

WDA Forum



University of St.Gallen

# Project Papers 2015

*on Demographic Challenges*

## Megatrend “Global Demographic Change” Tackling Business and Society Challenges in 2030 and Beyond

*Master Class Seminar by Dr. med. Hans Groth, MBA  
at the University of St. Gallen, Switzerland  
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## I. FOREWORD

Demographic shift, ageing, pension system performance and challenges – topics like these are omnipresent nowadays. The World Ageing and Demographic Forum, a foundation established in St. Gallen has for many years been a platform to enable dialogue, support research, develop positions and generate understanding across generations, across economic and academic sectors and in public policy, both nationally in Switzerland and Internationally.

In recognition of the complex, multidimensional and interconnected nature of the topics ageing and demography, the Forum is developing and supporting a series of activities to ensure better understanding and the promotion of new viewpoints and ideas. The respective master course offered at the University of St. Gallen is one of these activities. No social science study track can or should be pursued isolated from the parameters around ageing as they cut across almost all of study objects in one way or another. It is important to promote an analytical, scientific evaluation of inherent issues, the development of theories and hypotheses and finally the critical evaluation and constructive discussion of facts, proposals and theories. The paradigm shifts to be expected will challenge our world in a way never seen before. Resulting population movements, rising healthcare cost, retirement financing, behavioral impact within cohorts emerging and voicing their expectations will lead to difficult conflicts in need of answers. Promoting concepts to deal with the issues at hand requires mastering tools, the analytic processing of information and an open but critical mind.

The papers included herein are the result of the masterclass taught by Dr. Hans Groth during the 2014/2015 semesters. They represent a good example of the range and the scope dealt with as much as they provide an indication of the approach taken to deal with the subject chosen. Each paper, while not at the same level as a thesis, has to meet formal and scientific standards standards. All of the papers were developed in a course held during the previous semester under the supervision of Dr. Hans Groth, who also teaches the program. The program also includes discussion, debate and presentation by experts in the field. The papers are shedding light on various aspects of ageing, such as summarizing status and prospects of a region, a critical evaluation of concepts, characteristics of change and dynamics, all seeking to contribute a constructive perspective, a critical assessment or plain analytical and quantitative overview. Such a paper, submitted by a student or a team of students, is usually read by the reviewing professor and maybe tutors but the interesting end results and the nature of the entire discourse led us to the decision to provide a platform and publish the papers for a broader public. We find that the papers cover a span that well represents the extent and complexity of questions around ageing and we also find that the entirety of these papers is useful to explore the subject matter and to serve as a basic reference.

Our gratitude goes to the University of St.Gallen, who understands the relevance of such an important master program; to (Name) who prepared and reviewed the papers, to (Name) and Regina (full name) from the WDA for coordinating everything behind the scenes and of course Dr. Hans Groth for the cooperation and the exchange that led to this publication. I am of course particularly grateful that the compilation of last years papers as a publication was made possible by the support of the Galenica group. The Galenica group has supported the WDA for some time based on the conviction that the subject of ageing is of utmost importance particularly in healthcare and that the discussion is either not getting proper attention or is not anchored sufficiently on facts but rather often on preconceptions, interests, and existing frameworks. Galenica is proud to participate in the work of the Forum and is also proud to support the endeavors of students in this field. Galenica has high hopes that all this may be a small but important step, helping to develop solutions, prioritize activities, engage in dialogue and fundamentally provide services needed in tomorrow's health-care world.

Enjoy the reading and do get back to us if you have comments and insights. We have only started the first steps of a long journey. The journey of ageing and what it means to our life, society and the balance of our social systems.

**Christian Köpe, Dr. iur, President of the WDA Foundation**

## II. INTRODUCTION AND RATIONALE

Since 2009 I have had the privilege to teach a master class at the University of St. Gallen entitled “*Megatrend Global Demographic Change: Tackling Business and Society Challenges in 2030 and beyond.*”

The concept of this class is based on case studies, discussion rounds and interactive outside-the-box conversations on global population trends in the 21st century and their impact on business & society.

The case studies elaborated each year by the students focus upon three categories:

- Demography and geopolitics across the globe
- Demography and business & society
- Demographic challenges in Switzerland

But what is my motivation to offer such a lecture with both a changing content and a very interactive style?

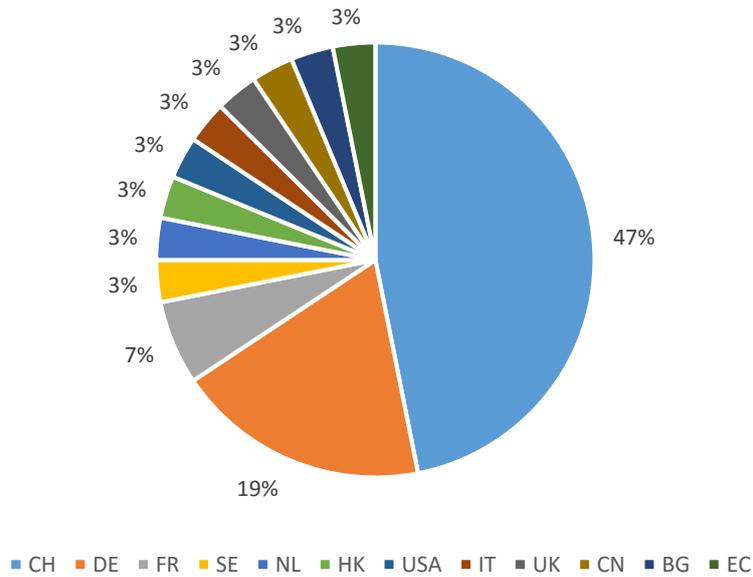
The coming decades will expose us to demographic dynamics that history has not equipped us to manage / to cope with. It forces us to focus on the future, a period of time which we are not accustomed to reflect upon. This is why the megatrend of demographic change is so intimidating and makes it all the more crucial to be permanently prepared for innovation and creativity as well as openness for change.

However, this will only be achievable if appropriate education/training and thus knowledge/skills are provided for those who have to lead and manage this challenge.

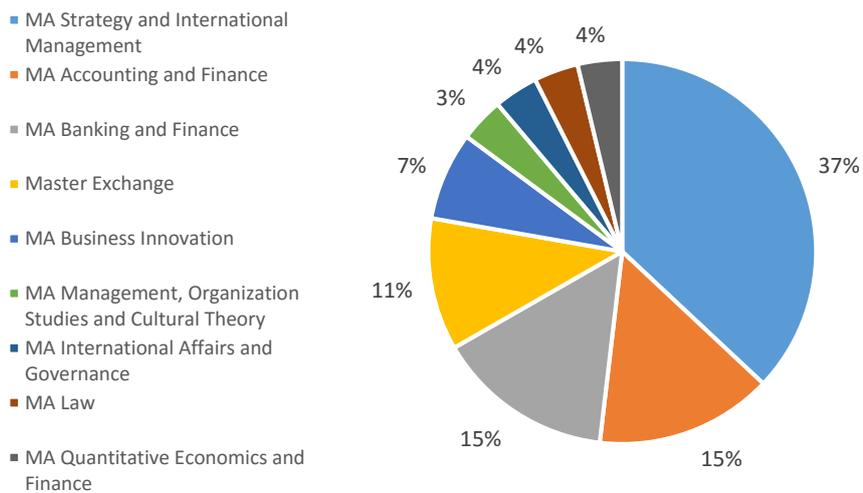
My response as a member of the 60+ generation is to provide a unique platform for academic thinking and exchange for HSG students who want to broaden the scope of their studies in terms of demography and its impact on business, governance and society – both as managers and as responsible members in the communities they are living in.

In this year's autumn semester 30 students from 12 different nations (Bulgaria, China, Ecuador, France, Germany, Hong Kong, Italy, Netherlands, Singapore, Sweden, Switzerland and the U.S.) and from 8 different HSG Master Programs (SIM, MIA, MAccFin, MSc CEMS Int Management, MSc CEMS Business Innovation, MA Economics, MSc CEMS Int Affairs & Governance, MA in Business Management) successfully bid for my class.

### Nationality Distribution



### Educational Background



It is obvious that such a unique group represented inspiring cultural and academic diversity.

The students aligned themselves in 11 project groups and engaged in one of the following subjects:

- **Demography and geopolitics across the globe**
  - *Past, current and future population dynamics across the 5 continents: Different qualities, different quantities, different impact*
  - *China: The role of demography for the political, economic and societal future of the biggest country in the world*
  - *United States of America: The role of demography for the political, economic and societal future of the largest economy in the world*
  - *Iran’s population dynamics in the light of the potential “post-sanction” period. What are the lessons for investors?*

- *Cuba – what should we know about this country’s demography?*
- *Japan - what can we learn from the world’s “most aged” society?*
- *Ethiopia: Draw a demographic road map of this country and compare Ethiopia with other countries of similar size*
- *The demography of the Sahel zone: Facts and implications*
- **Demography and business & society**
  - *Beyond replacement fertility rates: Are low fertility rates an irreversible phenomenon in modern societies or could there be new roles for families, partnerships and labor force participation of women?*
  - *Low interest rates and wealth generation: How should elderly citizens tackle this challenge?*
- **Demographic challenges in Switzerland**
  - *Generation Y’s knowledge and perception about the sustainability of Switzerland’s three pillar retirement scheme. How should this generation plan for their retirement?*

In this book you will find the corresponding papers which were elaborated by these 11 working groups in October and November 2015. Prior to submission all papers have been presented and vividly discussed in class.

The conclusions from these case studies can be summarized as follows:

- *Patterns of Population Dynamics across the Globe*  
 “In the 21st century the population on our planet will both age and grow. Africa will be the main source of population growth while Asia will reach its peak. Shrinking old Europe will be challenged by migration from Asia and Africa. Due to both immigration and comparatively high fertility rates, the US will continue to grow in population size. Even more importantly: Its working age population will grow also.”
- *Demography and the Future of China*  
 “By 2050 China’s working age population will shrink by 10% - but the impact of the recently abolished one-child-policy has not even been taken into account. The country will also face considerable societal challenges from its surplus of males. In addition, unprecedented ageing and the social behaviour and preferences of kids who grew up in a one-child-family environment will shape China’s society in the decades to come.”
- *Demography and the Future of the US*  
 “The US are the only developed country where the working age cohorts are expected to grow. The societal challenges are complex and interrelated: a changing ethnic composition, an ageing society with huge entitlements with respect to social security, pensions and healthcare and the capability to secure a premium education across the entire work life.”

- *The unique population dynamics in the I.R. Iran*

“It is a country with the same population size as Germany, Ethiopia, Egypt or Turkey and currently the 18<sup>th</sup> largest economy in the world. The society is very young and educated, but productivity and employment rates are much too low. Will the lift of the sanctions turn the I.R. Iran to a new economic power house? Can the country turn demography into an opportunity?”
- *Cuba –what do we know about its demography?*

“Cuba is a very bureaucratic communistic state country with low fertility rates, brain drain and longevity due to very well managed public health and social security systems. The challenge of this society is to make the transition to a more market-driven economy to compensate the burden of a shrinking and ageing society.”
- *How will Japan tackle its advanced demographic ageing?*

“Japan is the most aged society on this planet. Due to zero immigration and low fertility rates, it is also a shrinking society. But how can this nation maintain its wealth, economic power and social security entitlements? Can robotics be the new source of productivity, growth and wealth generation?”
- *Ethiopia. A country in Search of a Demographic Dividend*

“Ethiopia is the country where the history of demography started many thousands of years ago. High fertility rates with only slight tendencies for decrease, a huge youth bulge with low literacy, a still agriculture-driven economy, an infrastructure with many gaps, low economic freedom discouraging investment and growing climate issues, make it extremely demanding to tackle the following questions: How to develop the country? How capture a demographic dividend?”
- *The Sahel Zone: Can the Challenges be tackled?*

“The Sahel region encompasses 13 countries in the transition zone between the Sahara desert and the subtropical area closer to the Equator. The region’s most restrictive yet dynamic characteristic is its “rapid and mostly uncontrolled population expansion”. The current population size of 430 million in the Sahel region is expected to double in the next 30 years”.
- *Fertility in modern knowledge-driven societies*

“Demographic ageing & shrinking might be mitigated through several means such as a further increase in labour force productivity, longer work life, immigration, higher labour force participation of both women and elderly and higher fertility rates or any combination thereof. The issue of low fertility cannot be solved with a single specific

policy but rather through a set of reforms that complement each other. In addition, the complex phenomenon of “female/male equalization” needs a deeper understanding. What does it mean for the desire and wish to have children?”

- *The future of retirement: How to prosper despite low interest rates?*  
“In an environment with negative real returns from fixed income, there is only one honest answer to this question: Flying low!”
- *Switzerland’s Generation Y: How can they prepare and manage their retirement?*  
“To shed some light on the views of Generation Y regarding Switzerland’s 3 pillar system is urgently needed. There is an understanding on basic questions, but clearly a lack of knowledge in conceptual and more in-depth questions. Generation Y is prepared to work longer, but only a minority is capable to actively initiate additional pension savings already today”.

I am convinced that the 2015 papers of my students will be an extremely inspiring source on how our “Planet Earth” might develop. One might also agree that these students have developed a solid understanding about their business and civil society environment in which they are most likely to live in between 2030 and 2050.

On behalf of all 30 students who contributed to the content of this book, I am happy to facilitate further discussions with any potential reader.

Dr. med. Hans Groth, MBA

Chairman of the World Demographic & Ageing Forum (WDA Forum)

Guest Lecturer on “Demography and its interdependencies to wealth, health and social sustainability”, University of St. Gallen

St. Gallen, March 2016

### III. PAPERS OF THE 2015 MASTER CLASS

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- A. United States of America: The role of demography for the political, economic and societal future of the largest economy in the world
- B. China: The role of demography for the political, economic and societal future of the biggest country in the world
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- H. Past, current and future population dynamics across the 5 continents: Different qualities, different quantities, different impact
- I. Flying low – Managing elderly income in a world devoid of risk-free returns

#### **Opportunities arising from demography for business & society**

- J. Beyond replacement fertility rates: Are low fertility rates an irreversible phenomenon in modern societies – and if so, could there be new roles for families, partnerships and labor force participation of women to help compensate for this?

#### **The unique population dynamics of Switzerland**

- K. Generation Y’s knowledge and perception about the sustainability of Switzerland’s three pillar retirement scheme. How should this generation plan for their retirement?

## Country & regional case studies



## A. United States of America: The role of demography for the political, economic and societal future of the largest economy in the world

*by Teresa Maria Ducrey, Rahel Gubser, Benedict Seelhofer*

This paper covers the US population development with regard to the common known PEST analysis. The key findings are as follows:

On the political level, the subsequent years will determine how well the existing parties react and adapt to the shift within the population. Both parties must accept to evolve concerning their positions in order to adapt to demographic change (i.e. new voting majorities). Further challenges additionally arise on the economic and social level. The US will have to decide whether it will mainly focus on national expenses including large investments in the public sector, health care system and integration/migration program and therefore diminish its role as a superpower in the international arena – assuming its economic performance does not grow by the same order of magnitude. Technological developments may address some of the challenges, especially those regarding education (e.g. home and online education) and health care (large investments in research). As previously stated, these solutions can only be provided if the US decides on behalf of its national interests.

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## 1. Introduction

“We’ll be a very different country and we’re only just beginning to see the start of it.”

– William H. Frey, American demographer, 2015

Due to the magnitude of its economy and of its military force, the United States is the superpower of today’s world, exerting a considerable amount of influence on the global stage. However, if one views the nation’s meagre 16<sup>th</sup> place on the Social Progress Index, it becomes apparent that it is not a forerunner on all fronts. Especially in the areas of health and wellness (68<sup>th</sup> place), as well as basic knowledge (45<sup>th</sup> place), the US lags far behind (Social Progress Index, 2015). This highlights the fact that the nation is incapable, or unwilling, to provide for several essential needs of its population.

In light of these facts, demographic change becomes an important factor which cannot be neglected when trying to evaluate the present and future situation of the United States.

Considering the impacts of demographic change and the different demographic evolution in developed and developing countries, one could easily assume that the US will follow the same patterns as Western Europe. However, the population structure of the United States has always differed from that of other Western countries, which can largely be explained by the fact that the country is, and always has been, a melting pot fuelled by a constant influx of migrants. As can be seen in the public debates around the 2016 presidential election, the topic of immigration and, in a more general sense, demographic change poses a multitude of questions. To what degree does immigration spur demographic change? What other factors contribute to such change? And how does the United States’ international status change in light of such developments?

This paper attempts to examine the demographic outlook of the United States between today and 2030 and the implications thereof in both the domestic and international arena. In order to do so, the most prevailing factors pertaining to the topic, namely immigration, fertility and mortality rates are taken into consideration.

In regards to these essential questions, the structure of the paper is read as follows:

In a first step, an initial analysis was done regarding the overall demographic shifts, trends and developments up until today based on the three identified drivers of demographic change. In a second step, projections and expert opinions on the topic are discussed, providing the base for the next phase of the paper. In a third step, the obtained results are placed into a PEST analysis, forming the basis of conclusions to be drawn from this paper.

## 2. Methodology

Aiming to describe the demographic transition in the US, the nation's demographic evolution, beginning in the 1960's, has been analyzed and future trends have been forecasted. To situate the United States in comparison with other nations of the world, figures of both economically equal and less developed regions were considered and serve as the backbone of this analysis.

The four main key tracers which served our analysis and predictions are as follows: The U.S. Census Bureau; the UN Department of Economics and Social Affairs; CIA: The World Factbook and Worldometers: U.S. Population live. The information filtered thereof mainly deals with life expectancy, birth rates and migration. Moreover qualitative statements of several experts in the field broadened the quantitative data. Thanks to the given data it was possible to permeate the indicator schemes and derive future predictions for the demographic development of the US.

An important criteria for the data used, was to incorporate the most current figures possible in to the research, enabling an accurate picture over the US' demography in its present form. In the Appendix further used graphs and especially racial definitions can be found.

## 3. Demographic Development in the US until Today

The United States has always been a country defined by its high migration – whether it had been forced in times of slavery or voluntary by those who aimed for a better future in the land of opportunities. In any case, its relatively short yet intense history, as well as geography, has created the demographic environment of the US as it is today, not only within the country's borders but also in an international setting.

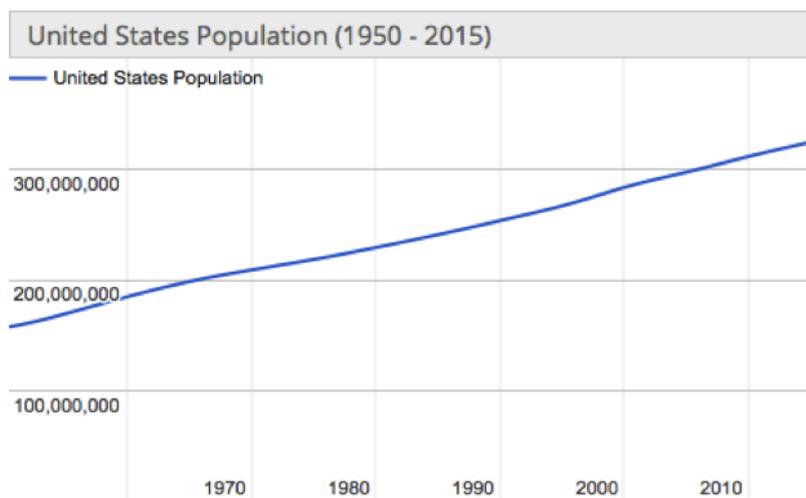


Figure 1: US Total Population (Worldometers, n.d.)

According to the U.S. Census Bureau (2014a), America was home to 320,090,857 citizens at the beginning of the year 2015. Put in to relation with the rest of the world, the US thus remains on third place regarding population size, after China (nearly 1.4 billion) and India (nearly 1.3 billion) and is followed by

Indonesia (nearly 256 million) (Census Bureau cit. in Schlesinger, 2014). Being the only developed Western country in the top nine, and home to 4.44% – compared to 6.19% in 1955

– of the world’s total population, the US has preserved its place in the top five of the most populated countries so far, though its share has decreased continuously since the 1950s (worldometers, n.d., see also Appendix). In recent years, the numbers have remained steady; the annual growth rate lied around 0.73-0.78<sup>1</sup> % in 2014 and was therefore in line with the growth rates of previous years (Schlesinger, 2014; worldometers, n.d.). In 2009, the population growth saw a veritable boom during the recession, only to be followed by a slight decline therein in the subsequent years (Schlesinger, 2014; worldometers, n.d.). Despite growth rates being lower than they used to be, one could argue that the US population is still continuously growing, as there has not been a negative trend in total population. Nevertheless, the data in *figure 2* clearly shows a decline of growth after the baby boomer period in the late 50ties and early 60ties. The United States’ median age of 37,5 years (worldometers, n.d.) supports this argumentation, given the fact that most Western societies tend to face national demographic trends towards an elderly society (i.e. Switzerland: 42,1 years; Germany: 46,7 years; Japan: 46,5 years; World: 29,9 years – CIA, n.d.). One could be inclined to assume that the US’ population is dispersed across the entire region. However the country proves to be highly urbanized, as 83% of its total population is located in urban regions (worldometers, n.d.).

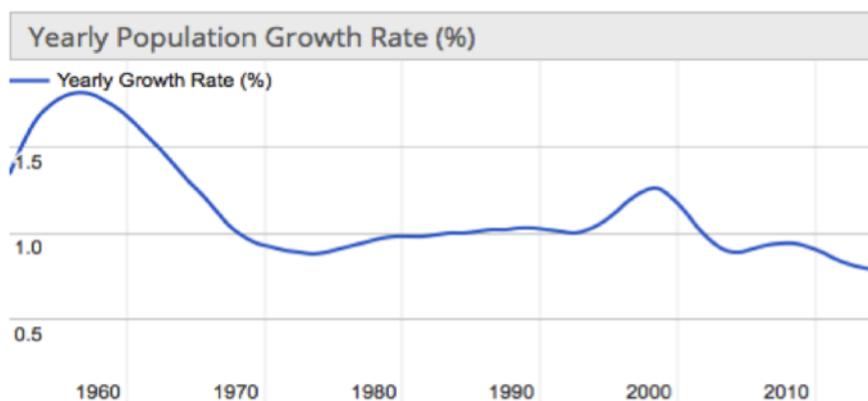


Figure 2: Yearly Population Growth Rate (Worldometers, n.d.)

As can be seen in the figure in the appendix, the overall median age and urbanization is increasing, whereas – in congruence with the worldwide trend – the fertility rate is decreasing over time

(current number: 1.97 // worldometers, n.d.). This rate, however, differs in dependency to racial as well as educational background<sup>2</sup> (Monte & Ellis, 2014, p.6 in the Appendix). Furthermore, the overall mortality rate influences the development too, as life expectancy is increasing steadily and is currently at slightly above 80. This does not come as a surprise given the fact that the United States is a developed country (see United Nations, Department of Economic and Social Affairs, 2015 in the Appendix).

<sup>1</sup> The data varies slightly according to different sources (Census Bureau: 0.73%; Worldometer: 0.78%), however the general direction is clearly pointed out

<sup>2</sup> White: 1.88; Black: 2.07; Hispanic: 2.37/ non HS graduate: 2.62; professional degree: 1.76

The U.S. Census Bureau (2014a) described the country's current demographic situation as follows: "In January 2015, the U.S. is expected to experience a *birth every eight seconds* and one *death every 12 seconds*. Meanwhile, net international migration is expected to *add one person* to the U.S. population *every 33 seconds*. The combination of births, deaths and net international migration increases the U.S. population by one person every 16 seconds."

In order to explain the steady growth rate and increasing total population, one should not only focus on the fertility and mortality rate/reverse life expectancy but rather on the third factor that adds on a country's numeric gain: the migration rate.

By analyzing statistical data available from 1850 on, it becomes evident that migration has always been a major factor for US population size. At that time, a total of 2.2 million foreign-born citizens were officially registered in the United States (U.S. Census Bureau cit. in Brown & Stepler, 2015). By the end of 2013, the number of foreign-born residents in the US reached an all-time high with 41.3 million people. This can mainly be explained by the Immigration and Naturalization Act of 1965 under President Johnson, which resulted in the quadrupling of the foreign born American population (Brown & Stepler, 2015). Only in recent years, population growth due to migration seemed to decelerate – however migration is still predicted to extend in the long term (Brown & Stepler, 2015; see also following chapter). While 84% of the migrants in the 1960s originated from Europe or Canada (and 6% from Mexico), migration streams have shifted dramatically: as of 2013, Europeans made up only a relatively small share (14.2 %). Whereas the majority (28%) now originated from Mexico, followed by South and East Asia (25.8 %) and other Latin Americans (24%) (Brown & Stepler, 2015). As Brown and Stepler (2015) stated: "With the Great Recession [in 2008/09], Latin American immigration slowed sharply, especially from Mexico. The number of new immigrants from Latin America has been about steady since then, but the number of newly arrived Asian immigrants has continued to rise."

Besides the general debate, the US is facing a rather controversial topic on the question of illegal migration: The land of opportunities had failed to deal with the relatively high rate of illegal, undocumented migration originating mostly from Latin American countries and Mexico. It was only in November 2014, that the Obama administration declared a new immigration policy stating that nationwide 48% of unauthorized immigrants – of which two third are originated from Mexico - are eligible for relief from deportation and obtain work authorizations if they meet certain given requirements (Krogstad & Passel, 2014). The total amount of unauthorized immigrants in 2012 added up to 11.2 million people<sup>3</sup>, of which 3.85 million were

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<sup>3</sup> California, Texas and Florida representing the highest amount

newly eligible for protection two years later (Krogstad & Passel, 2014). As figure 3 shows, approximately every fourth immigrant has entered the US illegally.

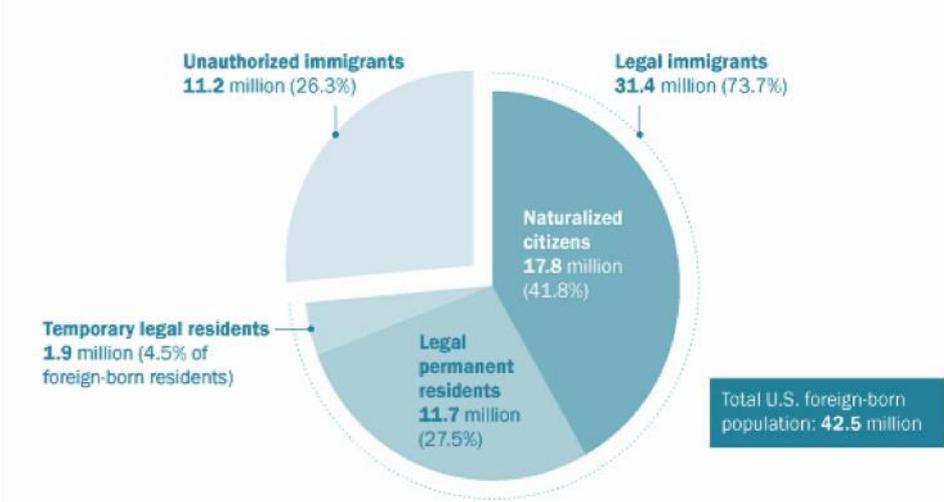


Figure 3: U.S. foreign born Population, 2012 (Pew Hispanic, 2015)

Representative for many developed countries, the US counts an almost equal share of women and men. Furthermore, 97.5 % of the nation is single-raced, while white non-Hispanics present the majority (62.2%) followed by white Hispanics (15.3%) and African Americans (13.2%) (Colby/ Ortman 2015, p.9). Native Americans, Asians and Alaska Native constitute the rest.

In summary, it can be seen that the fertility/death ratio of the United States, despite being a typical Western nation, does not result in a decline of the overall population. However, this ratio does not constitute the primary cause of population growth. The United States has long been known as a melting pot and its continuous attractiveness for potential migrants contributes to an influx of foreigners and the migration rate resulting thereof serves as one of the prime motors of the population growth. In the following chapter, these topics will be discussed in further detail.

**4. Demographic Outlook**

Based on the data covered in the previous chapter, the demographic development will be now presented in accordance with the three most prevailing factors and later elucidated in the subchapters of this outlook.

As recent research states, one in five Americans is projected to be 65 and over by 2030. (Colby & Ortman, 2015, p.1) This leads to the conclusion that at least 20% of the US population will be retired by 2030, if there has not been an upward adjustment of the

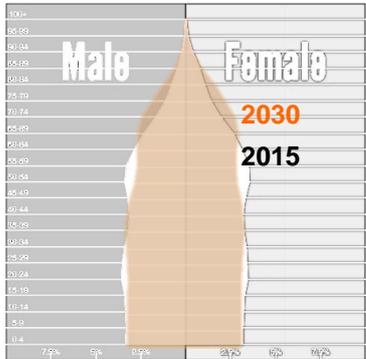


Figure 4: Age and Sex Structure of the US Population (Populationpyramid.net, n.d.)

retirement age. In the decade between 2020 and 2030, the elderly population is projected to grow the most (Colby & Ortman, 2015, p.5).

But also the migration rate will have an influence on the overall development: By 2030, the US is expected to have a population of approximately 359.4 million inhabitants. Of these, 56.9 million will be foreign born which translates to 15.8% of all inhabitants. Projections forecast, that in the period from 2020 to 2030 the change in native population size will be of 5.6 per cent and the foreign born of 18.7 per cent. Looking at the overall age distribution of the population in 2030, illustrated in figure 5, the *percentage of people under 18* and the one of people over 65 will be equal in size (21%). However, the majority of people (58%) will be between 18 to 64 years old; nevertheless this number will have seen a 4% decrease since 2014.

As figure 5 further shows, the total number of the under 18 population is going to stagnate,

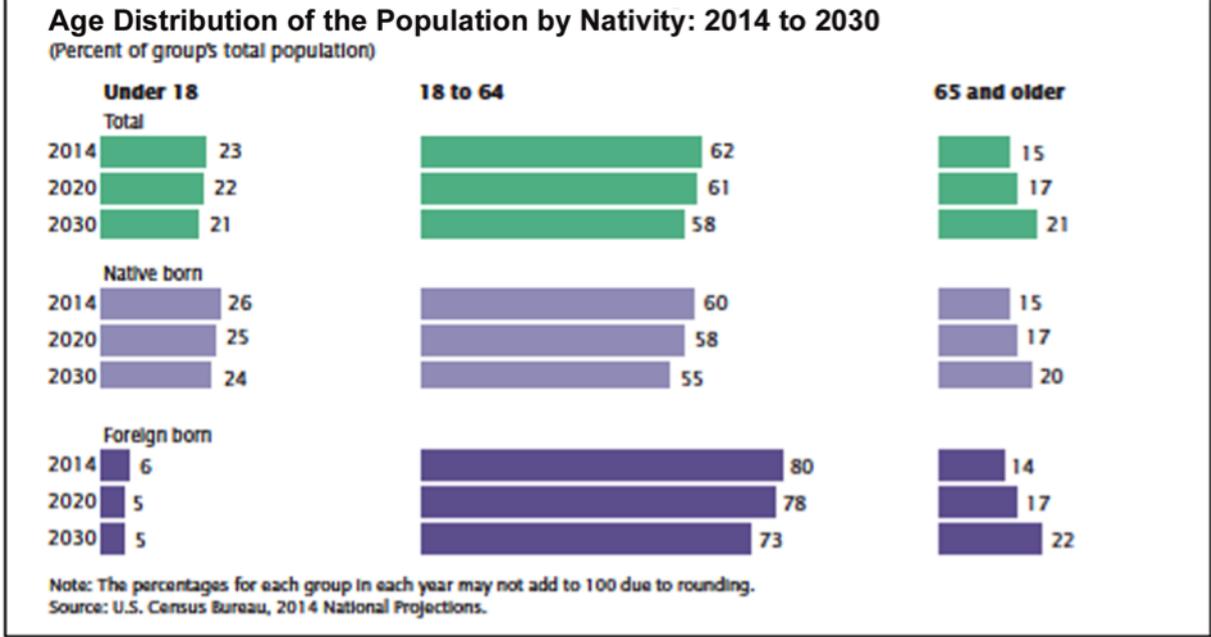


Figure 5: Age Distribution of the Population by Nativity: 2014 to 2030 (based on Colby & Ortman, 2015)

whereas the group between 18 to 64 years is expected to decline over time. This graph again shows that the population of the US is projected to conform in size and age distribution in congruence with worldwide trends. For both groups, natives and foreign born, the growth rates are the same.

Although White non-Hispanics now make up the majority of the population, the projections indicate that the nation has come close to the point at which “the US becomes a majority-minority nation”, comparable to the situation in other countries such as Israel (Colby/Ortman 2015, p.1). It is to be highlighted that out of the 358 million inhabitants of all races, 79 million will be Hispanic (U.S. Census Bureau, 2012).

### Population by Selected Age Group and Nativity: 2014 to 2030

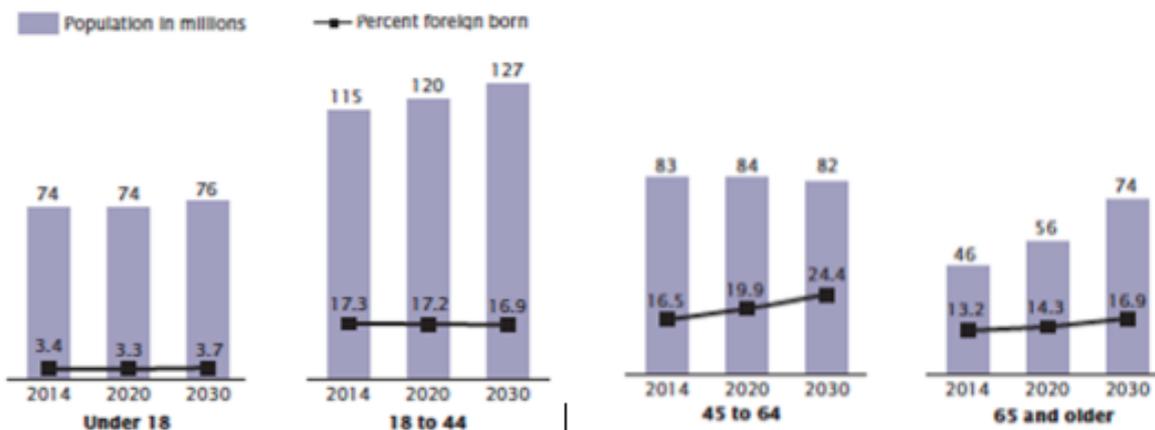


Figure 6: Population by Selected Group and Nativity (based on Colby & Ortman, 2015)

In 2030 - unlike Europe, where the fertility rate will be around 1.5 - the fertility rate in the US is forecasted to still be around 2.06, which means that the US population will still be growing (geoba.se, 2015). Overall by 2030 there will be a total growth rate of 0.65%. According to these forecasts the net number of migrants will be of 1'354'946 while the natural increase will be of only 973'980 (Census Bureau, 2015). As during past developments, migration in the US will continue to be one of the major drivers of population growth. Jennifer M. Ortman even highlights that around 2032 net international migration is projected to overtake natural increase as the primary driver of population growth (2013).

#### 4.1. Predicted dependency on migration

Nicholas Eberstadt, a political economist, demographer and member of the Global Leadership Council at the World Economic Forum (AEI, 2015), explains that even though the US has a relatively good record in assimilating immigrants as productive newcomers, resistance to continued immigration, or unexpected new problems in absorbing immigrant inflows, could limit future influxes. Migration within the next decades is expected to increase. Shortly after 2030, migration is even expected to stagnate at a level of about 1.17 million per year. The most important finding however is the fact that the net international migration is projected to overtake natural increase as the primary driver of population growth (Ortman, 2013).

#### 4.2. U.S. internal fertility rate diversity

As mentioned before, the US fertility rate is unexpectedly higher than in the rest of the developed world. Experts worldwide discuss two unique social phenomena which could explain this gap: the first reason is the already mentioned increasingly multiethnic composition

of the US; the second is that of the American teenage fertility level. This level is relatively high compared to other contemporary affluent democracies

(Eberstadt, 2007).

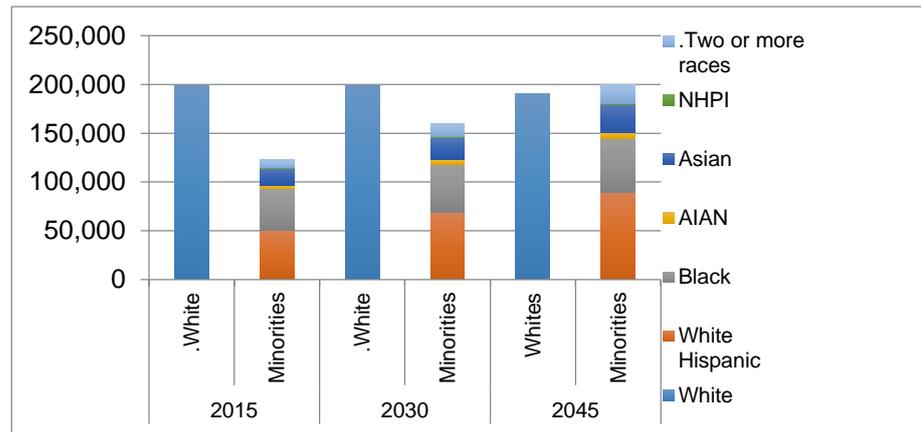


Figure 7: Projections of the Population by Sex, Race, and Hispanic Origin for the United States: 2015 to 2045 (U.S. Census Bureau, 2014b)

Both causes lead to the already mentioned ‘minority-majority’ shift within US demographics.

The core reason for the accelerating change is the significantly higher birthrates among immigrants (The New York Times, 2008). Figure 7 illustrates this phenomenon.

#### 4.3. U.S. mortality in 2030

By 2030, the population over 65 years old will be almost the same size as the population under 18 years, and by 2056 it is projected to become even larger (Ortman, 2013, p. 29). Trends show that the longevity of Americans, as in most parts of the world, is increasing. This increase of life expectancy and therefore decrease of mortality has occurred by virtue of declines in many of the major causes of death (i.e. cancer) due to medical improvements (Reuben et al, 2011. p.6).

Numbers show that although life expectancy increased among black and whites, blacks continue to have lower life expectancy rates compared to whites, which could be attributed to ongoing racial differences and economic, as well as social, separation in daily life. In 2007, for example, the life expectancy among the white population exceeded the one of the black population by five years (Reuben et al., 2011. p.6).

### 5. PEST- Analysis

Considering the outlook from the previous chapter, the PEST analysis aims at providing a holistic overview of the consequences of the predicted demographic shifts until 2030 on the political, economic, social and technological spheres of the United States. However, the focus is on the first three spheres, as most of the implications on the technological sphere are only indirectly influenced by demographic change. For completeness, the most significant impacts are highlighted shortly. The implications may change if there are different assumptions for the predictions.

### 5.1. Political Implications

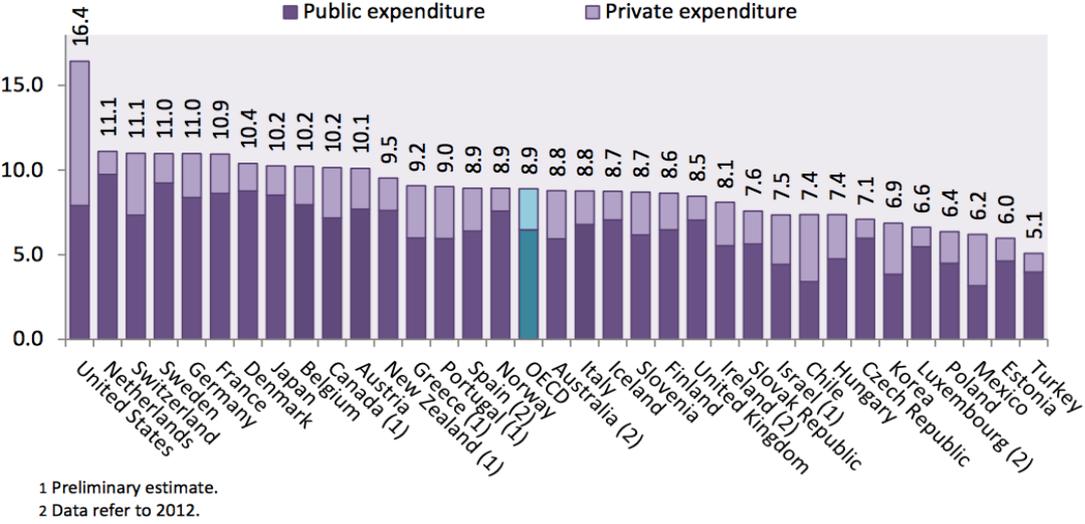
The future welfare of the United States is highly dependent on politics and policies. An underlying assumption of this subchapter is the continuing state of democracy and voting rights of the US citizenry as well as the sovereignty within the current borders of the country.

Seeing how the population composition will change in a way that the minorities of today will form the majority around 2030, the composition of citizens eligible to vote is going to be affected. The Republican Party especially, which mainly targets and relies on white voters, could struggle in a couple of decades due to their decreasing popularity amongst the voting population if they do not change their target audience (New York Times, November 7, 2012). C. Cillizza and A. Blake state that “at some point in the future – given current demographic trends – Republicans could win virtually every single white vote in the country and not be able to win a national election” (The Washington Post, 2012) This shows the urgency for the Republican Party to broaden their interest coverage to be more appealing to citizens with a migration background. A recent study by the Pew Research Center showed that African Americans, Asian Americans and Hispanics currently favor Democrats over Republicans. However, the share of independent citizens has overtaken that of both parties already percentagewise (Pew Research Center, 2015, April 7, 2015). Furthermore, participation in the elections also varies between different ethnicities and races. In the last decade, the participation of white voters has been significantly higher than that of Hispanics (File, 2015, p. 8).

Aside from a change in voting population, the ongoing demographic development also influences the objectives of politics (Jackson & Howe, 2008, p. 95 ff). The main issue in the political discussion (besides the migration issue) is the demographic aging of the nation and its implications on the national budget, of which currently more than 50% is spent on Medicare & Health and Social Security (National Priorities, n.d. in the Appendix): With an increase in elderly citizens, the cost of health care is rising (Wehling & Groth, 2010, p. 3). The U.S. health system has not had any big advances within the last decades, compared to other OECD countries (Jackson/Howe, 2008, p. 32). The most remarkable observation concerning health care expenses is that the United States has drastically higher expenses compared to other OECD countries, as you can see in figure 8. 38% of these expenses pertain to hospital care. A large contributor to these expenses is the Medicare program, which covers the health care expenses of most US citizens aged 65 and older (Covered California, n.d.)

Looking at the diseases, the 10 leading causes of death, with heart diseases and cancer covering the top two spots, has not change in the last years. Nevertheless, there was an increase of Alzheimer’s disease (Shrestha & Heisler, 2011, p. 9). In order to prevent an

exponential increase in health costs, investing in a different, more long-term effective concerning Alzheimer’s disease and other neurodegenerative diseases may be a necessary consideration (Wehling & Groth, 2010, p. 7).



1 Preliminary estimate.  
2 Data refer to 2012.

Figure 8: Health spending (excluding investment) as a share of GDP, OECD countries, 2013 (OECD, 2015)

However, the overall health level of the people is increasing and taking advantage of healthy aging would be a way to raise the national income levels by enabling a voluntary extension of the working period and offer incentives to stay longer in the work force (Eberstadt, 2010, p. 64; Shrestha & Heisler, 2011, p. 24). Different employment models for workers close to or above retirement age could help to lower the age dependency ratio. Another way to lower the dependency ratio is to allow more immigrants to work in the United States in order to boost the supply of workers (Economist, 2013). To facilitate this, U.S. citizens need to adapt their view, as a large part of the society still thinks of immigration as a burden, rather than an opportunity (Pew Research Center, June 4, 2015).

Currently, a large part of the national budget of the United States is spent on military and national security. The costs thereof are not only reflected in the budget, but also as opportunity costs incurred by citizens serving in the army as opposed to entering the regular labor market (Warner & Asch, 2011, p. 174). Recently, in order to prevent a decrease in the size of the voluntary military force, the army recruitment campaigns started to target immigrant groups specifically (Jackson & Howe, 2008, p. 69). In the future, the costs of the military forces will either remain a large part of the national expenses or eventually decrease to an extent allowing the balancing out of the increased costs of the social and health care system.

In conclusion, the major challenge in the politics of the United States is to adapt the public system to demographic changes to make sure that elderly people are guaranteed social

security and medical care. This must be done in a way that ensures enough remaining funds for other aspects of domestic spending and expenses for military and international involvement without having to take on further debt (Shrestha & Heisler, 2011, p. 25).

## 5.2. Economic Implications

Not even the country with the highest absolute GDP in 2015 can remain unaffected by demographic change. With the growth of the US population, there will also be a rise in the work force (Eberstadt, 2010, p. 62). The dependency ratio of the elderly people has further fiscal consequences, but the United States has an advantage in that its dependency ratio will remain one of the lowest compared to other developed nations (Ortman, Velkoff & Hogan, 2014, p. 14). There is a positive relationship between population aging and public-debt obligations. The costs associated with population aging form approximately half of the public-debt-run-up of OECD countries in the last 20 years (Eberstadt, 2010, p. 63). This correlation is unlikely to change within the next decades. Even though the United States has an advantage as their population is still growing and thus the GDP is likely to increase, there are other economic implications to face.

The increase in the age dependency ratio implies a decrease of the labor work force ratio, which will lead to financial imbalances within the socialized pension plans (Shrestha & Heisler, 2011, p. 24). If social security, in which the pension plans are included, remains the same, the government expenses related to the pension plans will have to be covered by less working people. There are several ways to conquer this issue. Tax raises, more restrictive coverage of social security, or an increase of national debt, are ways to deal with these additional expenses. Looking at the second option in detail, either benefits for retirees could be lowered or the retirement age could be increased in order to lower the expenses of pension plans. Concerning this last point, a rise in retirement age is foreseen within the next couple of years (Jackson/Howe, 2008, p. 56). However, all of the above mentioned options also affects the income spending cycle of the population. If these structures change, the consumer and capital spending of the population will likely be affected. These factors again affect the national GDP and income (Lee & Mason, 2011, p. 11).

Comparing the United States to other developed countries, it has an advantage in terms of a less expensive benefit system for elderly people and thus less of a burden for the government to fund. With their flexible working market, it also has the chance of increasing work force participation and creating new structures to support working mothers in the labor force. Additionally, the mentioned predicted raise in retirement age also supports the work force participation. Nevertheless, the United States has a rather low national savings rate and a costly health system. In fact, the increase of cost in the health care system has to be

considered as it can dissolve a large part of the advantage in lower costs for the benefit system for elderly people, not taking a reduction in costs for treatments into account (Jackson & Howe, 2008, p 32).

The growing labor force of the United States also offers a chance for further innovations and a rise in productivity, which is another advantage of the predicted trends in the United States compared to stagnating nations (Eberstadt, 2007). A further enlargement of the work force could be achieved through legalizing the status of currently illegally working, unauthorized immigrants, the way Obama did in 2014. By giving them legal work permits, additional taxes could be collected, contributing favorably to the national budget (US News, 2014).

Looking at the poverty rate, there is an expected rise as evidence shows that racial minorities tend to have higher poverty rates. If this evidence is combined with the predicted increase of minorities in the United States, poverty will become a growing issue in society. The higher lending costs for housing for low-income families also affects this issue in a negative way (Shrestha & Heisler, 2011, p. 29). Furthermore, the current GDP and yearly income in the United States would be higher if racial differences could be eliminated (Lynch & Oakford, 2012, p. 26). These differences are another factor to be taken into account and to discuss, if the United States wants to remain an economically strong nation, as a part of the increase of population is due to immigration.

### 5.3. Societal/Cultural Implications

As mentioned in the above, the composition of the US citizens in terms of racial and ethnic groups is going to change drastically due to different fertility, mortality and migration rates. The different groups are also aging at a different pace due to these factors.

An aging society causes an increased need for retirement housing and medical staff for the past-retirement-age group (Shrestha & Heisler, 2011, p. 27). Not only does the increase of the number of over 65 year old citizens have an influence on the demand of retirement housing and medical assistance, but also their forecasted higher life expectancy. If this fact is not taken into account for early enough, the possibility of a timely shortage of these resources exists. Additionally, the foreign born share of the population over 65 is predicted to increase due to increasing immigration and high fertility rates of this group. This has to be taken into account as the resulting cultural shift could have an impact on the needs of elderly people in terms of cultural and language differences (Colby & Ortman, 2015, p. 7). However, most of the immigrants arrive in the United States before they reach the age of 40, meaning that immigration will – at least in the short run - not have a direct impact on the growth of this part of the population (Ortman, Velkoff & Hogan, 2014, p. 3).

The trend towards women having children at an older age has further implications on the health system, as giving birth after 40 bears higher risks for both the mother and the child. In contrast, the demographic change can be favorable for children as parents have more time and money to invest into their upbringing (Shrestha & Heisler, 2011, p. 26).

Looking at the different racial groups and their evolvement, the United States will be more culturally diverse than ever before. The United States has long been known as a melting pot consisting of immigrants from various cultures. The different cultures tend to maintain part of their traditions within their families and communities (Suárez-Orozco, 2001, p. 186). There is even evidence that demonstrates differences in behavior of these groups when seeking medical treatment (Shrestha & Heisler, 2011, p. 26).

The increase in minorities in the United States will also have an influence on the education system. The US primary and secondary public education system produces uneven results that are generally mediocre in comparison to other affluent societies. The growth in the percentage of Americans graduating from high school has been slowing and could possibly plateau in the years ahead (2010, p. 65). Additionally, it will be challenging to make college education available for people from all different levels of society (Anderson, 2003, p. 11). The education system should be available to all races and ethnical backgrounds, even if those with different mother tongues. A survey conducted from 2005 to 2009 showed that 89 percent of the native population and only 68 percent of the foreign-born population attained a high school diploma (Ryan & Siebens, 2012, p. 5). The level of education was lowest amongst Hispanics compared to other ethnical groups, as in 2009 only 61% of the Hispanic adults in the US have completed high school (Reuben et al., 2011, p.4). Moreover, the level of education varied throughout the regions of the United States (Ryan & Siebens, 2012, p. 5).

#### 5.4. Technological Implications

The fact that the United States remains relatively young compared to other OECD countries can be seen as an advantage and an opportunity for further innovation. However, the majority in most developing countries is still younger, putting them in an advantageous situation (Eberstadt, 2010, p. 62; Jackson & Howe, 2008, p. 31).

Moreover, there is a positive correlation between education, health and labor productivity. The higher productivity should also result in better technology (Eberstadt, 2010, p. 57). Hence, if the level of education in the United States can be maintained or raised despite demographic change, it would prove favorable for the evolution of innovation processes. But as can be seen in the previous subchapters, these conditions are currently not given yet in the United States and are still dependent on future political decisions.

New legislation that is currently being discussed, could allow foreign STEM (science, technology, engineering and mathematics) students to stay in the US for longer periods, enabling them to seek out work and contribute to the nation's technology advances (Brookings, March 25, 2015). This would allow the United States to use further its advantage from having some of the best universities worldwide to support its strong technological hubs such as Silicon Valley, where some of the world's most innovative companies are based (Times, May 28, 2015).

However, if the budget of the United States remains the same, the increasing fiscal burden leaves less room for investing in education and further technology, which could lead the United States to a less favorable position (Jackson & Howe, 2008, p. 62 f).

## **6. Implications in a Global Context**

Looking at the demographic trends worldwide, the United States is going to be one of the youngest countries in the Western world. Applying the findings from above, there are clearly some advantages and disadvantages for the United States and its economic position in 2030. Looking at the aging and fertility rates, the United States has a relatively good position compared to other developed countries. Furthermore, in terms of social costs spent for retirees, the smaller dependency ratio of elderly people, as well as the restrictive social plans, mean that the U.S. government has fewer expenses for an aging society than other developed countries. However, the U.S. healthcare system and the costs resulting from it, poses a definite disadvantage. In order to stay competitive on the global market, the United States need to adjust its politics and increase investment in education and innovation (National Intelligence Council, 2012, p. 46). In terms of GDP, the United States will still remain among the top competing nations, closely followed or surpassed by China and India (National Intelligence Council, 2012, p. 103). In terms of GDP per capita, the United States still has a remarkable advantage, as the GDP per capita in 2014 was \$54'630 in the U.S. compared to a meager \$7'594 in China and \$1'596 in India (The World Bank). In other words, China's growth is currently not increasing the wealth of its population. Furthermore, with its technology hubs and the matured and stable political system, the US has several advantages that give it a head start that the other concurring nations first have to catch up with (Times, May 28, 2015).

## **7. Conclusion**

The United States, once known as the land of opportunity and migration, has managed to rise to position itself in the international arena as the strongest superpowers of today's world. However, the U.S. is currently struggling with a high national debt, a stagnating political system and an unclear integration and immigration policy. Whereas historically migrants tended to come from poorer backgrounds, this position has changed today: The recent minority groups

do not share the same cultural and social background as they used to during the periods of former migration streams. A more heterogeneous mass is going to share the same highly urbanized space while drawing on times when opportunities to build the country were been more tangible.

However, new migrants are accompanied by new challenges as well as new opportunities and the American population size is not only defined by its high migration rate. Contrary to Europe, the fertility rate is clearly above the Western average, while life expectancy will – following the global patterns – increase. In conclusion, the population of the United States will continue to grow while simultaneously becoming more heterogeneous and old.

### 7.1. Self-Criticism / Limitations

The data presented in this paper is largely based on a few, yet highly credible sources. However, due to the large amount of available data, the information on data collection has often not been covered in the sources. For example, the impact on the financial markets has not been taken into account as one of the implications of demographic change. Furthermore, the presented data focuses on the United States as a country, whereas data might differ immensely in every state. For the presented projections the focus lays on national developments, while the results covering the global agenda allow different conclusions due to the non-availability of further data.

### 7.2. Outlook on Further Research

The collected data presented in this paper mainly covers quantitative statistics. Nevertheless, a qualitative adjustment to the given data might have provided interesting insights: As for the demographic development until today, further research based on the oral history method might provide additional results on the experiences and attitudes of affected communities in regards to the population development. The demographic outlook, on the other side, could include additional interviews with qualified experts in the fields of sociology, demography, politics, economic development and others in order to adjust the presented results.

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## 9. Appendix

### Appendix A: Population of the United States (2015 and historical)

Source: Worldometers. Retrieved October, 17<sup>th</sup>, 2015 from  
<http://www.worldometers.info/world-population/us-population/>

Year	Population	Yearly % Change	Yearly Change	Migrants (net)	Median Age	Fertility Rate	Density (P/Km <sup>2</sup> )	Urban Pop %	Urban Population	Country's Share of World Pop	World Population	Global Rank
2015	<b>325,127,634</b>	0.81%	2,576,104	1,000,000	37.7	1.97	34	83%	270,987,380	4.44%	7,324,782,225	3
2014	<b>322,583,006</b>	0.79%	2,532,290	1,008,835	37.5	1.99	34	83%	268,084,524	4.45%	7,243,784,121	3
2010	<b>312,247,116</b>	0.93%	2,816,264	1,044,962	37.1	2.06	32	82%	256,489,148	4.51%	6,916,183,482	3
2005	<b>298,165,797</b>	0.94%	2,714,280	1,064,464	36.2	2.04	31	81%	240,712,230	4.58%	6,514,094,605	3
2000	<b>284,594,395</b>	1.21%	3,310,948	1,693,869	35.3	2.00	30	79%	225,082,861	4.64%	6,127,700,428	3
1995	<b>268,039,654</b>	1.04%	2,706,601	890,976	34.1	2.03	28	77%	207,060,633	4.67%	5,741,822,412	3
1990	<b>254,506,647</b>	1.02%	2,527,329	783,360	32.9	1.92	26	75%	191,643,505	4.78%	5,320,816,667	3
1985	<b>241,870,002</b>	1.00%	2,338,728	727,212	31.5	1.80	25	74%	180,178,639	4.97%	4,863,601,517	3
1980	<b>230,176,361</b>	0.96%	2,147,466	774,562	30.1	1.77	24	74%	169,727,445	5.17%	4,449,048,798	3
1975	<b>219,439,031</b>	0.89%	1,909,537	568,100	28.9	2.02	23	74%	161,623,430	5.39%	4,071,020,434	3
1970	<b>209,891,345</b>	1.00%	2,041,032	299,033	28.2	2.58	22	74%	154,484,228	5.69%	3,691,172,616	3
1965	<b>199,686,185</b>	1.39%	2,664,858	191,731	28.5	3.40	21	72%	143,532,433	6.00%	3,329,122,479	3
1960	<b>186,361,893</b>	1.74%	3,084,512	371,961	29.6	3.68	19	70%	130,445,871	6.16%	3,026,002,942	3
1955	<b>170,939,332</b>	1.61%	2,625,258	199,360	30.1	3.33	18	67%	114,807,984	6.19%	2,761,650,981	3

## Appendix B: Population Pyramid over time

Source: UN Department of Economics and Social Affairs. Retrieved October, 15<sup>th</sup>, 2015 from <http://esa.un.org/unpd/wpp/Graphs/>

Sex and age	Number, 2000	Percent	Number, 2010	Percent
<b>Total population</b>	<b>281,421,906</b>	<b>100.0%</b>	<b>308,745,538</b>	<b>100.0%</b>
Male	138,053,563	49.1	151,781,326	49.2
Female	143,368,343	50.9	156,964,212	50.8
Under 5 years	19,175,798	6.8	20,201,362	6.5
5 to 9 years	20,549,505	7.3	20,348,657	6.6
10 to 14 years	20,528,072	7.3	20,677,194	6.7
15 to 19 years	20,219,890	7.2	22,040,343	7.1
20 to 24 years	18,964,001	6.7	21,585,999	7.0
25 to 34 years	39,891,724	14.2	41,063,948	13.3
35 to 44 years	45,148,527	16.0	41,070,606	13.3
45 to 54 years	37,677,952	13.4	45,006,716	14.6
55 to 59 years	13,469,237	4.8	19,664,805	6.4
60 to 64 years	10,805,447	3.8	16,817,924	5.4
65 to 74 years	18,390,986	6.5	21,713,429	7.0
75 to 84 years	12,361,180	4.4	13,061,122	4.2
85 years and over	4,239,587	1.5	5,493,433	1.8
Median age (years)	35.3	n.a.	37.2	n.a.
18 years and over	209,128,094	74.3	234,564,071	76.0
21 years and over	196,899,193	70.0	220,958,853	71.6
62 years and over	41,256,029	14.7	49,972,181	16.2
65 years and over	34,991,753	12.4	40,267,984	13.0

## Appendix C: U.S. Population by Race

Source: U.S. Census Bureau. Retrieved October, 19<sup>th</sup>, 2015 from <http://www.census.gov/topics/population/race/about.html>

<b>U.S. Census Bureau Racial Definitions</b>	
White	A person having origins in any of the original peoples of Europe, the Middle East, or North Africa.
Black or African American	A person having origins in any of the Black racial groups of Africa.
American Indian or Alaska Native	A person having origins in any of the original peoples of North and South America (including Central America) and who maintains tribal affiliation or community attachment.
Asian	A person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent including, for example, Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, the Philippine Islands, Thailand, and Vietnam.
Native Hawaiian or Other Pacific Islander	A person having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands.

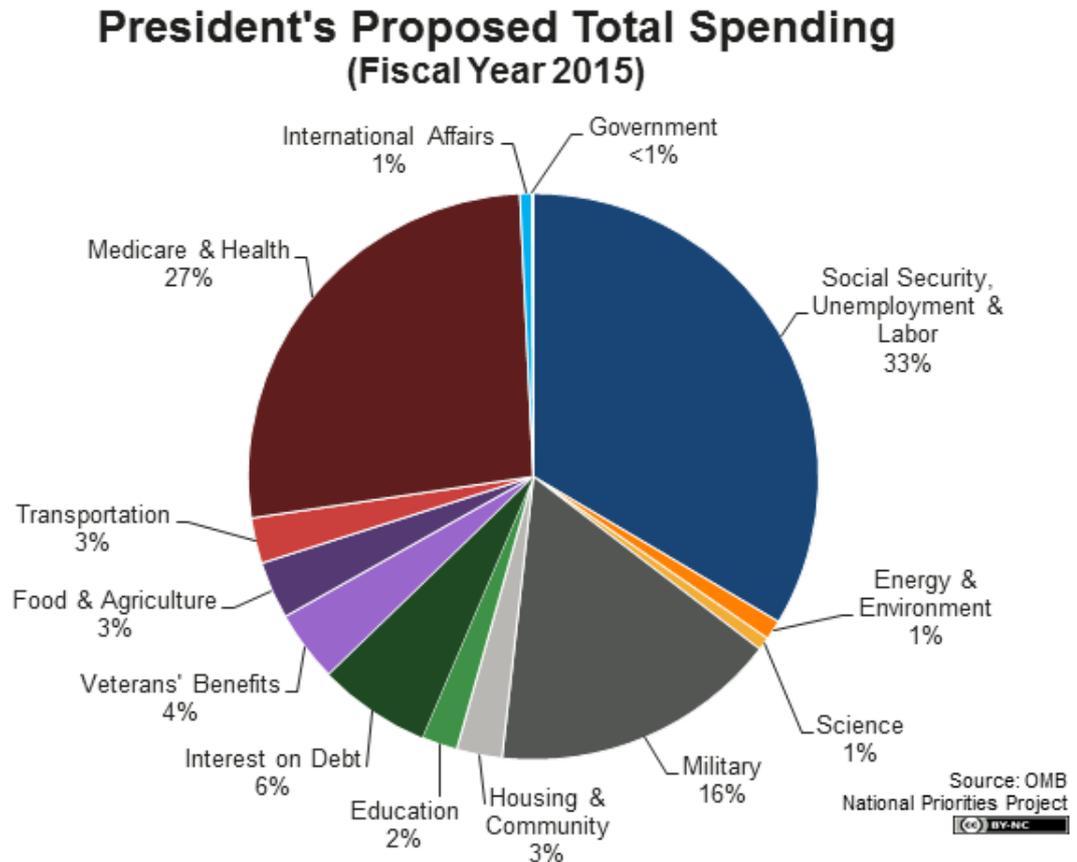
## Appendix D: US Fertility Rates

Source: Monte & Ellis, 2014: Fertility of Women in the United States 2012. Retrieved October 31, 2015, from <https://www.census.gov/content/dam/Census/library/publications/2014/demo/p20-575.pdf>

Characteristic	Total	Children ever born per 1,000 women	Percentage of mothers who are never married <sup>1</sup>	Percent childless <sup>2</sup>
<b>Total women 40 to 50 . . . . .</b>	<b>23,662</b>	<b>1,989</b>	<b>8.2</b>	<b>16.1</b>
<b>RACE AND HISPANIC ORIGIN</b>				
White alone . . . . .	18,375	1,974	5.0	16.3
White alone, non-Hispanic . . . . .	15,105	1,880	3.6	17.1
Black alone . . . . .	3,210	2,068	27.6	15.5
Asian alone . . . . .	1,409	1,918	3.3	15.0
All other races, race combinations . . . . .	669	2,172	12.1	16.1
Hispanic (any race) . . . . .	3,684	2,372	11.1	12.7
<b>NATIVITY AND CITIZENSHIP</b>				
Native . . . . .	19,196	1,930	8.3	17.2
Foreign born . . . . .	4,466	2,241	7.7	11.4
Naturalized citizen . . . . .	2,217	2,134	4.9	10.8
Not a citizen . . . . .	2,248	2,347	10.6	12.0
<b>EDUCATIONAL ATTAINMENT</b>				
Not a high school graduate . . . . .	2,257	2,621	17.4	11.6
High school graduate . . . . .	6,446	2,074	10.1	13.0
Some college, no degree . . . . .	4,005	1,962	8.8	15.1
Associate's degree . . . . .	2,836	1,934	7.0	14.4
Bachelor's degree . . . . .	5,357	1,805	3.6	19.9
Graduate or professional degree . . . . .	2,762	1,725	4.0	22.7
<b>LABOR FORCE STATUS</b>				
In labor force . . . . .	17,913	1,903	7.9	17.1
Employed . . . . .	16,787	1,899	7.3	17.1
Unemployed . . . . .	1,126	1,951	16.7	16.3
Not in labor force . . . . .	5,749	2,258	9.2	13.0

## Appendix E: US Governmental Total Spending / Fiscal Year 2015

Source: National Priorities. Retrieved October 30<sup>th</sup>, 2015, from <https://www.nationalpriorities.org/analysis/2015/presidents-2016-budget-in-pictures/>



Appendix F: Four Presidential Candidates on demographic topics in Presidential Campaign 2015/16

Source: Different sources discussed in class, Monday, November 1<sup>st</sup>, 2015

**Hillary Clinton**  
**(D)**



Supports legalization of unauthorized citizens

Strong position on individual rights such as women rights

Strongly disagrees on privatization of Social Security

**Bernie Sanders**  
**(D)**



Very vague on the topic of migration: supports minorities, however follows protectionism principle in order to protect local economy and jobs

Strong position on individual rights such as women rights

Wants to expand Obama Care

**Donald Trump (R)**



Controversial opinion on building a fence at border to Mexico, called Mexicans 'rapists'

Is neutral on the topic: 'support women in business'

Supports Single-payer system: Single-payer health-care systems are ones in which the government acts as the insurance company for everyone. That's how Medicare works in the United States, and it's how the Canadian health-care system works for everyone.

**Jeb Bush (R)**



More moderate position than Trump/ agrees with legalization of unauthorized minorities; personal relation to migrants (Mexican wife, speaks Spanish fluently)

Proposes reforms to Medicare and Social Security

Add private plans

## B. China: The role of demography for the political, economic and societal future of the biggest country in the world

*by Chang Su, Anna Di Padova, Hoi Kwan Lam*

China is experiencing a major shift in its demographic development and will have to face three major challenges: extremely low fertility rates, gender imbalance and a severely aging population. Because of a tremendously growing population, in 1979 China decided to control population growth by introducing the one-child policy. The policy has had major impacts on several aspects of the country's economy and society.

This paper aims at analyzing the impact of the demographic changes on the future development of Chinese politics, economy and society. This is achieved by first looking at the overall structure of each topic mentioned above, illustrated with secondary data resources. Following, these are discussed in light of the three major challenges and the way they have been influenced by the introduction of the one-child policy, also mainly with the help of secondary research.

The political structure in China has an upward accountability structure with the People's Representative Congress as the highest legislative structure. In response to the future situation and the effective impact of the one-child policy, the government has been forced to first ease the restrictions, then to introduce the selective two-child policy, and finally a universal two-child policy. This was done in the hope that the fertility rate curve will shift upwards slightly.

China's economy has been one of the highest performing economies in the world during the past decades and the country's productivity level has tremendously increased thanks to an accessible and large labor force. Unless Chinese industries are capable to find innovative and technological solutions to compensate for the shrinking labor force caused by the low fertility rate, the risk is that these achievement levels are going to change in a negative way in the next twenty to thirty years.

Unsurprisingly, society will also change substantially; gender imbalance leads to many single people who do not want to raise a child on their own. Family structures will look different since parents are spoiling their only child but expect them to be successful in return. This and the unwritten social contract that obliges the child to take care of his elderly relatives cause a very heavy social pressure on Chinese children.

In conclusion, we will also look at possible solutions that China could implement in order to mitigate the impact of the occurring and future demographic shifts on these three structures.

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## **1. Introduction**

The United Nations forecasts that the slowdown of global population growth will not come to a halt in the next 50 years. However, it is expected to only be 25 percent per year by 2050, in contrast to the current 125 percent. On the other hand, thanks to the increase in life expectancy, mainly due to better nutrition and medical advancement all over the world, the overall population is getting older and older. This trend will become a major demographic challenge because it will cause a shift in the concentration of people from working age (population 15-64 years) to elderly age, and pose the difficult question of how to take care of the elderly population both socially and financially, as well as how government should deal with it politically. A shift in the population age will have an impact on many aspects of the global demography such as migrations, since developed countries may need to fill the gap in the labor force by looking for new workers across borders and from developing countries where fertility rate is still high, and social stability, since demographic composition of a country could affect how people in the society behave.

China, the world's most populated country, its most rapidly growing and its second largest economy, is going through the same or, an even faster path of shifting population age. It is undergoing this shift while transiting from a developing country to a developed one making it an even more delicate change. As a country with one-fifth of the world's population and such an economic size, its demographic shift has an impact not only on the country itself but also on the world. This paper aims to discuss the demographic composition of China, and its impact on the future structure of the country's politics, economy and society.

The following chapters will start by introducing the major demographic challenges that China is experiencing at present and will experience in the years ahead, while also analysing the causes of these challenges. Next, information on the current political, economic and societal structure in China will be provided, and then the demographic impact on each of these topics will be analysed in the third part of this paper. To conclude this part, possible future solutions to the different challenges will be discussed. In the end the paper will provide a short summary of the main points, discuss the limitations of this research and give possible topics for future research.

## **2. China's Demography and Structure**

This is the theoretical part of the paper and will introduce the demographic challenges that China will have to face in the upcoming years. The subchapters will give a detailed overview and discuss research findings on China's political structure, the Chinese society and the economy.

## 2.1. The Chinese Demographic Challenges

In the 21<sup>st</sup> century, China will face three major demographic challenges:

1. *Extremely low fertility rate*; approx. 16 million newly-born each year.
2. *Gender imbalance*; in every age group under 70 years old there are more male than females (e.g. at the age of 1, the male-to-female ratio is 121:100),
3. *Severe aging*; the elderly population is increasing at a rate of 15.5% per year,

When the People's Republic of China was established in 1949, it was a country of 542'000 inhabitants. 30 years later, this figure had almost doubled to one billion because there was no war and sanitary condition had highly improved. It is well-known that in 1979, China implemented the "one-child policy" with a targeted fertility rate of 1.47 children per woman. Under the harsh birth-control policy, the country managed to slow down its population growth to only 1.3 billion by 2014, only 30% in 35 years (Liang, J. 2013). This policy prevented 400 million births, but the human cost has been huge, with forced sterilisations and abortions, infanticide, and a dramatic gender imbalance that means millions of men will never find female partners. On the other hand, this might have prevented famine and poverty of a large part of the population.

Although the target fertility rate was 1.47, due to several reasons the actual fertility rate however is between 1.2 and 1.4, while in Beijing and Shanghai, having the lowest rate in the world, it is only between 0.7 and 0.8. One of the reasons is that 20% to 30% of couples do not have the possibility or wish to have children. (Jin, Z. 2015)

The second and third reason are the imbalanced gender ratio and the increasing number of highly educated women which leads to a rising number of single women, who do not want children without a stable partner. Women in China look for men with an education level and income that is higher than their own. Therefore, if the number of highly educated women is rising, it becomes harder for them to find men that fulfil their high standards, which in turn leads to a rising number of single women, who do not want children without a stable partner. It is not easy to foresee whether this will change in the future.

To quantify the problem, the low fertility rate of 0.7 child per woman will cause the next generations to be reduced to only one-third of their previous generations, and if the rate persists, the population of the third generation will decrease to one-tenth of the current population level (Liang, J. 2013). Clearly these are extreme cases, however, according to De Wulf, a decrease of the Chinese population is expected after 2030, which is forecasted to be the peak of the population growth. (De Wulf, M., 2015)

Finally, voices in China and foreign countries are now urging for the abandonment of this policy; since January 2014, the “selective two-child policy” has been implemented in various Chinese provinces and drawn both local and global attention. This has an impact on both individual families when it comes to family planning and the overall composition of the Chinese population, providing hope in tackling the three challenges mentioned earlier. Despite the easing of the “one-child policy” being a very recent event, some early effects are already visible: the number of couples applying for a second child was in total 1.07 million during the first twelve months. Even though the new “selective two-child policy” is effective to 10million couples, only around 10% had applied for it until now (Jin, Z. 2015). This result may reflect the wish of the society wanting to have less children even when there are no restriction of the amount of children permitted. Despite this, Chinese research states that 66% out of 10 million eligible couples are keen to have a second child. In case their wish is granted and they apply for a second child; there will be 1.3 to 1.6 million extra new-borns each year. Since 2011, fertility rate has risen by more than 100 000 per year, and 2014 alone had seen an increase of 470 000. This can be due to 2014 being the year of the “Horse”; in China it is believed that the ones born under this sign will have a lot of luck (the same applies to the zodiac signs of the “Dragon” and the “Tiger”). Nevertheless, it is not that easy to clearly state what has caused this drastic change, though it is apparent that Chinese couples do wish to have a second child if it is allowed. The natural fertility rate is believed to be between 1.7 and 1.8, whereas the actual fertility rate in China is 1.3 to 1.4, and therefore suggests the impact of the one-child policy on the low fertility rate. (Jin, Z. 2015)

In recent years, the 35-year-old one-child policy has received a lot of criticism due to the creation of the gender imbalance in China’s population. Through the one-child policy some couples are allowed to have a second child if their first is female. As a result, an unnatural male to female ratio was created as couples whose first child is a male are not allowed a second child and therefore never give birth to a female. In addition, a lot of couples, provided their first-born is female, would influence the gender of their next child to ensure a male. As seen in Figure 1 below, male-to-female ratio is 104 in the age group 30-39, 101 in group 20-29, 112 in group 10-19 and 119 in the age group below 10 (China Statistics Bureau 2015). This gender imbalance will eventually cause low fertility rate. If we consider the population below 10 years old; even though in 15 to 20 years they will reach maturity and be able to give birth. Although, when that time has come, not only gender imbalance will have a negative effect on fertility rate

but also the fact that at least one-sixth of women will not have a partner because of their too high standards in men, which we have touched upon previously.

### Male-to-female ratio between age groups from 0 to 39

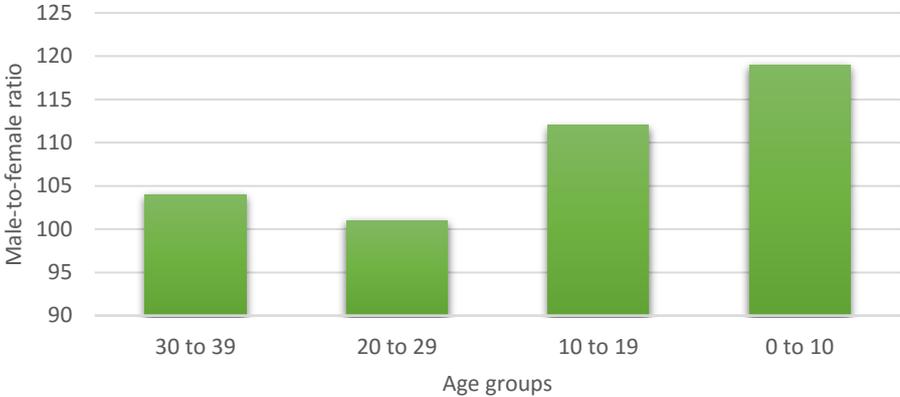


Figure 1: Male-to-female ratio divided in age groups from 0 to 39 years.

If we now consider the ageing population (aged 60 and above) in China, there were 212 million elderly people in 2014. The growth rate is 15.5% per years, which means that in 2050 it will have reached 480 million, comprising 34% of the total Chinese population. According to an article from Jin, a professor at Nankei University, the ageing population trend in China is “massive scale, super-high speed, ultra-high level, very stable” (Jin 2015).

However, if implementing the selective two-child policy will cause the fertility rate to rise, it will have an easing impact on the ageing population challenge. Although the population born in 2015 will turn 60 in 2075, the previously discussed ageing trend will not show big changes until 60 years later even though the one-child policy is alleviated. In addition, despite couples having two children, the population above 60 will still be 31% by 2050. (Liang, J. 2013)

#### 2.2. Political Structure in China

Chinese politics have had and continue to have a great influence on the demographic changes. After the collapse of the Qing Dynasty in 1911 the country adopted Western political structures and traditions, such as modernized governor bodies. Two other critical events which influenced the organization of modern China, were the victory of the Communist party in 1949 and the Open revolution, which determined China’s social organization and provided an impetus to change all aspects of Chinese society. In summary, China’s political structure is now characterized by three influential segments: traditional bureaucracy, socialist ideology and continuous modernization.

The power structure is split between the government and the party. The highest legislative government body is the People's Representative Congress. Its members are voted by the people of China without propaganda campaigns. The corresponding body of the party is the Political Consultative Congress. Its members are appointed by the government and are allowed to directly advise the highest leaders of China. The Political Bureau is the decision-making body of China and includes seven of the country's most important administrators. Despite the system having some similarity to a typical "Western structure", i.e. the People's Representative Congress somehow can be compared to the House of Representatives and the Political Consultative Congress to the Senate, China has an upward accountability structure. In other words, in China the higher ruling body is generally more powerful than the general public. (Alfred, M., 2012)

The most relevant policy for China's demography would be the well-known one-child policy launched in 1979, which is also the main factor that shaped China's demographic profile to its form nowadays. This policy was launched in order to quickly limit the growth rate of the population in an effort to reduce poverty and better allocate resources so as to foster economic growth.

### 2.3. Economical Structure in China

Before the year 1890, China had almost always been the biggest economy in the world. During the 19th and 20th century, the country had experienced a few decades of internal war and revolution. After the implementation of the Open-door policy, China has been the world's fastest-growing economy in the 21st century, with GDP per capita exceeding 7000 US dollars in 2014. GDP growth rate has even been double-digit and settled at 7% in 2015. It is expected to be stable at 6% for the years to come. If such trend persists, GDP per capita would exceed USD 10'000 by 2020. Thereafter, it is expected that the growth rate will slow down to 5%, which means GDP per capita will reach USD 20'000 between 2030 and 2040, thus becoming the biggest economy in the world.

In the past, China highly relied on labor-intensive manufacturing industries to fuel its growth. However, the country was forced to change from a labor-intensive to a less labor-intensive and more technological industry in order to compensate for the lack of labor force that had been caused by the population drop in these few years. Since 1990, the labor force in China has grown from approximately 640 million to 800 million in 2013 (see Figure 2). However, due to the challenges China will have to face, the labor force growth rate will decline in the next 15 years. We will discuss the demographic impact on the economy in more detail in chapter 3.

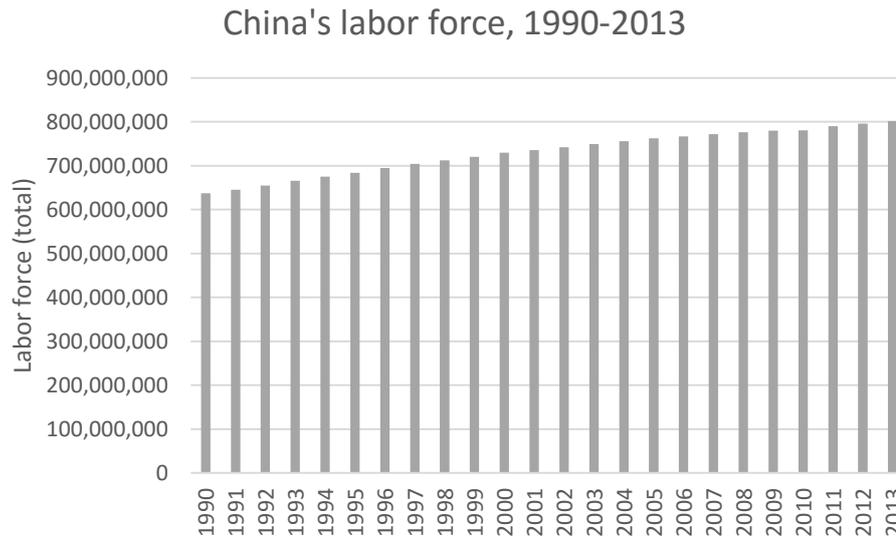


Figure 2: China's labor force, 1990-2013. (The World Bank, 2015)

#### 2.4. Societal Structure in China

Just like any society, modern China has numerous societal problems. The income gap is widening year after year (Gini coefficient: 0.55 in 2014 versus 0.33 in 1983). A study from Beijing University showed that, in 2012, top 1% of China's population own one-third of the country's wealth, while the bottom 5% earn just 0.1% of the total household income. In 2014, although per capita income had already reached US\$7,000, over 3 million people were still living in extreme poverty, struggling with basic nutrition needs. Among these 2 million did not even benefit from proper shelter. After education reform, the government promised that every person would receive nine-year obligatory education. However, in the rural area, 260,000 cannot afford to receive or finish these nine years of education. For those who do receive, 100,000 study in poor school facilities or without a classroom. Both the income disparity and education problem have pushed many people to leave the rural areas to pursue better salary and education in the cities, which has led to massive rural-urban migration, leaving only very young children and old people in the rural area, who cannot work or farm and utilise arable land resources, but wait for those in working age to send their salary earned in cities home.

Food scandals are reported in the international media one after the other: poisoned infant formulae, sewage cooking oil, and seafood from heavily-polluted oceans; moral values among Chinese people are said to be deteriorating. This is attributable to the change in values – new consumption culture, rising materialism, craving for wealth and status symbol, and lack of empathy and integrity.

Rapid industrialisation, without proper planning and effective policies to safeguard environmental protection, caused severe air and water pollution, and soil contamination.

There are more specific societal problems at family level. Gender imbalance is itself a societal problem and is causing others. Overall gender ratio at birth is 121 compared to natural ratio of 106. In Hubei, the ratio is extremely high – in 2000, 176 boys were born per every 100 girl. Gender ratio has a big impact on marriage rates and fertility rates. The change in demography over the past 30 years have also changed family view. Traditionally, as China was still an agricultural economy, big families were preferred, providing more labor. Due to religious reasons, male successor were a must-have in all families, which led to the preference for baby boys over baby girls. Families also used to live closely together – with four or five generations under the same ceiling. However with the restriction in family sizes under the one-child policy, many of these traditions have changed. People are expected to have small families. Migration to provinces for better career and education opportunities means most families do not live with many generations in the same house anymore. Family structure has changed from before the one-child policy, a wide-base triangle (fertility rate between 5 and 6), to nuclear structure, meaning that one child is in the centre while surrounded by the two parents and four grandparents. In more advanced cities (Beijing, Shanghai, Guangzhou, Shenzhen, Chengdu, Wuhan, Tianjin, Chongqing), the importance of having male successors has become less important over time.

Some things that have not changed much are the retirement plans for old people and the age of marriage. Traditionally, children, once they start working, are supposed to contribute part or whole of their salary to their parents to show their respect and gratitude. Parents therefore expect after retirement to live on the children's income. Marriage age is in the mid-20s; even with a high proportion of young people receiving tertiary education, women "have to" get married before 25, while men a little later, but no later than 30.

### **3. Role of Demography on China's Future Development**

The following section will provide a more detailed analysis of the future impact of Chinese demography on the political, societal and economic structures. The subchapters will therefore be divided accordingly. In the end we will discuss possible solutions to the future development of China's demographic challenges.

#### **3.1. Demographic Impact on Chinese Politics**

In view of the above-mentioned centralized structure, the problem related to the demographic shift is unlikely to have a direct influence on the political system, unless the majority shows dissatisfaction. Otherwise, the only hope might be that the ruling body digests the correct information and acts effectively. And in this section we will discuss the arguments that the governors should consider for further policy-setting. The single most influential policy that

contributed to the demographic challenges today would be the one-child policy, and this section focuses on discussing the arguments pro and contra such policy.

To cope with the seemingly unlimited population growth, the one-child policy was introduced in the year of reformation. At the beginning, the one-child policy was understandable since the Chinese population had just doubled within three decades; according to Thomas Malthus, in a agriculture-based society, this growth rate can only cause problems. Today, however, one can question if the one-child policy is still necessary after enormous economic achievements and the resulting low fertility rate.

One supporting theory for the one-child policy would be the limitation of resources. Many people argue that China's resource per capita is lower than world average and indeed, China's arable land ranks 141<sup>st</sup> in the world, water ranks 118<sup>th</sup>, forestry ranks 146<sup>th</sup>, crude oil 55<sup>th</sup>, coal 16<sup>th</sup> and nature gas 63<sup>rd</sup>. All these rankings prove that China is not a resource-rich country.

However, the argument may not hold if a deeper analysis is made especially by looking into relative rankings. Based on The World Bank's data that ranks percentage of GDP of a country derived from nature resources, the countries that rely on nature resources most are mainly undeveloped countries such as Congo Libya, Gabon, Mauritania, and Azerbaijan, and those countries are resource rich – they all have much more resources than global average. In contrast, OECD countries only derived 1.5% of their GDP out from their natural resources. Therefore, excluding special exceptions such as Norway and oil-rich countries in Middle East, resource richness has nothing to do with economic development. With further screening of the data, it is clear that almost all developed countries, such as Korea, Japan, German, Italy, Great Britain, are generally ranked below global average in natural resources like water, arable lands, forestry, coal, nature gas and oil. Why is economic development not depending on its most primary inputs - resources? Resources in this world are distributed unevenly: actually, most countries' resources are below average – the ranking is misleading. For example, out of more than 200 countries, 166 countries' water per capita is below the average – similar for oil and other resources. And with the below average arable land (141<sup>st</sup> in the world), China is still self-sufficient for 90% of its own agriculture consumption, with grain sufficiency over 97%. (The World Bank, 2012)

Another argument against a growing population is pollution. The argument believes that to account for energy consumed per capita, more population is equal to more pollution. However, the supporters of the theory should not neglect that every country experienced such pain when their economies grew via industrialization. London, as well as Los Angeles, used to be some of the most polluted cities in the world, and their population continued to grow even during the

most severe pollution periods while the pollution was slowly treated. Currently, China has a high energy consumption per capita, which is 4 times that of the U.S's and 7 times that of Japan's (EIA, 2015) - a result due to different development stages. Following the transition from a manufacturing-lead to an innovation/service-lead economy, China's energy consumed per unit GDP is likely to fall eventually. In fact, population density serves as an advantage with regard to pollution, because highly condensed population usually uses energy in a more efficient way, which explains the difference between Japan's energy consumed per capita and the U.S's (think about the population density of Los Angeles and Tokyo). Due to the density of China's population, the energy efficiency may reach Japan's level in the future due to the availability of better public services such as subway and high speed train (EIA, 2015).

The third rationale for keeping population from growing is with regard to the crowding problem, leading to traffic jams and other unpleasant experiences that will dilute the utility brought by public service. According to George Slavich, an assistant professor at UCLA, the most congested cities are Istanbul, Mexico city, Moscow, Rio de Janeiro and Salvador (Slavich, G., 2014). Surprisingly, most of these cities are found in countries with low population density at national level. It seems that population density is not necessarily correlated with traffic jam. Take Tokyo as an example, it has roughly the same population density as that of Beijing, (the most central area, Beijing's population density is about 1.63 times of Tokyo's, but Tokyo has a large area of high population density) but in contrast the traffic in Tokyo is much better. Thanks to its advanced public transit system and urban design, Tokyo manages successfully to have a high density without congestion. Every day, Tokyo's metro passengers account for 86% of total public transit, which is significantly higher than the 46% of Beijing. Tokyo also has higher area of roads, and Beijing's road area is only 46% of Tokyo's. These facts clearly illustrate that, traffic jams are not a result of too many people but of a lack of infrastructure. In order to tackle the crowding problem in China, building up infrastructure is much more effective than simply decreasing the whole population, and remember less population in total is not equal to less crowding in big cities as showed in Russia, Mexico and Brazil. Besides, with rural-urban migration, reducing of overall population at national level does not necessarily mean that the big cities have less people because a low birth rate can be written-off with because of population that moves from rural areas.

As mentioned before, the government is already relaxing the one-child policy with the "selective-two-child policy", reacting to the upcoming demographic shift and turning from a birth-restricting policy into a birth-encouraging policy.

In November 2013, the Congress decided to release in some provinces the birth-restriction for all couples of two single-child. The target is to increase the born population by 2 million per year. However, application in the first twelve months was only 1.07 million couples. Since not all couples that applied for the certificate would finally realise their second-baby plan, the actual birth rate is likely to be lower than the application number.

Above all, the long-term effectiveness of the partial relief also depends on whether a sustainable number of eligible couples would be interested in having a second child. Take Beijing as example, since the conditional abolishment of the one-child policy, the applications from couples has been decreasing every month, 2'976 applications in August 2014, 2'683 in September, 2'334 in October and 1'812 in November. The number seems to be declining, although seasonal factors can only be excluded with year-to-year comparison. Singapore had also established a similar birth-control policy in the late 1980s. After the relief of restriction, the birth rate was 1.96 in 1988, up from 1.62 in 1987, but the birth rate has been continuously decreasing in the following 5 years from 1.96 to 1.76. Thus, a conditional release of the restriction is not going to push the birth rate to 2.1, the natural replacement rate.

Apart from abolishing the restriction, complementary policies to encourage giving birth should be considered just like what happened in Korean, Japan and many western countries. Looking at another political autonomy with similar culture, Hong Kong, there has never been a strict policy about birth control, but in the 90s, government advertised the benefit of having two children (and not more), on top of the tax advantage of the first two children (couples enjoy no tax allowance for the third child), people naturally control their family size to two children or lower. However, with the increasing literacy rate of women and modernization, it is unlikely to convince people to have more babies only by extending tax allowance to the third child. The policy should focus on giving economic incentives and changing peoples' perceived ideal size of family.

Examples of such kind of policies can be found in nearby countries South Korea and Singapore. Fertility rate in Korea is at 1.2 and one of the biggest holdback for South Korean parents is the ability to pay for their children's care and education. To tackle this barrier, the government is promising to halve tuition fees for state-run childcare and is actively trying to weaken the perception that everyone needs a college degree in order to be successful. Besides, long working hour is seen to be an obstacle for couples to spend time together and have babies. Therefore, the government also encourages its office building people to go home at 7pm; Singapore offers \$15,000 parental packages for each child, tax incentives, and extended maternity leave in order to convince its citizens to produce more babies. The government also

makes use of the citizens' patriotism to advertise having babies as a patriotic behaviour. In order to tackle the trend of singleton lifestyle and encourage people to establish families, the Urban Redevelopment Authority is limiting the number of small one-bedroom flats that can be built. If Chinese government is to launch new policies to stimulate fertility, it should really consider these as examples.

### 3.2. Demographic Impact on the Chinese Economy

In 2014, China invested more than 200 billion dollars on research and development.

This has a positive impact on education and the future performance improvement in industries based on science and engineering. In China over 1.2 million engineers graduate from universities each year, which will provide the possibility to boost Chinese engineering-based companies and facilitate innovation and technology.

Nonetheless, the low fertility rate during the past years and the rapidly aging population in China are causing a negative impact on the future evolution of the economy. The GDP growth is slowing down, the debts are increasing and the returns on high fixed investments are declining. Last year (2014) China's debt-to-GDP ratio was 282 percent of GDP compared to 158 percent of GDP in 2007.

Furthermore, China is facing the challenge of a shrinking domestic labor force. The labor force is expected to decrease by 16% in the next forty years. This is not only due to the low fertility rate but also thanks to innovations in health care as the mortality rate of elderly citizens has improved. The forecast depicts that in 2030 the population outside of the labor force will have reached a total of 47%. In the year 2050, the amount of Chinese citizens over 60 years old will be three times that of today.

Thanks to the tremendous rise in aging population and the shrinking working age population, however, wages in China are rising; in the past five years, the average wages have risen by 11 percent.

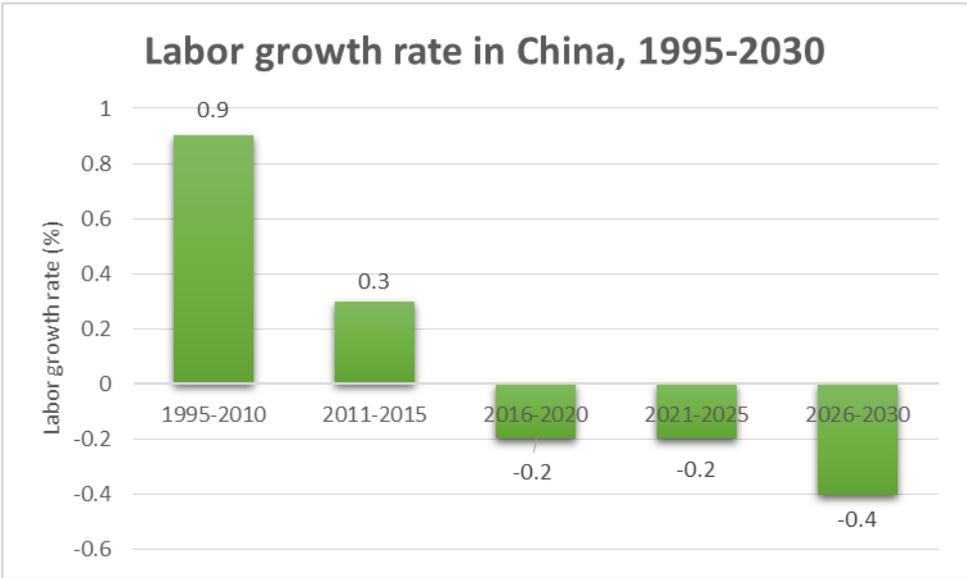


Figure 3: Labor growth in China from 1995 to 2030. (Development Research Center of the State Council, 2015).

There are 150million manufacturing workers in China, compared to 14 million in the US, which has enabled companies to scale up production at unmatched speeds. However, the rising wages and the lack of labor force raise new challenges for Chinese businesses due to higher labor costs and having to move low-skilled workers to higher-skilled manufacturing or service industries. As a result this leads to inconsistencies in the productivity of the economy. The ageing population has brought the foreseen growth of China’s economy in doubt. Japan, Germany and South Korea have gone through a similar path with the baby boomers. The highly-labor-intensive industry contributed to rapid economy growth, however, with an aging population and contracting youth population and labor, these economies’ growth inevitably slowed down. Japan’s economy has been suffering during the past two decades from the consequence of aging population. To the contrary, the US has had continuous growth, and there is no sign that such growth is going to stop. One main factor has been its balanced population in different age groups, with abundant young people driving the success of various industries. The country also attracts over one million immigrants among which are foreign elites. 30 years from now, total population will grow from 1.2 billion to 1.4billion, but elderly population (60+) will grow from 200million to 400 million, which means all the growth concentrates in the elderly segment. Working age people (20 to 60) will be reduce from 800million to 700million.

We take a look at Japan, since the population composition and economic prosperity can be a good mirror of the current situation in China. During the 1950 and 1980, Japan’s per capita

GDP exceeded 8% per year during three decades. It was at USD7000 in late 70s. Fertility rate was high after the Second World War but has been declining with the increase in income, to a level below 2 in the 70s. Even without state control of any policy similar to the one-child policy in China, fertility rate fell to 1.6 in the 80s when per capita GDP reached USD10'000.

Let's take Japan as an example, the latest statistics showed that fertility rate in Japan is only 1.3 and each young person is carrying the burden of 0.81 elderly people. The fiscal income of Japan is around JPY 83'000 billion, however, JPY 100'000 billion goes to social security. National debt is JPY 600'000 billion, ranking it the highest among the world's 7 top industrial countries. The government will have to increase tax income from working class to finance the already high and increasing proportion of elderly people. Due to the lack of a young labor force, a lot of physical jobs are done by elderly people even though young people would be more suitable for the job. In big enterprises, because of the large proportion of senior people, room for young people to be promoted is much slimmer than before. This evolution is connected to the culture of Japan, because seniority and old age are important for status. Although this has a negative effect on the advancement of the companies, since management positions are occupied by people with seniority status and not necessarily due to capabilities. In addition, elder people are usually more conservative and less creative than the young people, and so Japanese companies have become stagnant in innovations and creativity. If the trend persists, Japanese companies will soon lose its competitiveness in the global market. China will have to be careful not to repeat the same mistake and take advantage of the creativity of the young people. This is as important as investments in R&D technology because the country will have to rely on innovation and technology in order to be able to stay at the current high level of productivity.

Furthermore, the children of today will have to take care of their elderly relatives. Therefore, the demographic challenge of an increasing aging population would also have a negative impact on the savings rate of the working population. As a result, the establishment of new small business and entrepreneurial initiatives are suffering because people become more risk averse due to less savings. Also they will feel less keen to spend on consumption, which again has a negative impact on GDP growth.

### 3.3. Demographic Impact on Chinese Society

At the family level, with the nuclear family structure, all resources from two parents and four grandparents are invested in one person, which gives rise to better opportunities for the younger generation to receive good education and even go abroad. A single-child enjoys abundant materials but at the same time bears high expectation to be successful. The one-

child policy has reduced the poor population by 4million (He, Y. 2012), but the price comes later. High dependency ratio with longer life expectancy means ever higher economic burden on each subsequent generation, causing extra pressure on pensions. If the current demographic trends continue, by the year 2050, one young man needs to raise an elder one, which is infeasible. Additionally, China's pension is restricted from investing in the stock market for a long time, which means the return of assets is limited, which has already caused underfunding for 300 billion RMB (50 billion USD). The improved fertility rate, as well as the funding system reform, is necessary for China to step out from the trap.

Children under the one-child policy are very often referred to as having personality development problem, because they lack the chance to interact with peers of the same age at home, and since they are the core of the family, they receive excessive attention and material enjoyment.

This redefined family structure is causing problems such as a higher divorce rate. The divorce rate was climbing year by year since 1979. One possible explanation lies in a more open and non-traditional society. However, the rate accelerated sharply after 2003 (China Statistics Bureau, 2015), which cannot be explained with this reason.

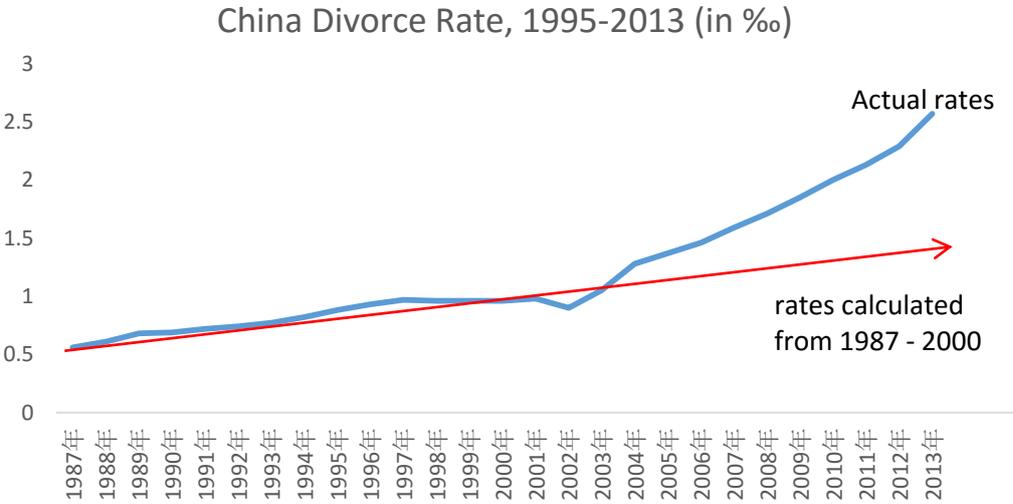


Figure 4: China Divorce Rate, 1995-2013. (Book of the Year, 2015)

In 2003 it was exactly 24 years after the introduction of the one-child policy, and since it is common to marry between ages 20-25, it is logical to suggest that the increase in divorce rates came from new couples who have no siblings. The hypothesis is that the children who were raised alone under a nuclear family structure may lack the experience of sharing every-day life with a similar-age person, and thus lack the ability to take care of the others, given the Eastern

Asian's tradition of education. Worth noting is that cohabitation with boyfriend or girlfriend is still uncommon in China

Gender imbalance, together with the improving education and career prospect of women, means that their expectation from the other half is also increasing. Financial stability, property and car ownership are common prerequisites for a man to be considered a subject to be married, before many other expectations. With the increasing gender ratio – there will be more and more men than women year after year. It can be logically derived that if a man cannot get married successfully at the ideal marriage age, he will build up his career and wealth and he will be able to convince available girls – but mainly in the younger age range – to marry him. Cross-age-group competition for women is forecasted to happen among men in the near future. And there will be more and more couples with a husband significantly older than the woman. Such structure also will impact the fertility rate.

Those who lose, the large amount of young single men, can be a problem to the society. Family responsibility can be the motivation for a man to have stable job, while single man may be more likely to be involved in gambling, crime and other activities that harms the stability of society. Gender imbalance will be a problem for employment, as there could be inadequate amount of women to perform the tasks that are mainly performed by female workers, such as in nursery and hospitality industries.

### 3.4. Potential Solutions

There has already been some changes to regulations that have had a positive impact on the fertility rate, such as the newly introduced selective two-child policy, which we have discussed earlier. Thanks to this policy the fertility has already started to increase. It is very important that the Chinese population is able to achieve and keep a steady fertility rate at around 1.8. Another option, which is an ongoing discussion at the moment, would be the abandonment of the one-child policy. This would lift the hindrance of having more than one child and increase the fertility rate further in the future. Having said this, the Chinese government could find ways to incentivize couples to have more children.

In order to reduce the upcoming burden on the economy, China must find solutions to raise productivity and proceed on a sustainable growth path through innovations. One way would be by substituting the lack of labor force with automation and mechanized systems. Innovation in new technologies and robotics will be necessary if China wants to keep up the high productivity level. According to McKinsey, the most efficient way would be through the implementation of semi-automated systems in order to use as little human labor force as possible (McKinsey, 2015). Another solution would be immigration from neighbouring countries

to reinforce the young labor force. According to the Economist, urbanisation, the movement from the Chinese rural population into the cities would also be a solution to increase the number of industrial workers. Nevertheless, it would pose a problem on the rural settings since these workers are also needed there. (The Economist, 2013)

Prolonging the working period and thereby delaying the pension age would be a radical solution to the problem of a shrinking working age population, but there is not an easy way to achieve this and new forms of employment and social security will have to be explored. Since life expectancy is rising thanks to better health care and improved living standards, people will be able to work until they have reached a higher age. Although manual work that requires body strength, is not possible for many people who have reached the age of 60. On the other hand, there are many jobs that require minimal body strength, and which could be covered by elderly people, such as working at supermarkets, where many young people are employed. This would give the young population the opportunity to look for jobs elsewhere and find jobs, in which they can develop and take advantage of their creativity and contribute with innovations for the society's wellbeing. In Germany, they are planning to increase the retirement age from 65 to 67 between now and 2029. Hence, the labor force will also remain stable for a longer period of time. (KPMG, 2013) Potentially, a part-time job would also be suitable in many cases to allow more time for leisure activities. Elderly people could also work as consultants, quality controllers of the work of younger and unexperienced workers and so on.

#### **4. Conclusion**

The last section of this paper will first of all recapitulate the main findings and conclusions discussed throughout the text. Like any other paper, this one has its limitations, which will be examined in the third subchapter of this section. The last subchapter will provide areas and possibilities for further research on this topic.

##### **4.1. Summary**

China will have to deal with three major challenges: extremely low fertility rate, gender imbalance and a high number of ageing population. These demographic issues have an effect on the future development of the political, economic and societal structure of China.

It is reasonable to say that the demographic challenges have been mainly caused by the one-child policy because of different factors, such as restricting couples to have one child, favouring male offspring, etc. which have contributed to major demographic shifts. The extremely low fertility rate is not only caused by the gender imbalance but also by the increasing number of highly educated women who have unrealistically high standards when they seek a partner, and couples who do not want too many children. As a result, there is less childbirth because single

women do not wish to have children without a stable partner, and couples who want to give their children a good living standard do not wish to have more than two children. As we have mentioned earlier, the fertility rate is around 1.8 child per woman. The increasing number of aging population is also caused by the one-child policy, since there will be a gap of age groups in the upcoming years. In 2050, the elderly people will comprise 34 percent of the Chinese population and will have to be looked after by the young generations.

If we look at the development of the political structure, we do not see a direct influence of the demographic shift. Nevertheless, the government will have to take actions to solve the future challenges of the country. We can already see a political action in regards to the selective two-child policy, which was introduced to ease the one-child policy. This has already had a positive outcome on the fertility rate, however, another solution would be to abandon the one-child policy completely.

By the time, the children that have been born under the restriction of the one-child policy, the working age group will have decreased drastically. In the next 10 to 40 years, China will have to face a major loss in labor force. It is crucial to find new technological solutions or ways to increase the number of working population in order to keep up the high productivity level, which has been one of China's major advantages in the past decades. In addition, the GDP growth rate will experience a decline in the future due to the upcoming disadvantages that China has to face.

Lastly, the societal structure has gone through several changes. Since there is only one child per couple, this only-child will have to take care of seven or more elderly people in the family. Furthermore, society has changed from being a traditional society to a more open one. This leads to an increased number of divorces and also many single men and women. This in turn has a negative effect on fertility rate, family structure and social stability.

#### 4.2. Limitations & Future Research

The focus of this paper lies on the political, economic and societal structure and the demographic challenges in China. Every country differs in the structure of the three analysed areas and the demographic transitions occurring all over the world have different impacts and future outcomes in different countries. It would be interesting to analyse what type of demographic challenges other countries have to face and how this has an impact on these countries' and the global future development.

External factors influenced by other countries, such as export and import, and foreign investors, have not been included in the analysis. As an extension, it would be possible to look at the impact of foreign countries on the structure and development of China's demography.

Also it is worth to keep in mind that China is a very big country, therefore, traditions, attitudes and values differ across the country. Statements on these aspects and certain data provided in this paper should not be generalized for the whole country. In addition, the complexity of society can also cause difficulty to find accurate data. For example although being based on the same variables, different studies and sources show slight variation in data.

Like in every country China's society is dynamic and by using predicted data, it is difficult to foresee how future unexpected events will influence the demography as well as the political, societal and economic structure in any country. It is therefore, interesting to do a similar research in, perhaps 10 years, to see whether there have been any unforeseen factors that have changed the future projected demographic development in China. One example would be the recent abandonment of the one-child policy. A possible question to address would be the effect of the abolishment of the one-child policy on the demographic challenges which we have analysed in this paper.

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## 6. Appendix

### Appendix A: Demography

#### China's Population, between 1950 and 2015

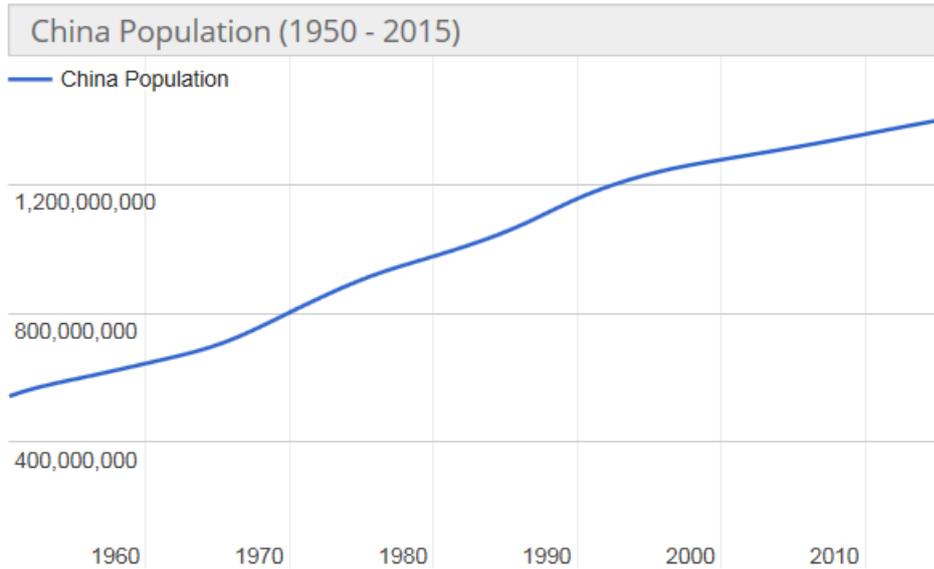


Figure 5: China's Population from 1950 to 2015 (Worldometers, 2015)

#### Beijing's future subway map, a plan



Figure 6: Beijing Subway Map 2020. (THAT'S, 2015).

**Age groups in China for the year 2014 (population in Mio.)**

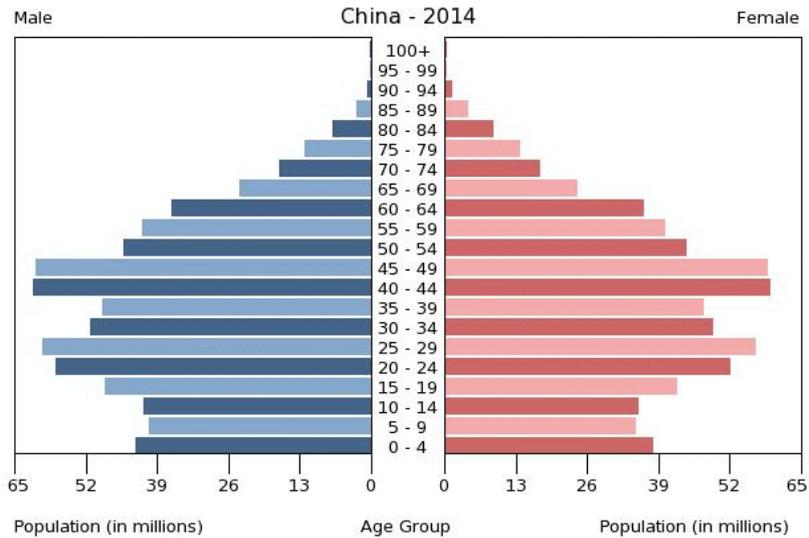


Figure 7: Age groups in China, in 2014 (Index Mundi, 2015)

**Age groups in China for the year 2025 (population in Mio.)**

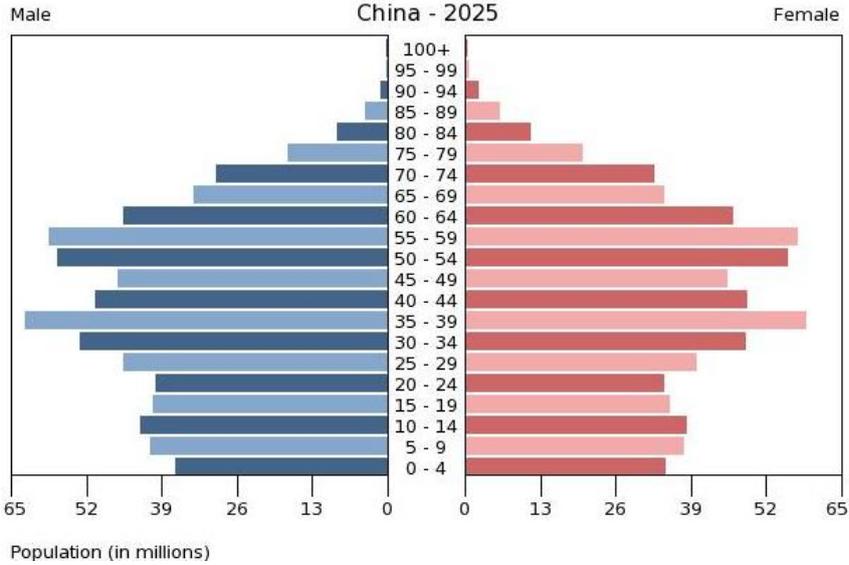


Figure 8: Age groups in China, in 2025 (Index Mundi, 2015)

**Age groups in China for the year 2050 (population in Mio.)**

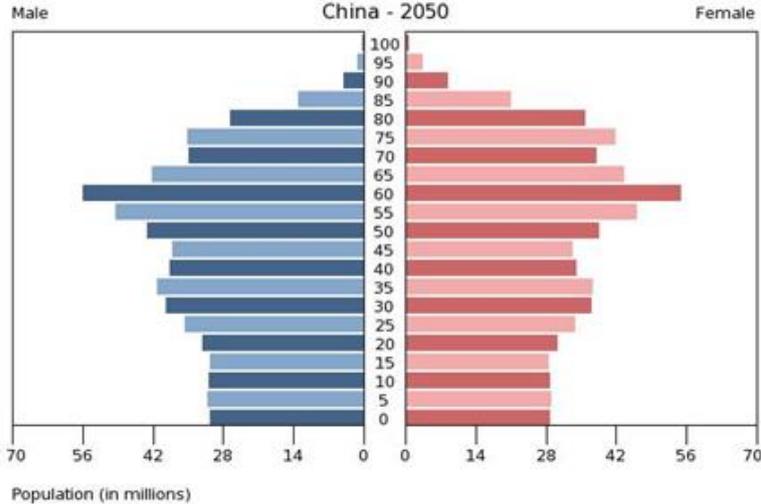


Figure 9: Age groups in China, in 2050 (Index Mundi, 2015)

**Total fertility rate, from 1950 to 2100 (children per woman)**

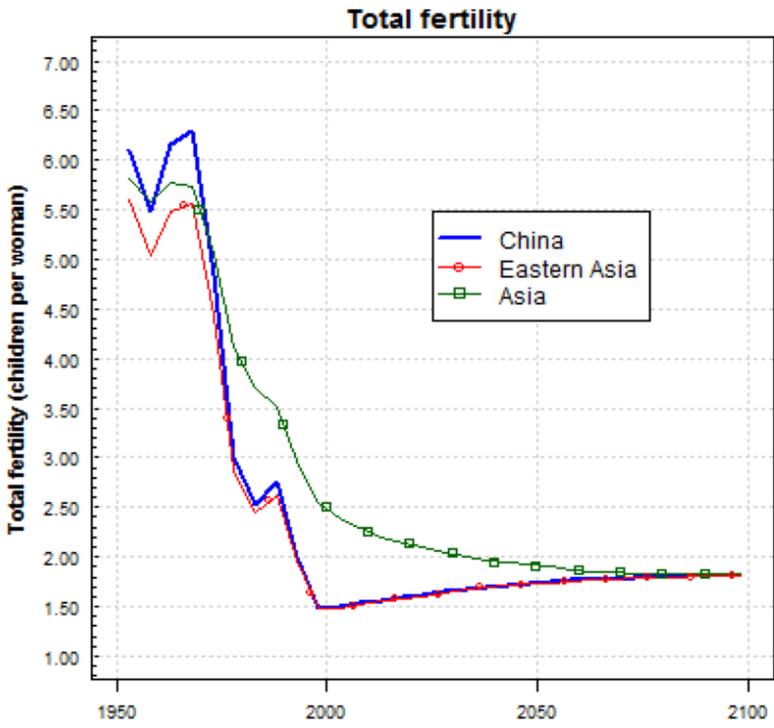


Figure 10: Total fertility, 1950-2100. (United Nations population projections, 2015)

**Total Population by broad age group in China, from 1950 to 2100 (in Mio)**

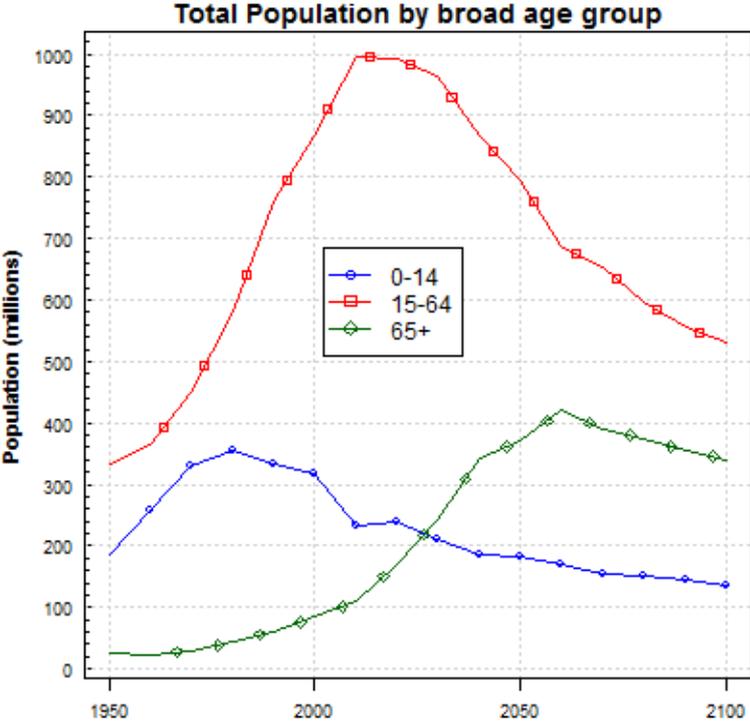


Figure 11: Total population by broad age group (United Nations population projections, 2015)

**Appendix B: The Chinese Economy**

**Real GDP growth rate in China, from 2011 to 2020**

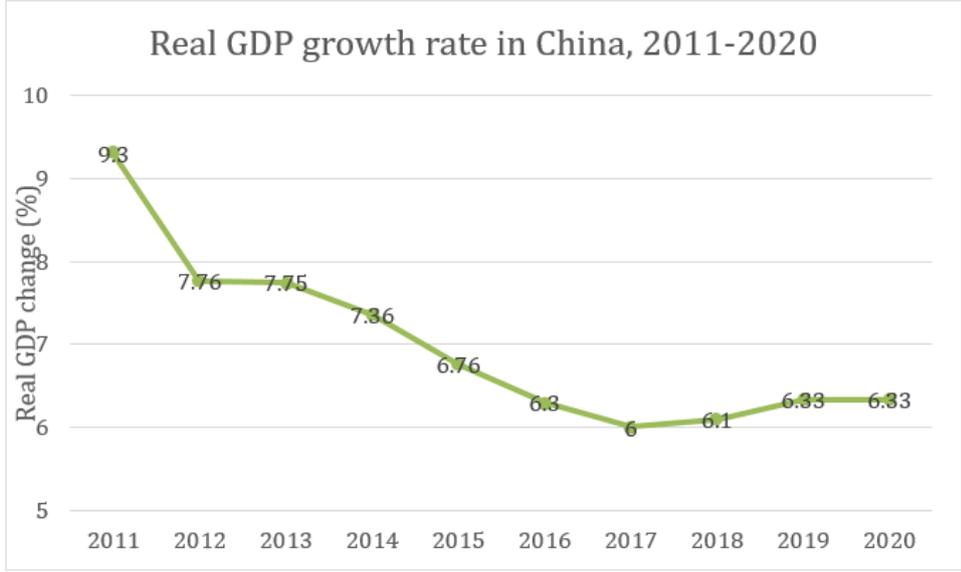


Figure 12: Real GDP growth rate in China, from 2011 to 2020 (International Monetary Fund (IMF) Forecast, 2015)

**GDP per capita in China, from 1962 to 2014 (in US. dollars)**

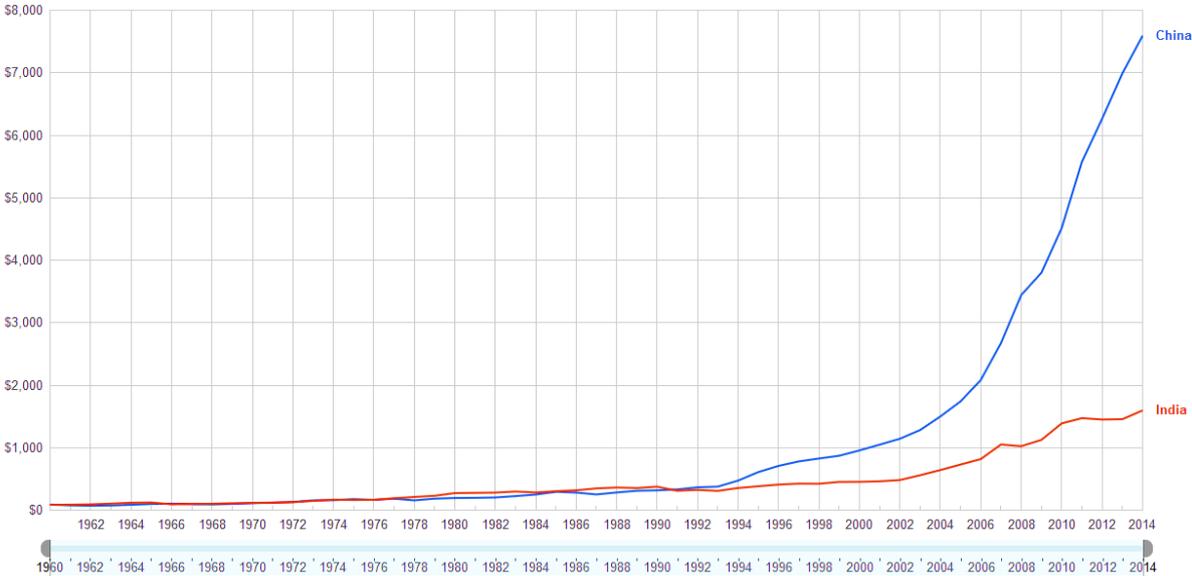


Figure 13: GDP per capita, 1962-2014 (The World Bank, 2015)

**Gross domestic product (GDP) growth rate in China 2010-2020**

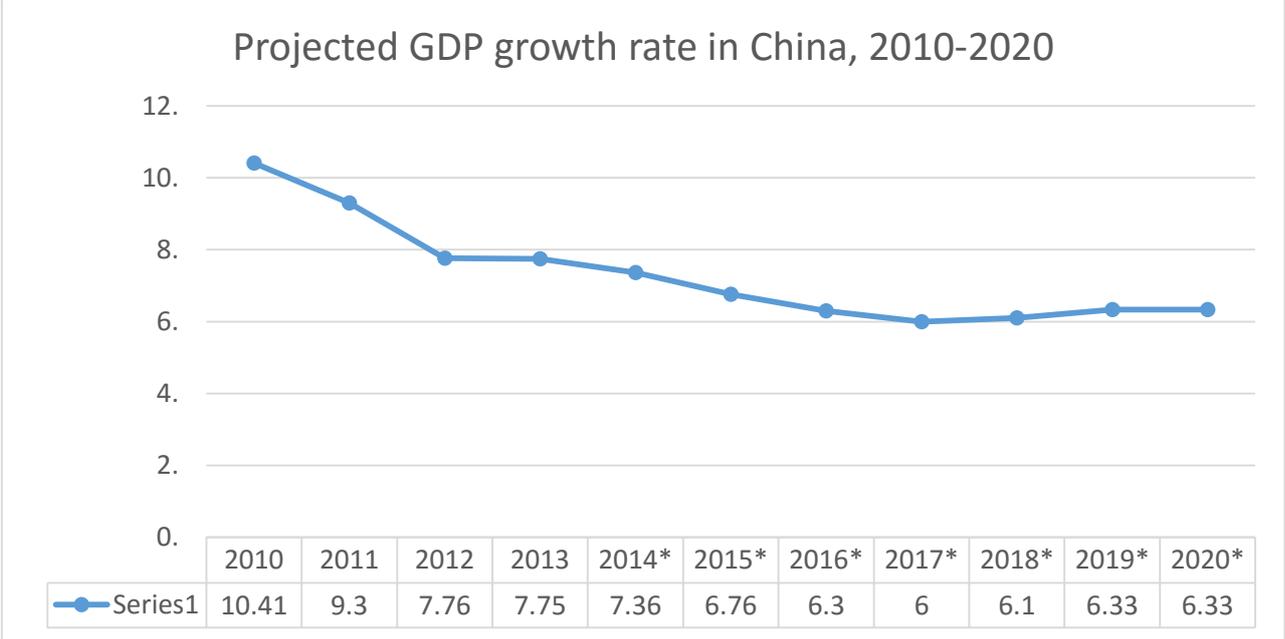


Figure 14: GDP growth rate in China 2010-2020 (Statista, 2015)

\* Forecast figures

## Appendix C: The Chinese Society

### Incremental amount of divorces, given in ten thousands

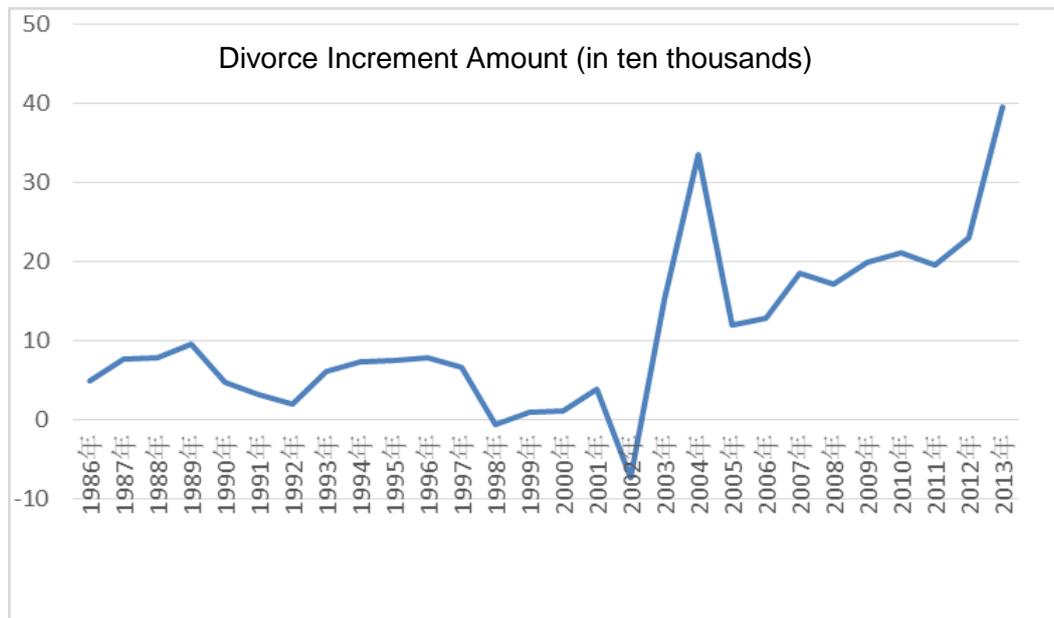


Figure 15: Divorce Increment Amount, from 1995 to 2013 (Book of the Year, 2015)

## C. Japan – what can we learn from the world’s “most aged” society?

*by Martin Ettl, Corinna Leist and Caspar Rogalla*

This paper focuses on the question of what Western European nations can learn from Japan, the world’s “most aged” society. The PESTEL analysis reveals strong interdependencies among demographic change and its impact on the three interconnected areas of politics, economics, and society, all of which are being influenced by Japan’s leading position in the field of technology. Therefore, any approach to addressing the challenges presented by an ageing society must adopt an interdisciplinary perspective, focusing on the sub-trends of fertility, longevity and migration. The main measures explored in this paper refer to re-integrating elderly into the workforce, supporting women in having a sustainable work-life balance, and further expanding immigration. To directly address the problem of a diminishing workforce, the technological development needs to be fostered simultaneously.

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*“Youthfulness is not determined by age. It is determined by one's life force. One who possesses hope is forever young. One who continually advances is forever beautiful.”*

—

Daisaku Ikeda

## **1. Introduction**

Since the end of World War II, rising standards of living in Japan have led to a higher longevity of the population (World Health Organization, 2015). According to the World Health Organization (2015), the average life expectancy in Japan is the highest in the world. In 1970, life expectancy at birth was still only 69.3 years for males and 74.7 for females. By 2025, these numbers are forecasted to increase to 79.8 and 87.5 respectively (National Institute of Population and Social Security Research, 2012b). Simultaneously, partly due to Japan's past economic success and its resulting high demand for labour, total fertility rates experienced a constant decline. The fertility rate dropped from 2.1 children per woman (over the span of her lifetime) on average in 1970 to 1.4 in 2010 (National Institute of Population and Social Security Research, 2012a). Finally, Japan's consistently low rates of immigration have not helped to alleviate the problem. Currently, less than 2% of Japan's population is of foreign origin – a proportion far below that of other developed countries (The Economist, 2014). As a result of the low fertility rates, the increased longevity and the lack of notable migration over the last decades, as well as the exceptional size of the 'baby boomer' cohort, the Japanese population has aged significantly (Harner, 2010). The three elements of the demographic megatrend, namely migration, fertility and longevity, are individually exacerbating the demographic situation in Japan and jointly rendering it especially severe.

The proportion of elderly, aged 65 and older, in the total population has more than tripled, from 7.0% in 1970 to 22.8% in 2010 (see Figure 3 in the Appendix). In addition, official projections forecast this level to rise to 31.6% by 2030 (National Institute of Population and Social Security Research, 2012c). These dynamics of ageing will eventually lead to a diminishing proportion of people of working age. According to official estimates and following this pattern, by 2030, every pensioner will be supported by less than two people of working age (National Institute of Population and Social Security Research, 2012c). Holding constant the propensity of the working age population to work, this in turn implies that labour supply will shrink. Consequently, Japan will have to rely on a diminishing workforce to support an increasing base of retired citizens. Furthermore, sinking fertility rates and low immigration rates are forecasted to lead to a shrinking population in the long-term. From 127 million in 2015, the population is projected to shrink by 8% to roughly 117 million in 2030 (National Institute of Population and Social Security Research, 2012c).

Although these dynamics of an ageing society are currently most strongly present in the Japanese society, “the ageing pattern in Japan is by far not an isolated problem case” and can be found in many developed countries (Hamada & Kato, 2007). By 2025, according to UN forecasts for Western European countries, life expectancy at birth will have increased to 78.6 years for males and 84.5 years for females. Also, the total fertility rate will be at 1.6 children per woman and the percentage of people over 65 years of age will increase to 23.5% (Population Division DESA United Nations, 2009). These numbers demonstrate that Western European nations will eventually also have to address similar demographic challenges to those currently afflicting Japan.

Therefore, this paper focuses on potential insights and experiences derived from a thorough analysis of the Japanese case system, and aims to transfer these findings to Western Europe. First, a PESTEL analysis addressing Japan’s demographic situation will be conducted and then used to identify the main demographic challenges the country faces. Second, the paper will focus on the identified key measures to cope with demographic change in Japan and try to discuss their applicability to Western Europe. Finally, the insights gained from the analysis will be set into a broader context, and recommendations for European economies facing similar demographic issues will be formulated.

## **2. PESTEL Analysis**

The PESTEL analysis serves as basis for the present paper and was conducted in order to analyse Japan’s internal environment as well as to identify the most important factors today with regard to the developments in Japan in general, and to its demographics in particular.

### **2.1. Political**

From a political standpoint, Japan can generally be considered a constitutional monarchy in conjunction with a parliamentary democracy (“Japan,” 2011). The ruling coalition of the dominant Liberal Democratic Party (LDP) with Prime Minister Shinzo Abe and the weaker New Komeito Party was renewed to political power in December 2014. Thus, the overall political outlook concerning the government and policy implementations can be considered relatively stable, providing the coalition with substantial leeway to enact its legislative agenda and to implement new policies (IHS Economics and Country Risk, 2015).

Already from the beginning of his legislative period, Shinzo Abe’s goal has been to pull Japan out of its deflationary spiral and to bring the economy back on track. Yet, this has proven to be a difficult task given the rapidly ageing and shrinking population. In fact, demography has turned into a hot and major political topic. The Japanese government’s main problem is the declining working population, which will eventually lead to labour shortages and make it challenging to support the steadily increasing number of old people. Thus, the government has

to cope with this issue by implementing sustainable policies and setting appropriate incentives. (The Economist, 2014)

Japan's government together with its special advisory panel forecasts that, over the next 50 years, Japan's overall population is expected to shrink by one third (ca. 42m people). Abe is therefore trying to act quickly to implement policies to raise the birth rate from 1.41 to 2.07 children over the lifetime of a Japanese woman in order to prevent the population from falling below the 100 million mark. (The Economist, 2014)

Even though plans to provide more publicly run childcare centres and to help mothers get back to work have been announced, population experts claim that these measures will not suffice. According to them, demographic change requires a redesign of the entire Japanese social and cultural architecture. (The Economist, 2014). In this context, Lam (2009, p. 185) states that "The Japanese government may exhort, build more child care centres, provide more financial and material incentives for women to have babies, and legislate benefits for maternity but to little avail."

Historically, Japan has allowed only very low rates of immigration. Moreover, those foreigners who did immigrate into Japan then struggled to truly integrate as the Japanese government has made little provisions regarding educational and other needs of immigrants and especially those of their children (The Economist, 2014). This is due to the fact that Japan is a very homogenous society with a rather predominant opposition towards multiculturalism (The Economist, 2014). Burgess (2014) and Clark, Ogawa, Kondo and Matsukura (2010) state that the decline of the Japanese population is indeed not only affected by its low fertility rate but also by the strict national no-immigration principle. Nevertheless, evidence suggests that, despite Japan's cultural aversion, immigration is now being considered as a possible solution to Japan's demographic problem. In this context, a government report recommended accepting 200,000 new permanent immigrants of working age per year, from 2015 onwards. However, government officials have denied that such a scale of immigration constituted government policy, rendering the recommendation a merely suggestive one. Apparently, none of the workers (primarily in the construction sector) accepted under this scheme would be allowed to stay in the country permanently due to political regulations. (The Economist, 2014)

One of the currently most pressing and thorny political issues is Japan's pension system (Lam, 2009). "About 85% of citizens are involved in the public social insurance in Japan, but the pension system is in deficit because of the worsening demographic characteristics and social insurance system management problems" (Bitinas, 2012, p. 274). While voters on the one hand worry about the sustainability of the Japanese pension system and demand more medical benefits for the old, they are on the other hand reluctant to pay more taxes to fund such social

security (Lam, 2009). Since 1985, the modern Japanese social security and pension system consists of three different pillars: The basic fixed rate national pension, the additional compulsory occupational pension (dependent upon the amount of earnings), and the private savings system (Bitinas, 2012). In 2004, an automatic payment adjustment factor was introduced to also integrate demographic and macroeconomic developments into the pension regulations (Bitinas, 2012). Nowadays, this pension system is facing solvency challenges as many young workers refuse to pay their premiums (Lam, 2009). Hence, the government is forced to spend a higher proportion of its budget on social security, thus causing it to stock up large amounts of public debt (Lam, 2009). Given this information, it is worth mentioning that already now, spending in social benefits (including health care, pensions and nursing for the elderly), exceeds spending in all other categories (Harney, 2013). According to a McKinsey report, the expenses in the health care system will make up 13.5% of GDP by 2035 ascending from 6.6% of GDP in 2005 (Henke, Kadonaga & Kanzler, 2009).

Overall, it is crucial for Japanese policymakers to understand that the longer they wait to tackle the problem of their ageing demographics, the higher the long term costs will be to its economy. While this “transformation has only just begun”, it is already weighing heavily on Japan’s national finances and strongly impacting its voter demographics, with voters over 60 years of age by now constituting 44% of total voters (Harney, 2013). Explicitly, this leads to older people exercising greater influence on political decisions, thereby primarily pushing elderly-friendly policies despite their potential costs to Japan’s long-term economic health. Consequently, electoral politics that favour the short-term gain of voters over the necessary long-term measures to address Japan’s pressing demographic and corresponding economic issues, need to be overcome in the near future (Harney, 2013).

## 2.2. Economic

While Japan is currently still the third largest economy in the world, its continuously worsening condition of stagnant growth and deflation is putting tremendous pressure on its government (Matthews, 2015). When Japan’s real estate and stock market bubble burst in the early 1990s, wages stagnated and consumers cut back on their spending, leading to a severe slowdown in economic growth and an increased level of government debt (Sharp, 2015). With GDP growth barely breaking above the 0% mark even before 2008, the global financial crisis hit the country’s export-dependent economy hard, with weak global demand eventually leading it into a recession from which it has not yet been able to fully recover (see Figure 4 in the Appendix). In addition, the country’s proneness to natural disasters, such as its “devastating earthquake, the tsunami and its nuclear meltdown in 2011”, has exacerbated the situation (Sharp, 2015).

As if this were not bad enough, Japan's ageing society and decreasing number of workers has led to a "concomitant decline in its manufacturing capacity", which heavily underpins the country's export-dependent economy and contributes 27% to its overall GDP (see Figure 5 in the Appendix) (Lam, 2009, p. 178). While deflation and the corresponding devaluation of the Yen have originally helped to nurture Japanese exports in the short term, the low Japanese yields have encouraged purchasers and investors to save their money rather than invest it into "solid and assured securities" (Economywatch, 2010). The therefrom resulting "liquidity trap" has further worsened the government's huge national deficit, which is predicted to reach 246% of GDP in 2015, thus making Japan the country with the highest sovereign debt ratio in the world (see Figure 6 in the Appendix).

While many prime ministers in the past have failed to get the country out of the recession, in January 2013, Shinzo Abe adopted his policy of "Abenomics", a "three-arrow strategy" aimed at guiding the country out of its economic crisis (The Economist, 2015). The first arrow consisted of a policy of quantitative easing, where large amounts of money are printed in order to stimulate economic growth. The second arrow is comprised of an economic stimulus package, e.g. in the area of social security, which is supposed to establish a more flexible allocation of government funds. Lastly, the third arrow, consisting of far-reaching structural reforms and business deregulation, is aimed at increasing the participation of females in the labour force and adjusting the country's taxation politics (The Economist, 2015). While economic growth had indeed briefly returned, the country slid back into a recession in the second quarter of 2014, as growth had been negatively influenced by an increase in the sales tax that had been intended to "claw away the world's biggest debt burden" (Sharp, 2015). As consumers reacted by cutting back their consumption and reducing their support for the current government, the government now plans to implement instead cuts to Japan's relatively high corporate tax rate in order to help boost the economy. Yet, while this decrease in corporate tax spending will help relieve Japan's strained economic sector, it will in turn result in lower available financial resources for the government. Thus it will probably fail to address its original goal of solving Japan's huge sovereign debt problem, and thereby making a slowly unfolding fiscal crisis in Japan more and more imminent (Matthews, 2015; The Economist, 2015).

As previously mentioned in section 2.1., the Japanese pension system has proven to be in need of considerable reform. Currently, social security and pension insurance obliges the present generation of workers to contribute to a common pool from which the benefits of current retirees are paid. In this system, the problems that the Japanese government are facing are threefold: Firstly, with an increasingly old population, social security costs and expenses for elderly care including their medical expenses have increased considerably, thus creating a

shortage of resources. Secondly, due to decreasing workforce participation, income tax revenues are low and there is a shortage of labour to provide services for the elderly. Lastly, as individuals forecast longer retirements and higher elderly care costs, people are increasing their savings and decreasing consumption, as they are afraid of not being able to benefit from their own social security contributions in the long-term. (Hamada & Kato, 2007)

In summary, one should mention that “Abenomics” currently risks “veering away from its original ambition into populism and misguided policy” as a result of changing voter demographics (The Economist, 2015), thus requiring alternative measures, such as higher levels of permanent immigration or improvements in corporate governance frameworks in order to get the country back on the track of economic growth.

Despite Japan being known for its “cultural aversion to immigration” (Matthews, 2015) and foreign workers accounting for only 1% of Japan’s total labour force in 2012, recent polls by Takenaka and Nakagawa (2015) have shown that roughly 75% of Japanese companies actually support “opening up the country to more foreign workers in low-skilled jobs” in order to combat the nation’s rapidly worsening labour shortage. While an increase in permanent immigration is considered a promising way out of the economic and demographic ageing crisis, the government currently still seems highly reluctant to do so.

### 2.3. Societal

As a consequence of industrialization in the 20th century, inter-region migration – associated to changes in professional occupations – has caused Japanese families to grow smaller in size and to become more nuclear (Fujimura, 2009). This trend was additionally reinforced by Japan having a rather paternalistic society with a slightly individualist leaning, where the family assets are typically inherited by the eldest son, obliging the younger siblings to leave home and make their own living with their “own core families” (The Hofstede Centre, 2015). Furthermore, with Japanese women attaining higher levels of education, they now tend to marry and have children later than they used to before, which further advances the single-household or nuclear family phenomenon (Lam, 2009).

Applying Hofstede’s model of Cultural Dimensions to the case of Japan allows us to gain further crucial insights on where the country is coming from and why changes both in politics as well as in society in general seem to be so difficult to implement. In this context, it should be mentioned that Japan is a country with extreme scores in several of the model’s dimensions. This in turn leads to a potential non-transferability of some of this paper’s insights to the Western European context, a point that will be discussed in-depth in the limitations section.

Generally, it can be noted that Japan embodies a “borderline hierarchical society” (power distance). While on the one hand, there is a high level of consciousness for one’s hierarchical position, Japanese society on the other hand also possesses strong meritocratic characteristics, implying a strong notion that everybody is born equal and can get ahead if he (!) works hard enough. This strong focus on the male side of society already displays the fierce differences in role perception between the genders and its consequently very low rate of female participation in the labour force. With the Japanese being “famous for their loyalty to their companies” and their “notorious workaholism”, their masculine norms of long and hard working hours easily help to explain the country’s decreasing birth rate and females’ difficulty in climbing up the corporate ladders. (The Hofstede Centre, 2015)

While the value system of many Japanese women concerning work, marriage and childbirth has changed considerably, the regulations in Japanese corporations and the value system of men have not. Men’s value system is currently still predominantly focused on the male breadwinner model, where the father is responsible for providing for the family (Lam, 2009). Yet, due to increasing irregular employment and higher unemployment rates, the male breadwinner model is challenged, requiring more and more females to actively participate in the workforce. While this can generally be considered as a positive development with regard to GDP growth and increased social security contributions, Japanese corporations have failed to establish rules that encourage women to have more children, as there is “neither compulsion nor penalties against corporations which do not abide by the norms of gender equality” (Lam, 2009, p. 181).

Furthermore, Japan is “one of the most uncertainty avoiding countries on earth”, which can be partly attributed to its constant threat of natural disasters. As people have consequently learned to prepare for such uncertainty, life has become highly ritualized, with everything being prescribed for “maximum predictability” and great effort and time put into feasibility studies that ensure that “all risk factors have been worked out before a project can start”. Japan’s high need for uncertainty avoidance thus explains why changes are so difficult to implement and why decision-making in Japanese companies is typically a very long and tedious process. (The Hofstede Centre, 2015)

Lastly, it shall be noted that Japan is also one of the countries with the highest long-term orientation scores in the world, as they see their lives as only a very brief instance “in the long history of mankind”. This long-term aspect of Japanese society is illustrated in the country’s “constantly high investments into R&D, its higher own capital rate, and its priority to steady growth of market share rather than to a quarterly profit” – even despite its increasingly difficult economic situation. (The Hofstede Centre, 2015)

## 2.4. Technological

Japan is considered an “innovative force in consumer electronics and technology”, with this sector constituting a large part of Japan’s exported goods (Statista, 2015). In 2012, Japan earned approximately 50% of the global shipment value of industrial robots, produced roughly 23% of global units in operation and held a share of 90% globally in the field of key robot elements, including precision reduction gear for robots, servo motors and force sensors (The Headquarters for Japan’s Economic Revitalization, 2015). With Japan ranking second place in the 2015 Bloomberg Innovation Index that considers R&D, manufacturing, Hi-tech companies, education, research personnel and patents, it can be considered an innovative nation (Coy, 2015). Thus, technology is an integral part of the Japanese economy and has historically been a reliable source of GDP growth. In 2013, 74.3% of the Japanese GDP originated from the service sector (Central Intelligence Agency, 2015). As this sector is very labour intensive, it is and will be severely affected by the projected scarcity of labour. The challenge therefore is to reduce the amount of human labour required in service activities.

In his speech to the OECD Ministerial Council in 2014, Japan’s Prime Minister Abe proclaimed Japan would create a “new industrial revolution” through the use of robots (Prime Minister of Japan and His Cabinet, 2015). He goes on to state that robotics technology is capable of diminishing the low productivity, which the service sector is facing globally, “at a single stroke”. By e.g. taking over more trivial tasks in the nursing care system, robots would allow workers to be active in more high value-adding activities. According to an official roadmap, a single robot can replace about ten employees (Fox News, 2008). In effect, Abe sees robotics to be a vital source of growth for Japan, and moreover, to have the potential of becoming a global application: “The robot revolution started in Japan will change the world” (Prime Minister of Japan and His Cabinet, 2015). The government further forecasts a strong surge in the industry from 600 billion yen (\$4.9 billion) annually to 2.4 trillion yen by 2020 (Bremner, 2015). To this end, the Robot Revolution Initiative Council, a forum for exchange on the matter, was founded in May 2015 (Bremner, 2015). Furthermore, a budget of ca. \$138 million direct investment in robotics has been planned for 2015 (Knight & Kaneko, 2014).

It can be seen that Japan is taking a uniquely visionary approach to support a dwindling labour force with robotic solutions. This endeavour is rooted deeply in Japanese society, with its population being very open to technological progress, especially in the fields of humanoid robotics and artificial intelligence (Fox News, 2008).

## 2.5. Ecological

For large parts of the post-war era, Japan prioritized economic development over any concern for the environment, focusing on heavy industrialization (Wu, 2009). However, in the 90s,

Japan underwent a green conversion, which culminated in it hosting the 1997 climate change convention in Kyoto (United Nations Framework Convention on Climate Change, 2014). This conversion lasted until today and the Japanese society has by now developed a strong conscience for environmental concerns. In the years 2014-15, Japan placed 26 out of 178 in the environmental performance index (Yale University, 2014).

The interrelations between an ageing society and the environment however are limited. A study focusing on such effects in Europe found that the “ageing of the population in itself is not likely to lead to significant environmental changes or pressures” (COWI A/S, 2008, p. 2). One minor exception found is that the consumption of heat, gas and other fuels was higher for the elderly than for the rest of the population, as the elderly have smaller households with larger living space in m<sup>2</sup> per inhabitant (COWI A/S, 2008). On the other hand, although the climate conditions might shift strongly and thus have an effect on the older cohort’s health condition, an attempt to identify concrete effects seems rather farfetched.

## 2.6. Legal

The executive power to introduce and implement new policies lies within a cabinet that is composed of a prime minister and several ministers of state, which all have to be civilians. Only the Supreme Court has the right to make decisions, which can have a direct effect on any later interpretation of the law. Overall, the judiciary in Japan is independent. ("Japan," 2011)

Already in the year 1986, the Japanese parliament passed an Equal Employment Opportunity Law to achieve a society with equal rights for all genders. Yet, as previously mentioned in sections 2.2 and 2.3, the implementation of such gender equality laws lacks in effectivity and has so far been rather unsuccessful (Lam, 2009).

However, in recent years, there have also been changes from a legal point of view to address the demographic trends and problems that Japan is facing. As Japan’s policymakers noted, “No other country in the world has ever had to grapple with an aging problem as serious as the one facing Japan” (Ministry of Health, 2011b, p. 5). Therefore, there have been changes in Japan’s laws to address the issues of low fertility rates and the increasing number of old people. For instance, there have been changes regarding the Child Care and Family Care Leave Law, the Child Allowance and Employment Measures for Older People in Japan (Ministry of Health, 2011c). Further details of these particular measures will be discussed in chapter 3 of the present paper.

## 2.7. PESTEL Conclusion

In the previous sections, a PESTEL analysis was conducted to better understand Japan’s current situation, giving special attention to the demographic situation and identifying the

country’s main demographic challenges. As it is the goal of this paper to identify possible solutions to Japan’s challenges caused by demographic ageing, evaluating the importance of any single PESTEL dimension must take into account not only the individual influence and impact of each of the factors on demographic change, but furthermore, evaluate the potential contribution to tackling the problem. To create a generic overview of the PESTEL results, three design driving motives must be taken into account. Firstly, strong interdependencies between the areas of politics, economy and society can be perceived which in turn underlines the nature of demographics as a cross-sectional topic. Furthermore, some of the introduced factors have a stronger impact than others when referring to the topic of demography and with regard to Japan’s problems in particular. Ecology and legal were identified as elements having a weaker impact and therefore take a more peripheral position. Finally, technology was perceived to be a more overarching theme. These motives are incorporated in Figure 1.

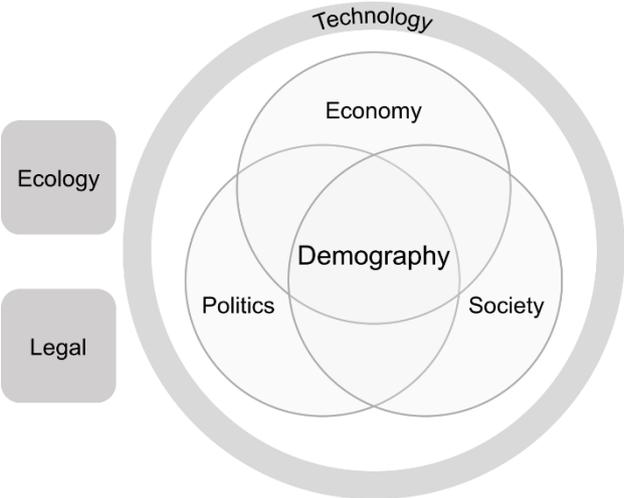


Figure 1: PESTEL Conclusion

*Politics*

When looking at Japan’s political environment, policy implementation was identified as an area for improvement in order to efficiently overcome the big obstacles that are currently still preventing the country from reversing its challenging demographic trend. Japanese politics will need to find a way to break through the rigid societal and corporate norms, to stop focusing on short-term electoral gains and rather focus on efficiently implementing the guidelines that have already been established within the existing legal framework.

*Society*

With regard to Japan’s societal environment, it seems that change is necessary in order to raise awareness in the Japanese society for the pressing demographic challenges. The goal should be an open societal debate that involves further interest groups besides only politicians

trying to use short-term focused political incentives in order to get re-elected. A change in the mind-sets of Japanese' individuals is necessary to mutually overcome the struggles that the whole population is facing. In the light of Hofstede's cultural assessment, with Japan scoring particularly high in the dimensions of uncertainty avoidance and long-term orientation, it indeed seems somewhat paradox that the demographic issues are not yet addressed as much as one would expect taking into consideration that demographics represent the single most important factor determining the countries long-term prospects (Harney, 2013).

### *Economy*

When assessing Japan's situation from an economic perspective, new impulses are needed as the country is in a deep recession and facing a deflationary situation. Furthermore, the nation's public debt is constantly increasing and has reached the highest level globally when compared to the country's gross domestic product. This is partly due to the fact that pensions are currently paid by issuing new debt, which makes the sustainability of the financial sector in general, as well as the pension system in particular, highly questionable. Thus, considering Japan's extreme economic developments, the demographic ageing problem is currently not the primary focus of Prime Minister Shinzo Abe and his government.

### *Technology*

Technology originates from and influences all central categories (society, politics and economy) and can hence be understood as an overarching theme, able to relieve pressure among them. In this area, Japan can be considered to be on a good track. It was seen that robots have a very positive image in the Japanese population. Additionally, by having already investing a lot into automation and robotics to substitute human workers in low-skilled jobs, Japan has become an innovation leader in the areas of e.g. factory assembly and foster homes, where it is crucial to use the means of technology in order to be able to deal with the increasing number of elderly people. Nevertheless, Japan must not disregard further investments into technology in order to maintain its role as an innovation leader.

### *Ecology*

The ecological field was shown to have fairly minor implications with regard to demographics. The present challenges in the ecological environment, which include climate change, CO<sub>2</sub> emissions and nuclear power plants, are thus not directly linked to demographic issues. Nevertheless, it is of great importance for the Japanese society to deal with resources efficiently and to keep global environmental issues in mind as following generations should not be additionally burdened by environmental issues on top of demographic challenges.

## *Legal*

The legal environment is considered a result of political decision-making and changes in this area are mediated via Japan's politics. Therefore, it is also considered a more peripheral element. While our analysis did reveal a relatively progressive legal framework capable of ensuring a healthy development regarding demographic evolution, its success will rely on an active translation into practice. Laws securing gender equality, ensuring a work-life balance with regard to labour and family, and establishing rules for the employment of the elderly do exist. It is now the task of the politicians and the society as a whole to encourage the economic environment in general and the Japanese corporations in particular, to enforce this coherent legal framework through sophisticatedly created policies.

To conclude, unlike other major challenges, such as Japan's current recession, the impact of demographic change will not only affect a single aspect of Japan's PESTEL environment individually, but is highly likely to permeate through all economic, political, and societal structures. Therefore, it is of utmost importance to pay particular attention to the megatrend of demographic change as a whole rather than focusing on any particular area, e.g. investing governmental resources only on fighting economic problems.

### **3. Recommended Measures and Key Insights**

Due to the strong interdependencies, the overall solution to Japan's ageing crisis will consist of a multitude of complementary factors. However, this is easier said than done: In order to tackle the diminishing workforce problem, immigration of young workers needs to be promoted and a significant increase in the participation of women and the elderly in the workforce must be achieved. Furthermore, the state, society and corporations must work together to change societal norms, become more supportive of working mothers and truly implement existing legal reforms. To relieve pressure on the state budget, the pension system needs to be reformed and the consumption tax needs to be increased in order to pay for social security. (Lam, 2009)

In this context, Lam (2009, p. 178) proposes that "the two key impediments [...] are: electoral politics which avoids making hard decisions painful to voters especially the hiking of the consumption tax, and even more insidious, the norms of Japanese corporations and patriarchal society, which discourage women from marrying and producing babies while holding onto a career and aspirations of their own."

At its core, the dynamics of the megatrend demography are driven by its three sub-trends, namely longevity, fertility and migration. These three factors represent the causes for demographic challenges. As discussed in the above PESTEL analysis, for Japan, these three factors are geared in a direction, which renders the current demographic situation particularly severe, thereby creating a tense situation that is marked by a diminishing work force and social

security issues. These results can therefore be referred to as the symptoms. For an integrated approach, it is essential to address both the causes as well as the symptoms of the problem. Thus, each element will be considered separately and the insights from the PESTEL analysis will be allocated either to the individual symptom or to the cause dimension. Furthermore, the PESTEL insights will be translated into recommendations, including more practical examples to demonstrate possible areas of application. Such recommendations addressing the causes are thus the “reintegration of the elderly”, “family and female friendly work models” and a “more open immigration policy”. A “technological boost” is in turn recommended to counter and weaken the negative symptoms.

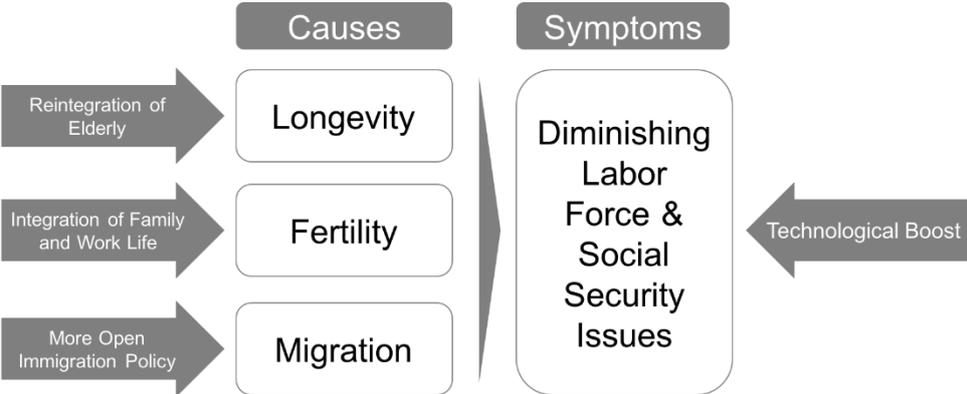


Figure 2: Recommended Measures for demographic challenges

### 3.1. Reintegration of Elderly into the Workforce

In order to address the diminishing labour force as well as the precarious social security system, it is essential to reintegrate more elderly into the workforce. Elderly in the workforce can help the society by accomplishing tasks that nobody else would otherwise do. As an added benefit, the elderly could thereby earn some income in order to supplement their pensions, thus relieving some pressure from the already strained social security system.

Accordingly, a law regarding the employment of elderly has been implemented in order to take this important aspect of the ageing society and increasing number of pensioners into account. For instance, this law secures elderly employment for everyone who desires to work up until the age of 65 and also made acceptance of such work a legal obligation to employers (Ministry of Health, 2011b; The Japan Times, 2013).

With the “Silver Human Resource Centre”, the Japanese have introduced one example of a new concept of how to reintegrate old people after retirement back into the working life. The “Silver Human Resource Centre” provides elderly persons aged 60 or older with jobs in their community and aims to revitalize the local environments. The objective is to offer another employment opportunity for a short-term or light work job to those elderly that are in good health and still have the desire to work after mandatory retirement. The business model states

that the “Silver Human Resource Centres” enter into contracts with e.g. companies, families, and municipalities for temporary community-based job opportunities. Then, jobs are assigned to those elderly who express interest and are registered. The elderly are compensated by the “Silver Human Resource Centres”, which are funded by the job suppliers themselves based on elderly performance. Possible work opportunities include the following: Addressing letters or cards, managing (park) facilities, cleaning, guiding tourist tours, doing welfare or housework services and assisting in child-raising or as supplementary school teachers. (Ministry of Health, 2011b)

Such employment opportunities are believed to “Increase job opportunities, create a purpose of life and revitalize the community for the elderly” (Ministry of Health, 2011b, p. 19).

This practice of re-integrating old people after retirement back into the workforce also seems applicable in Western countries. Yet, the motivation needs to be high enough for the people to work for their community and assist in rather low-skilled labour. Luckily for Japan, 36.8% of people over 60 state that they want to work as long as they can (Ministry of Health, 2011b). In Western European countries, this special motivation would also give the opportunity to let the remaining and diminished young workforce focus on highly intellectual or specialized work and hereby keep the same economic level as now present.

### 3.2. Integration of Family and Work Life

In addition to reintegrating the elderly into the workforce, there is also strong need to support women in the integration of both family and working life. If successfully managed, this could lead to an increased fertility rate as well as an enlarged workforce, thereby tackling the demographic challenges.

Nevertheless, a big obstacle toward gender equality at work and at home is the unsupportive societal and corporate attitudes, with long office hours and late nights out bonding with colleagues (Lam, 2009; The Economist, 2014). The starting point for political measures should therefore be to tackle precisely these obstacles. However, “Meanwhile, recent measures to boost the birth rate, such as assigning gynaecologists to remind young women of their biological clocks, smack of desperation” (The Economist, 2014).

The revised Child Care and Family Care Leave Law was designed to address the falling birth-rate, the commenced decline of the Japanese population and the employment situation of Japanese women. Nowadays, upon giving birth to children and starting child care, the majority of Japanese women leave the labour force. Hence, there is a huge gap for parenting-age women between the actual and the potential rate of participation in the labour force. Additionally, there is a tremendous gap between reality and people’s desires with regard to

marriage, childbirth, or parenting – factors strongly contributing to the rapid decline in the birth rate as well. The new law includes a work-life balance charter and several action policies. It tries to break the approach that Japanese people have to choose between either work or marriage and having a child. A first concept of work-life balance is supposed to be implemented by changing the working style and building a framework (social infrastructure) that helps parents balance working on the one hand and having children on the other. For instance, the law states that families' should be supported with childcare. The goals in this respect are to change the work style of parenting workers sustainably, to establish work styles that allow fathers to participate in the child care and to assist workers in balancing work and family care. It is crucial that all goals be achieved effectively and in a timely manner. (Ministry of Health, 2011d)

Accordingly, the child allowance system has also been implemented from the viewpoint that the whole society should provide support for raising children, as those are the ones that will play the crucial role for Japan's long-term prospects (Ministry of Health, 2011a). In order to tackle the problem of a low birth rate, the "Child Allowance" law thus tries to establish an environment in which children can be raised without any personal risks due to economic and financial hardships, therefore implicitly also enabling to afford raising and educating their children (Ministry of Health, 2011a).

### 3.3. More Open Immigration Policy

As previously mentioned, Japanese show high degrees of reluctance when it comes to accepting foreign immigrants into their country. This characteristic is based on the fact that Japan has been "one of the few industrialized countries not to have experienced a tremendous inflow of international migrants in the post-war period", thus causing the Japanese to perceive themselves as highly "homogenous people [...] who constitute a racially unified nation" (Burgess, 2014). In the words of Japan's former communications minister Taro Aso from 2005: "one culture, one civilization, one race". This impressive sense of national identity and cultural aversion has long been the basis for Japan's "no-immigration principle", which basically states that Japan does not accept permanent migrants (Burgess, 2014). Already in the past, instead of depending on foreign labour in times of labour shortage, the Japanese have been pushing for increasing automation in production, making it one of the world's most innovative country's (Kashiwazaki & Akaha, 2006).

Yet, the consequences of globalization as well as some social and economic factors, such as demographic ageing and shrinkage of the Japanese population, are increasingly pushing Japan toward a more open immigration policy in order to balance its declining population. Hidenori Sakanaka, the former Justice Ministry Official and director of the Tokyo immigration

bureau, has been able to provide ample demographic evidence for his claim that “only immigration can save Japan” and recent polls by Takenaka and Nakagawa (2015) have shown that three quarters of Japanese companies actually support “opening up the country to more foreign workers in low-skilled jobs” in order to combat the nation’s rapidly worsening labour shortage. Nevertheless, both have failed to understand that policymaking is de facto heavily influenced by “elite prejudices and public perceptions” (Burgess, 2014). While opinion polls have reported the Japanese public to be increasingly worried about the effects of a declining population, these polls have also shown that the public’s ideas of how to increase labour supply primarily focus on increasing the rate of working women and encouraging more elderly to work. In line with Japan’s no-immigration principle, only 37% of respondents have stated that more foreign workers should be accepted, and only about 10% of those additionally claimed that manual workers should be accepted (Takenaka & Nakagawa, 2015). This observation is closely linked to the “public’s mounting concerns about public security and growing apprehension about international terrorism”, which is leading Japan to adopt stricter immigration controls and to prevent foreigners in general from staying long or settling down (Burgess, 2014; Kashiwazaki & Akaha, 2006).

All in all, in response to demographic change and decreasing population, the government has been under increasing pressure to “relax its requirements for highly skilled foreigners” to enter the country (Kashiwazaki & Akaha, 2006). Nevertheless, those workers who could actually address the country’s mounting problem of labour shortage and who fall into the more “unskilled” category are still denied entry into the country for the longer term (Takenaka & Nakagawa, 2015). A highly recent example of current immigration politics is provided by the Japanese government’s 2020 Tokyo Olympics policies, where demand for construction workers is met through an expansion of technical internship trainee programs that allow longer stays until the fiscal year 2020, but not thereafter (Burgess, 2014).

### 3.4. Technological Boost

Japan’s society is interspersed with its uniquely visionary attempt to support a dwindling labour force with robotic solutions. Firstly, as seen in the PESTEL analysis, there is a strong support of this approach on a political level. For instance, in 2013, the central government awarded the Sagami province the special economic zone status of “Sagami, city of robots” (Japan Local Government Centre (JLGC) London, 2015). Alongside a large concentration of subsidized industries, research centres and university laboratories specializing in research and development of personal assistive robotics, a number of care centres and hospitals enabling functionality tests and developing prototypes can be found (Japan Local Government Centre (JLGC) London, 2015).

Moreover, the vision of robotic solutions has also established itself in Japanese businesses. There are a great number of examples of Japanese companies that have already developed intelligent robotics solutions. In 2015, Mayekawa introduced the "DAS" Series, a line of equipment for meat processing, which is considered to be very difficult, as meat processing robots have to be capable of sensing the subtle differences in each object such as shape, size, and firmness (MAYEKAWA Europe NV, 2015). A further application of robotics is found in the healthcare system. In this area, the utilization of robotics counters the effects of an ageing population by two means. On the one hand, it addresses the dwindling supply of labour, especially in the healthcare system, where Japan is forecasted to have a shortage of approximately 400.000 skilled workers (Nicolaysen, 2014). On the other hand, it meets the increased care demands resulting from an increasingly aged society (Nicolaysen, 2014). Therefore, the Japanese government estimates that "the market for care service robots will reach \$3.7 billion by 2035 from just \$155 million today" (Tobe, 2014). A concrete example for robotics is the "care assist robot" developed by the automotive producer Toyota Motor, which can help lift patients out of bed or accompany them to the bathroom (Toyota, 2014). Panasonic created a bed of which one part can transform into a wheelchair (Panasonic, 2009).

However, applications in the field of automation and smart gadgets stand only at the base of the robotics revolution. While automated processes can decrease the labour demand in trivial and repetitive tasks, the key metric for robotics is the level of artificial intelligence (AI). According to popular research, this metric determines capabilities such as reasoning, knowledge, planning, learning, natural language processing (communication), perception and the ability to move and manipulate objects (Luger & Stubblefield, 2004; Nilsson, 1998; Poole, Mackworth & Goebel, 1998; Russell & Norvig, 2003). The main challenge for robots is to move beyond process automation and enter the field of human interaction, or, in the words of the head of Fujisoff's Robot Department, to "change from mere tools to actual partners" (Gulf Times, 2014). A good demonstration on how AI permeates into practice can be seen in the following example. The Henn-na Hotel in Sasebo, Japan is unique in the sense that it is staffed with robots. Opening in 2015, it was designed conjointly by Kawazoe Lab, the Institute of Industrial Science at the University of Tokyo, and Kajima Corporation and therefore represents a good example of technological cooperation on a high level. In this hotel, guests are invited to engage in "warm" and "friendly" conversation with robots deployed to help guests check in and out, whilst porter robots tend to the luggage, and cleaning robots ensure hygiene (Robarts, 2015).

When discussing such advancements one must question, whether any level of AI will be able to replace actual inter-human relations and sentiments even to a partial extent. Although robots

are likely to become increasingly similar to humans, they will never have the genuine and authentic emotions as experienced by humans. One study has found mixed sentiments towards certain healthcare robots and derived that acceptance of healthcare robots can be created by “assessing the needs of the human user and then matching the robot’s role, appearance and behaviour to precisely those needs” (Broadbent, Stafford & MacDonald, 2009, p. 319). However, it was shown that the Japanese population is rather open to the utilization of robots, perceiving them as “friendly helpers” rather than “often rebellious and violent machines that often inhabit Western science fiction” (Fox News, 2008). While this is worth mentioning regarding the final analysis of the transferability to Western Europe, this aspect will not be further investigated in the context of this paper.

To summarize, the measure identified to approach the diminishing workforce problem is a combination of Japan’s political and economic support for robotic solutions, combined with a general openness towards the use of this technology. Through a strong cooperation between research institutions and companies, this in turn affects the high emphasis on intelligent and practical solutions within Japanese businesses. However, on a side note, the challenge must not be underestimated: “Still, Japan faces a vast challenge in making the leap – commercially and culturally – from toys, gimmicks and the experimental robots churned out by labs like Takeno’s, to full-blown human replacements that ordinary people can afford and use safely” (Fox News, 2008). Nevertheless, Atsushi Mano, the director of robotic technology at the trade ministry’s New Energy and Industrial Technology Development Organization has high hopes: “We think robotics can make Japan competitive again” (Knight & Kaneko, 2014).

#### **4. Summary**

This paper focused on the question of what Western European nations can learn from Japan, the world’s “most aged” society. The PESTEL analysis revealed strong interdependencies among demographic change and its impact on the three interconnected areas of politics, economics and society, all of which being influenced by Japan’s leading position in the field of technology. Therefore, any approach to addressing the challenges presented by an ageing society must adopt an interdisciplinary perspective, focusing on the sub-trends of fertility, longevity and migration. The main measures explored in this paper refer to re-integrating elderly into the workforce, supporting women in having a sustainable work-life balance, and further expanding immigration. To directly address the problem of a diminishing workforce, the technological development needs to be fostered simultaneously.

##### **4.1. Limitations**

Regarding this paper’s endeavour to obtain potential learnings from the study of the Japanese case to apply to Western European countries, one must acknowledge the uniqueness and

specifics of the Japan case with regard to its distinct economic, cultural and geographic situation.

Firstly, the economic situation marked by a high debt ratio and the long on-going recession makes it hard to compare Japan to Western European countries. Furthermore Hofstede's Analysis of Japanese culture reveals that Japan displays extreme scores across various dimensions and therefore significant differences in comparison with Western nations. Finally, Japan's isolated geographic situation may not be easily comparable to countries lying in the European Union that are directly connected via comparably open borders.

Furthermore, the conducted PESTEL analysis needed to adopt a fairly focused scope, due to constraints regarding the frame of the paper format itself. Therefore, this paper might be missing aspects that can additionally impact the drawn conclusions. Lastly, the authors of this paper might reveal a certain level of bias due to the fact that they are themselves from one particular Western nation and have not yet had an in-depth and first hand exposure to the Japanese context. The authors' judgment is thus based solely on secondary literature, as the development of an understanding for the more contextual societal norms was not possible.

#### 4.2. Outlook for Future Research

As previously mentioned, the transferability of the report's insights to the European context should be further explored. Furthermore, it would be interesting to closely observe the future measures taken by the Japanese government as well as the change in societal and corporate norms in order to validate whether the identified measures in this paper really have the strongest impact on Japan's severe demographic challenges.

Moreover, a deeper analysis of Japan's technological strengths, its implications and potential to support it in finding its way out of the crisis should be conducted. In recent literature the social acceptance of technological innovations such as robotics has been a topic of discussion and would be interesting to observe in the European context.

Lastly, Europe is currently encountering a tremendous wave of immigration. As this has been introduced as a possible solution for the Japanese struggles with demographic change, there would be room for further research as to whether the development in Europe is perceived by society, politics and corporations as an opportunity or a threat in the light of demographic change.

Emphasizing the fact that Japan cannot be seen an isolated case as demographic change is showing strong similarities among countries all over the globe, "[...] watching what unfolds in Japan may be like looking into a crystal ball of our own economic future" (Matthews, 2015).

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## 6. Appendix

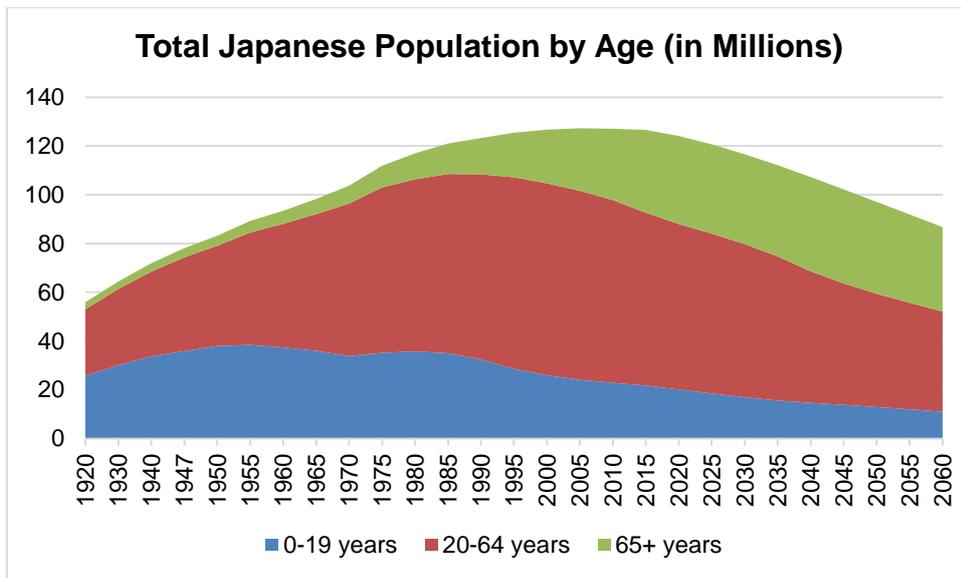


Figure 3: Total Japanese population by age (in millions) (National Institute of Population and Social Security Research, 2012c).

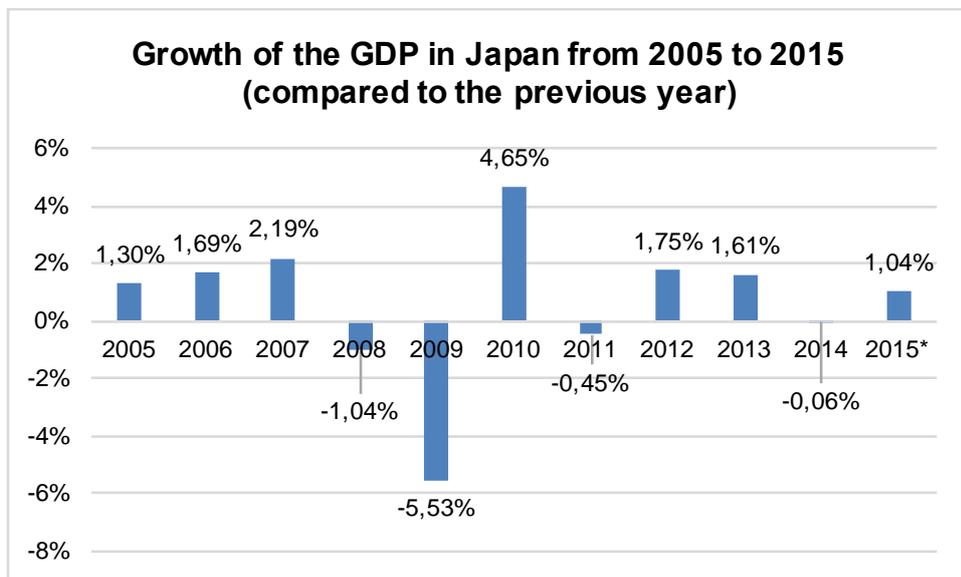


Figure 4: Growth of the GDP in Japan from 2005 to 2015 (compared to the previous year) (IMF, 2015b).

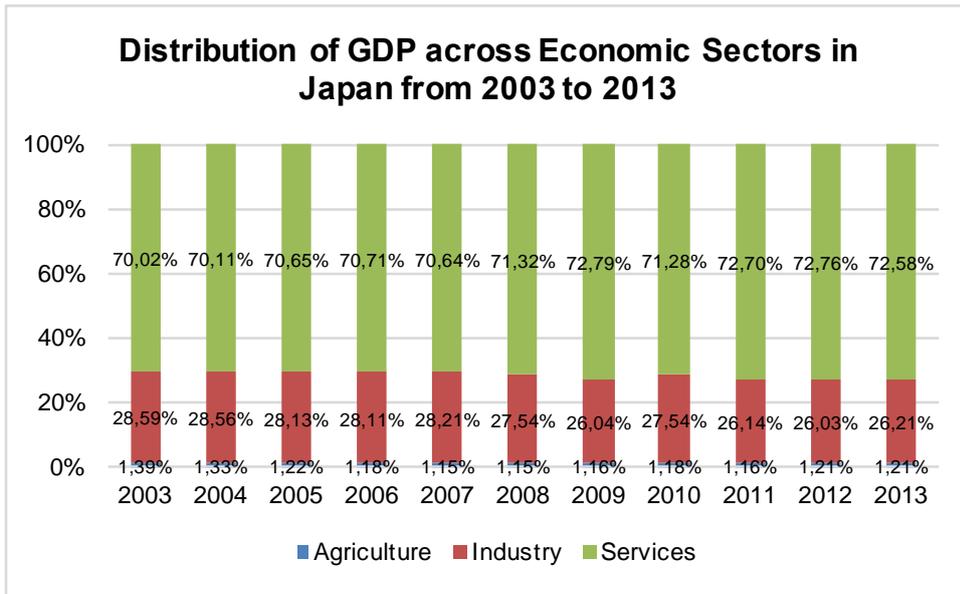


Figure 5: Distribution of GDP across Economic Sectors in Japan from 2003 to 2013 (World Bank, 2015)

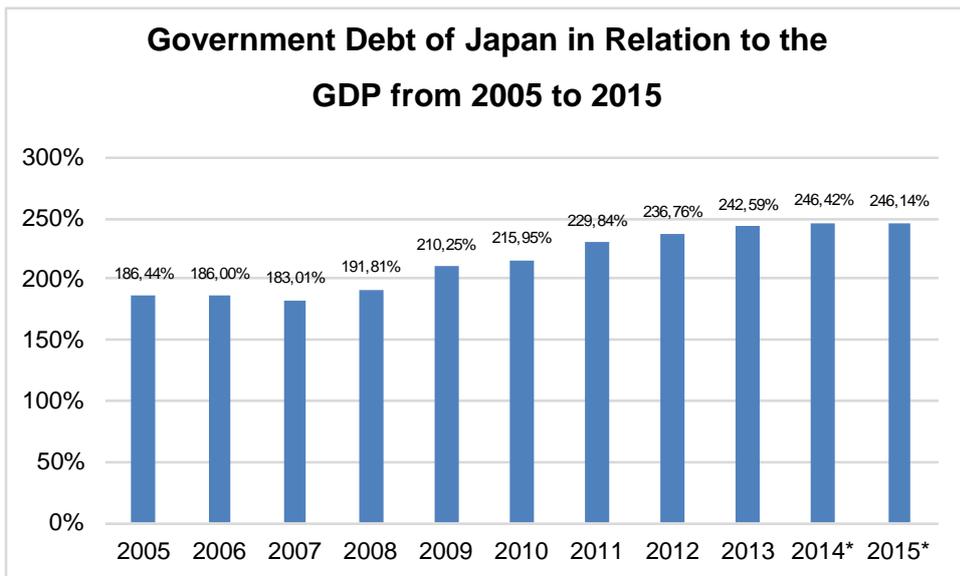


Figure 6: Government Debt of Japan in Relation to the GDP from 2005 to 2015 (IMF, 2015a)

## D. Iran's population dynamics in the light of the potential "post-sanction" period. What are the lessons for investors?

*by Germain Groppi and Florian Lethen*

In this paper, we seek to analyze Iranian demographics, economic fundamentals and foreign relations. Our aim is to discuss the outlook for the Iranian society, and especially for its attractiveness to foreign investors, given its demographic dynamics, its economic development and the likely partial or total relief from international sanctions. Therefore, we take the point of view of a potential foreign investor analyzing the market's opportunities as well as risks. We start to tackle the Iranian case by introducing first a general historic overview before describing the demographic and economic factors of Iran as well as the international sanctions imposed on the country and their effects. Consequently, we perform a 2-dimensional analysis from the point of view of the global investor, including both the *PES(TEL)* and the *SWOT* approaches, in which we include our findings from the descriptive analysis. We hereby find that Iran's strengths and opportunities provide major incentives to invest in the country. Investors could indeed benefit from a high potential country currently opening towards the international community and offering a young and qualified population, unexploited resources, and existing industrial and technological competencies. However, the ongoing tensions between Iran, the US, and its Middle Eastern neighbors have to be carefully observed as the improvement of international dialogue with Iran has just begun. Furthermore, the sanctions are presently neither fully lifted nor definitely permanent and investors might be confronted with the remaining risks of corruption, bureaucracy and the change of state policies. In that sense, our recommendation for investors is to strongly consider an investment in Iran pursuing, however, a cautious approach.

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## LIST OF ABBREVIATIONS

<b>bn.</b>	Billion
<b>c.</b>	circa
<b>CIA</b>	American Central Intelligence Agency
<b>EU</b>	European Union
<b>EU-3</b>	France, UK and Germany
<b>FDI</b>	Foreign Direct Investment
<b>FX</b>	Forex
<b>GDP</b>	Gross Domestic Product
<b>GNP</b>	Gross National Product
<b>IAEA</b>	International Atomic Energy Agency
<b>IRR</b>	Iranian Rial
<b>IS</b>	Islamic State
<b>ISA</b>	Iran Sanctions Act
<b>JCPOA</b>	Joint Comprehensive Plan of Action
<b>M</b>	million
<b>PES</b>	Political, Economic, Social
<b>PES(TEL)</b>	Political, Economic, Social, (Technological, Environmental and Legal)
<b>P5+1</b>	USA, UK, France, Russia, China + Germany
<b>SAVAK</b>	Organization of Intelligence and National Security ( <i>in English</i> )
<b>SWIFT</b>	Society for Worldwide Interbank Financial Telecommunication
<b>SWOT</b>	Strengths, Weaknesses, Opportunities and Threats
<b>UK</b>	United Kingdom
<b>UN</b>	United Nation
<b>UNCTAD</b>	United Nations Conference on Trade and Development
<b>US</b>	United States
<b>USA</b>	United States of America
<b>USD</b>	US Dollar
<b>USSR</b>	Union of Soviet Socialist Republics
<b>WMDs</b>	Weapons of Mass Destruction

## **1. Introduction**

On July 14<sup>th</sup> 2015, the USA, Iran and their negotiating partners finally signed the nuclear agreement limiting the Iranian nuclear program and planning the total relief from the sanctions in place, as well as opening a new perspective in the diplomatic relationships between Iran and Western powers. On the same day, US President Barack Obama stated: *“the deal offers an opportunity to move in a new direction. [...] A different path, one of tolerance and peaceful resolution of conflict, leading to more integration [of Iran] into the global economy, more engagement with the international community, and the ability of the Iranian people to prosper and thrive.”* (Obama, 2015) This deal could indeed release the Iranian society and economy. Iran, one of the major powers in the Middle East, could have a new breath of life and overcome its economic struggles of recent years.

From a global investor’s point of view, this shift could represent a substantial opportunity to enter the Iranian market. However, many risks still remain and overshadow the recently risen hopes resulting from the deal. Therefore, our aim within this paper is to provide answers to the following questions: What should the potential investors be aware of? What are the strengths and weaknesses of the Islamic Republic of Iran? Do future opportunities outweigh potential threats? In line with this goal, we will discuss the outlook for the Iranian society, and particularly for its attractiveness to foreign investors, given its demographic dynamics, the economic developments and the likely partial or total relief of international sanctions.

In this regard, the paper is divided into a descriptive and an analytic part. In the former, we give a general introduction to the topic by first providing a historic overview of Iran and describing its demographics, economics and the effects of the sanctions in the following. This is a necessary step in order to tackle the analytic part, in which we conduct a *SWOT* analysis included in a *PESTEL* framework. Generally, the strengths and weaknesses are thereby mostly derived from the descriptive part of the paper, whereas the opportunities and threats are directly deducted and discussed in the analysis itself. This methodology enables us to get an overall critical point of view on Iran and to make sound recommendations in the conclusion.

## **2. Descriptive Part**

In this part, we first introduce Iran and its recent history with a focus on its political regime and the timeline of economic sanctions before describing the demographics of the country. Then, we shortly present the Iranian economy. Finally, we discuss the effects of the sanctions on the Iranian society, concentrating particularly on its economics and politics. This descriptive part supplies us with Iran’s strengths and weaknesses, which we use as an input for our analysis part.

## 2.1. Historic Introduction & Timeline of Sanctions

In order to fully understand how Iran developed towards the state it is nowadays – an Islamic regime suffering from ongoing international conflicts and sanctions with an extremely well educated population – we have to look back at its recent history beginning in 1935, when Iran was chosen as the new official name of the former state Persia (BBC, 2015).

During World War II, the UK and the former Soviet-Union invaded Iran and deposed of the then Shah Reza Pahlavi, who supported the Axis (Germany, Japan and Italy), by substituting him in 1941 with his son, Mohammad Reza Pahlavi (ibid.). Under the regime of Prime Minister Mohammad Mossadeq, parliament voted in April 1951 in favor of the nationalization of the oil industry, which had so far been controlled by the UK-owned Anglo-Iranian Oil Company (ibid.). Consequently, UK imposed sanctions on Iran which strongly impacted the economy, until the British and American secret intelligence services initiated a coup in August 1953 in order to replace Mossadeq and help the Shah return (ibid.). This coup was followed by nationwide modernization, westernization and economic prosperity through the so-called “*White Revolution*”, during which the Shah improved the education of the population, introduced the right to vote for women, and privatized state-owned companies (Axworthy, 2007, p. 247). However, this period was also shaped by the Shah’s strict and violent rule which escalated in the late 1970’s with nationwide strikes, mass demonstration and street fights (BBC, 2015). At the beginning of the year 1979, the Shah is thus forced into exile and the Islamic fundamentalist Ayatollah Khomeini, who lived 14 years in exile for opposing the Shah, returned (ibid.). The Iranian revolution climaxed with the proclamation of the Islamic Republic of Iran on April 1, 1979. In the beginning of November, several American hostages were taken from the US embassy of Tehran with the aim to enforce the extradition of the Shah, who was staying at that time in the USA for medical treatment for his cancer (ibid.). This event led to significant tensions between the two nations, to the point that the US decided to prohibit “*oil imports from Iran*” and “*the delivery of aid and military assistance to the country*”, as well as to freeze “*all Iranian assets stored in US banks and their foreign subsidiaries*” (Macaluso, 2014, p. 4).

Although the exiled Shah had already died in Egypt in 1980, the hostages were not released before January 1981 (BBC, 2015). In the following years, the Western sanctions were partially lifted. However, new sanctions are soon imposed as it is revealed that Iran supports the terrorist movements of the Palestinian Jihad and of Hezbollah during the Israel-Lebanon war of 1982. Following this war, several Western hostages are captured and kept imprisoned by Hezbollah, which provided further incentives for the Western powers to react (ibid.). As a consequence, the US labeled Iran as a “*state sponsor of terrorism*” (Macaluso, 2014, p. 4) and implemented a legal framework in 1982 to legitimize a whole new range of sanctions meant to

counter the terrorism activities of Iran. This isolated Iran internationally and polarized US-Iran relations further. Around the same time, the Iran-Iraq war started in 1980 as a fight about the control over the crucial Shatt al-Arab waterway and endured for eight years (BBC, 2015). In July 1988, nearly 300 passengers of an Iranian airplane were killed by a US warship, leading to increased tensions between Iran and the US (Axworthy, 2007, p. 273). Under the supervision of the UN, Iran agrees to a ceasefire with Iraq during the same month (BBC, 2015). In June 1989, Supreme Leader Khomeini dies and is substituted by State President Khamenei (ibid.).

In the 90s, the second decade of sanctions, attempts of reconciliation between the US and Iran, particularly supported by President Rafsanjani, failed. Instead, the US accused Iran of being part of an “*axis of terrorism*” and of being willing to develop WMDs and ballistic missiles (BBC, 2015). They therefore refused further dialogue and diplomatic engagement. The isolation of Iran became stronger and the US expanded their restrictions on Iran with several acts, particularly the *Iran Sanctions Act (ISA)* of 1995 (Macaluso, 2014, p. 4). The bombing of American government workers in Saudi Arabia in 1996, in which Iran was accused of being involved, deteriorated their relations even more (BBC, 2015).

Until the third decade of sanctions, the US did not reach any consensus with other partners and were often criticized for the severity and rigidity of their unilateral sanctions (Macaluso, 2014, p. 6). In 2002, the IAEA<sup>4</sup> discovered Iran’s nuclear enrichment activities, which created the basis for the consolidation of a mutual response from the international community against Iran (pp. 4, 7). In June 2005, the Conservative Mahmoud Ahmadinejad, formerly mayor of Tehran, became the new president of Iran. His support of the nuclear program further undermined relations with the West. In the following years, the EU-3<sup>5</sup> was involved in diplomatic negotiations with the Islamic Republic, but the USA refused to join and even voted against the EU strategy “*by imposing tougher sanctions*” (p. 6) like the *Iran Freedom Support Act (2006)*. Finally, the referral of the IAEA to the UN Security Council in 2006 convinced the world community to follow US policy and to establish its first sanctions against Iran (p. 7). The multilateral measures adopted by the UN between 2006 and 2010, including among other things the *UN Security Council Resolution 1929*, went further in sanctioning the Iranian oil and financial sector, but mainly banned the imports of “*sensitive nuclear materials*” and “*Iran’s arms exports*” and blocked the “*financial assets of people and entities involved in nuclear activities*” (p. 7). Consequently, the first EU sanctions followed in 2007 in order to put more pressure on the nuclear activities of the Persian State (p. 7). In June 2009, Ahmadinejad won the presidential election for a second term, even though the results were questioned by the

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<sup>4</sup> International Atomic Energy Agency

<sup>5</sup> Consisting of the UK, France and Germany

rival candidates (BBC, 2015). During the protests in the course of the so-called “*Green Movement*” following the election more than 30 supporters of these rivals were killed and more than 1’000 were arrested (ibid.). In 2012, the EU imposed further severe sanctions, including a “*total oil embargo*”, the ban on the imports of several heavy industry raw materials, equipment and services, the freeze of the “*assets of the Central Bank of Iran*” as well as exclusion from the international banking system and, notably, from the SWIFT<sup>6</sup> (pp. 7,8). These decisions, combined with the strict package of sanctions<sup>7</sup> imposed by the US Obama Administration, amplified the impact of the sanctions, and were intended to isolate Iran and to cut off its sources of external revenue (Macaluso, 2014, pp. 5,6). As a result, the Iranian population was strongly hit, which led to mass demonstrations in 2012 against the enormous cost of living and in favor of a policy change towards the West. These protests were reprimanded by the security force of the government (BBC, 2012). However, this situation put pressure on the Iranian government to accept a shift in its policy, which climaxed in June 2013 when the reformist Hassan Rouhani was elected President of Iran, representing the hope and expectations of thousands of Iranians (BBC, 2015). Following his election, he publicly announced that Iran does not aim to build nuclear weapons, and additionally resumed talks with the UN about the nuclear question (ibid.). In July 2015, after years of negotiations, the P5+1 group<sup>8</sup> and Iran finally signed the JCPOA<sup>9</sup> agreed in November 2013 (Jones, Barker, Savastopulo, & Bozorgmehr, 2015; Rennack, 2015, pp. 2,3). This nuclear deal foresees to reduce Iran’s nuclear activities and to prevent Iran from developing a nuclear weapon in return for a progressive total relief from international sanctions (The White House, 2015, p. 1). Furthermore, the Iranian nuclear program will be regularly monitored via international inspections and the sanctions regime will snap back if the deal is violated (pp. 3,4). After a partial temporary lift in November 2013, a total relief of sanctions is expected by the government of Iran for 2016 (Polk, 2015, p. 3).

## 2.2. Demographics of Iran

The following description of the current Iranian demographics is, if not differently indicated, based on data from the *American Central Intelligence Agency* (CIA, 2015):

As per July 2015, the population of Iran amounts to approximately 81.8M, whereof the major part is between 25 and 54 years (46.9%). Young people – younger than 25 – make up 41.3% of the population, while the remaining percentage (11.8%) is older than 55 years. The resulting

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<sup>6</sup> Society for Worldwide Interbank Financial Telecommunication

<sup>7</sup> Including the the *Comprehensive Iran Sanctions, Accountability and Divestment Act (CISADA)* of 2010, the section 311 of the *USA Patriot Act (2011)* and the *section 1245 of the National Defense Authorization Act (NDAA)* of 2012

<sup>8</sup> Consisting of USA, UK, Russia, China, France and Germany

<sup>9</sup> Joint Comprehensive Plan of Action

total dependency ratio<sup>10</sup> is 40.2% and the total gender ratio 1.03 male(s) per female. Iran's total median age is 28.8 years, whereby the female median (29.1) is slightly higher than the male (28.6). These findings are represented in *Figure 1* below.

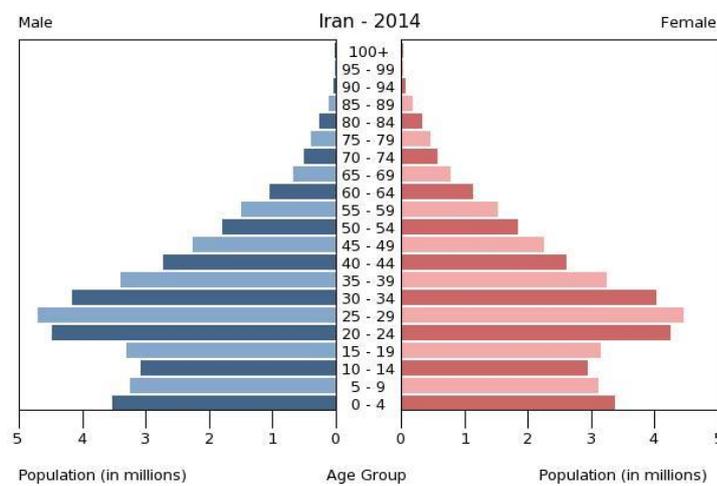


Figure 1: Iran's population pyramid in 2014 (CIA, 2015)

Given that Iran's official religion is Islam, 99.4% of Iranians are Muslim. Hereby it is necessary to distinguish between followers of Shia (90-95%) and Sunni (5-10%). The Islamic country has a fertility rate of 1.83 children born per woman, a birth rate of 18 births per 1000 population and a death rate of 5.94 deaths per 1000 population, which in combination with a close-to zero net migration

rate<sup>11</sup> (-0.07 migrants per 1000 population) results in an estimated population growth rate of 1.2% for 2015. A newborn in Iran survives with a probability of 96.2% and its life expectancy in 2015 is on average 71.2 years. The urban population in Iran, growing with an annual rate of c. 2.1%, makes up nearly three quarter (73.4%) of the total population. The remaining part lives in rural areas, whereof c. 8% have bad or no access to drinking water and c. 18% to sanitation facilities.

In terms of education, 86.8% of the total Iranian population is as of July 2015 literate<sup>12</sup>. Literacy is even higher among the population between 15 and 24 years (males: 98.8%, females: 98.5%) (UNICEF, 2013). As of 2013, 4.5 million students are enrolled in universities producing around 750,000 graduates yearly (Ayse, Nash, & Leland, 2013, p. 162). Of these enrolled students, 36% are studying (as per 2012) in the field of "engineering" or "medical sciences" (2013, p. 163). The overall gross enrollment ratio<sup>13</sup> in tertiary education<sup>14</sup> is approximately 58% (UNESCO, 2015).

Opposing this great level of education among the population, the overall unemployment rate rose from 2013 to 2014 by 1% to 11.4%. Unemployment is higher among woman (20.3% vs. 8.7% among men), among young people between 15 and 29 years (females: 39%, males:

<sup>10</sup> "Age dependency ratio is the ratio of dependents – people younger than 15 or older 64 – to the working-age population – those ages 15-64." (Worldbank)

<sup>11</sup> Difference between the number of immigrants and emigrants; a negative number represents a net emigration (CIA, 2015)

<sup>12</sup> Older than 15 and can read & write (CIA, 2015)

<sup>13</sup> Gross enrolment ratio: "Number of pupils or students enrolled in a given level of education, regardless of age, expressed as a percentage of the official school-age population corresponding to the same level of education. For the tertiary level, the population used is the 5-year age group starting from the official secondary school graduation age." (UNESCO, 2015)

<sup>14</sup> Tertiary education refers to education after high school and includes e.g. universities (Worldbank, 2013)

17.9%) and even among university graduates (19%). The weak labor market performance is mainly due to the fact that only 37.2% of Iran’s population is economically active. This low percentage results majorly from underemployment of women, of which only 11.8% are participating in the labor market (vs. 62.9% of men) (Worldbank, 2015).

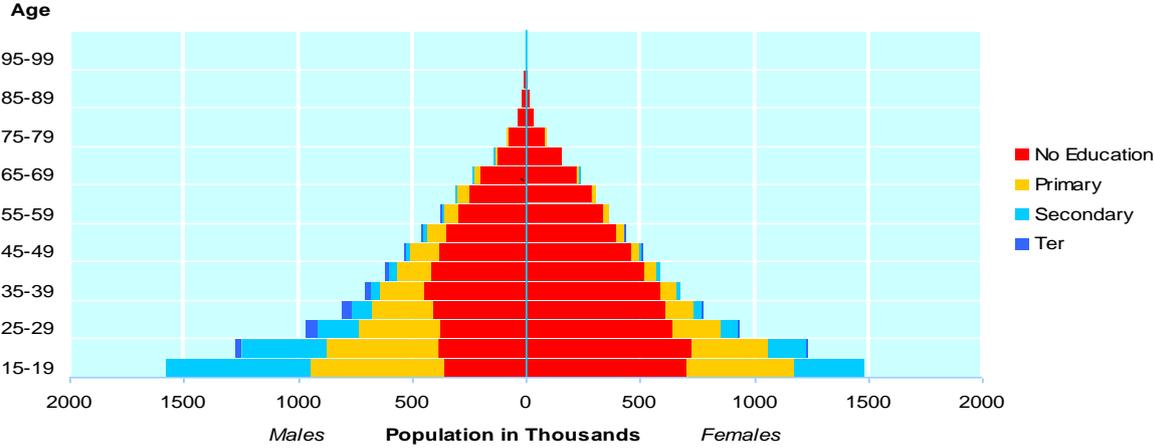


Figure 2: Iran by age, gender and educational attainment in 1970 (Groth, 2015)

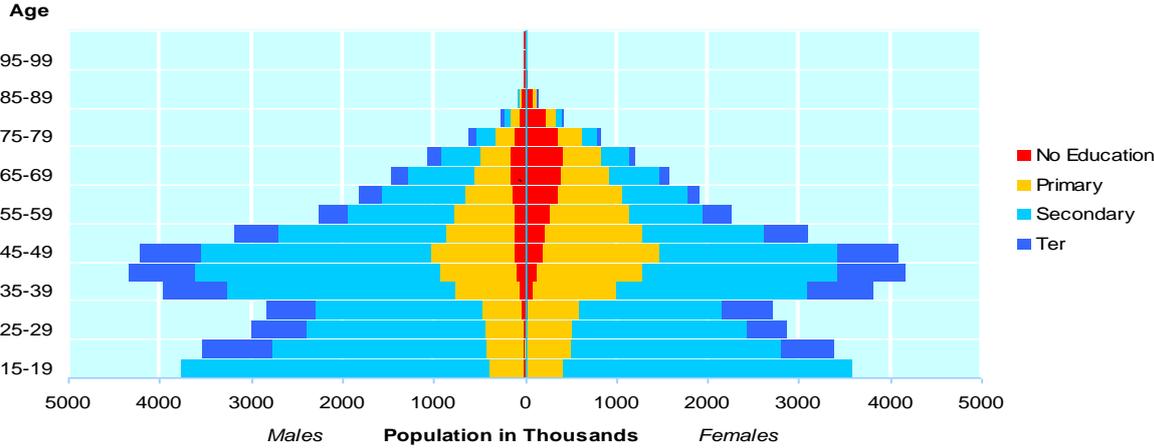


Figure 3: Iran by age, gender and educational attainment in 2030 (Groth, 2015)

Figure 2 and 3 above show Iran’s (forecasted) development from 1970 to 2030 in terms of age structure, gender and educational background. Regarding the age distribution among the population, it is striking that the average age is anticipated to increase progressively, since the share of old people – older than 64 years – will significantly grow, and the most populated age group will change from the youth – younger than 30 – to the population group older than 40 years. Furthermore, the graphs illustrate the growth tendencies of the Iranian population in total as well as the development of individual aging groups.

Moreover, the distribution of educational attainment has been majorly transformed: while approximately half of the male and two thirds of the female Iranian population did not have any education at all in 1970, there will be only an insignificant percentage of the population in 2030 without any education. Thereby, it is especially noticeable how the educational level of woman has changed throughout history. These improvements are the results of the “*White Revolution*” launched by the Shah in 1963, which reformed the educational system and provided more rights to women. *Figure 4* shows the comparison of birth rates between France and Iran throughout the history. Given the existing empirical evidence that woman’s education is the most important factor to explain differences in fertility rates (e.g. Drèze & Murthi, 2001), we can conclude that the sudden decline in the number of births in Iran is a result from the improvement of the female education from the 1960s onwards.

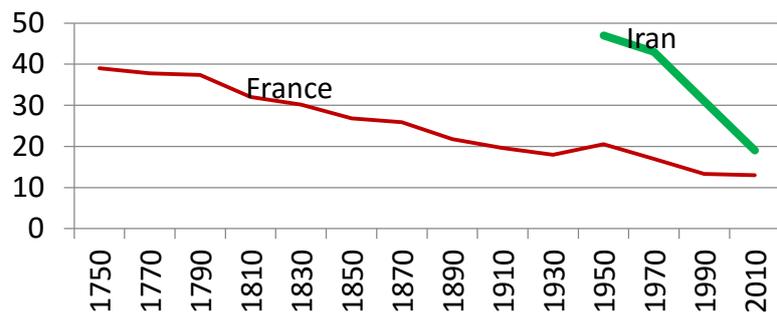


Figure 4: Number of births/1000 population – France vs. Iran (Groth, 2015)

### 2.3. Economics of Iran

The following description of the current economic situation in Iran is, if not differently indicated, based on data from the *American Central Intelligence Agency* (CIA, 2015):

Iran is a major power in the Middle East and the 3<sup>rd</sup> biggest economy after Turkey and Saudi Arabia in the region, with a GDP of c. \$ 400bn. and a GDP growth of 3%. GDP per capita is about \$ 17'100 per inhabitant, which represents the 13<sup>th</sup> rank in the Middle East. Moreover, the costs of living are high as the average inflation rate amounts to around 15% and poverty rate estimation for 2007 was about 18.7%.

The Iranian economy is strongly dependent on its external sources of revenues, i.e. oil and gas exports, with exports revenues representing a large proportion of the GDP. Main export partners are China (29%), India (11.9%), Turkey (10.4%), Japan (6.5%) and South Korea (4.8%). Besides, the GDP composition by sectors aggregates 9.1% for agriculture, 40.7% for industry and 50.3% for services. This shows that Iran is already a mature and post-industrial society, which has already developed its industrial and technological capabilities. Moreover, as already mentioned above, Iran’s education system is strongly technologically oriented. Iran’s developed industries are mainly petroleum, petrochemicals, gas, hydrocarbon products, fertilizers, textiles, cement and copper. Moreover, Iran is significantly rich in natural resources and possesses huge reserves of oil and gas (see *Figure 6*): worldwide, it has the 4<sup>th</sup> largest oil

and 2<sup>nd</sup> largest gas reserves, which are mostly unexploited (Mohamedi, 2015). As shown in *Figure 5*, gas production has grown rapidly in recent years and offers a promising potential for future economic growth (ibid.).

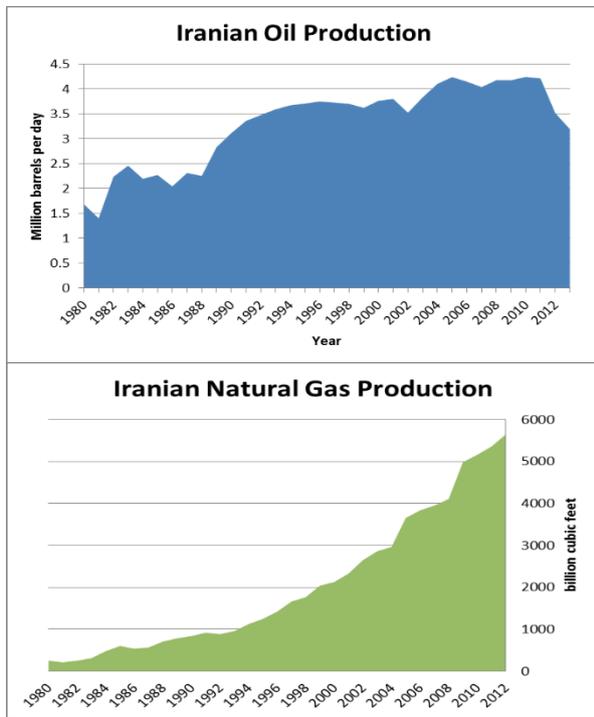


Figure 5: Historical Iranian oil vs. natural gas production (in \$ bn) (Mohamedi, 2015)



Figure 6: Oil and natural gas reserves in Iran (University of Texas, 2015)

Another important point about the Iranian economy is that it is not fully liberalized. The state has an important stake in the economy given that many companies are state-owned or state-related. State institutions like the Iranian Revolutionary Guards Corps play a big role on every level of the economy. Consequently, this nationalization of the economy results in inefficiencies and a tendency for corruption and bureaucracy, strongly undermining Iranian economic prosperity (Nasseri & Motevalli, 2015). However, the state budget itself is sound as estimated public debt represents 11.4% of Iran’s GDP.

#### 2.4. The Effects of Sanctions on Iran

Based on the historic introduction, we could conclude that the sanction regime against the Islamic Republic has been successful, at least during its most recent years, as Iran returned to the negotiation table and the Iranian people elected the more liberal Rouhani. Nevertheless, considering the long lifetime of the sanctions, we can question the success of their impact. In the following, we will describe the impacts of sanctions on Iran’s economics and politics. As illustrated in *Figure 7* below, the sanction regime imposed on Iran by the US and (from 2006 onwards) by EU and UN have had several motivations and the way they have been marketed has changed over the decades, whereby the most recent objective has been the end of the

Iranian nuclear proliferation (Macaluso, 2014, pp. 4,5). However, a deeper and broader goal has always existed beyond these economic sanctions: the change of the regime in place or a substantial change of its policy (Winkler, 1999, p. 146).

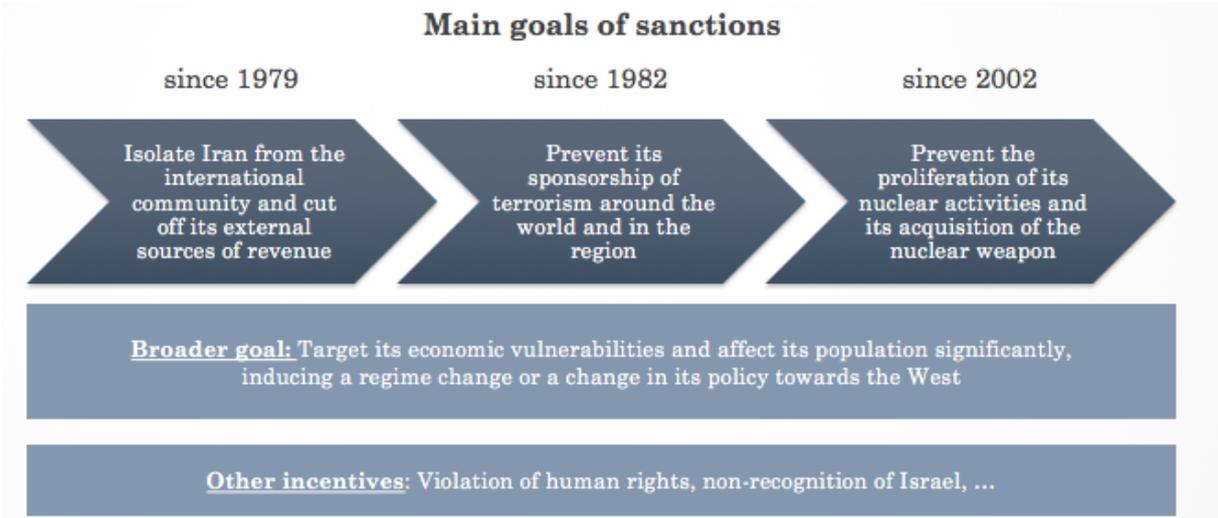


Figure 7: Objectives and incentives of the sanctions regime (own work)

Adam Winkler (1999) states in this respect that *“the burden of economic hardship will become intolerable to the citizens of the target state, who in turn will pressure their leaders to change undesirable policies”* (p. 146). The first step of this strategy is thus to harm the economy of the country and, thus, its population. The second step then is to provoke a policy or regime change. Looking at the true US American intentions of sanctioning Iran, it is striking that, hidden behind the marketed objectives, the real aim was to protect and expand its politic and economic interests in the Middle East. These interests had been supported by the dictatorial Shah’s regime, until the revolution in 1979 brought an anti-western regime to the power, which was followed immediately by US sanctions on Iran.

The effects of sanctions on the Iranian economy are rather difficult to analyze based on the fact that Iranian numbers are not officially given and are mostly estimated. Moreover, other factors like “*internal mismanagement*” and “*exogenous shocks, such as global recession*” have also had a relevant influence (Khajehpour, Marashi, & Parsi, 2013, p. 87). Nonetheless,

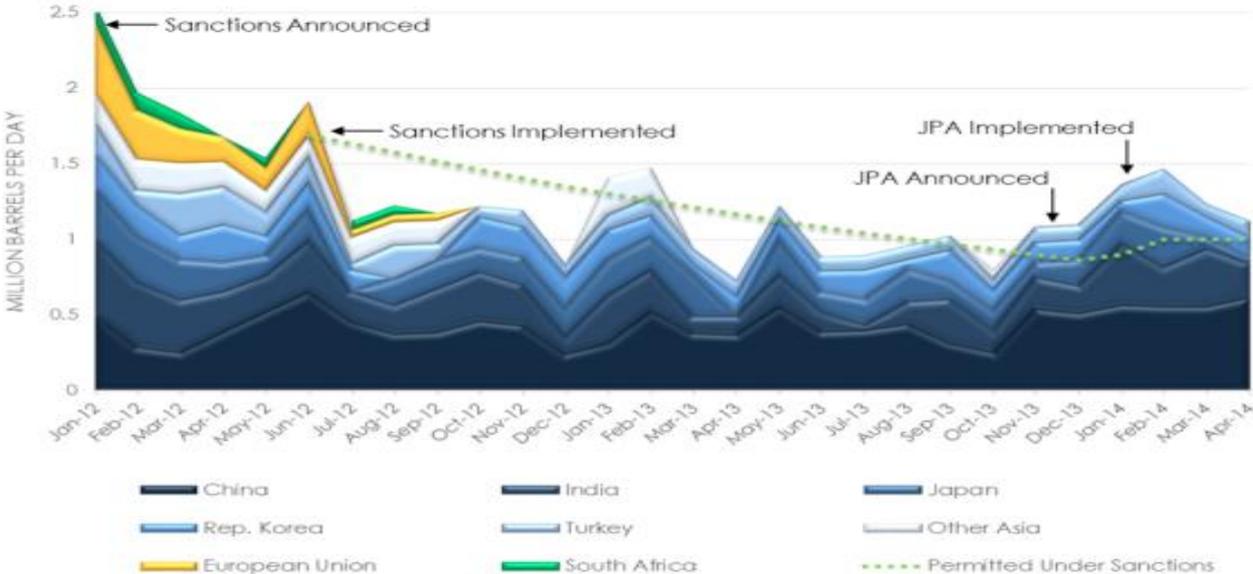


Figure 8: Sanctions and crude oil exports in Iran (JINSA, 2014, p. 8)

we can affirm that sanctions have strongly affected (as illustrated in *Figure 8*) Iran’s major pillar of the economy, namely its oil and gas exports (Macaluso, 2014, pp. 8,9). Indeed, due to the 2012 oil embargo, the total oil export revenues of the Islamic Republic dropped around 60% in less than one year (US Energy Information Administration, 2015). The bans for imports, like raw material, equipment, and services for industries have also targeted to hit the Iranian industries and undermine their ability to produce (Macaluso, 2014, p. 10). The effect on the economy has also been amplified through the recent multilateral accentuation of sanctions and is underlined by the decline of the real GDP growth as shown in *Figure 9*. The real GDP decreased by 5.6% in 2012, and 4.9% in the first quarter of 2013 (The World Bank, 2015). Additionally, we have to note that ineffective internal management such as “*wrong monetary policies*” have contributed to this economical disorder (Macaluso, 2014, p. 9). Moreover, the oil embargo led to an increase of the “*oil smuggling traffic backed by governmental officials*” and of overall public and private corruption, which further increased economic inefficiencies (p. 9). Concerning the

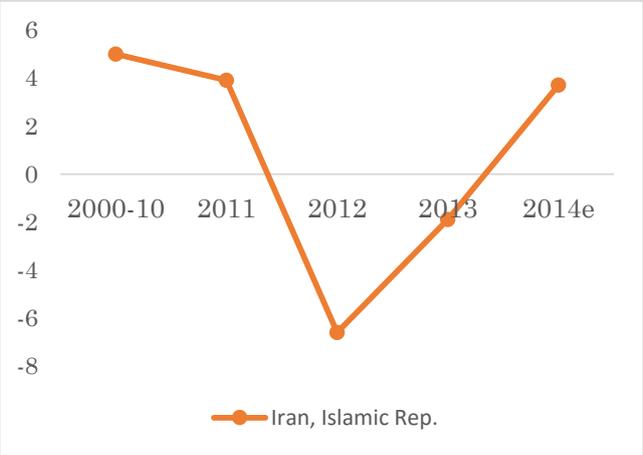


Figure 9: GDP growth in Iran (The World Bank, 2015, p. 4)

amplified through the recent multilateral accentuation of sanctions and is underlined by the decline of the real GDP growth as shown in *Figure 9*. The real GDP decreased by 5.6% in 2012, and 4.9% in the first quarter of 2013 (The World Bank, 2015). Additionally, we have to note that ineffective internal management such as “*wrong monetary policies*” have contributed to this economical disorder (Macaluso, 2014, p. 9). Moreover, the oil embargo led to an increase of the “*oil smuggling traffic backed by governmental officials*” and of overall public and private corruption, which further increased economic inefficiencies (p. 9). Concerning the

financial sector, Iran has also been significantly affected over the years. The freeze of individual, corporate and central bank assets as well as the prohibition of international transactions have played a substantial role in Iran’s recession (p. 11). Due to the unstable situation of the Iranian financial system, the domestic demand for foreign currency has risen on the black market and the Iranian Rial has strongly depreciated (p. 11). It notably lost around 80% of its value against the US dollar between 2012 and 2013 (Plaut, 2013) resulting in an IRR/USD exchange rate of c. 29’950, as of 31th October, 2015 (CIA, 2015). Furthermore, through the severe sanctions of 2012, the inflation rate reached its highest level of 45% in 2013 as depicted in the *Figure 10* (Warrick & Rezaian, 2013).

However, foreign investments in Iran do not show the same tendency as other economic figures such as GDP, inflation rate or export revenues, which all have deteriorated. Indeed, it seems that Iran’s FDI<sup>15</sup> has increased over the recent years, despite the lack of access to international financial markets, as illustrated in *Figure 11* (UNCTAD, 2000-2015). The striking increase in the FDI values from 2007 to 2009 could be explained by important unreported deals with China, Russia or India, or even by a prior underestimation from the UN agency.

Despite the fact that sanctions have failed “to bring about the collapse of the Iranian economy”, they have nonetheless succeeded in isolating Iran economically and cutting off its external sources of earnings (Macaluso, 2014, p. 10). Moreover, they have reached another

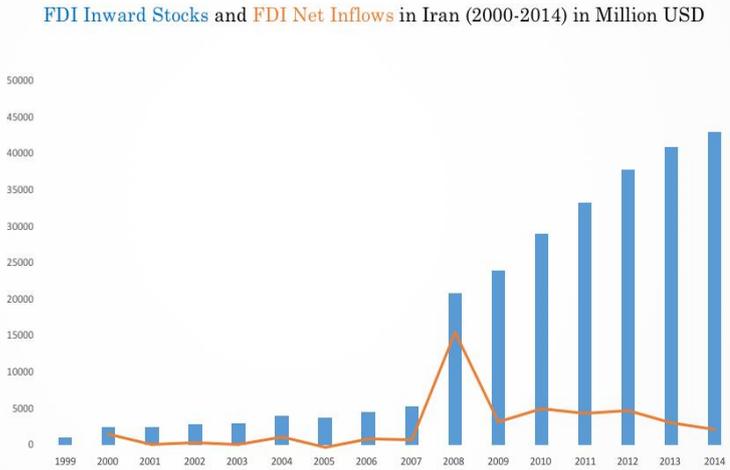


Figure 10: Inward stocks and net inflows In Iran (2000-2014) in USDm (UNCTAD, 2000-2015)



Figure 11: Historical inflation rate development of Iran (in %) (Trading Economics, 2015)

<sup>15</sup> Foreign Direct Investments

main goal: they have strongly worsened the situation for the Iranian population. Indeed, the impact of sanctions on the economy has been directly reverberated to the population, which has been severely hit (p. 11). Iranian people inter alia suffer from high unemployment (11.4%), shortage in commodities and raw material, high inflation rate and high cost of living (pp. 11,12). This economic pressure on the population climaxed during the demonstrations in 2009 and 2012 and has led to a huge pressure on the state regime and to high expectations placed on the new elected government (Milani, 2010; BBC, 2012; BBC, 2015).

In respect to the recent election of Rouhani and opening towards the West, represented by the negotiations and the finally signed nuclear deal, we could conclude that a change in the policy of the state regime has occurred and that sanctions have finally succeeded. However, this fact is controversial. Indeed, these sanctions have also led to counterproductive effects such as the radicalization of the extreme wings in Iran as well as in the US, and the reinforcement of an *“anti-western narrative”* in Iran (Macaluso, 2014, p. 23). The Islamic regime has also spread the propaganda of *“Iran [and its nuclear program] as a symbol of resistance against the West and its oppressive policies”* (p. 23). Moreover, despite the sanctions, Iran has steadily continued to enrich uranium over the recent years, making *“progress in achieving domestic nuclear and missile capability and skills”* (p. 13).

All in all, the radicalization and anti-western sentiment, which resulted mainly from the lack of strategy, comprehensiveness and diplomatic engagement of the American sanctions policy, has strengthened the support of the population for the regime in place, resulting in no policy change for many years (Takeyh & Maloney, 2011). Furthermore, as Iran is not a real democracy, population did not have the constitutional ability to put direct pressure on the mullahs (Macaluso, 2014, p. 15).

However, as already mentioned, the sanctions achieved a significant result in the recent years by influencing Iran to *“adopt a new, more conciliatory tone, and to sit at the negotiating table”* (p. 21). The role of the EU as a mediator, the more open-minded Obama Administration and the election of Rouhani are most likely the main sources for the changes in the status quo. Nonetheless, this Iranian political change must not necessarily be seen as a shift in the policy structure of the state, as the Supreme Leader and the mullahs are still in power (p. 22). Khajehpour, Marashi & Parsi (2013) state in this regard that *“any redistribution of the balance of power in the Iranian establishment so far remains in appearance only”* (Khajehpour, Marashi, & Parsi, 2013, p. 13).

### **3. Two-dimensional Analysis: PES(TEL) & SWOT**

In order to provide sound recommendations for potential Iranian investors, we conduct a SWOT analysis included in a PESTEL framework. Thereby, we mainly focus on the PES

(Political, Economic and Societal) factors. However, we do not ignore the remaining elements (Technological, Environmental and Legal), but include them in the analysis of the *PES* components.

### 3.1. Politics

#### **Strengths**

As a political strength of Iran, we identified the two other remaining major political representatives aside from the conservative omnipotent Supreme Leader Khamenei: President Hassan Rouhani and Minister of Foreign Affairs Mohammad Javad Zarif. Elected in 2013, Rouhani substituted the deeply conservative Mahmoud Ahmadinejad as President of Iran. His victory, which was seen as the result of the “*Green Movement*” started in 2009, was celebrated among young open-minded Iranians as well as among religious citizens and proved the country’s openness towards change and rejection of former policies of the conservative rulers (Fassihi, 2013). The recently signed Nuclear Deal with the P5+1 states can be interpreted as a further step towards an opening of the Islamic country to international dialogue. One of the major initiators of the agreement was thereby Mohammad Zarif. Given his international background of studies in the US as well as his former representative function of Iran in the United Nations (Iranian Diplomacy, 2013), he is one of the key elements besides President Rouhani for political change in a country with a young and well-educated population, which is thirsty for a transformation of the conservative Islamic Republic. This desire for change was visible not only during the 2009 protests in the course of the “*Green Movement*” after the re-election of Ahmadinejad (Athanasiadis, 2009) but also through the high expectations placed on Rouhani (after his election in 2013) regarding greater international engagement (Fassihi, 2013).

An additional political factor distinguishing Iran from its Middle Eastern neighbor states, is its fairly stable political environment ex post the revolution in 1979 and apart from several protests movement.

#### **Weaknesses**

In contrast to President Rouhani and Minister Zarif, we regard the person of Supreme Leader Ali Khamenei as a political weakness of Iran in regard to a potential opening towards international dialogue. In power since 1989, Khamenei represents a conservative political standpoint opposing strong modernization. The major flaw of the Iranian constitution is consequently the strong power concentration in the hands of the supreme leader. He does not only appoint major parts of the legislative branch in the form of Guardian Council and Expediency Council, but also the head of judiciary as well as the commanders of the armed forces (Thaler, Nader, Chubin, Green, Lynch, & Wehrey, 2010, pp. 24-25). The supreme leader



In addition, the legal framework of Iran shows significant flaws, which hinder modernization as well as investments in the country. First of all, the judicial system is, as explained above, too dependent on the supreme leader. Secondly, it is extremely time-consuming to found and run a business in Iran due to bureaucracy, opacity of administrative processes and inflexible labor regulations (Nasseri & Motevalli, 2015). Finally, there is significant informal labor activity in Iran as well as discrimination of minorities through confiscation of property throughout history (The Heritage Foundation, 2015).

### **Opportunities**

Iran's existing strengths, such as its young population desiring change and its current more moderate political leaders like Rouhani, in combination with the suspension of sanctions on Iran will offer a general chance to open the country towards the international community in terms of politics and economy. Thereby, since Iran used to be a modern and westernized state before the revolution in 1979, a change backwards might be easier than in other countries.

Moreover, Iran might use its influence in the Middle East, e.g. in Palestine or Lebanon, in order to promote peace and international dialogue (The Guardian, 2015).

A political modernization might go hand in hand with a reform of the legal environment, especially in terms of privatization of state-owned company and the fight against corruption. The lifting of suppressing laws, e.g. against the freedom of women or freedom of opinion, might also reduce the brain-drain of high-qualified Iranians. Furthermore, it might simplify the situation for companies entering the Iranian market since they will be able to easier convince qualified workforce to go in a moderate country rather than in a conservative one where women have to cover themselves.

### **Threats**

Iran's proximity to the war zones in Syria, Iraq, Lebanon, and Afghanistan might be a risk factor for the country, especially as Iran is already involved in these conflicts through the backing of the Assad-regime in Syria, militants in Iraq, and Hezbollah in Lebanon. Related to this, the current power vacuum in Middle East is not filled and might be used by one of the major Arabian players to expand its power and thence create destabilization in the region. In this context, the development of the extremist militant group IS<sup>16</sup>, a Sunni organization, has to be observed. The ongoing political tensions with Saudi-Arabia and Israel related to the above mentioned conflicts have moreover the potential to escalate and represent therefore a considerable threat for potential investors in Iran.

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<sup>16</sup> Islamic State

Based on the recently signed nuclear deal between Iran and the P5+1 group, the outlook for dialogue between the UN, the US and Iran has improved. Nevertheless, current events prove that there is ongoing conflict potential: As Iran is still labelled to be a “*sponsor of terrorism*”, it was recently excluded from an UN summit on IS (Borger, 2015), although an inclusion of Iran, given its military strength and proximity to IS-occupied countries, would significantly increase the chances to cope successfully with the situation. Furthermore, Iran’s pride to be independent from the West, as evident during the public demonstration of its military strength that happened in October 2015 (Waghorn, 2015), might also hinder a process of convergence. This pride might thereby even increase since the non-violent solving of the nuclear question could be seen by Tehran as an evidence of its strength (Brumberg, 2013).

### 3.2. Economy

#### **Strengths**

Considering the economic strengths of Iran, we can outline the strong industrial and technological capabilities of the country, which possesses not only the infrastructure but also the know-how and the qualified workforce to produce technical goods and to drive innovation. Many industries like oil & gas, mining, automotive and others are therefore well developed (CIA, 2015). Furthermore, transportation networks are well established and can ensure an effective supply and distribution.

Additionally, labour forces are, as previously mentioned, well qualified, with special know-how in the areas of engineering, construction and science. The high number of young graduated workers in the economy can be a main driver for Iran’s industrial prosperity and thus GDP growth (Going the Distance, 2013). Besides, Iran is a very rich country in terms of natural resources. Underlining this abundance of resources, the Islamic republic possesses the 4<sup>th</sup> largest oil and 2<sup>nd</sup> largest natural gas reserves worldwide, with many of these oil and gas fields still unexploited (Mohamedi, 2015). Moreover, Iran is endowed with many other resources like coal, copper, chromium, iron ore or lead (CIA, 2015). This wealth of resources ensures a long-term supply for the economy and can be seen, in combination with its industrial and technical abilities, as a major economic strength of Iran.

Furthermore, the energy sector can be considered a backbone for the country. The Islamic Republic possesses the ability, in terms of both infrastructure and knowledge, to produce nuclear energy for its domestic needs and for exports, if necessary (World Nuclear Association, 2015). Moreover, the country is not dependent anymore on imports of gasoline and has developed its own gasoline refinery production. Its ability to produce natural gas itself and to use it for transportation further accentuates its independency from external suppliers (Mohamedi, 2015).



Figure 13: Great geographical diversity in Iran (diverse Internet sources<sup>17</sup>)

Another remaining economic strength of Iran is its rich geographical diversity as depicted in *Figure 13*. Consequently, the country even has potential for tourism (Dehghan, 2015).

### **Weaknesses**

In regards to economic weaknesses, the lack of diversity of Iran's GDP and its dependency on external revenues, particularly on oil and gas export earnings, represent a first significant disadvantage (Ilias, 2010, p. II; CIA, 2015). Secondly, the country is largely dependent on the import of supply for its key industries and nuclear program. Sanctions have targeted both these weaknesses directly and have thereby strongly affected the Iranian economy over the recent years (Clawson, 2009). Indeed, the oil embargo prevents Iran to generate export revenues, whereas the bans on imports undermine its ability to maintain the level of production and to export capacity as ageing technology and equipment cannot be replaced.

Thirdly, although the resulting high inflation rate and weak Iranian currency may stimulate export earnings, they significantly increase the cost of living and imports (Macaluso, 2014, p. 11). Additionally, governmental ownership of major parts of the economy results in more bureaucracy, less dynamism and more inefficiency (Nasseri & Motevalli, 2015). Ineffective policies and inflexible labor regulations, in addition to the Western sanctions, have also harmed the development of industries, the formation of businesses and the inflow of foreign investments. Moreover, a negative side effect of sanctions is the formation of black markets for oil & gas and FX, a substantial informal labor activity (around 20% of GDP) and state-backed corruption (Macaluso, 2014, pp. 9,11).

### **Opportunities**

<sup>17</sup> [http://www.jonas.it/Iran\\_Teheran\\_Dizin\\_ski\\_Resort\\_1107.html](http://www.jonas.it/Iran_Teheran_Dizin_ski_Resort_1107.html),  
<http://resourcesforhistoryteachers.wikispaces.com/WA.3>  
<https://www.flickr.com/photos/rshoraka/2237020931/sizes/n/>  
<https://chronicle.fanack.com/iran/geography/>  
[http://www.lib.utexas.edu/maps/middle\\_east\\_and\\_asia/iran\\_petroleum\\_facilities\\_2004.jpg](http://www.lib.utexas.edu/maps/middle_east_and_asia/iran_petroleum_facilities_2004.jpg)  
<http://www.tradingeconomics.com/iran/inflation-cpi>

With regard to opportunities, the partial or total relief of Western sanctions already represents a huge potential itself, as it opens several new perspectives for the country in terms of economic growth: Iran has already initiated its re-integration process into the international community through diplomatic dialog, which might lift Iran's isolation in the long-term. Overall, the relief of sanctions will allow Iran to benefit from many business and investment opportunities. In detail, it would enable the Islamic Republic to export again oil and gas to many economic partners like the US and the UE (The World Bank, 2015, p. 2). Moreover, Iran would be able to import equipment, material and knowledge in order to develop its industries faster and more cheaply (p. 2). All the mentioned aspects might lead to a direct rise in Iran's GDP and a stronger economic growth over the next years. According to the World Bank, the Iranian GDP will rise by about 5% in 2016 after the kick-off of the sanction relief (vs. 3% in 2015) (The World Bank, 2015). Furthermore, they estimate that exports and investments will increase by about \$ 17 bn. and \$ 3 bn. in 2016 (ibid.).

In addition to the estimated unfreeze of c. \$ 100 billion foreign financial assets (Jones, Barker, Savastopulo, & Bozorgmehr, 2015), the country would have again access to international financial system and would be able to develop its domestic financial market. Iran would also become much more attractive for foreign investors and companies willing to invest and to found businesses in the country (The World Bank, 2015, p. 1). The inflow of foreign workforce could also increase, in line with economic prosperity. All of this might stimulate the GDP of the country, decrease unemployment among the Iranian population and lead to an appreciation of the Iranian Rial as well as lower inflation (pp. 13,14). Furthermore, the country has a general long-term economic potential due to its well-educated population as well as the anticipated pent-up demand, which might follow the period of isolation and economic struggles.

In terms of environment, economic prosperity would also lead to a better preoccupation of environmental issues such as the oil and gas standards, and thus to less pollution. Moreover, tourism might possibly become a relevant factor for the Iranian economy given Iran's geographical diversity and historical background (Dehghan, 2015).

### **Threats**

Although the evident economic opportunities should be persuasive for many investors, risks for the Iranian economy remain. First, economic sanctions are neither fully lifted nor permanent. As already explained, even if the Iranian regime expects a total relief in the beginning of 2016, sanctions can snap back at any moment if the deal is violated (The White House, 2015, p. 5).

Secondly, the position of the Supreme Leader and of the state regime is unclear (e.g. Waghorn, 2015). Despite the election of Rouhani, the Mullahs still control the government and could change the direction of the Iranian policy anytime, undermining the recent diplomatic efforts of Rouhani and his government (Macaluso, 2014, p. 20). Consequently, foreign investors and companies could possibly become less welcome, which would, in addition to the existing bureaucracy and corruption risks, represent a major business threat for a potential investor.

Furthermore, a potential positive imbalances of Iran's state budget resulting from anticipated investment inflows, unfrozen financial assets or improved performances of the Iranian economy may be used for hostile purposes. This could enable the regime and its army to make technological improvements, invest in new weapons and even finance terrorism.

Lastly, the expansion of industries and factories might come along with more pollution and destruction of environment.

### 3.3. Society

#### **Strengths**

As already described in the descriptive demographic part, Iran's major societal strength is its young population given that the majority of people is younger than 30 years and that the median age is 29 years (CIA, 2015). This is also proven by Iran's low dependency ratio (c. 40%), which allows the country to keep social expenses for pensions and healthcare low. Moreover, the country offers a well-educated society, given that more than 85% of the total population and even approximately 99% of the population between 15 and 24 years is literate (UNICEF, 2013). The fact that the post-secondary gross enrolment rate is above 50% (UNESCO, 2015) and that Iranian universities produce c. 750,000 graduates yearly (Ayse, Nash, & Leland, 2013, p. 162) ensures that the economy will be continuously supplied with a qualified workforce. A further advantage of the Iranian social system is that education can be achieved independently from social background due to low costs necessary for education (World Education Services, 2013). Additionally, Iran has a strong middle class (Brumberg, 2013) stabilizing the country by closing the gap between rich and poor.

#### **Weaknesses**

One of Iran's major social weaknesses is its low fertility rate of 1.85 births per woman, which is below the needed replacement rate of 2.1 (CIA, 2015). In addition, despite the high educational attainment among the population, unemployment is a significant issue in Iran as approximately 11.4% of all Iranians do not have a job, whereby this percentage is even higher among university graduates (19%) (Worldbank, 2015). This unemployment in connection with

dissatisfaction of the population about the political environment in Iran led to massive brain drain throughout the recent years, which is represented by a negative net migration rate (CIA, 2015). Moreover, the violation of human rights makes it difficult for Iran to attract foreign qualified workforce.

### **Opportunities**

Given its young population and strong educational system producing around 750,000 graduates every year (Ayse, Nash, & Leland, 2013, p. 162), Iran offers a continuous supply of qualified work force. Another additional social opportunity of Iran is its increased openness towards Western ideals and strong desire to integrate the country in the international economy. Moreover, the lifting of sanctions and its potential effects such as investment inflow in the country might be a chance to decrease unemployment as well as the brain drain of high qualified citizens. Related to this, if Iran achieves prosperity of its economy, there will be a higher budget available for social expenses.

### **Threats**

The major threat for Iran's society is the shrinking of its population resulting from the combination of a fertility rate below the replacement rate and a negative net migration rate (CIA, 2015). Moreover, the low fertility rate explains the gradual aging of the Islamic Republic, which will going-forward lead to higher dependency rates (Groth, 2015) and thereby to challenges in regard to higher social costs, for e.g. pensions and health. Taking the point of view of a potential investor, it is also important to consider the high probability that difficulties will occur in terms of convincing foreign qualified workforce to work in a country violating basic human rights such as the freedom of opinion and the freedom of women (Human Rights Watch, 2015).

## **4. Conclusion**

All in all, Iran's strengths and opportunities provide major incentives to invest in the country. Investors could benefit from a high potential country currently opening towards the international community and offering a young and qualified population, unexploited resources and existing industrial competencies. However, the ongoing tensions between Iran, the US, and its Middle Eastern neighbors have to be carefully observed as the improvement of international dialogue including Iran has just begun. Furthermore, the sanctions are presently neither fully lifted nor definitely permanent and investors might be confronted with the remaining risks of corruption, bureaucracy and the change of state policies. Moreover, Iran faces the threats of a shrinking

and aging population in the long-term. In that sense, our recommendation for investors is to strongly consider an investment in Iran pursuing, however, a cautious approach.

Therefore, one of our recommendations for companies intending to enter the Iranian market is to pursue this cautious approach by cooperating with Iranian companies, e.g. in form of Joint Ventures. Thereby, investors can avoid the burden related to the foundation of a new business, lower the risk of high losses in case that international sanctions are imposed again or that conflicts in the Middle East escalate, and benefit simultaneously from local knowledge and skills.

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## 6. Appendix

### Appendix A: Theoretical Link between Sanctions and Investments

*“A nation that is boycotted is a nation that is in sight of surrender. Apply this economic, peaceful, silent, deadly remedy and there will be no need for force. It is a terrible remedy. It does not cost a life outside the nation boycotted but it brings a pressure upon the nation which, in my judgement, no modern nation could resist.”*

US President Woodrow Wilson, 1919 (as cited in Padover, 1942)

Hufbauer, Schott, Elliott, and Oegg state, US president Wilson unknowingly started a still ongoing debate about the usefulness of economic sanctions, when he delivered a speech in Indianapolis after the end of World War I in 1919 (Hufbauer, Schott, Elliott, & Oegg, 2007, p. 1). Throughout history, economic sanctions have been used as an alternative tool to war in order to control controversial foreign policies. However, their effectiveness has ever since been doubted by sceptics arguing that targeted governments can easily transfer the impact of sanctions to the general population and that benefits of sanctions do not always outweigh the costs they burden on involved countries, populations and companies (Hufbauer, Schott, Elliott, & Oegg, 2007, pp. 1,2). In the following paragraph, our focus lies on describing the impact of sanctions on foreign investments in punished country based on existing empirical analyses.

Biglaiser and Lektzian (2011) analyze the relationship between US government sanctions and the inflow of private foreign direct investments (FDI) in the targeted country by using panel data of 171 countries throughout the period from 1965 to 2000. Thereby, they detect that US investors disinvest from sanctioned countries before the punishment is imposed (Biglaiser & Lektzian, 2011). Not focusing on the impact of sanctions on investments in the target country, but on the international trade of goods and services, Hufbauer and Oegg (2003) show that strong sanctions reduce total bilateral trade flows between the US and the targeted country by about 99% and US exports in this country by about 98% (Hufbauer & Oegg, 2003). These findings are supported by Caruso (2003) who discovers that *“[...] extensive and comprehensive sanctions have a large negative impact on bilateral trade, while this is not the case for limited and moderate sanctions”* (Caruso, 2003).

### Appendix B: Historic Examples of Sanction Regimes

In this part, we go one step further and, based on historic examples, also provide an answer on what sanctions (did not) achieve or (did not) prevent throughout the history. It is noticeable *“that economic sanctions usually have only modest effects, even if they can be an essential means of demonstrating moral resolve”* as Harvard Professor Kenneth Rogoff states in the

introduction of his "*The Guardian*"-article about the history of sanctions (2015). As a negative example of the usefulness of sanctions he names Serbia invading Bosnia in the early 1990s although it was confronted with economic sanctions. Moreover, Rogoff (2015) argues that US sanctions on Cuba have failed to overthrow the communist Castro regime as well as Soviet sanctions failed against China, Albania, and Yugoslavia. Looking at the case of North Korea, bearing the burden of strong international sanctions, the Harvard professor concludes that the Kim regime might have not yet collapsed due to the support of China, which fears a neighboring united Korean state (ibid.). This shows the importance of a consensus among major economic players in order to successfully conduct punishments via sanctions. Whether current sanctions on Russia will be successful in the medium or long term remains to be seen as the strong economic hit Russia currently suffers from might be more probable a result of the drop in oil prices than of international sanctions (ibid.). Nevertheless, there are also positive examples of the effectiveness of sanctions, such as in South Africa in the 1980s, where sanctions supported the end of the apartheid (ibid.), in Finland in 1959, which finally, after its GNP decreased by 1.1% due to sanctions, met the request of the USSR which wanted the prime minister to resign, and in South Korea in 1975, which never completed its planned purchase of a nuclear fuel plant from France due to the threat of US sanctions (Taylor, 2014).

## E. Cuba – what should we know about this country’s demography?

*by Matthew Chassot, Camille Leutenegger and Maxime Ueberschlag*

This paper is a study of the demographic situation and challenges of the Republic of Cuba. Detailed analyses of the political, economic, social, technological, environmental and legal landscapes of the country are presented. The major trends, namely the quality of life, the end of the U.S. embargo and the geopolitical development, are singled out and discussed in depth. Based on the trends identified, three potential forecasts of the country’s evolution are drawn and their potential impact on Cuba’s demography is shown. The first forecast is based on a status-quo scenario, where the deciding contributing forces remain constant, leading to a demography characterized by low fertility, negative migration and high mortality, resulting in an aging and contracting population. The second forecast is built on an enlightenment scenario, in which the country’s conditions improve faster than expected. The third forecast envisioned is grounded in a break-up scenario, whereby the actual circumstances deteriorate. Following these forecasts, the forecasts of Cuba’s national statistics office and those of the United Nations are rendered and their divergences addressed. Finally, the link between the economic and demographic situations is highlighted, and the key issues that must be tackled, together with how they will influence Cuba’s future, particularly in terms of intergenerational dependency, are explained.

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## **1. Introduction**

The republic of Cuba has played an important geopolitical role since the 1960s. It's mineral and gas resources triggered interests that led the small country to become a key point of pressure between the United States (U.S.) and the Union of Soviet Socialist Republics (USSR). Even after the fall of the USSR, Cuba remained a strong foe of the U.S. and paid for it in terms of recurrent exclusion attempts by the US, as well as with economic poverty. Recently, the warm up of the two countries' relationships has taken the center of the scene. During all these years, the study of its population has remained in the shadow. Cuba's demography is facing very particular challenges: it is one of the only if not the only developing country that is characterized by a very low fertility rate. Furthermore, the country exhibits high negative migration rate and high mortality. These trends have resulted in a quickly aging and shrinking society.

## **2. Theoretical Background**

Studying the demography of a country is a complicated endeavor that requires an understanding of parallel developments in different areas and addressing their interconnectedness. The PESTEL framework helps us capture the major developments in the political, economic, social, technological, environmental and legal landscapes (PESTLE analysis, n.d.). We then use the scenario planning methodology and the historical data of Cuba's demography to identify the key over-arching trends relevant for this analysis. Building on these trends we finally propose scenarios as to how the demography of Cuba may develop in the future.

## **3. Current Situation**

### **3.1. PESTEL Analysis**

#### *3.1.1. Political*

The Republic of Cuba is a communist and socialist state that gained its independence in 1902. The current Cuban president, who is both chief of state and head of government, is Raul Castro, 84 years old. Cuba is one of the world's last countries with only one legal political party, the Cuban Communist Party, led by Raul Castro himself. Official candidates face no opposition: the current president and vice-president, who are elected by the legislative branch, a unicameral National Assembly of 614 seats, received both 100% of the votes (World Factbook, 2015). Although they are appointed for a 5-year term only, there is no limit to the number of terms of office.

The country's political history is tumultuous. At the end of the Spanish-American war in 1898, Spain ceded Cuba to the U.S. Although the country gained independence in 1902, the U.S. continued to intervene in its political environment and retained control over the naval base of

Guantanamo. In 1959, a revolution led by Raul and Fidel Castro overthrew the U.S.-backed dictator Fulgencio Batista, leading to the presidency of Fidel Castro, and starting a period of executions, expropriations, and trade agreements with the Soviet Union. In 1960, a group of Cuban exiles, armed and trained by the CIA, failed to overthrow Fidel Castro in what is known as the Bay of Pigs Invasion. In 1962, the Organization of American States (OAS), under U.S. lobbying, suspended Cuba and started imposing sanctions. Later that year, in response to the failed coup, Cuba deployed Soviet ballistic missiles on its soil, leading to the culmination of the Cold War known as the Cuban Missile Crisis.

The alliance with the USSR also defined the political and economic framework of Cuba. By 1963, Cuba was a communist state modeled on the USSR system (Faria, 2002, p. 163). Subsidizes received from the USSR allowed the Cuban government to focus its development on social objectives, thereby neglecting economical ones. This prioritization resulted in costly social services, low productivity levels and high reliance on imports (Fuentes Reverón, 2013, pp. 57-59). The fall of the USSR and subsequent economic crisis that were exacerbated by the American embargo led to the “Special Period” from 1990 to 2005 characterized by austerity measures and the deterioration of the social system and of the country’s infrastructure. In 2004, Cuba and Venezuela founded the Bolivarian Alliance for the Americas, an intergovernmental organization with the aim of consolidating the economic and social interests of Latin America and the Caribbean.

Fidel Castro resigned in 2008, leaving the seat to his younger brother Raul Castro. With Raul Castro’s investiture, the strengthening of the economy became a priority. This new program was concretized through reforms focused on reducing state expenditures and increasing efficiency in both the productive economy and the social system. Changes also came on the international relationships level. In 2009, Cuba and the U.S. began to restore their relations. In October 2014, a vast majority of member countries of the UN General Assembly voted for a resolution condemning the U.S. economic, commercial and financial embargo. In April 2015, U.S. President Barack Obama removed Cuba from the list of nations that sponsor terrorism and in June both countries agreed to reopen embassies and reengage in diplomatic relations. The 24<sup>th</sup> UN General Assembly resolution on the U.S. embargo to be held in October 2015 will allow the rest of the world to see where the U.S. stand.

In February 2013, Raul Castro announced his resignation in 2018, ending his second 5-year term. Raul also announced his intention of establishing two-term limits and age caps for all political offices, including the presidency (USA Today). Current First Vice President Miguel Diaz is considered to be the favorite candidate for the presidential election in 2018.

### 3.1.2. *Economic*

Cuban economic activity is dominated by its government with around 75% of total activity directly in relation with the government (Hernández-Catá, 2014, p4). Following the economic reforms, the share of non-state economic activity in the GDP's growth has increased, and the government outputs have decreased, as illustrated by Figure 1. Official statistics report levels of non-state employment of 8.6% in 2013, which represents a strong increase compared to the 2.8% reported in 2009 (Desilver, 2015). There is a high probability that those level of non-state employment are in reality much higher in view of the unregistered "microenterprise" industry that has developed. This new trend in non-state employment has been driven by two government efforts. The reforms of the state sector that led to the introduction of accounting rules, performance requirements, sanctioning of "corporate pilfering" and mass layoffs, on the one hand. The reforms of the non-state sector, aiming at broadening self-employment, liberalizing real estate laws, and attracting further foreign investment, on the other hand. The population's view of the current economic situation fosters this development. According to a survey, "79% of Cubans said they were dissatisfied with the country's economic system; 70% said they wanted to start their own business" (Desilver, 2015).

The Cuban revolution of 1959 impacted the previously quickly developing economy in several ways. With the nationalization of all companies, foreign investment from non-socialist countries in industries such as mining came to a halt (Wacaster, Baker, Soto-Viruet and Textoris, 2015, p. 2). The US embargo led not only to the end of access to US products but also to the introduction of the regional clause stating that any ship having been boarded in Cuba was forbidden to enter the US, thereby effectively writing Cuba off the international vessels' maps. The embargo further increased the necessity of creating new capabilities and industries, such as the biopharmaceutical industry, and, particularly after the fall of the USSR, new economic alliances, such as those with Venezuela and Bolivia who became major gas and oil providers. It is said that about 40'000 Cuban medical doctors work in foreign countries, of which 75% work in Venezuela as part of the oil-for-doctors program, and 15% in Brazil (Devi, 2014, p. 294). In Brazil, these doctors earn 10% of their USD 4'250 monthly salary, while the remaining 90% goes to the Cuban government.

Next to the U.S embargo, the Cuban economy also suffers from its state politics, such as the barriers for foreign companies to do business in Cuba or the lack of clarity concerning the exchange rates. In terms of barriers to the Cuban market, the government used to enforce controlling interest in companies owned by foreign groups. The 2014 reforms have allowed for 100% foreign ownership but required that foreign companies face higher taxes. Referring to

historical cases, international companies have expressed skepticism towards the actual implementation of the new ownership rules (Frank, 2014).

The Cuban Peso and the convertible Peso are the two currencies in use in Cuba. The exchange rate is about 24 Pesos for one convertible Peso and one American Dollar for one convertible Peso. This double currency leads to confusion, as illustrated by the case of the GDP. According to Cuba's national statistical agency, the country's GDP was 77.2 billion Pesos in 2013, which can be converted to either 77.2 billion or 3.2 billion American Dollars depending on the exchange rate used. Contributing to the complexity, some businesses like taxi or hotels are using an exchange rate of 10 Pesos for one convertible Peso. The government has stated the objective of implementing a single currency by 2016. Defining a balanced exchange rate will prove difficult: state-owned companies using the over-valued convertible Peso for their exports and imports would have to face increasing costs. The change in currency will be particularly difficult due to Cuba's relationship history with the US and the country's non-member status at the World Bank and the International Monetary Fund, two institutions that usually support such currency changes. However, this change is undoubtedly a critical stepping stone for Cuba to have an economy oriented towards the rest of the world.

In 2011, Cuba had a 20 % debt-to-GDP ratio, which can be considered low compared to some developed European countries like France, which has a ratio of about 90% (Trading Economics, 2015). The reliability of this data needs to be looked at critically as the Cuban GDP depends on the currency exchange rate. Considering the debt of Cuba to be \$26 billion in 2014 (Frank, 2015) and its GDP to be only \$3 billion, it can be stated that the country is crawling under debts. A more reliable way to estimate the level of debt that Cuba is facing would be to look at recent events: Russia writing down \$32 billion debt in 2013, Mexico recently forgiving \$478 million, Japan forgiving \$1.4 billion in 2012 and China restructuring its \$6 billion debt are strong signs that the Cuban economy can no longer deal with the weight of its debt. During the Cold War Cuba engaged in loans with the USSR, which upon collapse left Russia as the new legal successor to Cuba's loans. Cuba rejected the new entity and its debt, stating that "the debt was in a currency that no longer existed, and was to a country that had vanished" (RT, 2014). In exchange for most of these debt write-offs, Cuba entered new middle-term loans with values equal to approximately 10% to 30% of the previous ones.

While it is estimated that the Cuban GDP increased by 80% since 2005, the growth rate has decreased from 12% in the mid-2000s to 1.3% in 2014, as illustrated by Figure 2. Table 1 shows the composition of the GDP structured by the national statistics office. As a result of the economic reforms, the government has reduced its investments from 14.2% of total GDP in 1989 to 9.1% in 2012 (Desilver, 2015). This reduction of government spending directly impacts

the growth experienced by the state-dependent country. The fall of commodity prices since the 2015, especially of oil prices, particularly affects Cuban exports. Cuba receives 3.5% of Venezuela's total oil production and re-exports around half of that.

The large unknown of the Cuban economy is the number of unemployed or sub-employed people. The official unemployment data recorded rates of 1.6% in 2008 and 3.5% in 2012, following the layoff of state employees amounting to 10% of the labor force. Although three times as many state-company workers were scheduled to be let go by the end of 2015, the increase in the unemployment rate shows that the absorption of workers by the non-state sector has proven more difficult than anticipated by the government. Scholars have discussed the quality of the data, the lowest in Latin America, and explained that the unemployment rate excluded workers not actively seeking employments and workers from the non-state sector (Mesa Lago, 2014, pp. 6-8).

### *3.1.3. Social*

Providing universal access to the primary care system has been one of the pillars of Cuba's post-revolution social policy program. In 2014, health was the largest government spending account, amounting to 34.2% of the total spending, and reflecting a 26.6% increase from 2013 (ONE, 2015a, p. 25). The country's low infant mortality rate, a particularly looked after indicator as it reflects one of the United Nations' Millennium Development Goals, has driven Cuba's reputation for high healthcare standards. Cuba's infant mortality rate has indeed become comparable to that of the U.S., Canada and Europe, although some authors argue that the low infant mortality rate is biased due to the distinction between late fetal mortality rate and early neonatal mortality rate (Gonzales, 2015, p. 20). Table 2 shows the evolution of general health indicators from 1958 to 2014.

Investments have been performed in healthcare education, healthcare services as well as in the biopharmaceutical industry. In terms of education, more than 22'000 student graduate in medical sciences every year. In the context of the Cuban economic crises and general public infrastructure shattering since the USSR fall, the family's doctor model has enabled a secure provision of healthcare, with family doctors' offices accounting for 87% of the state's healthcare units (ONE, 2015b, p. 11). In terms of infrastructure, vast efficiency reforms have been performed since 2008 which led to a reduction in the number of hospitals by 30%, respectively of 10% in the number of family doctors' offices between 2009 and 2014 (ONE, 2015b, p. 11).

In terms of healthcare services, infectious diseases have been at the heart of the Cuban effort, which resulted in very high vaccination rates (Unicef, 2015) as well as the eradication of polio in 1962 (WHO, 2015, p. 9). Infectious diseases remain a constant threat and onsets of cholera and dengue fever have been followed very critically (Devi, 2014, p. 295). The officially most

treated diseases in 2014 were acute respiratory infections with consistent high records reaching 6 million of cases over the last five years, and acute diarrhea in reduction of almost 50% since 2009 with 447' 231 cases registered in 2014 (ONE, 2015b, p. 21). The exposure to poor living conditions and pollution has led to significant infant and young children mortality related to acute respiratory disease. 27% of the children below 5 years old in five Cuban provinces suffered high level of anemia due to poor access to micronutrients (WFP, 2015, p. 1). The Cuban pollution combined with important smoking habits are also defined as leading causes for trachea, bronchial tubes, and lungs cancer, the most represented type of cancers (Gorry, 2015, p. 677). Oncology and heart indications carry the largest death toll, leading to official number of 50'000 deaths in 2014.

In terms of social security, costs amounted to 5.2 billion Pesos in 2014, the third highest government expenditure category. 96% of these spending were directed to the old age and invalidity insurance, the rest being for maternity and partial invalidity costs (ONE, 2015c, p. 17). Given the population aging and shrinking dynamic, reflected in the fact that 60% of the working population is above 40 years old, the fulfilling of elderly people's basic needs (nutrition and healthcare) has become an increasing burden. Retirement ages have been increased and other measures introduced to contain retirement and other social security costs (Diaz-Briquets, 2015, p. 16). That has led the social security system to rely mostly on the families' daily support and care, thereby increasing the families' burden. Pensioners have increasingly been working as self-employed to supplement their pension entitlements.

#### *3.1.4. Technological*

The Cuban technological development has been driven by the right to free access to education anchored in the constitution and by necessities resulting from the embargo.

Education has always been a major state budget account. From 2009 to 2014, it was the first account, followed closely by healthcare and social security. In 2015 it was second to healthcare, with a figure of 7.0 billion Pesos, 9.1% less than in 2011 (ONE, 2015a, p. 25). After having registered illiteracy rate of 23% in 1953, Cuba was proclaimed free of illiteracy in 1961 (WHO, 2015, p. 8). In 2003, an effort to generalize access to superior education led to the launch of 3000 municipal university campuses. Enrollment in humanities increased 40 fold, in physical education 5 fold, whereas enrollment in natural sciences and mathematics fell by 39%. As part of the reforms introduced to reduce social costs after 2008, thousands of those campuses were closed, quotas and entering exams were introduced, and enrollment in humanities and physical educations were reduced to the profit of enrollment in natural sciences and mathematics (Mesa Lago, 2014, p. 11). Enrollment figures for the year 2014-2015 reported a reduction of 71% in the number of enrollment in the higher education compared to 2009. 40.2%

of the enrollment targeted the medical sciences, 17.4% the technical sciences, 12.8% the social and humanistic sciences and 11.3% the pedagogic sciences (ONE, 2015d, p. 25). Table 3 illustrates the evolution of general education indicators and shows the budget cuts and the general reduction in the number of graduate at any level since 2009.

The biopharmaceutical industry shows how the Cuban investment in education and healthcare has paid off in terms not only of capacity building but also of innovations. The Cuban biopharmaceutical industry was originally created out of the necessity to “develop vaccine-production capability to circumvent the US embargo” (Devi, 2014, p. 294). While the country had some experience in the manufacturing of drugs due to the presence of domestic and foreign laboratories such as Abbott and Squibb that were nationalized after the revolution (WHO, 2015, p. 8), the government investments in the industry were reported to be as high as 1 billion USD. This industry development process has been based on the buildup of human resources, research centers, infrastructure and industrial capabilities but also on the filing of international patents and trademarks, which led to clinical collaborations with different institutions around the world. Among the fruits of this industry are drugs targeting acute respiratory trouble and cancer, the last of which, CIMAvax-EGF, is a therapeutic vaccine approved in Cuba in 2008 for lung cancer that is commercialized in Cuba, Peru and Paraguay and is currently undergoing clinical studies in Europe and Asia. The country has become a major exporter of medical drugs in Latin America and has registered drug based export figures of USD 686 Million in 2013, in increase of 230% over the 2005 figure (WHO, 2015, p. 34).

In other areas, the leverage of the government investment in education is currently curtailed by the interdiction for self-employed to exercise most of the skilled jobs (Mesa Lago, 2014, p. 8).

The technologies of information and communication are the upcoming area of development. Since 2008, Cubans have been entitled to subscribe to mobile phone services. Since 2012, private persons have been entitled to access Internet services from hotels at a rate that was circa 13% of the median wage (García García, 2015, p. 46). In 2013, 118 public Internet access spots were created across the country. Connections speed improved as satellite transmissions were replaced by a fiber optic cable line between Cuba and Venezuela. In 2015 the hourly access rate was divided by three and efforts were undertaken to broaden the connectivity. According to Cuban official data, 25.6% of the population now has access to the internet (García García, 2015, p. 48). While the government wants to control the opening process, many authors argue that the transition to the digital world will no longer be stoppable.

### *3.1.5. Environmental*

Cuba is an archipelago of islands, located in the Caribbean Sea. Its closest neighbors are the Bahamas (21 km), followed by Haiti (77 km), Jamaica (140 km), the United States (150 km) and Mexico (210 km). The country is roughly 111'000 square kilometers, making it the 106<sup>th</sup> largest in the world. The climate is tropical, with an average temperature of 21°C in January and 27° in July. Due to its climate and its location, Cuba is subject to frequent hurricanes, which occur mostly in September and October, and severe droughts.

Often referred to as an “ecological bastion” (Whittle and Rey Santos, 2006, p. 74), Cuba places a strong priority on the preservation of its environment and natural resources. A movement started in 1992 at the Rio de Janeiro Earth Summit, when Fidel Castro delivered a speech supporting sustainable development and environmental protection. The Cuban government amended the constitution and launched a series of reforms targeted at remediating more than 200 years of environmental degradation, caused by deforestation, exploitation of minerals, industrial-scale sugar production and poor farming practices in general resulting in soil erosion, water pollution and loss of biodiversity. Whittle and Rey Santos (2006) believe that if the government continues its environmental efforts, a high level of environmental protection can be achieved.

### *3.1.6. Legal*

The country's legal framework has been dictated by the Cuban Communist Party and the Congress meetings it holds every five years.

The legal system and its recent reforms have defined core aspects of the Cubans' daily life. Universal free education and healthcare access are defined constitutionally. Work remuneration has been subjected to reforms in 2008 that aimed at raising wages by legalizing pay for performance and enterprise stimulus bonuses, eliminating the salary cap and authorizing multiple jobs (Mesa Lago, 2014, p. 11). The rationing of goods at subsidized prices is undergoing reforms to reduce the number of quotas and subsequently eliminate completely the rations. After the laws of 1960 that confiscated housing and forbade private construction, sales and rentals, allowing citizens solely to rent state-owned apartments and own them after 20 years, the 2011 reforms reinstated the right to purchase and sell housing at a freely fixed price. In addition, the sales and subsidization of building materials were enabled, addressing the urgent need to repair homes damaged by time and hurricanes (Mesa Lago, 2014, p. 14). The social security system also underwent reforms starting in 2008, leading to an increase of the retirement age by five years to 60 for women and 65 for men (U.S. Social Security Administration, 2015), the establishment of a worker contribution to the pension fund, the compression of social assistance and the complete cutoff for beneficiaries with relatives able

to support them. Last but not least, 2013 reforms lifted the travel ban, thus allowing Cubans and their children to travel outside the island.

On the institutional side, the major legal institution of the last fifty years has been central planning, defined in 1961. While the economic model has seen several gradual reforms aiming at the transformation, deregulation and self-financing of state enterprises since 2011, the model based on state-ownership and central planning remains at the core of the economy. Concretely, the government continues to “centrally assign resources to enterprises that are not allowed to use their own resources to solve their own problems”, but large enterprise may newly retain 50% of their post-tax profit for reinvestment or wage raises (Mesa Lago, 2014, p. 2). Reforms to enhance the productivity of enterprises and plans to lay off 1.8 million people between 2011 and 2015 have led to a call for the expansion of non-state jobs, including self-employment, non-agricultural production, and service cooperatives. The number of authorized categories for cooperatives and self-employed jobs increased significantly, although the later remained focused almost exclusively on low-skilled jobs. Cooperatives and the self-employed can set prices freely, are allowed to buy, sell and lease, to open bank accounts and receive micro-credits. Cooperatives pay monthly fees and taxes that increase progressively based on income and climb steeply for organizations with more than five employees (Mesa Lago, 2014, pp. 6-7). The most important current reforms concern the further opening of the non-state sector and the opening to foreign investors. On the agricultural side, the usufruct model has been allowed by law since 2008, providing that farmers may cultivate state land in tightly regulated contracts of defined length (10 years for individuals, 20-25 years for cooperatives and state entities) under the condition of rational use and of selling circa 60% of their fruits to the state. The list of products allowed for cultivation and farming, respectively allowed for sales outside of the state market, remains tightly defined (Mesa Lago, 2014, pp. 2-3).

Of particular importance in the Cuban context is the question of the implementation of the law. The travel ban in place until 2014 did not hinder a massive exodus since the Cuban revolution. On the production side, corruption, “pilfering” and “book cooking” have been widely practiced and law violations have been revealed in 45% of state enterprise (Guerra, 2015, p. 220). The reforms formulated have been obstructed by managers and employees as these refused to comply, reflecting a conflict of interest based on the state’s ownership monopole and on the lack of citizen representation at the national assembly (Guerra, 2015, p. 220). The government itself has also hindered the reforms implementation process through its slow concretization of the reforms and the implementation of contradictory regulations aimed at “avoid[ing] the concentration of wealth” (Mesa-Lago, 2014, p. 2).

On the judicial side, the Cuban justice system is generally looked at as highly discretionary. Human Right Watch notes that in the judicial practice, “courts are subordinated to the executive and legislative branches, denying meaningful judicial independence” and preventing individuals from fair process guarantees (HRW, 2015).

### 3.1.7. Demographic

According to estimates made in 2012, the main ethnic group is white with 64.1%, followed by mestizo, which means a person of mixed European and American Indian descent (Merriam-Webster), which accounts for 26.6%, and black with 9.3%. The main religion is Roman Catholicism (85%); other religions include Protestantism, Jehovah’s Witnesses, Judaism and Santeria, a religion of Caribbean origin. Similarly to the worlds’ overall population, Cuba’s population has experienced an explosion in the last century with its number increasing from 1.6 million inhabitants in 1900 to 5.9 million in 1950, and to 11.1 million in 2000 (ONE, 2015e, p. 13). Figure 3 illustrates this development. However, the total population growth rates have been declining since 1960 with the exception of 1984 to 1988. 2008 marked the beginning of negative growth rate resulting in the population shrinkage. In July 2015, the population was estimated at 11,031,433 inhabitants, making Cuba the 78<sup>th</sup> most populated country in the world.

The 25-54 years old represent the largest portion of the population with 47.16%, followed by 0-14 years old (15.96%), 15-24 years old (13.29%), 65 years and over (12.95%) and finally 55-64 years old (10.65%). As observable in figure 4, 40-49 years old are a significant part of the population, which has a median age of 39.5 years for male and 41.3 years for female, for an average of 40.4 years. Figure 5 shows the real and forecasted evolution of the age structure of the Cuban population between 2002 and 2030. The cohort of 60+ year-old has been steadily increasing over the last decade. The Cuban National Office of Statistics (ONE) projects an even stronger rise in the coming years, with an equally strong decline in the 15-59 years old cohort. The UN Department of Economic and Social Affairs, in its World Population Prospects report, projects 41.9% of 60+ years old in 2050, compared to 21.2% for the world average (UN DESA, 2015). This has far reaching consequences for the dependence ratio, as will be discussed later. The median age is forecasted to reach 54.1 years in 2050 making Cuba the 3<sup>rd</sup> oldest population in the world by that time. As for the life expectancy, it should go up to 89.8 years. The DESA expects the population to decline by 16.6% reaching 9.4 million inhabitants by 2050 and even 5.5 million by 2100, despite a fertility rate that is expected to rise to 1.83 by 2100.

According to the World Factbook 2015, the population growth rate is estimated at -0.15%, the crude birth rate at 9.9 births/1,000 population, the death rate at 7.72 deaths/1,000 population, and the net migration rate at -3.66 migrants/1,000 population, making Cuba #211, #195, #112

and #188 in the world, respectively. 77.1% of the population lives in urban areas and roughly 19.4% (2.137 million) live in the capital, Havana. The total population is balanced between male and female, with 0.99 male/female. The life expectancy is 78.39 years (#59 in the world), the infant mortality rate is 4.63 deaths/1,000 live births (#183) and the total fertility rate is 1.47 children born/woman (#197). The literacy rate is high (99.8%), with a school life expectancy of 14 years, and the unemployment of youth is low (3.1%).

### 3.2. Major Trends

In the following paragraphs we reflect about the insight into Cuban realities gained through the PESTEL analysis and draw the overarching key trends that are relevant for the demography and/or are influenced by the demography.

#### 3.2.1. *Quality of Life*

While Cuba occupied the 44<sup>th</sup> position in the Human Development Index (HDI) in 2014 (UNDP, 2015), second only to Chile in Latin America, the development of the HDI indicators, congruently with the evolution of the demography indicators in this paper, reflect a different development. The food crises related to the low agricultural productivity and to the import limitations, the increasing unemployment and limited job opportunities in the non-state sector, the scarcity and deterioration of housing, the balance of healthcare progress and rising pollution, all had a significant impact on the country's fertility and net migration.

The Cuban fertility rate has seen a steep decline since the baby boom of the years 1950 to 1970 that led to a 47% increase of the total population to 8.7 million inhabitants. In 1978, the Total Fertility Rate (TFR) dropped below the replacement level, where it has remained since then with the exception of 1985. Crude Birth Rate dropped from 17% to 10% during the "Special Period" of 1990 to 2005 in which austerity measures were implemented. In 2006, the TFR hit an all-time low at 1.39, 1.3 being defined as the ultra-low women fertility threshold. Since then, fertility has slightly recovered at levels around 1.7 before falling as low as 1.47 in 2014. Figure 6 shows the development of fertility between 1955 and 2014. Diaz-Briquet argues that the reduction in fertility experienced by Cuba in the last fifty years is not a result of women's postponing childbearing in a "desire to satisfy higher-order aspirations, as formulated by Maslow" but rather a consequence of the "frustrated material expectations in a severally battered economy, where families struggle to satisfy the basic needs, women are fairly well educated and have high rates of participation in the labor force; and contraception is widely available, with abortion in particular, being freely accessible on demand" (Diaz-Briquets, 2015, p. 13). These assumptions are backed by data showing that from 2010 to 2015 72% of pregnant women were between 15 and 29 years old (UN DESA, 2015), as well as by data reporting abortion rates as high as 30% (UN, 2013), making Cuba the country with the second

highest abortion rate after Russia. Fertility fostering policies have been announced but not detailed out and will have to address financial incentives, thereby creating a “tradeoff among competing social demands” (Diaz-Briquets, 2015, p. 14).

Although Cuban citizens were prohibited to travel until 2013, Cuba has faced high net migration rates since 1959, with an estimated 1.8 million citizens having left the island since 1959 (Diaz-Briquets, 2014, p. 680). Figure 7 retraces the migration history. The high emigration has been fostered by the dire economic conditions and by the Cuban Adjustment Act signed in 1966 by American President Johnson. This act provides that any Cuban citizen who has been admitted into the U.S. after January 1959 and has been physically present in the United States for at least one year (originally two) may stay and may be admitted for permanent residency. Migration negotiations between Cuba and the U.S. led to a “Normalization” Agreement in 2004-2005 that limited the number of Cuban citizens to be admitted in the U.S. to 20,000 per year and introduced a “wet foot/dry foot” clause: any citizen intercepted by boats at sea would have to be repatriated to Cuba. Cuban citizens remain among the few sets of “foreign nationals that are eligible for federal benefits and cash assistance in the United States” (Wasem, 2009). Cuba's net migration rate for 2010-2015 stabilized at -1.4%, a lower level than the -3.4% registered in the 2005 to 2010 period (UN DESA, 2015). The consequences of the recent lift of the travel ban by the Cuban government have yet to be seen.

The socio-economic reforms defined since 2008 have led to a rationalization of social policies and a progressive adjustment of the economic model towards more market orientation. They have also brought a curtailing of social resources, such as education and health, and a decline of the purchasing power through rising unemployment, reduced pensions and newly raised taxes, to name a few. All in all, these years of reforms have seen low fertility rates, high negative net migration rates and growing mortality rate, a natural phenomenon of the aging population. These factors drove the declining population growth rate to turn negative with the 2014 total population number comparable to that of 1997, in decline of 2.4% in respect to the 2007 number. While the high mortality rate will remain a fact until 2050, when the baby boom effect is expected to decline, the demographic future of the country, driven by fertility and net migration, depends on the results of the implementation of these reforms and particularly on their ability to increase the Cuban quality of life in the midterm. The reform of the subsidies and rations shall have a particularly important impact in the short term. Given that 80% of the nutrition needs are covered by imported goods (WFP, 2015) and that 50% of those needs were supported by state subsidies in 2012 (PAHO, 2012), the careful implementation and

coordination of these reforms will be critical for the population nutrition security and is expected to have a direct impact on the demography.

### *3.2.2. End of Embargo*

The US trade embargo against Cuba is still active, and it is unclear when the US government will permit free trade between the two countries. In the meantime, however, the rigidity of the embargo has started to diminish. Since the year 2000, US exports of certain agricultural products, medicines and medical devices have been allowed, although they still need to be paid for upfront. The regional clause has been lifted, allowing the access of international goods to Cuba. In September 2015, the US Treasury Department lessened the restrictions preventing US companies from doing business in Cuba. Last but not least, the US, which counts 1.5 million Cuban expatriates, lifted the limit of USD 50 remittance per day allowed to be sent to Cuba. This has had a direct impact on resources available to Cuba as remittances reach households directly.

It is difficult to forecast the scope of the Cuban economy's rebound after a lift of the U.S embargo. The country's deficient infrastructure, the lack of capital and transportations systems, the government's dual-currency system, its control on business ownership, its strong regulations, its credit situation, and its reputation are deemed strong challenges to be overcome by international companies considering investing in Cuba (Fox) even after the embargo disappears.

Until the embargo is lifted by the U.S. Congress, President Obama advocates a gradual process, seeking step by step opportunities (Asia News Monitor). The restoration of diplomatic relations has prompted some US officials to visit the island in hope of economic opportunities. In April, the governor of New York travelled to Cuba, along with 20 business leaders, including representatives from Pfizer, MasterCard and JetBlue Airways. According to the Congressional Research Service (Beitsch), US agriculture could benefit massively from trading with Cuba: exports, which amounted to \$365 million from 2012 to 2014, could match those to the Dominican Republic, which were \$1 billion over the same period. As for Internet access, some US technology firms hope to profit from this untapped market, while others fear a Chinese-like, heavily censored model (Reinl).

One sector of Cuba's economy will at least benefit directly from the lift of the U.S embargo: the tourism industry. As illustrated in figure 8, 25.8% of Cuba's GDP is directly affected by the travel and tourism industry while 21.2% is induced from it (World Travel & Tourism Council, 2014). In view of the impact of the tourism industry on the whole Cuban economy, the potential growth coming from American tourists will have a consequent effect on Cuba.

### 3.2.3. Geopolitical Development

The normalization of Cuba relations with the rest of the world could lead to a cooling of its relation with its main current partner: Venezuela. From a warming of its relation with the U.S.A, to its key role in the mediation between the Colombian government and the FARC, to its meetings with Guyana's president, Cuba is currently having a lot of interactions with Venezuela's foes. Venezuela is in the meantime facing economics issues due to low oil prices, government mismanagement and weak investments in new oil infrastructures. As a result, the country with the biggest proven oil reserves might use Cuban international relations as a pretext to rethink the economic alliance established by Hugo Chávez and Fidel Castro in 2004. (Woody, 2015).

## 4. Forecasts

Based on the trends identified, we draw scenarios as of how Cuba could develop in the near future and how this could impact on the demography. For this we work with three scenarios: the status quo scenario, the enlightenment scenario and the break-up scenario and build our own forecasts.

### 4.1. Status Quo Scenario

The economic reforms take some time to bear their fruits. The state sector wages rise slowly, proportionally to the productivity. The number of non-state businesses increases with the new job categories and the foreign remittances, but the additional income is heavily taxed. The uncertainty of the currency rate keeps foreign investors and companies at bay. Population continues to age, reaching a median age of 46 years old in 2030 and the old age dependency ratio more than doubles from 18% in 2010 to 40-50% in 2035 (Diaz-Briquets, 2015, 10). This trend is expected to last until 2050 when the baby boom effect is expected to decline. Young cohorts, encouraged by the Internet and the travelling permission, leave the country to go work in the US, leading to stable net migration rate of – 2.5%. The fertility stabilizes at 1.5% by 2020, reflecting a reduction in the cohort of women aged between 20 and 39 years old of 10.9% between 2010 and 2020 (ONE, 2011, p. 23) and the burden of the elderly care on families. Cuba's population continues to contract as a result of the relatively low fertility rate, the negative net migration rate, and the ageing population.

### 4.2. Enlightenment Scenario

The economic reforms lead to positive results faster than expected. Cuban citizen receive higher wages. They still have to bear the burden of the high old age dependency ratio in the medium term but their quality of life improves significantly. The 2016 congress meeting leads to deregulation of the agriculture and the food markets, enabling the population to access food in an efficient and secure manner. The 2016 congress further continues to foster the expansion

of the private sector (EIU, 2015, p. 1) and the election of the current vice-president, Miguel Diaz Canel, as successor to Raul Castro in 2018, leads to further decentralization of authority and maintained focus on anti-corruption and anti-pilfering measures (EIU, p. 6). The number of non-state businesses increases quickly, funded by Cuban expatriates remittances and promoted by the access to the American fiber optic grid that grants Internet access to all. The abandonment of the Convertible Peso in 2017 and the removal of the US sanctions in 2018 (EIU) foster the arrival of American companies building production sites in Cuba to profit from the relatively low wages and good education. These investments lead to improvement in water, telecoms and transport infrastructures. The GDP grows substantially (4.6% in 2015-2017, 5.8% in 2018-2019) as does the number of tourists visiting the island. As public-sector jobs disappear, the non-state sector compensates for it, keeping the unemployment rate below 5% (EIU, p. 1). The growing economy and the emergence of a domestic banking system foster the emergence of a new middle-sized non-state sector. Workers come from neighboring countries to work in Cuba, leading to positive net migration rates. The improvement in the quality of life lead to fertility increases with the TFR reaching 1.7% by 2020. For the first time since 2007, the total population size stabilizes and the forecasts expect positive growth by 2025.

#### 4.3. Break-up Scenario

Reforms of the economy are boycotted so that the productivity does not increase and that no positive outcome results for the population. The new currency adopted in 2017 puts state companies under financial pressure and these can no longer import products. One million workers are let go, suddenly raising unemployment to 20%. The rations and subsidies are stopped and lead to 30% of the population living in precarious conditions. Riots emerge in the country. The travelling permission allows for new emigration waves, particularly of young people. Net migration rates reach -7%. The departure of young cohorts and the deterioration of the living condition leads to further decrease in fertility with the TFR reaching 1.3 % by 2020. In 2019 the newly elected president decides to change politics, reintroducing subsidies and increasing pensions. Not much changes at first, as the population is skeptical as of how the economy shall produce for their living in the medium term. The total population contracts at accelerating rate.

### 5. Discussion

The forecasts proposed in this paper show how strong the consequences of single events, respectively of the reforms implementation, may be for the demography. In this context, it should not come as a surprise that demographical forecasts of the UN and of the Cuban statistics office (ONE) offer diverging data. Tables 4 to 7 and the respective figures 9 to 13 present these forecasts and their divergences.

Particularly striking in this context are the divergences in the forecasted total population growth dynamic as well as in the net migration. Pertaining to migratory balance, the ONE forecast looks after improvements with a decrease of its population outflow over the years. From 35'000 Cubans leaving the country every year between 2010 and 2020, the negative migration is expected to decrease to 9'000 Cuban after 2030 (figure 10). This expected migratory turn translates the government confidence in its reforms and its expectation for the country to become attractive for its citizens and for foreigners. The UN report is more conservative and does not expect such improvement in the next decades, as illustrated by a 20'000 population outflow from 2035 to 2040. The migratory balance then automatically influences the total population growth.

All in all, the divergences translate the different expectations as to how the current Cuban landscape will impact the country's demographic future. It will be very interesting to monitor future UN reports on Cuba as potential positive changes in the forecasts may reflect a change of opinion concerning the effectiveness of the government reforms and actions.

## **6. Summary**

### **6.1. Summary**

This paper has shown that Cuba's demographic and economic situations are tightly linked. The government must strike a balance of economic and social reforms that ameliorate the business conditions and the quality of life of its citizens. If the economic reforms succeed, the country will benefit from higher wages, better productivity, employment opportunities, foreign investments and growth. Tourism will develop and bring an extra source of income. Similarly, if the social reforms address the food crisis and provide incentives that foster fertility, the population will more likely stay in Cuba, where they will raise their children. The last option is to reform migratory regulations to encourage immigration. Havana's adoption of policies that further emigration will benefit the economy in the short and medium-term by reducing the labor market and the housing pressures, as well as bringing remittances and return tourist visits, but these policies could aggravate the demographic crisis as a sizable portion of the working-age migrants leave Cuba to raise their children abroad (Diaz-Briquets, 2015, p. 5).

Concluding with Diaz-Briquets, we can say that there is a need for a reformed welfare regime that could fulfill the social, economic and health requirements of the aging nation, including a "sustainable pension system capable of satisfying basic needs", displaying responsibilities shared between the government, the market and the Cuban families (2015, p. 15). The government will have to deal with the issue of intergenerational justice, where the next working-age population has to support older generations and to bear the inheritance of a bankrupt state. When 60% of the elderly deplore that pensions do not cover their living expenses (ONE 2011b,

p. 29), Cuban families will have to take that supporting role. An economic growth could however alleviate this burden, thus showing once more the link between Cuba's economy and demography.

## 6.2. Self-Criticism / Limitations

Although population projections can help to evaluate the possible consequences of present demographic trends, the future remains uncertain. Their relevance as predictors and their validity decreases the further they are carried into the future (Diaz-Briquets, 2015, p. 5). Hence, an analysis of the current situation does not guarantee an accurate representation of the future. Moreover, the various forecasts described above rest on unpredictable factors, namely the success of the reform implementation and the evolution of the Cuba-US relations, just to cite the most obvious ones. The next turn of events will be observable on October 27, 2015 at the 24<sup>th</sup> UN vote regarding the US embargo.

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## 8. Appendix

The appendix presents the figures and tables in the order in which they are cited in the paper.

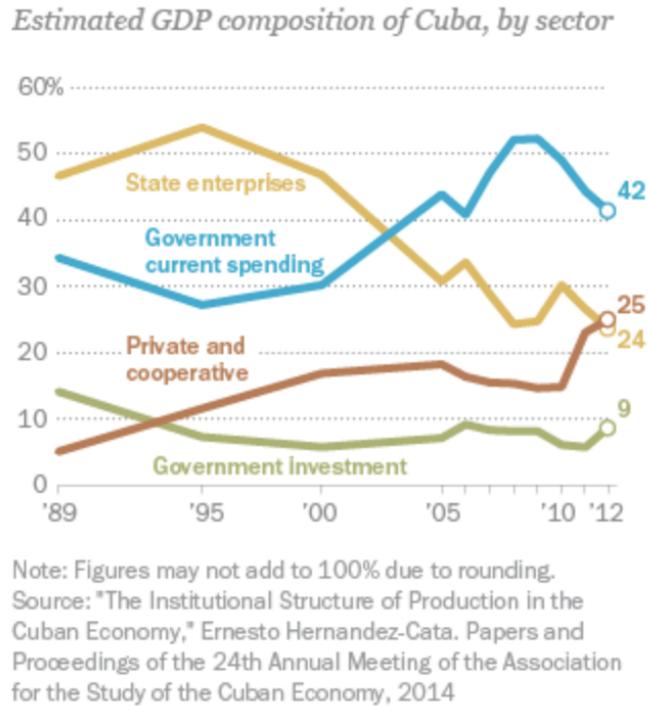


Figure 1: Cuba's Gross Domestic Product Composition (Desilver, 2015)

## Cuba's Economic Growth Slows

*Real GDP growth, annual*



Source: CIA World Factbook (2014), Oficina Nacional de Estadística e Información (2003-2013), World Bank (1990-2002)

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Figure 2: Cuba's economic growth (Desilver, 2015)

<b>Gross Domestic Product Accounts (in million Pesos)</b>	<b>2010</b>	<b>% of Total 2010 GDP</b>	<b>2014</b>	<b>% of Total 2014 GDP</b>
Public health & social assistance	10'016	15.57%	15'732	19.51%
Trade & repair of personal effects	12'058	18.74%	15'588	19.33%
Manufacturing industries (excl. sugar)	9'623	14.96%	11'636	14.43%
Transport, storage & communications	5'314	8.26%	6'878	8.53%
Education	6'010	9.34%	5'934	7.36%
Construction	3'211	4.99%	3'978	4.93%
Hotels & restaurants	3'098	4.82%	3'456	4.28%
Public administration and defense & social security	2'080	3.23%	3'169	3.93%
Agriculture, livestock & forestry	2'230	3.47%	3'063	3.80%
Culture and sport	3'030	4.71%	2'498	3.10%
Business services, real estate	1'775	2.76%	2'173	2.69%
Other communal and social activities	1'925	2.99%	1'882	2.33%
Electricity, gas & water	1'032	1.60%	1'255	1.56%
Financial intermediation	1'028	1.60%	1'157	1.43%
Import duties	658	1.02%	793	0.98%
Sugar industry	432	0.67%	567	0.70%
Mining & quarrying exploitation	429	0.67%	465	0.58%
Science & technological innovation	284	0.44%	319	0.40%
Fishing	95	0.15%	113	0.14%
<b>Total</b>	<b>64'328</b>	<b>100.00%</b>	<b>80'656</b>	<b>100.00%</b>

Table 1: Composition of Cuba's Gross Domestic Product (ONE, 2015a, 17)

<b>Health Indicators</b>	<b>1958</b>	<b>1960</b>	<b>1970</b>	<b>1980</b>	<b>1990</b>	<b>1995</b>	<b>2000</b>	<b>2010</b>	<b>2014</b>
Child mortality (per 1000 live births)	>60.0	42.0	38.7	19.6	10.7	9.4	7.2	4.5	4.2
Mortality in children aged <5 years (per 1000 live births)		42.4	43.8	24.3	13.2	12.5	9.1	5.7	5.7
Children with low birth weight (%)				9.7	7.6	7.9	6.1	5.4	5.3
Maternal mortality (per 100 000 live births)		120.1	70.5	52.6	31.6	32.6	34.1	43.1	35.1
Hospital deliveries (%)		63.0	91.5	98.5	99.8	99.8	99.7	99.9	
Inhabitants per physician	6286	-	1389	638	276	193	169	147	130

Table 2: Evolution of general health indicators (selected years) (WHO, 2015, 12, completed with 2014 data from ONE, 2015b, 10-27)

<b>Academic year</b>	<b>Schools (n)</b>	<b>Teaching staff (n)</b>	<b>Initial enrolment (n)</b>	<b>Graduates (n)</b>	<b>Higher education graduates (per 10 000 inhabitants)</b>	<b>Population (n)</b>
1958–59	7 679	22 798	811 345	26 693	3	-
1959–60	10 623	30 793	1 240 898	29 179	-	-
1970–71	35 582	116 787	2 345 188	135 774	41	8 569 121
1980–81	15 857	213 159	3 213 014	636 496	156	9 723 605
1991–92	12 702	232 626	2 416 367	459 046	209	-
1999–2000	12 175	195 917	2 285 641	475 863	106	11 146 203
2007–08	12 323	289 279	3 081 117	639 691	662	11 188 028
2009-2010	11 308	303 348	2 727 442	609 434	76	11 174 952
2011-2012	9 673	298 508	2 193 312	539 139	80	11 175 423
2013-2014	9 482	284 633	1 966 085	469 288	49	11 210 064

Table 3: Evolution of general education indicators (selected years) (WHO, 2015, 12, completed with 2009-2014 data from ONE, 2015a and 2015d)

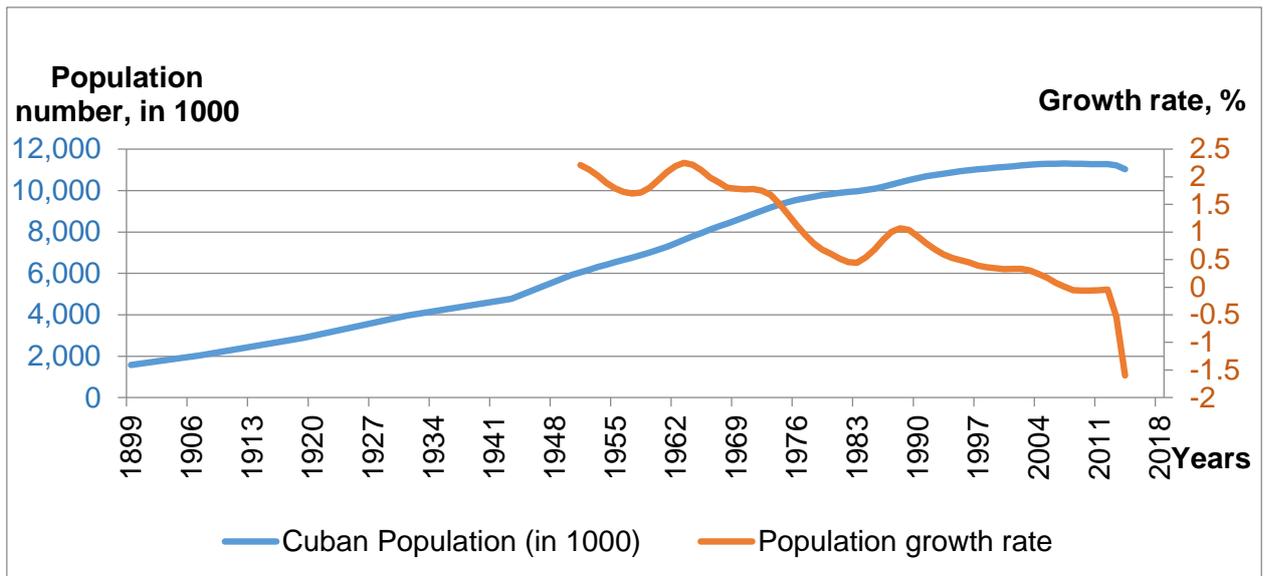


Figure 3: Evolution of Cuba's total population since 1899 (ONE, 2015e, 13-14)

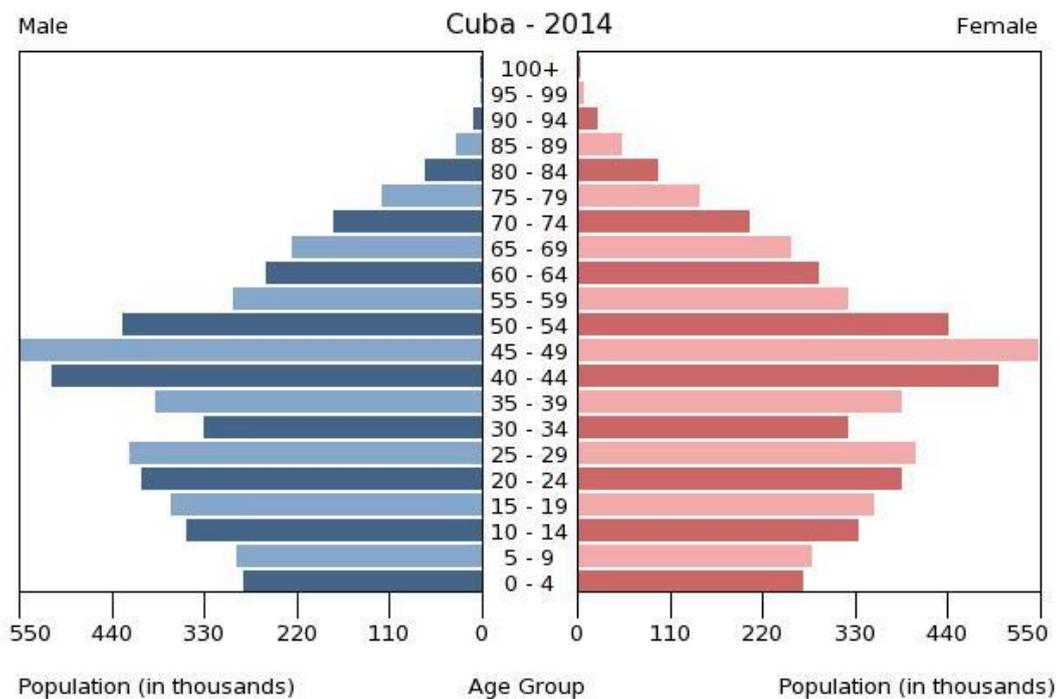


Figure 4: Cuba's population pyramid (The World Factbook, 2015)

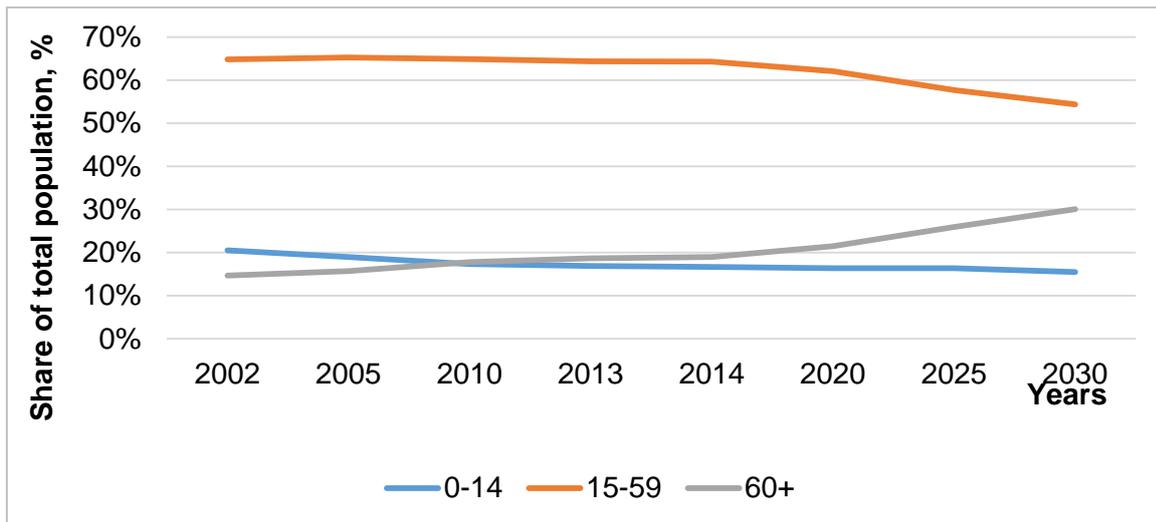


Figure 5: Evolution of the age structure of the Cuban population (UN DESA, 2015)

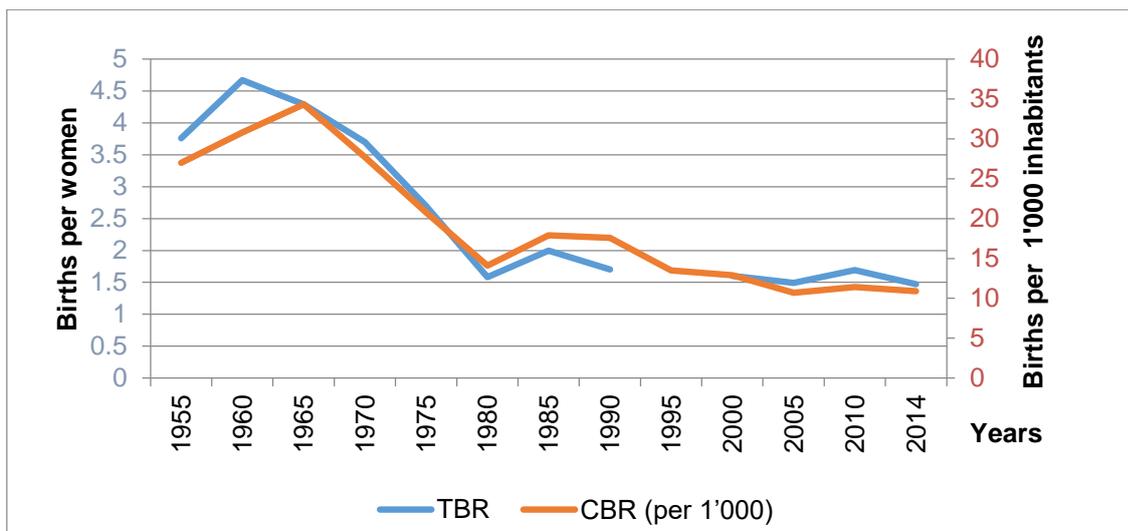


Figure 6: Development of fertility in Cuba from 1955 to 2014  
 ((ONE, 2015F, 36) for the CBR from 1965 to 2014, (ECKSTEIN, 2003, 253) for the CBR 1955-1965 and the TFR 1955-2000, (Diaz-Briquets, 2014, 681) for the TFR 2005-2010, (the world factbook) for the TFR 2014)

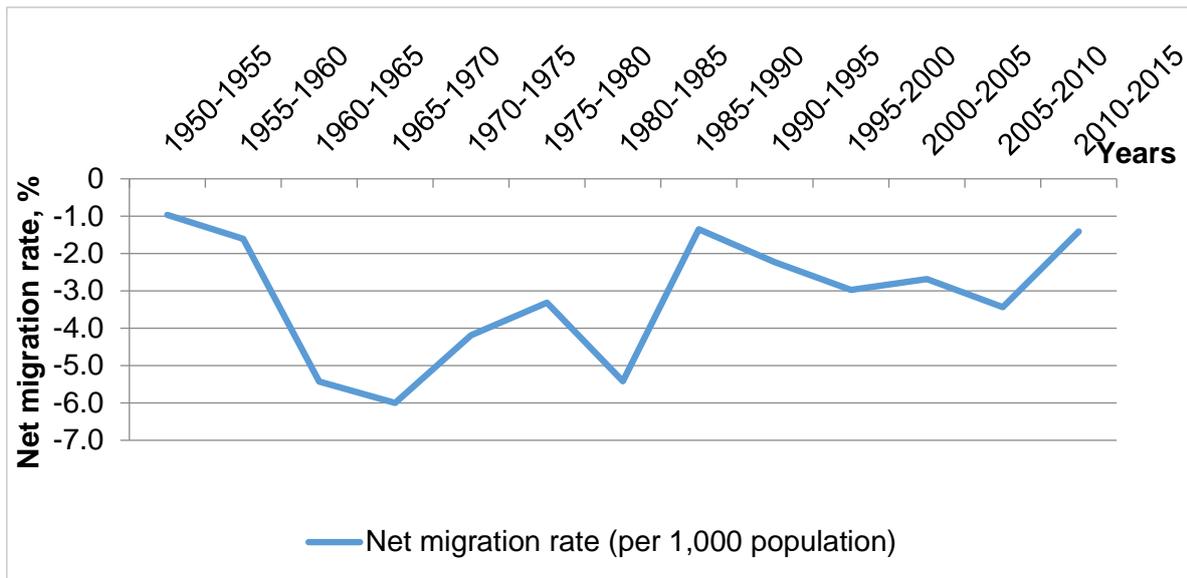


Figure 7: Net migration rate in Cuba (UN DESA, 2015)

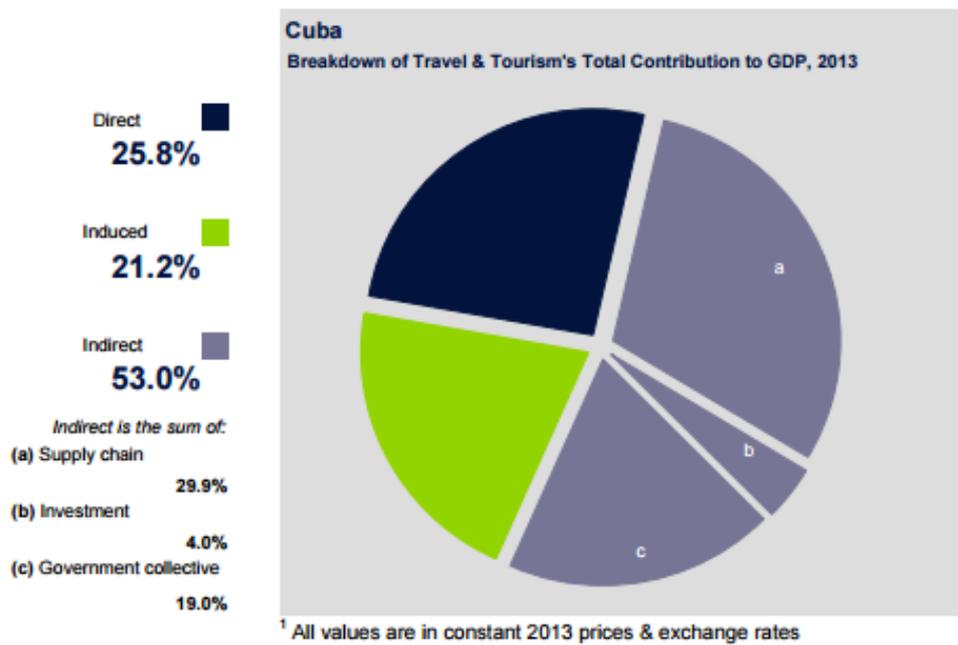


Figure 8: Breakdown of travel and tourism's total contribution to GDP (World Travel & Tourism Council, 2014)

	ONE	United Nations			
		Low	Medium	High	Constant
<b>Projected population (in thousands)</b>					
2010	11'232	11'282	11'282	11'282	11'282
2015	11'199	11'156	11'249	11'341	11'266
2020	11'124	10'929	11'162	11'395	11'195
2025	11'029	10'623	11'019	11'416	11'055
2030	10'905	10'299	10'847	11'399	10'875
2035	10'754	9'899	10'579	11'311	10'609
2050		8'186	9'392	10'770	9'329
<b>Fertility: TFRs (in births per women)</b>					
2010	1.52	1.2	1.45	1.7	1.5
2015	1.56	1.05	1.45	1.85	1.5
2020	1.59	0.99	1.49	1.99	1.5
2025	1.62	1.03	1.53	2.03	1.5
2030	1.64	1.07	1.57	2.07	1.5
2035	1.66	1.1	1.6	2.1	1.5
2050		1.19	1.69	2.19	1.5
<b>Fertility: CBR (in births per thousands of people per year)</b>					
2010	-	89	108	127	111
2015	-	74	103	131	106
2020	-	65	98	131	99
2025	-	61	91	122	90
2030	-	54	84	117	81
2035	-	46	78	116	74
2050	-	29	66	119	58
<b>Women 15–49 (in thousands)</b>					

2010	2'941	2'988	2'988	2'988	2'988
2015	2'752	2'758	2'758	2'758	2'758
2020	2'496	2'503	2'503	2'503	2'503
2025	2'256	2'236	2'236	2'236	2'236
2030	2'176	2'078	2'122	2'167	2'131
2035	2'114	1'889	2'002	2'115	2'018
2050		1180	1'518	1'864	1'524

Table 4: Total population and fertility related indicator projections 2010-2035 (Diaz-Briquets, 2015, 7)

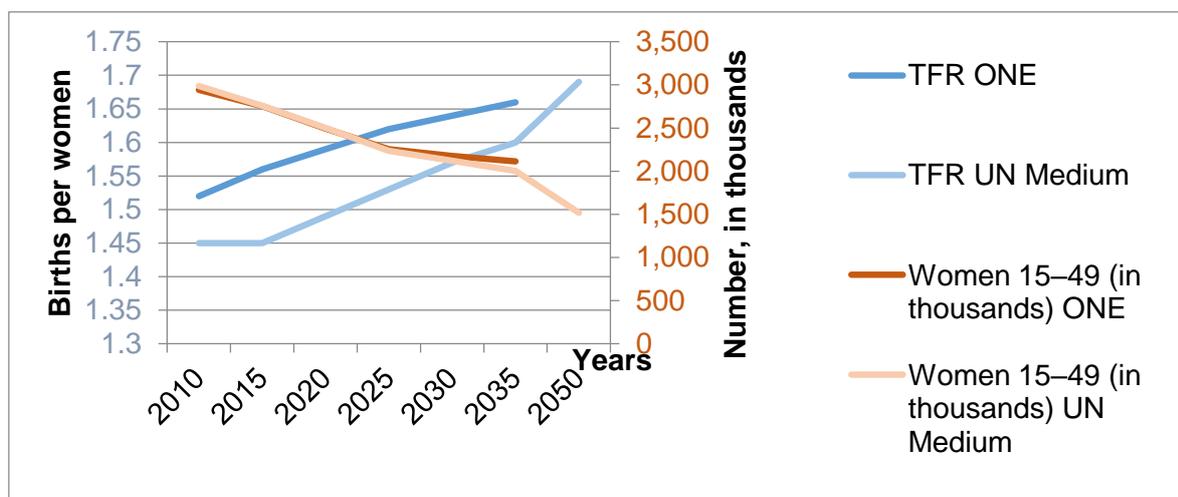


Figure 9: Women 15-49 and TFR projections 2010-2035 (Diaz-Briquets, 2015, 7)

	ONE	United Nations				
		Low	Medium	High	Constant	
<b>Population growth rates (%)</b>						
2010–2015	-0.07	-0.22	-0.06	0.11	-0.03	
2015–2020	-0.13	-0.41	-0.16	0.09	-0.13	
2020–2025	-0.17	-0.57	-0.26	0.04	-0.25	
2025–2030	-0.22	-0.62	-0.32	-0.03	-0.33	
2030–2035	-0.28	-0.79	-0.47	-0.15	-0.5	
2035–2040	-	-1.01	-0.63	-0.25	-0.67	

### Net migration rates (%)

2010–2015	-	-2.5	-2.5	-2.5	-2.5
2015–2020	-	-2.5	-2.5	-2.5	-2.5
2020–2025	-	-2.6	-2.5	-2.5	-2.5
2025–2030	-	-1.9	-1.8	-1.8	-1.8
2030–2035	-	-2	-1.9	-1.8	-1.9
2035–2040	-	-2.1	-1.9	-1.8	-1.9

### Annual net migration (thousands)

2010–2015	-35	-28	-28	-28	-28
2015–2020	-35	-28	-28	-28	-28
2020–2025	-26	-28	-28	-28	-28
2025–2030	-17	-20	-20	-20	-28
2030–2035	-9	-20	-20	-20	-20
2035–2040	-	-20	-20	-20	-20

Table 5: Population growth rate and migration related indicator projections 2010-2035 (Diaz-Briquets, 2015, 8)

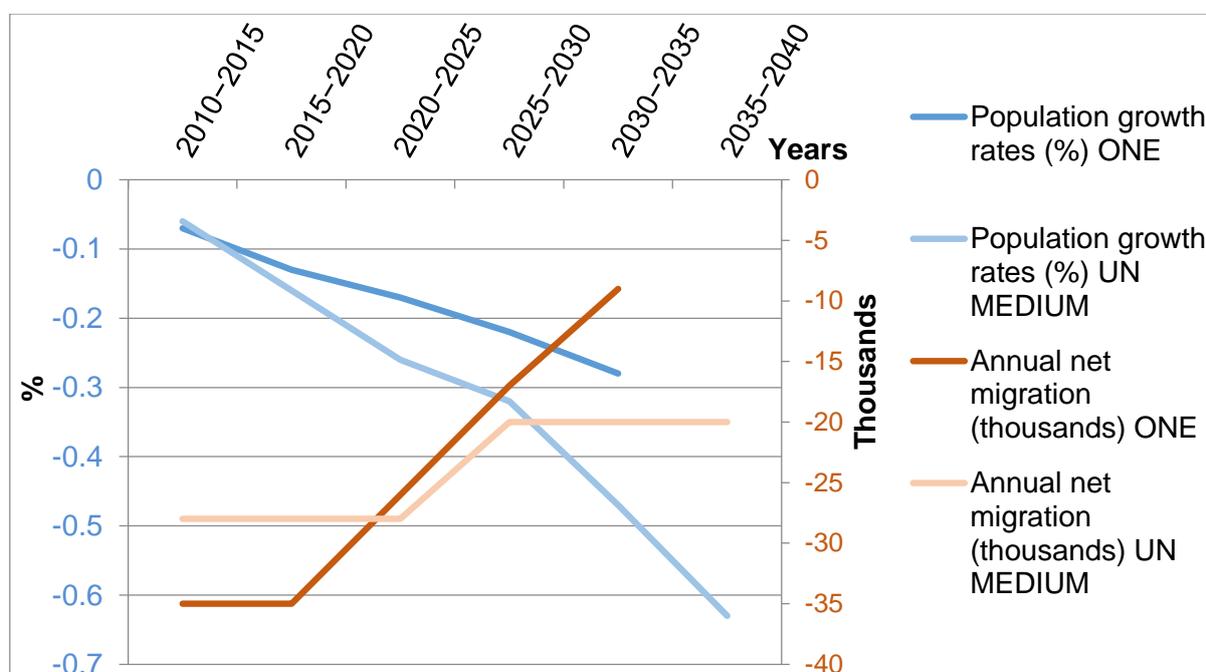


Figure 10: Growth rate and annual net migration projections 2010-2035 (Diaz-Briquets, 2015, 8)

	<b>ONE</b>	<b>United Nations</b>			
		Low	Medium	High	Constant
<b>Total</b>					
2010	43	42	42	42	42
2015	43	41	42	43	41
2020	45	41	44	47	41
2025	48	42	47	52	42
2030	56	51	57	63	51
2035	66	64	69	74	64
2050	-	86	84	85	82
<b>Child</b>					
2010	24	25	25	25	25
2015	23	21	22	23	21
2020	22	17	20	23	17
2025	22	14	20	25	14
2030	22	14	20	27	14
2035	23	14	21	28	14
2050	-	12	21	30	19
<b>Old age</b>					
2010	18	18	18	18	18
2015	20	20	20	20	20
2020	23	24	24	24	24
2025	26	27	27	27	27
2030	34	37	37	36	37
2035	43	50	48	46	50
2050	-	73	63	55	63

Table 6: Population dependency ratio indicator projections 2010-2035 (Diaz-Briquets, 2015, 11)

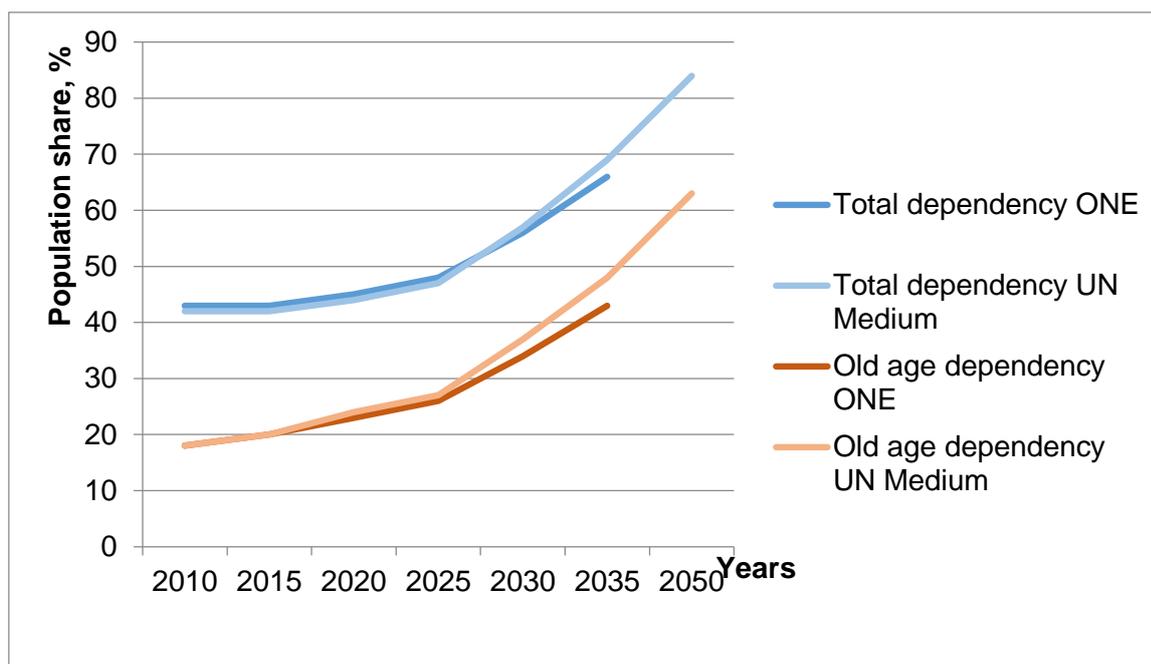


Figure 11: Dependency ratio projections 2010-2035 (Diaz-Briquets, 2015, 11)

	ONE	United Nations			
		Low	Medium	High	Constant
<b>15-64</b>					
2010	7'865	7'925	7'925	7'925	7'925
2015	7'816	7'921	7'921	7'921	7'921
2020	7'674	7'763	7'763	7'763	7'763
2025	7'454	7'487	7'487	7'487	7'487
2030	6'977	6'804	6'896	6'988	9'913
2035	6'487	6'048	6'280	6'512	6'313
2050	-	4'409	5'104	5'816	5'116
<b>0-14</b>					
2010	1'918	1'953	1'953	1'953	1'953
2015	1'787	1'659	1'751	1'844	1'769
2020	1'667	1'339	1'572	1'805	1'605

2025	1'613	1'081	1'478	1'874	1'514
2030	1'552	947	1'403	1'862	1'413
2035	1'491	852	1'317	1'799	1'296
2050	-	550	1'061	1'727	986
<b>65+</b>					
2010	1'449	1'403	1'403	1'403	1'403
2015	1'596	1'576	1'576	1'576	1'576
2020	1'783	1'826	1'826	1'826	1'826
2025	1'962	2'054	2'054	2'054	2'054
2030	2'376	2'549	2'549	2'549	2'549
2035	2'776	3'000	3'000	3'000	3'000
2050	-	3'227	3'227	3'227	3'227
<b>80+</b>					
2010	344	325	325	325	325
2015	365	376	376	376	376
2020	428	454	454	454	454
2025	513	535	535	535	535
2030	602	617	617	617	617
2035	685	747	747	747	747
2050	-	1'365	1'365	1'365	1'365

Table 7: Population age structure indicator projections (in thousands) 2010-2035 (Diaz-Briquets, 2015, 12)

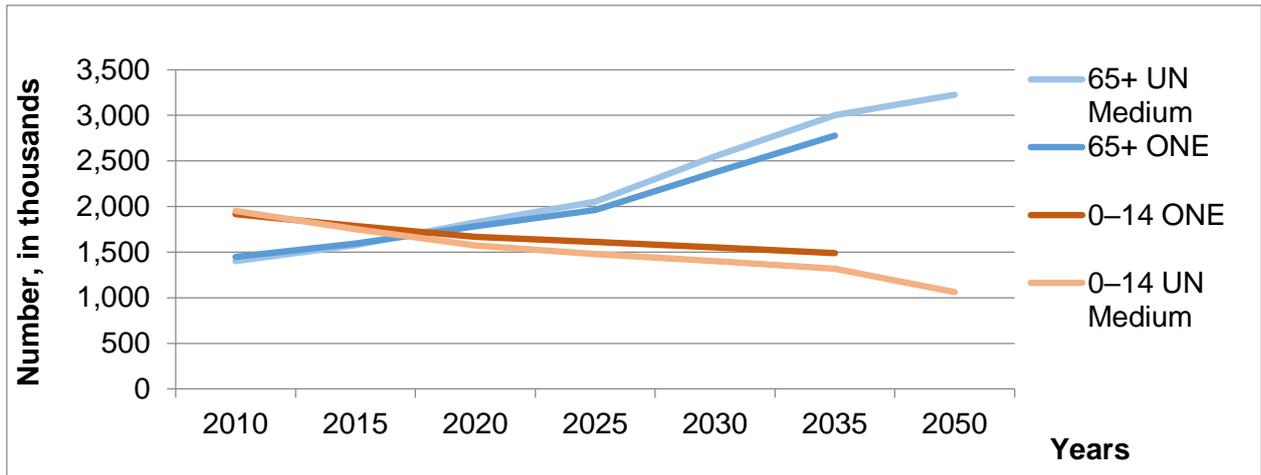


Figure 12: Population age structure projections 2010-2035 (Diaz-Briquets 2015, 12)

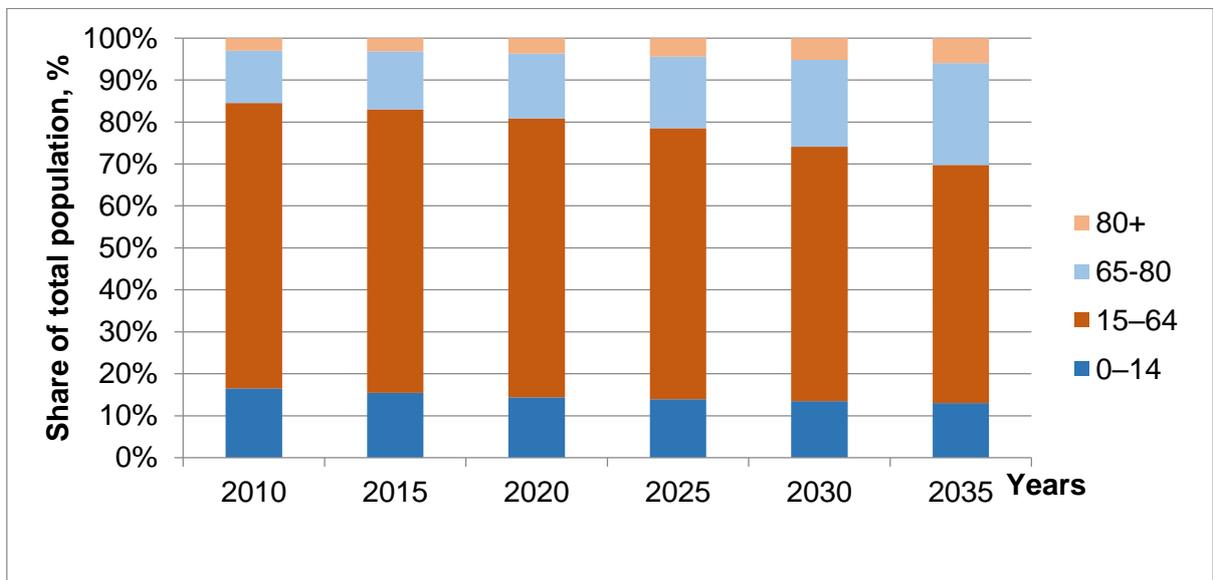


Figure 13: Population age structure indicator projections of ONE (Diaz-Briquets 2015, 12)

## F. Ethiopia's demographic roadmap - how prepared is Ethiopia for its youth bulge?

*by Antonia Haller, Dragomir Tashev and Paulina Widmer*

Ethiopia, despite sharing common features with other developing countries on the African continent, presents some very distinctive facts. It is one of the largest countries in Africa, and more importantly also has one the largest and fastest growing populations, with a growth rate of 2.89% and a fertility rate of 5.15 children per woman (2015 est.).

On the one hand, its population pyramid is expansive, with a predominantly young population, which could offer a huge potential for the country's development as it opens up a window of opportunity for the demographic dividend to materialize. On the other hand, Ethiopia is still in the midst of its demographic transition and a continuously growing population represents a great challenge, among other issues, for the nation.

The young workforce could unlock the country's economic potential and accelerate its development. However, in order for this to happen, the country must make changes to and investments in its policies in most areas. In fact, the country's current state and development is difficult and full of obstacles and is still mainly in the hands of the government.

Through a PESTEL analysis the situation and problems are described in all main areas. With this information, it is observed how they relate to the demographic trends of Ethiopia. It is found that Ethiopia's GDP is still low and that the country lacks adequate infrastructure in all aspects from an effective political system, healthcare, human rights to technology and freedoms.

In order to get a better understanding of the magnitude of Ethiopia's specificities and challenges that compare it with, on the one hand, a country of similar population size, namely Germany, and on the other, with its closest neighbors, Kenya and Somalia, to illustrate its distinctive characteristics.

It is found that the great potential in a large and young population is in the hands of drastic changes, a process that has in some aspects already started but still has a long way to go.

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## LIST OF ABBREVIATIONS

COMESA	Common Market for Eastern and Southern Africa
ECI	Economic Complexity Index
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GEI	Government Effectiveness Index
GTP	Growth and Transformation Plan
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immuno Deficiency Syndrome
ILO	International Labour Organization
PPP	Purchasing power parity
USD	United States Dollar
WTO	World Trade Organization

## 1. Introduction

Demographics have witnessed an exponential growth for the past 70 years and have rapidly become a challenge that the whole world has to face. The highest growth rates being in developing countries that have not yet completed their demographic transition<sup>18</sup>, Ethiopia is at the forefront of tackling these challenges with a total fertility rate of 5.15 children per woman, and 43% of the population that is under 14 years of age.

Located in Eastern Africa, Ethiopia is considered as the cradle of humankind. With a long history, it is unique among African countries, having maintained its freedom from colonial rules with the exception of a short-lived Italian occupation between 1936 and 1941. Since the independence of Eritrea in 1991, Ethiopia has been a landlocked country that is about three times the size of Germany and has a population of roughly 100'000'000 habitants. As most countries in sub-Saharan Africa, Ethiopia is very ethnically diverse, with the Oromo and Amara ethnic people accounting for more than half of the population and Christianity being the most widely spread religion, closely followed by Islam, the faith of about a third of the population.

Despite having an impressive GDP growth above 10% over the past several years, Ethiopia still has one of the lowest GDP per capita (PPP) at just USD 1600. Economic growth is limited due to the fact that the country is landlocked, environmental issues such as desertification and water shortages, and structural problems such as a high level of corruption and a low level of education.

In light of the imminent youth bulge that will soon join the labor force of the country, this paper seeks to integrate the PESTEL model to the Ethiopian case in order to truly understand the challenges the country is facing in order to benefit from this potential demographic dividend<sup>19</sup>. In the first part, the PESTEL model is applied to explain the current situation of Ethiopia. Then, the key demographic indicators of Ethiopia are portrayed, followed by a comparison with three other countries. Chapter 4 addresses how the demographic change is influenced by the current PESTEL elements and examines what measures are needed to take full advantage of the incipient demographic bonus. Finally, chapter 5 concludes this study and summarizes all findings, addresses potential limitations, and gives an outlook on the topic.

---

<sup>18</sup> Demographic transition refers to the stages that a country goes through when transitioning from a pre-industrial to an industrialized economic system, with a shift from high birth and death rates to low birth and death rates (Kalemli-Ozcan, 2012, p. 3).

<sup>19</sup> Demographic dividend, sometimes also „demographic bonus“ , refers to a “demographic window of opportunity” when a there is larger ratio of working-age adults relative to non-workers, thus lowering the “dependency burden” of the workers. Under the right conditions, this can lead to economic surplus in the country experiencing this change in age structure (Fadayomi, 2011, p. 233).

## 2. PESTEL Analysis

The PESTEL analysis is a framework used to study the macro-environmental factors that have an impact on an organization or country (Professional Academy). This definition suggests that the six elements of the PESTEL are key to explaining the current state of a nation. The idea behind the use of this model in our study is to examine how the factors of the PESTEL have influenced the current demographic state of Ethiopia, and as a second step, how can Ethiopia influence its future PESTEL in order to achieve a desired demographic state. The following section provides an overview of the present situation in Ethiopia.

### 2.1. Politics

The Government Effectiveness Index (GEI) assesses the quality of governance by analyzing the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. In the 2013 GEI results, Ethiopia received a total score of -0.52 (-2.5 weak; 2.5 strong), placing it in rank 16 out of 53 African countries, and in the 122<sup>nd</sup> position compared to the rest of the world, comprising 192 countries (World Bank, 2015a). Even though the situation seems to have improved this last decade, between the years 2008 and 2013, it has experienced a small setback as seen in figure 1.

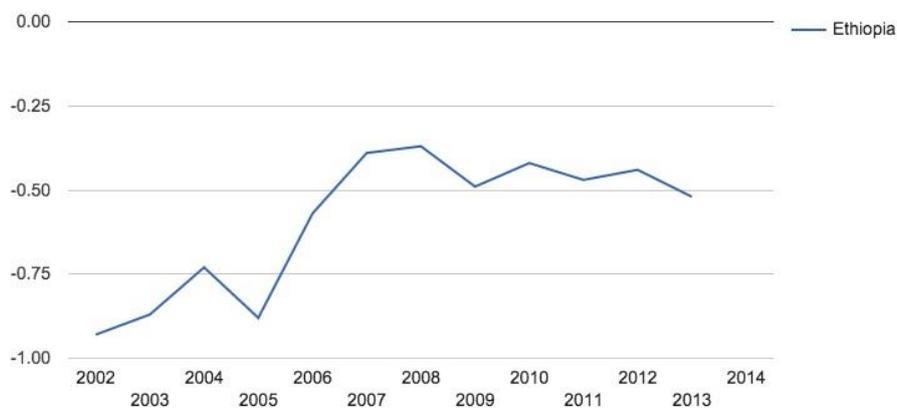


Figure 1: Government Effectiveness in Ethiopia (World Bank, 2015)

One of the possible reasons for such a decadent political situation might be corruption. Corruption as a global phenomenon poses one of the greatest challenges of the contemporary world (Transparency International, 2001). In the case of developing countries, corruption continues to be one of the greatest factors of poverty and underdevelopment as it misuses public resources for private gain, depleting national wealth and thus inhibiting the transformation of the economic growth into development dividends for the people (Ayferam, Bayeh, & Muchie, 2015, p. 73). In the Corruption Perception Index, which measures the levels

of perceived corruption in countries around the world, Ethiopia scored 33/100 (with 0 as highly corrupt and 100 as very clean) (Transparency International, 2014).

In fact, corruption affects society in a multitude of ways. On the political and social front, corruption represents a major obstacle to a functioning democracy and the rule of law as it diminishes people's trust in the political system. In addition, corruption is also directly linked to environmental degradation due to the non-enforcement of existing regulations intended to preserve precious natural resources (Transparency International, n.d.). Most importantly, corruption bears huge costs from an economic point of view. According to a report by Global Financial Integrity, Ethiopia has lost around USD 22 billion from 2003 through 2012 to illicit financial outflows (Kar & Spanjers, 2014, p. 28). This misappropriation of public wealth has a serious impact on the individuals, the community and country as it is often responsible for increasing costs of goods and services, inflation, and the misallocation of public resources to uneconomic high profile projects instead of much more needed projects like the construction of schools, hospital and roads, and the supply of drinking water and electricity (Transparency Ethiopia, n.d.).

## 2.2. Environment

With 80.5% of the population residing in rural areas (CIA, 2015), Ethiopia remains one of the least urbanized countries in the world (Ringheim, Teller, & Sines, 2009). Thus, it should come as no surprise that the agricultural sector plays a major role in the country with 85% of the labor force of Ethiopia being involved in it (International Fertilizer Development Center, n.d.). In 2014 agriculture added a total value of USD 21.38 billion, which accounted for 47.7% of that year's GDP (World Bank, n.d.). Even though agriculture is the mainstay in the Ethiopian economy, it is confronted with major challenges: As a consequence of water-intensive farming, the inappropriate use of pesticides, and poor management, Ethiopia is facing major water shortages in some areas. Overgrazing, deforestation, and poor agricultural practices have also contributed to severe soil erosion, wearing away the field's topsoil, which in the long-term leads to infertile land (CIA, 2015).

## 2.3. Society

The extended family plays a central role in the Ethiopian social system. Such a family comprises the nuclear family members as well as aunts, uncles, and cousins from both sides of the family, either all living nearby or in the same household. When people marry they join the two families, thus ensuring a family structure that they can turn to in times of need (Mathambo & Gibbs, 2009). This means that in times of crisis, the family will take full responsibility for the family member's problems, whether they are of financial, health or social

nature. Usually, it is the husband's parents that will move in with the nuclear family when they can no longer look after themselves (Duncan & Hayden, 2008).

In addition to the evident consequences of the HIV/AIDS epidemic, this disease has shown to have significant impact on the family structure as well. The vast majority of those affected with HIV/AIDS are the main wage earners and principal sources of financial and material support for older people and children in their families. For older people this implies not only the loss of their own support as their own children die, but also the additional burden of caring for their orphaned grandchildren (National Research Council, 2006, p. 2; Abebe & Aase, 2007). As of 2012, 900'000 children were orphaned due to AIDS, according to UNICEF statistics (2013).

Other major health concerns in Ethiopia include maternal mortality, malaria and tuberculosis aggravated by acute malnutrition and lack of access to clean water and proper sanitation. As a consequence of severe underfunding of the health sector, access to health-care services is very difficult mainly because of the limited number of health institutions, inefficient distribution of medical supplies and disparity between rural and urban areas. The World Health Organization (WHO) estimates that more than half of the Ethiopian population lives more than 10 km away from the nearest health-care facilities (2005). Moreover, the lack of nearby health-care facilities is a reason, along with opposition to use, health concerns, lack of knowledge, and costs, why married Ethiopian women do not reach out for contraceptives (World Bank, 2010).

Religion in Ethiopia consists of a number of faiths. In the national census conducted in 2007, 43.5% of the population were reported to be Ethiopian Orthodox Christians, 33.9% Muslims, 18.5% Protestant, traditional 2.7%, 0.7% Catholic, and 0.6% other (CIA, 2015). Ethiopia is one of the oldest Christian states in the world, having officially adopted Christianity as the state religion in the fourth century (Munro-Hay, 1991, p. 77). The Ethiopian Orthodox church has played a major role in the Ethiopian society as it dominated the formal education system in the country for many centuries until secular education was established in the early 1900s. In the decades leading to the civil revolution in 1974, Ethiopia had an estimated illiteracy rate of 90%, placing the Ethiopian education system at the bottom among African nations. As shown in the graphic below (figure 2), Ethiopia is still lagging behind other African countries, with a total adult literacy rate<sup>20</sup> of 49.1% as of this year (CIA, 2015).

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<sup>20</sup> *World Bank definition:* „Adult (15+) literacy rate (%). Total is the percentage of the population age 15 and above who can, with understanding, read and write a short, simple statement on everyday life. Generally, 'literacy' also encompasses 'numeracy', the ability to make simple arithmetic calculations. This indicator is calculated by dividing the number of literates aged 15 years and over by the corresponding age group population and multiplying the result by 100.“ (World Bank, n.d.)

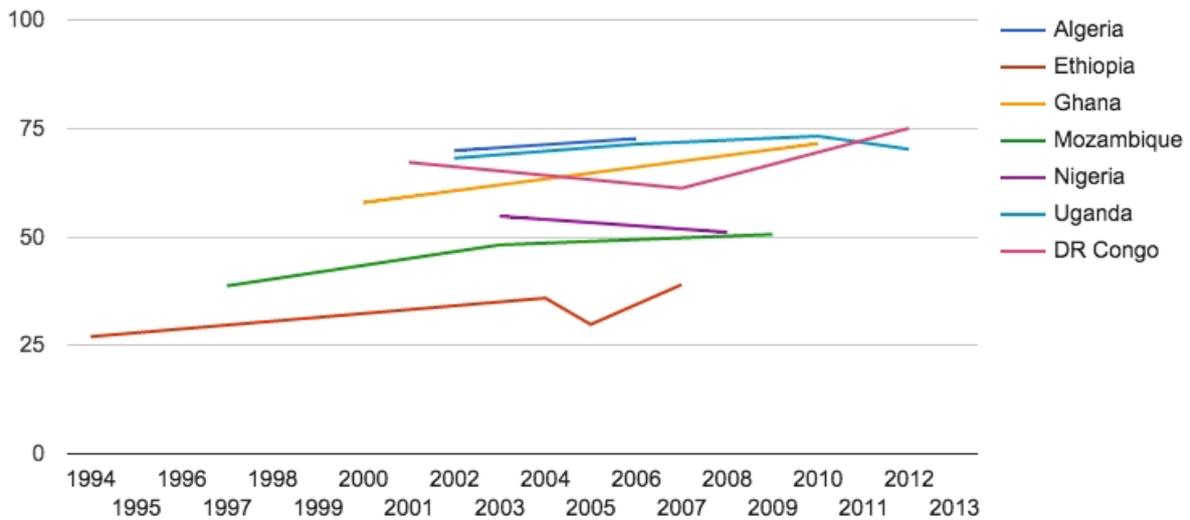


Figure 2: Literacy Rate in African Countries (The Global Economy, n.d.)

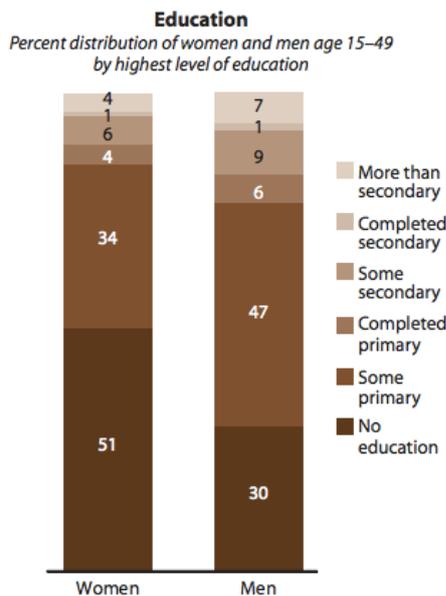


Figure 3: Education In Ethiopia (Central Statistical Agency [Ethiopia] and ICF International, 2012)

According to the 2011 Ethiopia Demographics and Health Survey, the majority of the Ethiopian population has little or no education, with females being even less educated than males. As can be seen in figure 3, over half of Ethiopian women and 30% of men have never attended school (Central Statistical Agency [Ethiopia] and ICF International, 2012, p. 26).

Another finding of the survey was that school attendance was highest among urban residents: while 83.6% of children attend primary school in urban areas, the ratio in rural areas is 61.1%. For secondary school, the attendance rate of the urban population is 39.1% versus 6.2% of the rural population (p. 30). This discrepancy between

school attendance rates has its roots in the circumstances experienced in rural regions, mainly the lack of provision, crowded and understaffed schools (53.75 student/teacher ratio (The Global Economy, n.d.)), and alternative occupations. In most rural families, children help with the household chores and thus contribute to the family's income (Oumer, 2009). Given the high opportunity costs, sending one's offspring to school is regarded rather as a burden than as a future investment, dispraising the importance of proper education.

Furthermore, another issue in the education system is the prevailing gender gap between men

and women. Even though the access to education for girls has been improving during the last years, the ratio of female to male pupils in primary school is 90.63, it then decreases to 79 in secondary school, and to 41.78 at tertiary level (est. 2012) (UNESCO, n.d.). Among the reasons why the attendance of girl is compromised over time are gender stereotypes, violence, lack of sanitary facilities, and early marriage. In fact, 63% of woman in Ethiopia are married by age 18, with the median age at first marriage being 16.5. One interesting insight is that the age at marriage increases with education, a woman with more than secondary education will get married almost eight years later than those with no education (Central Statistical Agency [Ethiopia] and ICF International, 2012, p. 62).

#### 2.4. Technology

When it comes to technology and innovation, Ethiopia is a long way from other African countries (Kalan, 2013). The low access and penetration of telecommunication technologies in particular represent a significant impediment in the economic development of the country, especially for businesses. One of the main hurdles is the government's repressive position on digital freedoms, especially the Internet. It was only in 2013 that mobile banking was approved, finally allowing banks to offer the service (Tredger, 2014). Ethiopia is said to have Africa's last big telecom monopoly and the absence of competition puts it behind the rest of the continent in a sector that generally develops alongside economic growth (The Economist, 2013). In 2014, according to CIA data, there were only 820 000 land lines, equaling to 1 per 100 inhabitants, placing Ethiopia in 87<sup>th</sup> position in global country rankings, and just 32% of the population were mobile phones users. Finally, there are 1.6 millions Internet users, making up 1.7% of the population, ranking 107<sup>th</sup> globally.

Expenditures for research and development in both public and private sectors for new applications represented just 0.25% of the country's GDP in 2010, of which the biggest share was spent on agricultural sciences, followed by medical science. Furthermore, the country totaled 42 researchers in R&D per million inhabitants in 2010. Those are engaged in the conception of new knowledge, products or systems, and included Postgraduate PhD students (UNESCO, 2014). Even though it is said to be growing fast, Ethiopia has one of the youngest and least-qualified pool of agricultural researchers in Africa, as more than half on them only hold a BSc and almost half of them are under 31 years old (Agricultural Science and Technology Indicator, 2014).

A Climate Innovation Center was launched early 2014. It is supported by a USD 5 million grant agreement, signed between the World Bank and the Addis Ababa University (World Bank, 2014). A first of its kind in the country it will support pioneering clean technology enterprises

that address climate changes while increasing resilience to climate change of Ethiopians and creating green jobs and improving life standards (World Bank, 2013).

Finally, Ethiopia possesses a bounty of renewable energy potential, especially hydroelectric, and seeks to exploit these resources by increasing installed capacity of renewable energy sources. Wind, geothermal, and solar power are also major areas for investment opportunities. In fact, the Grand Ethiopian Renaissance Dam (GERD) is under construction across the Blue Nile River and according to latest plans, it is set to become the largest hydroelectric dam in Africa, and one of the largest in the world (Chandler, 2015).

## 2.5. Economy

Ethiopia's GDP (PPP) reached USD 144.6 billions in 2014, ranking it in 73<sup>rd</sup> place worldwide, while its GDP per capita was USD 1600, placing it only in 217<sup>th</sup> place. However, with a GDP growth rate of 10.3% p.a. it is one of the fastest growing economies in the world, ranking 11<sup>th</sup> overall and 4<sup>th</sup> on the African continent (CIA, 2015). The country's growth is said to be primarily state led, with a focus on infrastructure expansion and commercial agriculture development. Regarding GDP's origin, agriculture represents 47.7%, as mentioned in chapter 2.2. In fact, Ethiopia largely relies on the agricultural sector, but productivity is low, practices are inefficient and droughts are frequent. Subsequently, the industrial sector makes up 10.4% of GDP and the service sector 41.9%. Household consumption, at 83.7%, makes up the largest part of GDP composition by end use followed by government consumption.

Ethiopia's economy has a labor force of 47.32 million people, making it the 14<sup>th</sup> largest in the world and second largest in Africa. Again, 85% of this workforce is employed in the agricultural sector. The country's unemployment rate was estimated at 17% in 2012 but went down to 5% in 2013 (Heritage, 2015). Furthermore 39% of the population was still living below poverty line as of 2012.

Ethiopia's import and export have been rising year on year (Observatory of Economic Complexity, 2014), however, the country faces a growing trade deficit at the same time. The top five products exported by Ethiopia are coffee (28%), oily seeds (15%), followed by vegetables, cut flowers and dried legumes. It may be worthwhile noting that Ethiopia does not export petrol. In fact, its top five imported goods are refined petroleum (19%), followed by delivery trucks and large construction vehicles, mixed mineral or chemical fertilizers and wheat. Regarding Ethiopia's trading partners, its top export destinations are China (11%), Germany and Switzerland, neighboring Somalia, and Saudi Arabia, while its top Import origins are China (21%), Saudi Arabia (14%), India, Kuwait, and Italy. The observatory of Economic Complexity ranked Ethiopia 121 out of 144 countries with an Economic Complexity Index (ECI) of -0.94235

in 2012<sup>21</sup>. This index ranks how diversified and complex a country's export basket is. This scaling has shown that when a country produces complex goods and a high number of products, it is generally more economically developed. Consequently, ECI can be used as a measure of economic development (US Department of Commerce, 2014).

FDI inflow was reported to be in amount of USD 953 million in 2013 and according to a report from the US Department of Commerce (2014), the government of Ethiopia is said to be actively seeking foreign direct investment in local manufacturing as a means of import substitution and of reduction of its trade deficit, as a national development priority. But foreign investments still remains heavily regulated by the state and keeps important sectors of the economy closed to global trade and investment.

The National Bank of Ethiopia, the country's central bank, controls the exchange rate and has officially devalued the local currency by over 115% against the U.S. Dollar between 2007 and 2014. The Birr has continued to follow a steady depreciation against the dollar to date, with a rate of 21.13 Birr per US dollar in 2014 (US Department of Commerce, 2014). Interest rates are largely negative, as the minimum bank deposit rate of 5%, bond yield of 3.67% and treasury bills yield of 3.67% are lower than inflation. Only the average commercial bank prime lending rate is positive, at around 11 and 12% (IMF, 2015).

Inflation in Ethiopia is at about 8% currently, however it saw a year on year high of 40% in August 2011, but it has stabilized since, following a firm efforts by the government to reduce the inflation rate through strict monetary and fiscal policy.

## 2.6. Legal and Regulatory

Ethiopia's economic freedom score is 51.5<sup>22</sup>, making its economy the 149th freest in the 2015 Index, a score that comes in below regional average. Government intervention still remains significant and is keeping the country from its potential growth and corruption also remains an issue. Furthermore Ethiopia ranks 125th out of 189 countries in the World Bank's 2014 Ease of Doing Business report, a decrease from the previous year (World Bank, 2015b). The decrease comes from lower rankings in starting a business, registration of property and paying taxes, but this is partially offset by improvements in energy access and insolvency resolution procedures.

Ethiopia's economic development is mainly driven by the Ethiopian government's five-year Growth and Transformation Plan (GTP), which covers the 2010-2015 planning period. It

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<sup>21</sup> As a measure of reference, Japan is at the top of the ranking with an ECI of 2.29, followed closely by Switzerland. At the end of the list we find Guinea and Turkmenistan, with indices of -1.75 and -2.1 respectively (OEC, 2012).

<sup>22</sup> The measure is based on 10 factors, grouped into four broad categories. Each of the ten economic freedoms in the categories is graded on a scale of 0 to 100. A country's overall score is derived by averaging them, each carrying equal weights (World Bank, 2015).

envisages an 11% annual average GDP growth as a base case scenario and 14.9% annual GDP growth as a high case growth scenario. GTP targets have been widely labeled as ambitious by international organizations, with large uncovered financial needs. They are currently in the process of drafting the next five years of the GTP. In fact, Ethiopia is still a relatively closed economy. It is not a member of the WTO, it is however a member of COMESA, a free trade area comprising twenty member states in eastern and southern Africa (IMF, 2015). Ethiopia imposes a 10.3% average tariff rate.

There is no constitutional right to own land in Ethiopia, which may only be leased for up to twenty years (World Bank, 2015c). Under the “villagization” program residents have been forcibly relocated, and usually compensated, by the government, which decides that the land they are living on should be used for a road or other public use (Human Rights Watch, 2015). Human rights watch reports that this has affected up to 1.5 million Ethiopians.

Ethiopia has yet to sign a number of major international intellectual property rights (IPR) treaties, such as the Berne Convention for Literary and Artistic Works or the Madrid System for the International Registration of Marks but the Government has expressed its intention to accede these by 2015. The Ethiopian Intellectual Property Rights Office (EIPO) has been tasked primarily to protect Ethiopian copyrighted materials and pirated software. But it has weak capacity in terms of manpower and law enforcement. In addition, a number of businesses freely use well known trademarked names without permission.

Concerning antitrust law, state-owned enterprises and ruling party-owned entities dominate major sectors of the economy. There is state monopoly or dominance in sectors such as telecommunications, power, banking, insurance, air transport, shipping and sugar. Ruling party-affiliated companies have a strong presence in the ground transport, fertilizer and textile sectors. State-owned companies have considerable advantages over private firms, local business owners and foreign investors, particularly in the realm of Ethiopia's regulatory and bureaucratic environment, with easier access to credit and speedier customs clearance.

Ethiopia has ratified all eight core ILO conventions and the country generally enjoys labor peace. The right to form labor associations is constitutionally guaranteed for many workers. Although the constitution provides workers with the right to strike, provisions make it difficult to carry out and in practice they are rare. Child labor is widespread, especially in rural agrarian areas and in the informal economy in urban areas. Employers are prohibited from hiring children under the age of 14 and there are strict labor laws for “young workers” between 14 and 18, but these are infrequently enforced. Labor remains readily available and inexpensive, however skilled manpower is scarce. Furthermore, there is no national minimum wage standard.

Freedom of expression is limited, and the government continues to block even mildly critical web pages and blogs (Human Rights Watch, 2015) and bans opposition media websites. Therefore, media outlets regularly limit their criticism in order to be able to work. The government is also said to monitor telephone conversations especially international calls as well as digital communications means.

Discrimination against women persists. In fact, the Constitution recognizes the application of customary and religious laws alongside statutory law, in particular in the area of family law. The practice of early marriage is common, particularly in rural areas, with 48% of women being married by age 15 (ORCHR, n.d.). Similarly, Ethiopia's criminal code punishes adult same-sex relations with up to 15 years in prison.

### **3. Key Demographic Indicators**

The following chapters examine in a first instance the key demographic indicators in Ethiopia, followed by a comparison with three other countries, namely Germany, Kenya, and Somalia.

#### **3.1. Ethiopia**

Ethiopia is a country that has still not completed its demographic transition, which is characterized by a decrease in the mortality rate, followed by a decrease in the fertility rate, which causes population growth to stabilize (Kalemli-Ozcan, 2012, p. 3).

Ethiopia has among the highest birth rates in the world, estimated at 37.66 births per 1000 people, and as a result an impressive population growth of 2.89% (2015 est.). This, combined with an average life expectancy of just over 60 years (58.43 years for men and 63.15 years for women) translates into an expansive population pyramid where 44.2% of Ethiopia's citizens are under the age of 14. This population is most likely to work from a very young age, with child labour figures (children between the age of 5 and 14) as high as 53% (est. 2005), while the average school life expectancy is only 7 years, leading to a scarce literacy rate of just 49.1% of the total population (est. 2015) (CIA, 2015).

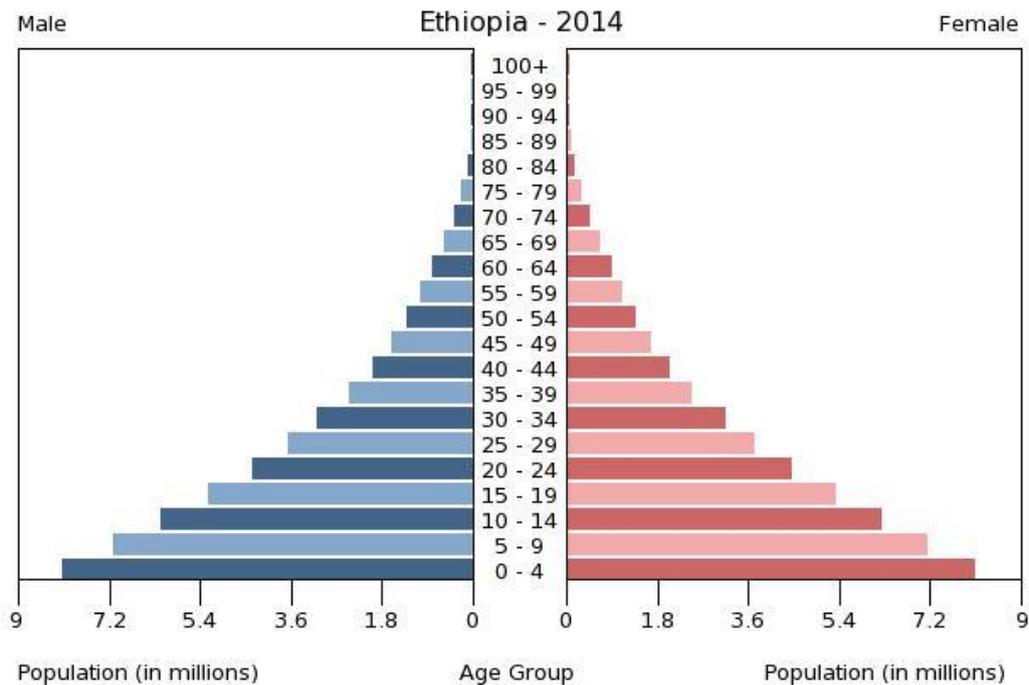


Figure 4: Population Pyramid Ethiopia (CIA, 2015)

Nevertheless, the mortality rate in the country has been improving in the past several years, going down from 10.70‰ in 2011 to 8.52‰ in 2014. This confirms our initial statement that Ethiopia is still going through its demographics transition. One of the hypothesis which would explain a future birth rate decline is an increase in the contraceptive use among women, which according to the United Nations will rise from slightly above 20% today to anywhere between 60% and 80% by 2050 (Guengant & May, 2011; UN FFPS, 2010). This development should be witnessed especially in rural areas, where contraceptive use is estimated to currently be as low as 11% (Ringheim et al., 2009, p. 2).

As already stated, Ethiopia is still a largely rural country, with 80.5% (CIA, 2015) of the total population living outside urban zones. Despite having a population close to 100 million, the largest city, Addis Ababa, accounts for (only) around 3 million inhabitants (2011 est.). This is accompanied by a low access to improved drinking water sources in these rural areas, at just 42.1%, compared to 96.8% in an urban setting, and access to improved sanitation facilities is as low as 22.8% in rural areas of the country, whereas in cities it's slightly higher at 27.4% (CIA, 2015). Nonetheless, there is a visible shift of the rural population towards the cities in order to seek a better living standard. This is confirmed by the high rate of urbanization of 4.3% (2010 est.), whereas the population growth rate is at 2.89% (2015 est.). This is also a stage that countries in demographic transition go through, namely the shift of population from the countryside to cities in order to seek better opportunities.

### 3.2. Demographic Comparison

In order to gain a better understanding of the challenges that Ethiopia faces with its current demographic state, it is of interest to compare it with different countries of similar size, or simply with its neighboring countries.

Germany has a population size that is just slightly under that of Ethiopia, at around 81 million. Other than that, Germany and Ethiopia share very few other demographic indicators. Germany, compared to Ethiopia, has completed its demographic transition, as it currently has a shrinking population at a rate of -0.18% (2014 est.), an ageing population, with a median age of 46.1 compared to 17.6 for Ethiopia, and a low birth rate of just 8.42 births per 1000 people. As most other economically developed countries, Germany also has a mainly urban population, with 73.9% (2014 est.) of its citizens living in the city, they have a 100% access to both drinking water and sanitation facilities. Furthermore, it is a country with a high level of education, where the school life expectancy is at 16 years for both male and female, and the literacy rate is at 99% (CIA, 2015).

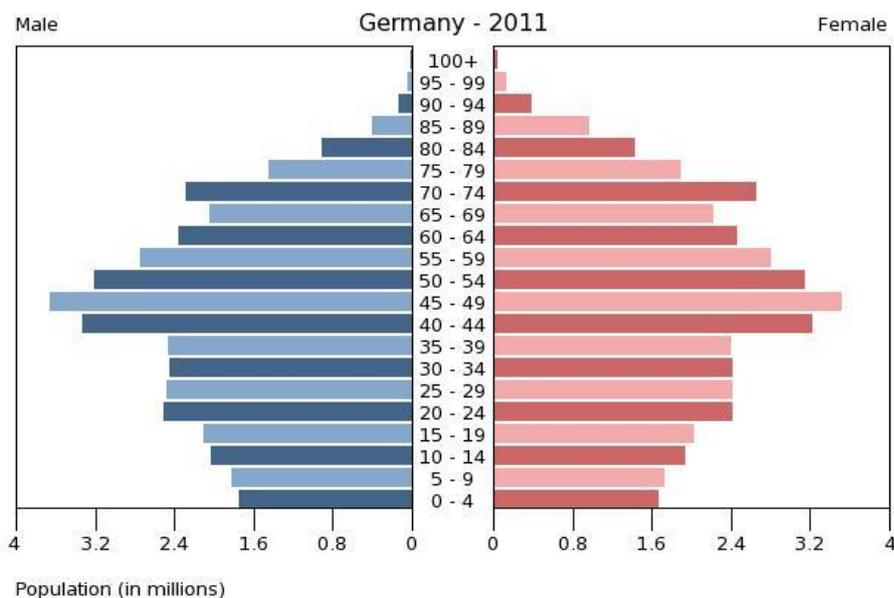


Figure 5: Population Pyramid Germany (CIA, 2015)

On the other side, Ethiopia shares also many similar demographic indicators with other sub-Saharan African countries such as Nigeria for example, and especially with neighbouring countries such as Kenya or Somalia. Both of these countries share an almost identical population pyramid, with an excess of 40% of the population that is under the age of 14.

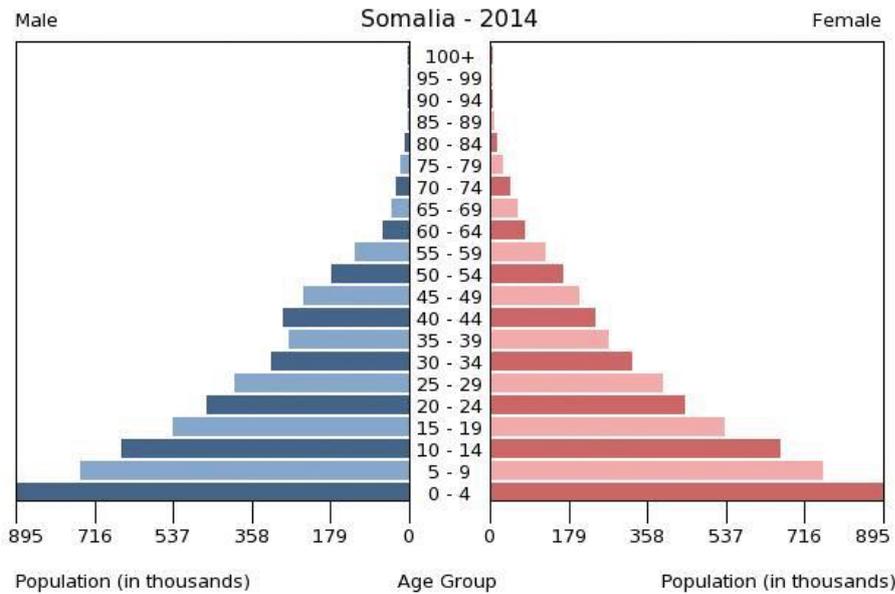


Figure 6: Population Pyramid Somalia (CIA, 2015)

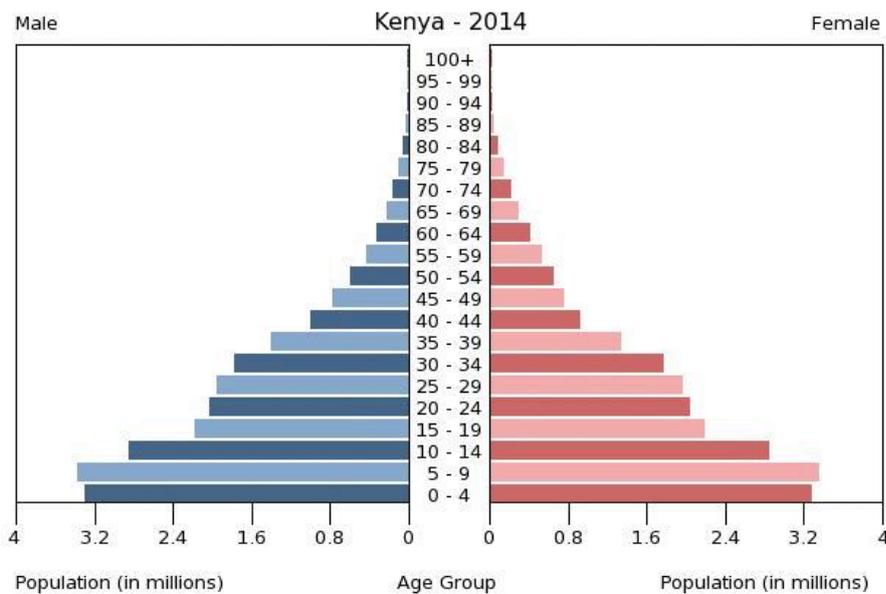


Figure 7: Population Pyramid Kenya (CIA, 2015)

Although Somalia has a very close median age to that of Ethiopia, set at 17.7 years (2014 est.), its life expectancy is one of the lowest in the world, much lower than that of Ethiopia (60.75 years), at just 51.58 years. Kenya on the other hand has a life expectancy slightly higher than that of Ethiopia set at 63.52 years. One anomaly that is found in Ethiopian demographics is that it has a significantly lower share of an urban population than both Somalia and Kenya. This is followed by a much higher literacy rate in Kenya, with 87.4% (2010 est.) of the population over 15 years of age that is able to read and write. This however is not seen in

Somalia, where the literacy rate is similar to that of Ethiopia, at just 37.8% (2001 est.). Furthermore, the access to drinking water in Ethiopia is higher than that in Somalia, however lower than that in Kenya. The sanitation facility access is very similar in the three countries. Another interesting factor to point out is that despite having decreased since the early 1990s, Kenya still has a significantly higher HIV/AIDS prevalence rate of 6.1% (2012 est.) among adults than that of both Somalia and Ethiopia, which are respectively at 1.3% and 0.5% (2012 est.) (CIA, 2015).

Overall, apart for some slight differences, it is clear that Ethiopia is in a similar demographic state as its neighbouring countries, which have also not completed their demographic transition.

#### **4. PESTEL and Demographics: a close link**

Admittedly, Ethiopia is going through a demographic change: even though the mortality rate has fallen, the fertility rate remains high, which means that Ethiopia's population could double in size in less than 30 years. At this rampant growth rate it is difficult for a country's institutions and technologies to cope with the pressure of an expanding population on all sectors, like water, sanitation, health, agriculture, housing, and education. Other issues like the degradation of the environment and natural resources, increased climate variability, and market vulnerability only aggravate these concerns (Ringheim et al., 2009, p.1). In spite of these rather gloomy prospects, there might be a potential positive outlook. The current youth bulge will become part of the working population soon, creating the possibility of a demographic dividend and thus of a much needed economic boost in the nation. The question arises as to whether Ethiopia is prepared to take advantage of the incipient demographic bonus, and if not, what changes need to happen.

Undoubtedly, the PESTEL model of Ethiopia is tightly linked to the current demographic state of the country. The characteristics of all six of the PESTEL elements have directly caused the present demographic challenges that Ethiopia is facing. Moreover, it became apparent while comparing Ethiopia's demographic indicators with other countries that the current situation is unique to this country. It is therefore of interest to analyse in what direction Ethiopia should influence its PESTEL in order to achieve a desired development in its demographics so as to fully capture the economic stimulus that a demographic bonus can provide.

A demographic dividend will not be realized without prior investments in all sectors. The current political situation, as previously mentioned, is characterized by a low level of Government Efficiency, combined with a high level of corruption. The economic cost of corruption in Ethiopia over 10 years (2003-2012) is estimated at USD 22 billion, which is approximately half of its GDP. There is no simple solution to eliminating corruption, however it is clear that tackling this problem will save the country large sums of money. These additional funds should be used to

improve the utilities (water & electricity) of the country, as well as be invested in healthcare and education (Fadayomi, 2011). Another possibility is to broaden trade encouraged FDI, broaden trade agreements, encourage FDI, as well as tourism and private savings so as to provide additional employment opportunities for young workers (Ringheim et al., 2009, p. 5).

Since Ethiopia has a large mass of young people (44% under the age of 14), providing them with an adequate educational level, as well as access to water and electricity would improve the future prospects of these youths. Ethiopian policymakers have to determine what skills their young people need to gain employment, become better entrepreneurs, or more successful farmers (Agbor, Taiwo, & Smith, 2012, p. 10). Additionally, it has been proven by the Earth Policy Institute that there is a significantly negative correlation between education and fertility rate. This is witnessed especially in the case of female education, as the Earth Policy Institute states: “research consistently shows that women empowered through education tend to have fewer children and have them later” (figure 8). The education gender gap is still present in Ethiopia, even though access to education for girls has been improving during the past several years.

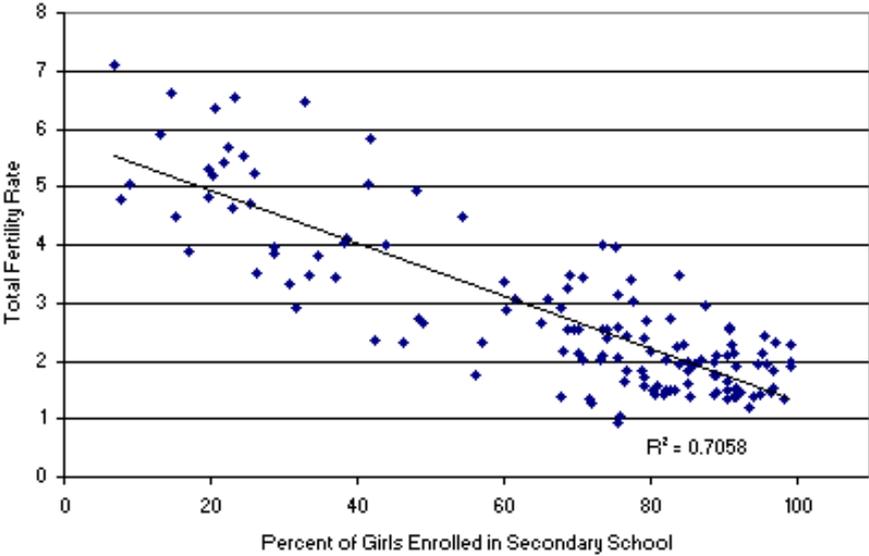


Figure 8: Female Secondary Education and Total Fertility Rates (UNESCO, n.d.)

Stable economic conditions that lead to growth and job creation are also necessary for the realization of the demographic bonus (Ringheim et al., 2009, p.2). Ethiopia’s current economy is dominated by its large agriculture sector that attracts 85% of its labour force. However, the low productivity of the sector and the environmental degradation that agriculture is causing has been an issue for Ethiopia. In a country where the primary sector accounts for almost half of its GDP, improving its efficiency would lead to a significant raise in the country’s GDP/capita.

However this would be a challenging task and would require large government subsidies in the sector.

Providing Ethiopia with adequate healthcare is crucial (Ringheim et al., 2009). As mentioned earlier, the country has to tackle an HIV/AIDS epidemic, while at the same time the majority of the population does not have sufficient access to healthcare facilities. Ethiopia is also dealing with other deadly diseases such as tuberculosis or malaria. Investing in healthcare, as well as providing HIV/AIDS prevention campaigns should enable the country in decreasing its child mortality rate, the number of orphaned children, as well as increase its life expectancy. Losing a sibling in the prime of their life is especially hard for families in Ethiopia since very often elders rely on that person for financial support.

Internet access in Ethiopia is still a luxury, as only 1.7% of the population is connected. However, it is fair to assume that a better access to Internet, as well as access to (western) media in general could decrease fertility rates in the country. There have been several studies on the impact of television on fertility rates, and the findings are that higher access to television lead to lower fertility rates. Taking as an example the study by La Ferrara & Co, on “Soap operas and fertility: Evidence from Brazil”, or the study by Robert Jensen and Emily Oster “The Power of TV: Cable Television and Women’s Status in India” in the Quarterly Journal of Economics, have both found that access to television has led to lower fertility rates. The supposed reason behind this result is that families on television are usually relatively small (one or two children), and this leads to women taking that as an example. Such a study has not been conducted in Ethiopia or in any of its neighbouring countries, however it can be assumed that the result of better access to television and Internet would be the same.

Ethiopia still lacks adequate intellectual property right laws. This limits foreign direct investment in the country, and therefore GDP growth, as foreign companies would restrain from entering the market from fear of getting their technology stolen or copied. Furthermore, anti-discrimination laws are not applied in the country. As a consequence, persistent discrimination of women in the Ethiopian society is still an issue. This translates for example into a lower educational level for women who have on average a school life expectancy of 6 years, which is two years lower than that of men. As previously mentioned, lower female education leads into higher fertility rates. Reducing gender discrimination through the creation of a proper legal framework in Ethiopia should therefore be considered as a priority in order to decrease fertility rates (Ringheim et al., 2009, p. 4).

If Ethiopia manages to influence its PESTEL in order to achieve its demographic goals, it will truly be able to take advantage of the masses of youths at its disposal, and insure a more prosperous future for the country and its people.

## **5. Conclusion**

The goal of this paper was to examine the challenges that Ethiopia is dealing with in order to take advantage of the country's youth bulge for the demographic dividend to materialize. The PESTEL analysis shows that even though the country has made some progress in all sectors, it is still struggling in some areas. Relatively low government efficiency, high levels of corruption, environmental degradation, high fertility rates and other health concerns, low levels of education especially in rural areas, scarce access to basic technology, high economic dependency on poorly managed and inefficient agriculture, heavily state regulated FDI, high inflation rates, and a lack of legal and regulatory requirements that foster economic development area issues that need to be tackled. The outline of the current demographic indicators in Ethiopia and the comparison with other countries confirm that the country is still going through a demographic transition and the age structure in the country is changing. The emerging youth bulge opens up a window of opportunity for the demographic dividend to happen, which would lead to economic growth and positive overall progress. Clearly, appropriate development strategies are needed in order to benefit from the implied human endowment, and thus efforts in all PESTEL elements are to be made. In particular, appropriate social and human capital development policies and programs, as well as investments in physical infrastructure, services and industry are essential to fully embrace the potential demographic bonus.

During the PESTEL analysis and subsequent portrayal of the key demographic indicators in Ethiopia, a special focus was set on factors that were linked to population growth and the prospects of the youth bulge. Even though the interdependence between the PESTEL elements and the demographic status was illustrated, the interdependency on a broader scale with less influential factors was not taken into account, thus limiting the scope of this research. Nonetheless, this opens up the possibility to future research in the field. If Ethiopia is not able to cope with the demands of its rapidly growing population, the country is likely to fail to seize its demographic dividend, which would almost certainly lead to more poverty, hunger, and instability in the country and possibly cause international reverberations. In this context, the question arises as to what role developed countries can play, for both humanitarian and strategic reasons, in order to help not only Ethiopia but also other developing countries to achieve inclusive prosperity and bring hope to their growing population.

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## G. The demography of the Sahel zone: Facts and implications

*by Frédéric Ador and Maurus Wuethrich*

Demographic change is an omnipresent topic in today's world. Whilst many developed nations are confronted with shrinking and increasingly ageing populations, the opposite is true for many developing regions. For example, countries belonging to the Sahel region are characterized by exceptionally high fertility rates, leading to a very high proportion of young people in society. This very young society can be both a blessing and a curse for their nations. On one hand, countries can reap a demographic dividend as the majority of their population can be productive in the economy and the dependency ratio remains low in the short and medium term. On the other hand, a country might face social unrest if the government cannot create the necessary preconditions to incorporate the majority of the working population into the labor market. In this respect, Sahelian nations have progressed at various rates. Whereas some Sahel countries have prospered both economically and socially, others are in despair.

The aim of this paper is to delve deeper into the reasons that have hindered some nations from thriving in social and economic terms, but also examine the causes that have led some countries onto the path of success. Both quantitative and qualitative approaches will be employed to achieve this. To begin with, demographic change as a whole will be put into the context of the PESTEL framework and the various interdependencies will be studied. Subsequently, an indicator based on the individual component of the aforementioned framework will be created to quantify the development of each country relative to the rest of the Sahel region in holistic terms. From these results, the best and worst performing countries will be explored to gather both success factors and painful lessons to avoid. Lastly, key recommendations will be provided to guide Sahelian countries from a troubled past to a safer future.

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## **1. Introduction**

### **1.1. Introduction to the Topic of Demographic Change**

Demographic change is increasingly pressing subject in this day and age. Most projections show that the world population will grow in the next 35 years, from 7.3 billion in 2015 to approximately 10 billion in 2050 (Population Reference Bureau, 2015). Associated with this rapid growth comes a plethora of socioeconomic, political, legal, environmental, and technological challenges that governments will have to address. Whereas the economically more developed, predominately Western countries face shrinking population numbers, less developed countries still experience a meteoric rise in population numbers. This is principally owed to the fact that improvements in the health, education and economic infrastructure have not happened simultaneously. In contrast, advances in healthcare have rapidly driven mortality rates down. In the meantime, developments in female education, a key factor in lowering fertility rates, have not occurred as quickly. Together, both these trends account for the fast population expansion many developing countries see themselves confronted with.

With these trends, leaders in politics and the economy stand at a crossroads. Are they able succeed in attending to the obstacles faced, they can create great prosperity. However, if they do not manage to resolve the challenges affiliated with this pronounced demographic change, a future looms with economic uncertainty, increased inequality, and internal conflicts.

### **1.2. Course of Investigation**

This work sets out to investigate demographic change and its associated implications in the Sahel region, both qualitatively and quantitatively.

In the first part, a qualitative focus will be taken and with that the principal consequences of demographic change in accordance with the PESTEL framework will be explored. It is critical to state that the directionality of influence between the demographic situation and the individual components of the framework is not always evident, but that the relations are frequently bilateral. Similarly, the boundaries between distinct elements of the framework are sometimes not straightforward to draw, but remain blurred. Afterwards, the quantitative part will focus around ranking the individual countries of the Sahel region according to the dimensions of the PESTEL framework. For each facet, appropriate measures and indicators are selected to eventually obtain an overall score for each country. Moreover, succinct case studies from well and poorly performing countries will be employed to gather additional insights into best and worst practices, respectively.

With this triangulation of both qualitative and quantitative data as well as case studies, there is sufficient grounds to provide a recommendations on how to guide the region “into safer waters”. The paper will be then conclude and have its limitations of this research presented.

### 1.3. Introduction to the Sahel Zone



Figure 1: The Countries of the Sahel Zone (Own Illustration)

The Sahel region encompasses 13 countries in the transition zone between the Sahara desert and the subtropical area closer to the Equator. Definitions about the precise span of the region differ, but most researchers seem to agree to include all countries lying between 12° and 20° N latitude. The region’s “most restrictive yet dynamic characteristic” is its rapid population expansion (OECD, 1999). This course is set to continue for the near and intermediate future: Over the next 35 years until 2050, population figures are projected to double (OECD, 1999). Although several regions have witnessed a similar rise in its population in the past – 19<sup>th</sup> century America and the early-20<sup>th</sup> century Asian subcontinent – this demographic change is unique in three aspects. To begin with, the population growth occurs later than elsewhere and under more problematic conditions as this “archaic world with set traditions is suddenly thrust in contact with modernity and the global market” (OECD, 1999). Moreover, contrary to North America’s mostly urbanized migrants, businessmen and capitalists with skills that helped build the nation, the growth in the Sahel zone stems mostly from the rural regions. Finally, unlike China and India whose governments managed to isolate the respective countries from foreign

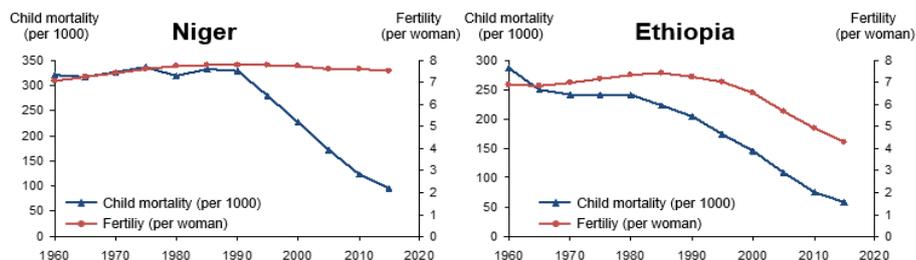


Figure 2: Fertility and Child Mortality Rates for Niger and Ethiopia (UN Data, 2015b)

interests whilst realizing their social, demographic and economic transformations, the countries in the Sahel region are entirely open to outside influences (OECD, 1999).

However, the Sahel region is by no means entirely homogenous in terms of demographic and social development. As Figure 2 suggests, there remain significant differences between individual Sahelian states. Whereas child mortality has notably decreased both in Niger and Ethiopia, only Ethiopia has made meaningful strides towards reducing the fertility rate. In Niger, by contrast, they have stagnated on a very high level of approximately 7.5 children per woman. Please see Appendix A for more details on the temporal evolution of the population pyramids. This interesting development gives room to pose the following question: *“How did two countries subject to so seemingly similar circumstances develop in such dissimilar ways?”* To address this matter a holistic approach is given by providing qualitative as well as quantitative analyses. Overall, the demographic situation of the Sahel region thus presents a worthwhile subject of study that merits everyone’s attention.

## 2. Qualitative Analysis – PESTEL

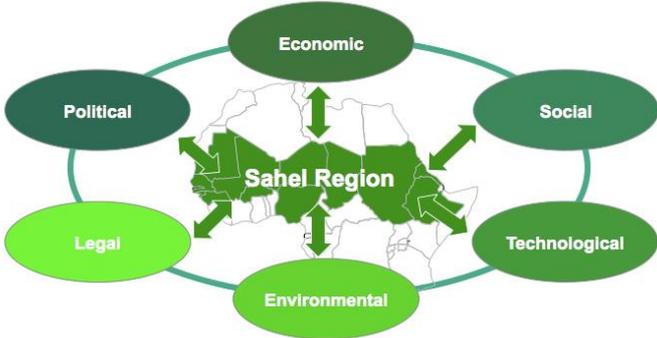


Figure 3: PESTEL Framework (Own Illustration)

In this paper, the authors will employ the PESTEL framework, as can be seen in Figure 3, to critically evaluate the environment the Sahel countries see themselves confronted with. This analytical approach has been used by researchers and practitioners alike and has gained wide acclaim. Its main strength is the holistic approach taken by considering a comprehensive list of six influential factors, ranging from political to environmental aspects. However with regards to demographics, it is not always self-evident in which way causality acts. For instance, do good economic circumstances play a role in lowering fertility rates as populations grow wealthier and become more educated? Or in contrast, do lower rates of childbearing give women more time to contribute in the economy? Thus, such conundrums can be best described as interdependencies between the two factors.

## 2.1. Political

The Sahel's current political climate is among the least stable on Earth, with ten countries among the world's most fragile states (Fund for Peace, 2015). The region's independence movements and post-colonial history can in part explain this state of political uncertainty. As a result of changes from post-colonial reformers to military rule, many Sahelian countries are ruled by ambitious leaders with little respect for democratic processes, multi-party politics and traditional societal models, and who are more generally detached from the population they govern (OECD, 1988). Aggravating factors such as rural exodus, population growth and migration are worsened by the governments' inability to deal with security issues (UN OCHA, 2013). As the Northern Mali Conflict between 2012 and 2015 showed, the lack of proper political governance creates power vacuums that can easily be filled by ethnic insurgents or religious extremist groups (Council on Foreign Relations, 2014). This lack of government effectiveness extends to other aspects of Sahelian countries' situations (World Bank, 2014a). For example, bureaucracy tends to be excessive and of much lower quality than the rest of the world. Likewise, Sahelian governments score lower in their coverage of basic duties, in their ability to uphold the rule of law, and in their ability to act in case of emergencies (World Bank, 2014a). These shortcomings lead to a potential vicious circle of lower economic attractiveness, migratory outflows, lower government revenues, and below-average public services. However, in recent years developments have raised the hopes of several observers and NGOs. On one hand, security initiatives such as the Trans-Sahara Counterterrorism Partnership aim to decrease opportunities for terrorist groups to develop in the Sahel region through training and the sharing of information (Talwar, 2015). On the other hand, a 2014 paper by the Intelligence Unit of the Economist finds that the region's trend has been towards democratization and an improvement in both government services and political stability. Nonetheless, the majority of the work still has to be done and the long-term development of the Sahel region will have to include government improvements and a discussion on the region's conflicts.

## 2.2. Economic

The Sahel countries' economies all fall under the category of "developing countries." Both their GDP per capita and HDI are among the world's lowest (IMF, 2015; UNDP, 2014). There is a large potential for both development and growth, but multiple factors are making great leaps unlikely. One main issue is the structure of Sahelian economies. To begin with, they tend to be overly focused on agriculture, and this sector has historically tended to favor traditional and inefficient techniques (Essoungou, 2013; OECD, 1988). In their 1988 paper, the OECD also finds that, due to colonial imperatives, Sahelian countries have overinvested in the production of low-value export crops, which may divert resources away from fodder crops. Furthermore, the level of industrialization – including resource extraction – in these countries is below the

world average (CIA, 2015a). The potential markets for locally produced goods are further hampered not only by the countries' size and poverty, but also by a lack of physical infrastructure, market information, important business services, standardization, and links between the public and private sector (OECD & Sahel and West Africa Club, 2004). Moreover, the service sector has been growing steadily in the past decades and is now considered to be a major growth driver in Sub-Saharan Africa (OECD, 1988; UN CTAD, 2015). However, this growth cannot hide other issues within local economies. The public sector is still large and inefficient and Sahelian bureaucracies have a history of putting their own expansion before the broader development of their country (OECD, 1988). Moreover, the informal sector, already important during the second part of the 20th century, has been the "main provider of urban jobs and will most likely remain so in the medium-term" (OECD, 2006). However, the quality of infrastructure is improving, and greenfield projects are playing an increasingly important role in foreign direct investment (UNCTAD, 2015). Likewise, demographic pressure is acting as a catalyst in the increase of agricultural productivity (OECD, 1999). Finally, the region's growing entrepreneurs might be its most promising aspect. From agriculture to services, these entrepreneurs addressing mostly urban markets are likely to determine, to a large extent, the region's economic future (Walther, 2012; OECD, 2006). These positive signs, coupled with a more stable political environment, might allow Sahelian countries to escape the volatility of its past expansion cycles and grow steadily towards their potential (Ndulu, O'Connell et al., 2009).

### 2.3. Social

Socio-cultural developments in the Sahel zone are predominately driven by the rapid population growth in the region. Progress in information technology and medicine, combined with interventions on behalf of developed countries, has greatly reduced infant and adult mortality rates before the society was prepared to naturally decrease fertility rates (OECD, 1999). This results in fertility rates among the highest in the world lead to a great proportion of young people. For example, Niger will still have 136 young people below the age of 20 for every 100 people aged between 20 and 64 by 2050 (Population Reference Bureau, 2015). This most likely presents one of the greatest challenges, but possibly also a salient opportunity, to the region. Currently, only a relatively small working population has to support a great proportion of young people, also described as a high youth dependency ratio. However, this young population will soon be old enough to participate as productive members of the economy, reaping the demographic dividend. However, if the economy is not ready to absorb all this new labor, high un- and underemployment rates will result, culminating in greater criminality and social unrest. Furthermore, the region is also witnessing continued urbanization as vast groups of people living in rural areas migrate towards cities in search of prosperity and employment (OECD, 1999). In these newly formed settlements, urban dwellers have invested their savings

and labor to create a more thriving economic environment. This new environment then further attracts rural citizens and accelerates the migratory influx (OECD, 1999). Even originally rural farmers have moved closer to urban centers where their produce finds more reliable outlets (OECD, 1999).

In conclusion, the inhabitants of the Sahel zone have endeavored with great vigor to improve their living conditions. Their initiative has taken different forms through intra-regional mobility, primarily directed towards towns. Small makeshift businesses have thrived in such areas. However, two principal predicaments remain unresolved. Firstly, job growth will have to be sufficient to integrate young people, and secondly agricultural yields need to rise to support the ever-expanding population. If this does not occur, competition for employment and resources will rise and ultimately lead to deep discontent with the status quo.

#### 2.4. Technological

The modernization of technology is an important challenge for Sahelian countries. With little innovation, poor markets, and an export-oriented agriculture, the technological development and infrastructure of Sahelian countries has long been neglected. For example, agricultural yields in the region are among the world's lowest and the sector is defined by a low use of external inputs, such as seeds and fertilizers and an absence of mechanization (Essoungou, 2013). In addition to industrial shortcomings, the technological situation of Sahelian countries is under increased pressure from urbanization and migrations. However, infrastructure relating to information and communication technology (ICT) is showing signs of healthy growth with the world's highest growth rate in Internet users between 2013 and 2014 (Real Time Statistics Project, 2014). Furthermore, the region's strong growth in mobile cellular subscriptions shows promise across multiple industries (World Bank, 2014b; Buerkert & Schlecht 2013; Bolay, Schmidt et al., 2012). From 1990 to 2013, investment in ICT has represented a majority of public-private projects, and, more generally, continent-wide initiatives such as the Programme for Infrastructure Development in Africa have been launched to improve the continent's infrastructure (UN CTAD, 2015). Despite these positive enterprises with respect to infrastructure, the key factor is likely to remain agriculture. Since the sector employs a majority of the Sahelian workforce, improvements in techniques and inputs would allow for a lower dependence on food imports, an increase in labor available for non-farm work, and a better ability to respond to environmental issues such as disruptions in rainfall cycles and desertification (Oxfam, 2008; OECD, 1988; Essoungou, 2013).

#### 2.5. Environmental

Throughout time environmental circumstances have played a vital role in a region hard pressed to sustain a rapidly expanding and increasingly urbanized population. With accelerating

desertification and a population relying primarily on the supply from the agricultural sector, there is a mounting challenge to cultivate the available farmland more productively whilst not overstraining it to later detriment. Regrettably, the latter seems to occur. The OECD predicts that arable land will become practically saturated throughout the region, compelling farmers to migrate southwards into more sub-tropic regions as they have in Nigeria (OECD, 1999). Alternatively, they would have to progress from their current extensive farming structures to more intensive systems with increased yields. Thus far, in spite of the difficult circumstances, the food crop production between 1990 and 2010 has risen by 2% annually and in accordance with the growing need (OECD, 1999). However, it was not sufficient to entirely measure up to the faced demand. The remaining balance was fulfilled by two sources: an abundance of food aid and commercial imports mainly from Sub-Saharan Africa. Coupled with food shortages, the Sahel region will also increasingly become subject to extreme climate variations and associated water shortages (Barrios, 2006). In his 1998 paper, Watson suggests that this will impose substantial changes to human settlements in the Sahel region. The increasingly irregular rainfall exacerbates this further as agriculture in the Sahel zone is especially dependent on frequent precipitation (Watson, 1998; Barrios, 2003). To sum up, there is compelling empirical evidence that the declining rainfall and aggravating climatic situation in general are vital determinants of intra-regional, rural-urban migration in the Sahel zone introducing the new concept of eco-refugees (Barrios, 2006).

## 2.6. Legal

Legal aspects are also an important facet to be considered. Especially with the substantial intra-regional migration taking place (see Appendix B for more particulars), legislation governing the internal movement of native Africans is gaining in importance. The regional trend is that such legislation was imposed after colonial independence prohibited the free internal flux of natives (OECD, 2011). Even though this makes it more difficult for migrants to cross borders, it represents also a first step in counteracting destabilizing influences of terrorist and criminal groups (UN ODC, 2015). In recent years, criminal networks are again increasingly smuggling drugs and migrants through the Sahelian route towards Europe. They have attained a level of sharpness that does not only pose a threat to the governance and social stability in the region, but also to the peace and security of the international community at large (UN ODC, 2015). Furthermore, revenues from such illicit activities are an important source of funding for violent and extremist groups such as Boko Haram. As a consequence, governments need to work towards strengthening the rule of law in the region. This can only be achieved by a renewed commitment towards establishing democratic governance and upholding human rights (Affa'a-Mindzie, 2013).

### 3. Quantitative Analysis – PESTEL Indicator

The qualitative analysis serves well to present an overarching and holistic picture of the Sahel region. However, one also must pay attention to the individual differences between the constituent countries. In order to address this, an indicator has been developed that builds on the respective components of the PESTEL framework to establish comparability between the countries.

#### 3.1. Methodology

In order to construct the PESTEL indicator, a series of indicators was used to create a score for each perspective. The political score is built on three indicators from the World Bank's *World Governance Indicators* (WGI): Government Effectiveness, Control of Corruption, and Political Stability & Absence of Violence/Terrorism Indicator. The economic score includes GDP per Capita, GDP Growth, and the Gini Coefficient from the World Bank database. The social score encompasses a country's Age Dependency Ratio, Literacy Rate Gender Parity Index, Government Expenditure on Education, Tertiary School Enrolment, Fertility Rate, and Infant Mortality Rate, all according to the World Bank. The technological score comprises Internet Users (per 100), Mobile Cellular Subscription (per 100), Gross Fixed Capital Formation from the World Bank, and Agricultural R&D Spending from the International Food Policy Research Institute (ASTI). The environmental score relates to Yale University's composite Environmental Performance Index. The legal score includes two WGI indicators, Rule of Law and Regulatory Quality, and a measure of the Enforceability of Contracts from the World Bank's *Ease of Doing Business* ranking. Some data, such as the Gini coefficient for Eritrea, the government spending on education for Guinea-Bissau and Nigeria, and the Gambia's tertiary school enrolment, was missing. This forced for a computation of certain intermediary scores without them. Similarly, some present day data on social matters was lacking, which led to the use of data dating back to 2007 and 2005 for certain countries. Afterwards, these indicators were compared across the different countries and yielded a "percentage score" going from one for the best performer, to zero for the worst performer. These percentage scores were then weighed to create each intermediary score, one per dimension of the PESTEL framework, which is then also standardized into a percentage score. These six intermediary scores are finally combined, with the economic and social scores both counting twice, in order to compute the total standardized score. The weights attributed to each indicator and intermediary score reflect the authors' impressions regarding the importance of economic and social factors in the future development of a country. For further information on indicators and weights, see Appendix C.

#### 3.2. Results and Discussion

Table 1 presents the individual scores for each constituent of the PESTEL framework and the overall score. As already detailed in the description of the methodology, it gives a good insight

into the respective relative placement of a country with respect to the whole group. Even though the standardized score adjusts the country’s absolute score to a value between 0 and 1, the absolute score merely represents the weighted average of the component scores of the PESTEL framework.

Country	Weight Year(s)	Political	Economic	Social	Technology	Environment	Legal
		1 2014	2 2003-14	2 2005-14	1 2011-14	1 2014	1 2014
	<b>PESTEL Score</b>						
Ethiopia	1.00	0.71	0.67	0.91	0.54	0.53	0.96
Nigeria	0.92	0.19	1.00	0.82	0.88	0.52	0.34
Senegal	0.81	1.00	0.39	0.48	0.87	0.56	1.00
Burkina Faso	0.72	0.73	0.42	0.65	0.72	0.56	0.70
Mauritania	0.70	0.54	0.59	0.18	1.00	1.00	0.68
The Gambia	0.58	0.79	0.00	0.73	0.88	0.27	0.94
Mali	0.43	0.39	0.28	0.70	0.74	0.00	0.67
Niger	0.36	0.59	0.52	0.15	0.54	0.45	0.61
Guinea	0.31	0.41	0.31	0.80	0.30	0.24	0.14
Eritrea	0.28	0.37	0.27	1.00	0.00	0.18	0.09
Sudan	0.17	0.00	0.56	0.39	0.61	0.16	0.11
Guinea-Bissau	0.16	0.24	0.34	0.63	0.12	0.44	0.00
Chad	0.00	0.21	0.43	0.00	0.58	0.32	0.22

Table 1: 2015 PESTEL Indicator

From the results detailed in Table 1, it becomes apparent that countries are evenly distributed over the entire range.

Ethiopia, Nigeria, and Senegal all reach absolute PESTEL indicator scores and are the leading nations in the examined sample. It is Senegal that displays the top scores in both the political and legal components as evidence of great political stability, relative absence of corruption and high rule of law. Interestingly, economic progress is somewhat lagging behind the top performers in the selected group. When also taking into account the temporal evolution in the indicator score (see Appendix D&E for details), Senegal also performs extremely well against its peers.

In contrast, Guinea-Bissau and Chad fare most poorly both in 2000 and in 2015. As opposed to the top performers, the bottom three score very low in both political and legal.

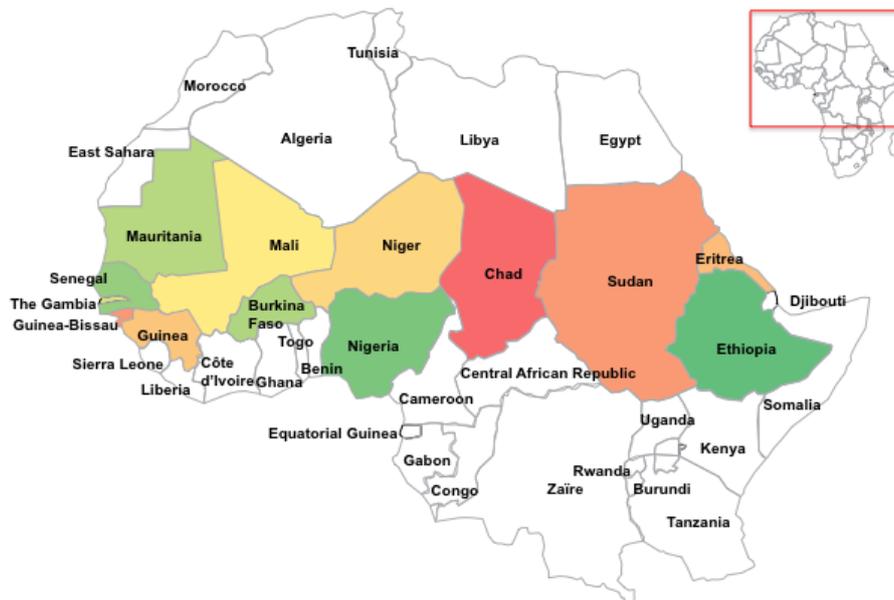


Figure 4: Results From PESTEL Indicator Analysis

The colored map in Figure 4 provides no distinctive geographic pattern with regard to the PESTEL indicator. For example, access to the sea does not seem like a deciding factor with the poor score of Guinea-Bissau in mind. However, it also appears that many poorly performing countries are landlocked and are situated in the center of the Sahel region. To gain a well-founded understanding for the determining factors with reference to a nation's overall development, a case study approach will be applied. In doing this, light can be shed on what practices to adopt in order to foster a country's sustainable progress.

#### 4. Case Studies – Best and Worst Practices

The quantitative indicator discussed in the previous section already offers some elementary explanations for the country-specific issues within the Sahel region. In order to further analyze this, two cases at the extremes of the spectrum are used: top-scoring Senegal and poorly ranked Guinea-Bissau.

##### 4.1. Senegal

Senegal is the top-ranked nation according to the PESTEL indicator outlined in this paper. It owes this strong position to very strong scores in the political, legal, and technological areas. By contrast, it somewhat lags behind its counterparts economically, illustrated by a below average score in this field.

The well-founded position in the political and legal domain is unsurprising as Senegal has witnessed a continuous and untroubled history of stability since its independence in 1960. Over the decades, the political landscape has advanced considerably from a highly centralized one-party state to well-established multi-party rule. This political balance is well illustrated by recent pronounced transitions in the governmental composition which were entirely coerced by the

electorate. For instance, a strong and vocal civil society coupled with politically engaged citizenry exercised its power and ousted the long reigning Socialist Party in 2000 voting in Abdoulaye Wade. This change has brought about increased market liberalism, as well as diversified partnerships with non-OECD countries such as Brazil and India (US AID, 2012). Altogether, this combination of well-founded governance and strong legal framework forms an excellent platform to build the nation's prosperity in the future.

Economically speaking, Senegal's government has taken unconventional ways that have led the country on the path to greater wealth. In the 1960s, it privatized the rice and cereal markets, which was a deciding factor in helping Senegal to unburden state structures and open agricultural markets to the long-term benefit of farmers and merchants (US AID, 2012). This led to an extraordinary rise in yields and a competitive agricultural sector. Additionally, lower barriers to entry for entrepreneurs helped foster a climate of entrepreneurship. The strong political stability in an otherwise unstable West African region has also played a role in attracting foreign organizations. However, this strong past growth leads to slower current growth when compared to its neighbors. Rural unemployment has also risen over the same period. This inequality between rural poverty and urban prosperity has prompted many to migrate to the cities in search of their fortune. Of course, not all these often unskilled migrants can be absorbed by the urban economy, leading to a growing urban informal sector (US AID, 2012).

Moreover, social development in Senegal has also accelerated in recent years. In education, primary school enrolment rates have risen from 68% in 2000 to 84% in 2014 (World Bank, 2014b). Nonetheless, the quality of education is still critically restrained by a lack of qualified teachers and funding (US AID, 2012). As a consequence, Senegalese schoolchildren often do not perform in accordance with their grade level, especially in reading and mathematics (US AID, 2012). In the health sector, strides have been made, especially in rural areas where the development of health infrastructure has taken place. This has significantly improved the child survival rate while decreasing maternal mortality. Other initiatives, such as the distribution of insecticide-impregnated mosquito nets to reduce malaria transmission, have also led to a rapid decrease in the spread of diseases and infections (US AID, 2012).

Furthermore, in terms of technological and environmental aspects, the Senegalese government has invested heavily in agriculture. Specifically, investments reach over 10% of GDP per year. Part of this funding has gone towards research and development of novel agricultural technology. This has fundamentally increased productivity and consequently made headway towards stable, resilient food security. Initiatives to increase productivity have gone hand in hand with measures to address environmental concerns. Leaders in politics and the

economy have clearly recognized that rapid growth can only be built on a sustainable resource base and have taken the appropriate actions.

In conclusion, Senegal has reinforced its status as the vanguard of West African democracy over the last decades (US AID, 2012). The government has instituted the right reforms to nurture and stimulate the national economy while not losing sight of environmental and social concerns. The road towards greater prosperity is long, but Senegal is in a prime position to face the next decades.

#### 4.2. Guinea-Bissau

Guinea-Bissau scores lowest according to the indicator developed in this paper. One should thus look into the country's poor standing in the legal, political, and technological dimensions.

To begin with, Guinea-Bissau's legal score reflects the country's lack of legal and law enforcement capabilities. For example, there were seven competing law enforcement agencies in 2008 whose precise tasks were not defined. This has been leading to institutional conflicts, a lack of personnel training, and a general loss of trust from the population (UN, 2008). In fact, the entire judicial system is understaffed and the country ranks extremely low in contract enforceability and in perceived strength of the rule of law (UN, 2008). An additional factor of legal instability is the prominence of the drug and weapon trades, which benefit from the current situation and are incentivized to prevent the establishment of a strong rule of law (CIA, 2015b). These activities also gain from the lack of proper legal infrastructure and information the government needs in order to keep track of the flows of goods, people, and funds across the country. Even though the government recently showed its willingness to reform, the results still have to materialize. Additionally, the country has been increasingly active in ratifying international treaties ranging from trade agreements to human rights matters.

In addition, Guinea-Bissau's social situation reflects the multiple challenges the country will have to face. Even though the country's fertility rate is rather low compared to its peers and the mortality rate, on average over 40% of the population is below 14 years of age, and, among these children, 47.3% are engaged in child labor (UN Data, 2015; U.S. Department of Labor, 2014). Although primary school completion rates are higher than the regional average, informal fees make conventional education very unattractive. School completion rates drop suddenly after primary school since many children without official documents are barred from secondary school and many others leave school for months in order to help during harvest season. Without changing the status quo, it is unlikely that Guinea-Bissau fully develops one of its assets with the highest potential: its people.

Furthermore, the country's technological situation and infrastructure are significantly below the region's average. This situation can be partially explained by the 1998 civil war, which resulted

in the dismantling of large segments of the economy, social disruption, and physical destruction of economic, infrastructure, and social service delivery assets and systems (World Bank, 2015b). Today, most roads are not paved and there is no railway system. Likewise, the country's electricity grid and water supply system are in a terrible state, especially in cities where above-average population growth has added pressure on the existing infrastructure (World Bank, 2015b). Incidentally, the lack of a reliable power supply is one of the main reasons behind the unreliability of other government services and infrastructure. Guinea-Bissau's communication infrastructure is similarly underdeveloped. Overall, it registers the 13th lowest Internet penetration in the world and is well below the region's average mobile cellular penetration. Furthermore, Guinea-Bissau has the lowest rate of government spending on infrastructure among Sahelian countries. This also extends to agriculture, as Guinea-Bissau invests less in agricultural research and development relative to its GDP than its neighbors, even though 45% of its GDP comes from agriculture (CIA, 2015a).

In the future, demographic growth in Guinea-Bissau is likely to be slower than its neighbors. The population pyramid is heavily skewed towards the bottom, and education levels are lower than the Sahel average. Without a significant improvement in the country's legal environment, trafficking and child labor are unlikely to be reduced and might in fact grow as a result of this new generation of young, uneducated workers. The country as a whole lacks the infrastructure to develop and diversify its economy. This discourages both potential local entrepreneurs and foreign companies looking to invest (World Bank, 2015b). It comes as no surprise that the World Bank ranked the country eleventh worst country to do business (World Bank, 2015a). Finally, as long as Guinea-Bissau remains as politically unstable, there is little chance it will attract the capital required to develop its economy in the near future.

## **5. Recommendations**

Political stability is an important and common issue with Sahelian countries. The exception to this is Senegal, whose allegedly peaceful government transition in 2012 occurred after months of violence. This lack of stability and accountability can be linked to both internal and external decent into violence. As potential guidance, it is advised to:

### **1. Improve stability within the Sahel region**

Overly long has there been a breach between Sahelian governments and both their people and the international community. Only stable governments will be able to provide the necessary long-term thinking and cooperation that is required to foster positive development in the region. Stable governments will also be able to rebuild reliable relationships with the international community. Therefore, a key recommendation is to help build stable governments that are supported by the local people.

## 2. Enhance the efficiency and transparency of Sahelian governments

Bureaucracy is a large burden on the region's economies. Governments need to reduce bureaucratic spending and invest more in basic infrastructure and education. More efficient and transparent governments will also be able to attract more foreign aid and investments. Although foreign aid is likely to remain an important resource for these countries, making a better use of international funds is not the only step governments can take. Leveraging foreign knowledge should be an important point on their agenda and a way to become less dependent on the generosity of others.

Alternatively, when looking at the economic situation in the Sahel, a noticeable improvement has been realized in the past decades, but there is still a lot of potential improvement ahead. The complicated situation in the region tends to make old solutions less reliable than in other situations, and the economic development of Sahelian countries is likely to require innovative solutions. Volatile growth, income inequality, unemployment, and overreliance on export crops and foreign aid are heavy burdens on Sahelian economies, which gives room to the following recommendations:

## 3. Develop larger markets through regional integration and liberalization

In the long run, the ideal economic situation within the Sahel zone would be a large market composed of unique countries with diversified economies. This can only happen through economic integration at the regional level, increased liberalization and greater freedom of movement for both goods and people. Trade agreements have flourished since the turn of the millennium and governments should continue their efforts in this direction.

## 4. Increase productivity and foster entrepreneurship

In the shorter run, individual countries should improve their use of urban resources, especially the urban labor force, in order to develop a local business environment and a strong consumer class. This business environment should help agricultural entrepreneurs gain access to bigger markets and encourage such behavior within other sectors across the region. Productivity gains should also be sought within the agricultural sector to feed the booming urban population and alleviate some of the pressure put on the soil.

## 5. Reduce the dependency on foreign aid and the exposure to foreign currencies

Countries within the Sahel region should try to lower their exposure to foreign exchange rates and international aid. As the dependency towards the latter has grown, sudden changes in exchange rates can drastically lower a country purchasing power and severely curb the impact

of its investments. Foreign aid can be of great help in the short term, but Sahelian countries need to make stronger efforts to become economically independent.

The Sahel zone is currently witnessing the fastest population growth in the world. This rapid expansion comes with numerous associated social challenges that governments in the respective countries need to address. To begin with, the proportion of young people will rise significantly as a consequence of high fertility and steadily decreasing infant mortality rates. Additionally, rural-urban inequality will gradually increase further as urban centers become more prosperous. To effectively utilize these trends, the following recommendations are suggested:

6. Educate young people and integrate them into society

Most African education systems lag behind their counterparts from other developing countries. However, they will be key components to guiding their respective countries towards greater prosperity. Not only will an educated youth evolve into critical citizens that hold their political leaders accountable, but they will also make better choices with regards to family planning. Naturally, fertility rates will gradually decline. Finally, an elaborate education system will also pave the way to a more mature economy relying less on the primary sector and growing a strong presence in the secondary and tertiary sector.

7. Maintain free movement for people and goods

Migration has been an essential measure in the past for the people of the Sahel to adapt to changes in their environment. Freedom of movement within the Sahel region has prevented intra-regional conflicts and tensions from escalation. When numerous governments in the region start to erect barriers to free movement to protect wealth or national identities, ease of movement is harmed and could result in the start of significant social tension.

With regards to technology, the Sahel region has a lot of catching up to do. Conflicts and political unrest have either destroyed infrastructure or discouraged the long-term investments required to modernize a country. Some steps can be taken easily or will come naturally, but some actions will require decisive government action in order to succeed. In light of this, the following is recommended:

8. Modernize infrastructure and agriculture

Countries should focus their attention on basic infrastructure such as water supply, transportation, waste management, health, and the electrical grid. Electricity might be the biggest concern at the moment. Regular interruption in the electricity supply has severe impacts on other government services and the smooth operation of infrastructure.

Technological development in agriculture is also required. Expanding arable lands is becoming increasingly complicated and demographic growth and migration are putting additional pressure on the soil. In order to solve these problems, governments should encourage the use of information technology, fertilizers, and machinery in order to raise agricultural productivity and free additional labor. These opportunities extend to the environmental problems of the region: Individual farmers could share information and machinery to better use the arable land.

9. Encourage the development of information and communication technology

Information and communication technology should be encouraged to develop rapidly in the Sahel. The trend has been positive across the region although some censorship and control over information have hurt certain countries more than others. Beyond the economic benefits of increased information and communication technology, such expansion can be leveraged to increase civic engagement and to develop innovative solutions to the region's issues by empowering the Sahelian people.

Moreover, environmentally speaking, the people of the Sahel have always maintained an ambivalent relationship. With the Sahara desert expanding its territory southwards and consuming the once fertile land, farmers are confronted with a plethora of obstacles. How can they use the available natural resources to utmost productivity whilst not compromising the needs of future generations? Thus, it is believed crucial to:

10. Understand the delicate relationships between people and the eco-system and act accordingly to protect the latter

The natural process in which the population and economic activity gravitate towards certain specific areas is inexorable. Of course, this leads to positive outcomes such as economic competition between businesses and innovation. However, the concentration of people and economic activity cannot be left to market forces alone. Often, the areas in question comprise fragile and threatened eco-systems that must be preserved. It is thus the government's duty to intervene wherever necessary.

Finally, a country's legal framework plays a pivotal role in either fostering or hindering progress. It sets the boundaries between what is allowed and what is not. In a fast-growing region such as the Sahel zone, this is more relevant than ever. Two aspects where legal concerns come into play are the control of borders and economic regulation. Therefore, governments need to:

11. Control the borders for illegal activity, but do not inhibit the flux of people

In regions like the Sahel where overly often terrorist groups counteract the government's will, strict border control is vital to inhibit illegal activity. Frequently, rebel groups such as Boko

Haram in Nigeria's North rely on funding from drug trafficking to persist with their illicit scheme. However, free flow of people still needs to be safeguarded to avoid violent conflicts.

#### 12. Abandon excessive regulations on local initiatives

Inhabitants of the Sahel have shown much spirit to improve their livelihoods with entrepreneurial ventures. Governments need to stimulate this enthusiasm by tearing down unwarranted regulation that makes it difficult to conduct business.

### **6. Conclusion**

The Sahel is a complicated region undergoing rapid demographic growth. As of today, it is hard to see how the Sahelian countries could cope with it. From unstable governments to a general lack of education to poor infrastructure, the current situation in the region does not foreshadow a positive outcome. In order to further analyze the different states of each country, an indicator based on political, economic, social, technological, environmental, and legal factors was established. The results show that some countries such as Senegal or Niger are doing better than others, such as Guinea-Bissau and Eritrea. By looking at the top and bottom countries, Senegal and Guinea-Bissau, several recommendations can be made based on key development factors. Among these are the following: improving stability within the Sahel region; enhancing the efficiency and transparency of Sahelian governments; developing larger markets through regional integration and liberalization; increasing productivity and foster entrepreneurship; reducing the dependency on foreign aid the exposure to foreign ex-change rates; educating young people and integrate them into society; maintaining free movement for people and goods; modernizing infrastructure and agriculture; encouraging the development of information and communication technology; promoting intensive agriculture; understanding the delicate relationships between people and the eco-system and acting accordingly to protect the latter; controlling the borders for illegal activity, but without inhibiting the flux of people; and fostering entrepreneurial activity by abandoning excessive regulations.

#### 6.1. Limitations

Even though the PESTEL indicator computed in this paper can be a meaningful tool to compare the situation in different countries, it cannot yet be extended beyond the Sahel region because it only shows a position relative to other countries in the indicator. Likewise, the indicator might not detect broader worsening of the situation in the Sahel zone as it does not include data from the rest of the world. The qualitative analysis of the Sahel region only analyses region-wide patterns and not those of specific countries. Finally, the weighting system used to compute the final score is subjective, and the case studies following suggest that some other system might yield different yet meaningful results.

## 6.2. Outlook on Further Research

As stated above, the PESTEL indicator computed in this paper is not perfect. There are, however, ways in which it could be improved. Firstly, the indicator could be extended beyond the Sahel region in order to better compare countries. The best and most complex option would be to develop a worldwide PESTEL indicator which would help discern both regional trends and individual differences between countries. Secondly, this paper's qualitative analysis only analyses region-wide trends and could be improved by looking deeper into individual countries. Thirdly, the data chosen by the authors to compute the final indicator are very subjective – some might be a little redundant. Consequently, the PESTEL indicator could benefit from further work in order to better represent the situation on the ground. Finally, the quality of the data used in this paper was not always to the authors' satisfaction. Some indicators such as the Gini Coefficient and Government Expenditure on Education for certain countries were either not available or over ten years old. Finding better and more recent figures would, therefore, be a significant improvement to the current indicator.

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## 8. Appendix

### Appendix A: Demographic Pyramids and Population Growth – Ethiopia and Niger

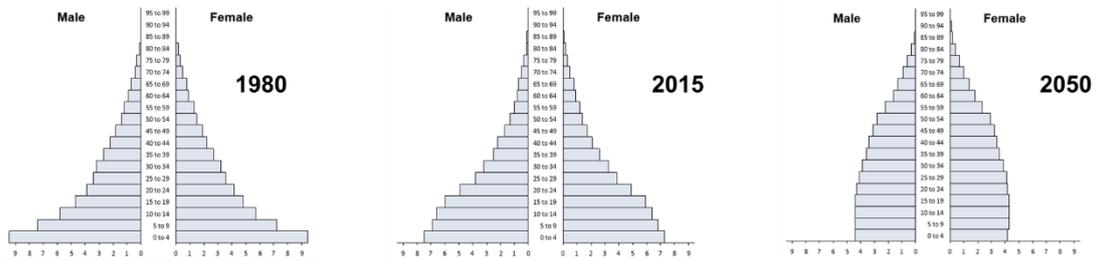


Figure 5: Demographic transition of Ethiopia from 1980 to 2050 (Own Illustration, data from UN Data (2015c)).

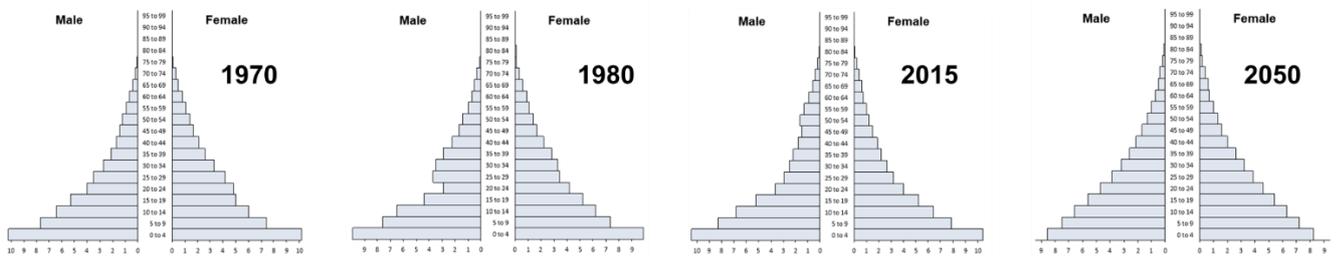


Figure 6: Demographic transition of Niger from 1970 to 2050 (Own Illustration, data from UN data (2015c)).

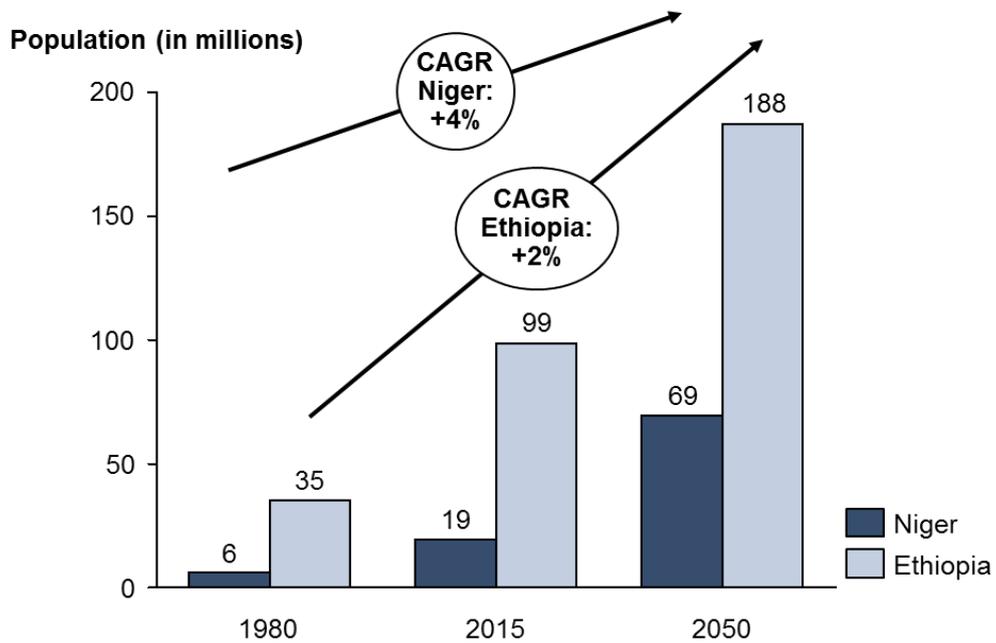


Figure 7: Population Growth in Niger and Ethiopia Between 1980 and 2050 (own illustration, data from UN data (2015c))

## Appendix B: Migration Patterns

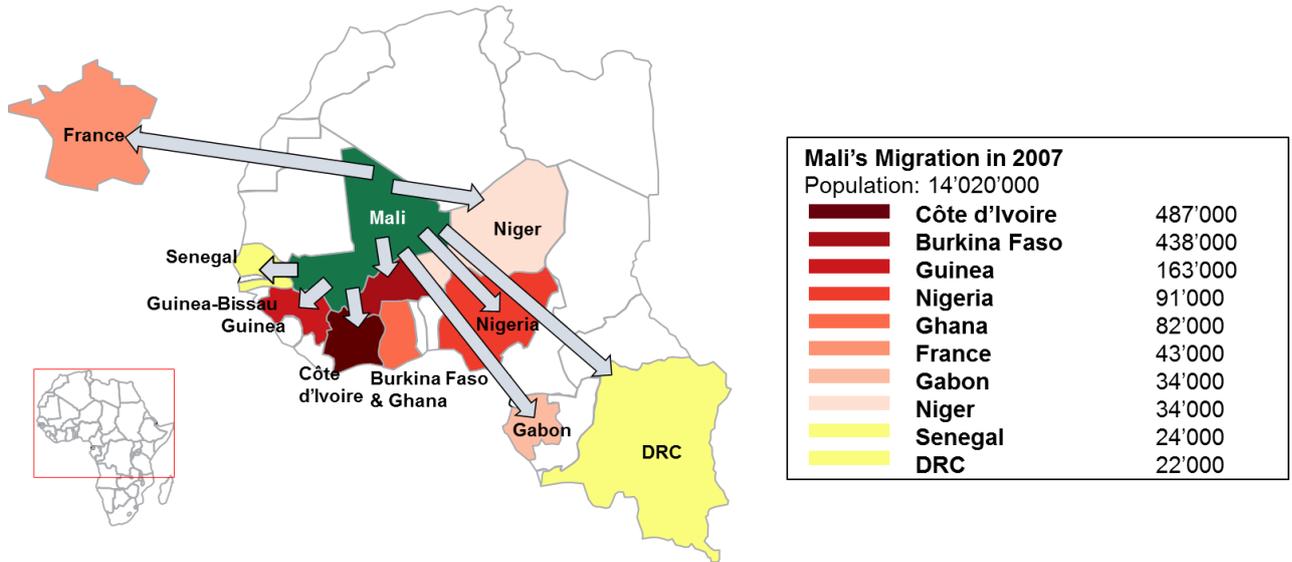


Figure 8: Intra-regional Emigration in Mali (own illustration, data from Development Research Centre on Migration, Globalisation and Poverty (2007)).

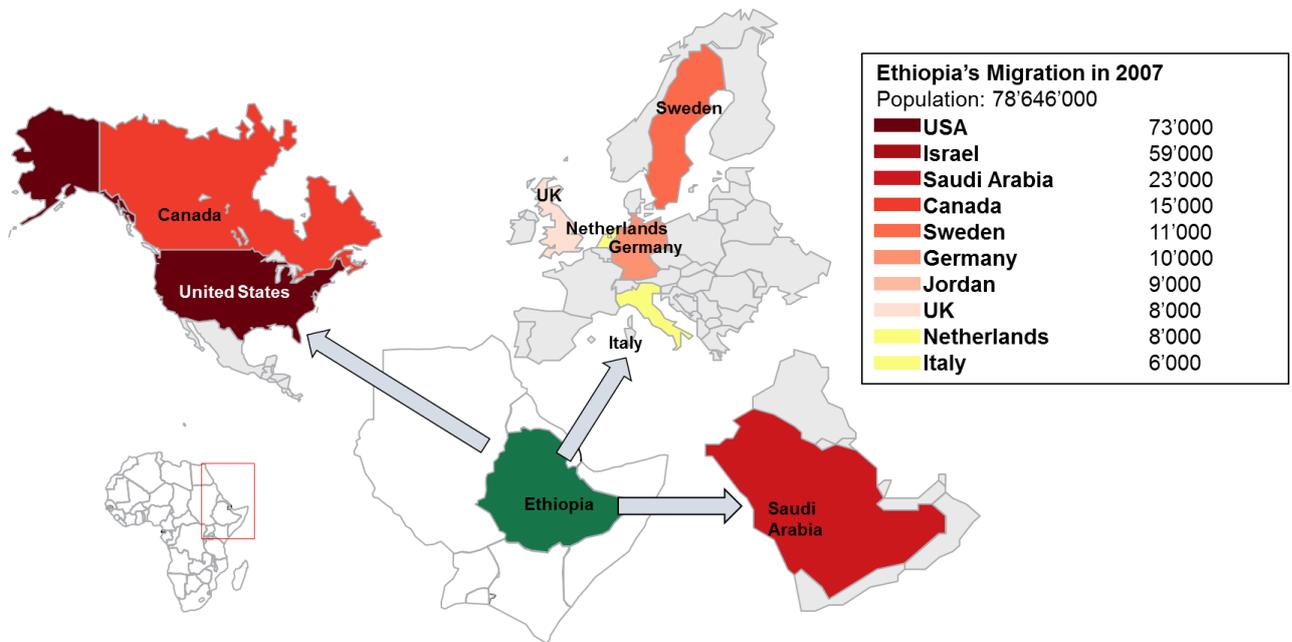


Figure 9: International Emigration in Ethiopia (own illustration, data from Development Research Centre on Migration, Globalisation and Poverty (2007)).

## Appendix C: List of Component Indicators

Indicator	Measurement	Source	Individual Weight	Category Weight
<b>Government Effectiveness</b>	Capturing perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.	World Bank (WGI)	4.17%	12.5%
<b>Control of Corruption</b>	Capturing perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests.	World Bank (WGI)	4.17%	
<b>Political Stability and Absence of Violence/Terrorism</b>	Capturing perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism.	World Bank (WGI)	4.17%	
<b>GDP/Capita</b>	Last four years average	World Bank	12.50%	25%
<b>GDP Growth</b>	Last four years average	World Bank	7.50%	
<b>Inequality (Gini)</b>	Representing the income distribution of a nation's residents.	World Bank	5.00%	
<b>Age Dependency Ratio</b>	The ratio of older dependents - people older than 64 - to the working-age population - those ages 15-64 as the proportion of dependents per 100 working-age population.	World Bank	6.25%	25%
<b>Literacy rate, youth (ages 15-24), gender parity index (GPI)</b>	Gender parity index for youth literacy rate is the ratio of females to males ages 15-24 who can both read and write with understanding a short simple statement about their everyday life.	World Bank	2.08%	
<b>Government expenditure on education, total (% of GDP)</b>	General government expenditure on education (current, capital, and transfers) is expressed as a percentage of GDP and includes expenditure funded by transfers from international sources to government.	World Bank	2.08%	
<b>School enrollment, tertiary (% gross)</b>	The total enrollment in tertiary education (ISCED 5 and 6), regardless of age, expressed as a percentage of the total population of the five-year age group following on from secondary school leaving.	World Bank	2.08%	
<b>Fertility Rate</b>	The number of children that would be born to a woman if she were to live to the end of her childbearing years and bear children in accordance with current age-specific fertility rates.	World Bank	6.25%	
<b>Mortality Rate</b>	Infant mortality rate is the number of infants dying before reaching one year of age, per 1,000 live births in a given year.	World Bank	6.25%	
<b>Internet Users per 100</b>	Individuals who have used the Internet (from any location) in the last 12 months via a computer, mobile phone, personal digital assistant, games machine, digital TV etc.	World Bank	3.75%	12.5%
<b>Mobile cellular subscriptions (per 100 people)</b>	Subscriptions to a public mobile telephone service that provide access to the PSTN using cellular technology (postpaid and prepaid).	World Bank	3.75%	
<b>Gross Fixed Capital Formation (% of GDP)</b>	Outlays on additions to the fixed assets (land improvements; plant, machinery, and equipment purchases; roads, railways, schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings) of the economy plus net changes in the level of inventories.	World Bank	3.75%	
<b>Agricultural R&amp;D Spending (% AgGDP)</b>	Spending on agriculture-related research and development as a percentage of the country's total agricultural GDP.	International Food Policy Research Institute (ASTI)	1.25%	
<b>Environmental Performance Index</b>	Worldwide country ranking based on environmental health and ecosystem vitality.	Yale University (EPI)	12.50%	12.5%
<b>Rule of Law</b>	Capturing perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.	World Bank (WGI)	6.25%	12.5%
<b>Enforceability of Contracts</b>	Assessing the efficiency of the judicial system by following the evolution of a commercial sale dispute over the quality of goods and tracking the time, cost and number of procedures involved from the moment the plaintiff files the lawsuit until payment is received.	World Bank (Ease of Doing Business)	3.13%	
<b>Regulatory Quality</b>	Capturing perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.	World Bank (WGI)	3.13%	

Table 2: List of Component Indicators (own illustration).

## Appendix D: Indicator Scores

### 2000 Indicator Breakdown

2000 Data		Political	Economic	Social	Technological	Environmental	Legal
	Weight	1	2	2	1	1	1
	Year(s)	1996-2001	1993-2003	1995-2002	1999-2002	2000-2002	1996-2001
Country	PESTEL Score						
The Gambia	1.00	1.00	1.00	0.68	0.51	0.79	1.00
Senegal	0.97	0.66	0.81	0.77	1.00	0.85	0.82
Mauritania	0.62	0.35	0.27	0.90	0.96	0.38	0.70
Guinea	0.58	0.80	0.58	0.41	0.29	0.69	0.78
Sudan	0.56	0.00	0.68	1.00	0.71	0.00	0.37
Mali	0.47	0.45	0.47	0.12	0.63	1.00	0.73
Nigeria	0.42	0.20	0.25	0.59	0.90	0.53	0.41
Eritrea	0.39	0.50	0.14	0.77	0.31	0.11	0.86
Burkina Faso	0.35	0.52	0.32	0.28	0.53	0.55	0.58
Ethiopia	0.32	0.47	0.31	0.35	0.49	0.11	0.83
Chad	0.15	0.45	0.25	0.06	0.33	0.51	0.46
Guinea-Bissau	0.08	0.42	0.00	0.43	0.00	0.71	0.00
Niger	0.00	0.23	0.20	0.00	0.02	0.51	0.42

Table 3: 2000 PESTEL Indicator (own illustration)

### Temporal Evolution of Indicator Scores

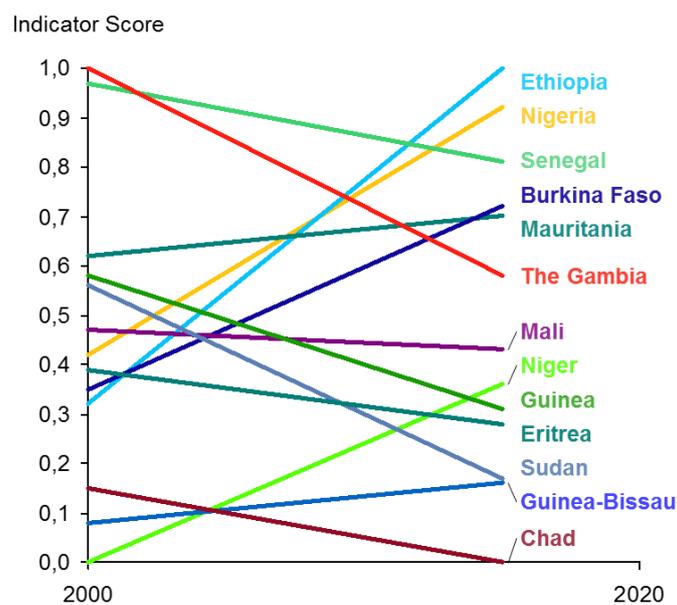


Figure 10: Temporal Evolution of Indicator Scores (own illustration).

A close-up, slightly angled view of a stack of US dollar bills. The bills are fanned out, showing the intricate patterns and colors of the currency. The top bill is a \$100 bill, with the number '100' and the words 'ONE HUNDRED DOLLARS' visible. Below it, other bills of various denominations are partially visible. A white rectangular box is overlaid on the top right portion of the image, containing the text 'Geopolitics & Financial Markets'.

# Geopolitics & Financial Markets

## H. Past, current and future population dynamics across the 5 continents: Different qualities, different quantities, different impact

*by Maura Hegi, Kong-Keung Liu, and Loredana Soldini*

The aim of this paper is to provide an overview of the main population dynamics in the past, nowadays, and in the future. It was shown that demographic parameters behave differently from continent to continent, but that there are some converging trends. Firstly, the mortality rate has declined and will continue to do so in the future. Secondly, the fertility rate will eventually settle down at a global level of only slightly below replacement level at 1.99 in 2100. It is important to note, however, that the African fertility rate will continue to stay at a high level of between 3 and 4 until mid-century before declining. Thirdly, further migration movements from developing to developed regions will influence the demographic evolution throughout the coming century.

These trends procure two crucial demographic developments: an ageing and growing world population. The age dependency ratio will change drastically, inducing an enormous pressure on the shrinking workforce to support the growing number of people aged 65 and over. The degree of this shift in age structure is more intense in most of the continents except for Africa, where it is less apparent and delayed. Moreover, UN projections demonstrate that the driving force of the population growth will be Sub-Saharan Africa and Asia. Although the latter disposes of a declining fertility rate compared to Africa, its population is huge already, and a low fertility rate nevertheless will contribute to a growth.

The implications of such transitions are manifold. The most notable ones are the labor shortage to guarantee economic growth, the financial challenges of keeping current pension systems upright, the political disputes over changing the pension and social security policies, changes in social behavior and structure, increased environmental burdens, poverty and the need to improve access to education.

In order to cope with all those ramifications, governments will have to put finding a solution to global ageing and population growth to the top of their priority list. As evidence shows, education has a positive influence on all negative implications of an ageing population. The government's' focus should therefore lie on supporting and funding education improvements.

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## 1. Introduction

World population dynamics have greatly changed from 1800 until today, and are predicted to evolve even further until 2100. Before the demographic transition took place, high birth as well as high death rates kept the population more or less constant. The world population in 1800 amounted to 978 million people and was growing at the low rate of 0.05% (Geohive). However, the industrial revolution induced a remarkable change. This started in Europe in the late 18<sup>th</sup> century, from where it then spread to the other continents over the following 100 years. Improved hygiene, sanitation, and food supply diminished the risk of suffering from a disease and early death, which led to a decline in mortality rate (UNDP Data). Because fertility rates remained high at the same time, there was a population boost in those countries undergoing the industrial revolution. However, in the early 20<sup>th</sup> century the availability of contraception, urbanization, women's education, and a rise of living standards affected the birth rate (Cleland, 2013). This fall in fertility rate decelerated population growth in the late 20<sup>th</sup> century. In his 2010 paper, Eberstadt states that birth rates even fell twenty percent below long-term replacement fertility. "Close to half of the world's population now lives in countries with fertility rates below the replacement level, which, as a rough rule of thumb, is 2.1 births per woman" (Eberstadt, 2010, p 55). In these cases the low birth and low death rates will lead to an aging population in which less and less young people, also referred to as the working forces, have to support an increasingly big aged population. This shift in population demographics, connected to the higher health and pension demands, is especially alarming and of great concern in Europe and Japan (Eberstadt, 2010). According to UN projections, the number of older people will more than double to 2 billion until 2050 (Population Facts, 2015). There was a promising, but still minimal, rise in fertility rate in Europe that could have counterbalanced the aging population (UN Data). However, when the economic crisis hit in 2008, any trend was destroyed. "Some of the biggest declines [in fertility] occurred in countries hardest-hit by the euro crisis" (The Economist, p. 1/-chart 1).

Continents are in different phases of demographic evolution. Therefore, fertility and mortality are not yet low in all the continents. Africa, for example, still enjoys very high birth rates. Additionally, given the huge size of its current population, this will strongly affect the development of world population in general. The same can be said for Asia, whose population constitutes a big share of total population and whose influence on future changes is enormous. Overall, world population is expected to increase inexorably until the end of the 21<sup>st</sup> century.

However, regardless of which source of predictions one looks at, a definite increase of the world population until the mid and end of the century seems inevitable. According to Gerland

et al. (2014), in 2100, the human population will have enlarged from 7.2 billion to between 9.6 and 12.3 billion with an 80% chance.

This paper aims to provide an overview of the worldwide population dynamics, its parameters and exceptions. The paper is structured as followed. To begin with, the theory of the key variables influencing population dynamics will be explained. Specifically, an explanation regarding fertility, longevity and migration will be provided. The trends of their behavior and their future perspective will also be discussed. Afterwards, the paper provides empirical evidence to support the presented theory. The main results are the ageing population and the population growth. They will be explained on the basis of UN projections. Migration also plays an important role in the future. Finally, a section is dedicated to elaborate on the implications of the population growth on sustainability, society, capacities and standards in general. The PESTEL framework will guide the investigation of the possible ramifications.

In the analysis, the continents are examined separately from each other whenever possible, because there are internal differences and parameters might differ among continents. Furthermore, due to the complexity and wideness of the topic, this paper focuses only on the most important aspects and, therefore, does not have the aim to be exhaustive.

## **2. Demographic trends**

The main drivers of demographic change are found in mortality, fertility, and migration, which were all influenced by external events throughout history. However, mortality and fertility are seen as trends that are usually linked to social and economic development, whereas migration is more understood as a phenomenon that is more likely to influence population dynamics (Population Facts, 2015). The main trend resulting out of these two parameters will be a growing and ageing population, which in turn is likely to influence migration. In the following chapter, these factors' evolution throughout history and their projected future behavior will be outlined.

### **2.1. Life Expectancy: Mortality and Longevity**

Life expectancy consists of two aspects: mortality and longevity. Mortality is the relative frequency of death in a specific population, whereas longevity describes the length or duration of life. However, longevity is also understood as life expectancy and as well used as such in this work.

#### *2.1.1. General Evolution of Life Expectancy*

Before the eighteenth century life expectancy was on a very low level, being under 40 years (Cleland, 2013). This changed during the great industrialization in the eighteenth century (Cutler, Deaton and Lleras-Muney, 2006). The mortality age fell relatively continuously during

the eighteenth century, causing an effect on the economic growth and the significant improvement in agriculture and thus nutrition (Cutler et al., 2006). The newly gained wealth helped people to become more resistant against diseases and, hence, to be more likely to survive them. However, life expectancy was still on a low level because of several dramatic diseases like typhoid, cholera, dysentery, and non-respiratory tuberculosis, which could not be healed at this point in time. The 20<sup>th</sup> century was drawn by a huge population growth. “This huge expansion did not occur because people suddenly began reproducing at higher rates; instead, population surged because humans finally stopped dying like flies” (Eberstadt, 2010: p. 54). The decreased mortality could be explained by the improved hygiene and the advice of personal health practices (Cutler et al., 2006). Nevertheless, there were several wars during this time which weakened the decline in mortality. During the 20<sup>th</sup> century the global life expectancy was more than twice as high as it was before (Eberstadt, 2010: p. 55). This is due to a better health situation through the development of medical treatment. Cutler et al. explain that “[this era] has been of big medicine, starting with vaccination and antibiotics, and moving on to the expensive and intensive personal interventions that characterize the medical system today (Cutler et al., 2006, p. 106)”. As a result, there was a dramatic decline in mortality and an increase in the longevity. Considering the data provided in Figure 1, life expectancy is expected to rise constantly in all continents. However, the graphs of life expectancy are rising on different levels. Poverty is one possible factor accounting for this difference. Additionally, in their 2006 paper Cutler, Deaton, and Lleras-Muney also outline that life expectancy of poor countries differs from rich countries. Reasons can be found in different living standards and health care availability (Cutler et al., 2006). However, making further assumptions and finding evidence move outside the scope of this paper.

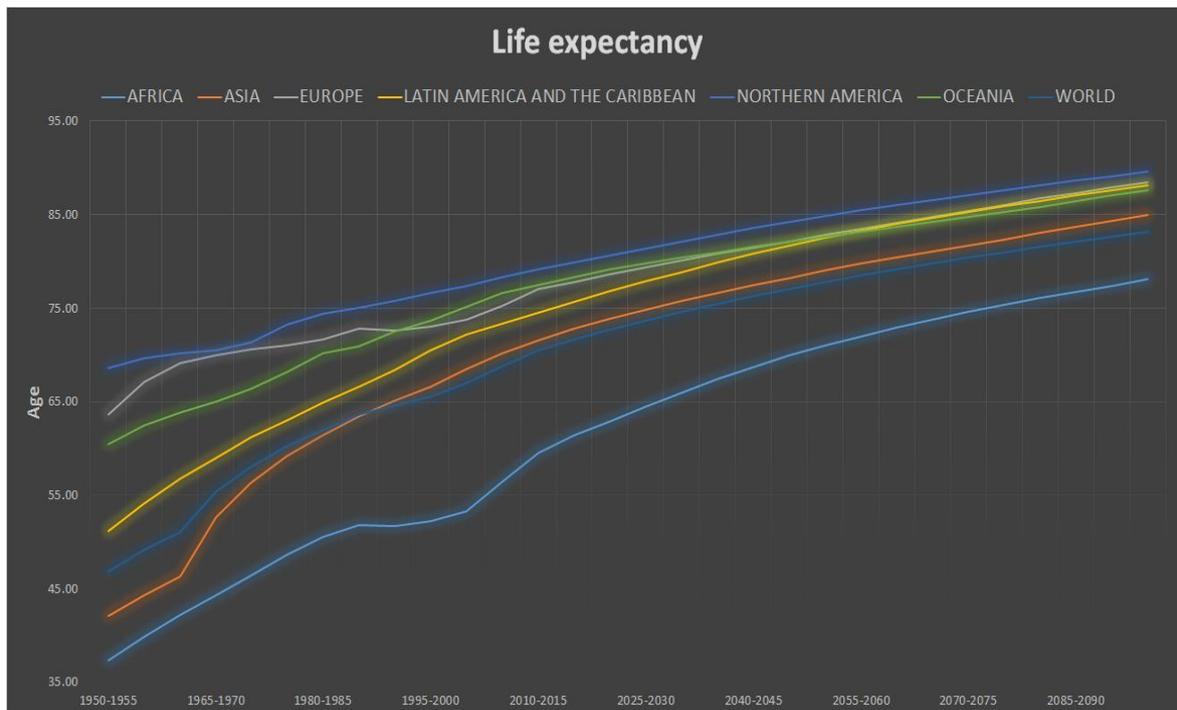


Figure 116: Worldwide Evolution of Mortality, 1800–2100 (United Nations, 2015)

### 2.1.2. Life Expectancy in the Five Continents

North America's life expectancy was, is, and will remain the highest worldwide. In the past, water purification eliminated some diseases, which led to a reduction of mortality in North America (Cutler and Miller, 2005). In 1950, life expectancy had increased by approximately 18% to 68 years. Currently, North America's residents are likely to live up to 80 years, which is above the average of the other continents. Furthermore, it will increase another 12.5% up to 90 years by 2100.

In the middle of the 19th century, longevity in Europe was linked to the amount of income, the personal wealth, the education level, and the individual's social status. The higher these factors were, the longer people lived (Cutler et al., 2006). For example, in 1851 the mortality of British people of low classes was significantly higher than the one of skilled people or professionals (Macintyre, 1997). Since 1950, Europe's average life expectancy slightly increased, parallel to the life expectancy of North America, but on a different level. In the middle of the 20<sup>th</sup> century, the average life expectancy was at 64 years and increased up to 78 years in 2015, which is currently two years below North America's longevity. In the future, Europe's longevity will remain at approximately 80 years. Europe's low life expectancy compared to the one of America could be explained by the poverty in some areas of Europe. When looking at the more prosperous Northern part of Europe, the longevity is slightly higher than it is in North America from 1950 until 2100. In contrast, in the Eastern part of Europe life expectancy remained at a very low level at 60 years in 1950 and at 72 years in 2015, and it will be at 82 years in 2100.

For example, in 2015, Ukraine's average monthly wage was on a very low level at 686 USD per month, while its longevity was low as well at 71 years. On the other side, Sweden's life expectancy was significantly higher at 83 years and simultaneously its average monthly income was 3,023 USD per month, which is more than three times as high as Ukraine's monthly average wage (Statista, 2015). This leads to the conclusion that the lower income areas of Europe weaken the average life expectancy of Europe.

When looking at Asia, it can be seen that in the past, Asia's life expectancy remained at a dramatically low level of 42 years in 1950. Currently, the average longevity is 72 years, which constitutes a significant 71% increase in 70 years, but it is still on low compared to the other continents. In 2100, the average longevity of Asia will remain at 85 years. Within Asia, however, huge differences have been discovered. Afghanistan has been holding the lowest life expectancy throughout the evolution and will be holding the lowest in the future. The highest life expectancy has changed its holder: in 1950, it was Israel, whereas currently it is Hong Kong at approximately 84 years. In the future it will become Singapore, whose life expectancy is predicted to rise to 94 years. This fragmented data is attributable to the different wealth and available living standards of the countries in Asia.

Latin America's life expectancy has been growing continuously since 1950. Starting at 51 years, it grew sharply from 1950 until now. The predictions state that the average life expectancy will further increase up to 88 years until 2100. In Latin America the internal difference are not as high as it is discovered in Asia. Here, Bolivia had the lowest longevity in the past which was stable at 40 years, while Uruguay's average life expectancy was already at 66 years. Currently, Martinique's longevity is the highest at 82 years and it will also increase the most up to 94 years. The most populated country is Brazil, whose life expectancy remains at the respective average level of the years 1950, today, and in 2100 at 50, 75, and 89 years.

Finally, Africa is the continent with the lowest life expectancy compared to all other continents. From 1950 to 1990, it was strongly growing at approximately 5% every year. Afterwards growth stopped and life expectancy stagnated for several years. During this period, Africa went through independency wars and other political and ethnical unrests. After this phase the life expectancy exploded and sharply increased for approximately 5 years. The UN projection shows that the Africa's longevity will grow on a constant level up to 78 years until 2100. Focusing on Sub-Saharan Africa, which is estimated to have the biggest population increase in the future, life expectancy was at a low level of 36 years in the past and increased on a constant level to a current 60 years. It is predicted to grow further up to 77 years in approximately 85 years from now.

## 2.2. Fertility

The fertility rate – the number of children born per woman – is the second key parameter that influences demographic change, such as the ageing and growing of the population. 2.1 children per woman would guarantee long-run replacement level. However, fertility rate has fluctuated much throughout history as can be seen in Figure 2.

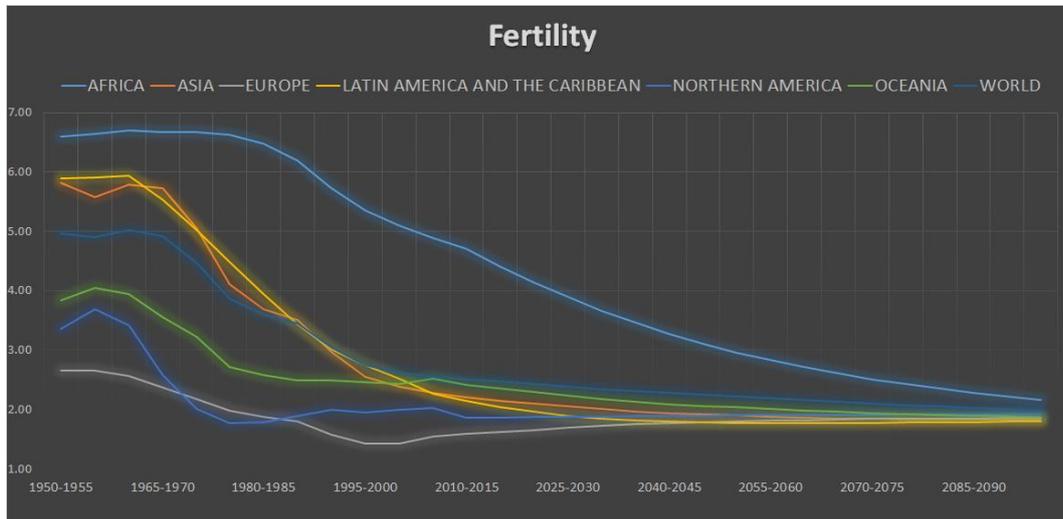


Figure 2: Evolution of Worldwide Fertility Rate, 1800–2100 (UNDP data, 2015)

### 2.2.1. General Evolution of the Fertility Rate

From 1800 until the demographic transition in the middle of the 20<sup>th</sup> century, global fertility was constantly high between 4.5 to 6.0 births per woman. However, because only 2 of those children survived childhood, population size remained more or less constant (Cleland, 2015). This changed drastically after WWII, when fertility momentarily rose due to optimistic family planning (Brooks, 2002). Because the mortality rate had already improved a lot since the start of the century, there was a gap between the two, bringing about the so-called “baby boomers” generation. The fertility rate did not fall sharply until after the war: “[It] fell from about 5 in 1950 to a little over 2.5 in 2005 [and is] [...] projected to fall to about 2 by 2050” (Bloom, 2006: p. 6). The fertility decline was steepest in developed countries. Only over time did birth rates decreased in the developing countries as well. Today, global fertility rate is found to be at 2.4 children and is above replacement level, but it varies greatly from continent to continent. “Close to half of the world’s population now lives in countries with fertility rates below the replacement level [...]” (Eberstadt, 2010: p. 55). This fact supports the thesis that fertility tends to be lower in rich countries, whereas it is higher in poor countries.

The diffusion of contraceptives is one of the factors influencing the reduction in childbearing. Worldwide, between 60-70% of the women regularly use contraceptive methods. Whilst contraception was already widely used before WWII in developed regions, where it led to the decline in fertility combined with other factors, the unmet need of contraceptive methods is still

pressing in developing regions. In those regions, it was due to other factors that childbearing declined. Factors like decreased child mortality, improved education, and working possibilities for girls and women resulted in changes of the desired family size. According to Hirschman, this proves that “[...] higher contraceptive use and higher female education are associated with faster fertility decline” (Gerland et al., 2014, p. 144). Furthermore, the Economist named the tempo effect, which refers to the postponing of childbearing due to educational, economical or other reasons, as an additional influence on the fertility rate. In contrast to the decision to generally have fewer children, which indefinitely lowers fertility rate, postponing the childbearing to a later stage in life only lowers fertility rate temporarily.

### *2.2.2. Fertility Rate across the Five Continents*

North America’s fertility rate has greatly fluctuated in the past 50 years. It declined from 3.35 in 1950 to the lowest point of 1.77 in 1975, then regained strength in 1990 at 2.00 before it fell again to 1.86 in 2015. The UN projects a small growth to 1.92 of North America’s fertility rate until the end of the century.

Europe’s fertility rate had been declining constantly from 2.66 in 1950 to the lowest point of 1.43 in 2000. Since then, however, it has been growing slowly but steadily to 1.60 children per woman in 2015. UN data even awaits an additional increase to 1.86 until the end of the century. There are apparent differences within Europe: In 2015, Northern (1.87) and Western (1.66) Europe have higher fertility rates than Southern (1.41) and Eastern Europe (1.55) have. This gap is predicted to become smaller until 2100 so that the four fertility rates will be dispersed evenly around the average 1.86 of Europe.

Asia is one of the continents that experienced one of the sharpest declines in the past 65 years. Its fertility rate more than halved from 5.82 in 1950 to 2.20 in 2015, and it is even expected to fall further to halt below replacement level at 1.83 in 2100. There is a huge discrepancy among states within Asia: fertility rates reach from 1.20 children per woman in Hong Kong, China, to 5.91 children in Timor-Leste. Even within single countries there are disparities. For example, India’s fertility rate averages 2.48 in 2015. But most Southern Regions with higher life expectancy rates, better education and stronger economic performance, fertility rates below 2 are found. In contrast, the Northern Regions that are far more populated easily counterbalance these rates by having fertility rates around 3.

Latin America is the second continent whose fertility rate fell sharply, from 5.89 in 1950 to 2.15 in 2015. Its predictions are also similar to that of Asia in that its fertility rate will fall below replacement level to 1.80 in 2100. In contrast to Asia, however, the internal deviation is not as big as one would expect. It ranges from 1.64 in Puerto Rico to 3.48 in French Guiana. Brazil,

Latin America's most populated country, is situated below the 2015 average at 1.82, but will only fall slightly to 1.79 at the end of the century.

Finally, despite the fact that Africa's birth rate has declined from 6.60 in 1950 to 4.71 in 2015, it is still at a very high level. In fact, it is the only continent with a fertility rate above replacement. The difference in fertility rates between Southern (2.51) and Northern Africa (3.27), on the one hand, and the Sub-Saharan region (5 - 5.8), on the other, is immense. Although predictions indicate that Africa's fertility rate will go down to 2.16 by 2100, it has a huge impact on population growths due to population momentum in the Sub-Saharan region. Nigeria, for example, Africa's most populated country, has a fertility rate of 5.74 today, and will therefore account for a great share of Africa's population growth in the next decades, even if its birth rate is predicted to decline to 2.27 by the end of the century. Despite an increased use in contraceptive methods, there is still a great unmet need for family planning (Gerland et al., 2014).

### 2.3. Migration

Migration has influenced population dynamics all throughout history. It is considered an ongoing phenomenon, rather than a trend. Nevertheless, there is evidence of significant demographic effects caused by migration. In general, migrants „[...] move from poorer and unstable to richer and more stable locations” (Helliwell, 2004: p. 5). Moreover, poor people usually have more children than rich people do. This could be due to a different understanding of an ideal family size, because people in lower socioeconomic classes rely on their children as their future social insurance when they retire, or other factors. As a result, migrants from poorer region could influence the fertility rates in the rich, destination countries (The Economist, 2012). Mostly, motivation for migration can be found in political events and instabilities such as regime collapses or wars, as well as in economic reasons (Hatton and Williamson, 2002).

#### 2.3.1. *History of Migration Waves*

Throughout history there were several streams of migration. Before the early 20<sup>th</sup> century, immigration was unconstrained, which caused an increase of a lower-skilled workforce in more developed countries (Helliwell, 2004). Due to migration restrictions mainly in developed countries “ [...] migration has become tightly constrained by tough immigration policies that undoubtedly suppress a vast amount of potential migration that might otherwise have taken place” (Chiswick and Hatton, 2002). Even though there were sharp restrictions, the United Nations states that the number of immigrants around the world increased by 55 million from 1965 until 1990. More specifically, Latin America is the continent with the highest emigrant rate since 1955. Interestingly, Africa, which is one of the least developed continents, has a significant lower emigration rate than Latin America. Hatton and Williamson (2002) outline “ [...]

that emigration from poor countries increases as economic development takes place in the source country” (p. 4). This leads to the conclusion that people living in underdeveloped areas simply do not have the means for a long-distance move. Furthermore, Europe’s immigration rate is average compared to the other continents, whereas North America and Oceania experience a constant high inflow of migrants since 1950. Oceania, however, won’t be further analyzed in this paper for reasons of complexity.

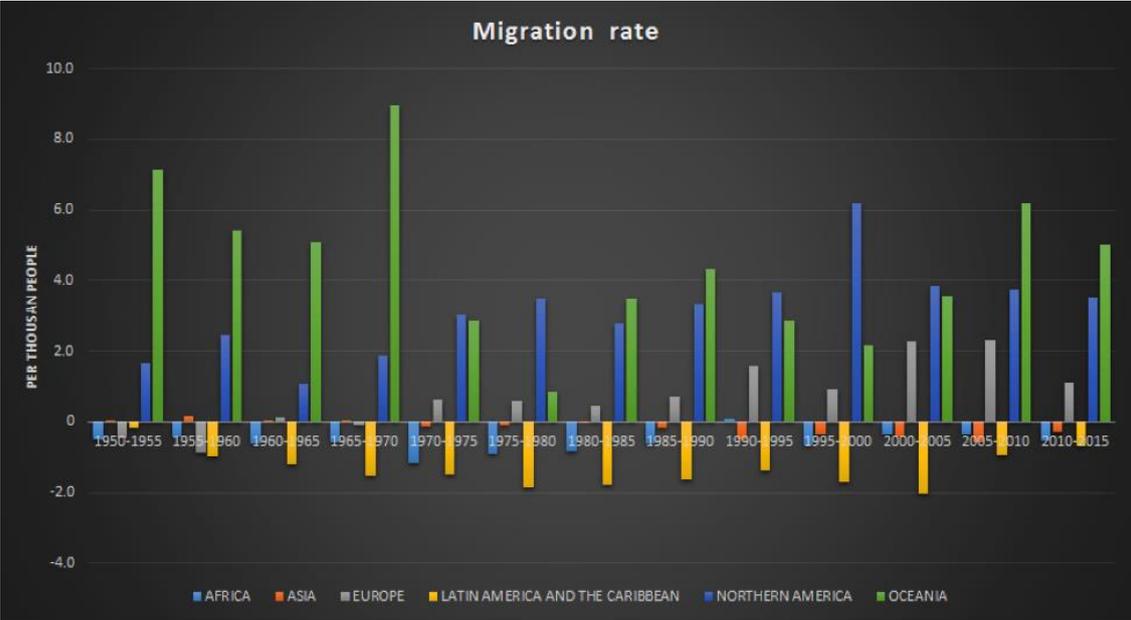


Figure 3: Migration Development, 1800–2100 (UNDP DATA, 2015)

2.3.2. Migration Movements in the Five Continents

North America’s immigration rate remained on a constantly high level between 1950 and the end of the 20<sup>th</sup> century. The inflow of foreign people rose from 7.9% in 1990 up to 11.1% in 2000 (Hatton and Williamson, 2004). During this period of time, the number of immigrants per thousand people shrank from over 6 to under 4 after this explosion, but remained stable since then.

More than 50 million Europeans migrated to the New World before the First World War, mainly from Ireland (Hatton and Williamson, 2002). After the Second World War, almost 50% of the United States’ immigrants were originally from the Western Europe (Hatton and Williamson, 2003). After a momentary decline in 2010, there currently is a huge migrant wave moving towards Europe, with a dimension that has not been seen since WWII.

In early centuries, Latin America was a common destination for migrants. This changed during 1960 because the migrants from Latin America mainly departed for North America (Hatton and Williamson, 2002). Between 1970 and 2005 there was a constant emigration with some

fluctuations. Although the emigration declined over the last 10 years, Latin America's outflow of migrants will remain the biggest compared to the other continents.

Around 1950, Asia was an influx continent for immigrants, whereas after 1970 more people emigrated from Asia to more developed areas. For example, in 2002 there were more than 9 million migrants living in one of the oil-rich countries of the Middle East, which exceeds 5% of the global migrant population (Hatton and Williamson, 2004). However, Asia's emigrant level remains on a very low level compared to Latin America.

Africa is the poorest continent of the world. As a result, the amount of migrants leaving the country remains relatively small. Missing means for long-distance move are seen as a possible explanation for this behavior (Hatton and Williamson, 2002). However, Hatton and Williamson (2002) point out that there are huge numbers of illegal flows between North Africa and southern Europe, which could not be registered. Additionally, before the 19<sup>th</sup> century a huge amount of Africans were forced by Americans to migrate as slaves (Hatton and Williamson, 2002).

### **3. Future Demographic Situation**

In the previous section the three driving forces of demography, fertility, mortality, and migration, have been examined and discussed. While many drivers of fertility and mortality are applicable to most part of the world, the shifts in these parameters occur at different rates and started at different time frame in different continents and result in different paths of demographic change that different regions take. Therefore, in this section estimations on population and population compositions based on future projections will be presented to provide an overview to the reader on demographic trends of this century in various continents.

The estimates in this section are based on the United Nation's (UN) projections as in most of the existing literatures on demography. Therefore understanding the assumptions taken by UN might help readers analyzing the situation. Fertility is assumed to stabilize at around 1.85 to 1.9 and therefore continents with current fertility lower than that such as Europe will be expected to slowing increase until reaching 1.85. Life expectancy is assumed to increase in general but at a lower rate for regions with already high life expectancy. Migration, which has been showing volatile character in the past, is assumed to be stable in the future and has little changes.

#### **3.1. Ageing Population**

With both declining fertility and increasing longevity since the 50s, ageing populations of the world are an inevitable result. Figure 4 indicates the dynamics of the ageing population.

### 3.1.1. General Predictions of an Ageing Population

In the 1950s, the old population (65+) only accounted for 5% of world population, while the young (0-14) and the workforce (15-64) population made up the remaining 35% and 60% respectively. In 2015 senior citizens account for 8% of world population whereas youth and working-age people make up 26% and 66% of world population. Under the UN prediction, youth and elderly will account for 21% (18%) and 16% (23%) respectively in 2050 (2100).

The phenomenon is raising concerns as the productive members that support the society is declining in relative terms. Through studying the dynamic nature of the dependency ratio transition many implications can be drawn (Population Facts, 2015). The dependency ratio is measured by dividing the 0-14 and 65+ population by working-age population expressed in per 100 working-age population and can be subdivided into old-age and young-age dependency.

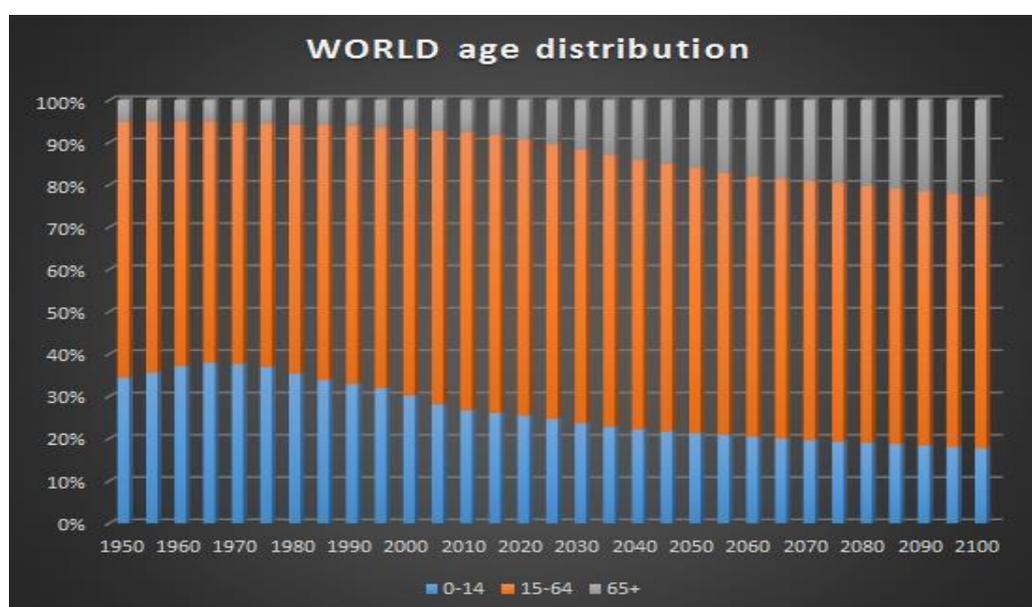


Figure 4: Age Distribution of the World, 1950–2100 (UNDP data, 2015)

Table 1 through 3 show the total dependency followed by young-age and old-age dependency. The advantage of separating young age and old age dependency is that resource consumed by young people can be seen as investment as they will join the workforce, whereas resource taken by old people will be depleted.

The world had a 65.1 total dependency ratio in 1950 and is expected to have a ratio of 67.9 in 2100. While the figures are similar, the situation is substantially different as the old age dependency shifted from 8 to 38 and child dependency dropped from 38 to 29.

The last table shows change in the dependency ratio with zero migration assumption. It is notable that migration does change the world dependency under the UN model, but the impacts are immaterial (less than 0.2) and the mechanism is arbitrary.

Dependency ratio estimates						
	total		old		child	
	2050	2100	2050	2100	2050	2100
WORLD	59.6	67.9	25.6	38.1	34.0	29.7
AFRICA	61.5	56.5	9.5	22.4	52.0	34.1
ASIA	56.6	74.4	28.4	48.1	28.2	26.3
EUROPE	74.6	80.0	48.1	52.9	26.4	27.1
LATIN AMERICA AND THE CARIBBEAN	57.8	84.1	30.8	58.0	27.0	26.1
NORTHERN AMERICA	66.3	77.3	37.7	48.7	28.6	28.7
OCEANIA	61.9	72.3	29.5	44.1	32.4	28.2

Table 1: Dependency Ratio Estimates (UNDP data, 2015)

Dependency ratio under zero migration						
	total		old		child	
	2050	2100	2050	2100	2050	2100
WORLD	59.7	67.7	25.6	37.9	34.0	29.7
AFRICA	61.3	56.5	9.5	22.4	51.9	34.1
ASIA	56.5	73.9	28.3	47.6	28.3	26.3
EUROPE	77.5	81.8	51.3	54.9	26.3	26.9
LATIN AMERICA AND THE CARIBBEAN	57.3	83.2	30.4	57.1	26.9	26.1
NORTHERN AMERICA	70.5	82.6	42.9	54.4	27.6	28.2
OCEANIA	65.6	73.7	33.7	45.7	31.9	28.0

Table 2: Dependency Ratio Estimates, Zero Migration Assumption (UNDP data, 2015)

Dependency ratio contributed by migration						
	total		old		child	
	2050	2100	2050	2100	2050	2100
WORLD	-0.063	0.206	-0.047	0.199	-0.016	0.007
AFRICA	0.203	0.018	0.066	-0.015	0.137	0.034
ASIA	0.110	0.483	0.160	0.527	-0.051	-0.044
EUROPE	-2.965	-1.825	-3.111	-1.979	0.146	0.154
LATIN AMERICA AND THE CARIBBEAN	0.468	0.918	0.441	0.934	0.027	-0.017
NORTHERN AMERICA	-4.234	-5.239	-5.192	-5.728	0.958	0.488
OCEANIA	-3.639	-1.412	-4.139	-1.593	0.500	0.181

Table 3: Difference in Dependency Ratio Estimates (Zero Migrants – Normal) (UNDP data, 2015)

### 3.1.2. Ageing Societies in the Five Continents

North America will experience an increase of total dependency to 77.3 and it is comprised of an increment in old age dependency and a drop in young age dependency. Migration will be an important factor as it is expected to reduce old age and total dependency by 4 to 5.7 extra points, as shown in the table above.

Europe will experience a big jump of total dependency to 80 at the end of the century from less than 50 now. An increment in both old age and child dependency is expected. Migration will also be a significant factor for Europe as it reduces the total and old age dependency at around 3 points by the end of the century.

Asia will maintain its dependency ratio in 2050 but experience a jump to 74 by the end of the century. This is due to the temporary matching of increasing old age dependency and the falling of child dependency before 2050. However, it will result in shrinking work force and therefore the rapid increase by the end of the century. Migration is relatively insignificant for dependency in Asia and is expected to increase less than 0.5 point of the continent's total dependency.

Latin America will have the highest dependency ratio in the world by the end of the century at 84.1. This is largely due to the estimated old age dependency at almost 60. Migration is insignificant for dependency in Latin America and is expected to increase 0.9 point of the continent's total dependency by the end of the century.

Africa will be the only continent with an improving dependency ratio with estimated ratio at 56 in 2100, which is lower than the rest of the world by a margin. While old age dependency in Africa increases from 6 to 22 at the end of the century, it is being outweighed by the substantial fall in child dependency from close to 80 to 33 by the end of the century. Migration is unimportant for dependency in Africa and the outflow is expected to increase total dependency by 0.01 point by the end of the century.

## 3.2. Population Growth

### *3.2.1. General Aspects of a Growing Population*

The world population is expected to grow continuously until the end of the century. The population is estimated at 9.7 billion and 11 billion in 2050 and 2100 respectively. Additionally, the composition of the world population is expected to be vastly different from now because of distinct developments of fertility, mortality and migration. Therefore, different population dynamics in different continents result. It is notable that Europe is already shrinking and Asia will shrink after 2060 alongside with Latin America. The sole driver of world population in the next century will be Africa, as growing Northern America and Oceania combined will account for less than 5% of world population in 2050 and 2100. Africa is expected to have population of 2.4 billion and 4.4 billion in 2050 and 2100 and will account for 25% and 39% of the world population.

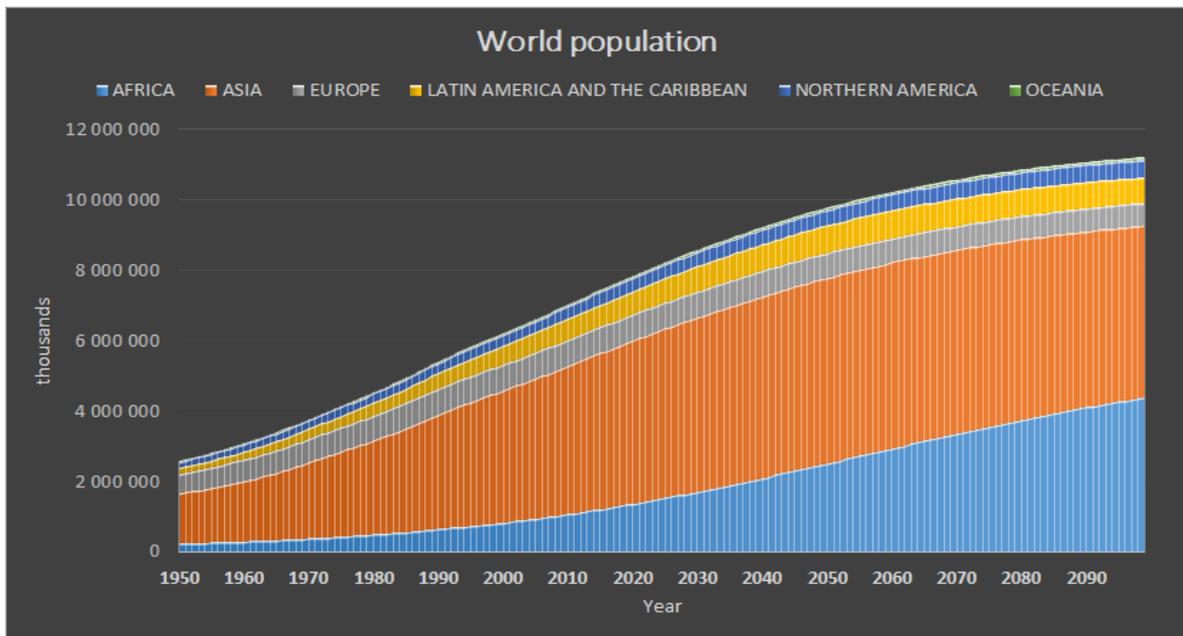


Figure 5: World Population Dynamics, 1950–2100 (UNDP data, 2015)

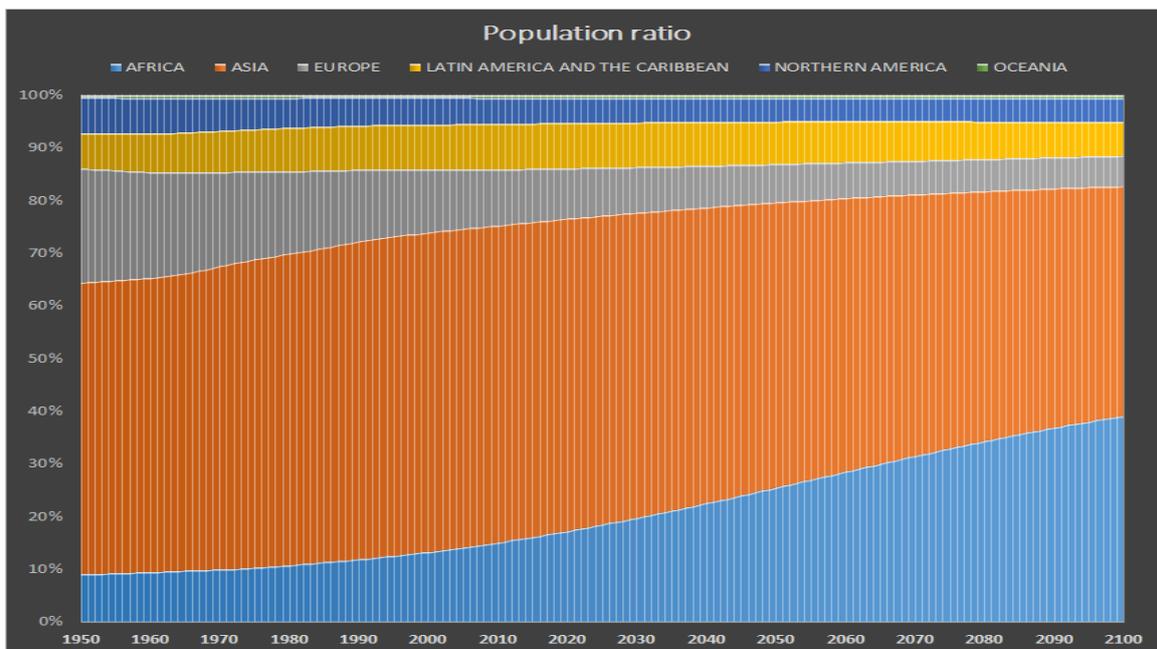


Figure 6: World Population Composition per Continent, 1950–2100 (UNDP data, 2015)

While declining fertility and improving longevity are shaping the population of the world, the two factors are not playing equal roles in all regions. Table 4 below shows a comparison between normal population estimates and population estimates under constant fertility and mortality assumptions. The world population in 2050 is predicted at 11.8% higher and 6.4% lower than normal level under constant fertility and mortality assumptions respectively. Therefore it can be stated that the shift in fertility is explaining 11.8% and the change in mortality is explaining 6.4% of the population in 2050.

It is notable that improving longevity interacts with population similarly across all continents and 4-6% of the population can be attributed to the factor, except for Africa which gained 8.5% population through longevity change. However, fertility level changes behave differently in shaping demography across regions and is more substantial in shaping demography. The population change explained by shifting fertility ranged from 2.8% to 27.9% across continents, with Europe and America experiencing positive fertility change and the rest of the world a declining fertility. However, at the time of writing this paper, there was no evidence for an explanation of this behavior.

From the charts showing the dynamic of the 3 estimates in Appendix 1, it is clear that Africa and the world share curves with similar shapes, while other continents take on different forms. Once again it shows that Africa is the key driver of world demography in the future. Migration rate, however, while not being significant in percentage for Africa, contributes largely to demographic change in immigrant receiving continents with smaller relative population like Europe and North America. As shown in the above table North America will have 41.4% less population without any immigrants.

Population Gain under assumptions						
REGION	Constant Fertility (2050)	Constant Mortality (2050)	Zero Migration (2050)	Constant Fertility (2100)	Constant Mortality (2100)	Zero Migration (2100)
WORLD	11.8%	-6.4%	N/A	131.6%	-23.4%	N/A
AFRICA	27.9%	-8.5%	1.0%	260.1%	-30.7%	1.5%
ASIA	7.8%	-5.9%	1.2%	63.0%	-20.6%	2.9%
EUROPE	-2.8%	-5.3%	-6.2%	-13.2%	-12.7%	-18.2%
NORTHERN AMERICA	-0.6%	-4.2%	-15.2%	-3.3%	-11.0%	-41.4%
LATIN AMERICA AND THE CARIBBEAN	8.1%	-5.1%	1.9%	46.3%	-17.8%	4.2%
OCEANIA	7.3%	-4.0%	-14.9%	49.5%	-13.2%	-36.5%

Table 4: Population Gain under Assumptions (UNDP data, 2015)

**3.2.2. Population Growth in the Five Continents**

North America is expected to grow and have a population of 433 million and 500 million in 2050 and 2100 respectively. Mortality explains a large part of the population growth as fertility is assumed to change only slightly. It is notable that North America is expected to experience minimal increase in fertility along with Europe. However, migration plays the biggest role among the three factors as more than 40% of estimated 2100 population will vanish under the zero immigrant assumption.

Europe is expected to shrink and have a population of 706 million and 645 million in 2050 and 2100 respectively. Similar to North America, fertility is expected to increase but contribute only slightly to population growth, whereas longevity will explain more population growth than fertility. Migration will explain similar amount of population in 2050 and become the largest factor for population estimate in 2100 and accounts for 18% of population.

Asia is expected to grow until 2059 and have an estimated population of 5.2 billion and 4.8 billion in 2050 and 2100 respectively. While the population will shrink, Asia will remain the most populated continent and represent 43% of the world population. Fertility decreases explain 8% and 63% of the estimated 2050 and 2100 population of the continent. Migration is insignificant for Asia as the expected outflow will be at 1% and less than 3% in 2050 and 2100.

Latin America is expected to grow until 2061 and have an estimated population of 792 million and 721 million of people in 2050 and 2100 respectively. Like in Asia, a drop in fertility will explain more of the future population than longevity. Emigration will explain 4% of population in Latin America in 2100 but it is relatively insignificant as the impact pales compared to 46% and 17% explanatory power from fertility and mortality change.

Africa is expected to grow throughout the century and have a population of 2.4 billion and 4.4 billion in 2050 and 2100. It will account for 25% and 39% of the world population in 2050 and 2100. It will be one of the only growing continents with North America after the 2060s. The decrease in fertility explains most of the future African population where 2100 population is estimated to be 260% higher in case there is no fertility change. Migration is insignificant for the African population size with only 1% and 1.5% impact on 2050 and 2100 population.

#### **4. Impacts of an Ageing and Growing Population**

The shift in the age structure of the population and the resulting change in the dependency rate have severe impacts in various fields. At first, it seemed that only the developed countries are affected by the ageing population problem. Africa's high fertility rate implies a continuing growth of the work force. Its proportion of aged people above 65 will stay at around 15% for the next 20 years. However, towards 2100, when the fertility rate of developing countries will have been low for a while and Africa's proportion of older people will have tripled, they will be equally afflicted by this concern. In brief, evidence shows that in 2100 the same amount of today's working people need to support more than twice as many people aged 65 and above than they have to today. This has strong implications on a global scale. On top of that, the growth of global population also sets its challenges.

It is of interest to understand how nations with aged populations will keep up economic growth and productivity, pension promises, financial strength, healthcare systems, social stability and

environmental sustainability. Therefore, this paper will make use of a framework similar to the PESTEL-analysis in order to interpret the different impacts of the change in age structure. This analysis is not meant to be exhaustive as the complexity of the far reaching ramifications go beyond the scope of this paper. However, some of the most important ones are discussed below.

#### 4.1. Economic Considerations

The rising ratio of working-age to retired individuals puts more and more pressure on the workforce as the proportion people aged 65 and more keeps growing. It is responsible for providing enough financial, medical, and social support for the old through keeping productivity, economic growth and GDP high. This lack of manpower not only slows down economic growth, but also has dramatic consequences for the future fiscal viability of pension, health, and social insurance systems. It will influence the age of retirement, the tax system and saving behavior, according to the US National Research Council. All nations have to find a solution to this rising burden on the working-age people, some earlier than others.

A social security and pension reform will be essential because otherwise “the contribution rate necessary to balance the budget of our public pension systems would have to grow proportionally to the ratio of pensioners to workers, roughly in line with the old-age dependency ratio” (Börsch-Supan and Chiappori, 1991, p. 108.).

The great costs of an unreformed pension system will greatly influence the overall budget. States might even risk an economic crisis due to the fact that they will have to increase the part of GDP spent on social security and pension. This lack in funding cannot be resolved by higher taxes, since a tax increase of 25-40% would be necessary to guarantee promised pension benefits (Kinsella and Phillips, 2005).

There are further consequences on economic growth, business profits, investment behavior, consumer spending and more, but they will not be analyzed in this paper for reasons of complexity.

#### 4.2. Education

Education is a key element in changing future demographic developments. An educated population will determine the evolution of many other indicators, which will, in turn, influence the population dynamics in the future. For example, evidence shows that there is a correlation between the level of education and the number of children per woman (Hirschman, 1994). Thus, high fertility rates could be curtailed by promoting education for girls in poor regions. Better education would also benefit economic productivity, since the economy can benefit from the knowledge of a better-educated workforce. In this case, there is a correlation between

education and economic growth and productive potential (Eberstadt, 2010). Furthermore, as Eberstadt (2010) states it: “Better-educated workers tend to be not only more productive but also healthier and better placed to lead longer working lives” (p.64).

The school life expectancy rate more or less shows both connections: the higher the number of school years is, the lower the fertility rate and the richer the country.

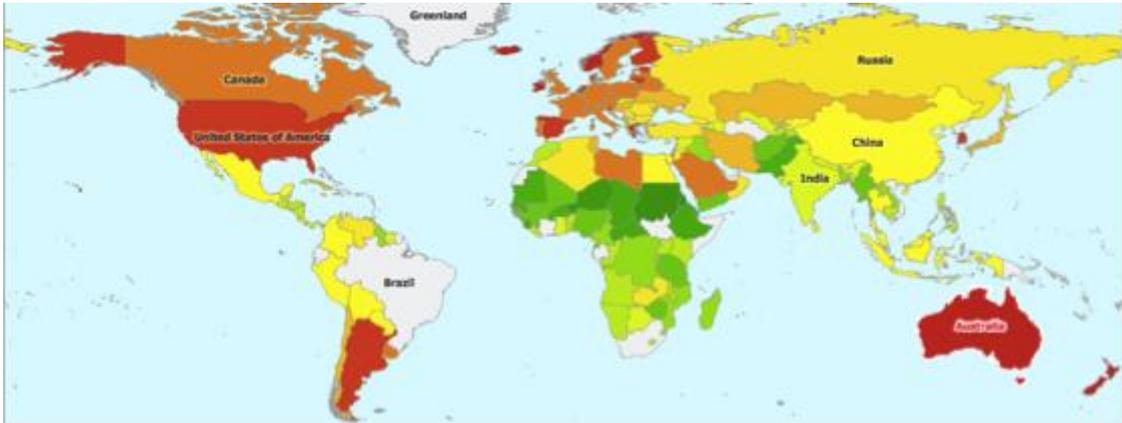


Figure 7: Years of Education

(with red equal a high number of school years and green a low number of school years)

### 4.3. Environmental Challenges

Climate change is an alarming issue. The USA, China, Russia, India, and Japan are the countries with the highest emission and pollution rates (World by Map). Although they account for almost half of the world population, their emission rates will not increase considerably because their populations are not expected to grow exceedingly until 2100 (World by Map). The biggest growth will take place in Africa. Thus, one might think: more humans mean more required resources, more production, more consumption, more emission. However, as Cleland states it: “In the next few decades the contribution of human population growth to global environmental change is moderate, because nearly all growth will occur in poor countries where consumption and emission of greenhouse gases is low” (Cleland, 2013: p. 543).

Population growth has a much greater impact on food production and water consumption. The depletion of natural resources, including the loss of bio-diversity and natural habitats, is one result.

### 4.4. Healthcare

In addition to the growing proportion of elderly people, the old people within that group actually grow even older as longevity is increasing continually. According to Hong (2013), “[however], living longer does not necessarily mean having a better or healthier life. With advancing age of the population, the prevalence of age-related diseases tends to increase dramatically” (p. 1). States will have to adapt their health policies if they want to be capable of counteracting

morbidity and providing adequate health support for the affected individuals. Extra staff, funding, infrastructures such as hospitals and more medical research are needed to meet those needs.

#### 4.5. Social aspects

The change in the age structure entails a change in family size and structure, which in turn affects social and economic behavior. When people live longer but have fewer children, then they have fewer future caregivers they previously could have relied on for their pension. Not only will older people be exposed to poverty, but they will generally be more likely to end up alone or bond with other adults (Kinsella and Phillips,2005).

Another assumption is that because of the shrinking workforce, individuals will have to work more and their retirement age will have to go up. The adapted labor laws and pension policies imply a change in the work/life balance.

A very important consequence of all the changes mentioned in this chapter is the rising risk of conflict. Whether internal (political disputes about pension reform, labour policies, foreign workers etc.) or international (intensified inequalities among nations, migration, economic crisis etc.), there is apparent tension linked to the unresolved problem of ageing population and population growth per se. Moreover, a new, permanent separation could arise, similar to the North/South confrontation seen in many national and international conflicts: the young versus the old. Young population areas are predicted to have higher economic growth than areas with a high proportion of old people. This fact might structure future conflicts (Peterson, 1999).

#### 4.6. Migration

Disparities in prosperity and economic perspectives will increasingly motivate large migration movements from poor towards the more wealthy areas. This could play into the hands of the wealthier governments because of the labor shortage in the developed regions. Young migrants are additional workforce and desperately needed by the over-aged population of wealthy regions, whose working-age class is too small.

#### 4.7. Governmental Approaches

Governments all around the world have to understand the magnitude, as well as the future trends of the ageing population problem and act accordingly. "The overall implications of population growth for policy lie in the imperative for investments in health and education, and for sound policies related to labor, trade and retirement" (Bloom and Canning, 2006: p.3). Only if governments acknowledge the dimension of the problem and adapt their policies accordingly, will the system be able to cope with the coming changes and survive them. These changes in governance will not come easily and might also be a source of multi-level conflict. For example, "[t]ransforming a youthful population into a productive workforce requires investment in

education at all levels, while a larger, better-educated workforce will yield benefits only if they can find jobs. In many countries, necessary steps to reaping the benefits of the demographic dividend include strengthening the rule of law, improving the efficiency of government and reducing corruption” (Bloom and Canning, 2003: p. 18).

## 5. Conclusion

The aim of this paper was to provide an overview of the main population dynamics in the past, nowadays, and in the future. It was shown that demographic parameters behave differently from continent to continent, but that there are some converging trends. Firstly, the mortality rate has declined and will continue to do so in the future. Secondly, the fertility rate will eventually settle down at a global level of only slightly below replacement level at 1.99 in 2100. It is important to note, however, that the African fertility rate will continue to stay at a high level of between 3 and 4 until mid-century before declining. Thirdly, further migration movements from developing to developed regions will influence the coming demographic evolution.

These trends procure two crucial demographic developments: an ageing and growing world population. The age dependency ratio will change drastically, inducing an enormous pressure on the shrinking workforce to support the growing number of people aged 65 and over. The degree of this shift in age structure is more intense in most of the continents except for Africa, where it is less apparent and delayed. Moreover, UN projections demonstrate that the driving force of the population growth will be Sub-Saharan Africa and Asia. Although the latter disposes of a declining fertility rate compared to Africa, its population is huge already, and a low fertility rate nevertheless will contribute to a growth.

The implications of such transitions are manifold. The most notable ones are the labor shortage to guarantee economic growth, the financial challenges of keeping current pension systems upright, the political disputes over changing the pension and social security policies, changes in social behavior and structure, increased environmental burdens, poverty and the need to improve access to education.

In order to cope with all those ramifications, governments will have to put finding a solution to global ageing and population growth to the top of their priority list. As evidence shows, education has a positive influence on all negative implications of an ageing population. The government's' focus should therefore lie on supporting and funding education improvements.

One of the difficulties of writing this paper was that most of our findings are based on projections, which vary, sometimes greatly, depending on how certain variables are used. Drawing reliable inference is difficult. Furthermore, the fragmented and inconsistent information about the impacts of the population growth and ageing population compound the difficulties in drawing reasonable conclusions. Further research on specific topics analyzing different impact scenarios would be interesting. Another barrier to an accurate analysis was the disparities among countries within same continent. A generalization of behavior is very difficult. Therefore, a profound analysis of the sub-region development could give interesting findings.

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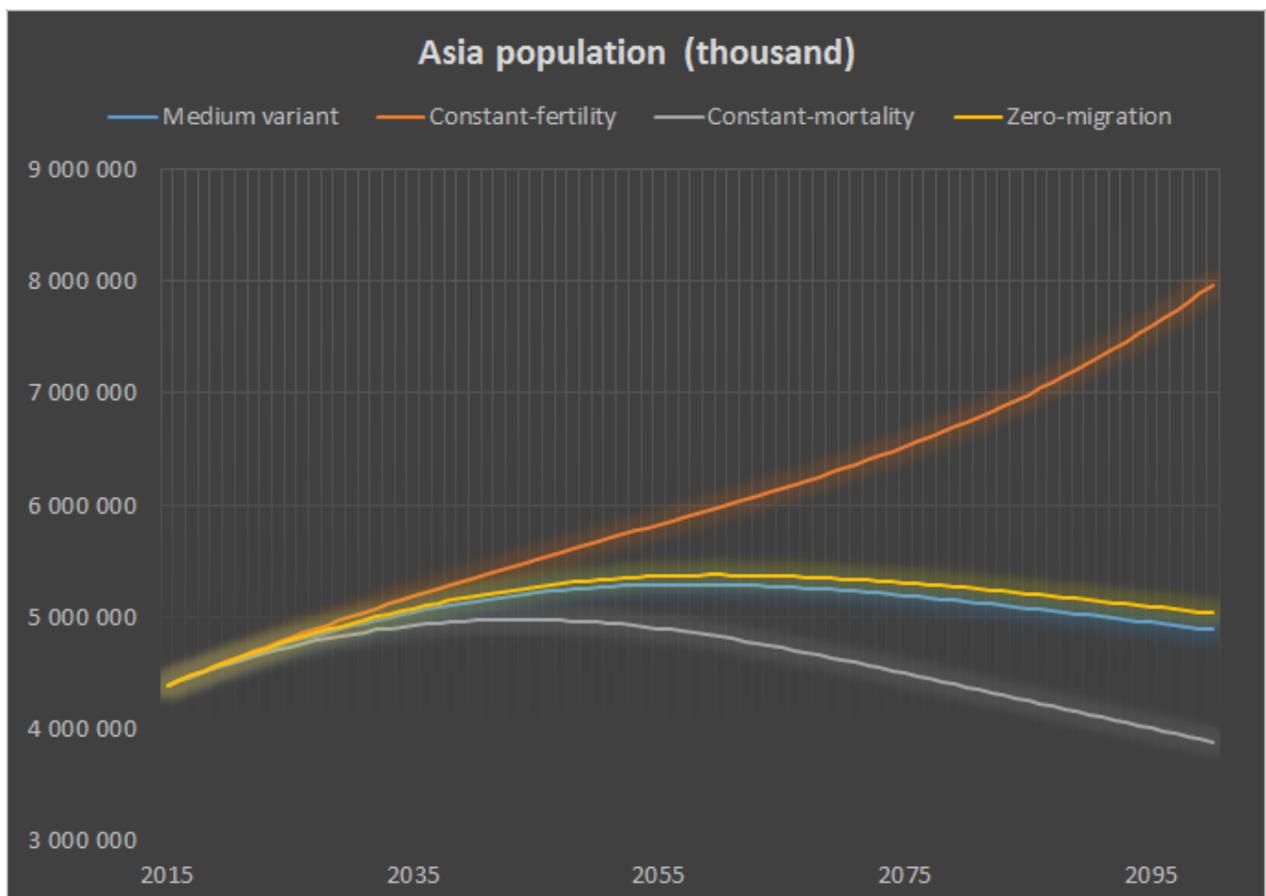
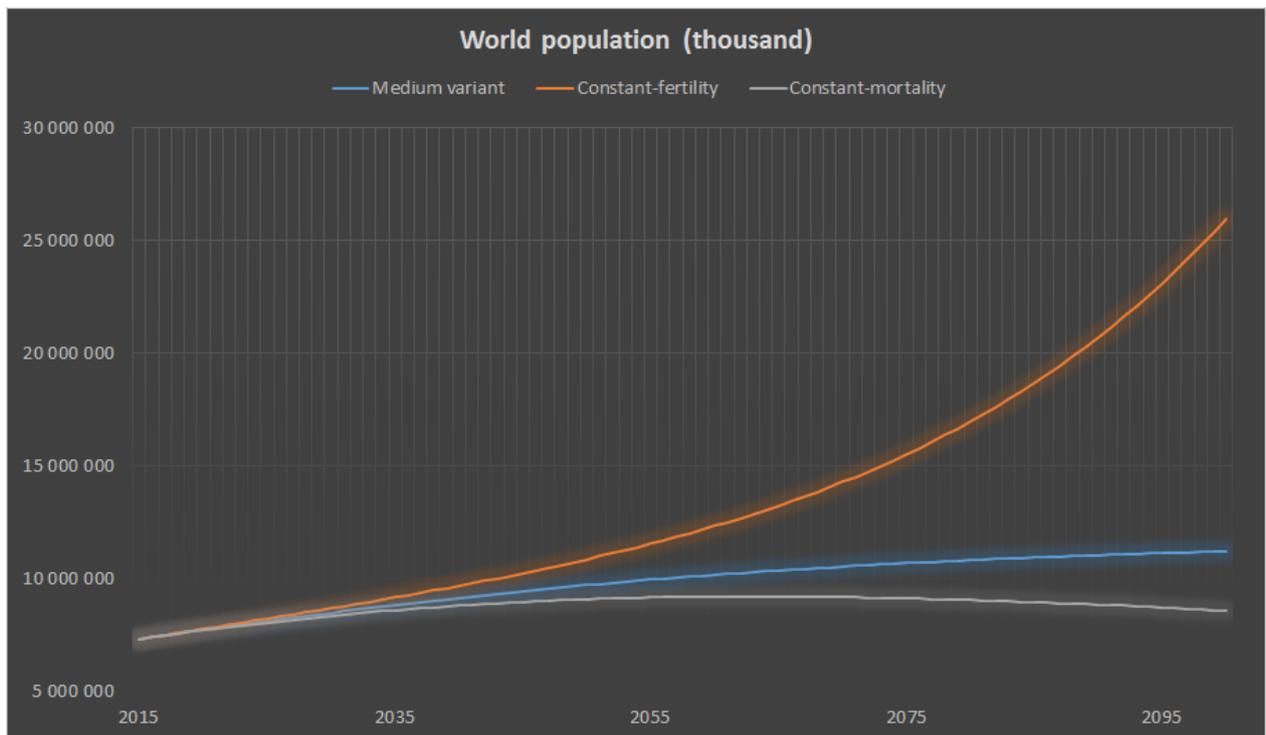
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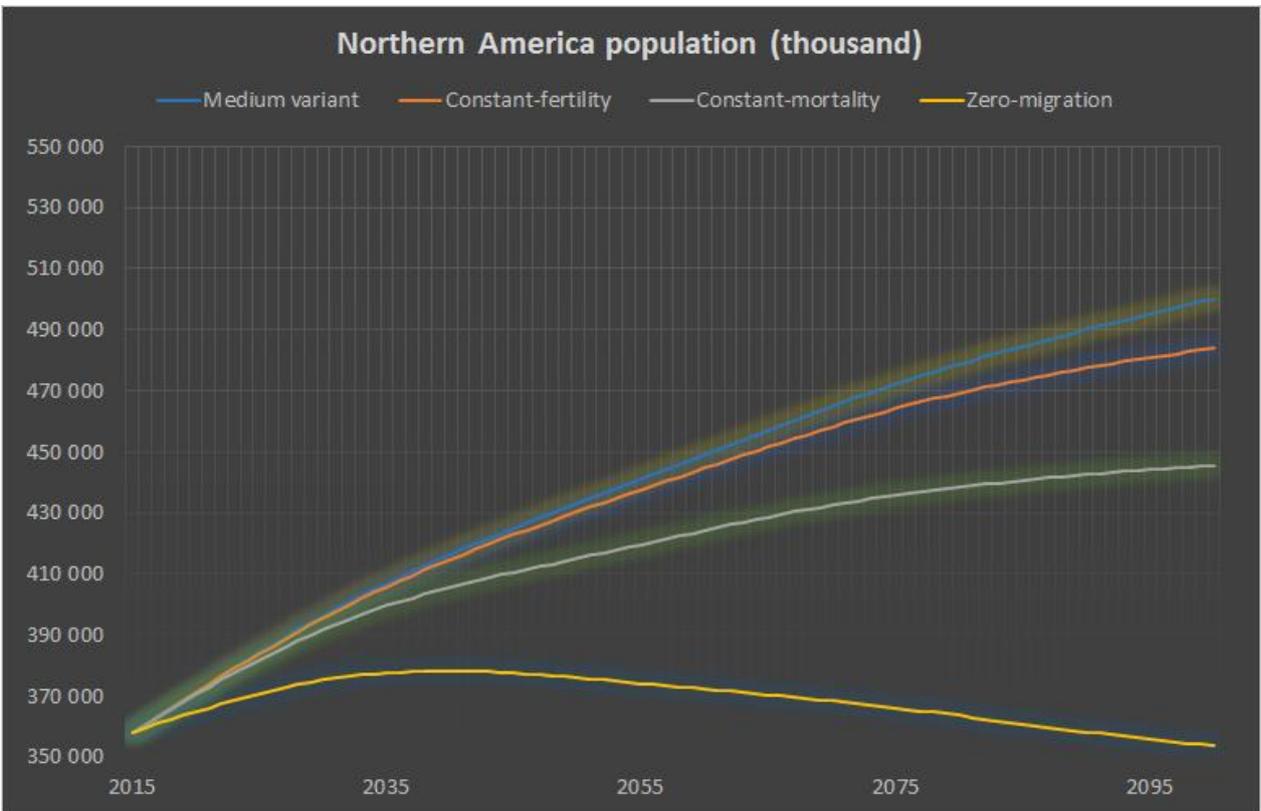
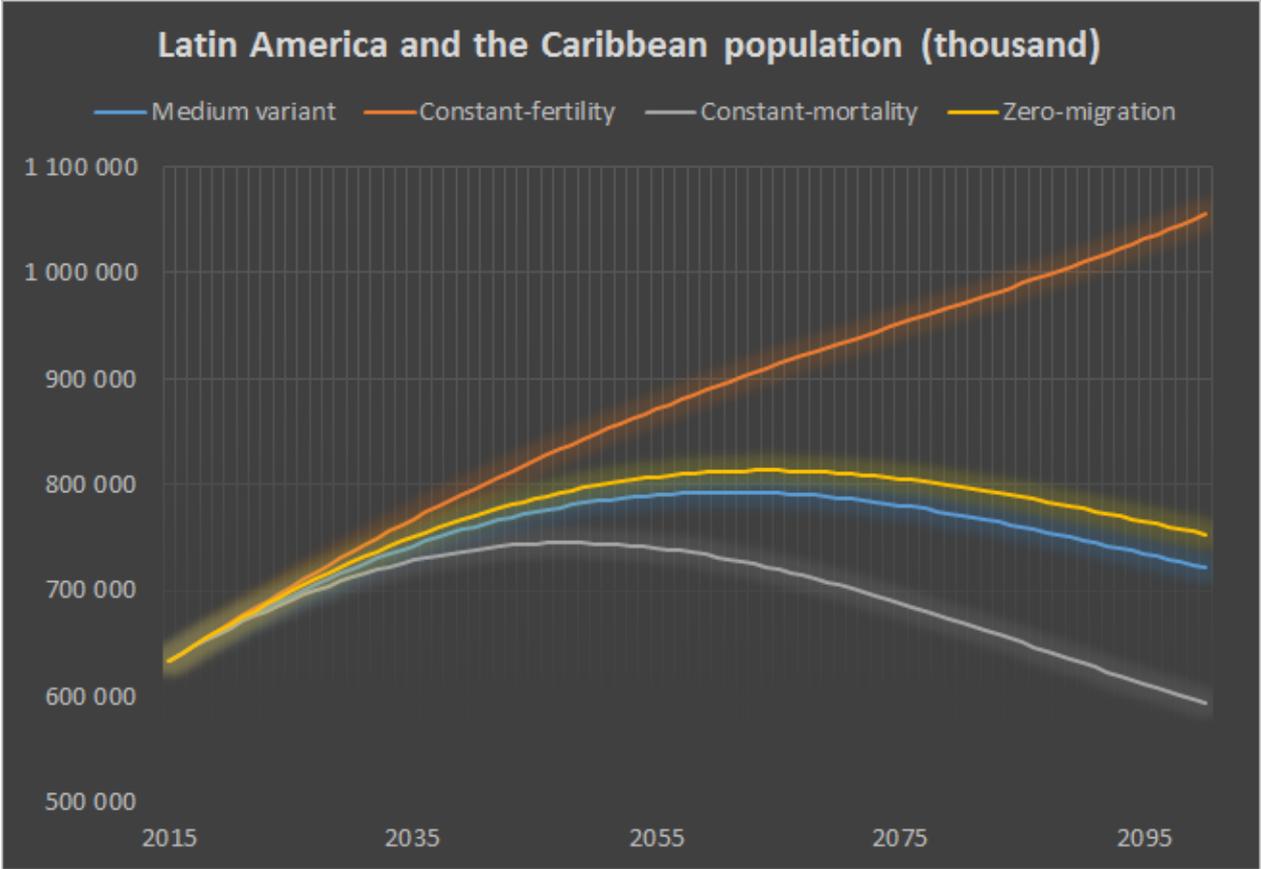
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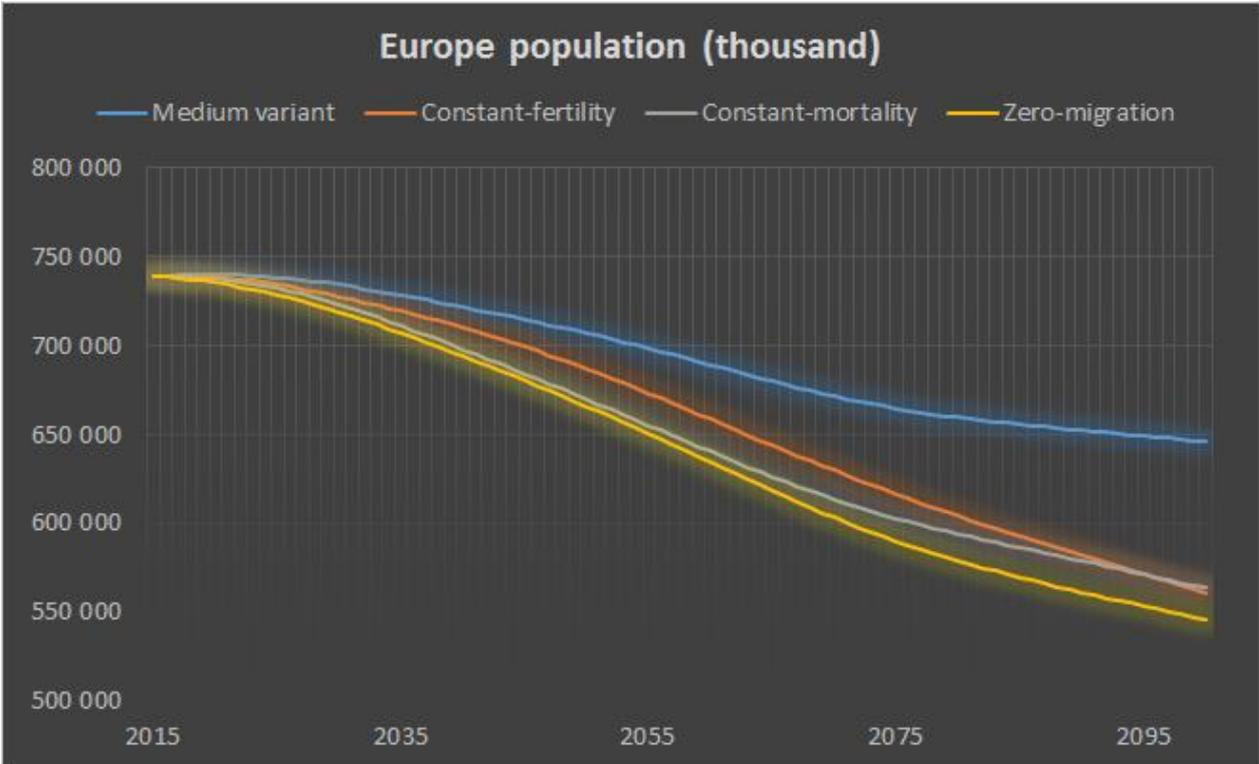
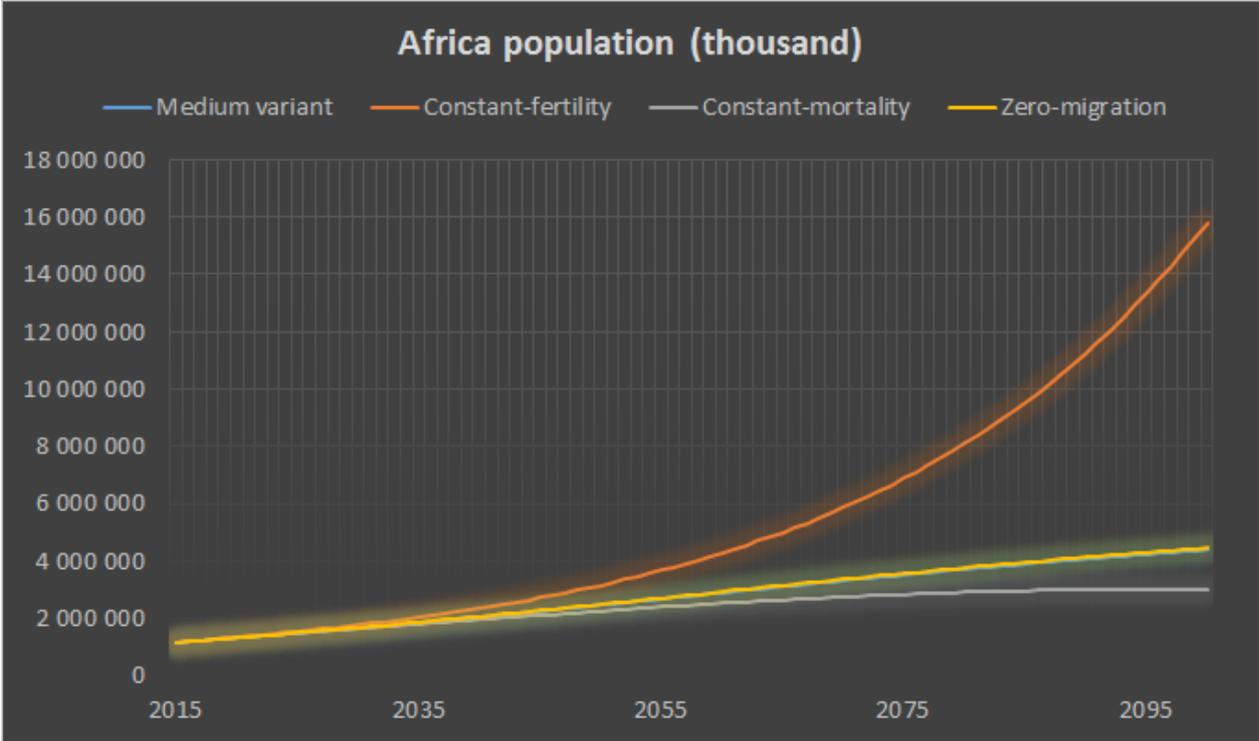
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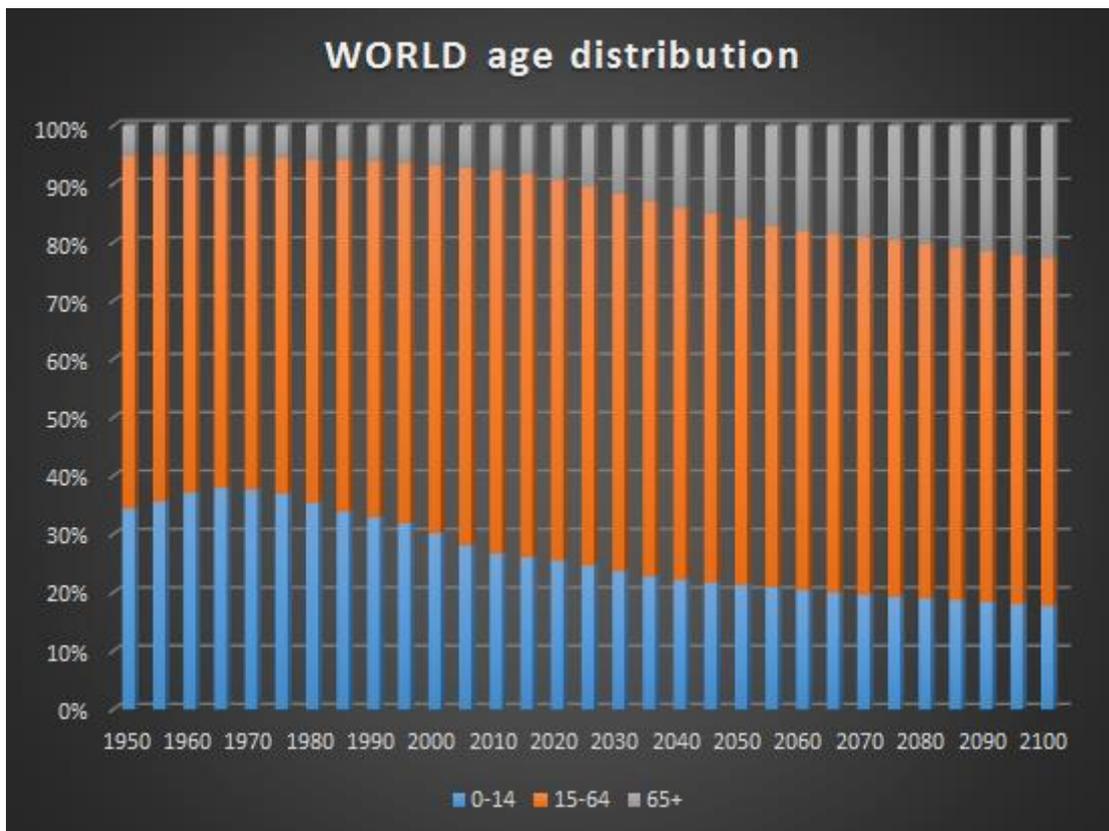
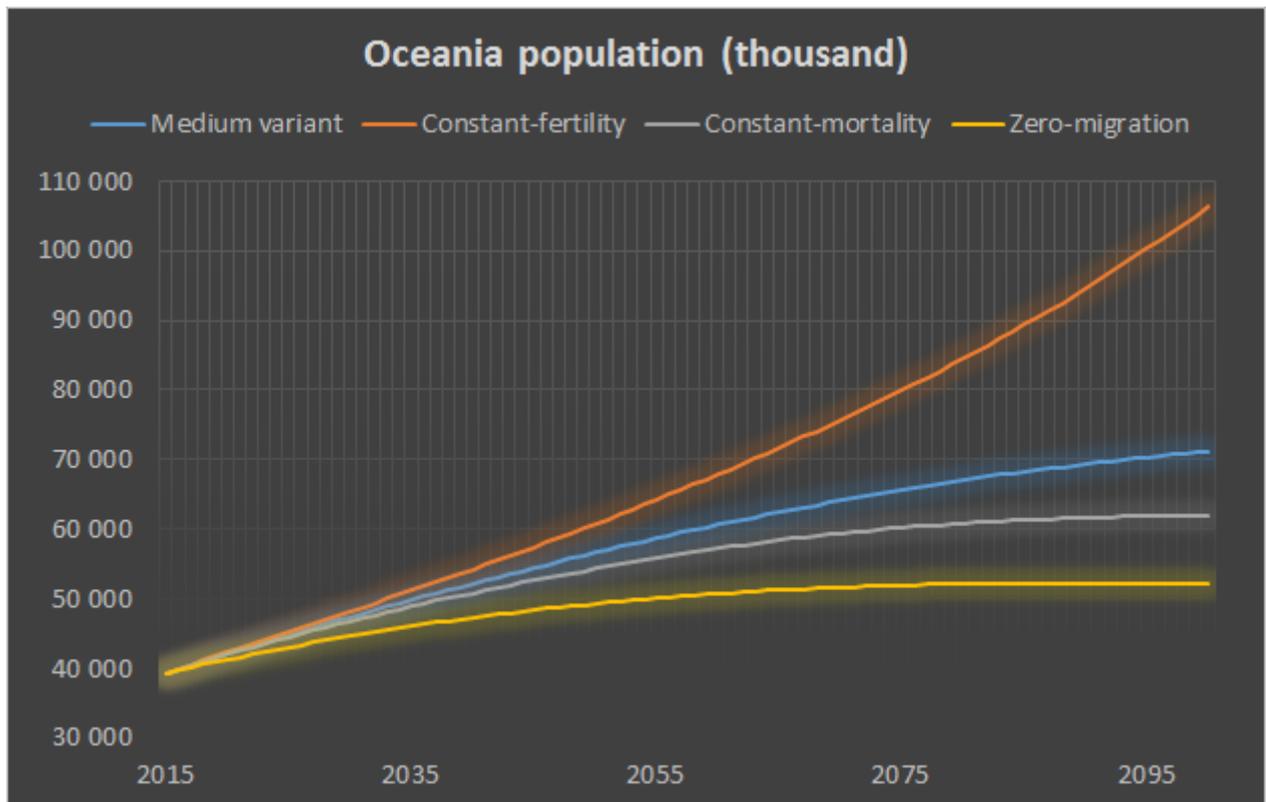
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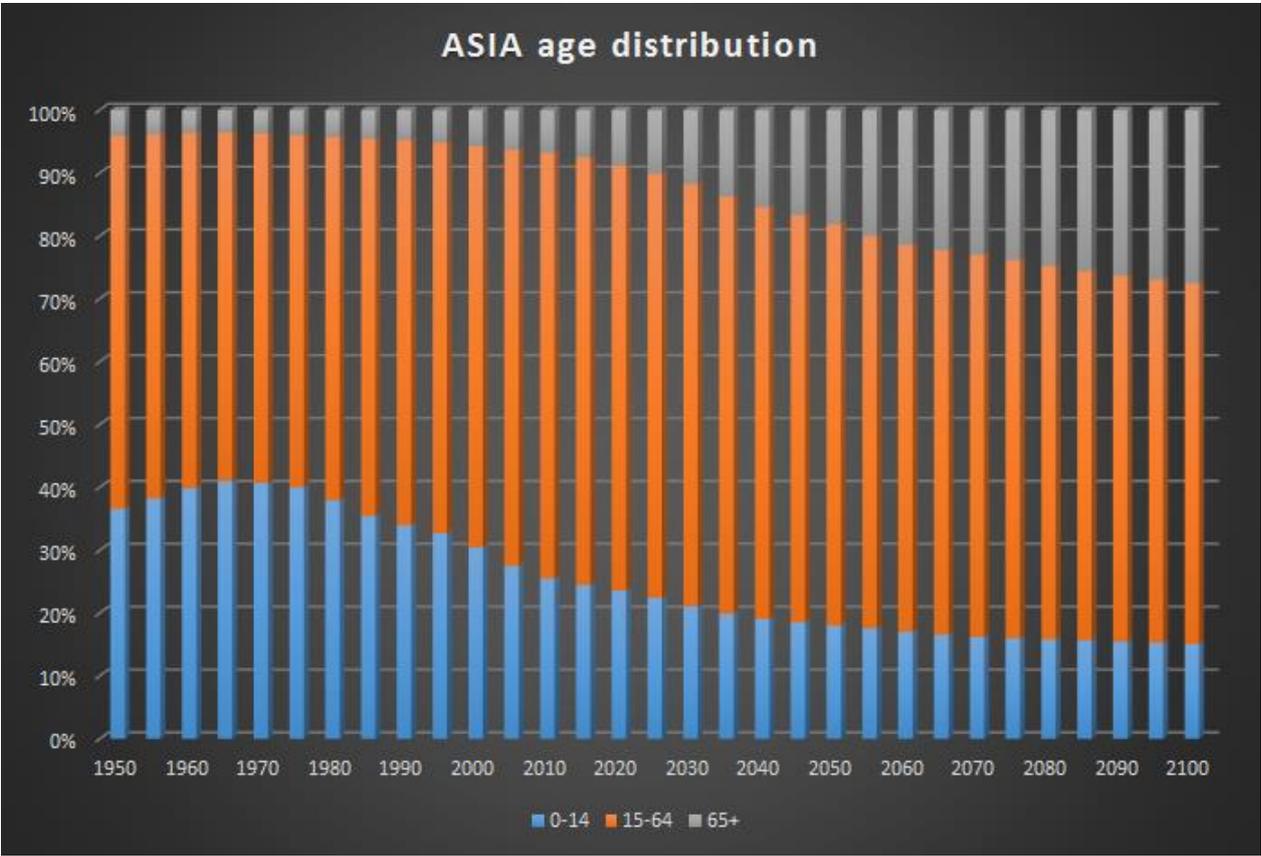
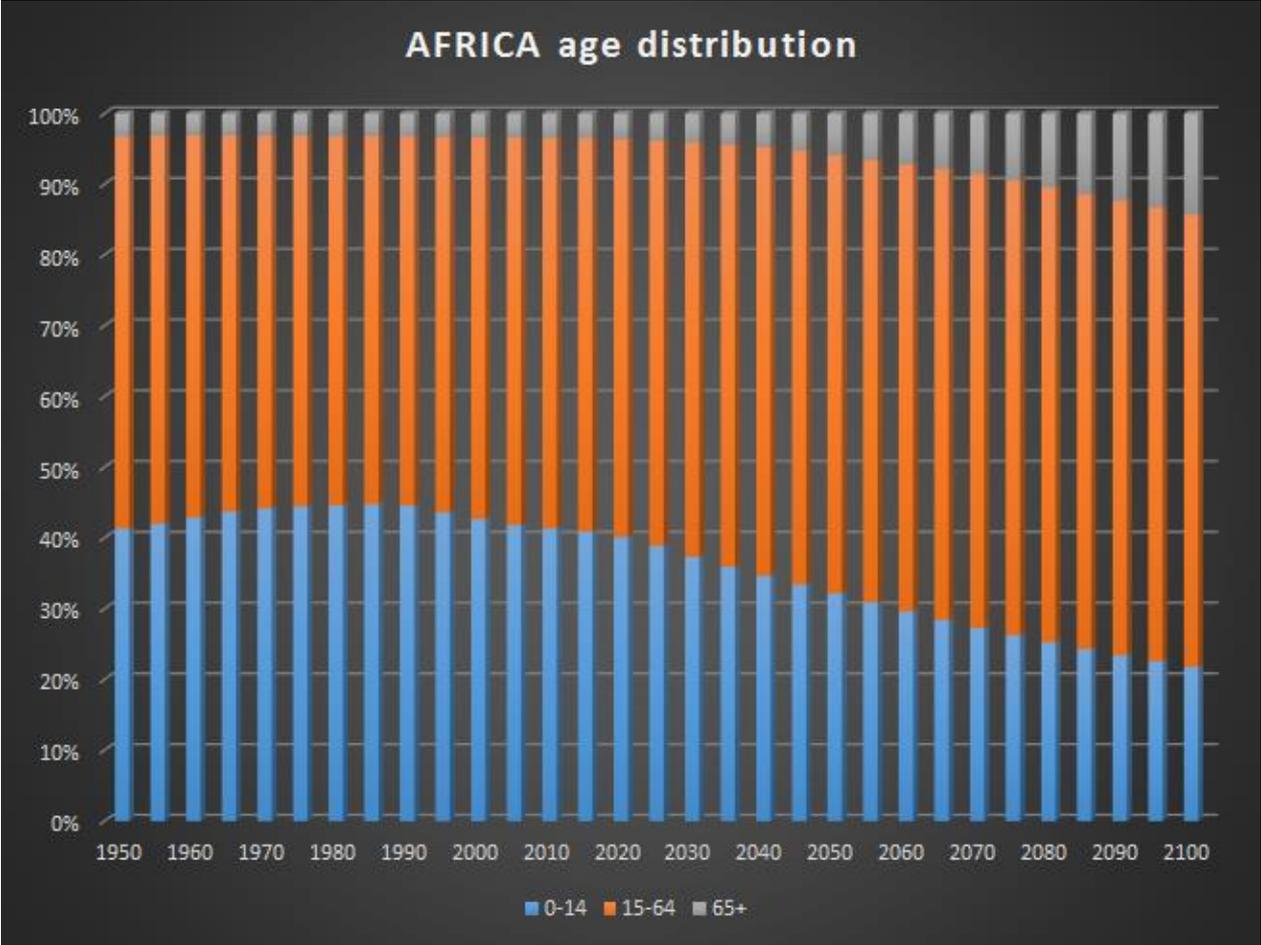
## 7. Appendix

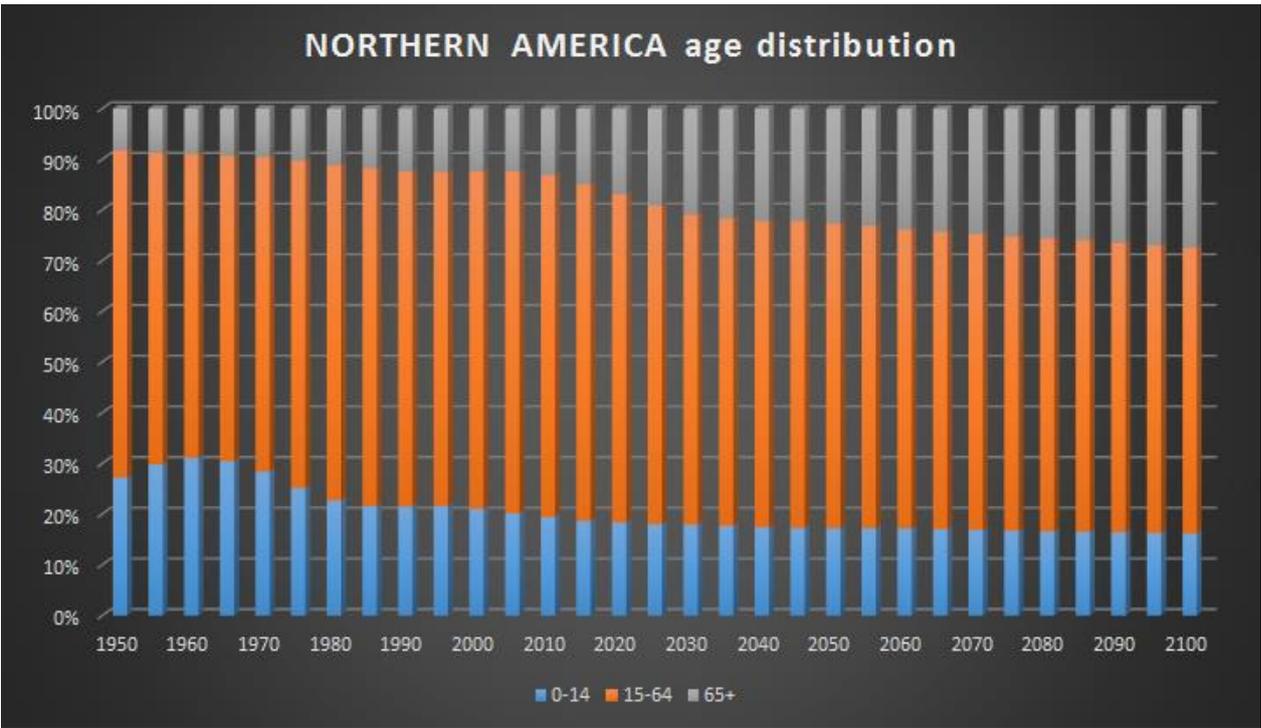
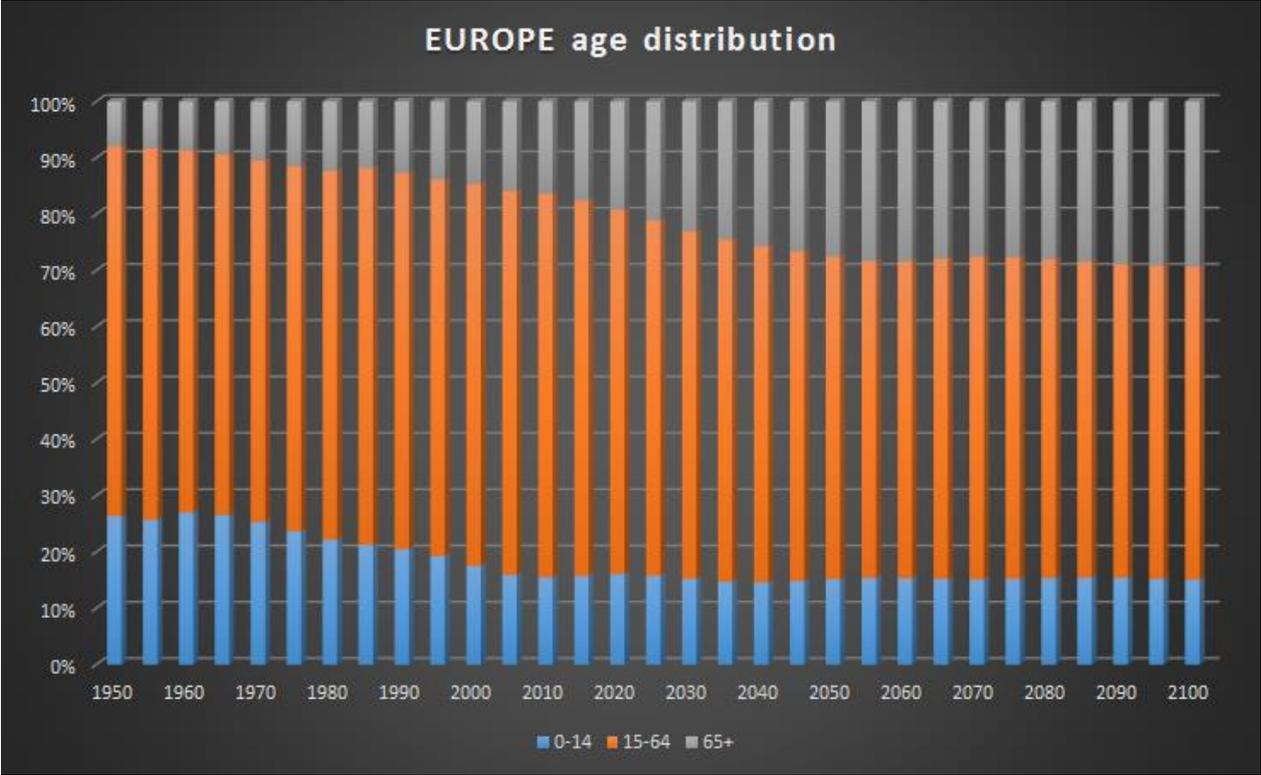


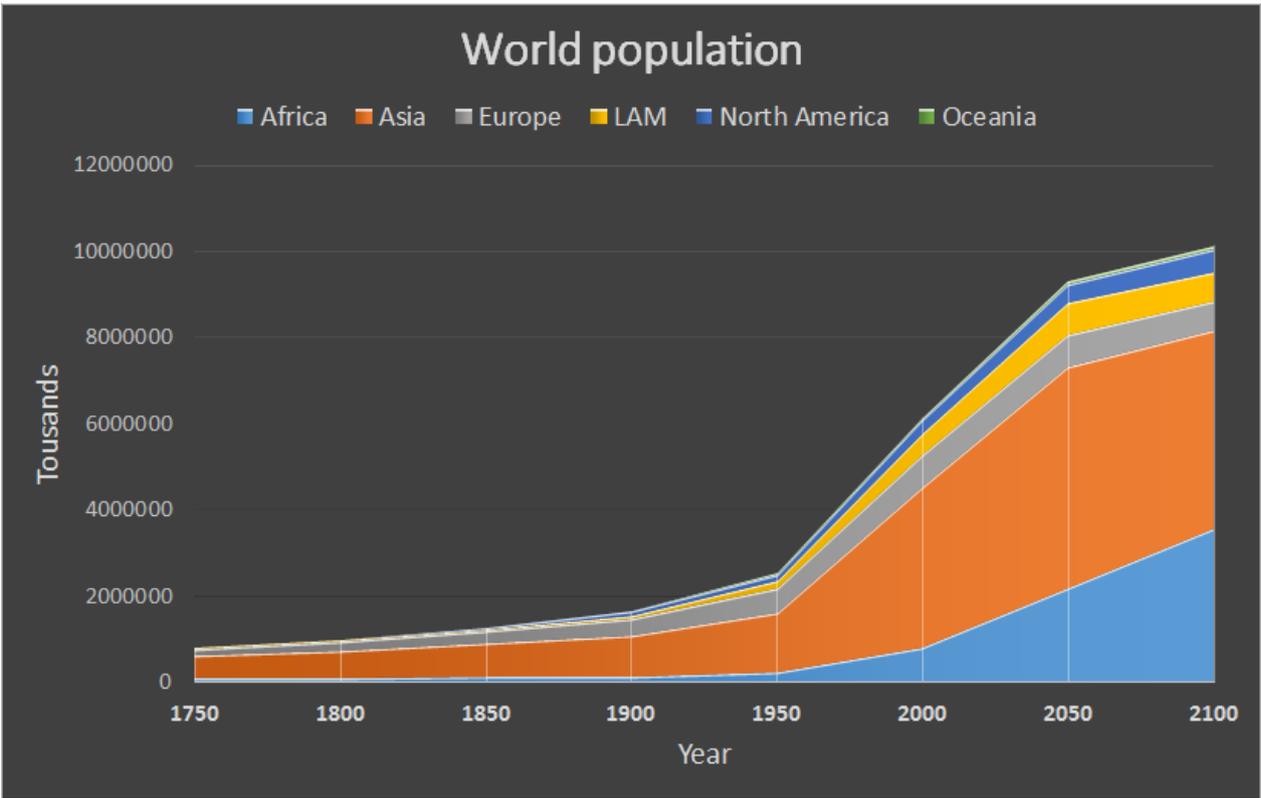
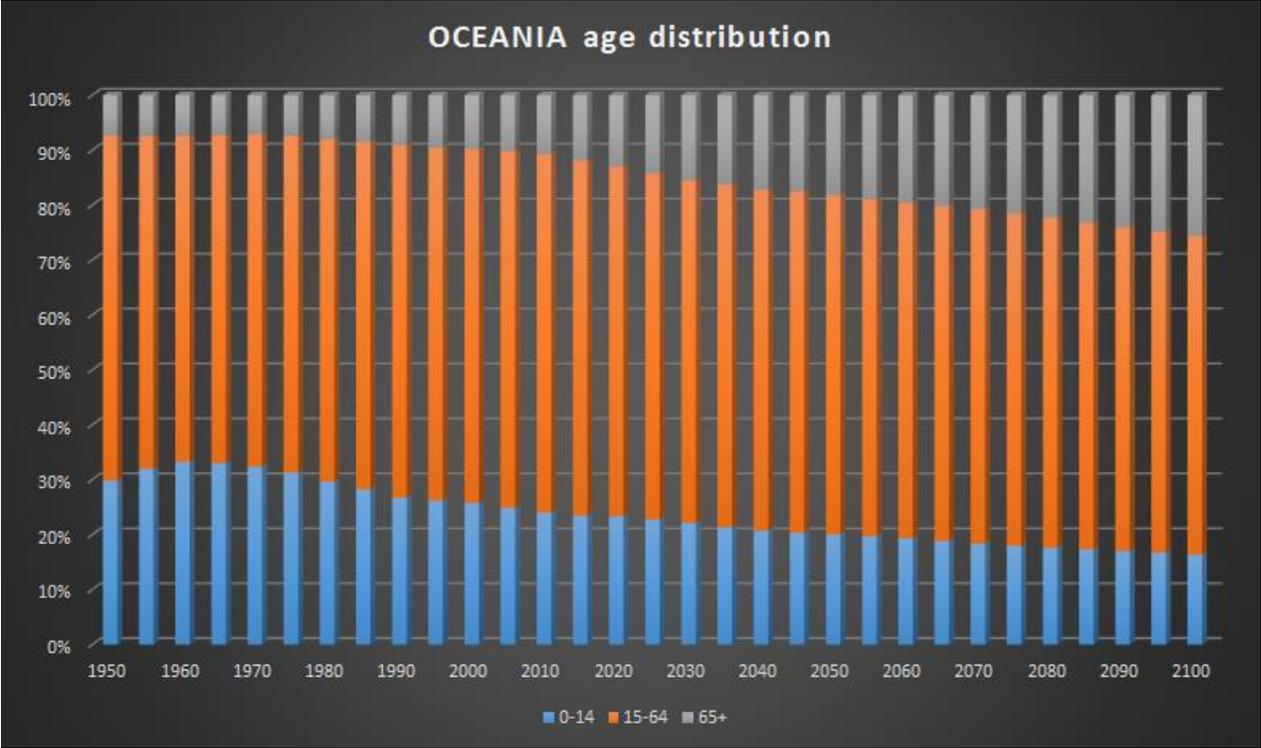


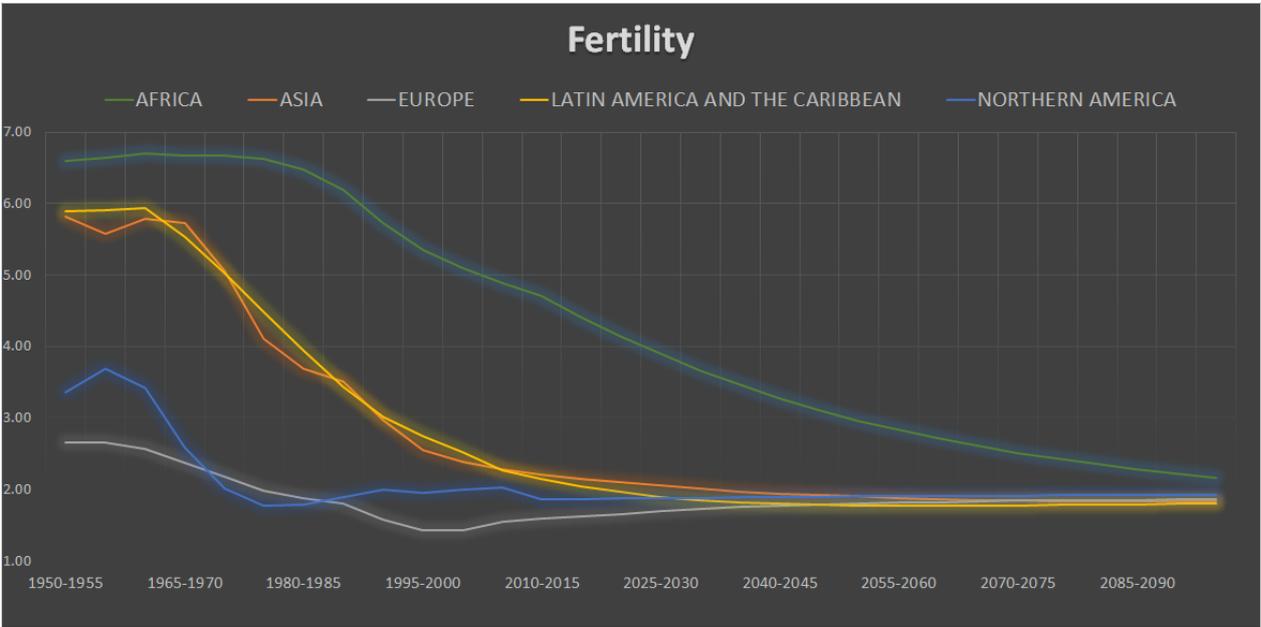
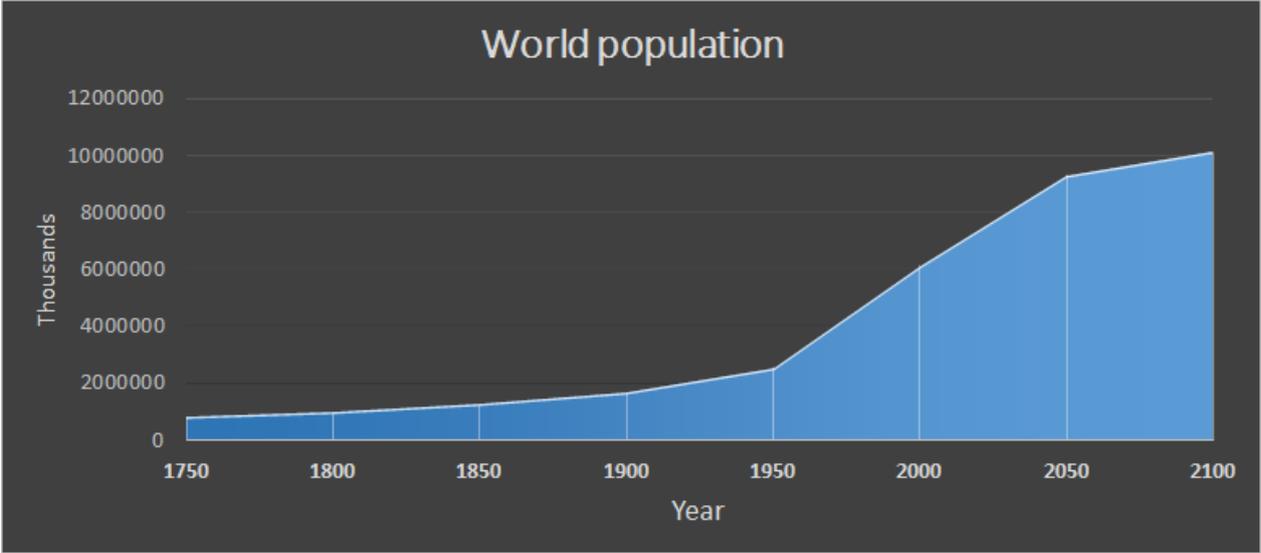


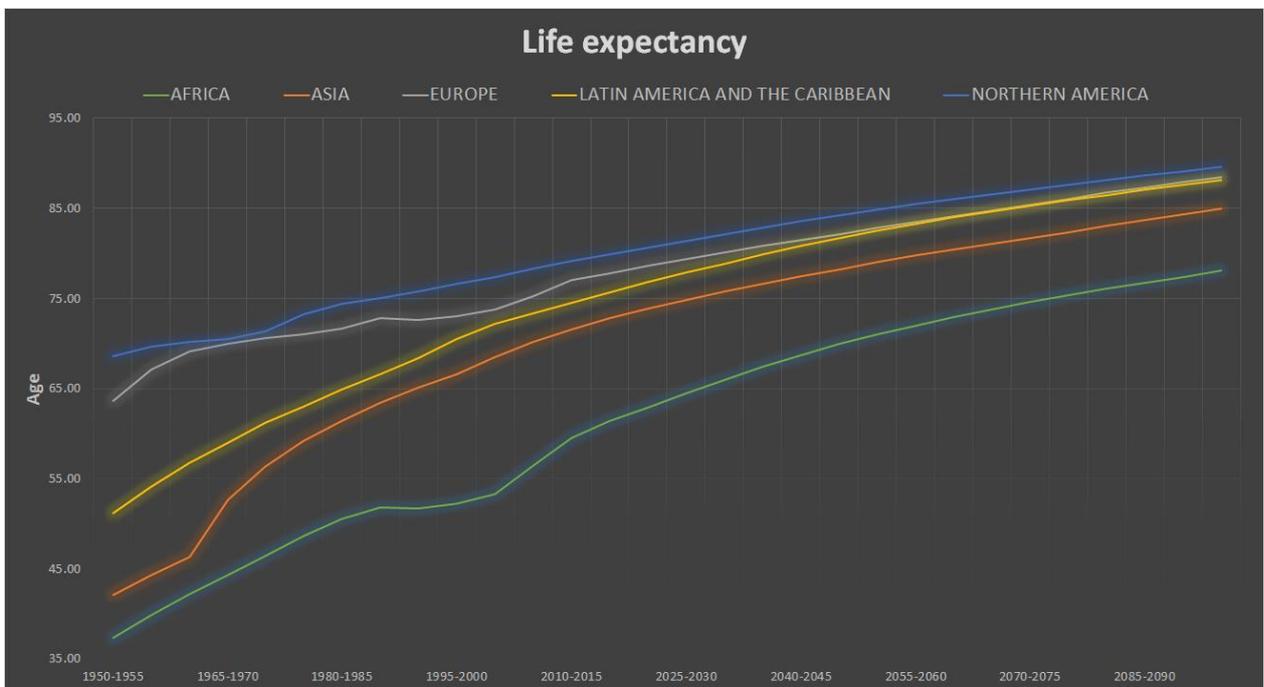
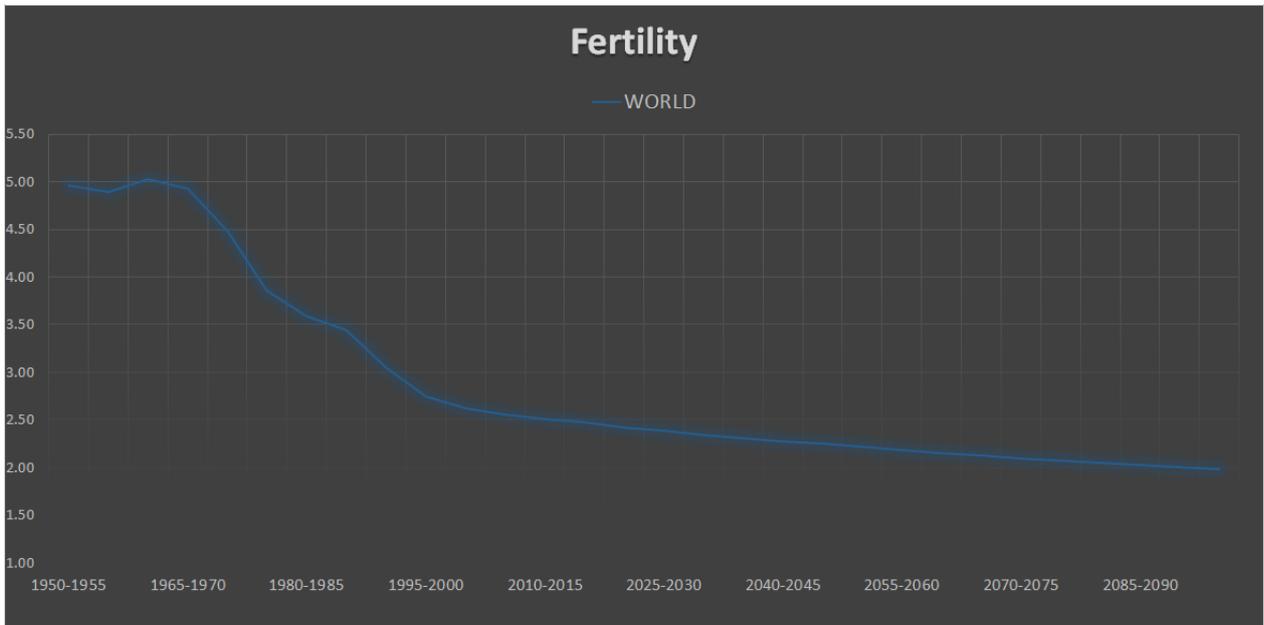




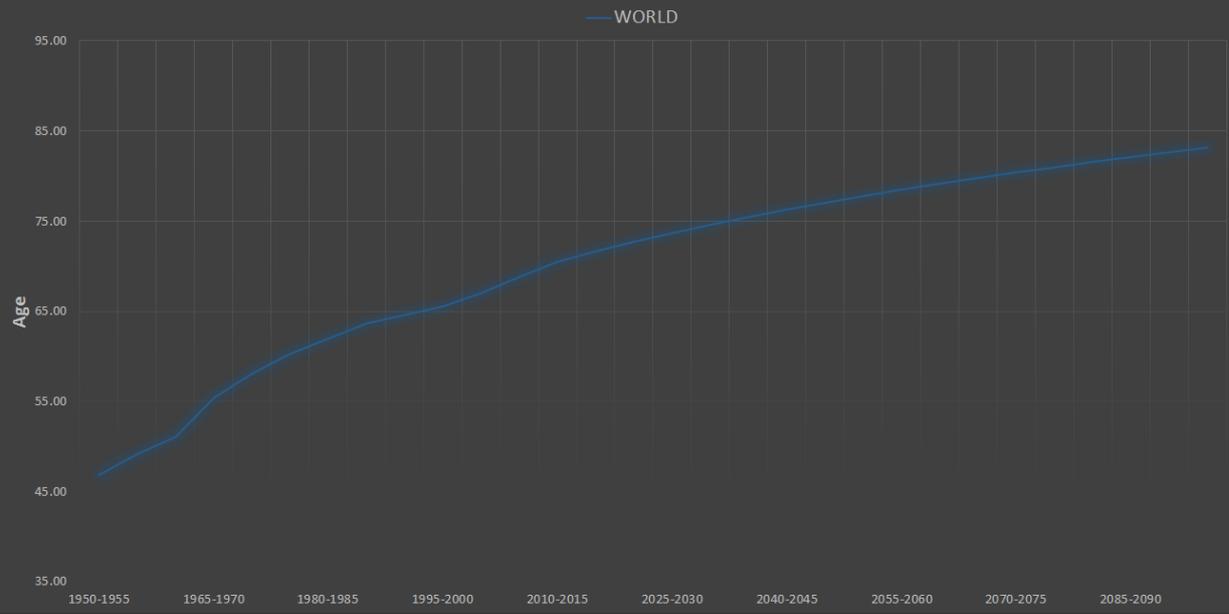








# Life expectancy



## I. Flying low – Managing elderly income in a world devoid of risk-free returns

*by Mitch Kabel, Louis Lenoir, and Lars von der Burg*

Since the Global Financial Crisis of 2008, many economies in the industrialized world have experienced persistently low interest rates. This development affects the wealth generation and capital preservation capabilities of the elderly population, both directly and indirectly. Can wealth be generated while “flying low”? Those owning financial assets experience greater difficulty generating sufficient low-risk returns to finance their livelihood without diminishing their wealth. Public, semi-public, and private pension schemes, on which a substantial fraction of the elderly population depends, can experience either net positive or net negative effects from the current low interest rate environment. The dynamics and interactions of these effects are explored in the present paper. Our findings are threefold: Firstly, we argue that the current low interest rate environment will resolve into a more sustainable environment in the medium term, turning real interest rates positive again and effecting better wealth generation opportunities through low-risk strategies. Secondly, for those retirees owning substantial wealth, sufficient income payments can be secured at a minimum amount of risk through two types of investments: investing the funds in a portfolio of rental property or a portfolio of highly defensive dividend shares, thereby sufficiently diversifying the holdings to minimize risks. Thirdly, our assessment of possible government action to ease the financial burden of the elderly population suggests that the money saved through decreased public debt interest burdens could be employed to (a) increase the sustainability of capital method public pension and health insurance schemes, (b) support the private sector’s defined-benefit pension plans, which suffer severely from the low interest rate environment, and (c) support the wealth generation of those elderly owning financial assets through direct subsidies. Political feasibility and social sustainability considerations for each of these measures may limit their applicability in different countries.

From the findings it is concluded that wealth generation while “flying low” is possible. However, it comes down to a cooperation of governmental and individual forces to discover possibilities to equate the burden of low interest rates and to work together on a more sustainable age financing system.

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## **1. Introduction**

Old-age financing has traditionally been rather straightforward: Throughout a person's work life, contributions to public, occupational, and private pension schemes are made, which gradually increase future retirement income entitlements. After retirement, the retiree lives off these income streams. They are supplemented by income generated by personal investments made in earlier stages of life, or through capital depletion. However, demographic and economic shifts have put significant stress on such a financing strategy. To begin with, people in the Western world benefit from increasing life expectancy, implying that post-retirement income needs to suffice for more years and that the dependency ratio is increasing. Additionally, all Western countries face an aging society, putting governmental pay-as-you-go (PAYGO) old-age financing systems under pressure. Finally, risk-free investments have been experiencing continuously low returns due to near-zero interest rates. For this reason, current retirees are increasingly forced to "fly low" and thus move towards risk-taking investment strategies to meet their financing needs. It is therefore unsurprising that this topic has received increased attention in academia, policy-making, and the public.

As evidenced in the above discussion, old-age financing is based on a complex web of interactions between individuals and their respective governments. This paper will focus on retirees, defined as individuals aged 65 and above without full-time work, living in Western countries. The choice of Western countries has been made due to the richness of information sources, the relative cohesiveness in the usage of a "Three Pillar" system (defined in Section 2.3), and the greater impact of this "flying low" environment on the populations and political choices of those countries. Switzerland and the United States have been selected as examples to highlight similarities and differences within the Western world.

This paper is divided as follows: To begin with, the current economic, demographic, and political environment will be reviewed in Chapter 2. A detailed discussion about how retirees can personally secure income that is consistent with a risk-minimizing strategy follows in Chapter 3. On a more abstract level, Chapter 4 discusses the effect of the low interest rates on government policies. Additionally, initiatives a government could implement to assist retirees in securing an appropriate income during their final stages of life will be analyzed. To conclude, all previous findings will be synthesized and limitations of the approach chosen in this paper are touched upon in Chapter 5.

## **2. The economic environment and its link to old age livelihood**

To understand how “flying low” can work in the current global situation, a more elaborate understanding of the current economic environment is required. Specifically, it is of interest to understand how certain economic policies have developed over time and are expected to change in the future. Moreover, there needs to be an understanding of the necessity and reliance on governmental age-financing policies and the exact workings of these policies. It is these topics that will be further elaborated on in this part of the paper.

### **2.1. The current low interest rate environment**

Since the beginning of the Global Financial Crisis of 2008, most developed countries have experienced an environment of nominal interest rates close to zero, combined with relatively low inflation (Hamilton, Harris, Hatzius, & West, 2015). In order to better understand the implications such an environment has on investment decisions and wealth generation in general, nominal interest rates can be split into two components: the so-called real interest rate and the expected inflation at the beginning of the period for which the nominal interest rate was set (Fisher, 1930). It is important to note that inflation expectations cannot be measured directly, leading most researchers to use autoregressive models of actual inflation to estimate (forward-looking) inflation expectations (Hamilton et al., 2015, p. 4). The real interest rate is a core measure in macroeconomic theory and indicates the time value of money before accounting for investors’ expectations that the prices of goods will increase in the future (Mishkin, 1981; Mundell, 1963). Concentrating on the real interest rate provides a decent indication of the wealth generation that can be achieved by investing money in risk-free investments. For this purpose, however, one should substitute the expected inflation with the ex-post realized inflation to arrive at the realized real interest rate. From time-series analysis, it is apparent that there have been, historically speaking, multiple periods of negative real interest rates – periods when investing money lead to a diminishing of purchasing power over time (cf. Appendix A). In this sense the current low interest rate environment, which is also marked by negative real interest rates, is not unique<sup>23</sup>. Still, some economists have argued that we have entered an era of “secular stagnation” (Summers, 2014) – that is, low growth rates combined with low nominal interest rates and often negative real interest rates. Others suggest that the protracted occurrence of negative real interest rates over the past eight years is not indicative of a “new neutral” (Clarida, 2014), but rather in accordance with observations made after crises comparable to the 2008 Global Financial Crisis (Hamilton et al., 2015, p. 27; Reinhart & Rogoff, 2014). Among others, the aftermath of the dramatic housing supply surplus

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<sup>23</sup> Depending on the exact calculation mechanism, some organizations estimate the real interest rate to lie between 0% and 2% (e.g. U.S. Department of the Treasury, 2015; World Bank, 2015). This paper refers to the FOMC members’ estimates as given in Hamilton et al., 2015.

in the US, private sector deleveraging (Council of Economic Advisers, 2015), and the prolonged fiscal debt crisis in Europe are named as a major reasons contributing to a delay in the expected business cycle recovery in the US and Europe (Hamilton et al., 2015, pp. 27–28). In Europe, negative nominal interest rates have been introduced in some economic areas – a historically unprecedented monetary policy choice (Hannoun, 2015). This signifies that Europe will face even more headwinds than the United States on the path back to economic normalization.

Recently, the US Federal Reserve’s Federal Open Market Committee (FOMC) has announced that it expects to raise nominal interest rates in late 2015 (Board of Governors of the Federal Reserve System, 2015). It should be highlighted that this only implies that the real interest rates becomes less negative – leaving the low interest rate environment would require interest rates to be raised significantly above the respective inflation rate. Irrespective of the exact timing, many economists argue that the low interest rate environment will prevail for at least the near future (Clarida, 2015; Hamilton et al., 2015). Therefore, for the context of this study it can be assumed that the low interest rate environment remains in place. This allows for a discussion of this low interest rate environment on pensioners’ wealth generation efforts and public pension budgets.

## 2.2. Income and wealth distribution

Additional to the general economic environment, it is of interest to discover how income and wealth are distributed among the general and elderly population. Dependent on one’s financial situation, the low interest rate environment may or may not be felt directly. Additionally, the magnitude of the effect depends to a large extent on the nature of the assets owned.

Income distributions and demographics tend to be highly dependent on national factors. Therefore, there will be one specific focal country: the United States. As the United States has an extreme case of income disparity and because these data are documented very detailed, the country is seen as an appropriate example for this section.

### 2.2.1. *Income Distribution by Demographic group*

As demonstrated by Figure 1 below, there are vast wealth disparities amongst the different demographic groups in the United States. These disparities exist for multiple reasons. To begin with, because of their age, older generations have been able to accumulate more wealth during the span of their lifetime. However, additional to having had a longer time to accumulate wealth, the older generations were able to benefit from more positive economic conditions than those that exist today. One demographic group benefitting from this was the Silent generation (approximately 1923-1945) and the early Baby Boomers (1946-1964), allowing them to accumulate the most wealth.

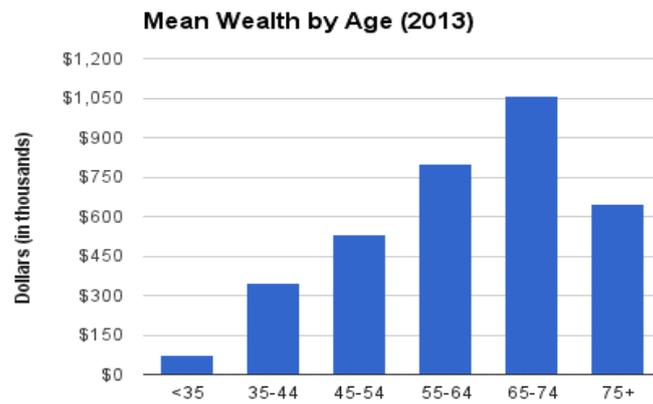


Figure 1: Mean Wealth by Age Group (Federal Reserve, 2014)

This difference in wealth accumulation, aside from lifetime wealth accumulation, can also be explained by three trends in the United States over the past 50 years. The first of these trends is wage stagnation. Wage growth has been significantly lower for the last 20 years than it was in the past (Daly & Hobijn, 2015). The second trend is the decrease in house ownership in the younger demographic groups. As housing price levels have increased dramatically over time, this has greatly benefitting older, home owning, generations at the expense of new entrants on the housing market (Schiller, 2015, see Appendix B). Finally, stock ownership is declining amongst the general population, mitigating the positive benefits of growth in financial markets in the population (Saad, 2013).

### 2.2.2. Income Distribution amongst the Elderly

Low interest rates only affect those with a significant amount of savings. In order to understand the proportion of retirees that are significantly impacted by these times of “flying low“ and better comprehend the implication for the study, it is necessary to understand how the wealth is distributed in this group.

As seen in Figure 2, wealth is extremely unequally distributed amongst the different demographic groups, including amongst the elderly, with the distribution being quasi identical amongst those aged over 65. The 10% wealthiest of the group control close to 65% of the wealth, the next 40% around 25% and the bottom 50% only 10%. This has important implication for the paper, as only those with significant assets are impacted by current interest rates.

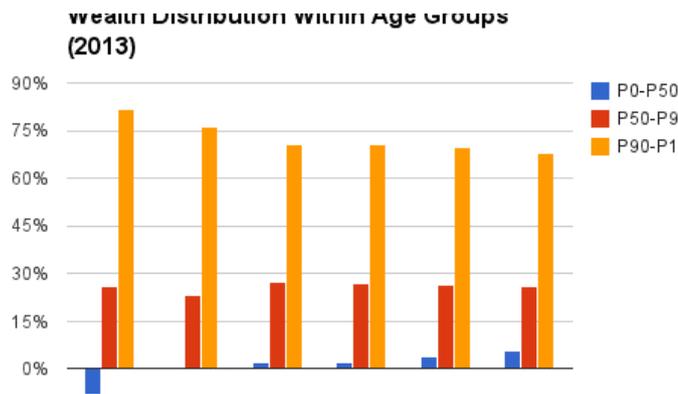


Figure 2: Wealth Distribution within Age Groups (Federal Reserve, 2014)

### 2.2.3. Sources of Income for the Elderly

Another interesting factor to research is the source of income for retirees. As evidenced by Figure 3 below, private investment accounts for a small percentage of total income in most developed countries. As this is the pillar most directly impacted by variations in the interest rate, it highlights the fact that low rates only directly impact a small, financially better endowed share of the overall population.

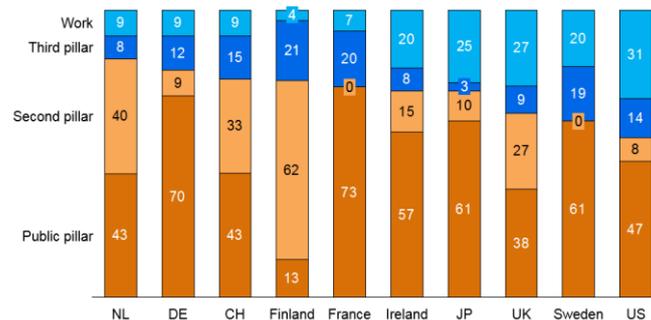


Figure 3: Sources of Retirement Income (Allianz, 2013)

## 2.3. Typology of Pension Schemes and Old Age Support Systems

As discussed above, pensions received from public or private pension systems can constitute a substantial portion of overall income after retirement. Pension schemes around the world have been developed over time and are therefore often locality-specific constructs (Edward, 2007). Researchers and policymakers often use a framework called the “Three Pillars” to classify different types of pension schemes and old age support systems. While many slightly different definitions have been created and applied, this paper uses the World Bank’s framework of 1994 that is often employed in research. It is comprised of the following three groups of systems (World Bank, 1994, pp. 238–239):

1. The **public pillar** (also called “first pillar”) has the primary goal of providing a subsistence income after retirement and to insure against common risks of old age and

retirement, including (unexpected) longevity, financial risks to retirement savings, and private market failures. Thus, the public pillar has a redistributive function. It is managed by the state, usually obligates the subject population to participate (and thus become eligible for benefits) and almost universally follows a pay-as-you-go financing<sup>24</sup> scheme (Edward, 2007; Willmore, 2001). Depending on the locality, multiple co-existing schemes and social security systems may belong to this pillar.

2. The **second pillar** complements the first pillar by providing additional pension income dependent on the income level and/or contributions to the system(s) over the working life of beneficiaries. Thus, it provides new retirees with a smoothed transition from pre- to post-retirement income (World Bank, 1994, p. 239). The main function of the second pillar is to create a savings effect; thus to ensure that higher contributions result in higher pensions. The participation in systems belonging to this pillar is typically mandatory and tax-advantaged by the state (e.g. the Swiss “Pensionskasse”). Systems can be organized either as public or as private structures (a good example for the latter is an occupational pension scheme). Due to its savings nature, it is often based on the capital method (sometimes called “personal accounts” or “notional accounts” method) and thus better equates personal costs to personal benefits than the first pillar (World Bank, 1994, p. 239). Under this classification, one public pension scheme may carry out the functions of both the first and the second pillar simultaneously, e.g. the public pension insurance (“Rentenversicherung”) in Germany.
3. The **third pillar** is of voluntary nature and is chiefly comprised of private methods of pension savings: personal annuities, savings accounts, private financial investments directed at producing pension income. It is intended for those who want to take extra measures for their personal retirement and contributions can be income-related or not. In this pillar, systems often enable participants to receive funds either as a lump sum, as an annuity over their remaining life, or over a fixed time period. Systems in this pillar are almost exclusively based on the capital method and are privately managed (e.g. by an insurance corporation or bank).

As mentioned before, many alternative classifications or additional tiers within the first two pillars exist.<sup>25</sup> For example, systems falling into the first pillar could be classified based on their redistributive effects into “basic”, “targeted”, “minimum pension level within earnings-related schemes”, and “social security”. Second pillar systems could be grouped into “defined benefit”,

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<sup>24</sup> A pay-as-you-go financing scheme is defined as a scheme in which current payouts to beneficiaries are funded by current contributions of unretired members.

<sup>25</sup> In Europe, a commonly applied alternative “Three Pillars” definition is based on the manager of plans: The first pillar is comprised of all government-managed pension schemes and the second pillar’s main plan type is the employer-managed occupational pension (e.g. in Benölken, Bröhl, & Blütchen, 2011). This paper applies the World Bank (1994) classification because it distinguishes clearly behind the purposes of the different pillars.

“defined contribution”, “points-based”, “personal account”, and “defined credits” systems (based on Edward, 2007, pp. 5–9). For the purposes of this paper, the classification of the Three Pillar framework is sufficient.

### **3. Livelihood financing and wealth generation**

Wealth can be accumulated throughout an individual’s work life. Depending on personal circumstances, the individual’s aim is to achieve a financial position from which that person can fund all costs of living after retirement. This financial position is strengthened during the work life of a person, whereas the position is utilized when the person decides to retire. At the point of retirement, it is the previously-mentioned Three Pillar framework that ultimately determines income distribution. Nonetheless, additional wealth can be generated by optimizing one’s investment strategy and by exploiting the financial position that has been built up until retirement.

When looking more closely into the effect that the current low-interest-rate environment has on individual retirees, it is of importance to understand which pillars are open to individual decision making. This is due to the fact that a retiree can only change his or her investment strategy if he or she has access to the specific fund. For this reason, the governmentally-funded public pillar will be out of scope for this part of the study. Moreover, long-term employment-funded pensions, comprising all pensions that have been accumulated at a pension fund through mandatory salary contributions, should also be excluded from this part of the study. Finally, those personal funds belonging to the third pillar that do not provide the option to extract the built-up pension at the time of retirement in the form of a lump sum payment will also not be in the scope of this section.

After having excluded the majority of pension types, it becomes apparent that the majority of retirees will have a rather limited personal influence over their pension’s risk level and return on investments. For example, on average, around 60% of a pensioner’s income up to 70,000 CHF is generated through the first pillar and the second pillar in Switzerland (OECD, 2008). Therefore, furthering a retiree’s financial position will, on average, only affect a minority share of the total income. Nonetheless, there is a group of retirees with an income exceeding the average amount. For these people, it is of great interest how their financial position can be optimally exploited in their investment strategy. Therefore, in this section we will delve into the key tradeoffs for these retirees with regards to their investment strategy. Moreover, there will be a discussion on methods of improving the current financial position. It is then from this new financial position that proposals will be made for personal investment opportunities in the low interest rate environment.

### 3.1. Applicability and key investment tradeoffs

Before delving further into actual strategic recommendations, it is of importance to understand that the current low-interest-rate environment poses some questions for retirees.

#### *3.1.1. Applicability of investment strategy alterations*

Additional to the question of how to obtain an income level that can meet a retiree's current living expenses, one could reverse the question. Specifically, there is the question of whether the focus of a retiree should not be placed on budgeting and lowering living costs, instead of maintaining a lifestyle that requires taking additional investment risks. In general, the income requirements of a retiree should be lower than at the time of working, since expenses on tax, retirement saving, and other work-related costs decrease (Engen et al., 1999). Even though this question is deemed outside of the scope of this paper, it is of great influence in the investment strategy of a retiree. Especially in the final stages of someone's life, taking investment risks is deemed highly undesirable (Halek & Eisenhauer, 2001). If risk taking can be minimized by reducing the spending behavior, this should be taken into consideration.

Additionally, it is important to understand for each individual how much of his or her living costs can be covered by the out-of-scope pension incomes. In the case when not all costs are covered, investment strategies will have to be altered to meet the required returns on investment. Therefore, increasing investment risks should be limited to a minimum.

#### *3.1.2. Key investment tradeoff when designing a strategy*

If strategic alterations are deemed necessary and applicable, there is one key tradeoff that has to be made by the retiree: How much importance is placed on the capital-growth aspect of the investment strategy? Here, capital-growing investments are those investments that are made with the aim of disposing of the investments only after a considerable increase in the market value has been achieved (Mulvey, Bilgili, Vural, 2011). It is the risk-reward tradeoff that is central in this question. As a retiree desires an increasing amount of capital growth, more risk will be required. Alternatively, if the focus of the retiree is on sustaining the current amount of capital and to sustain a living off of the returns made by investing his or her capital, then risk levels will be lower. Moreover, it should be taken into account that at the retirement life stage, a retiree should have accumulated sufficient capital to not require much additional capital growth. It is therefore deemed more likely that a retiree will have a greater interest in securing annuity payments that can sustain his or her costs of living than having volatile income levels. Nonetheless, an investment should always aim to increase the capital level if possible, as this will increase future income levels. However, this is a secondary element of an investment strategy.

### 3.2. Generating additional wealth through leveraging

Retirees who have the possibility to change their risk-reward level can do so because they have generated accessible wealth over their lifespan. The main sources of accessible wealth for the current generation of retirees are household wealth, spanning all property-related ownership, and financial assets, including liquid assets such as savings, and stock investments (Smith, 1997).

When looking into more detail at options to expand on the current funds that a retiree has, the illiquid types of wealth become of interest. With regards to household wealth, there are significant cash flows that can be generated through freeing up illiquid assets. Especially as the majority of retired property owners have paid off their mortgages throughout their lives, mortgage interest costs are evaded. However, it is often neglected by retirees that many Western governments, including Switzerland, actively subsidize mortgage ownership, as interest costs can be deducted from tax payments (Bourassa & Hoesli, 2010). Thus, a retiree's cash inflow can be subsidized by the government if leveraging is introduced in the investment strategy. Leveraging is defined as the act of increasing the amount of debt a person owns to finance assets. Leveraging has a secondary aim of lowering the weighted average cost of capital through tax advantages. Especially in the current low-interest-rate environments, taking up some additional debt could increase the total wealth a retiree has, without dramatically increasing the financing risks. A prime example of this strategy can be found in the Netherlands, where banks actively provide mortgage packages for retirees with large asset holdings in their household wealth, but with a financing need (Toussaint, 2013). Therefore, the advantages of this strategy are twofold: Illiquid assets will become liquid and total wealth will increase through debt introduction. It should be noted that there is a risk increase as interest payments will have to be made on the new mortgage. However, these costs should easily be covered by sources of income that will be discussed in the following section.

### 3.3. Ensuring income

From a solid financial position, investments can be made to ensure a certain amount of income. Even though generating a completely risk-free income stream is not possible, there are strategies that get very close to this aim. For this reason, the following two investment subjects, property and financial assets, have the goal of creating an annuity stream for the remainder of a retiree's life.

#### 3.3.1. *Property investments*

By accessing the cash available through leveraging existing property, new investments can be made. One of the main interesting investment markets is the housing market. This is due to trends being favorable for long-term investors. Specifically, long-term scarcity is expected in

many urban areas. Moreover, housing prices have significantly decreased in many Western countries in the aftermath of the financial crisis of 2008 (Eurostat, 2015). As a retiree has a long-term orientation, the housing market shows a prime market in which low risk levels can still obtain decent returns. In many European markets, there is a vast lack of rental housing, creating an interesting low-risk investment (Housing Europe, 2015). The advantage of acquiring housing property available for rental is that there will be a monthly fixed cash flow received from the rental. Additionally, if prices were to change over time, these can be passed on to the lessee, thereby creating an automatic inflation adjustment. Finally, housing costs, including waste and sewage tax, can also be passed on to the lessee. Therefore, only property maintenance and taxes will have to be deducted from the income.<sup>26</sup> In conclusion, a sustainable annuity can be created for the property.

A main problem of rental property investments is the risk that a property is not occupied for some period of time between different lessees. For this reason, individual investments in property can be deemed relatively risky. However, there is a plethora of options in which multiple retirees can bundle their wealth to acquire a portfolio of property. In this case, the retirees would effectively be acting as a pension fund and diversify their investments to lower the risk. It is in this setup that also other property investments can be considered, such as parking garages and renewable energy plants.

A main assumption for property investments is that the retiree is a long-term investor and prioritizes income guarantees over capital growth. This is of importance because the housing market is not a completely stable market. In extreme times, property values in Europe can decrease by over 30% (Eurostat, 2015). However, the housing market tends to stabilize over time, indicating that a long-term approach is necessary to maintain a certain amount of capital. The benefit of the housing market, however, is that the income amount from rent is correlated only moderately to the value of the principal, stabilizing resulting rental income (Gallin, 2004). Thus, property investments remain an interesting option for retirees.

### 3.3.2. *Financial asset investments*

An alternative to property investments are investments in financial assets. Specifically, stocks and bonds are normally of interest to retirees. However, due to the current low-interest-rate environment bonds are deemed insufficient to meet the income needs that exist. Currently there are no AAA or AA+ governmental bonds that have a yield of over 3 percent (Appendix C based on Bloomberg, 2015). The only bonds that would have sufficient returns would be bonds issued by relatively risky governments or companies, violating the low-risk investment

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<sup>26</sup> Even the costs of maintenance and lessee management can be outsourced at relatively low rates so that retirees less capable or willing to manage their properties are not forced to do so.

constraint of retirees. For this reason, the main focus of financial asset investments will be placed on stocks.

As stated before, for a retiree the main objective will be to secure a guaranteed income flow, meaning that preference will be given to equities that provide a sustainable flow of income. As stated before, the capital-growth part of an investment is deemed of lesser importance, meaning that defensive stocks can be identified as most appropriate. The advantage of defensive stocks is normally that only a very low risk needs to be taken to receive decent returns on investments. Specifically, income can be generated directly through dividends. The normal disadvantage of a defensive stock is that the average capital growth rate will be minimal, but for a retiree this should not be a problem. Nonetheless, a disadvantage for equities in general will be that a company is not required to hand out dividends if its financial position is jeopardized. Therefore, equities in general will be more volatile than the housing market (Case, Quigley & Shiller, 2005). It is for this reason again advised that retirees make use of a portfolio approach to investing in defensive equities, resulting in a large degree of diversification. Even though the returns might be relatively low, they will still be higher than returns from investing in government bonds, as is assumed to be the current situation. The advantage of investing in equity portfolios is that there is much more flexibility for a retiree to make use of changing market situations, compared to investing in a property portfolio. For this reason, a stock portfolio can be customized on a much higher degree to fluctuations in life situations. It is for this that equity investments should be deemed of interest.

### *3.3.3. Other income generation options*

Even though the main income generation options are encompassed in the previous two topics, there are alternatives to generate additional income to take into consideration. For example, an intuitive approach would be to extend the time spent working. As evident from Figure 4 in Part 2.2.3, many retirees supplement their retirement income through work. Even by working only part time, much income can be generated on a monthly basis. If the retiree has the desire to do so, continuing in their previous occupation or other jobs that match his or her qualifications profile may provide a sustainable source of additional income.<sup>27</sup>

## **4. Impact of Low Interest Rates on Governmental budgets and Implications for Pension Systems**

As thoroughly discussed in the previous parts, the Three Pillars determine how income is ultimately distributed. Therefore, it is of great interest how one of the most important pillars, the public pillar, is affected by the low interest rates and what measures the government could

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<sup>27</sup> It should be noted that in some countries, continued income-earning work reduces eligibility for first or second pillar pensions.

take to aid retirees in securing sufficient income. In this part, firstly there will be a discussion regarding why the most developed countries have been able to borrow at such low interest rates; secondly, there will be an attempt to quantify the resulting savings; finally there will be a discussion on policies that could be implemented and their feasibility.

#### 4.1. Budget Savings from Low Interest Rates

Opposed to the effect on pension systems and private savers, the low interest rate environment has had largely beneficial effects on fiscal budgets that are encumbered with high levels of interest payments. But what determines interest rates? And what is the magnitude of the impact of low interest rates on government budgets?

##### 4.1.1. Factors Impacting Interest Rates

Over the last couple of years, debt-to-GDP ratios have reached very high levels in most of the developed countries (cf. Appendix D). Additionally, the vast majority of these countries have run significant budget deficits over these years. Despite this, many of the western countries, especially those whose debt is considered to be a financial “safe haven”, have seen their interest rate diminish almost continuously over the last 30 years. In fact several countries, including Germany and Switzerland, have issued bonds with a negative nominal interest rate, meaning that investors pay for the “privilege” of owning the bonds (Rocheteau, Wright & Xiao, 2015). Therefore, in effect there is a payment for security. This is the result of several factors. The most important of these factors have been the continuing low levels of central bank interest rates in the EU, the USA and Japan in the aftermath of the subprime crisis. These low rates have been maintained in order to mitigate the impact of the Euro crisis and a combination of low economic growth and high unemployment across the majority of OECD countries (Bernanke, 2012). As risk-free bonds are often a close substitute to deposits with the central bank these low rates have had a significant impact on the nominal interest rates on governmental debt (Federal Reserve Bank of San Francisco, 2000).

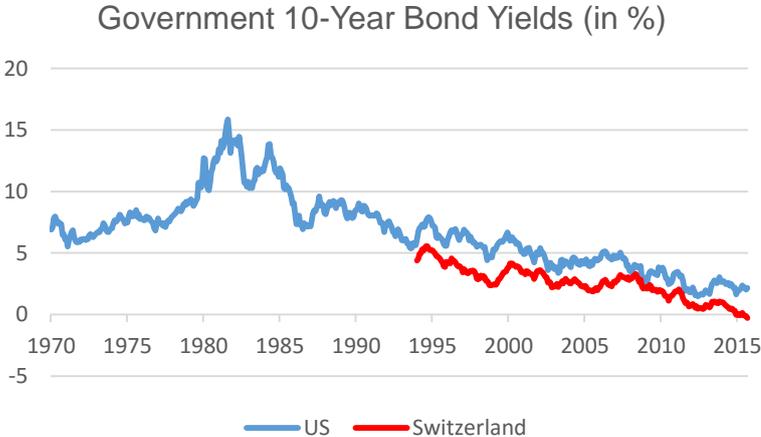


Figure 4: US and Swiss Nominal Interest Rates (Bloomberg, 2015)

Another factor has been the vast monetary creation by central banks. A notable example of this has been the “Quantitative Easing” policy implemented by the Federal Reserve Bank in the United States that only recently concluded. In effect, a glut of savings was created, therewith increasing demand for government equities which leads to lower interest rates. This glut was exacerbated by demographics as the large Baby Boomer generation in developed countries has increased its savings, in provision of retirement (Wigglesworth, 2015). Additionally, minimum inflation amounts, despite this monetary creation, have reduced the “premium for inflation” that bonds must have in order to be attractive (Danthine, 2013). Finally, extreme volatility in emerging and peripheral countries (e.g. the “PIGS:” Portugal, Italy, Greece and Spain) has led to a flight of capital to safety, further increasing demand for assets considered “risk free” (The Euro-nomics Group, 2011). As a result of these factors, major developed countries have been able to easily finance their debt and deficits with very low interest payments.

#### *4.1.2. Interest Payment Savings*

Had the interest rates remained as high as they were in 1990, the United States federal government would have spent an additional USD 7 trillion servicing their debt since 2000, without taking into account the compounded interest resulting from such an increase. In contrast, had the interest rates remained as high as in 2000, the country would have spent an additional \$4,609.33 (based on data from the Federal Reserve Bank of St Louis and the Department of Treasury, see Appendix E). This represents saving between 25 and 40% of the current annual GDP. Current levels of debt and the current deficit of 2.8% are only sustainable thanks to the low interest bonds the government can emit (Federal Reserve Bank of St Louis, 2014).

In contrast, In Switzerland savings have been lower because of several factors. Firstly, the Swiss Federal government has maintained fiscal discipline, with decreased levels of debt compared to several years ago. Secondly, Switzerland has historically benefited from lower interest rates than the United States (Danthine, 2013). Had interest rates remained as they were in 1996, the Swiss federal government would have spent an additional CHF 68,670.46 million since 2000, without taking into account compounded interest; had interest rates remained as high as in 2000 the country would have spent an extra CHF 49,202.68 million since 2000 (based on data from the Swiss Central Bank and the Federal Administration of Finance, see Appendix F). While these are considerable savings of between 7-8% of current annual GDP, that is far from the equivalent in the United States.

In an effort to understand what effects certain interest rate variations could have on the budget of the United States, the Congressional Budget Office (CBO) has conducted a scenario

analysis for the next 10 years, as can be seen in Figure 5 below. As can be seen, changes in interest rates could have a dramatic impact on the spending and deficit amounts in the United States. This would also be the case in other highly indebted countries such as France, the UK or Japan.

**Effect on the Deficit of Specified Interest Rate Scenarios Relative to CBO's February 2013 Baseline**

(Billions of dollars, by fiscal year)

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Total, 2014- 2018	Total, 2014- 2023
Scenario 1	2	13	32	66	104	136	162	190	218	246	274	352	1,443
Scenario 2	4	33	85	201	355	529	671	833	1,003	1,185	1,378	1,204	6,274
Scenario 3	3	11	55	126	138	122	120	129	137	147	157	453	1,143

Source: Congressional Budget Office.

SCENARIO 1: AVERAGE RATES 1991-2000, SCENARIO 2: AVERAGE RATES 1981-1990, SCENARIO 3: AVERAGE OF HIGHEST 10 INTEREST RATE FORECASTS; ESTIMATE EXTRA INTEREST PAID IS RELATIVE TO CBO BASELINE OF 4%, COMPOUNDED

Table 1: Scenario Analysis for Public Deficit under Varying Interest Rate Assumptions (own illustration)

Developed countries' public administrations have significantly benefited from low interest rates, particularly those with high levels of debt, such as the United States. However, such savings could quickly change if interest levels were to rise to those seen in the past. Many people, most notably those dependent on fixed income revenue such as retirees, are negatively impacted by these interest rates. Therefore the question should be raised about whether governments should intervene to help these groups maintain the standard of living that would have been guaranteed in the past.

**4.2. How Can Governments Compensate Retirees For Lost Income?**

The direct impact of low interest rates is obviously felt more strongly by those relying on income from savings. Thus one option governments have to help this population through these times of "flying low" is to compensate them for income that is lost relative to periods when risk-free returns were much higher. Alternatively, special treasury bonds could be made available to citizens over the age of 65, which would guarantee a higher interest rate than current market rates. Moreover, the government could offer tax breaks for income derived from fixed rate assets. However, this would present the dilemma that those relying on this income are already the better-off portion of retirees. For example, in the United States 52% of retirees do not have any private savings and only 13.6% of income is from private investments (Allianz, 2013). Additionally, the median of private retirement savings for the other 48% is under 150,000 USD (Governmental Accountability Office, 2013). Even in the best of times this would have been

insufficient to maintain pre-retirement standard of living (an annuity of 5%, would represent 7,500 USD/Year).

Another measure that the government could adopt is to increase the standards of living of all retirees and not just those with savings. These could take the form of direct or indirect subsidies. The most obvious way of boosting the income of all retirees would be to increase Social Security payments in the public pillar. Most Americans over the age of 62 are eligible to receive Social Security, with payments determined by how much the individual has paid into the fund during his working years and the age at which Social Security is claimed (Social Security, 2015). For example, the government could use the funds saved thanks to low interest rate payments to increase all Social Security benefits by a certain percentage. Indirect subsidies would seek to maintain the standard of living of the elderly. For example, government funds could be used to further subsidies transportation, food, medical expenses or living accommodations.

Finally, governments could use the increased funds to increase the sustainability of the diverse instruments that today provide retirees with the majority of their income. Although Social Security is well-funded and sustainable (Allianz, 2014), it has started to operate at a deficit and is also significantly impacted by the interest rates since it is mandated by law to place its reserve funds in US Treasury bonds (David Pattison, 2015). The US government could insure the sustainability of the fund by increasing its yearly tax allocation. Additionally, many retirees depend on corporate-defined benefit plans that have often been underfunded and also face the low interest rate problem, although they have been able to mitigate this effect thanks to the high growth rates of equities in the past few years in which they are allowed to invest.

#### 4.3. Limits to Government Intervention

Although, as seen above, low interest rates have allowed developed governments to save a significant amount on interest payments, this is only the case because most of these countries have high levels of debt. As such, it seems difficult to advocate for increased spending on retirees while many countries grapple with the effect of austerity. Additionally, it would not always be politically feasible and perhaps even deemed unfair to the rest of the population as older generations already hold a significant share of the wealth (see section 2.2). In the many countries, fiscally conservative parties, such as the Republicans in the United States or the Conservative Party in the UK would likely block any attempts to increase social spending as this runs contrary to their belief in reduced social and governmental spending. Also, as mentioned previously, this low rate environment could quickly change, negating the current savings and removing the need for governmental programs to further support the

elderly, while history has shown that these programs, once in place, would be difficult to remove or change.

## **5. Conclusion**

Evaluating the elements discussed above in a broader demographic context, this paper signifies the impact of a low interest rate environment on retirees' personal financial situation and the greater policy choices that have to be taken. Both limitations and implications of our findings are shortly summarized below.

### **5.1. Limitations to the Study**

This paper has only provided a first study of the implications of "flying low." Further research is highly warranted, especially given the uncertainty about how long the current low interest rate environment will subsist and what an end of "flying low" in the United States could implicate for interest rates in the Eurozone. Limitations to our research mainly exist due to its limited scope and relatively strong assumptions, leaving room for further in-depth analysis.

Our explicit assumption of constantly low interest rates is clearly an abstraction from reality and thus questionable. What do slowly rising rates in the medium term imply for today's retirees? How does it change the optimal investment strategy? Another limitation is the enormous diversity of asset endowments and financial needs of individual retirees. Due to the limited scope of the paper, such diversity could not be considered duly. Further, we have only discussed two viable investment strategies to compensate for "flying low." Additionally, equally feasible approaches can certainly be identified. Moreover, income-generating strategies can be refined further on if the assumptions of desiring income stability over capital growth and extreme risk aversion are relaxed. Also, our study of governmental policies is preliminary and can certainly be enhanced through an incorporation of public policy and economic theories.

### **5.2. Key implications**

The low interest rate environment could resolve within a few years, but research and economic evidence point in the opposite direction. Uncertainty about future interest rate movements is high and steep rate increases within the next 3-5 years are unlikely at best. Therefore, retirees need to assess their own available financial resources more carefully and take defensive investment decisions based on their need for generating additional income. "Flying low" is certainly not trivial – but it is possible, as the previous chapters have shown. Governments should consider the three strategic options highlighted in Chapter 4 to mitigate the impact of low interest rates: creating financial instruments for retirees, increasing public pensions and subsidizing cost-of-living.

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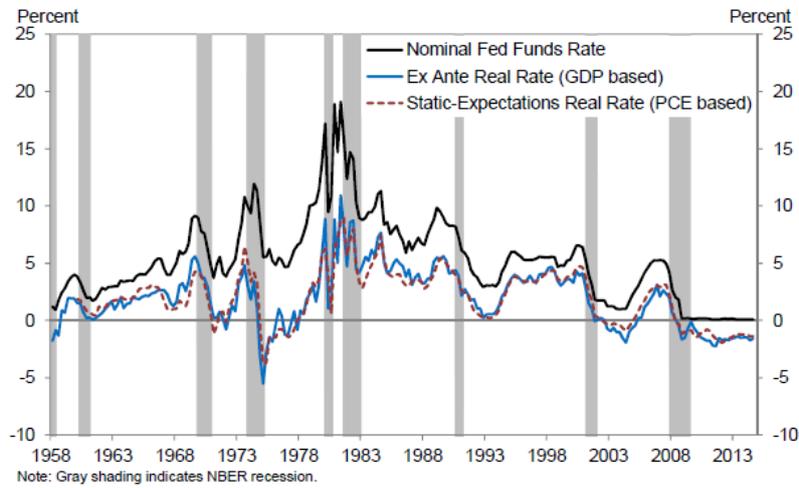
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## 7. List of Appendices

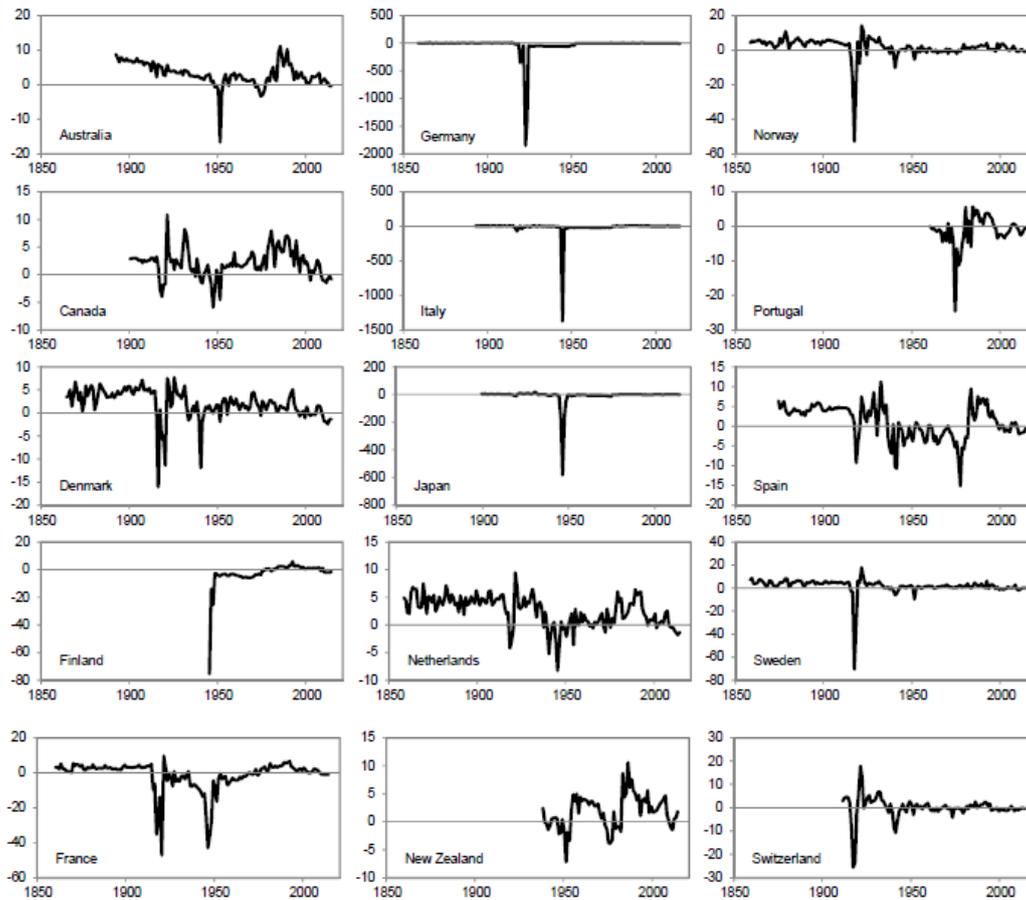
### Appendix A: Historical development of real interest rates

#### Nominal and real interest rates in the United States



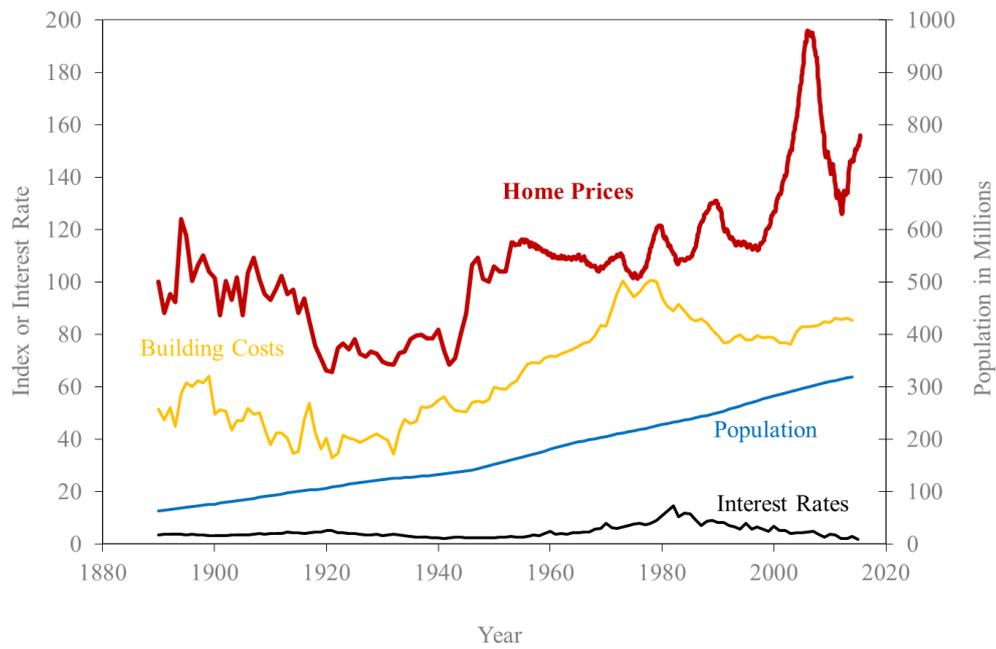
(Hamilton et al., 2015)

#### Ex-ante real interest rates in major developed markets



(Hamilton et al., 2015)

## Appendix B: The US housing market



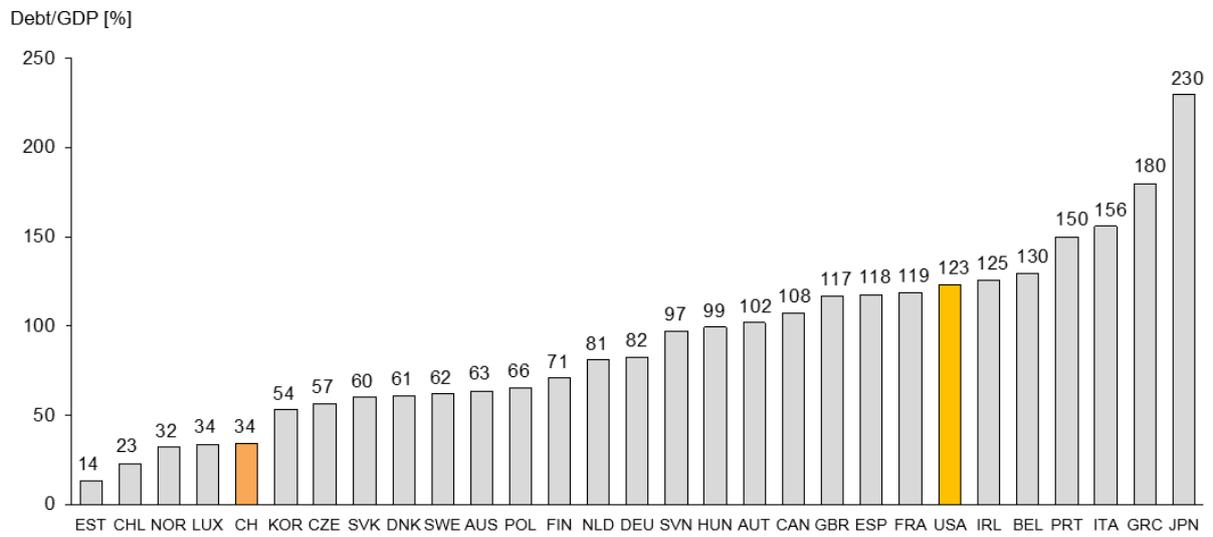
(Shiller, 2015)

## Appendix C: High-grade government bond yields on 5 November 2015

<b>Country</b>	<b>Yield on 10-Year Government Bonds</b>
United States	2.23%
Canada	1.63%
United Kingdom	1.97%
Germany	0.60%
France	0.95%
Italy	1.66%
Spain	1.74%
Netherlands	0.74%
Switzerland	-0.31%
Japan	0.31%
Australia	2.79%
South Korea	2.19%

(Bloomberg, 2015)

## Appendix D: Debt-to-GDP ratios in major economies



(OECD/SNB, 2014)

## Appendix E: Interest rate scenarios and their effect on the US federal budget

Year	Interest Paid (Billion USD)	Debt to GDP (%)	Nominal GDP (Billion USD)	Nominal Debt (Billion USD)	Interest Paid on Debt	Interest Paid Scenario 1 (Billion USD)	Interest Paid Scenario 2 (Billion USD)
2014	\$430.81	102.98	\$17,615	\$18,141.44	2.375%	\$1,427.95	\$1,159.82
2013	\$415.69	101.17	\$16,957	\$17,156.12	2.423%	\$1,350.40	\$1,096.83
2012	\$359.80	100.83	\$16,297	\$16,432.73	2.190%	\$1,293.46	\$1,050.58
2011	\$454.39	96.44	\$15,785	\$15,222.94	2.985%	\$1,198.23	\$973.24
2010	\$413.95	92.09	\$15,230	\$14,025.22	2.952%	\$1,103.96	\$896.66
2009	\$383.07	84.52	\$14,567	\$12,311.35	3.112%	\$969.05	\$787.09
2008	\$451.15	73.54	\$14,550	\$10,699.80	4.216%	\$842.21	\$684.06
2007	\$429.98	62.85	\$14,685	\$9,229.17	4.659%	\$726.45	\$590.04
2006	\$405.87	61.71	\$14,066	\$8,680.22	4.676%	\$683.24	\$554.95
2005	\$352.35	61.06	\$13,382	\$8,170.41	4.313%	\$643.11	\$522.35
2004	\$321.57	60.47	\$12,562	\$7,596.14	4.233%	\$597.91	\$485.64
2003	\$318.15	59.22	\$11,817	\$6,997.96	4.546%	\$550.83	\$447.40
2002	\$332.54	57.69	\$11,104	\$6,405.71	5.191%	\$504.21	\$409.53
2001	\$359.51	55.54	\$10,701	\$5,943.44	6.049%	\$467.82	\$379.98
2000	\$362.00	54.07	\$10,472	\$5,662.22	6.393%	\$445.69	\$362.00
1999	\$353.51	58.19	\$9,926	\$5,776.09	6.120%	\$454.65	\$369.28
1998	\$363.82	60.20	\$9,326	\$5,614.22	6.480%	\$441.91	\$358.93
1997	\$355.80	62.61	\$8,788	\$5,502.39	6.466%	\$433.11	\$351.78
1996	\$343.96	64.23	\$8,287	\$5,323.17	6.461%	\$419.00	\$340.32
1995	\$332.41	63.96	\$7,799	\$4,988.66	6.663%	\$392.67	\$318.94
1994	\$296.28	64.20	\$7,476	\$4,800.15	6.172%	\$377.83	\$306.88
1993	\$292.50	64.49	\$7,032	\$4,535.69	6.449%	\$357.01	\$289.98
1992	\$292.36	62.37	\$6,697	\$4,177.01	6.999%	\$328.78	\$267.05
1991	\$286.02	60.54	\$6,279	\$3,801.70	7.524%	\$299.24	\$243.05
1990	\$264.85	55.86	\$6,023	\$3,364.82	7.871%	\$264.85	\$215.12
1989	\$240.86	51.24	\$5,763	\$2,952.99	8.157%	\$232.44	\$188.79
1988	\$214.15	49.59	\$5,413	\$2,684.39	7.977%	\$211.29	\$171.62

\*Source Federal Reserve Bank of St Louis

\*Source U.S. Department of the Treasury, Bureau of the Fiscal Service

Scenario 1: interest rate = that of 1990

Scenario 2: Interest rate = that of 2000

**Interest Saved Since 2000 scenario 1\*\***    **\$7,013.68**

**Interest Saved Since 2000 scenario 2\*\***    **\$4,609.33**

\*\*Not compounded

## Appendix F: Interest rate scenarios and their effect on the Swiss federal budget

Year	Debt to GDP	Interest Paid (Million CHF)	Nominal GDP (Million CHF)	Nominal Debt (Million CHF)	Interest Paid on Debt	Interest Paid Scenario 1 (Million CHF)	Interest Paid Scenario 2 (Million CHF)
2014	34.54191	832.01 Fr.	642,255.91 Fr.	221,847.46 Fr.	0.38	9,162.30 Fr.	7,875.58 Fr.
2013	34.61738	2,747.12 Fr.	634,854.04 Fr.	219,769.83 Fr.	1.25	9,076.49 Fr.	7,801.83 Fr.
2012	34.1975	1,194.89 Fr.	623,943.04 Fr.	213,372.94 Fr.	0.56	8,812.30 Fr.	7,574.74 Fr.
2011	33.203	1,519.24 Fr.	618,324.76 Fr.	205,302.38 Fr.	0.74	8,478.99 Fr.	7,288.23 Fr.
2010	33.9469	3,444.55 Fr.	606,145.69 Fr.	205,767.67 Fr.	1.67	8,498.20 Fr.	7,304.75 Fr.
2009	35.22053	4,073.29 Fr.	587,060.67 Fr.	206,765.90 Fr.	1.97	8,539.43 Fr.	7,340.19 Fr.
2008	36.9356	4,743.89 Fr.	597,380.52 Fr.	220,646.07 Fr.	2.15	9,112.68 Fr.	7,832.94 Fr.
2007	39.4385	7,029.04 Fr.	573,080.33 Fr.	226,014.31 Fr.	3.11	9,334.39 Fr.	8,023.51 Fr.
2006	42.88158	5,745.84 Fr.	538,125.43 Fr.	230,756.66 Fr.	2.49	9,530.25 Fr.	8,191.86 Fr.
2005	48.00232	4,774.45 Fr.	507,463.40 Fr.	243,594.21 Fr.	1.96	10,060.44 Fr.	8,647.59 Fr.
2004	50.25309	5,852.97 Fr.	489,369.10 Fr.	245,923.09 Fr.	2.38	10,156.62 Fr.	8,730.27 Fr.
2003	50.7238	6,684.19 Fr.	474,015.01 Fr.	240,438.44 Fr.	2.78	9,930.11 Fr.	8,535.56 Fr.
2002	50.37709	5,674.53 Fr.	469,337.80 Fr.	236,438.70 Fr.	2.4	9,764.92 Fr.	8,393.57 Fr.
2001	46.67426	7,813.09 Fr.	470,213.92 Fr.	219,468.85 Fr.	3.56	9,064.06 Fr.	7,791.14 Fr.
2000	48.04232	7,824.49 Fr.	458,778.95 Fr.	220,408.05 Fr.	3.55	9,102.85 Fr.	7,824.49 Fr.
1999	48.83512	7,698.27 Fr.	435,463.94 Fr.	212,659.35 Fr.	3.62	8,782.83 Fr.	
1998	51.61377	5,981.80 Fr.	427,658.41 Fr.	220,730.61 Fr.	2.71	9,116.17 Fr.	
1997	49.08755	7,044.17 Fr.	415,948.42 Fr.	204,178.87 Fr.	3.45	8,432.59 Fr.	
1996	47.18579	7,939.49 Fr.	407,409.52 Fr.	192,239.40 Fr.	4.13	7,939.49 Fr.	
1995	44.8312		404,130.03 Fr.	181,176.34 Fr.			
1994	42.97591		399,250.51 Fr.	171,581.53 Fr.			
1993	40.4312		389,629.83 Fr.	157,532.02 Fr.			
1992	35.98649		381,268.18 Fr.	137,205.03 Fr.			
1991	31.37438		373,499.49 Fr.	117,183.14 Fr.			
1990	29.29449		357,608.27 Fr.	104,759.51 Fr.			

\*Source: Swiss Central Bank/ Federal Administration of Finance

Scenario 1: interest rate is that of 1996

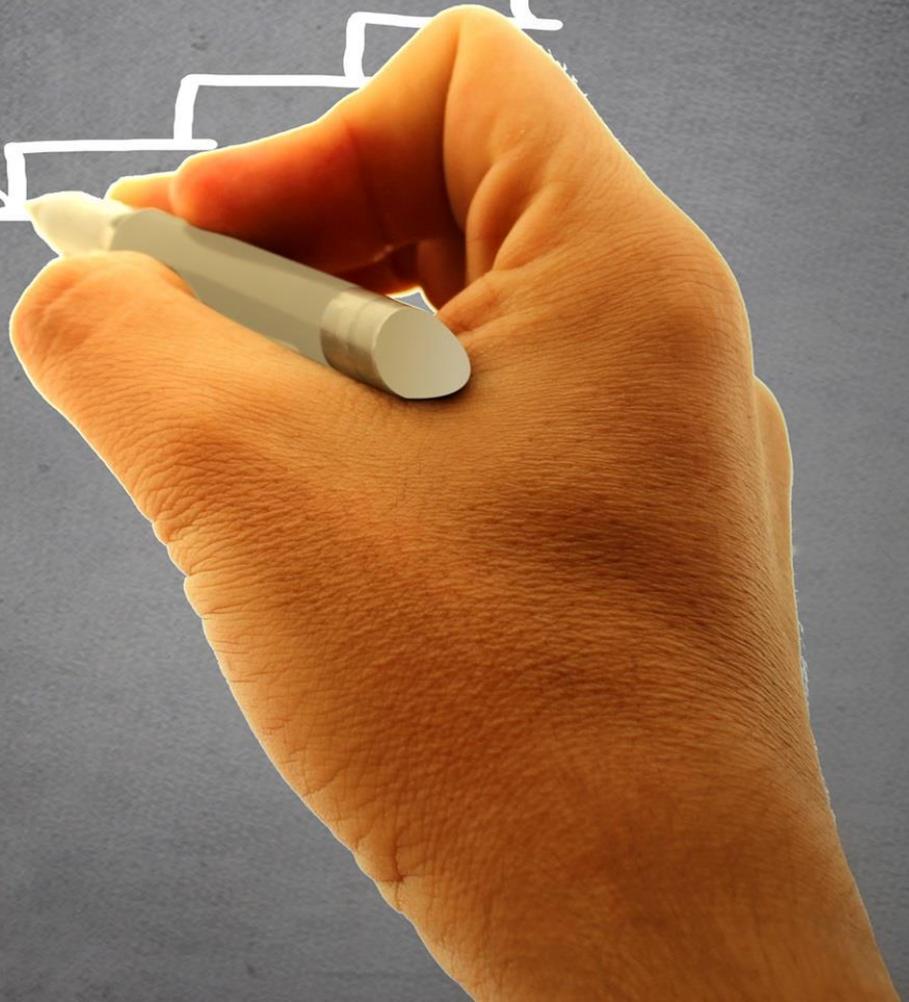
Scenario 2: Interest rate is that of 2000

Interest Saved Since 2000 scenario 1\*\* 68,670.46 Fr.

Interest Saved Since 2000 scenario 2\*\* 49,202.68 Fr.

\*\*Non compounded

Opportunities arising from  
demography for business & society



J. Beyond replacement fertility rates: Are low fertility rates an irreversible phenomenon in modern societies – and if so, could there be new roles for families, partnerships and labor force participation of women to help compensate for this?

*by Aurèle Major and Mikhaël Salamin*

In developed countries, and increasingly in developing countries, TFRs are decreasing below, or stabilizing under, the replacement rate level of 2.1. This paper attempts to see if this rate might rise again in the near future and if not, how there could be new roles for families, partnerships and labor force participation of women to help compensate for this.

To remedy the adverse effects of an aging society this paper recommends several policy reforms. Firstly, the balance between family and career needs to be promoted. Therefore, subsidized day nurseries and even free nursery schools should become prevalent in society. Schools and day nurseries should have long opening hours that are compatible with fulltime work hours. This solution could positively affect fertility rates but would likely increase the labor participation rate of women. Secondly, cash benefits for parents could be used to reduce child poverty and give them a sense of security. Thirdly, divorce laws should make shared parenting the norm to equalize roles between men and women. Fourthly, during economic busts countries should try to avoid cutting the budget for fertility-increasing policies. Fifthly, a system similar to Fureai Kippu in Japan should be introduced to at least partially overcome the high costs of formal care. Finally, pension plans should be reformed to have two schemes: one based on an individual's personal contribution and the other based on the contribution of his or her children. This combination incentivizes adults to not only have more children but also to invest in their human capital. Moreover, this reform should also take off any implicit tax that exists in some pension funds in order to increase the labor participation rate of the elderly people.

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## **1. Introduction**

Over the last decades, developed countries, as well as ever more developing countries, are seeing an unprecedented growth in the proportion of elderly, arising from a combination of declining fertility rates and increasing life expectancies. Because the ratio of dependent population relative to the working population is rising rapidly, these nations may be plagued by severe structural imbalances if their governmental authorities succumb to the status quo. The economic pressure on public pension plans, as well as on universal health coverage systems, is becoming increasingly high and may be exacerbated by the fact that many of these nations already suffer from troubling debt levels. However, this demographic problem may be mitigated through several means. Examples include a rise in the labor force productivity level, in the average number of work hours of the labor force, in immigration, in the labor force participation of the elderly and of women, in the fertility rate, or in any combination thereof. One might also envision to remedy this situation by reforming both the public pension and public health care system. Clearly many options are available, some of which differ ideologically and ethically. In this paper, the promoted solutions are those that are in line with a market-based economy that values not only self-responsibility and freedom, but also a certain degree of solidarity.

The rest of this paper is organized as follows. To begin with, Part one analyzes why the aging of the population is a phenomenon of utmost importance and why this salient societal issue has not yet received the attention it deserves. Afterwards, Part two discusses the development of the family as an institution and how promoting organizational structures that allow to balance family and career life may boost fertility rates, or at least the labor participation rate of women. This part additionally discusses the link between financial security and fertility rates. Moreover, some possible solutions to the high costs of formal care and to reforming the public pension plans in order to enhance fertility rates, to raise the labor participation rate of the elderly, to make them financially sustainable are provided. The paper is then concluded in Part three.

## **2. Threats of Declining Birth Rates**

Declining birth rates, also called demographic winter, have a wide range of repercussions. Some of which are rather direct and measurable, whereas others are harder to assess. Currently, debt levels in developed countries are at already historically high levels, as can be seen in Figures 2 through 4 in the Appendix. With the aging of society, the threat to the social welfare system is of a rather obvious nature, as Figures 5 through 8 in the Appendix indicate. The financial sustainability of retirement pension funds are often being called into question. Indeed, with the very nature of the system relying on a younger population paying for the older one, a decrease in the former directly affects the total contribution given towards the latter. The health care system is at risk by this as well. Elderly are more prone to illnesses than the young. Some of those illnesses, such as Acute Pneumonia and Macular Degeneration or hip fracture, do not weight upon the health care system so much. However, others, such as Dementia, can subject the ailing persons to long-lasting restrictions that not only hamper their quality of life, but also lead to high medical costs.

These first two threats are measurable in both time and size, but the economic repercussions linked to the decrease in birth rates is much harder to grasp. The economies and welfare systems of most countries are based on the assumption of an ever-increasing population. Therefore, it is of interest to better understand the economic consequences of having to deal with a declining population. Indebted capitalist countries require constant economic growth in order to stay healthy. One way to generate this growth is by widening the consumer base, achieving economies of scale, and increasing consumption. If indeed the aging of population leads governments to increase spending on social security, while the shrinking of the population leads to a fall in aggregate consumption, then deflation could become a standard in developed countries. On top of this, young people have a tendency to stand at the vanguard of innovation. A lower youth population could decrease overall innovation, eventually leading to a less competitive economy. All these factors might cause a shift in the world economic hegemon away from Western nations, towards high-growth countries such as India and China.

Finally, the phenomenon called 'gerontocracy' could bring about sweeping changes. The rise in the share of the elderly at the expense of that of the young grants the former increasing decisional power in the outcome of votes. The elderly may refuse to vote for political parties proposing to enact legislations that run counter to their financial interests, even if doing so would benefit society as a whole. With the aging of society, it may hence become increasingly difficult to introduce social policies that promote higher birth rates or to reform pension plans.

Although low fertility rates are a phenomena of outmost importance, this salient societal issue has yet to receive the attention it deserves. Therefore, the next paragraphs will give an

overview of the reasons that keep the general public in the dark about this issue by following the key point given by Steven Philip Kramer in his book “The Other Population Crisis”.

The first and probably the most obvious reason for the lack of attention for this pressing topic is the confusion that this topic creates among the general public. Demographers have been talking about the ticking demographic time bomb that could lead to the explosion of the world population if fertility rates do not fall drastically in developing countries. Now that this notion is embedded in people’s mind, changing it may prove a daunting task. In most developed countries, this notion comes along the rise of extreme right-wing parties that articulate their political campaigns around immigration. This can further mislead the public opinion into thinking that this flow should be reduced to prevent an overpopulation in their respective countries.

Additionally, results from countries enacting birth rate policies have been contradictory at times and failed to attain a stable total fertility rate (TFR) above 2.1. These uncertain results are further questioned by the misuse of these very policies in the 20<sup>th</sup> century by nationalist governments who, through eugenics, wished to “purify the race”. This period of persecution is still deeply ingrained in the minds of people, especially in countries such as Germany, Italy, and Japan.

Another interesting actor in this issue is the church and its desire to keep its influential power on families and on education. Its interest was, and still sometimes remains, to keep the state out of the family life and to promote traditional family values. The reasons why promoting traditional family values may not be in the best interest of high fertility policies is discussed in the next chapter.

Furthermore, demographers have made projections that have come very far from reality, leading some people to doubt their ability to make accurate population forecasts. Indeed, after World War II, because many soldiers had returned home, demographers projected an increase in fertility rates. However, the amplitude of this phenomenon, which led to the Baby Boomer generation, was considerably underestimated. Moreover, this incomprehension was followed by the sudden fall in fertility rates 20 years later.

Moreover, at a first glance low TFRs go hand in hand with ecological reasoning. Less people leads to a smaller footprint and therefore relieves the pressure human activity has on the environment. This argument has to be given credit as limiting the global population would help to preserve the environment. However, although developed countries amount for about a fifth of the global population, a decrease in their population is likely to affect their economy negatively. India and Nigeria, to give two extreme examples, are likely to benefit greatly from

limiting their population. Due to their high level of population, this limitation outweighs the one that developed countries could have in limiting theirs. The argument here is not to put aside the impact developed countries have on the environment, but to stress the benefits of limiting it where is necessary and to achieve a global stable population with a viable economy for all parties.

Another factor at play is one of the threats already mentioned: gerontocracy. Hypothetically speaking, if tight state budgets push public spending to be perceived as a zero-sum game, the elderly, who are seeing their population share rising, may be incentivized to vote in their financial interest and may hence underestimate the importance of both pro-family and pro-children policies.

Finally, the very nature of the low fertility rate issue is a factor on its own. On the surface it may appear that low fertility rates are not problematic. This perception may be due to the fact that demographic issues are incremental and therefore take time to reveal themselves. Moreover, because of population momentum, countries that suddenly have below replacement level TFRs continue to see an increase in their population size for several years. This seemingly contradictory result can be confusing and the phenomenon seems more difficult to grasp for a decreasing population than for a growing one.

All these reasons taken together would probably suffice to explain why low fertility rates are downplayed. However, on top of those reasons there also exists the tendency of human beings to deny claims regardless of how strongly they are substantiated. A good example of this human behavior is the reaction some people still have regarding climate change, even though the numbers speak for themselves and natural extremes reach new records almost every year.

### **3. Fertility Rates and Social Policies**

Within this Chapter a further investigation is provided regarding fertility rates and the social policies that have been shaped around them. With fertility being at the forefront of a human life, it can be seen that lawmakers have always been aiming to control the rate of it. For this reason, Chapter two is divided over three subchapters. The first subchapter will delve deeper into previous fertility rate policies. Afterwards, a discussion regarding the position of the family will be given. Finally, the perceived security of the system and the total fertility rate will be examined. It has to be noted that within this Chapter, unless specified otherwise, averages have been used of the OECD countries.

#### **3.1. Fertility Rate Policies, Immigration, and Educational Expenditures**

Fertility rates are a function of many complex factors and it is therefore a challenging task to establish causal relationships between policies and fertility rates (Fertility and public policy, 2011). One cannot simply enact a policy and expect fertility rates to suddenly rise (Fertility and public policy, 2011). To make matters worse, fertility policies are generally very expensive (Fertility and public policy, 2011). Hence, one might wonder if the cost of increasing fertility policies is even worth it in the first place. Alternatively, increasing education spending in the hope of boosting the productivity of the labor force or further increasing immigration could be more worthwhile.

To compare different OECD countries through a good proxy for educational quality, the mean PISA score of a country is used. While even a small increase in the mean PISA score of a country seems to have a positive and important effect on a country's GDP and future well-being, achieving this increase by means of higher educational expenditure can lead to disappointing results (The High Cost of Low Educational Performance, 2010). The relationship between a country's average PISA performance and its average spending per student between 6 and 15 years old converted in purchasing power parity is very strong under a threshold of 35,000 USD per student. However, this relationship however becomes nearly none-existent at a threshold higher than 35,000 USD per student (Does money buy strong performance in PISA?). Yet the grand majority of countries that have a below-replacement-level fertility rate are already spending more than that amount. Of course other learning areas that might have been underfinanced could be improved, but educational results seem nonetheless to follow the law of diminishing returns.

Alternatively, further increasing the inflow of migrants could also offset shrinking populations. Although many migrants bring a net economic benefit for numerous countries and help to slow down the aging of society, depending solely on immigration to fix this problem may be unwise for several reasons. To begin with, as recent years have shown, when immigration rises above

a certain threshold some residents become anxious about the perceived erosion of their country's prosperity and cultural heritage. Additionally, countries usually wish to gain immigrants with marketable skills so that their labor will result in a net economic contribution. Hence, nations compete against each other to attract the most skilled and talented immigrants, who often prefer to work in wealthier countries. Yet ever more countries have fertility rates below the replacement level, some of which are even middle income countries. Whereas in the 1970 there were only ten countries in the world that had a fertility rate below 2.1, this figure currently amounts to 86 and is likely to become larger in the coming years (Population Reference Bureau, 2015). Moreover, in the 1970, the lowest fertility rate was 1.8, a rate only slightly below 2.1. Today the lowest rate is at 1.2. Therefore, it must also be acknowledged that countries ranking relatively high in terms of fertility rates are also those ranking relatively low in terms of human capital. Furthermore, the flow of immigrants is not stable over time as it depends on events such as wars or natural catastrophes. Therefore, it is not a long term solution as Figure 1 elaborates. Finally, immigration does solve a part of the problem, but only on a temporal basis because the fertility rate of immigrants in the second generation tends to align with that of nationals (Hill & Johnson, 2002).

### NET MIGRATION FLOWS 1961-2060

According to EU projections, net migration inflows will remain strong but will not be enough to prevent the European Union's total population from reaching its peak by mid-century and start declining later in the century.



Sources: Commission services; Eurostat; EUROPOP2013 Copyright Stratfor 2015 www.stratfor.com  
 Figure 1: Net Migration Flows (European Union, 2015)

Thus, even though increased educational expenditure and immigration can help to solve issues of an aging society, other means must also be used.

### 3.2. Development of the Family as an Institution

The family unit can be thought as an institution, one of the oldest in human history. Over the last forty years the family unit has changed substantially and analyzing its development is important in understanding the key drivers of fertility rates and how society can offset the adverse effects of an aging population. The first prominent change to the family unit has been the decline in the average household size. This phenomenon can be attributed largely to the decrease in fertility rates going from an average of 2.8 in 1970 to 1.7 in 2013 (SF2.1: Fertility rates, 2015).

Two main factors have sustained high fertility rates over time: (i) the human sex drive and (ii) the necessity to have children to support senior parents (Fertility and public policy, 2011). The first factor plays a much weaker role thanks to technological advances. With the advent of contraceptives and the medical possibility for women to abort, a much smaller proportion of the fertility rate can now be explained through unwanted or unexpected pregnancies (Fertility and public policy, 2011). This trend is likely to continue with the improvement of birth control, such as new male contraceptive pills that are set to come out in the coming years (Aaron Hamlin, 2015).

Additionally, the second factor has also been strongly attenuated. Economically speaking, an individual's children are a by-product between an investment good and a consumption good. However, the expansion of public pension plans and more generally of the welfare state has made parents much less likely to think of children as a means for age old support (Fertility and public policy, 2011, pg. 20).

Now that households can increasingly efficiently plan the number of children they wish to have, individuals are more likely to only have children if doing so positively affects their utility. That means that policies seeking to increase the fertility rate should aim at either making children become more of an investment good and/or making children more attractive as a consumption one by, for example, reducing the costs or the opportunity costs of bearing children.

The UN projects the fertility rate for Europe to increase from 1.6 in 2010-2015 to 1.8 in 2045-2050 (UN, 2015). Therefore, household sizes are not expected to change substantially due to fertility rates. These projections may give the impression that fertility rates in wealthy countries will never sustainably increase above the replacement level. However, it should be noted that most wealthy nations only exhibit these low fertility rates for less than forty years and that demographic forecasts are very difficult to make. These below-replacement-level fertility rates

may only be a transitory phenomenon in the long term (Fertility and public policy, 2011). Furthermore, the number of intended children is lower than realized. The average number of ideal children for both men and women equals 2.25 children (SF2.2: Ideal and actual number of children, 2014). This suggests that individuals, on average, wish to have larger families, but due to life circumstances are unable to do so. Policies helping individuals to reach their ideal rate could positively affect fertility rates.

Another prominent change in the family unit has been the emergence of new types of family formations. Extended families have almost completely disappeared in many countries (The future of families 2030, 2011). This change, as well as the increased mobility of individuals, has made it harder for parents to count on relatives to contribute in the caretaking of their children. The nuclear family that was traditionally composed of a married man and woman with children is becoming less prevalent with falling marriage rates and soaring divorce rates. Even though marriage is still the most common partnership between couples, from 1970 to 2012 the crude marriage rate has dropped by 43% whereas the crude divorce rate has increased by 73% (Families are changing, 2011) (SF3.1: Marriage and divorce rates, 2015). Additionally, the last forty years have seen the emergence of a much higher proportion of same-sex partnerships, cohabiting couples, single parents, and children born out of wedlock. These trends are expected to persist in the coming decades (The future of families 2030, 2011).

In 2011, 1.3% percent of children were living with no parents, 14.9% percent with only one parent, 11.3% with two cohabiting parents, 72.5% with married parents, and 6.6% in a multigenerational households (Families are changing 2011). Additionally, ten percent of the children lived in reconstituted households (The future of families 2030). Sole-parent households are projected to rise by 22% to 29% from early-mid-2000s to 2025-2030 and could by that time represent 30% to 40% of all family households in several countries, including Australia, Austria, Japan, and New Zealand (The future of families to 2030, 2011).

Compared to married couples, sole-parent and cohabiting households are at a higher risk of poverty with the former facing the most elevated risks (The future of families to 2030, 2011). The child poverty rate is defined as the share of children living in households with a total incomes less than 50% of the median for the entire population. This indicator is somewhat misleading since it is based on relative poverty and not on absolute poverty. Nonetheless, it serves its purpose of enabling one to notice large wealth differences between family structures. When looking into this poverty rate, the rate for children in sole-parent households are on average 61.4% if the parent is jobless and 21.3% if he or she is working. In stark contrast, the poverty rates for children in a household with two parents are on average 49.4%, 17.3%, and

3.9% when none of the parents are working, when only one of them is working, and when both of them are working respectively (Families are changing, 2011).

Moreover, adults in sole-parent households may find it much more difficult than those in dual-parent households to balance family and career life. Many of these sole parents are hence faced with a dilemma: by working more they have additional economic resources to support their children, but they also have less time at hand to take care of their children. Unsurprisingly, children in sole-parent households face, on average, considerably higher negative outcomes such as lower education attainment and higher criminality rates than those in dual households, with children in nuclear families faring on average the best. However, the differences in a child's outcome regarding the family structure become considerably smaller and often statistically insignificant once one controls for the household income and the time a parent or the parents spend with their children (Ginther and Pollak, 2004) (Thomson McLanahan, 2011).

The heightened probability of a family household ending up as a sole parent household could arguably negatively affect fertility rates. Specifically, individuals might be reluctant to face and to make their potential children face the adverse effects of living in sole-parent households. However, according to Bradshaw and Attar-Schwartz "the prevalence of single parents is a good indicator of female emancipation and liberty, and fertility choice is associated with that" (Fertility and public policy, 2011, 198).

Furthermore, a substantial change within the family unit has been with regards to the division of work between men and women and the starting age of parenthood. The last forty years have seen a strong rise of the educational attainment and of the labor force participation rate of women (Families are changing, 2011). Whereas in the 1960s a strong division of work between men and women had the former primarily acting as the breadwinner and the latter primarily as the caretaker, these two roles have been equalizing with time and most couples have become dual-earner families (Families are changing 2011). In 2010, the labor participation rate of the population aged between 15 and 64 years old was 80% for men and 62% for women, with several European countries achieving a rate above 70% (OECD, 2012). The average labor participation rate of women between 15 and 64 years old is projected to rise (The futures of families to 2030, 2011). Although countries with higher labor participation rates of women tend to have a less pronounced division of labor in households between men and women, women still remain on average the main caretakers across all OECD countries due in part to taking longer parental leave (Families are changing, 2011). Moreover, there exists a gender gap in terms of partial employment, with women at 21.7% and men only at 4.4% in 2011 (Families are changing, 2011). Employment rates for males and females are similar during their twenties but start showing differences as they become parents (Families are changing, 2011). However,

once children reach the age of three to five years old, employment rates of women rise (Families are changing, 2011, 36).

On average, women are currently having a larger opportunity cost of bearing children than in the 1970s as they must now face higher difficulties in finding ways to balance their family and career life (Fertility and public policy, 2011). This opportunity cost may explain why the share of women between 25 and 49 years old who remain childless has risen to 20% in 2011 (Families are changing, 2011) (Fertility and public policy, 2011). While this rise might be due to women bearing children at a later age, the fact that women with a tertiary education are much more likely to be in a childless household than those with only a secondary one seems to confirm that part of this rise can be explained through the educational attainment of women (Families are changing, 2011). Another possible explanation is that highly-educated women seem reluctant to partner with a man of lower educational level (Families are changing, 2011). This phenomenon may be exacerbated by the fact that large disparities in graduation rates exist between men and women. On average 46% of women and 30% of men graduate from university (Highlights from Education at a Glance, 2010). The demand for higher education is projected to increase in the coming years and may thus widen this gender gap (The future of families to 2030, 2011).

Moreover, female educational attainment seems to affect the age of childbirth. A link exists cross-nationally between the school-leaving age and the age of childbirth of women (Families are changing, 2011). Generally now both men and women prefer to establish themselves in the labor market before becoming parents (Families are changing, 2011). Whereas women in 1970 on average had their first child at 24 years, women in 2008 on average had their first child at 28 years old (Families are changing, 2011).

These developments in the family unit indicate the existence of a strong need to finding ways to combine work and family life, especially for sole-parent households. One way of aiding parents is to implement day nurseries and have relatively long school days to allow parents to work fulltime. For instance, in France day nurseries are subsidized and accept children as young as 2 to 3 months with opening hours of 7 to 8 am to 6 to 7 pm. Nurseries schools are free of charge and accept children at age 2 with classes starting at 8.30 to 9 am and ending at 4.30 pm. Most nursery schools also provide care for children after class until 6 to 6.30 pm. Implementing a similar school structure in other countries could increase the labor force participation rate of women, lower the poverty of children and hence improve their life outcome and finally positively affect fertility rates by reducing the opportunity cost of having children. Another way is to change divorce or separation laws to give men the same rights as women so that shared parenting becomes the norm. Doing so would help women to balance family

and career life by reducing their share of caretaking. Furthermore, children that have a high level of father involvement face considerably better outcomes in life (Allen and Daly, 2007). It is also recommended to give cash benefits to parents with minor children. While such a policy is not likely to boost fertility rates, it can reduce child poverty and create a better sense of security for parents.

Finally, an important change within the family unit is in regards to the aging of the population. The average life expectancy was 66 years in 1950 and 76 years in 2007 and is expected to rise further by at least 6 years by 2050 (The future of families to 2030, 2011). The relative share of young people in terms of the overall population are projected to decrease from 2011 to 2030 by 8.5%, 12%, and 15.6% for people aged between 0 and 14, 15 and 24, and 25 and 39 respectively. Alternatively, this figure is projected to increase by 37% and 54% for people aged between 65 and 79 and by 54% for people aged more than 80 (The future of families to 2030, 2011).

The aging of society has considerable ramifications on households. In nearly all countries more than half of households do not have children and this share is projected to rise (Families are changing, 2011). One-person households are also projected to rise substantially, comprising in several countries such as Switzerland, Norway, and Germany a share of 40% or more of all households by 2025-2030 (The future of families to 2030, 2011).

Additionally, with the aging of society a greater proportion of the population will be dependent on formal and/or on informal care capacities. However, there is a considerable gap between the cost for formal and for informal care. A study conducted in 2013 on Finnish households shows that the provision for the elderly of formal care had an average cost of 25,300 EUR per annum. When formal care was combined with informal care this cost was on average 22,300 EUR per year. In contrast, when a senior received mainly informal care from a family member the cost was only 4,900 EUR per year if they both lived together and 6,000 EUR per year if the senior lived alone (Kehusmaa and al, 2013).

The changes within the family unit could reduce the provision of informal care. Now that both men and women have high labor participation rates, it will become increasingly difficult for adults to find sufficient time to provide informal care for their parents and they might hence have to increasingly rely on expensive formal care if they are willing to pay for it or even able to do so. Since fertility rates are low, many adults have no brother(s) or sister(s) to help them in providing the time or the financial means to take care of their senior parents. This scenario assumes the senior has a child or children in the first place. Yet the proportion of childless adults is at around 20%, meaning many seniors may have to rely entirely on formal care paid by the welfare state and/or by themselves.

The increasing fragmentation of the family unit could also affect the provision of informal care. The rise of divorces, remarriages, couple separations, step-families, and sole-parent households may undermine family ties (The future of families to 2030, 2011). Divorced, separated, and remarried parents seem to have more difficulties in sustaining long-term relationships with their children. These weakened family ties could further reduce the provision of informal family care (The future of families to 2030, 2011).

Another consequence of the aging of society and of the fragmentation of the family unit is its impact on the supply and the value of housing. As stated previously, there is a growing number and proportion of single-adult households. In an apartment with two residence for instance, the bathroom, the kitchen, and even maybe the room are shared. All else equal, these “economies of scale” allow the average person to spend less money on housing and more on other things. On a national level this sharing of housing saves lots of space. By having an increasing number of and proportion of single-adult households, society is likely to see more housing shortage and an increasing pressure on housing prices (The future of families to 2030, 2011). This trend can add further economic stress to young people.

To at least partially resolve the problem of caretaking, this paper recommends introducing a system that already exists in Japan named ‘Fureai Kippu’. The concept is based on a complementary currency in which the unit of account is an hour of service or care provided to a senior person. Hence, under this system a person is transferred a credit-hour from the elderly for each hour of service or care provided. This person can then transfer these credits to anyone they wish. Consequently, it allows people through their civic engagement to earn credits that can then be used when they are themselves elderly. They can also transfer these credits to their parents for instance. Many adults might want to take care of their parents but cannot readily do so because of their work hours or simply because their parents live too far away (Lietaer, 2004).

### 3.3. Perceived Security and Total Fertility Rates

As discussed above, changes in the family model and the possibility to balance work and family life are factors that tend to reduce the opportunity cost of having children and hence increase the labor participation rate of women. However, to fully grasp the picture, other elements have to be considered and, in some cases, play an important role in defining very low fertility rates.

The first element that has an influence on TFRs is the overall economic security a couple has. This economic security has to be divided in different aspects. To begin with, the general economic situation and the level of unemployment needs to be taken into consideration. Afterwards, the types of employment that the youth face become of interest and finally comes the discussion regarding the perception of this security in people minds.

Economic turmoil and stagnation affect the TFR in many ways. First, these situations tend to increase the level of unemployment, which in turn can leave a greater proportion of the population dependent on social benefits, if they are provided in the first place. This development impacts the income of couples. More than just periodically reducing their purchasing power and creating momentary, if not long term financial insecurity, this lack of income generates a chain reaction. In the southern part of Europe, including Italy, Spain, Greece, and Portugal in some ways, where the traditional family norms are still prevalent, young couples do not move in together and rather stay at their parent's house until a stable employment is found. Men and women tend to move out of their parent's house later. However, this behavior is more common for men and may in part be due to the fact that women are more often taught housekeeping skills. Therefore, some men may find it difficult to look after themselves alone, waiting to be able to move in with a woman. This phenomenon is not new but is exacerbated with a situation of a high youth unemployment and of an increasing percentage of women who work. A direct clash appears for women that are forced to choose between a large family and work (Caldwell & Schindlmayr, 200). The proportion of young people living alone is much higher in Northern European countries than Southern ones because of different family values, of a better social welfare system, and of a higher standard of living.

Nonetheless, even Sweden has yearly fluctuations of its TFR due to economic fluctuations. As parental leave is calculated as a percentage of employment rate, having a stable job is an important prerequisite to having children. Couples will therefore delay parenting, creating a fluctuation on TFRs that will eventually be recovered later (Kramer, 2014). This last example shows that even with a strong welfare system, economic fluctuation has an influence on fertility rates and that this correlation is attenuated with pro-family and pro-children policies.

A second factor at play is the fact that in times of economic crisis, social welfare cuts are more likely to happen. For instance, resulting from the 1990's crisis, Sweden drastically cut housing subsidies, which created housing segregation between classes that potentially affected social integration, quality of children's development, and birth rates (Kramer, 2014, 33).

In general, economic crises have other effects on birth rates than only creating unemployment. The 70's crisis led the world into a more liberal economy, one that is characterized by greater job insecurity for both young and old people. In this system, it takes many years for young people to find a stable job, creating an insider-outsider model (Caldwell & Schindlmayr, 2003). Insiders have long-term contracts that allow them to benefit from the whole social welfare system. In contrast, outsiders find themselves unemployed and in unpaid internships. Here, unpaid internships are basically the same according to the definition of employment, temporary

contracts or part time jobs, especially when it comes to women, and therefore are not able to access the same benefits that insiders do.

This situation again depends on which states are considered. Two big categories can be drawn in this respect. One category includes the “Universalist” states, British and Scandinavian, and another one includes the “Particular” states for the rest of Western Europe and Ireland. The latter is based on Otto Bismarck’s 1880 model. It provides assistance in old age, health and seeks to stabilize existing families rather than helping the most in need. The former comes from William Beveridge. Introduced in Great Britain after WWII, it is more egalitarian and aims at providing for the most in need. Therefore, the “Particular” system “rewards in proportion to work and earnings record, placing the young in an invidious position” (Caldwell & Schindlmayr, 2003, 246). To exemplify, facing high unemployment supposedly due to rigid regulations, the Italian center-left government “reformed” the system and gave more security and benefits to older workers, leaving younger ones entering the job market with “nonstandard” jobs such as part time and fixed-term employment. The reforms introduced did not prove effective and left young Italians in a desperate situation (Kramer, 2014). Moreover, because employers tend to turn down applications from pregnant woman or from those who have kids, some women rather not have children until a stable “insider” job is found. However, often this argument is attacked by stating that the United States has a fairly good TFR. It is clear that the American model has the advantage of not creating an insider-outsider situation by creating an underclass. Although the figures seem encouraging for the United States, part of it is induced by high birth rates in their immigration population.

From this last section it appears that not only unemployment is a factor that lowers fertility rates, but that the type of employment and the social benefits attached thereon seem to greatly influence this same rate. Furthermore, social security can put economic stress on the younger generation. Indeed, elderly people tend to have higher health expenditures than young people, yet both of them often pay similar health insurance premiums. Ironically, as Bradshaw and Attar-Schwartz state “what the literature might indicate is that it is not social policy that matters now, it is human capital, a sense of security, and power in the market place—so apparently an independence from social policy is what matters to fertility”. Finding a solution to this problem through policies may prove difficult. On the one hand, state interference could increase job security for the young. On the other hand, firms may be reluctant to employ young people under these terms, which could even increase their level of unemployment.

Finally, there remains a point that has not much attached to it but is worthwhile mentioning. Although tangible economic indicators influence birth rates, it is not so surprising considering the nature of human beings that the perception of the future economic situation influences

human choice. A 2001 study from Rychtariková and Kraus shows that at the fall of the Iron Curtain, Czech Republic, although subject to heavy investments by Germany that kept unemployment levels low, saw a fall in fertility rates due to the “fear of unemployment and a deep apprehension about the loss of certainty of continued employment” (Caldwell & Schindlmayr, 2003, 252). This fear and uncertainty came from the observation of the situation in Eastern Europe, characterized by low employment and loss of social security after the fall of the USSR. Although this is an extreme situation, it reveals the gap that can appear between tangible economic indicators and the reaction of people to the overall economic situation even when they are not directly impacted. It would be interesting in this respect to keep track of birth rates in Switzerland during the EU crisis to see whether the same type of behavior is observed.

#### **4. Reforming the Pension System**

There is significant evidence that the expansion of the public pension fund system has strongly contributed to the fall in birth rates by misaligning incentives. Indeed, elderly with no children or with financially unsuccessful children can “free ride” the pension system by having at least part of their pension paid through the children of other people. A study by Cigno finds that the expansion of the public pension system accounts for as much as 75% of the reduction in the total fertility rate which occurred in Italy between 1930 and 1984 (Fertility and public policy 2011). The largest decline in total fertility rate occurred in the developed nations from 1960 onwards, when public pension systems reached their maximum size. Furthermore, the pill only became widely available in the late 1960s. Additionally, Boldrin and al. find, after controlling for several variables such as income level and female labor force participation, that a strong negative correlation exists between the size of a pension fund system and the total fertility rate. This effect exists across European countries and the United States as well as across time (Boldrin and al, 2004).

The reform this paper proposes is inspired from an idea of Cigno (Fertility and public policy 2011). In the pension system there would be two parallel schemes that are linked to an individual's pension: (i) his or her own personal contribution and (ii) the contribution of his or her children. Therefore, for each salary a person perceives, a share is allocated to his or her own pension and another share directly to the pension of his or her parents. There could additionally be a third scheme to promote a certain level of solidarity. For instance, each person could be obliged to contribute to a public insurance so that if a parent's child dies or is unable to work anymore outside of this person's personal fault, the parent would be compensated for the loss of pension. This paper also recommends to have no implicit tax on pension funds as much evidence shows that they reduce the labor participation rate of the elderly (Pensions at

a glance, 2011). Everyone should have the liberty to work as long as they wish without being penalized, especially in societies in which there is a shortage of workers.

The advantages of this system are fourfold. To begin with, it incentivizes adults to have more children, but also very importantly to invest in the human capital of their children—all else equal, the better their children fare financially, the more pension they will receive. Moreover, such a system would strongly reduce the structural imbalances many nations are facing because of their public pension plans. Furthermore, taking away the implicit tax on pension funds could increase the labor participation rate of the elderly and hence also their purchasing power. Finally, such a reform has never been enacted yet and hence could be what is needed to increase the fertility rates close to or even above the replacement level, especially if it is combined with policies that allow individuals to balance career and family life, and that supports them through child benefits.

## **5. Summary**

In developed countries, and increasingly in developing countries, TFRs are decreasing below, or stabilizing under, the replacement rate level of 2.1. This paper attempts to see if this rate might rise again in the near future and if not, how there could be new roles for families, partnerships and labor force participation of women to help compensate for this.

To begin with, it is very unlikely to see the TFR rise substantially in the foreseeable future. The institution of the family has seen considerable changes such as increased sole-parent families, recomposed families, concubine families, and less nuclear families. With the rise of the educational attainment and of the labor force participation rate of women, the opportunity cost of having children has risen as there is a strong need to be able to balance family and career life. At the same time, job insecurity is becoming more prevalent among the young, who often wish to establish themselves in the job market before starting a family. The situation of the young is exacerbated by an aging society that increases the economic pressure they must face because of the rise in social security costs. Finally, the pension fund plans does not create any incentive to have children.

Additionally, the aging of society may create severe structural imbalances as the dependent population rises and as elderly people face higher health expenditures. Along with the changes in the family unit, elderly people will be more dependent on formal care than on informal family care, rising the costs for families and societies.

To remedy the adverse effects of an aging society this paper recommends several policy reforms. Firstly, the balance between family and career needs to be promoted. Therefore, subsidized day nurseries and even free nursery schools should become prevalent in society.

Schools and day nurseries should have long opening hours that are compatible with fulltime work hours. This solution could positively affect fertility rates but would likely increase the labor participation rate of women. Secondly, cash benefits for parents could be used to reduce child poverty and give them a sense of security. Thirdly, divorce laws should make shared parenting the norm to equalize roles between men and women. Fourthly, during economic busts countries should try to avoid cutting the budget for fertility-increasing policies. Fifthly, a system similar to Fureai Kippu in Japan should be introduced to at least partially overcome the high costs of formal care. Finally, pension plans should be reformed to have two schemes: one based on an individual's personal contribution and the other based on the contribution of his or her children. This combination incentivizes adults to not only have more children but also to invest in their human capital. Moreover, this reform should also take off any implicit tax that exists in some pension funds in order to increase the labor participation rate of the elderly people.

Overall, the issue of low TFR cannot be solved with a specific policy, but rather a set of reforms that complement each other, allowing the TFR to raise again. This needs to be looked into as a package for which every element has a role to play and, if neglected, can affect the whole process. Although it is difficult to imagine a radical change in the TFR, it is likely that improvements can be made. While in this transition phase, low TFR countries can still fill the gap for a few decades with immigration, providing them with the necessary time to consider and implement effective solutions.

### 5.1. Self-Criticism & Limitations

As the broad scope of this topic can easily fill an entire book, this paper is only able to give a brief general overview. Therefore, a simulation of the proposed pension reform by economic research was deemed unattainable. Additionally, the limited size could not allow for an in-depth analysis of how the ongoing aging of societies affect the structural fiscal balances of countries. Regarding solutions for the lack of employment security among young generations, this paper cannot provide a clear answer on which types of policies should be adopted because it depends on the situation of the market.

### 5.2. Outlook on Further Research

Further research could look into creating a social security system that limits economic pressure on younger generations and that promotes higher fertility rates without harming social cohesion. New technologies could also be explored as a solution for early detection of sicknesses and for reorganizing society in a more effective way, responding for instance to care for elderly people and children by enhancing social cohesion.

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## 7. Appendix

### Gross Central Government Debt as Percent of GDP: Advanced and Emerging Market Economies, 1860–2011

(unweighted averages)

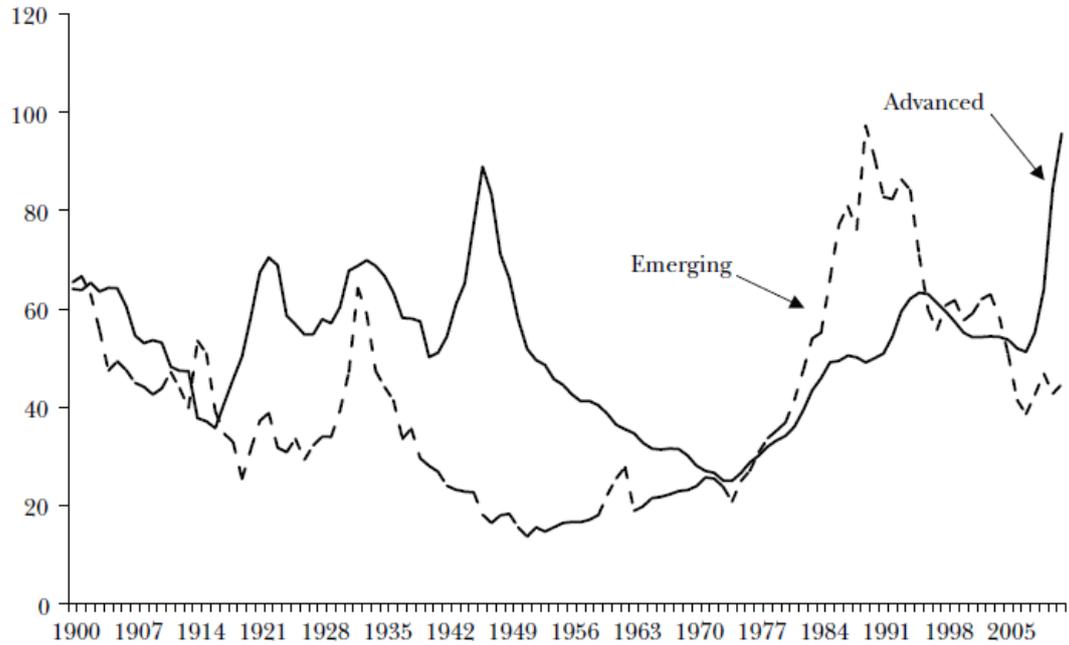


Figure 2: Government Debt as Percentage of GDP (Reinhart et al., 2012)

### Gross Total (Public plus Private) External Debt as a Percent of GDP: 22 Advanced and 25 Emerging Market Economies, 1970–2011

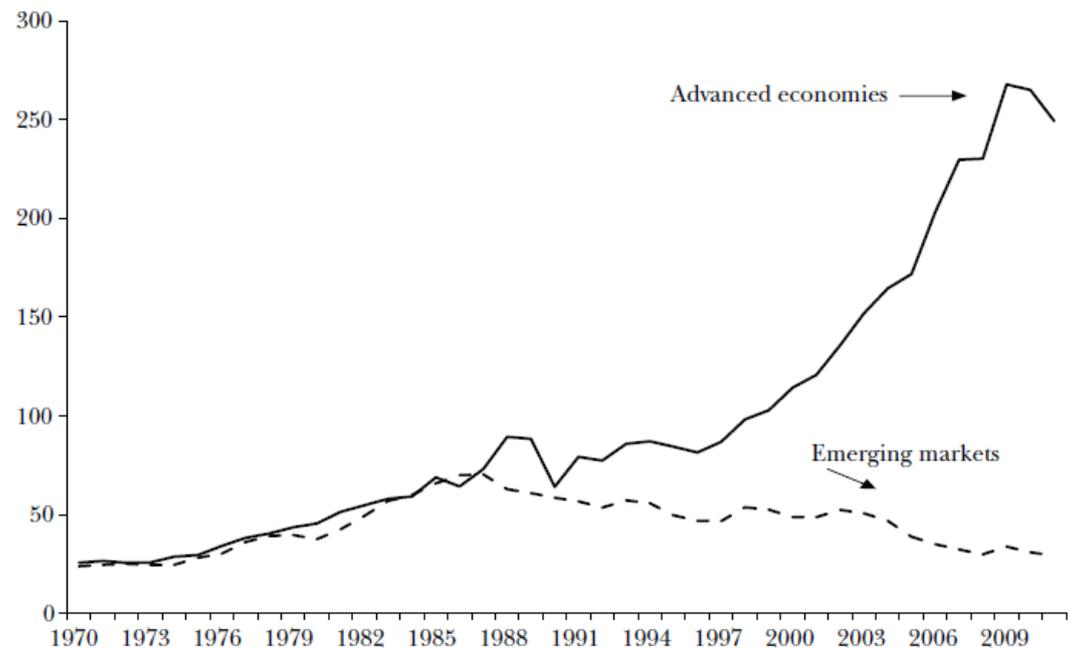


Figure 3: Debt Levels of Advanced and Emerging Economies (Reinhart et al., 2012)

### Private Domestic Credit as a Percent of GDP

(22 advanced and 28 emerging market economies, 1950–2011)

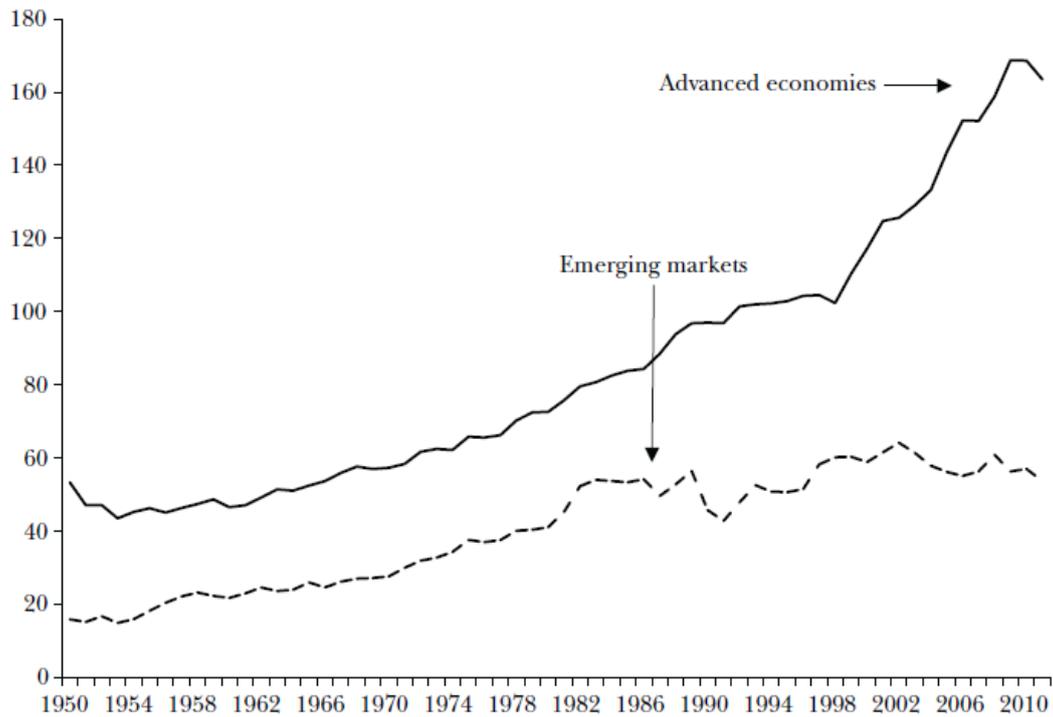
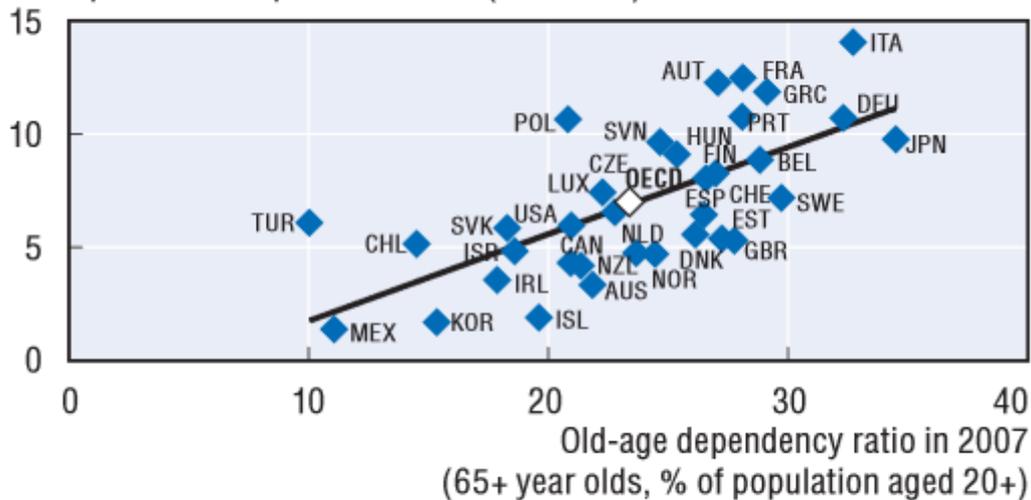


Figure 4: Private Domestic Credit as Percent of GDP (Reinhart et al., 2012)

## Demographic pressures and public pension expenditure

Public expenditure on pensions 2007 (% of GDP)



Note: Regression line is  $\text{pension expenditure} = -2.091 (1.908) + 0.3835 (0.07814) \times \text{dependency ratio}$ , where heteroskedasticity adjusted standard errors are given in parentheses. The coefficient on the dependency ratio is significant at the 1% level and the  $R^2$  of the regression is 0.4670.

Figure 5: Public Pension Expenditure and Dependency Ratios (Pensions at a Glance, 2013)

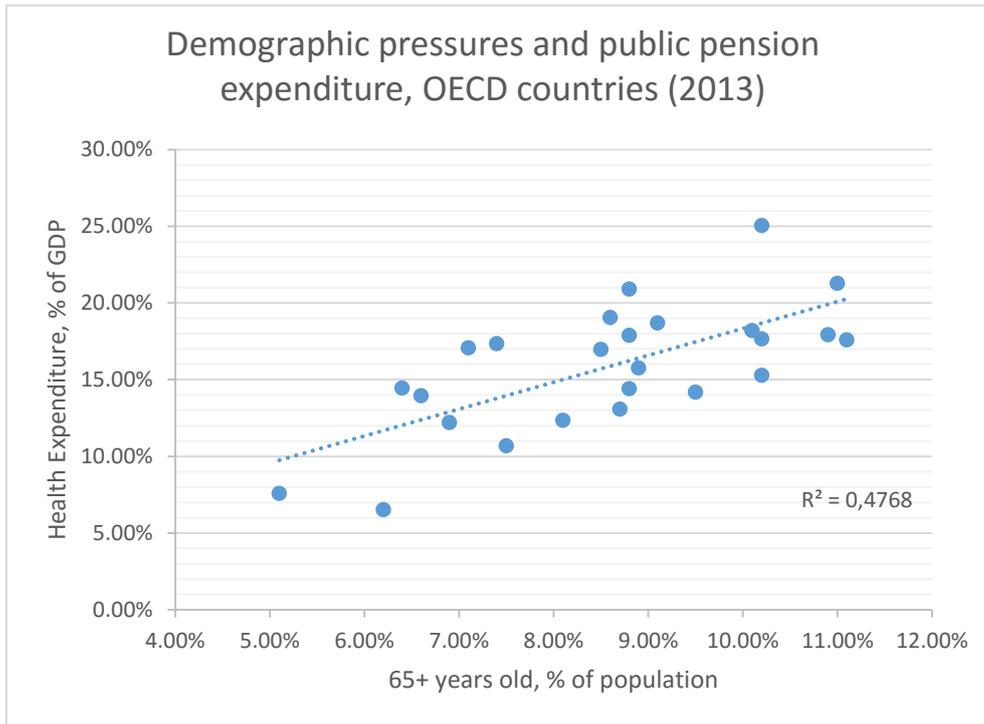
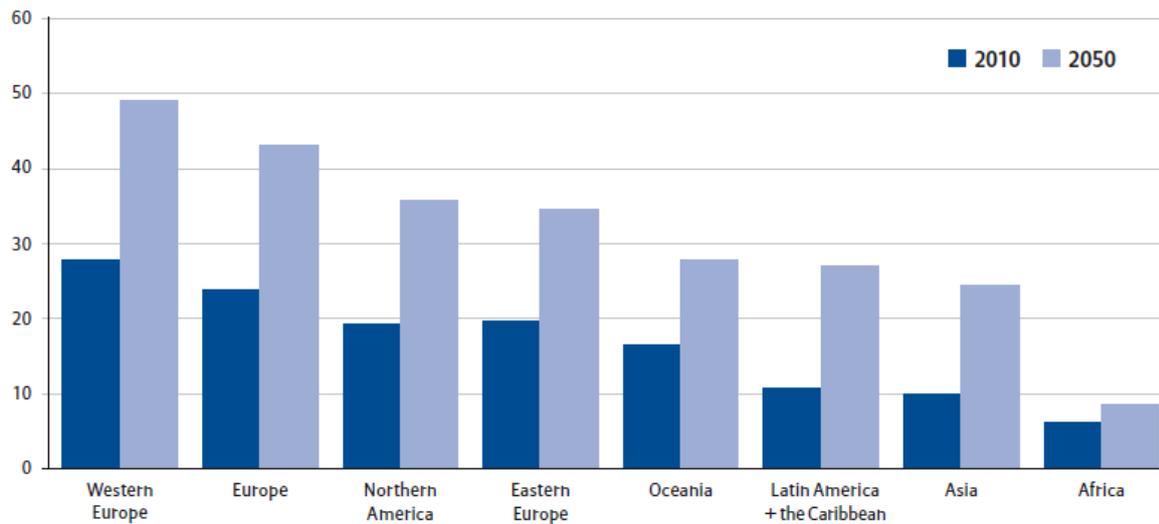


Figure 6: Demographic Pressures in OECD Countries (OECD data, 2015)

Old-age dependency ratios\* for different World regions (2010 to 2050) [as %]



\*Population aged 65 and older to population aged 15 to 64

Sources: UN Population Division (2012), Allianz Asset Management

Figure 7: Dependency Ratios across the World (Allianz, 2014)

## Pensions and health are the main areas of public social spending

Public social expenditure by broad social policy area, as a percent of GDP, in 2012 or latest year available<sup>1</sup>

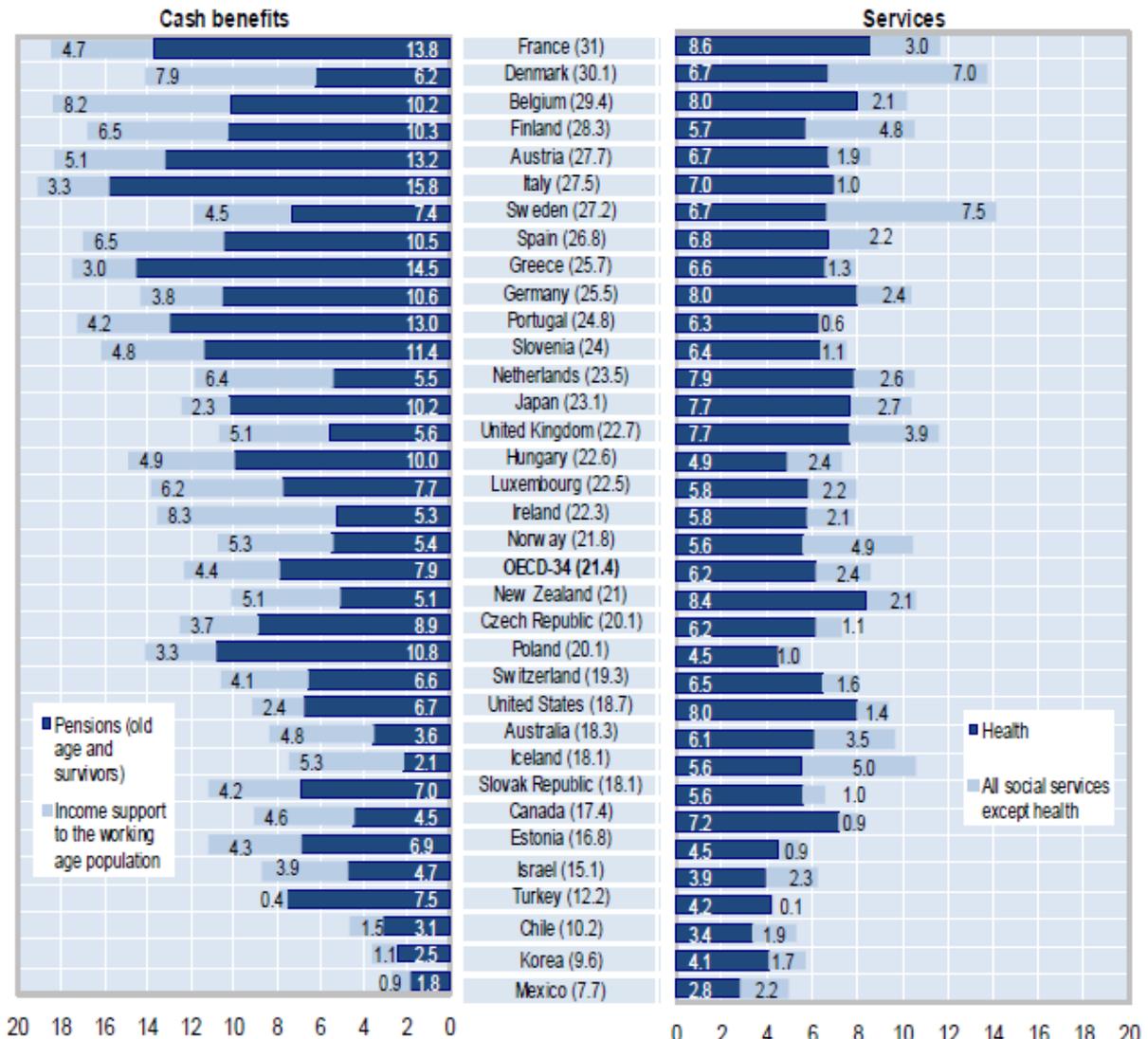


Figure 8: Public Social Expenditure by Policy Area (OECD, 2014)

# The unique population dynamics of Switzerland



## K. Generation Y's knowledge and perception about the sustainability of Switzerland's three pillar retirement scheme. How should this generation plan for their retirement?

*by Michael Fostinis, Anna Rontojannis, and Andreas Ruppen*

Switzerland, as other countries, is affected by demographic change and an ageing population, putting pressure on the retirement system. The sustainability of a retirement system under such conditions is questionable and therefore raises thoughts about whether the young generation, also referred to as Generation Y, will benefit in an adequate way. Switzerland's retirement system is constituted by three pillars, wherein each pillar has its special purpose, mechanism, and conditions. In this long-term oriented system, Generation Y will be affected by current societal, economic, and political developments as well as by individual decisions, even though their retirement lies in the distant future.

The purpose of this paper is to shed light on Generation Y's opinion regarding Switzerland's three pillar system. Through an online survey data has been generated regarding the state of Generation Y's knowledge about the three pillar system, their views on its sustainability, and their thoughts on their retirement plans. With the data, two main hypotheses are tested. To begin with, it is claimed that the knowledge among Generation Y with regards to pensions is limited. Secondly, currently not many Generation Y people have taken care of their pension.

The analysis shows that the respondents are able to answer basic questions. However, there is a lack of concept knowledge and a lack in the ability to answer in-depth questions. On the matters about the perception of sustainability more awareness can be found. A majority of the respondents believe that today's system will be unsustainable in the future and additionally show some awareness for that conditions will need to change. For instance, most of the respondents believe they will retire at a later age than under the current law. They perceive the demographic shift to be a major threat for the retirement system. Furthermore, the analysis shows that only a minority of the respondents is at the moment actively pursuing pension planning. Emphasis is put on considering additional means for retirement than just the mandatory pillars, which gives idea of additional efforts needed by Generation Y to improve their pension planning.

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## 1. Introduction

*“O AHV, du Wunderwerk, bist unser Trost im Alter ...”*

*Rosa Bertschin, AHV-song (Federal Social Insurance [FSI], 2013a)*

The above-stated song extract can be translated to “O AHV, you marvel thing, our comfort in age ...” This message relating to the Swiss retirement system is illustrative for the reliance people place on this institution in order to live comfortably when retired. However, the question of how comfortably and under which circumstances remains a perpetual debate and has recently gained in importance due to the challenges that retirement systems face.

The current retirement system in Switzerland is politicized and, ever since its establishment, has received multiple approaches to reforms, with some being more successful than others. The recent election period has shown increased attention to the topic, also in light of the ‘Reform 2020’. Switzerland is often ranked internationally as one of the best countries to retire in (cf. Natixis, 2015). However, this promise for a stable and comfortable retirement has been questioned, given the fact that Switzerland is also affected by major demographic changes and an ageing population. The inherent question of how sustainable the retirement system is therefore remains of utmost relevance for the younger generation, also labeled as Generation Y. Especially as this generation will only benefit from the current system in the very long term. Nonetheless, they will be affected by the current demographic development and actions undertaken in politics, as well as by individual decisions on pension planning. The question of sustainability is in public discussions often referred to as the “Contract of Generations,” which discusses the long-term and intergenerational aspect of the above-presented problem (cf. Cosandey, 2014).

The research question presented in this paper is threefold; it covers how Generation Y perceives the current retirement system, what their current knowledge of the system is, and how they view their personal planning capabilities. This paper is not meant to answer the question on how to solve the challenges faced by the retirement system, but attempts to provide insights on the views of Generation Y.

In order to collect information on the knowledge and opinions of the young generation, an online questionnaire was developed and published and serves as the main data source to answer the questions. The questionnaire can be found in the Appendix of this paper.

The paper is structured in the following order: To begin with, the current understanding of Generation Y is further developed and overview about the currently valid population expectation scenarios for the future in Switzerland until 2045 are given. Additionally, an overview of the current three pillar retirement system in Switzerland is given. Afterwards the

characteristics and results of the survey are presented and discussed. Finally, the paper is summarized and concluding remarks and future outlooks are provided.

## **2. Theoretical Part**

In this section an overview regarding the relevant age group “Generation Y” will be given. Moreover, the impact of the demographic change within Switzerland will be discussed. Finally, an overview about the current pension fund system will be provided and explained as part of the foundation for the conducted survey.

### **2.1. Generation Y and Its Age Structure**

To be able to address the correspondent group of people, an encompassing generational definition needs to be provided. According to Strauss and Howe (1991), a generation is roughly set by a length of 20 years. Having defined a structure of generations starting from 1433, Strauss and Howe define the people born between 1982 and 2004 as the “Millennials”. However, further research into this generation has led to the conclusion that the terms “Millennials” and “Generation Y” can be used as synonyms. Therefore, this paper will use the term Generation Y to describe the relevant age group.

Unfortunately, not only the term but also the exact range of years remains only vaguely defined. Depending on the selected literature, the years differ from 1980 to 1995 (PWC, NextGen: a global generational study, 2013) or between 1982 and 2000 (McCrinkle, 2005). It has been decided that this paper applies the definition given by PWC, as the questionnaire focuses on a topic that ideally requires some know-how about working conditions in Switzerland and its pension system.

### **2.2. Demographic Change Within Switzerland**

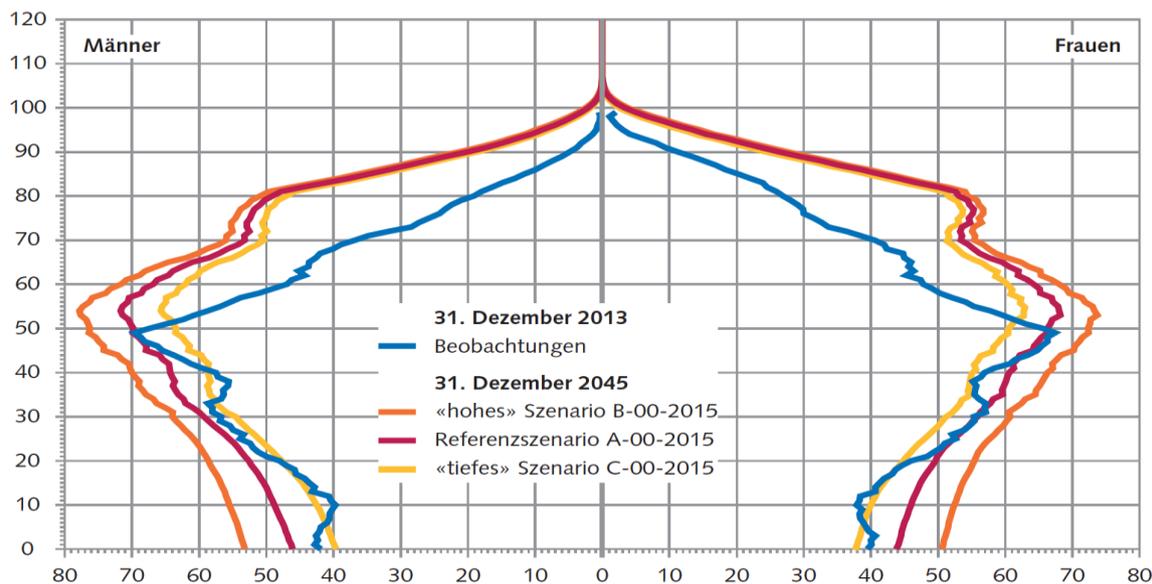
Predicting the future is not an exact science, but scenario building remains a useful method to determine the robustness of a system through sensitivity analysis. The demographic development in Switzerland is being assessed in such a fashion by the Swiss Federal Office of Statistics. The study “The future of longevity in Switzerland: background and perspectives” focuses on the impact of longevity among older persons, whereas more detailed scenarios can be found in the study “Szenarien zur Bevölkerungsentwicklung der Schweiz 2015-2045” (Swiss Federal Office of Statistics, 2008) (Federal Office of Statistics, 2015a).

The scenarios all show a growing number of inhabitants, more elderly but also a stable group of youth. The number of inhabitants over the age of 65 is expected to rise from the current 1.5 million (18.0%) to over 2.17 million (22.8%) by 2030 and to 2.69 million (26.4%) by 2045. Figure 1 provides an overview of these above-mentioned scenarios.

The different scenarios will each have a different impact on the retirement system of Switzerland. However, due to the limited scope of the paper, this cannot be focus on.

## Alterspyramide

Nach den 3 Grundszenarien, in Tausend



Quelle: BFS – SCENARIO

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Figure 1: Scenarios for the Development of the Age Groups Distribution in Switzerland until the Year 2045 (Federal Office of Statistics, 2015)

### 2.3. Overview of the Establishment of Switzerland's Three-Pillar System

In the following section, a brief overview about the current setup of Switzerland's three-pillar retirement scheme will be presented. The main objective is to provide a basic understanding of the underlying mechanism, as well as to show future perspectives in relation to Generation Y. The three-pillar retirement system counts as a Swiss particularity and has been legally embodied in the Swiss Constitution since 1972 (FSI, 2014). All statements below are structured by the specific pillar and do not claim entire completeness. Figure 2 at the very end of the section illustrates Switzerland's three-pillar system.

#### 2.3.1. First pillar: State Pension

The first pillar consists of the old-age and survivors' insurance (AHV) and the invalidity insurance (IV). They both are intended to cover basic living costs and therefore are mandatory for all individuals<sup>28</sup>. The old-age and survivors' insurance forms the most important part of the Swiss three-pillar system. Implemented in 1948, AHV grants pensions to people of retirement age and to spouses or dependent children of a deceased insured person. The IV scheme as

<sup>28</sup> Minimum pension is 1'175 CHF per month and maximum 2'350 CHF, married couple's pension is capped at 150 percent of the maximum amount, provided no gaps in contribution years (AHV/IV, 2014, p. 7).

such has been introduced for the entire population twelve years later in 1960. Supplementary benefits to increase income come to play only in the case when the support of both the AHV and the IV are not sufficient to cover basic living cost (FSI, 2014; Vimentis, 2015a). The first pillar functions according to the pay-as-you-go system, which means that it redistributes money that it receives from the working population as pensions.

According to the Federal Social Insurance Office, there is an urgent call for action for several reasons (FSI, 2013b). First of all, the contribution principle on which the funding of the first pillar is based will be in deficit from approximately 2020 onwards. This means that the expected return on asset of the first pillar will not be able to balance out the deficit of the contribution principle. Furthermore, the annual financing gap will amount to approximately 4.8 billion CHF by 2025, which determines a return potential of 1.2 percentage of salary or 1.4 percentage of value added tax respectively. Moreover, the annual financing gap is expected to increase to 8.9 billion CHF by 2030. Finally, in order to eliminate the annual financing gap without any increase of public sector revenue, the statutory retirement age would have to be raised by three years. All of these developments mean severe restriction to Generation Y's pensions if any future actions fail to address these issues.

### *2.3.2. Second pillar: Occupational Retirement Planning*

Occupational pension funds, also referred to as the second pillar, complete the first pillar's ideology. Taken together, they are responsible to ensure that "retired people, to a large extent, maintain their former standard of living" (FSI, 2015a). The first and the second pillar together are supposed to jointly deliver approximately 60% of the earned salary before retirement. As enforced by lawmakers, the occupational pension fund system includes the principle of minimum provision and therefore counts as a mandatory part within the Swiss three-pillar system. However, certain individuals are not subjected to the mandatory second pillar scheme: the self-employed, salaried person with a maximum of a three-month fixed contract, family members of a person who operates an agricultural establishment and who are working in this establishment as well, and persons who are disabled to at least 70% according to Swiss Law (FSI, 2015a; Vimentis, 2015b). The second pillar functions according to the funding principle, which means that the accumulated money will gather interest before disbursement. The pensioners obtain a perpetuity<sup>29</sup>, also referred to as a never-ending retirement pension, with a conversion factor of 6.8 percent of their total deposits.

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<sup>29</sup> However, the pensioners may choose to obtain the so-called perpetuity all at once instead of monthly payments. With a conversion factor of 6.8 percent, an accumulated capital of 100'000 CHF would imply an annual pension of 6'800 CHF, lifelong.

Similar to the first pillar, the occupation insurance also shows an alarming development, especially in regards to Generation Y. Considering the fact that the second pillar functions according to the funding principle, the average return on investments has been continuously declining for more than ten years (FSI, 2013b). Additionally, a continuous rise in life expectancy leads to a distribution of the policy reserve over a longer time period. This development therefore leads to redistribution from the active participants to the pensioners as the return on plan assets primarily needs to be used to finance the interest rates of the pensioner's capital (Delpy, 2012, p. 27).

### *2.3.3. Third pillar: Private Retirement Savings*

Unlike the other two pillars, the third pillar is not compulsory. Although having its voluntary character, the individual provision to meet further needs offers certain tax benefits and is therefore differentiable to traditional forms of savings (FSI, 2013b; Vorsorge-3a, 2015a). The third pillar can be divided into an unrestricted insurance (pillar 3b) and a bound, restricted insurance (pillar 3a). While pillar 3b consists of ready cash, traditional savings, life insurance or other financial investments, pillar 3a defines specific savings that are supported by fiscal policy. Precise procedures regarding pillar 3a have been set out in a federal regulation in 1985 (FSI, 2015b). In order to set up an individual pillar 3a, either a legally recognized bank or insurance institution is needed. The third pillar is accessible to everyone whose income is subject to contributions of pillar one; however, because the self-employed do not have to contribute to the second pillar, the third pillar is their major pension establishment. In accordance with this fact, the self-employed are currently allowed to deduct an annual amount of maximum 33'840 CHF from their direct taxes to the federal government, cantons and communes, whereas employees are only allowed to deduct a maximum of 6'768 CHF per year (FSI, 2015b).

Because of the financing problems that both pillar one and two are currently facing, the third pillar is said to optimally prepare the young for their retirement (Vorsorge-3a, 2015b). Therefore, Generation Y is expected to make use of the individual provision pillar in order to maintain their standard of living after retirement.

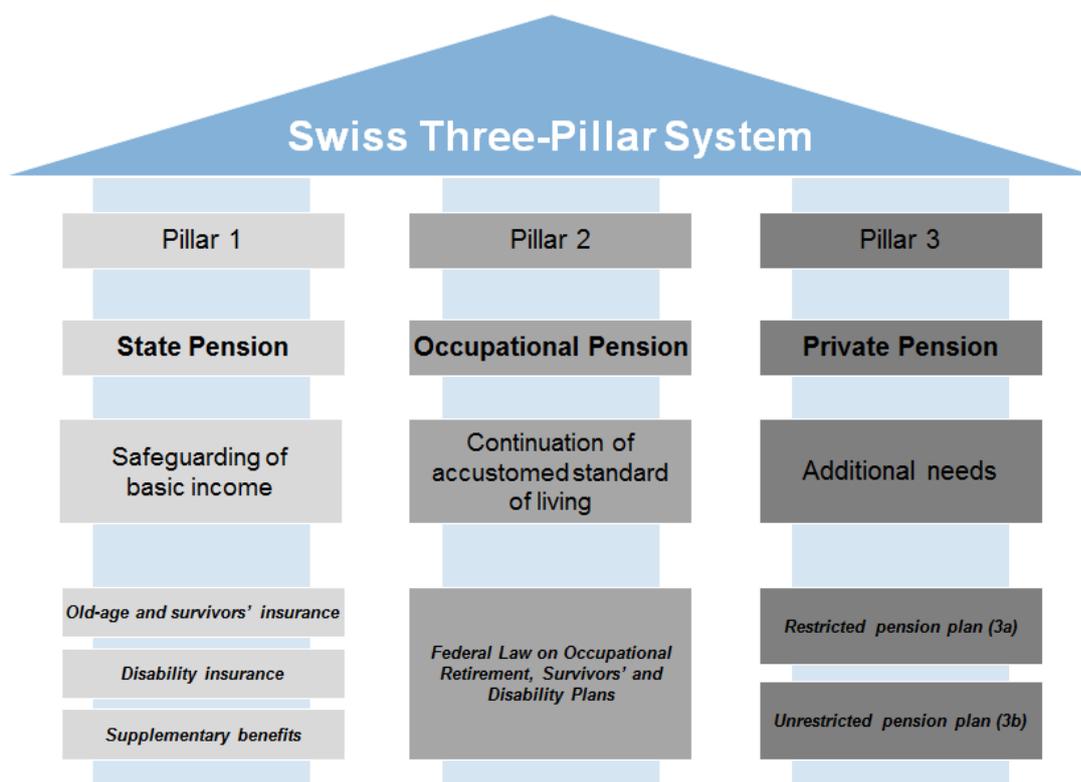


Figure 2: Swiss Three-Pillar System (Author, based on Credit Suisse, 2015; SwissLife, 2015; UBS, 2015)

### 3. Survey among Generation Y

The following chapter focuses on how data gathering was conducted and provides an overview of the obtained sample. However, the analysis itself will be presented in Chapter 4.

In order to collect the data, a questionnaire using Google Forms was created and distributed via social media platforms. The full questionnaire can be found in the Appendix. The first part of the questionnaire focused on personal details of the interviewee. Afterwards, a personal assessment of the present know-how about the pension fund system was requested.

#### 3.1. Hypotheses

It is believed that, in order to plan well and make decisions, an individual should have a working knowledge of basic concepts. Therefore, questions were included that test for knowledge in different forms and details and eventually addressed personal planning. Additionally based on the theoretical part and the provided topic, two main hypotheses were raised. First, the general knowledge in Switzerland within Generation Y about the current pension system is limited. Second, it is expected that the main part of this generation has not taken care of their pension as of today.

The two hypotheses will be revised using the acquired sample of answers from the respondents. Furthermore, it is desired to gain insights on what planning opportunities the Generation Y considers for its retirement.

### 3.2. Overview of the Survey Respondents

As mentioned above, the designed survey was distributed over social media platforms. In total, the online form was accepting answers from October 4th, 2015 up to, and including, October 12th, 2015. In total 209 responses were received, with seven being excluded as they were not permanent residents in Switzerland and two due to fake entries. All following matters related to the survey are based on those 200 remaining responses.

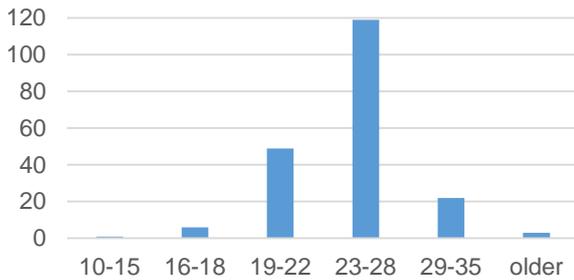


Figure 3: Age Distribution of Respondents

Figure 3 depicts the age distribution of the sample and shows that most of the respondents have an age within our target group of Generation Y as previously defined.

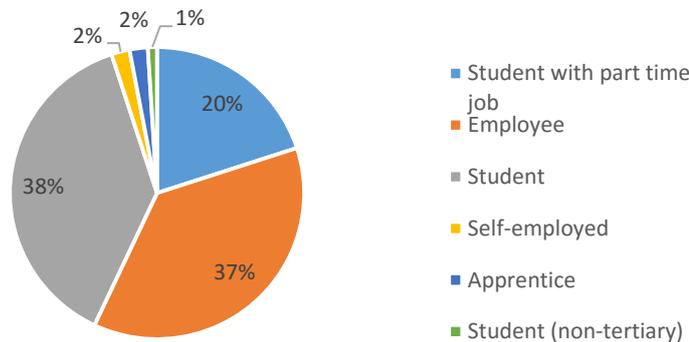


Figure 4: Current Occupational Status of Respondents

As one can see from figure 4, most respondents are young students, with or without part time occupation. Additionally, it is important to mention that 64% of all respondents are male<sup>30</sup>. These demographical aspects need to be kept in mind when interpreting further results.

Another key characteristic of the respondents is that most of them have an annual income of below 20'000 CHF. This makes intuitive sense given the age and occupational status of the majority of the group. The complete distribution can be found in Figure 5.

<sup>30</sup>The issues related to the sample are discussed in the limitations section. To provide a comparative benchmark, around 33 percent of the population between 15-24 years old are considered inactive, meaning among others, mainly still in education or not job seeking (Swiss Federal Office of Statistics, 2015b).

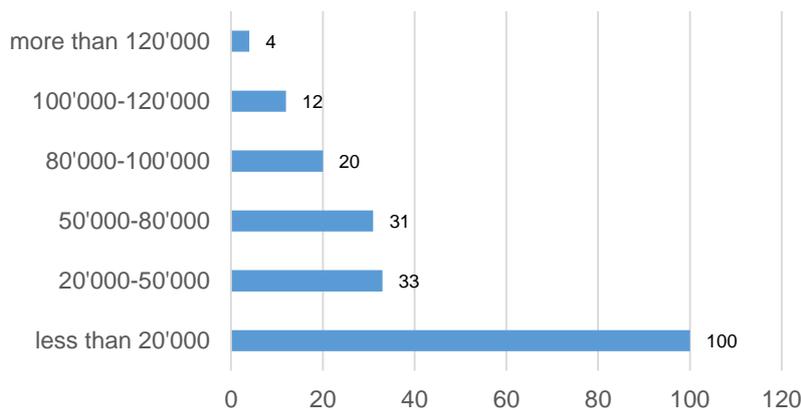


Figure 5: Current Annual Income according to Conducted Survey

Furthermore, to get a better picture of the respondents they were initially asked to judge for themselves how good they believe their knowledge about Switzerland's pension system to be and how much they are interested in that topic.

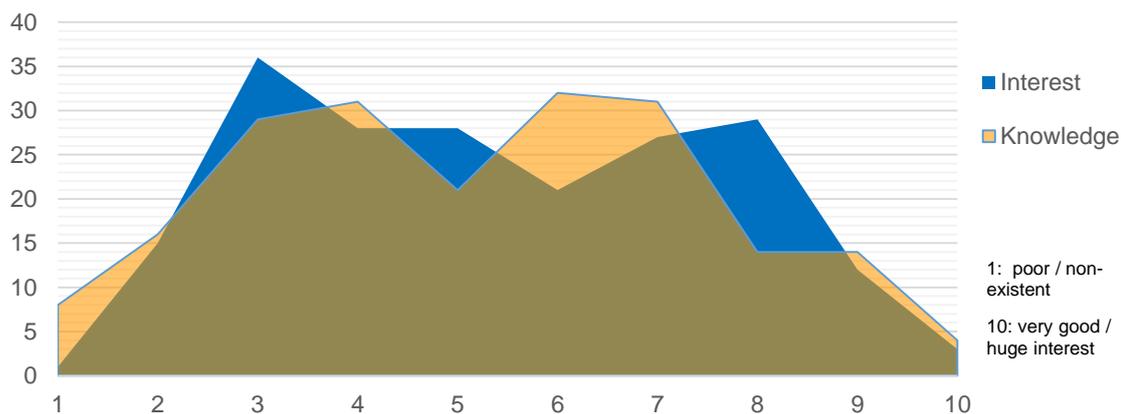


Figure 6: Judgement of Interest and Knowledge according to Survey

As Figure 6 indicates, nearly half of the sample judges their knowledge to be low to medium. This is similar to the general interest for the system, which only shows a slightly higher trend. Only 31.5 percent of the respondents rate their knowledge of the current system a 7 or higher - on a scale from 1 to 10. This information will additionally assist us in understanding the way the respondents complete the survey.

#### 4. Analysis and Interpretation

The following chapter will give an overview regarding the study's results related to the questions focusing on the retirement system. The subsections have been structured according to the three-folded research question.

##### 4.1. Knowledge about the Current System

Having carried out the survey among 200 relevant Generation Y representatives, the main objective of this subsection is to present Generation Y's knowledge about the current system.

A first overview analysis indicates that 64 percent of the respondents correctly identify old-age and survivors' insurance, invalidity insurance, supplementary benefits, occupational insurance, as well as private insurance to belong to Switzerland's three-pillar system. However, 25 respondents (12.5%) mention unemployment insurance and 14 respondents (7%) classify life insurance as basic components of the system. Therefore, knowledge remains lacking.

Afterwards the survey takers were asked to match each given pillar with its exact description. These survey results are presented in Figure 7 below.

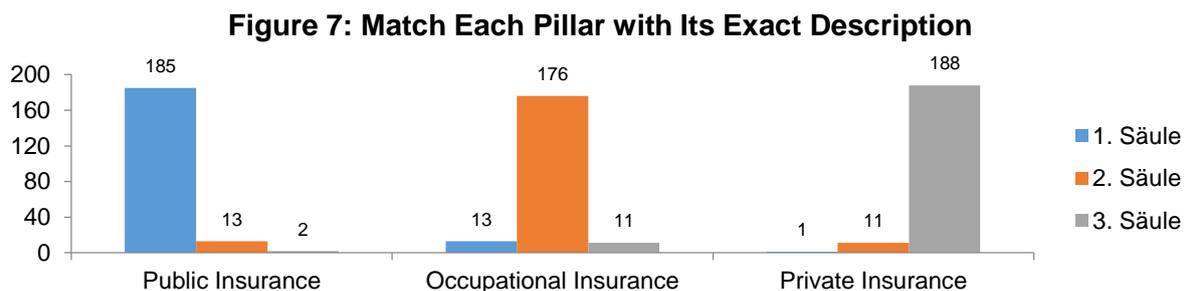


Figure 7: Knowledge about each Pillar and its Exact Description

Out of the 200 participants, 185 respondents (92.5%) correctly assigned old-age and survivors' insurance, invalidity insurance, and supplementary benefits to the first pillar. It is worthwhile to mention that 40 percent of the remaining survey takers possess a degree in higher education (university or university of applied science) and independently 26.7 percent estimated their existing knowledge a 7 or higher on scale from 1 to 10. Regarding the second pillar, only 88 percent properly stated occupational insurance. A closer look on the data shows that 45.8 percent of the incorrect answers stem from people owning a degree in higher education and 25 percent estimated their personal knowledge about the retirement system a 7 or higher. The results concerning the third pillar appear to be slightly better, as here 94 percent of the respondents correctly named private insurance to be the third pillar. In terms of the higher educated participants, one third was unknowing. Additionally, independently, only 8.3 percent judged their knowledge 7 or higher. In total 84.5 percent of respondents identified all pillars correctly.

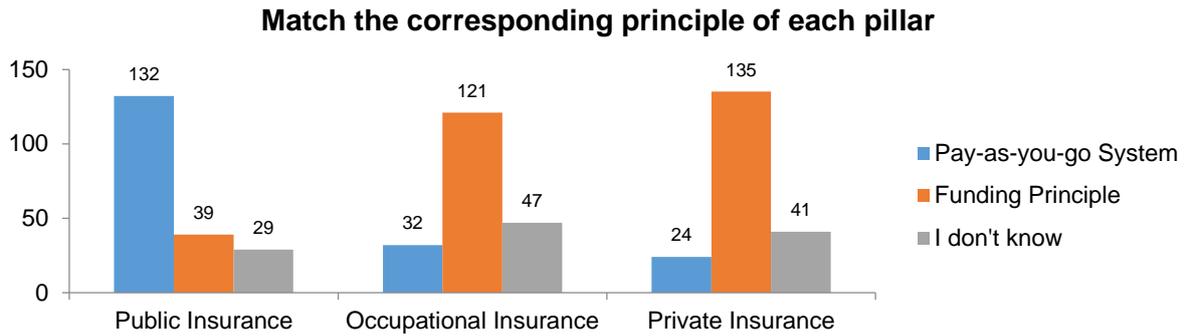


Figure 8: Knowledge about each Pillar's Underlying Principle

Figure 8 depicts the matching results for the underlying principle that is followed by each pillar. Analysis shows that 66 percent of the survey participants know that the public insurance functions according to the pay-as-you-go system. With respect to the occupational insurance and the private insurance, respectively 60.5 percent and 67.5 percent correctly stated the funding principle to be the underlying mechanism. Combining all three pillars, there is an average of 36 percent of the higher educated survey takers that is unknowing or mentions the wrong principle.

When asking the participants to specify the main intention of the first pillar, 164 respondents (82%) clearly indicate the purpose of covering basic living costs, as indicated in Figure 9. However, splitting the incorrect respondents further into different age categories, 36.1 percent range between 19 and 22 and 55.6 percent range between 23 and 28 indicated this.

**Figure 9: What is the main purpose of the first pillar?**

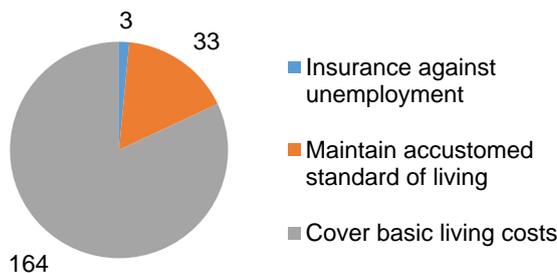


Figure 9: Knowledge about the First Pillar's Purpose

Going into more detail regarding the second pillar, 103 respondents (51.5%) stated to be familiar with the funding principle. Out of these 103 Generation Y members, 68.0 percent knew the exact conversion factor of 6.8 percent.<sup>31</sup> However, asking all survey takers what will happen once their amount paid into the retirement system will be re-distributed to them, only

<sup>31</sup>In the research of Delpy (2012, p. 40) 35 percent were able to explain the conversion rate correctly.

38.5 percent was aware of the perpetuity, as revealed in Figure 10. This suggests a misconception of the interrelations between the pillars.<sup>32</sup>

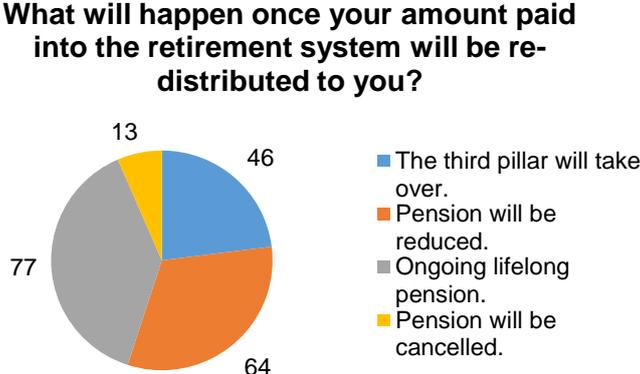


Figure 10: Know-how about the Second Pillar's Perpetuity

Additional research about in-depth knowledge with regards to the third pillar was conducted. Of this, the exact overview can be found in the Appendix. With 87.5 percent, a majority of Generation Y's surveyed representatives know that private insurance is on a voluntary basis. In accordance with this result, 75 percent recognize third pillar's free accessibility to basically all individuals. Furthermore, most of the survey takers are aware that there are some limited tax deductions for employees as well as for the self-employed. However, only 94 respondents (47.0%) know that tax deductions are limited to a higher amount for the self-employed as the third pillar constitutes their main pension after retirement. Additionally, the analysis exposes that most of the respondents know that there are limited reasons for premature payments.

4.2. The perception of the retirement system and its sustainability

It has been previously outlined that there are financing problems affecting the current retirement system, leading to the inherent question of whether the current generation thinks that the present system is still feasible in the future. The majority of the respondents provide a negative answer to this questions, as can be seen in Figure 10. These answers indicate that the respondents seem to perceive a notion of the unsustainability of the system. This perception is in line with the very recently published "Youth Barometer 2015" from Credit Suisse, where the data suggests that the retirement system is in second place in terms of the main worries of the young generation (Gfs.bern, 2015, p. 52). The reasons why the respondents answered the way they did varies and makes it unable for us to draw the conclusion that a negative answer implies the perception of being lost and without a remedy. When asked to choose the statement the respondents agree the most with, almost 40% of

<sup>32</sup>In representative study from AXA (2015, p. 16) 48 percent were able to answer correctly a concept question about the conversion rate.

those who previously said that the current system is not feasible anymore, agrees that there will be solutions to this topic, showing a positive outlook and attitude. The written comments provide further valuable insight on the opinions of the respondents. This can also be seen in Figure 11. Specifically, most of the answers have one thing in common, namely that they anticipate a change or see the need for changes, irrespectively of their opinion regarding the sustainability of the system. The respondents with an affirmative answer in many cases answer the outlook of the retirement system in a positive way due to changes they deem necessary.

**Figure 10: Will the current system still work in the future?**

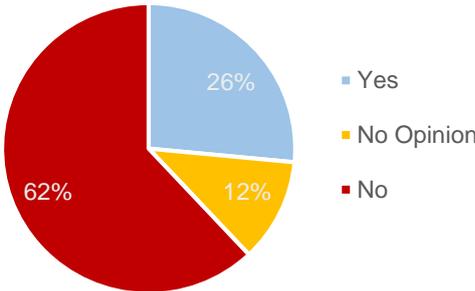


Figure 10: Estimation about the Current System’s Sustainability

In the comments provided by the respondents, the key word demographic situation appears in most of the answers and is associated with the negative outlook, and 87 percent deem the demographic situation to be a significant to extreme threat to the retirement system. This can also be seen in Figure 12.

Statement vs. Perception of Sustainability	Yes	No	No Opinion	Total
The current system will not be sufficient in order to provide me a sufficient pension	2	73	4	79
In my opinion there is no need to worry about my pension given the current circumstances	8	2	5	15
I am confident that there will be adequate solutions found within an appropriate time horizon in order to secure also for me an adequate pension like today	43	49	14	106
<b>Total</b>	<b>53</b>	<b>124</b>	<b>23</b>	<b>200</b>

Figure 11: Statement versus Perception of Sustainability

It is often commented that the amount of active workers is not sufficient to sustain the system with the same pension level. In general, the respondents do not challenge the system of the three pillars itself. However, they see the need for adjusting some properties such as the retirement age. Specifically, some mention flexible retirement age or think that the level of pension payments need to be revised downwards.

In the survey 72 percent of the respondents think that they will retire at a higher age than the current one in place. Most of them judge it to be at an age between 66-70 years old, which indicates a sort of realization that this generation will need to sacrifice part of the current

benefits. Few of the respondents see the structural challenge of the ageing as a temporary problem by expressing the view that after the so-called baby boomers have disappeared, the pressure on the pension system will fade and the age structure will be again more beneficial for the system. One can conclude that the respondents are aware that the retirement system is facing challenges.

Given this observation, many show some confidence that there will be a solution that requires political steps, although some note that this is also a challenge for lawmakers themselves. On the political sphere a respondent makes an interesting note in stating that the majority of the voters belong to the ageing population. This creates a political power mismatch between those who will soon benefit or are already benefitting from the system and those younger people who will be affected by current action or inaction.

**Figure 12: Size of Threats to Sustainability**

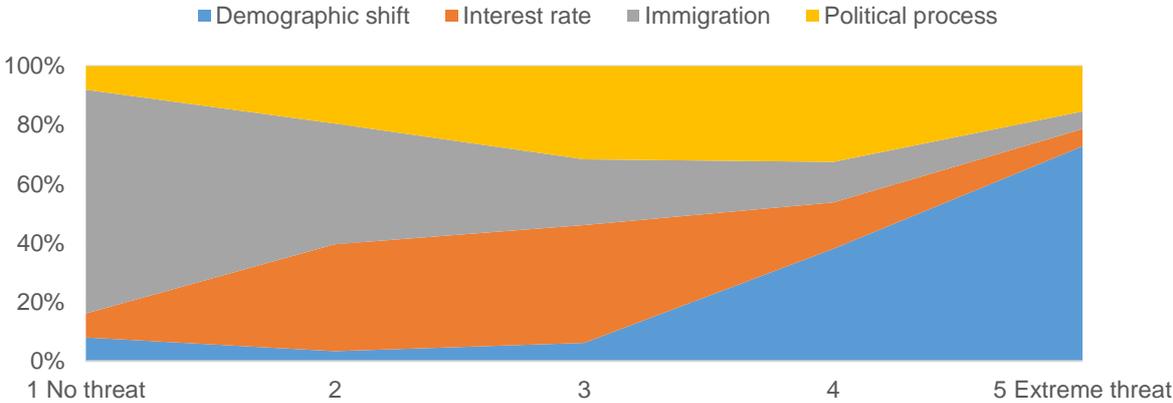


Figure 12: Perception of Threats according to Analysis

The political process is categorized to be a threat to some extent as shown by Figure 12 above. Furthermore, the financial environment considering interest rates is also seen as a medium-risk threat due to the fact that some respondents fear that interest rates do not provide adequate return. Immigration with some exceptions is not seen as a threat, as its effect can in fact also be considered positive given it increases the number of active people working and paying into the retirement system. However, the effect can be disputed (cf. Fotakis, 2003).

**4.3. Generation Y’s Possibilities for Their Retirement Plan**

Due to the demographic changes the redistribution of money from younger, working people to the older generation becomes an increasingly large issue in the coming years. From a political point of view, research conducted previously has led to the conclusion that older people usually vote against disadvantageous changes to the current pension system (Bonoli, Häusermann 2009). As we are currently in an all-time low interest phase (Kalt, Weisser 2015), the second pillar is also no longer working as expected and there is also a redistribution happening from

younger to older people. We can therefore also expect an underfinancing of these funds and calls for action to start planning retirement more individually and personally.

Being able to plan for retirement does not only presume that people are aware of an existing problem and also have technical knowledge about basic concepts of the retirement system. In contrast, they also need to have a perception on whether individual planning can improve their later-planned retirement. When asked if respondents think that they can bridge gaps in the retirement system themselves through planning in order to provide an adequate pension, 65 percent rate their possibility to influence an adequate pension through planning in the upper half, showing some confidence of the effect of personal actions, given the circumstances.

Of the 200 respondents, 64 (32%) of them answered with yes regarding the question if they are currently actively pursuing pension planning. Of those, 38 mention the third pillar as their savings-option. It cannot be neglected that around 69 percent of those who are actively planning retirement are already either employees or self-employed. The survey shows that active planning and saving at the moment is currently low, which can be partly explained by the occupational status of most respondents. This can also be seen in Figure 13, where most of the respondents say that savings beyond the mandatory pillars cannot be achieved due to the current income situation, followed by people that did not make any considerations yet and those who would like to use their means otherwise, which could show a saving versus consumption trade-off.

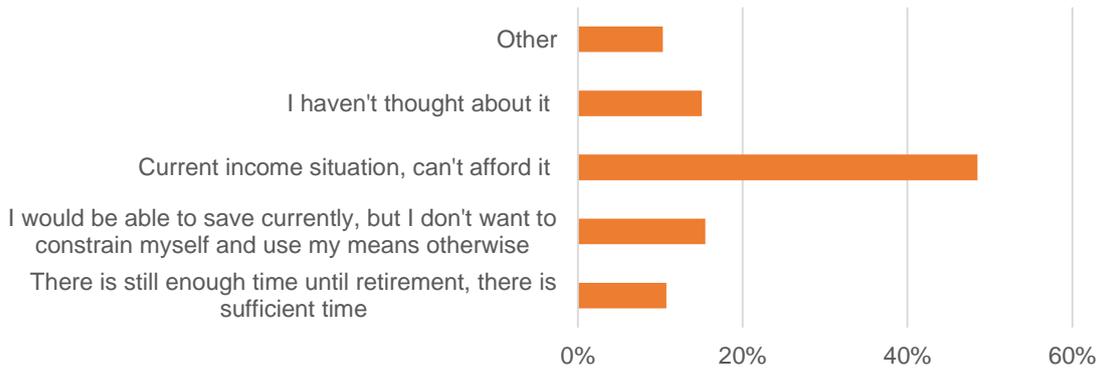


Figure 13: Reasons why People do not save beyond the Mandatory Pillars

Some respondents write that as soon they will be in an adequate earnings position, they will start to save more actively for retirement, which can only be recommended to strengthen financial stability in retirement and also benefit from the tax advantages during the active working time.

On the following page Figure 14 shows how the respondents answered the question “What is in your opinion the best alternative to take care of your living standard after retirement?”

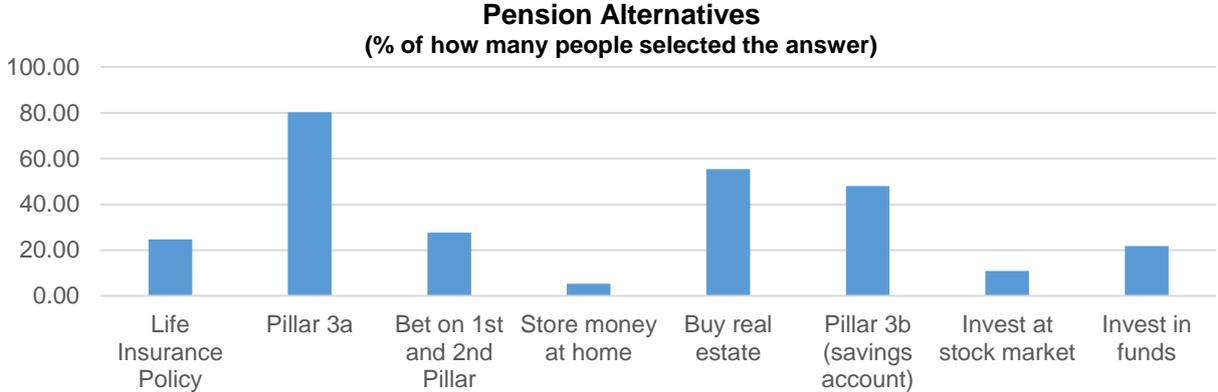


Figure 14: Pension Alternatives

The top three candidates that the respondents are considering in their planning are the pillar 3a, as intended by the system, buying real estate to in order to store wealth and 3b savings. It is clear from the results that young people are considering additional means than just the mandatory pillars. Therefore the importance<sup>33</sup> of the third pillar will be rising as a pension income and that is what young people also should focus on, considering the security of the investment. The fact that people are considering additional private savings options also means that planning is more demanding and more effort is needed to manage that. In contrast to more traditional saving options, investment alternatives at the stock market might also be an opportunity in order to face the low interest environment, but this depends on the risk-appetite of the individuals and financial endowment.

If the recommendation is to consider retirement planning and saving as early as possible, constraints need to be considered. Making use of the different options the respondents selected currently presumes some disposable income to allocate to this additional options. As Gabadinho and Wanner (2008, pp. 34-37) show, the different sources of income when retired depend on whether households belong to lower or higher financial means groups. Households with lower financial means depend much more on the first pillar as a source of income. This makes one respondent’s comment interesting, as she states she is investing in her education, which can create more opportunities for retirement saving if a solid basis with education is set. Another rather creative response from a respondent was to just start making more children again and thus increase fertility rates.

To further improve the incentives for savings new possibilities should be found. These alternatives do not necessarily include only saving products, but also include changes to the current

<sup>33</sup>Similar as the importance of the second pillar has increased over time (cf. Gabadinho & Wanner, 2008, p. 62).

system. Another approach could be to use behavioral economics to boost the savings rate. For example, the pillar 3a should be included in the standard bank package for private people, and a monthly transaction of a small percentage should be set automatically. Research has shown that people tend to save more if they have to opt out (Benartzi & Thaler 2013).

## **5. Summary**

The conducted survey for this paper gives some first insights about Generation Y's know how and perception about the current retirement system. This chapter will summarize the most important findings of the paper, provide limitations and a future outlook.

### **5.1. Conclusion**

In a first step, a hypothesis was stated that claimed that the general knowledge in Switzerland within Generation Y about the current pension system is limited. Analysis shows that there is good general knowledge available. However, going into more details, most of Generation Y's representatives prove insufficient in-depth knowledge. This is illustrated primarily by the extensive ignorance of the second pillar's perpetuity principle. Another hypothesis stated that Generation Y has not taken care of their retirement so far. As only 32 percent of the respondents answered with yes to this question we can conclude that the percentage is rather low and is therefore in accordance with the raised question. In contrast to our study, the recently conducted study of Pedroni & Rieskamp (2015) showed that 79 percent of the respondents are investing in a third pillar, though that study included a much higher percentage of older respondents than the study conducted for this paper.

Currently, paying into the first pillar is mandatory starting at age 21 if one wants to avoid a gap. A reason often stated for not having a third pillar is lack of money. This could mainly be based upon the high percentage of students. The system of the three pillars itself is not really questioned, but in terms of planning for the young generation, alternatives to the mandatory pillars gain more importance, which therefore needs more considerate and cautious planning that should be individually assessed. As mentioned above, the hypothesis about limited knowledge cannot be completely rejected. Although the high-level questions were answered mostly correctly, there is a lack of knowledge in the more in-depth functioning of the retirement system. This supports the idea of additional efforts needed by the Generation Y to improve their planning. Although planning and knowledge show some space for improvement, it can be concluded that the awareness for the challenges is present and that there is a perception that things will have to change, such as the retirement age. This shows that the topic is not ignored but rather discussed actively.

## 5.2. Self-Criticism and Limitations

This chapter focuses on the limitations of this study. As mentioned above, the sample itself is not representative for the Switzerland's entire Generation Y population. The sample size with a number of 200 representatives is neither in terms of geography nor in terms of age adequately spread. Regarding income, highest level of education and current occupation the survey fails to present an equally distributed number of representatives over all categories as well. Furthermore, with a share of 64.5 percent, male participants are overrepresented among the survey population. The main reason for these limitations lies in the similar ages of the authors, their similar occupation as students, as well as the limited time to conduct the present survey. These mentioned limitations may even explain some strong tendencies of the survey takers. Additionally, the questionnaire as such certainly contains some interpretation and framing errors and the survey may be affected due to sometimes limited answering possibilities given.

However, despite the initial knowledge of the existing limitations of the present research, it is claimed that valuable insights have been delivered into the knowledge, the sustainable perception and the level of future thinking of Switzerland's Generation Y regarding their personal retirement planning. Moreover, it is claimed that the paper presents the first research in this specific area of Generation Y's retirement perception in Switzerland. Especially during the first research stage, when available studies among Switzerland's Generation Y retirement awareness were investigated, little to no sources had been identified.

## 5.3. Outlook on Further Research

In order to deal with the above-mentioned limitations, the sample size should be enlarged and possibly also include older generations to allow for comparisons.

Questions regarding the awareness of retirement planning and the overall perception of the need for planning were rather numerous. Further research could be conducted if income gaps will be filled in a different way to provide for a more comfortable retirement. This also goes together with the statement of students as they often lack the means to start early on, but often have more income later.

To improve the savings rate behavioral economics could be used by creating an opt-out instead of an opt-in system as described in Chapter 4.3.

Another possibility to test in a larger timeframe could be the upcoming of the so-called sharing economy, where not owning but using lies in the foreground. Research could be conducted focusing on how this new mentality influences saving behavior. As this is in itself a very new research topic, the impact on current business models is not yet completely clear.

Together with the limitations mentioned, the topic offers several possibilities for further research which focuses on the younger generation of the working people. Due to the economic surroundings and the demographic changes expected in the coming years, the topic will most probably remain in the spotlight.

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## 7. Appendix

The following pages include the questionnaire and figures that were used during the analysis, but were excluded from the main part for better understanding.

### Appendix A: Questionnaire

The following pages show the complete questionnaire as it was presented to the respondents.

## Umfrage zum Vorsorgesystem der Schweiz

Die folgende Umfrage hat zum Ziel, das Wissen und die Einstellung der "Generation Y" in Bezug auf das Schweizerische Vorsorgesystem zu erfassen. Bitte fülle alle Fragen nach deinem besten Wissen aus, und nimm bitte keine Hilfsmittel zur Verfügung.

\* **Erforderlich**

**Wie alt bist du? \***

- 10-15
- 16-18
- 19-22
- 23-28
- 29-35
- älter

**Geschlecht \***

**Beruf \***

**Höchster Bildungsabschluss \***

**Momentanes Einkommen \***

**Bist du ständig in der Schweiz wohnhaft? \***

- Ja  
 Nein

**In welchem Kanton wohnst du? \***

**Wie schätzt du deine Kenntnisse über das Schweizer Vorsorgesystem ein? \***

1 2 3 4 5 6 7 8 9 10

gering            sehr hoch

**Mein Interesse für das Thema Altersvorsorge ist...**

1 2 3 4 5 6 7 8 9 10

nicht vorhanden           extrem gross

**Aus welchen Säulen besteht das Schweizer Vorsorgesystem? \***

- Lebensversicherung  
 AHV/IV/EO  
 Private Vorsorge 3a und 3b  
 Berufliche Vorsorge BVG  
 Arbeitslosenversicherung

# Das Säulensystem der Schweiz

Ordne die einzelnen Säulen zu \*

	1. Säule	2. Säule	3. Säule
AHV/IV/EO	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Private Vorsorge	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Berufliche Vorsorge BVG	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Nach welchem Prinzip funktioniert welche Säule? \*

	Kapitaldeckungsverfahren	Umlageverfahren	Weiss nicht
AHV / IV / EO	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Berufliche Vorsorge BVG	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Private Vorsorge	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## Das 3-Säulen Prinzip

Was ist der Sinn und Zweck der AHV? \*

- Fortsetzung des gewohnten Lebensstandards
- Sicherung des Existenzbedarfs
- Arbeitslosenabsicherung

In Medien wie Fernsehen und Zeitungen wird häufig über den Umwandlungssatz gesprochen. Ist dir dieses Konzept bekannt? \*

- Ja
- Nein

Wie hoch ist der heutige Umwandlungssatz? \*

- 5.2%
- 9.6%
- 6.8%
- 12.1%
- Weiss nicht

Die private Vorsorge ist freiwillig. \*

- Ja
- Nein
- Weiss nicht

## Kurzes Fallbeispiel

Du hast während deiner Zeit als Arbeitnehmer in der beruflichen Vorsorge ein Altersguthaben von CHF 100'000 angespart.

Nehmen wir an, dass du pro Jahr eine Rente von CHF 10'000 ausbezahlt bekommst. Dies bedeutet vereinfacht, dass dein Altersguthaben nach 10 Jahren Rentenbezug aufgebraucht ist.

**Was passiert, wenn das angesparte Kapital aufgebraucht ist? \***

- Du erhältst keine Rente mehr.
- Du erhältst bis zum Lebensende CHF 10'000.
- Die Rente wird reduziert.
- Dann kommt die 3. Säule zum Tragen.

**Wie hoch ist hier der Umwandlungssatz? \***

- 10%
- 1%
- 100%

**Angenommen du warst als Arbeitnehmer in einer 50%-Teilzeitstelle und dein Jahreslohn betrug netto um die 60'000 CHF. Mit deiner Teilzeitstelle wärst du nicht obligatorisch BVG-versichert gewesen. \***

- Richtig
- Falsch
- Weiss nicht

**Während deiner Zeit als Arbeitnehmer hast du dich zudem entschieden, ein Säule 3a Konto aufzubauen. Welchen der folgenden Aussagen stimmst du zu? \***

	Richtig	Falsch	Weiss nicht
Die Säule 3a steht grundsätzlich allen Personen offen, die entweder einer selbstständigen oder einer unselbstständigen Erwerbstätigkeit nachgehen und deren Einkommen AHV-pflichtig ist.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Die Beiträge an die Säule 3a können bei den direkten Steuern von Bund, Kantonen und Gemeinden bis zu einem bestimmten Umfang vom Einkommen abgezogen werden.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Zum Abzug sind nur selbstständigerwerbende Personen berechtigt, nicht aber Arbeitnehmende.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Selbstständigerwerbende können einen höheren Anteil von ihren Steuern abziehen als Arbeitnehmende, wenn die Selbstständigerwerbenden keiner beruflichen Vorsorge angehören.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Du willst Wohneigentum zum Eigenbedarf erwerben. Dies ist ein Grund für eine vorzeitige Ausrichtung der Altersleistung.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Du willst dir ein neues Auto kaufen. Dies ist ein Grund um eine vorzeitige Auszahlung deiner Altersleistung zu verlangen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

# Persönliche Vorsorge

**Was denkst du, mit welchem Alter du pensioniert wirst? \***

- 55-60
- 61-65
- 66-70
- 71-75
- 76 oder älter

**Denkst du, dass das heutige System in der Zukunft noch funktionieren wird? \***

- Ja
- Nein
- Keine Meinung

**Bitte begründe kurz deine Meinung zu vorhergehender Frage. \***

**Planst du deine Vorsorge bereits aktiv? \***

- Ja
- Nein

**Machst du heute schon etwas Konkretes für deine Vorsorge? Falls ja, was? \***

**Wie informierst du dich über deine persönliche Vorsorge? \***

- Professionelle Beratung
- Human Resources Abteilung
- Internet ([admin.ch](#), ...)
- Verwandte und Bekannte
- Arbeitskollegen
- Banken und Versicherung
- Sonstiges:

**Was ist deiner Meinung nach die beste Option, um deinen Lebensstandard nach der Pensionierung zu sichern? \***

Bewertungen nach heutigem Wissensstand, und Zinsstand. Mehrfachauswahl möglich, wähle alles aus was du für nötig hältst um das Ziel zu erreichen.

- Lebensversicherung
- Säule 3a
- Auf gesetzliche Vorsorge verlassen (1. und 2. Säule)
- Geld Zuhause lagern
- Immobilien kaufen
- Säule 3b (Sparkonto)
- Investitionen an der Börse
- Investition in Fonds
- Sonstiges:

**Besitz du ein Säule 3a Konto? \***

- Ja
- Nein
- Weiss nicht

**Wie gut schätzt du deine Möglichkeiten und Chancen ein, eventuelle Lücken in der Vorsorge durch eigene Planung zu decken? Nimm an, dass sich externe Faktoren wie Zinsen, Umwandlungssatz, Beitragszahler etc. nicht ändern im Vergleich zur momentanen Situation.. \***

1 2 3 4 5 6 7 8 9 10

Durch eigene Planung kann ich gar nichts bewirken, alles wird durch externe Faktoren beeinflusst

Ich kann alles genau planen, auch gegeben den externen Faktoren, um mir die Vorsorge zu ermöglichen, die ich will

**Welcher der untenstehenden Aussagen zur Nachhaltigkeit der Schweizerischen Altersvorsorge stimmst du am meisten zu? \***

- Ich bin der Meinung, dass gegeben den momentanen Umständen, ich mir keine Sorgen um meine Altersvorsorge machen muss.
- Ich bin zuversichtlich, dass in angemessener Zeit Lösungen gefunden werden, um auch mir eine ähnlich angemessene Altersvorsorge wie heute zu ermöglichen.
- Das momentane System wird nicht reichen, um mir eine genügend grosse Altersrente zu ermöglichen.

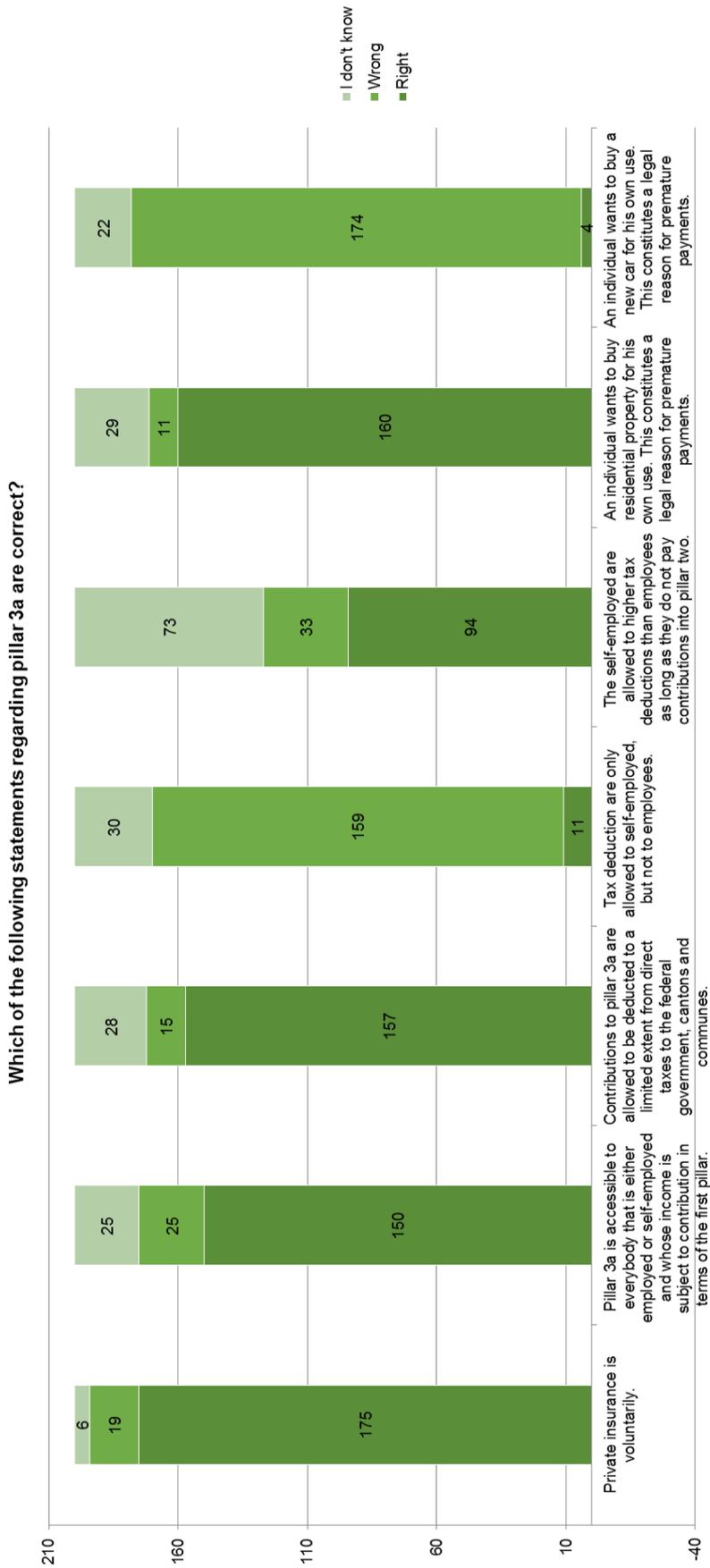
**Angenommen du würdest dich entscheiden, dass du zusätzlich zur gesetzlichen Vorsorge(1. und 2. Säule), auch noch privat zu sparen (3. Säule oder auch anderes). Was hindert dich am meisten sowas überhaupt zu unternehmen oder zumindest nicht in dem Umfang, wie du es dir wünschen würdest? \***

- Momentane Einkommenssituation, ich kann es mir nicht leisten.
- Bis zur Rente habe ich noch genügend Zeit, es ist noch zu früh zum Sparen.
- Ich könnte in meiner Situation schon sparen, jedoch möchte ich mich im Moment nicht einschränken und die Mittel anders verwenden.
- Ich habe mir dazu noch keine Gedanken gemacht
- Sonstiges:

**Wie stark setzen folgende Faktoren gemäss deiner Meinung die Nachhaltigkeit der Altersvorsorge unter Druck? \***

	1 Keine Gefahr	2	3	4	5 Extrem grosse Gefahr
Demografischer Wandel, Alterung der Bevölkerung.	<input type="radio"/>				
Zinsumfeld	<input type="radio"/>				
Zuwanderung	<input type="radio"/>				
Politischer Prozess (aufgrund heikler Materien, zögern sich Reformen hinaus)	<input type="radio"/>				

## Appendix B: Which of the following statements are correct?



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