WDA Forum

University of St.Gallen

Project Papers 2010

on Demographic Challenges

Megatrend «Global Demographic Change»: Tackling Business and Society Challenges in 2030 and beyond

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Introduction

The objective of the HSG Masterclass „Megatrend Global Demographic Change" is to make tomorrow's leaders in business & society familiar with the demographic environment in which they most likely will operate both professionally and privately.

Therefore the course participants have not only been sensitized but also been encouraged already today to develop and hopefully execute unprecedented business models which will meet the demands of the world of 2020 and beyond.

The 8 project papers of the 2010 class have been prepared by 20 master students from 13 different countries (India, US, Singapore, Argentina, Norway, Germany, Spain, Switzerland, Austria, Bulgaria, Russia, Turkey). This truly reflects that these students represent a global platform of fresh and energized thoughts.

It is needless to say that the number of demography-related themes that could be addressed in project papers is endless. However, the themes selected by the 2010 class have not only provided great insights for the 20 students themselves – they are also an extraordinary reading and learning experience for a broader audience and this is why we aim to share this work with a wider public.

In this book the reader will find valuable information about:

1. Demographic projections until 2050 for China, India and Singapore – will the countries remain competitive and why?

2. How will demographic change which will occur on all continents impact the power structures on our globe?

3. Changing people compositions will modify the demand for goods and services – but how will this impact today's industries and services? How are the winners of tomorrow?

4. Fertility is the key determinant of the global population size – but what determines fertility?

5. Demographic change and ageing represents a stress factor for public budgets and public dept – but will this stress factor become ultimately a Tsunami or not?

6. The demographic change in the Islamic world is one of the most unknown changes – but it represents a region with the fastest modifications both in size

and scope. Unprecedented youth bulges become evident in these countries - but are these societies capable of capturing the “demographic dividend” deriving from this bulge or are these bulges a source for instability based on lacking employment opportunities? The recent news from the Middle East/North Africa may turn out as an unprepared wake-up call.

Both the class lecturer and the students are more than happy to answer any questions which might arise when reading the papers. Our contact details are listed at the end of this booklet.

Zurich, February 2011

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(HSG)

China 2030 – 2050

Scenario of Population Size & Composition offering answers to: 1. How to keep a growing and competitive economy? 2. What are drivers of success? 3. What are China's prerequisites to tackle its demographic challenges successfully?

Topic No. 1

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November 2010

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Megatrend "Global Demographic Change"

Dr. Hans Groth

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Executive Summary

China is currently the world's most populated and one of the fastest growing countries. The country has implemented a "one-child" policy in 1979 in order to control its booming population. The next decades are forecasted as a period where the policy's effects will show and in which China will most likely experience unprecedented demographic changes.

The paper starts with a projection of a general demographic status for China in 2050. Then we introduce underlying demographic rationales for the country in order to keep its economy fast growing and globally competitive. While looking at the drivers that created a fast pace growth so far, we also investigate if these drivers are compromised by the future demographic trend. Thirdly, we will focus on three main aspects of China's demography:

1. Gender imbalance

2. Labor force evolution

3. Ageing

We will then analyze likely challenges brought by changes of these three factors as well as possible solutions for China to cope with this situation. Finally, we will verify the underlying reasons for most scholars' projections on China's potential future economic slowdown. When doing this we will discuss if the potential "economic slowdown" is influenced by China's unavoidable demographic transition.

1 Introduction: China 2050 Scenario Overview

China is currently the world's most populated and one of the fastest growing countries. It currently counts 1.34 billion habitants, representing around 19.5% of the world's population (Chinese Official Population Clock). However, it experiences a small annual growth of 0.63% due to its one-child policy established in 1979. As a consequence, the country is stabilizing its population and expects negative growth by the year 2030, reaching the peak of 1.44 billion citizens. By 2050 the country is expected to count a population of 1.39 billion (Chen & Liu, 2009).

Gender imbalance will continue to be an issue of future China. Another detail is that by the year 2029 China will be considered as an ageing society; where the number of people older than 65 years old will exceed children less than 15 years of age (Chen & Liu, 2009). Furthermore, it is calculated that there will be at least 350 million of elderly citizens by 2050, representing more than 25% of the total population. This will definitely put lots of pressure on the pension funds, due to a sharp increase of the dependency ratio and the decrease of the labor force. On the other hand, the young population, who is not considered a labor force, will shrink, partially offsetting the sharp increase in the elderly segment. Overall, the total dependency ratio is expected to increase from 38% in 2010 to 66% by 2050.

Figure 1 (Chen & Liu, 2009) emphasizes what was previously mentioned. Furthermore, we can observe a steadily increase of the dependency ratio of the next forty years. Especially in the elderly sector there will be a sharp increase mainly due to rise of life expectancy.

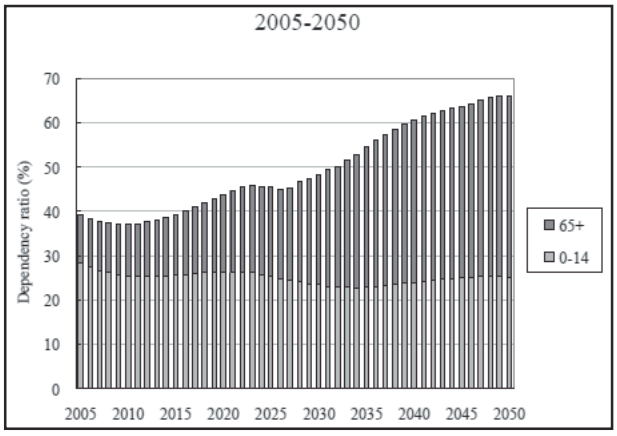

Figure 1: China´s dependency ratio evolution (Chen & Liu, 2009)

From the population pyramids in Figure 2, we can emphasize what was recently stated. The evolution of the population pyramid's shape is mainly due to the one child policy.

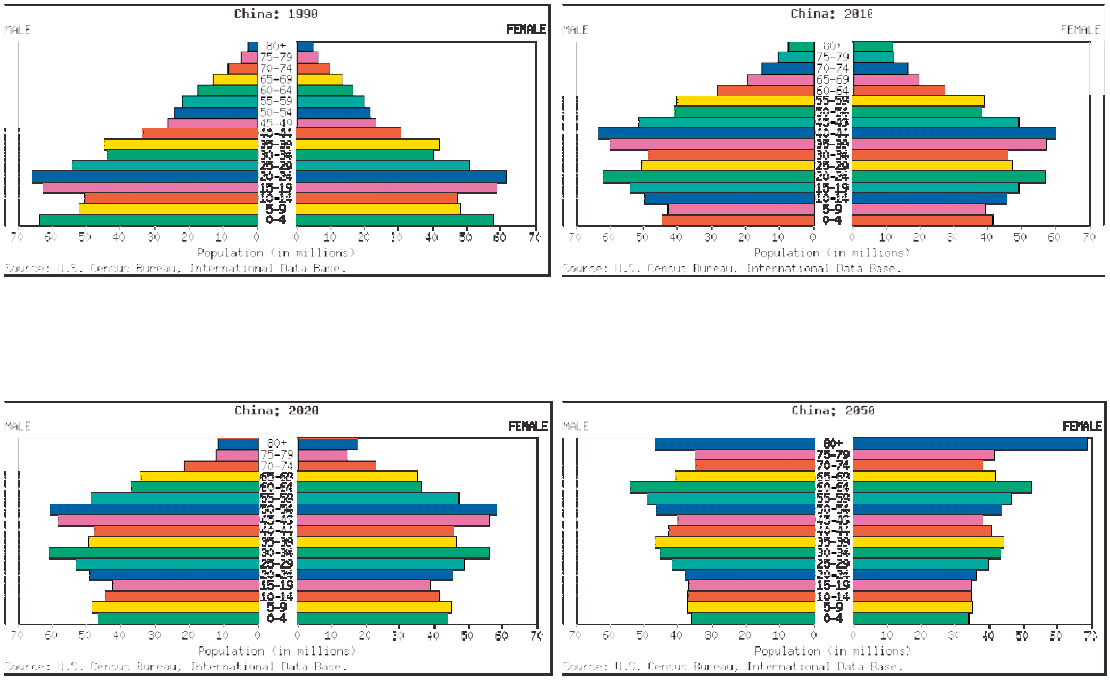

Figure 2 (Data source: U.S. Census Bureau,2010)

2 How to keep a growing and competitive economy?

To begin with we have to define what is meant by economic growth and when an economy can be called competitive. Usually, economic growth is the increase in value of goods and services produced by an economy (Trading Economics, 2010). Conventionally, it is measured as the percentage change in the real gross domestic product and adjusted by its change in price, commonly known as real GDP. Moreover, it is the most widely accepted indicator for economic growth. However, it has many deficiencies: for example the wealth distribution is not considered (Trading Economics, 2010). The World Economic Forum creates an annual report focusing on the competitiveness of nations. More specifically, it elaborates a ranking based on a wide range of variables: institutions, infrastructure, macro economy, health and primary education, higher education and training, market efficiency, technology

readiness, business sophistication, and innovation (World Economic Forum, 2010). Hence, to be competitive a given country should improve or have good forecasts on these variables.

In the last two decades China's economy achieved the fastest economic growth, measured in real GDP change, an annual mean average of 9.31% (Trading Economics, 2010). In figure 3, we can see its GDP evolution, emphasizing its stable and constant growth throughout the period 1992 - 2008.

Figure 3: China evolution GDP Growth rate from 1989 to 2010 (Trading Economics, 2010)

There are significant differences regarding its GDP growth forecast for the next 40 years. It is noticed that a 1% difference in 40 years might change its overall GDP by almost 50%. Nevertheless, we forecast an annual constant growth of 4.4% for China, the second fastest pace after India (Mrsnik, Beers & Morozov, 2010).

On the other hand, China has increased its competitiveness from the last years, but currently still ranks on the 27th position far behind the leader, Switzerland (World Economic Forum, 2010). We will try to analyze the 2050 economic competitive position of the country based on the variables form the World Economic Forum. The idea behind it is not to give a quantitative measure like the annual report, but to find out if the future population structure will influence China's competitiveness.

3 Drivers for Success

China has several strengths and drivers for its future's economic growth and competitiveness. However, we will just have a look at the most important one. To start with, it has a huge market that is growing and is expected to continue to grow in the long term. Currently, it has the best foreign and domestic market index among the world. It has achieved macroeconomic stability in the last decades, being one of

the leaders in important indicators such as national saving, inflation and government dept. Innovation is another quality of China, not being as the ones stated before, yet still showing reasonable results in its capability for innovation and government procurement of advanced technological products (World Economic Forum, 2010).

When we look at labor market efficiency and product market efficiency, China has achieved good results on some measures while it has underperformed on others. For instance, it has a very good pay and productivity but the reliance on professional management is poor. Secondly, it has one of the highest redundancy costs making the labor force inefficient. Regarding product market efficiency, it outperforms in the following indicators: agricultural policy costs, business impact on foreign direct investment (FDI), and intensity of local competition. Nevertheless, it has one of the worst bureaucracies in the product market efficiency, ranking almost last in fields such as: total tax rate, number of procedures to start a business, time required to start the business and trade tariffs (World Economic Forum, 2010).

The main weaknesses are concentrated on the financial market development, technology readiness, higher education and training. First, it has a number of restrictions on capital flows. Further constraints are poor availability of financial services, financing through local equity is hard, and access to attractive loans is difficult. Even though it has shown improvement, still a lot has to be done in order to meet future needs and to be considered as one of the world's economic leaders. Even though, innovation is considered as one of the drivers for growth, technology readiness is not good at all – especially availability of latest technologies, FDI and technology transformation and firm level technology absorption. This highlights that even though China is considered as an innovative country, the technology involved to increase the productivity is not clearly shown. Finally, higher education is a huge issue. To start with, it has one of the worst secondary and tertiary enrolment rates worldwide. If we consider the population, there are millions of people with no secondary education, where in many countries it is compulsory. Secondly, the quality of the education system and the quality of management schools are not satisfactory at all (World Economic Forum, 2010). For the industry, it is extremely important to have good managers to lead the companies with highly skilful labor forces, highlighting the importance of the last two indicators. Finally, higher education is one of the key issues that must be a permanent topic on the government agenda as it might considerably influence China's evolution and performance in the next forty years.

We must also not forget that good health has a very strong impact on business performance. However, in China's case a currently very negative trend can be observed. We just have to consider diseases such as malaria, tuberculosis and HIV and imagine their negative impact on productivity.

4 Challenge and Suggestions

We will now look into challenges and possible solutions for this country considering three aspects: gender, labor force and ageing.

4.1 Gender Imbalance

According to the Chinese Academy of Social Sciences, there will be 24 million Chinese men at fertility age facing the reality of having no spouse by 2020 (BBC, 2010). The academy has also mentioned that sex imbalance is currently the biggest demographic problem for this country. Ninety-nine cities had gender ratios with 25% more men than women.

Li et al (2005) analyzed the marriage squeeze phenomenon from 2001 to 2050 based on an assessment model. The findings are: 1. 2027 will be the peak for the number of available men. 2. The new highly sex-biased and male dominant birth ratio will have a huge impact on China's marriage market once today's children grow up.

A study of Ye and Lin (1998) shows that marriage squeeze has already existed in China before 2000. In 1990, the eligible yet unmarried population who were over 30 in China reached 12.4 million. Three fourth of them were between 30 and 40. According to the report, nearly 80% of the over-aged, unmarried population is found to be in rural areas. Particularly, this unmarried male population is concentrated in villages whereas unmarried women are scattered in towns and cities. Over 70% of this population have only attended primary education or below. The unmarried rate is high for mainly two groups of people: men with lower occupational status and women with higher occupational status.

4.1.1 Major Challenges to Society and Economy

As we project China's gender imbalance will last in the long run, it can bring several adverse influences to the country's development, mainly including:

1. Social stability. The massive single male availability may cause severe social problems and possible crimes in the future. The single bachelor's problem could be

converted into group activity and form a threat for the social stability. For example, in western parts of China, bachelor villages full of single men have already been established. As a group, they will greatly enhance the chance of crimes and insecurity.

2. Sex-biased job squeeze. The imbalance of gender for total population will also be accompanied by imbalance of gender for the working force (Liu, 2009). Female-dominant professions will face the difficulties of employee-shrinking, bringing changes to the wage system, gender structures, pricing as well as consumer behaviors for these sectors.

3. Vicious cycle of not being married. Poor single men in villages may not have much family support to depend on in terms of old age support (Banister el at, 2010). This will eventually lead to a big problem for the already existing social welfare gap between rural and urban areas.

4.1.2 Why the Situation Is Getting Worse?

As is written in the article "The Worldwide War on Baby Girls" (2010), sex-specific abortion is very common in China. The Chinese Academy of Social Sciences has also indicated that sex selection abortion in China is "extremely common". This is also because China is not a Christian-based society and abortion is not a severe ethical issue. Furthermore, Zeng (1993) has pointed out that in some rural areas infanticide, e.g. killing a baby girl is even permitted.

Yuan (2004) has summarized further reasons for the rising of the sex ratio at birth as:

1. The social, economic and cultural grounds in China have conditioned a high sex ratio (favoring male) at birth.

2. Technologies that alter the sex ratio at birth are conveniently accessible.

3. A low birth rate is a catalyst for the phenomenon.

Government's policy makes the situation worse. In most parts of China, there is an unofficially called 1.5 child policy: if a couple has a baby girl as the first child, they are given the opportunity by the government to have a second child.

The Economist has recently reported further details on the 1.5-child policy. On the countryside where 55% of China’s population lives, there are three variants of one-child policy: 1. Couples are allowed to have a second child if their first child is a girl. This is applicable for around 40 percent of couples in the coastal provinces. 2.

Couples are allowed to have a second child if their first child is a girl or if the parents suffer “hardship”, a criteria determined by local officials. This is applicable in many southern and central provinces. 3. In the far west and other provinces with a large ethnic-minority-population, there is almost no one-child policy in operation. Ethnic minorities are permitted to have a second child or sometimes even more, regardless the gender of their first children.

4.1.3 How can Government improve?

The Chinese government is planning to take some actions in order to reduce the widening gap between men and women. Du (2007) has described the mission of The National Population and Family Planning Commission of China for their "Care for girl" program: 1. rapidly raise public awareness on high sex ratio at birth and trigger effective discussion in public, 2. implement and develop the "Care for Girl" program, 3. major issues include the protection of the health of both mothers and babies, 4. challenges lie in difficulty of implementing the local government, 5. improvement of people's awareness of the program and lack of feasible methods for alternative solutions.

As a first step, it is suggested that the country should abandon the 1.5-child policy, in order for the gender-biased birth rate to stop at least at the official level. As an aggressive approach, the government can even undertake efforts in promoting the goodness of having female children and create policies to encourage female births.

In addition, women’s social status should be improved in the near future. This includes several aspects (Wang et al, 2002): 1. Women’s participation in governmental decisions should be enhanced, 2. Education should try to build an awareness of equality between men and women. Additionally, abortion should be discouraged, if not abolished. Infanticide should be stopped and set as an illegal behavior.

4.2 Labor Force

While the greatest advantage of the demographic dividend in China is the simple size of its labor force, this advantage will soon be lost. Decrease of labor force and increase of economy needs will possibly induce the gap between labor supply and demand, which will further lead to structural changes across industries and economies.

4.2.1 Shift from Demographic Dividend to Debt

Demographic transition will generate a dividend if the growth of effective numbers of producers is greater than that of consumers; if the growth of effective numbers of producers is less than that of consumers demographic debt will be the consequence.

China has gained a great demographic dividend since its 1980s due to the dramatic decline in fertility rates combined with the entry of large volume of young people into the labor force. In last decades the country has enjoyed a huge demographical advantage: Low child dependency ratio, low or even falling elderly dependency ratios and a large and even growing labor force supply.

This advantage, however, seems to be disappearing very soon. As shown in figure 4, this dividend will disappear in approximately one decade (Cai 2006; Wang and Mason 2006). China benefited from demographic changes since 1964 however it will start to face adverse impacts starting from middle 2010s. Once the support ratio starts to level off and the dependency ratio starts rising, the country will begin to hold a demographic debt.

Figure 3. The Time Period of the First Demographic Dividend in China

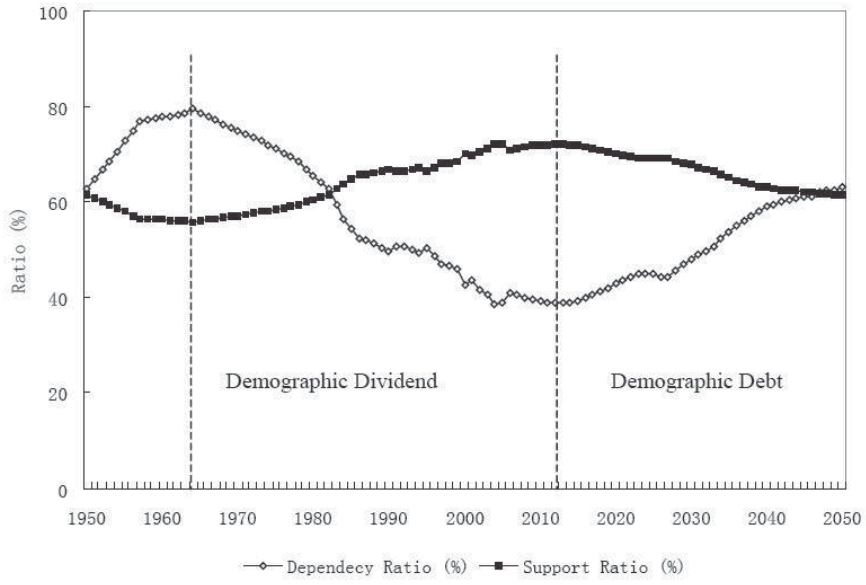

Figure 4 (Data source: NBS, China Population Statistic Yearbook, various issues; NBS, China)

4.2.2 Dangers or Opportunities?

There are many disputes among scholars whether the decline of labor force will pose a danger for China's future economy. Mu (2006) argues that there will be a risk when the demographic dividend turns into demographic debt. The increasing dependency ratio will increase the burden for the whole society, while the decrease of work force will gradually weaken the country's reliance on cheap labor. The two adverse effects, all together, will bring structural changes to several sectors and eventually make the economy volatile.

Even though this highly growing economy is waiting for more skilled workers to fit in, there is little prospect for a lack of workers leading to a tremendous slowing of growth in GDP or GDP per capita (Banister el at, 2010).

Currently China still holds a significant amount of underemployed work forces. As many people remain in a status of unemployment, the work force shrinkage in the following decades may create a better balance of labor demand and supply (Banister el at, 2010). When older workers are retiring, there are more than enough working-age people to fill their shoes and to support the daily needs of China's elderly population.

Banister (2010) has further given rationales for predicted increases in labor-population ratio: Firstly, there may be an increase of the female labor force. With continued low fertility, parents, especially women, will need to devote less time to children. As wages continue to rise, particularly in cities, the opportunity costs of not working also rises. The latter will stimulate more people to enter or remain in the labor force. Secondly, with the increase in healthy life expectancy, more people, under the attraction of salary as well as the Chinese convention of being hard working, will tend to continue working to later ages. Thirdly, according to the Chinese tradition, the increased number of elderly who are not in the labor force will most probably provide child care for their grandchildren, which spares more time and energy of the labor forces' from cares on their children. Finally, potential labor shortage will be inclined to cause wages to rise, which will attract more immigrants from rural areas or abroad to enter the labor market.

4.2.3 How Can The Government Do Better?

Nevertheless, reforms in education, health, pensions, labor policy, and internal migration could certainly make China's economic future all the more secure. Cai and Wang (2006) argue that, for a country whose comparative advantage lies in the

labor-intensive commodities but whose advantage is vanishing, it is vital to gradually change its competency from the massive, cheap labor provider to an economy with more skilful, efficient workforces.

Education is a critical way to improve labor skills. On this area, China's standards for primary education are really impressive given the large country, but the perspective dramatically changes when we look at higher education. Enrolment rates are very low for tertiary education, making it difficult to obtain a productive and efficient labor force in the long term, especially when markets become more developed.

Two actions should be taken by the government regarding education: From the external perspective, public investment in education, especially on higher education, should be greatly increased. The later will be crucial to improve education levels and labor skills throughout the country. From the individual perspective, the awareness and motivation of individuals and families of education should be enhanced, in order to be self-motivated for human capital accumulation as well as investments in further education. It is also crucial to improve inclusion of all groups of people, such as increasing the labor force participation of women and liberalize immigration, in order for the whole population to be utilized for economy development.

Migrating labor can be a second solution. Along with the decrease of labor force and increase of wage, immigration labor from rural areas as well as other countries can serve as the substitutes. In some cases, immigration can largely increase a country's productivity. The countries of the Persian Gulf, for example, rely on massive movement of labor from South Asia. These methodologies can also be applied in China. Given the improved wages, working conditions and living conditions China has the potential to become an attractive country of immigration and attract immigrants from countries with less advantageous working conditions. Therefore, an open policy towards immigration is crucial. However, this requires two aspects: 1. removal of the Hukou system (citizenship card) which restricts people's mobility from one area to the other, 2. set-up of friendly policies in order to welcome job seekers from abroad.

4.3 Ageing

4.3.1 What're the challenges?

As mentioned previously, ageing will become a serious issue for this country's future development.

The ageing issue comes with two aspects: 1. People from China's population expansion between 1950 and 1970 are today close to the age of mortality. 2. Increase of life expectancy. Current life expectancy in China is at 73.18 years and is expected to increase within the next 40 years. Considering that the determinants of health such as income, social status, education, physical environment and access to health services will improve over the years, significantly increasing life expectancy is the logical consequence (WHO). As a result, a life expectancy of 77.65 years for males and 82.05 years for females is forecasted for 2050 (Chen & Liu, 2009). Along with China's continuous growth in GDP both in absolute and relative, a huge amount of money will be invested in the health care system including its infrastructure (Mrsnik, Beers & Morozov, 2010). Therefore, we can assume that the health services will improve significantly.

4.3.2 How Can the Government Do Better?

Many countries like China might have identified policies related to uneven population structure that might mitigate future economic growth. For example, policies that will e.g. rise retirement age, increase savings, and liberalize migration. Since, China has one of the best saving rate in the world it is unlikely that it will increase its savings further. Therefore the solution is: foster domestic consumption to increase domestic demand rather than saving (Banister, Bloom and Rosenberg, 2010). At this point we must highlight explicitly that domestic demand is the key feature for China's future growth.

Nevertheless, the country might experience problems when people from the rural areas retire due to low wages and hardly existing pensions. However, they encounter this lack of pension funds with little personal savings. Hence, China will have to choose the most financially viable pension system (Banister, Bloom and Rosenberg, 2010).

Mainly due to increase in life expectancy, there will a great demand for health care within the elderly sector. China is expecting at least 350 million people older than 65 years old by 2050. Considering the fact that China's current health care system is

beyond minimum standards and it expenditure/GDP is below 2% (far below developed countries) we can expect a Tsunami Scenario (Nation Master, 2010). Moreover, poor health care will foster diseases such as malaria, tuberculosis and HIV, which already have a significant negative impact on business.

Conclusion

To conclude, we have given an overview of China's future demographic and economic situation until 2050. Significant demographic changes will take place in this country within the next 40 years, as the shrinkage of its labor force, ageing and gender imbalance. Our research has found that although labor force will decline in the next decades, it will not necessarily induce adverse impacts on the country's economy. It will, instead, help the country in its unemployment issue to some extent particularly if the country improves its educational standards to modern requirements.

The phenomenon of ageing will become very obvious after China enters 2030, however, it will not cause significant adverse impact on China's economy.

Gender imbalance will be the major problem for future China. Failure in solving this issue will cause the country into social as well as economic instabilities in the future. Therefore, this issue should draw Chinese government's special attention for the upcoming decades.

Finally, we can conclude that the forecast of economic growth for the next 40 years will not be significantly affected by its demographic transition, but it will be modulated by demography.

Finally, a threatening slowdown in economy potential and size will likely to be due to the other reasons - especially failing to catch up with those factors driving the global economy of the 21st century.

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India in 2030 – 2050

Scenario of Population Size & Composition: offering answers to 1. How to keep a growing and competitive economy? 2. What are drivers of success? 3. What are India's prerequisites to tackle its demographic challenges successfully?

Topic No. 2

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1. Executive Summary

With an increasing investment in its knowledge-based service sector as well as its large work force, India has begun to gain greater recognition in the global affairs. This is marked by United States growing support for India in form of a nuclear deal under the Bush Administration as well as support for membership as a Permanent Security Council seat at the United Nations by the Obama Administration. Moreover, the United Kingdom has identified India as a strategic partner in helping combat terrorism and stabilizing peace. Therefore, from a mere developing country with the world's largest share of people living below poverty line, India has emerged as a key partner for leading global powers as aforementioned. It is natural to then study and forecast the domestic situation of India as well as its global economic influence. This paper aims to predict a demographic scenario for India from 2030-2050.

The demographic scenario from 2030-2050 includes five key elements: first, India will have 1.5 billion inhabitants with 68 percent eligible to participate in the labor work force. Second, by 2040 India will become the third largest economy in the world. Third, India's middle class will be the second largest among emerging powers. Fourth, India will face constraints in areas of electricity, petroleum and land. Fifth, India will be one of the significant contributors to the green house emissions.

The keys drivers in India's excelling economic power are primarily its demographic dividend and a service based economy. The demographic dividend indicates that until 2050 India will enjoy on average a work force of 68 percent of its population. Furthermore, a service-based economy is promising to India's success; IT has solid foundation in this sector but medical tourism, pharmaceutical research, and development will become the next wave of 'new service based business' for India in the coming decades. To optimally reap the benefits of such a service and knowledge driven economy, India must face its challenges in the fields of poverty, child and maternal health to reduce absolute poverty of its citizens. It must also increase investments in higher education, infrastructure, social welfare, and pension schemes for older population (age group of 65+).

Unless India’s policies act urgently now and respond to its challenges, there is a significant chance that India's demographic dividend will become its demographic burden.

2. Introduction

Following the decision to liberalize its markets in the early 1990s, India has emerged as one of the top players of today's world economy. Goldman Sachs projected that for the period from 2007 to 2020 India's GDP per capita will quadruple, surpassing the GDP of the United States before the year 2050. Nevertheless, experts have cautioned that India would remain a low-income country for several decades, with per capita incomes well below its BRIC peers (Brazil, Russia, India and China). The profound inequality between different social groups and the economic disparity between the rural and urban areas overshadows the economic growth India has enjoyed in the last two decades. Subsequently, the World Bank has reiterated that India must continue to focus on public sector reform, agricultural and rural development, removal of labor regulations, improvement in transport, energy security, and health and nutrition.

The scope of this paper is to forecast a demographic scenario for India for 2030-2050 in the wake of the profound changes the country is facing. As such **Section 2** highlights the basic theoretical framework and provides the different theories applied during this forecasting exercise. **Section 3** presents the demographic scenario for 2030-2050, predicting that the Indian population will be one of the largest, reaching 1.5 billion by 2050. It will have a 70 percent labor force of aged 15-64 in 2040 eligible to positively contribute toward the rising economic power of the country, making India the third largest economy by 2040. Not undermining such positive and phenomenal outlook for India, **Section 4** sheds light to the inherent challenges facing India in achieving sustainable growth. These challenges include, but not limit to, persistently high poverty rates of 54 percent (those below $1.25 threshold), highest child mortality numbers, lack of quality health services to low income people, and a lack of investment in higher education in order to meet the demands of a highly specialized area of the labor sector. **Section 5** concludes with a discussion of the overall paper and offers solutions for competing against China, India's economic rival.

3. Theoretical Framework: Population Economics

A prevalent topic of research in economics has been the golden question: what causes economic development? How does population growth affect economic development (Subramanian, 2004)? Scholars have debated and analyzed the effects of population growth on the greater economy, resulting in three distinct population

growth theories: pessimistic, optimistic, and neutral (Bloom, 2003). Before proceeding to the central research topic of this paper, i.e. predicting the demographic scenario for India from 2030-2050, it is essential to understand the significance of population growth and its effects on the economy. Such a theoretical analysis is beneficial as it provides an analytical framework for this paper and assists in predicting a cohesive demographic scenario for India.

The pessimistic population theory gains its grounds from Thomas Malthus' economic theory of rent in 1798. Guided by the scarcity of resources, Malthus contemplated that food production would be outstripped by an exponentially growing population (Bloom, 2003). The available diet and nutrition levels would decrease below the required subsistence level, until the population growth was interfered with a high death rate. Hence, Malthus observed a growing population as distressing the economy. Following the same pessimism and echoing some the public discourse on scarcity instigated by the *Club of Rome's* report *The Limits of Growth*, Paul Ehrlich commenced his widely popular book *The Population Bomb*: "The battle to feed of all humanity is over. In the 1970s and 1980s many people are going to starve to death." Additionally, the pessimist population theorists posited that with an increasing demand for fixed sources, there would be negative effects of population growth on capital intensity. A greater prevalence will be given to demands of the increasing population, such as more homes, factories, jobs, infrastructure, as well as capital. Hence, with influxes of population booms, the capital per person spent by the government will decrease and lead to a decline in standard of living. Consequently, as a population grows a large part of the investment is used to supply the needs of the growing population rather than enabling an increase in the level of provision per capita.

The optimistic population theorists did not gain relevance as neither Malthus' nor Ehrlich's predictions of "millions starving to death" materialized. Alternatively, famines occurred but not due to the *shortage* of food but due to *poverty* and lack of *accessibility*. Sen's seminal work *Poverty and Famines: an Essay on Entitlement and Deprivation* emphasizes the corollary between democratic governance and the capacity to avoid famine. Thus, democratic countries have not suffered from famines so far. This is the point of departure between the two population theories, with the optimistic regarding population growth as an economic asset. These theorists argue that a population increase has four advantages (Bloom, 2003): first, it leads to an increase in population ingenuity; second, large societies are more apt to effectively take advantage of economies of scale and develop, exploit and disseminate

information faster; third, with technological progress population growth has the potential to cause positive impact on the economy by decreasing the prices; fourth and most importantly, as resources become scarce the population becomes more inclined toward innovating and creating substitute and\or better products. The latter has essentially been the research and development (R&D) emphasis given in our current society which has led to creations of critical vaccinations, antibiotics, transportation means, data storage etc.

Both the theories shed important insight into the problem of increasing population, however this paper finds two alternative arguments more appealing to forecasting demographic scenarios: Bloom's emphasis on the age structure of a given population and Amartya Sen's capabilities approach to evaluate economies in terms of human development and the welfare of the people.

Using the life cycle of income and consumption patterns, Bloom suggests that each age group performs differently in a society. The young group does not participate in a formal labor market but requires investment in health and education. The prime-age adults provide labor and income into the economy through consumption and savings. The older persons require health care and retirement pensions to sustain. Hence, a country's income growth prospects depend on its dependency ratio, which is the ratio of the age group 0-14 combined with 65+ to the age group of 15-64 (Bloom, 2003).

Using Sen's arguments of the capabilities approach, the paper will examine the philosophical and normative questions about social justice: 'Equality of what?' The objective is to go beyond a simple analysis of poverty and growth and provide tools to evaluate and compare situations with "respect to the real opportunities they offer" (Commin, 2008). For the purposes of forecasting a demographic scenario for India, this paper will pay more attention to its changing age structure and its consequent demographic transition. Sen's capabilities approach will be beneficial in adding a multi-dimensional analysis of poverty, growth and standard of living. The capability approach places the accent on an individual’s freedom, one’s capacity to utilize resources in order to engage in an activity and the notion of` happiness derived from engaging in an economic activity. It is important to understand development not merely as material prosperity but to conceive it as freedom from any form of scourge that circumscribes a person’s freedom. Consequently, the paper aims to give its readers a holistic view on the prospects of India’s human development, reaffirming that when it comes to projections of living standards and demographics, a multidimensional approach is vital.

4. Demographic Scenario: India in 2030-2050

It is crucial to study the demographic impact of India on its economy as India has already gained a greater precedence in global economic and political affairs due to its strategic ties with the United States as well as its appealing information technology (IT) sector. The central research question of this paper is to predict a demographic scenario for India between 2030-2050. The paper identifies five elements to India's changing demographic scene and forecast the following (H.J.M. de Vries, 2007):

- India's population will remain one of the largest, reaching 1.5 billion inhabitants by 2050, with the potential of having 68 percent of the population into the labor force (see Table 6);
- In less than 100 years after its independence, the India's economy is capable of becoming the third largest economy in the world by 2040;
- An increasing middle class will represent as the second largest consumer market amongst the emerging markets, with a focus on domestic products;
- India will suffer severe resource constraints, primarily in energy and land capacities
- India will be a key player in contributing to greenhouse gas emissions as well as trans-border pollution due to its increasing energy consumption

India's current population of 1.2 billion will rise to an estimated 1.5 billion inhabitants by 2050. Although the male/female ratio has been highly unbalanced in favor of Indian males, it is projected that this will even out in the future. By 2050 there are estimated to be merely 30 million more males than females. The population aged 0 – 14 will decline from 30.8 percent today to 18.2 percent in 2050 (see Table 7 in the appendix). For the population aged 15 – 64, the number is expected to increase from 64.3 percent today to 68 percent in 2050 (see Table 2). In addition, the age group of 60+ will increase from 7.5 percent today to 19.6 percent in 2050 (see Table 6). Furthermore, it is highly probable that India will go through an extremely dynamic period of economic growth from 2030 – 2050. A younger and more educated population aspiring for more than what India has accomplished so far and building on the fact that it already provides one of the largest fleet of skilled engineers and offers a plethora of opportunities for outsourcing needs in not only in the information technology realm but also in medical tourism and pharmaceutical research and development ventures. Therefore, India will expand its base in the service-sector and

emerge as one of the few economies to have skipped the industrial revolution and established itself as a top economic superpower.

5. Strengths of the Indian Economy

"The most decisive mark of the prosperity of any country is the increase of its inhabitants."

-- Adam Smith

Adam Smith, one of the key thinkers of modern economics, recognized an increase in population as a positive element to a country's economic enhancement. As such, this paper gives due attention to India's growing population. India's GDP rate of nine percent in 2007 as well as its growing ability to attract foreign direct investment through the means of a democratic government leads to promising economic projections for the future as well. In forecasting India's economic conditions, India's strengths have been recognized as the following:

- Market-oriented economic conditions
- Democratic government
- Continuing boom of the service sector, including the IT
- Rebound of the Indian economy with 9 percent growth rate in 2007
- Demographic dividend, i.e., growing labor force

For the purposes of this paper, an in-depth analysis of India's strength will limit to its economic conditions and demographic dividend to gain a better understanding of the interrelation between the two and their effects on the Indian economy in a suitable manner.

5.1. Economy

While countries such as China have focused on exporting manufactured low-price goods to Western countries, India's growth has been largely stimulated internally due to the economies of scale realized by many Indian companies. The Indian economy has adopted a cautious approach in regard to foreign direct investment (FDI), with certain sectors being completely barred from investments and imposing caps on other. Indian economic policy has been circumspect toward capital account liberalization in an attempt to avoid the damaging effects of the volatility of international markets. This approach has served India particularly well in the wake of the recent global financial crisis, which left the country relatively unscathed.

Furthermore, India's economic boom is inextricably intertwined with the affluent and rising middle-class which is experiencing the benefits of consumerism.

The GDP growth in the years 1900 – 1950 was 1 percent, from 1950 – 1980 it was 3.5 percent, 1980 – 2002 it was 6 percent and from 2002 – 2006 it was 8.0 percent (Indian Finance Ministry Statistics). Even during the recession India managed a growth rate of 5.5 percent, but is now back up at 7 percent (IMF Statistics). Additionally, India is observing a decreasing pattern in its population growth, falling from its peak in 1950 – 1980 at 2.2 percent to on average of 1.5 percent between 2001-2010 (see Table 1). Moreover, an increase in literacy rates has been tremendous: from 17 percent in 1950, 52 percent in 1990, and 65 percent in 2002 to 80 percent in 2008 (World Population Prospects Statistics). These higher literacy levels are a healthy sign toward one of India's future challenges, namely education. To uphold the quality of the service-sector and high-tech section driving the economy, high literacy rates will be crucial to help create the number of future experts in India. Moreover, the middle class is contributing greatly to the high literacy rates.

Consumption has been identified as one of the strengths driving India's growth at the moment because the Indian middle-class is growing increasingly: from 65 million people and 8 percent in 1980, to 220 million people and 22 percent in 2000 and 368 million people and 32 percent in 2010 (Indian Finance Ministry Statistics). Hence, an estimated middle-class now counts for a third of India's population. Alternatively, poverty is declining with the increase in economic growth in India. The number of people living below $2 per day threshold decreased from 84 percent in 1987 to 76 percent in 2005; and 54 percent of the population living below $1.25 threshold in 1947 to 42 percent in 2005 (Gapminder).

A development of the Indian IT sector has been a key factor in India's rapid economic growth. The ratio of the IT sector output to the country's GDP increased from 0.38 per cent in 1991-92 to 4.5 per cent in 2004-05 and over the same time period, IT services exports grew at a remarkable 47.5 per cent per year (Jha, 2009). The IT sector provides employment to approximately 1.6 million of almost 458 million workforce. Likewise, the other 'booming' segments of the economy have hardly helped in generating quality employment on a significant scale, but the IT sector has nevertheless become a power sector of the economy.

Furthermore, with an increase in the Indian middle market and move toward a more domestic consumer market, numerous Indian companies have benefitted from this

surge and have successfully raised their stakes against other global companies. According to Forbes 2000, list of world's leading companies, 56 different companies were listed in making India "the hot spot for wealth creation" (Times of India, 2010). Moreover, besides its usual rankings, Forbes now conducts a 'Forbes 40 India' annually, highlighting the growing power of the Indian business sector on a global platform. Some of the companies that have regularly appeared on this list and on the global Forbes 2000 list includes the Reliance Industries Limited (RIL), State Bank of India (SBI), Oil and Natural Gas Corporation (ONGC), Steel Authority of India Limited (SAIL), Reliance Communications, Larsen and Toubro Limited (L&T), Bharat Petroleum Corporation Limited (BPCL), Bharat Heavy Electricals Limited (BHEL), and HDFC Bank and Tata Consultancy Services (TCS). Therefore, the recent surge and growth in the economy has helped India reduce its poverty and provide essential goods like education to its citizens. Notwithstanding the rise of the Indian IT-sector, other Indian companies have experienced positive growth as well, reflected by the Forbes 2000 rankings.

5.2. Demographic Dividend

In order to forecast India's economic growth for the next 20-40 years, economists have utilized an endogenous growth model known as the Solow Growth model which computes the growth in output by underscoring three essential elements: capital, labor, and total factor productivity. To measure capital accumulation or aggregate savings, economists have given greater emphasis on the composition of dependency ratios. Whereas, to determine growth in human capital and labor force, economists rely on the percentage of working age population. In the case of India, its labor force is an essential asset in future growth projections because the declining fertility rates and increasing life expectancy have changed the age structure of India, resulting in a "bulge" or a "dividend" in the working age-group (Bloom, 2003). This demographic dividend has improved the dependency ratio leading to the hypothesis that the bulge in working population will lead to acceleration in growth.

As shown in Table 1 the Indian population growth rate was 1.43 percent for 2005-2010, decreasing from 1.79 percent in 1995-2000. Regardless of the shrinking population growth rate, India remains one of the youngest countries in the world. Moreover, Table 2 indicates that 21.8 percent of the Indian population in 2005 belonged to the age group of 5-14 and 19.4 percent to the 15-29 age group as observed in Table 3. These figures steadily decreased to 20.5 and 19.3 respectively for 2010. Nevertheless, as highlighted in Section II, this paper is not concern with the

size of the population, but its age structure. Such a population bulge is regarded as a demographic dividend no matter how large the total population. This is a key advantage for India in economic affairs as this demographic dividend can potentially lead India to become the third largest economy by 2040, behind United States and China, in mere 100 years of its independence. As such, this section will discuss India's strength of demographic dividend through an economic analysis of India's dependency ratios and labor force from 1990-2050.

Dependency ratio is an age-population ratio of those who are not in the work force to those who currently are in the labor force, i.e., those below the age of 15 and above 64 divided by the age group 15-64. It is important to note that higher the dependency ratio, greater is the burden on the productive part of the population to maintain the public finances consumed by the nonworking group. Table 4 illustrates the dependency ratios in India from 1985-2005. In 1985 the dependency ratio was 73 but decreased to 56 for 2010, as a result of the increasing work force. This 17 percentage point decline in dependency ratios between 1985-2010 yields a roughly equivalent rise in private and aggregate savings. It is projected that the dependency ratio will decrease further to 47 in 2025 and will then remain stable until 2050. Rodrik and Subramanian prove that the witnessed fall in dependency ratios will lead to a rise in private and aggregate savings, from 25 percent of the GDP in 2000 to 39 percent in 2025 (Subramanian, 2004). Moreover, they claim that the rise in savings will yield increase in investment domestically, with a growth of the capital stock at 8.3 percent in the coming years (Subramanian, 2004). Hence, the growth rate of the capital stock combined with growth rate of the factor productivity will yield an output growth of 5.4 per cent (Subramanian, 2004). This growth rate projection is explained explicitly in the discussion of the labor force below.

The Indian labor force is another essential element to the Solow growth model. The labor force increased between 2005-2010 from 62.3 to 64.3 percent of the population (See Table 6). Over the next 20 years, the working age population is projected to increase by 1.9 percent per year (Subramanian, 2004). If education attainment and labor force participation rates remain consistent, then it is forecasted that labor growth will contribute another 1.3 percent, confidently delivering an aggregate growth rate of 6.7 percent per year. This simplifies to per capital growth rate of 5.3 per cent per year which would increase an average person's income by 8-fold in 40 years (Subramanian, 2004). This empirical evidence is justified with currently approximately two-thirds of the Indian population eligible for the formal labor market (See Table 6). The inherent assumption in this optimistic outlook remains that the

growing workforce can be trained to acquire skills needed by more dynamic industries.

This notion of a demographic dividend supersedes the arguments presented under the pessimistic population theory in Section II which promotes that a large population is burdensome as it leads to high levels of aggregate consumption even at low levels of per capita income and becomes the leading cause of underdevelopment. As the Solow Growth model predicts a positive growth for India, the capabilities approach alludes to yet another dimension of demographic dividend: it questions whether the increased opportunities and 8-fold income predicted above will in fact be transformed into valuable activities and allow for a greater welfare of a 40 percent poverty stricken society of India. These arguments, while justified and discussed in the Section 2, must be examined collaboratively with the optimistic outlook of India.

6. Challenges facing the Indian economy

To realize the competitiveness of its economy, India must make policy changes to enhance its 'developing country' status to fully achieve and reap the benefits of a true economic powerhouse. In 2000, the United Nations with the support of 191 Member States signed and sought to achieve the Millennium Development Goals by 2015. Although India has experienced economic growth over the past decade, it has performed poorly in achieving its MDGs and hence has joined the 'Medium Human Development' category with a cohort of countries like Botswana, Gabon, Congo, Honduras and Philippines (UNDP HDI 2010 Rankings). The Human Development Index (HDI), which is based on the premises of the Capabilities Theory (see Section 2) measures life expectancy, literacy, education, and standards of living. India is ranked 119 out of a possible 169 on the Human Development Index. Subsequently, India must address the MDGs and implement strategies to alleviate suffering and improve standards of living. Some of the essential challenges recognized for the purposes of this paper are below, but are not limited to the following aspects:

1. Reduce poverty and hunger
2. Increase health services in an attempt to reduce child and maternal mortality
3. Expand educational opportunities, specifically in the higher education realm
4. Raise awareness on gender issues
5. Recognize the issue of population aging

6. Enhance infrastructure to meet its growing demands of roads, energy, water, etc.

For the purposes of this paper, an analysis on health and higher education will be done as an investment as both of these elements is essential to the projected economic growth rates above.

6.1. Health

An insufficient public health care budget of 1.1 percent of the GDP along with a striking lack of preventive reproductive measures have led to high child and maternal mortality rates (ESCAP, 2006). Despite having ratified the *Convention on the Rights of a Child in 1992* and, thereby, committing itself to enhancing child welfare, India currently accounts for the highest global child mortality rates below the age of five, with 2 million children dying annually (Save the Children, 2008). The child mortality rate measures the number of deaths in every 1,000 children below five years of age, and in 1990 this figure accounted for 117 in India, steadily decreasing to 72 by 2007. Nonetheless, the MDG target for India is 38 and therefore, the annual Indian average rate of reduction in child mortality must be increased to 7.9 from 2.9 in order to adequately meet the MDG by 2015.

Poverty and lack of capabilities to access health services represent a scourge that leads to many of the Indian maternal, newborn and child deaths. It is proven that households with poor incomes have more than twice the risk of mortality than those from higher income households. Moreover, malnutrition has been identified as the leading cause to child and infant mortality in India. Malnutrition is the result of inadequate intake of micronutrients as well as poor dietary quality, and is responsible to causing one-third of the child deaths (Countdown 2015, WHO). Maternal deaths during pregnancy have been attributed to iron deficiency anemia, causing 20 percent of the global maternal death incidents (WHO, 2010). Moreover, malnutrition during pregnancy can create a higher propensity of neonatal deaths due to premature, underweight babies as well as infections and asphyxia (WHO, 2010).

India is involved in numerous health projects with international organizations for example, with the World Bank, India is currently in a collaboration for a 'Reproductive and Child Health Second Phase' project which ends in March, 2012 and aims to "expand the use of essential reproductive and child health services of adequate quality with reduction of geographical disparities" (WB, 2010). Though this project reflects India's desire and political pressure to provide more health services, scholars

have readily challenged such policies under the premises that increase in health services does not lead to an increase in usage and have blamed the poor quality of services provided for the failure of such policies (Rao and Peters, 2007). Moreover, as health services are provided and regulated at the state level than at the federal level in India, it has been increasingly observed that the state leaders do not budget for public health according to the need but instead rely on the international organizations and NGOs to carry out the state government's mandates. Consequently, India needs to take greater ownership over its public health crisis and provide *quality* access of health services in rural areas.

6.2. Higher Education

As India is a service oriented economy combined with an increasing labor force, the positive economic growth of the Indian economy is destined upon the consistent supply of an educated and apt labor force to meet the demand of the service industry. Much of the spurt in the service industry has been induced by the remarkable growth in information IT sector, with a particular emphasis of export of software and IT-enabled business services (Jha, 2009). Though an influential and rapidly growing industry in India, the IT- sector only employs 1.6 million from a labor force of 458 million applicants (Gupta, 2007). Consequently, it is essential to not overemphasize the IT-sector; more service oriented sectors are growing in India which will seek highly skilled labor force as well. Medical tourism and pharmaceutical R&D businesses are such examples which will gain greater importance in the coming years. Medical tourism is highly beneficial to India in that Mckinsey Consultancy estimated a gain of approximately $1 billion net worth between 2009-2012. Because of rising costs and shorter product lifelines, outsourcing strategy to India is now becoming a popular choice for the pharmaceutical companies.

Subsequently, to reap the benefits of a services-oriented society, the Indian government must invest more into higher education and vocational skills training. Currently India houses 40 percent of global population under the age of 25 years but a mere 5 percent of the total Indian industrial workforce is skilled, compared to 85 percent of the industrial population in South East Asian Countries (4^{th} CII Global Summit, 2010). According to the Indian National Sample Survey Organization (NSSO) from 2004-05, only two percent of the youth from the age group 15-29 has received some sort of formal vocational training while eight percent received non-formal vocational training. Additionally, the participation of skilled Indian women into the labor market has been stubbornly low, regardless of the scaled efforts by the

Indian government to boost education attainment for women and achieve gender equality (Gupta, 2007). While women represented 38 percent in higher education in 2004, a mere 25 percent of the skilled women participated in the labor market that year (Gupta, 2007). These figures are alarmingly low for a country with a large labor force and with projections of becoming an economic power by 2040. The government expenditures in higher education must increase otherwise the current supply of skilled labor force will be insufficient in order to meet the economic demands. As a consequence negative impacts on the projected growth rates can be expected.

6.3. Population Aging

With a population of approximately 1.2 billion people, seven percent of the Indian population belongs to the 60+ age group, aggregating to 84 million people (World Health Organization, 2002). Figure 1 demonstrates the global aging pattern and as observed, the older population of 60+ has grown faster than the overall population and will continue this pattern. Currently, the 60+ is growing at 2.6 percent annually which is more than twice the overall population of 1.2 percent (United Nations Economic and Social Affairs, 2009). This pattern is also observed in India, where the 1950s and 1960s were marked with high fertility. The proportion of 60+ in India is projected to increase above 11 percent by 2025 up to 20 per cent by 2050, thereby three times the current group of older population (UN Population Fund, 2009). With a 20 percent of the total population in 2050 projected as 'older persons,' India must plan and implement strategies now to appropriately incorporate this group of people into the society, otherwise besides the labor force being a demographic burden due to unemployment etc, the older persons would also add to the burden of public finances.

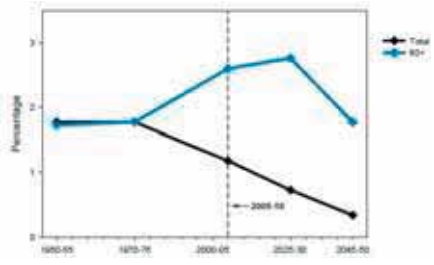

Fig 1: Annual growth rate of total population and population aged over 60, World

Social security coverage has been limited to those employed in the organized sectors and can contribute to a pension's scheme which entitles them to receive pension benefits after retirement. Nonetheless, it is important to allude to the urban-rural differences in such social security coverage. In rural areas, no such safety

programs exist and as the rural areas will feed a greater amount of people to the 60+ age group, income security will constitute a large portion of the population aging challenge in India. This is largely because the farmers and self-employed traders in the villages did not have the option of pension accounts, and have to rely on their life savings and family\community assistance through their 'old-age' timeframe. In addition, India faces problems in three particular aspects in the realm of population aging that have an adverse effect on the older persons.

First, the oldest old are the group of old persons who are above 80 years (HelpAge India, 2007). An increase in life expectancy has led to an increase of the oldest old. Approximately 72 percent of the oldest old in India are financially dependent on others, primarily on their children. In a socio-economic demography such as India, it is common to observe such a familial arrangement, where the old persons live with their children instead of care facilities. A large number of older persons stay with their families and depend on them for financial and mental support. This is also due to a lack of social security framework in India.

Second, one-fifth of the oldest old reported to have experienced verbal abuse and neglect from their family members (HelpAge International, 2010). As a person grows older and sicker, they tend to exert more pressure on the family resources, leading to cases of abuse. Absence of support system presents another problem for the old persons and the oldest old persons who might have lost their spouse and live under abusing situations. Such circumstances lead to greater isolation of the elderly as they become more introverted (Agewell Foundation and Advocacy Center, 2010). An international NGO, HelpAge International, reported an opportunity to work and earn money not only brings the elderly respect in the household but also empowers them and helps avoid isolation. This information is based on conducted surveys in India with the elderly age group. Therefore, channeling the elderly into formal workforce can create a positive atmosphere to not only tackle the abuse and isolation challenges but also accredit them with income security (HelpAge International, 2007).

Third, lack of health services constitutes a principal obstacle in healthy population ageing. As explained in Section II, older people are more susceptible to catch diseases due to their weaker immune system, less strength and frailty. While there are different options to heath services in urban areas, the rural population does not have appropriate access to the same services. While an average urban area in India can have up to 4 different private hospitals, in the rural areas there are merely

weekly clinics and camps. As such, there is a diverse range of differences in health levels between rural and urban old persons which must be explored by the government.

These are a few but crucial challenges facing India for population ageing. Of the different policies enacted by the Indian government, one that provides health insurance to cover those below the poverty line is the Rasthriya Swasthya Bima Yojna (RSBY), implemented in 2007 (Indian Ministry of Labor & Employment, 2009). Currently 15 states are members of this policy with 75 percent of the financing provided by the Union Government of India. State governments engage in a competitive bidding process and select a public or private insurance licensed to provide health insurance (Indian Ministry of Labor & Employment, 2009). Therefore, as India is evolving to a powerful economy it has slowly begun to focus toward enhancing its health expenditures through projects like above. Nonetheless, with the ever increasing older population, it is important for the government, NGOs, and international organizations to understand the needs of the older people in the Indian context and collaborate to find sustainable solutions simultaneously as other societal issues raised in this paper.

7. Conclusion

The paper aims to outline a demographic situation in India for 2030-2050. By applying the theories of population economics and capabilities approach, a forecast of demographical scenario is obtained by focusing on India's changing age structure of the population. This paper aimed to predict India's strengths as well as applied a multi-dimensional analysis to the examination of India's challenges. After a thorough analysis of India's strengths and challenges, the authors conclude that India has the potential of gaining a greater global platform. However, it remains ambiguous whether India is able to become the third strongest economy following the United States and China by 2040. With 42 percent of its population still living below $1.25 per day, India must take urgent measures to eradicate poverty and enhance standard of living. Additionally, India's economic strength is its service-based industry which demands skilled labor. If mere 2 percent of the youth aged 15-29 acquires formal training, then the demographic dividend will become demographic burden and a liability to the public finances. Lastly, 20 percent of the Indian population will comprise of older persons and require pensions. Currently the Indian government ignores this age group the most as the federal government does not allocate any

specific funds for services toward this age group. If this approach does not change, then besides the labor force, the retirement force can also become a burden for the Indian government in the upcoming years.

In other words: the authors are excited to witness India's growth and greater importance in global affairs, yet urge the Indian government to recognize and implement strategies on the issues raised in this paper.

8. Appendix

Table 1: Population Growth Rate

Period	Pop growth rate
1990-1995	2.01
1995-2000	1.79
2000-2005	1.62
2005-2010	1.43
2010-2015	1.27
2015-2020	1.10
2020-2025	0.92
2025-2030	0.73
2030-2035	0.58
2035-2040	0.48
2040-2045	0.37
2045-2050	0.25

Table 2: Youth Population (5-14)

Year	(thousands)	(%)
1995	223 381	23.4
2000	238 215	22.8
2005	246 293	21.8
2010	248 511	20.5
2015	247 842	19.2
2020	244 553	17.9
2025	239 488	16.7
2030	230 669	15.5
2035	218 987	14.3
2040	207 445	13.3
2045	201 321	12.6
2050	198 261	12.3

Table 3: Youth Population (15-29)

Year	(thousands)	(%)
1995	182 936	19.2
2000	202 080	19.4
2005	218 813	19.4
2010	233 977	19.3
2015	242 525	18.7
2020	245 123	17.9
2025	244 856	17.1
2030	241 940	16.3
2035	237 190	15.5
2040	228 639	14.6
2045	217 189	13.6
2050	205 832	12.8

Table 4: Dependency Ratio

Year	Total	Child	Old-age
1985	73	67	6
1990	71	65	7
1995	69	62	7
2000	65	58	7
2005	60	53	7
2010	56	48	8
2015	52	44	8

2020	49	40	9
2025	47	36	11
2030	45	33	12
2035	44	30	14

Table 5: Life Expectancy Ratios

2040	44	28	15
2045	45	27	18
2050	47	27	20

Table 6: Work Force (15-64 age group)

Period	Both sexes combined	Male	Female
1990-1995	58.8	58.3	59.4
1995-2000	60.5	59.7	61.3
2000-2005	62.0	60.9	63.3
2005-2010	63.5	62.1	65.0
2010-2015	65.2	63.7	66.9
2015-2020	66.8	65.1	68.5
2020-2025	68.1	66.4	70.0
2025-2030	69.4	67.6	71.3
2030-2035	70.5	68.7	72.5
2035-2040	71.5	69.7	73.5
2040-2045	72.4	70.6	74.5
2045-2050	73.3	71.4	75.4

Year	(thousands)	(%)
1990	502 790	58.3
1995	565 315	59.3
2000	632 992	60.7
2005	704 611	62.3
2010	780 571	64.3
2015	852 921	65.9
2020	916 278	67.0
2025	972 464	67.9
2030	1 021 687	68.8
2035	1 061 287	69.5
2040	1 088 361	69.6
2045	1 099 824	69.0
2050	1 097 969	68.0

Table 8: Population in age group 60+

Table 7: Population in age group 0-14

Year	(thousands)	(%)
1995	349 874	36.7
2000	365 268	35.0
2005	374 118	33.1
2010	374 159	30.8

2015	371 639	28.7
2020	364 432	26.7
2025	353 832	24.7
2030	338 335	22.8
2035	321 356	21.0

2040	308 686	19.7
2045	300 403	18.8
2050	293 987	18.2

Year	(thousands)	(%)
1985	46 192	6.0
1990	52 901	6.1
1995	60 601	6.4
2000	69 790	6.7
2005	79 401	7.0
2010	91 652	7.5
2015	111 990	8.7
2020	134 533	9.8
2025	158 762	11.1
2030	184 611	12.4
2035	212 728	13.9
2040	244 759	15.6
2045	279 395	17.5
2050	315 637	19.6

Table 9: Population by Sex

Year	Both sexes combined	Male	Female
1995	953 148	494 810	458 337
1996	971 210	504 062	467 148
1997	989 150	513 237	475 912
1998	1 006 996	522 351	484 645
1999	1 024 799	531 428	493 371
2000	1 042 590	540 485	502 105
2001	1 060 371	549 522	510 849
2002	1 078 111	558 523	519 587
2003	1 095 767	567 468	528 299
2004	1 113 283	576 325	536 958
2005	1 130 618	585 075	545 543
2006	1 147 746	593 703	554 043
2007	1 164 670	602 213	562 458
2008	1 181 412	610 619	570 793
2009	1 198 003	618 943	579 061
2010	1 214 464	627 198	587 266
2011	1 230 792	635 386	595 405
2012	1 246 960	643 492	603 468
2013	1 262 941	651 500	611 441
2014	1 278 696	659 386	619 310
2015	1 294 192	667 132	627 060
2016	1 309 412	674 728	634 685
2017	1 324 345	682 169	642 176
2018	1 338 972	689 446	649 526
2019	1 353 271	696 548	656 723
2020	1 367 225	703 465	663 759
2021	1 380 821	710 193	670 629
2022	1 394 047	716 723	677 325
2023	1 406 880	723 043	683 837
2024	1 419 294	729 142	690 152
2025	1 431 272	735 009	696 263
2026	1 442 809	740 643	702 166
2027	1 453 910	746 045	707 864
2028	1 464 572	751 217	713 355

2029	1 474 799	756 159	718 640
2030	1 484 598	760 877	723 721
2031	1 493 962	765 368	728 594
2032	1 502 908	769 640	733 269
2033	1 511 495	773 724	737 771
2034	1 519 801	777 662	742 139
2035	1 527 879	781 481	746 399
2036	1 535 754	785 193	750 560
2037	1 543 410	788 793	754 617
2038	1 550 823	792 267	758 556
2039	1 557 952	795 596	762 356
2040	1 564 763	798 764	765 999
2041	1 571 240	801 762	769 478
2042	1 577 383	804 591	772 792
2043	1 583 198	807 253	775 944
2044	1 588 689	809 751	778 938
2045	1 593 852	812 081	781 771
2046	1 598 674	814 236	784 438
2047	1 603 126	816 203	786 924
2048	1 607 169	817 959	789 210
2049	1 610 749	819 478	791 271
2050	1 613 800	820 725	793 075

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(HSG)

Singapore in 2030 – 2050

Scenario of Population Size & Composition offering answers to: 1. How to keep a growing and competitive economy? 2. What are drivers of success? 3.What are Singapore's prerequisites to tackle its demographic challenges successfully?

Topic No. 3

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6 November 2010
St. Gallen University
Megatrend "Global Demographic Change"
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Executive Summary

Singapore is a small city-state with 5.67 million inhabitants, of which 33% are foreigners working or studying in the country. The country consists of 76.8% Chinese, 13.9% Malays, 7.9% Indians and 1.4% other ethnic groups. After its independence from the British rule in 1965, the country's economic restructuring was so successful that Singapore became one of the most competitive economies in the world, surpassing many Asian and even European countries. In 2010, Singapore is ranked fourth as one of the world's leading financial centers and in 2008, is considered the busiest port in the world. In 2010, the World Economic Forum ranked Singapore as the third most competitive economy in the world after Switzerland and Sweden with an average GDP per capita of $53,143 in 2009.

Despite its economic achievements, Singapore faces tremendous challenges in shaping its demographics. Total fertility rate (TFR) is at 1.22 - one of the world's lowest. This is a similar trend seen in other Asian "Tigers", where TFR is 1.19 in South Korea, 1.06 in Hong Kong and 1.03 in Taiwan. The shortfall in birth rates resulted in a very open immigration policy making up for the shortage of labor force.

Singapore's competitiveness as an economy plays on its strength of high standard healthcare, basic education, and income levels. Public services and institutions are of high quality which created an attractive place for international trade and business. The country has been very effective in mobilizing foreigners to balance low birth rates and meet the demands of economic growth. Yet, an aging and shrinking local population will challenge a sustainable population development, currently compensated by immigration. Likewise, the country lags behind in productivity growth, business innovation, and female labor mobilization.

By 2050, the country will face pressing issues from aging population, labor force shortages, increasing elderly dependency ratios, and the feminization of the elderly population. Using PESTEL analysis, we identified certain trends which are unique to Singapore. These include the need: (1) to have more open and flexible policies for marriages between citizens and foreigners, (2) to restructure the Central Provident Fund – a saving scheme for retirement, (3) to increase female participation in

workforce, (4) to improve healthcare technologies that allow early prevention, diagnosis and treatment of diseases that cause high mortality among men, (5) to strategize urban development that will keep up with the growth of the population and economy at the same time.

Increasing fertility rate continues to be a top priority which needs to be addressed in the long run. The Super-Mom Program is a proposed program which empowers women both at home and at work. This program targets to provide flexible working scheme which enable women to manage their time better and to handle the demands of raising children. It also encourages the participation in coaching programs and the building of women's supportive networks which encourage greater fertility as well as greater female participation within the workforce.

1 Overview of Singapore

Singapore is an island country of about 710.3 square km[1] situated at the southern tip of the Malay Peninsula. The country was under British colonial rule from 1819 until the outbreak of World War II. It gained independence in 1965. Within a short period of three decades, rapid industrialization and globalization transformed the island from a developing country to a world-class city-state that plays a key role in international trade and finance. The country, together with Hong Kong, Taiwan and Korea are known as the Four Asian Tigers[2] – a term used to describe the highly developed economies of these four regions.

1.1. History and Founding[3]

From 16th to early 19th centuries, Singapore was part of the Sultanate of Johor. The island was a fishing village until the British East India Company caught sight of its strategic location as a trading post for the trading route between India and China. In 1826 a treaty was established between of the Sultan of Johor and the British East India Company, the island became part of the Straits Settlements which was a British colony. Since establishment as a free entrepôt, the island attracted traders and merchants from India, China and the surrounding Malay Archipelago. Business opportunities and employment attracted immigrants from around the region which made up the ethnic diversity today.

1.2. Demographics and Racial Diversity

Singapore's history of immigration from China, India and surrounding Malay Archipelago created the ethnic diversity in its population. The proportion of different ethnic groups has not changed drastically since establishment as a free entrepôt. There are 76.8% Chinese, 13.9% Malays, 7.9% Indians and 1.4% of other ethnic groups. The different ethnic groups also differ in demographics and socioeconomic attainments - the Chinese group has the highest socioeconomic attainment yet lowest fertility rate and smaller families; while the Malay group exhibits the opposite trend. In today's population of 5.67 million[4] (as of 2010), 3.77 million are citizens and permanent residents, while the rest are foreigners working or studying in the country.

[1] www.sg, Singapore at a Glance
[2] Wikipedia – Four Asian Tigers
[3] Barbara Leitch Lepoer, ed. *Singapore: A Country Study*.
[4] Singapore Statistics (Latest data on Population)

1.3. Globalization and Competitiveness

Singapore ranked fourth as world's leading financial centre[5] in 2010 and the busiest ports in the world[6] in 2008. A.T Kearney in its Globalization Index[7] (2006) listed Singapore as the most globalized country in the world. Average GDP per capita in Singapore is $53,143[8] (in 2009), one of the highest in the world.

Singapore's economy is heavily dependent on exports and refining of imported goods. Manufacturing constituted 19.5% of Singapore's GDP in 2009[9] (See Figure 1) - the biggest share by industry. Rated the most business-friendly economy in the world, Singapore sees hundreds of thousands of foreign expatriates working in multi-national corporations. Success in globalization policy made Singapore an attractive destination for work and study especially among foreign worker in the region - 33.5% of Singapore's population today are foreigners.

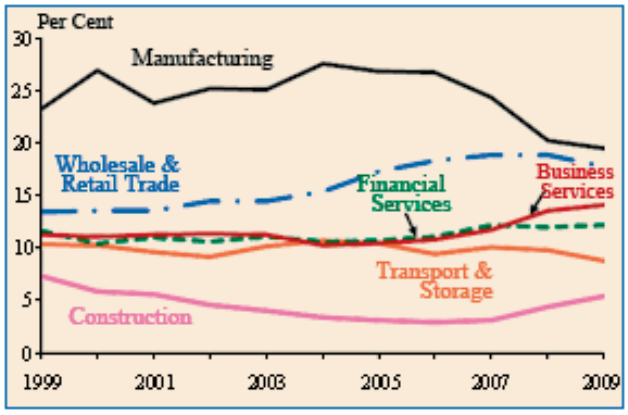


Figure 1: Share of GDP by Industry.

Source: The Singapore Department of Statistics (Statistical Charts: Economic Indicators)

[5] The Global Financial Centres Index 8. September 2010
[6] World Port Rankings 2008.
[7] A.T. Kearney/Foreign Policy Magazine Globalization Index 2006
[8] Singapore Statistics (Economic Indicators)
[9] Ministry of Trade and Industry (Singapore). Economic Structure Report 2009

2 Demographic Trends

Singapore's population grew by 5% in 2008 over the previous year. Growth includes 1% increase of citizen, 6% permanent residents and 19% non-residents[10]. The large growth of the foreign workforce came alongside with the good economic growth before the economic downturn in late 2008. With the rapid economic development of the city-state, the country saw a trend towards smaller families seen in most developed countries: as its people become richer and women become better educated, they have fewer children.

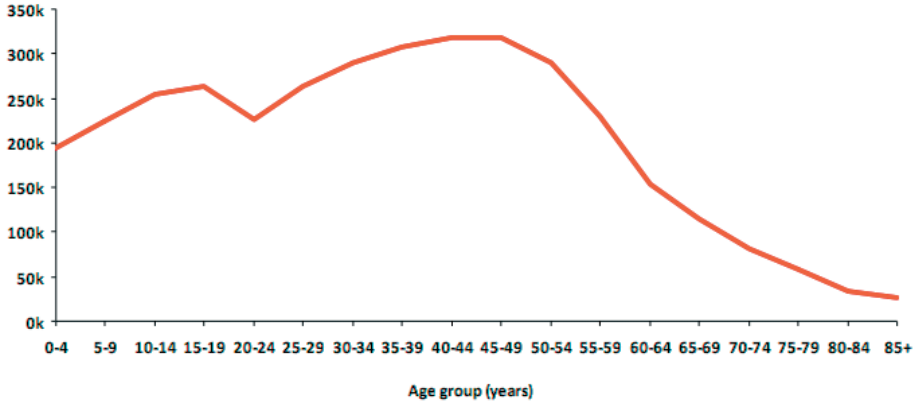


Figure 2: Resident population by age group (June 2008).

Source: Singapore Government Portal (Information and Policies: Population in Brief 2009)

2.1. Health and Education[11]

The average life expectancy has increased from around 68 years in 1970 to 81.4 years in 2010. This is expected to rise to around 85 years by 2050. Infant mortality rate is 2.2 per 1000 live-births is one of the lowest in the world. Singapore is ranked 6th in the World Health Organization's ranking of healthcare system in 2000. Likewise, Singapore has a strong emphasis on educational quality. A majority of Singaporeans has at least secondary education. Singapore tops the attainment indicators in terms of math and science scores and reading scores[12]. Higher educational attainment is also seen to increase since 1999.

[10] Singapore Government Portal (Information and Policies: Population in Brief 2009)
[11] Statistics Singapore, Key Annual Indicators 2010
[12] Trends in International Mathematics and Science Study, 2007

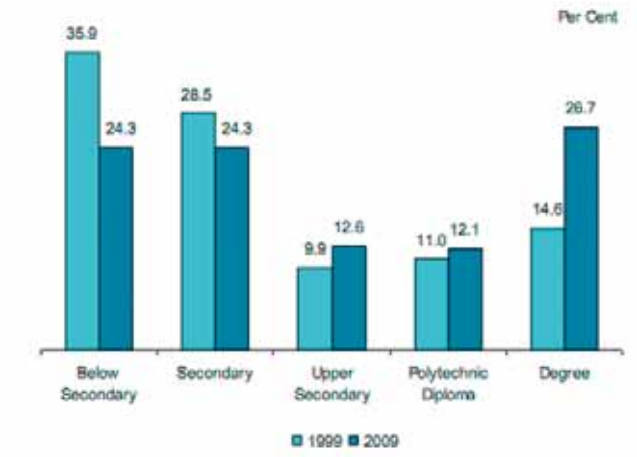


Figure 3: Educational Attainment of Resident Labour Force, 1999 & 2009 (June)

Source: Labour Force Survey, Ministry of Manpower

2.2. Total Fertility Rate

The Total Fertility Rate (TFR) in Singapore was 1.28 in 2008 which is way below replacement rate of 2.0 in rich countries. Such low fertility rates were also experienced by the other Asian Tigers where TFR is 1.19 in South Korea, 1.06 in Hong Kong and 1.03 in Taiwan. Low TFR is mainly attributed by (1) delay in marriage and child-bearing, (2) rising women's education, (3) greater family planning measures, (4) rising singlehood rates and (5) changing attitudes and values.

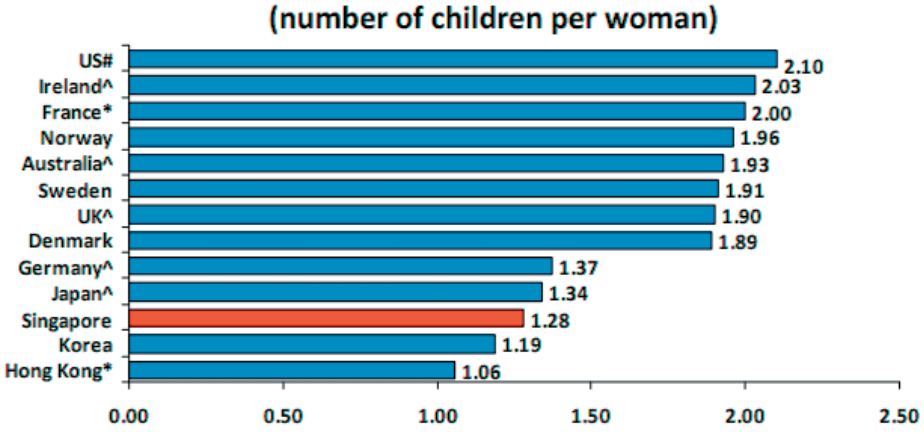


Figure 4: International comparison of TFR (2008).

Source: Singapore Government Portal (Information and Policies: Population in Brief 2009)

Trends in TFR: Singapore experienced an extended post-war baby boom that lasted until the mid-1960s. At its peak in 1957, the TFR reached more than 6 children per woman. The TFR fell to nearly five children per woman in 1965 when Singapore

gained independence. The government's efforts in shaping demographics include an initial anti-natalist policy which calls for citizens to "Stop at Two" which was later replaced by a selectively pro-natalist policy “Three, or more if you can afford it” in 1987 after its TFR fell below standard replacement rate of 2.0 in 1975. In 2008, the total fertility rate was only 1.28 children per woman (the 3rd lowest in the world) below the 2.10 standard replacement rate required. Difference in total fertility rate spread across different ethnic group with the Chinese having the lowest TFR at 1.08, followed by Indians (1.14) and Malays (1.82).

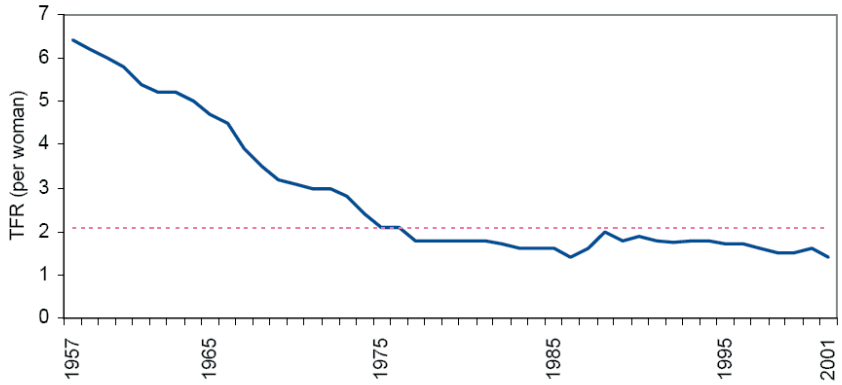


Figure 5: Total Fertility Rate (1957-2001).

Source: Journal of Population and Social Security Vol. 1, Fertility and Population Policy: the Singapore Experience

Changes in TFR in Singapore are heavily influenced by the economic cycles and by the Chinese zodiac year. In 1986, the unprecedented low TFR of 1.4 children per woman was a result of economic recession and coincidence with the inauspicious year of the Tiger whereas the momentary peak in 1988 was a result of economic recovery, the reversal of anti-natalist policy and the positive perception of the auspicious Dragon year and symbolic double prosperity from the figure "88". Since then, the TFR fell and remained below 1.6.

Rising education among women but low participation in workforce: The government identified that the better-educated women were not replacing themselves while the lower-educated "over-produce". The proportions of childless or with only one child tend to increase with better education attainment. It started promoting bigger families especially among educated women with a belief that intelligence is inherited.

Incentives were provided to encourage the better-educated mothers to have at least three children. Likewise, Singapore's female participation rate in labor force remains one of the lowest in among the developed countries with 62% as compared to 78.2% in Sweden. Participation rate is also seen to fall tremendously after the age of 30.

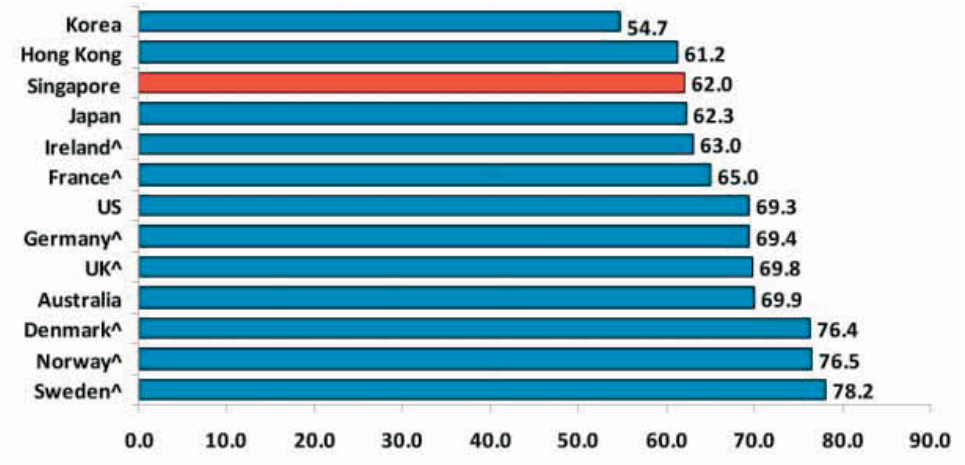


Figure 6: International comparison of Labour Force Participation Rate for females aged 15-64, 2008 (%).

Source: Singapore Government Portal (Information and Policies: Population in Brief 2009)

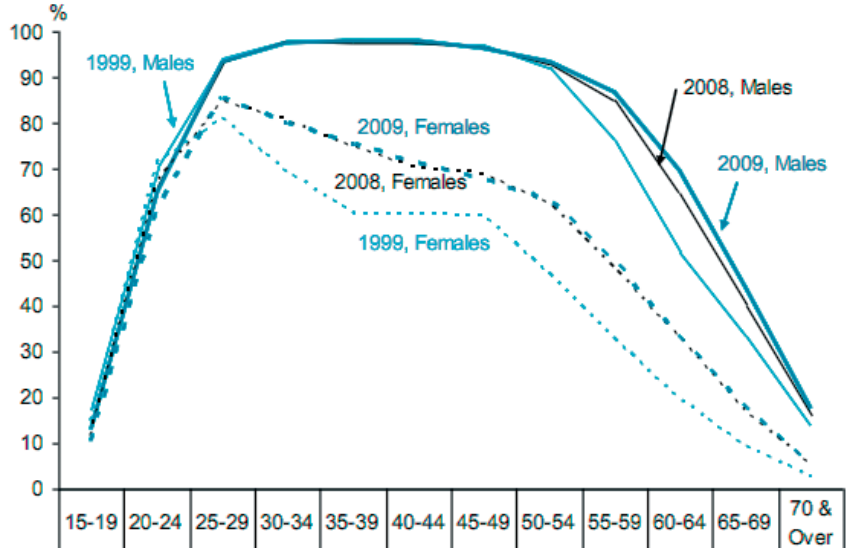


Figure 7: Age-Gender Specific Resident Labour Force Participation Rate, 199, 2008, and 2009

Source: Singapore Government Portal (Information and Policies: Population in Brief 2009)

Rising singlehood rates: The country's increasing level of education among its women population also leads to rising singlehood rates. A typical norm has been that

the "Asian man" tends to select a wife with less education than him. As such, statistics reveal that men with below secondary education and women with university degrees are more likely to remain single than other educational groups (particularly among the Chinese ethnic group).

Changing ideals and values: This may be another plausible explanation of the change in fall in TFR. There has been a rising trend among the Singaporean males in placing a high priority on building career and achieving a certain level of financial security before seriously considering marriage and starting a family. Among the Singaporean females, there has been a rising concern over opportunity costs of marriage and child-bearing that will disrupt the progress in their career advancement.

2.3. Immigration

Since 1980s, Singapore has been relaxing its immigration policy to facilitate the entry of growing number of qualified foreigners to work and live in the country, so as to make up for the shortfall in birth rates and rising labor needs for a rapidly growing economy. These qualified individuals are encouraged to take up permanent residency and citizenship in the country. On the other hand, there are a growing number of unskilled workers brought in to fill manual jobs which do not appeal to the local population. According to latest statistics, 33% percent of the total population comprise of foreigners who live, work or study in Singapore. Immigration in Singapore is said to raise the level of educational attainment of the resident population and spur economic growth by meeting labor demands of the growing economy. Without immigration, the government projected in 2000 that Singapore's population would decline from 3.2 million to 2.7 million by 2050, and the resident workforce reduced by more than a quarter, if the TFR remained at 1.48[13].

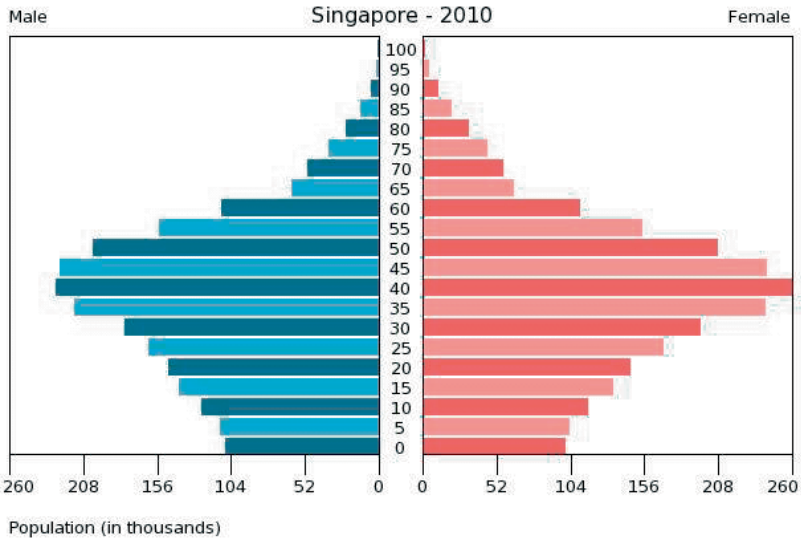
2.4. Demographic Projection: 2030 - 2050

The figures below shows Singapore's population pyramid in 2010, 2030 and 2050 respectively. The projection was generated by the US Census Bureau based on historic patterns in fertility, mortality and net international migration. Historic data for Singapore has been taken since 1990 as a reference point. While there are no drastic changes in fertility and mortality, only changes in net international migration

[13] Prime Minister's National Day Rally Speech 2000.

due to Singapore's open-economy policy to foreign workers might induce some slight inaccuracy.

Population size is projected to reach 5.13 million in 2030 but will fall to 4.64 million in 2050 with a rise of TFR from 1.3 in 2030 to 1.5 in 2050. Given the prolong issue of low fertility, we can see from the figures that by 2030 and 2050, a large portion of the population will be above 40, while the low fertility creates a narrowing base in the pyramid. In addition, proportion of elderly females outnumbers that of elderly males.



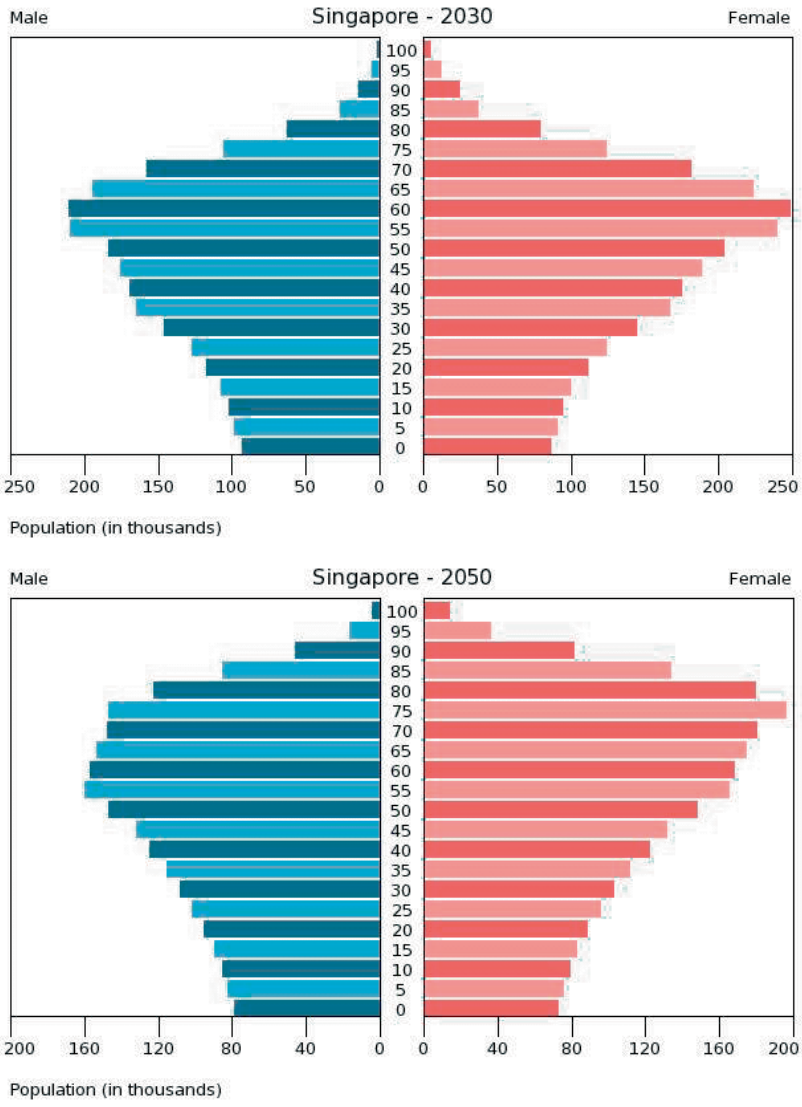


Figure 8: Singapore Population Pyramid in 2010, 2030 and 2050.

Source: US Census Bureau, Internet database.

3 Competitiveness

Each year, the World Economic Forum (WEF) evaluates a list of factors that measures the overall competitiveness of each national economy. The Global Competitiveness Report[14] facilitates a holistic view of potential economic growth and long-term prosperity among different countries, thereby; allowing governments to evaluate the effectiveness of their policies and identify best-practices that will help them fine-tune policy-making that brings about strategic growth.

[14] http://www.weforum.org/en/initiatives/gcp/Global%20Competitiveness%20Report/index.htm

3.1. Measurement and Drivers

Central to this measurement of competitiveness are twelve pillars of competitiveness which WEF identifies as crucial elements that drive productivity and growth. These pillars are classified in three stages of economic development and maturity: (1) factor-driven stage considers areas which are the basic requirements for economic prosperity, (2) efficiency-driven stage considers areas which determines the efficient allocation of resources for productivity and (3) innovation-driven stage considers areas that brings about sophistication and innovation in business. As a country achieves economic growth and development, it moves from fulfilling factor-driven requirements to efficiency-driven measures. WEF identified 32 countries in the latest stage of innovation-driven economies – of which 68% are European countries. Asian countries in this innovation stage of economic development include Korea, Japan, Hong Kong and Singapore.

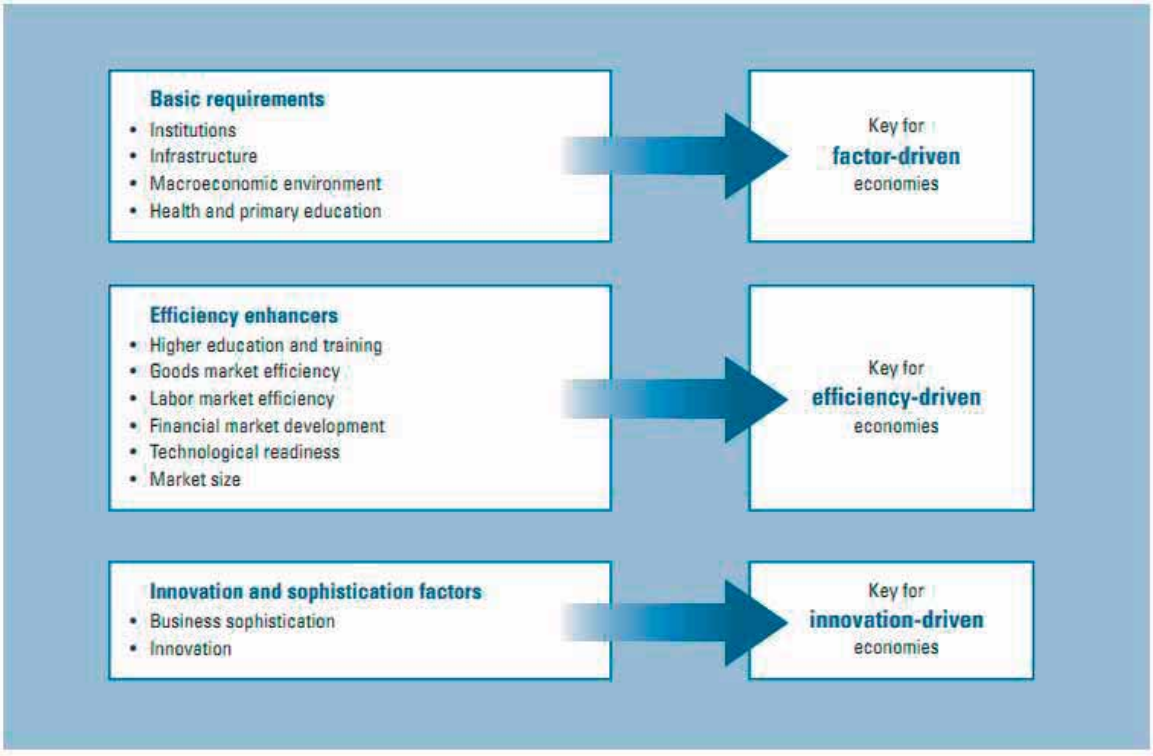


Figure 9: The 12 Pillars of Competitiveness.

Source: World Economic Forum (The Global Competitiveness Report 2010-2011)

3.2. Singapore's Success and Gaps

In WEF's Global Competitiveness Report 2010-2011, Singapore was ranked third after Switzerland and Sweden. The country was ranked highly for the lack of corruption, government efficiency, financial market sophistication and efficiency of its goods and labor markets (See Appendix). Singapore, however, needs to work on stronger adoption of latest technologies and higher level of business sophistication. The small size of the country makes it easier to reach consensus on policies since there is no conflict between rural and metropolitan areas. As such, Singapore has the advantage of highly efficient public services.

According to another evaluation report by the Asia Competitiveness Institute, the Singapore Competitiveness Report[15] 2009 applied a detailed analysis using Michael Porter's competitiveness framework and highlighted the following points on strengths and gaps in Singapore's economic competitiveness:

1. Singapore's competitiveness strongly outperforms most of the other Asian countries
2. High standard of living is due to high income levels and a strong position on healthcare and basic education
3. Economic performance is mainly driven by high labor mobilization from foreign workers
4. Labor mobilization among female residents remain very low
5. When increasing share of its population retires, future economic growth will have to come from productivity growth
6. Singapore maintains a high quality and stable political and economic environment conducive for international business
7. Effectiveness of public institutions has been one of its greatest strengths
8. Attractiveness as a country for multinational companies compromising performance in entrepreneurship

[15] Singapore Competitiveness Report 2009. Asia Competitiveness Institute.

4 Implications for Future

Declining birth rate and increasing life expectancy have profound implications on the age-structural composition of the population. Consequently, the country is facing issues from population aging, labor force shortages, increasing elderly dependency ratios, and the feminization of the elderly population. In 2010, the largest number of men and women were in the 40-44 age group but by 2050, it is projected that the largest number of females will be in the 75-79 age group while males in the 55-59 age group (See Figure 8). This generation of elderly population will be the ones who had first experienced the implementation of education policies in 1979 and received proper education and employment exposure to international business. Effectively, this means that the bulk of elderly will demand different aging policies from those existing today.

Singapore faces an aging population similar to that experienced in most European countries which requires a holistic program that caters to the needs of the elderly people. Changes such as incentives to encourage later retirement, investments in old-age healthcare, products and services designed for the elderly have often been in recent discussion about the aging world. The PESTEL Analysis below will omit discussions on above and focus on issues specific to Singapore.

Political and Legal:

(1) ***Marriages between citizens and foreigners:*** As the country become increasingly global, research have shown increasing trend of marriages between local citizens and foreign nationals[16]. Non-citizen spouse are not automatically granted permanent residency in Singapore and do not receive special privileges in finding employment in Singapore. Likewise, Singapore does not allow dual citizenship. Children of a citizen and foreigner will have to make a choice in citizenship. Policies can therefore tap on this trend as an opportunity to increase workforce as oppose to mobilizing large numbers of foreign labor.

(2) ***Restructuring of Central Provident Fund:*** While Singapore does not have any pension system, the Central Provident Fund is a compulsory saving system that enforce long-term saving among its citizen. Contribution to this saving fund is shared between employees and employers. Funds are allocated into 3 accounts and may be

[16] Singapore Government Portal, Information and Policies: Population, Family and Community
http://www.nps.gov.sg/files/news/Marriages%20between%20citizens%20and%20non-citizens,%201998-2008.pdf

accessed upon conditions for housing, investment and hospitalization. Upon reaching age of 62, individuals can freely withdraw the fund for monthly personal use. As the elderly population becomes more educated and internationally exposed, the government may have to consider building in more flexibility in allowing individuals to manage these funds such that they cater to needs of elderly that will keep them active and productive in workforce.

Social and Economic:

(1) ***Mobilization of Female Labor:*** Although education among the women population has been rising, the participation rate in workforce remain low compared to most European countries. A holistic scheme that provides financial incentives and reduces opportunity cost will need to be put in place.

Technological:

(1) ***Healthcare Technology for Men Killers****:* The feminization of the population is a result of high mortality among males. Cancer, heart disease and stroke are the top three killers of Singaporean males. Advances in technologies that allow early detection and treatment of these diseases will reduce the mortality rates.

Environmental:

(1) ***Urban planning***: Even though projected population by 2050 indicate a population of 4.64 million, Singapore's open-economy policies may see an increase in immigration and a growing issue of overcrowding. Singapore has the world's highest population density of 7,022 people per square kilometer. The country will soon face serious challenges in providing sufficient housing to the growing population and ensuring good capacity in its infrastructures to meet its growing economy.

4.1. Super-Mom Program

Singaporeans are historically known to be malleable through social engineering where success in government campaigns may be seen in the banning of chewing gums, promoting of courtesy and learning of Mandarin. While increasing immigration has currently served to provide for the strong economic growth in Singapore, relying on this will not be sustainable. The main issue of an extremely low fertility rate and female labor participation remains an issue that needs to be addressed. While economic progress in most societies often bring about higher birth rates and bigger family size, it has increased the opportunity costs for Singaporean women who are now highly educated. Opportunity costs need not be directly related to financial gains and career development but to psychological health and freedom that often causes many not to give birth or to stop after having the first child.

Super-Mom is a holistic program which empowers women both at home and at work. It complements the lucrative financial incentives already in place to encourage marriage and parenthood. This program targets to provide flexible working scheme such that women can better manage their time to handle the demands of raising children. It also promotes training and the use of technology such that the working mom receives greater mobility and also achieves better efficiency without compromising on productivity and causing inconveniences at work. The program leverages on the government's strength in new policy implementation, creativity and affinity to large multinational corporations whereby a special taskforce from the Super-Mom program actively communicates with the top management of multinational companies and promote the adoption of the program. Companies that actively participate in this program receive Super-Mom ratings (which endorse the company's work-culture friendliness towards women), tax incentives and training subsidizes which eventually benefit businesses through higher employee productivity, work satisfaction and lower turnover and training cost.

Super-Mom program also include an exclusive coaching program in which women may actively seek out the agency for coaching sessions to resolve personal conflicts between work and home. The sessions also encourage the creation of a personal development plan that allows them to increase overall personal capacity and work-life satisfaction.

The program also emphasize on building a women's community led by successful women from various fields, where women get support from each other through events such as self-improvement activities, sports and workshops. A ranking system allows motivated and high-achieving women to take initiative to lead sub-groups and provide mentoring to other younger women who are new to the network.

5 Conclusion

In conclusion, the issue faced by Singapore is one that is similar to many of the world's developed economy. Competitiveness analysis of the economy reveals that Singapore's strengths in not only ensuring that basic factor-driven pillars are well-taken care of, but also continuing to excel in provision of factors for efficiency-driven economies. However, much can be done to increase productivity, female participation in labor force, innovation and entrepreneurship within the country. While the government has been quick to implement changes to prepare for an aging population, such as increasing retirement age, restructuring the Central Provident Fund to prepare for higher healthcare cost with increased life-expectancy, providing retraining and employment opportunities for the elderly. Gaps in efforts and effectiveness in encouraging marriage and birth rates are still lacking. Singapore has been very successful in deploying foreign workers to support economic growth. However, high growth in immigration may not be a sustainable solution to its problem of low fertility rates. As such, the Super-Mom will be an essential step to address the core of this issue. While presently, incentives provide financial support to encourage more births, the Super-Mom program will empower women by addressing non-financial opportunity costs of parenthood such as psychological distress and conflicts between work and family. Likewise, it attempts to build a women's network that will encourage support, higher workforce participation and productivity among women.

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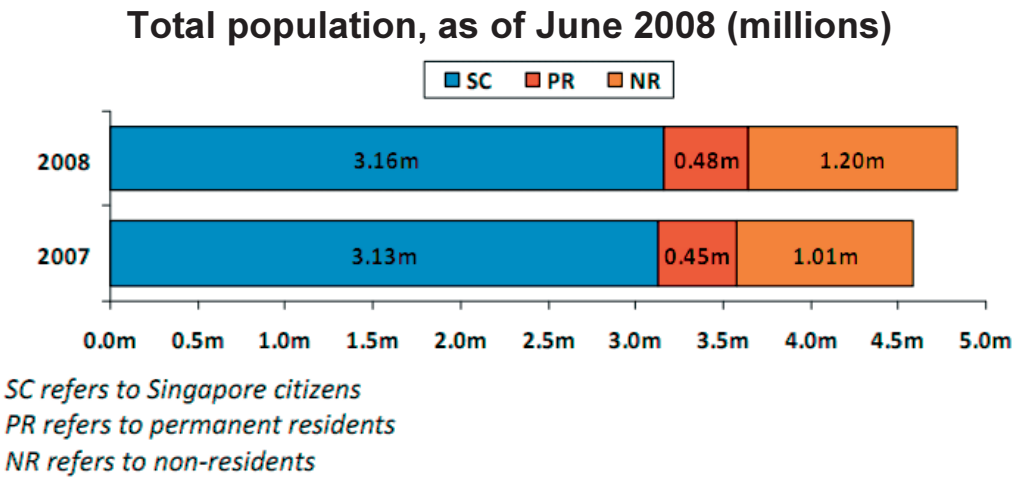
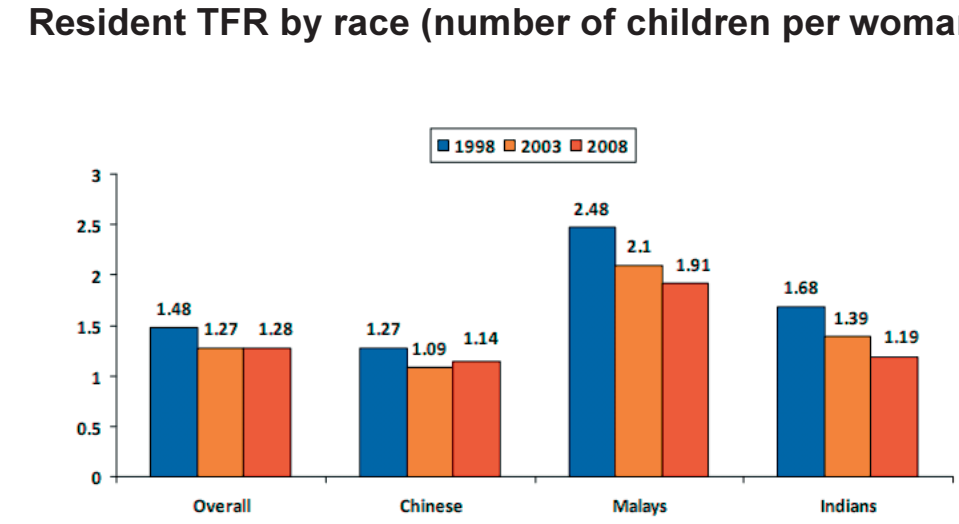
Appendix



SC refers to Singapore citizens
PR refers to permanent residents
NR refers to non-residents

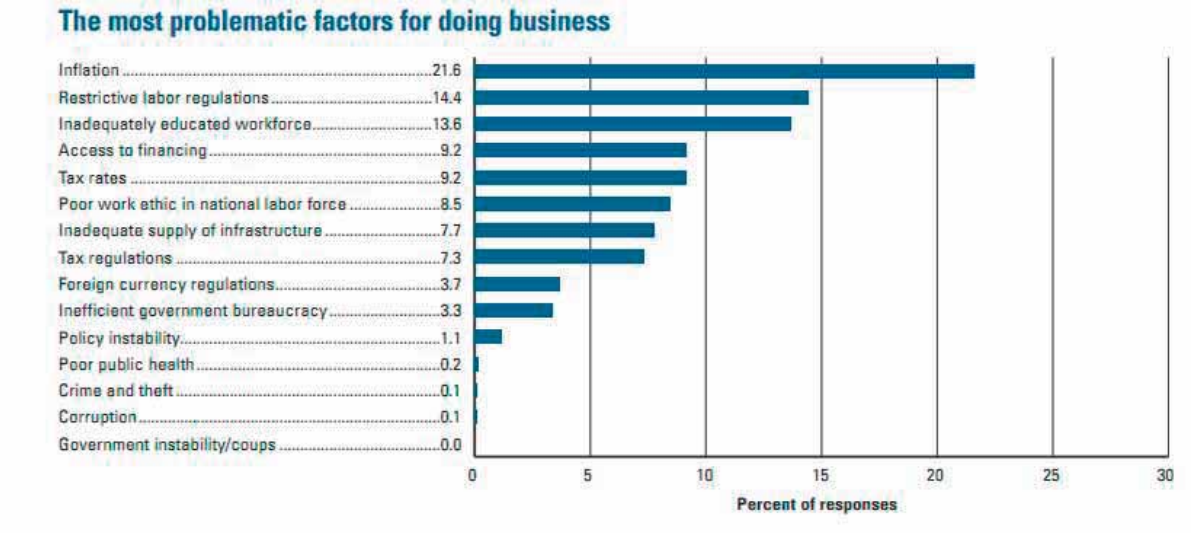


Singapore's Global Competitiveness Index by WEF

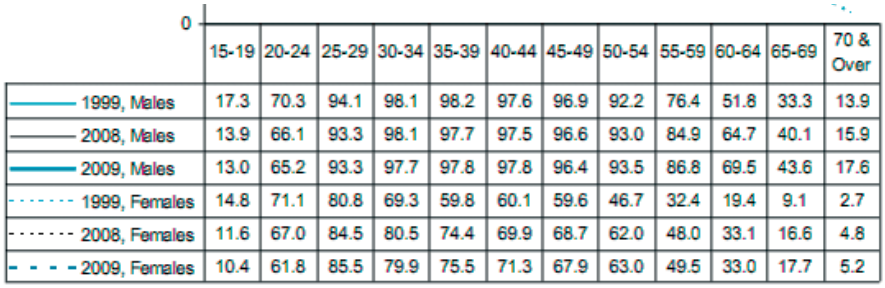
Global Competitiveness Index

	Rank (out of 139)	Score (1–7)
GCI 2010–2011	**3**	**5.5**
GCI 2009–2010 (out of 133)	3	5.5
GCI 2008–2009 (out of 134)	5	5.5
Basic requirements	**3**	**6.1**
1st pillar: Institutions	1	6.1
2nd pillar: Infrastructure	5	6.2
3rd pillar: Macroeconomic environment	33	5.2
4th pillar: Health and primary education	3	6.7
Efficiency enhancers	**1**	**5.5**
5th pillar: Higher education and training	5	5.8
6th pillar: Goods market efficiency	1	5.7
7th pillar: Labor market efficiency	1	5.9
8th pillar: Financial market development	2	5.8
9th pillar: Technological readiness	11	5.3
10th pillar: Market size	41	4.5
Innovation and sophistication factors	**10**	**5.1**
11th pillar: Business sophistication	15	5.1
12th pillar: Innovation	9	5.0

Singapore's problematic factors for doing business by WEF



Age-Gender Specific Resident Labour Force Participation Rate



	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70 & Over
1999, Males	17.3	70.3	94.1	98.1	98.2	97.6	96.9	92.2	76.4	51.8	33.3	13.9
2008, Males	13.9	66.1	93.3	98.1	97.7	97.5	96.6	93.0	84.9	64.7	40.1	15.9
2009, Males	13.0	65.2	93.3	97.7	97.8	97.8	96.4	93.5	86.8	69.5	43.6	17.6
1999, Females	14.8	71.1	80.8	69.3	59.8	60.1	59.6	46.7	32.4	19.4	9.1	2.7
2008, Females	11.6	67.0	84.5	80.5	74.4	69.9	68.7	62.0	48.0	33.1	16.6	4.8
2009, Females	10.4	61.8	85.5	79.9	75.5	71.3	67.9	63.0	49.5	33.0	17.7	5.2

Principle Causes of Death

	2007	2008	2009
Total No. of Deaths	17,140	17,222	17,101
% of Total Deaths			
1. **Cancer** [ICD9 : 140-208]	27.7	29.3	29.3
2. **Ischaemic Heart Disease** [ICD9 : 410-414]	19.8	20.1	19.2
3. **Pneumonia** [ICD9 : 480-486]	13.9	13.9	15.3
4. **Cerebrovascular Disease (including stroke)** [ICD9 : 430-438]	8.7	8.3	8.0
5. **Accidents, Poisoning & Violence** [ICD9 : E800-E999]	6.0	5.8	5.7
6. **Other Heart Diseases** [ICD9 : 393-398,402,415-429]	4.3	4.0	4.4
7. **Urinary Tract Infections** [ICD9 : 599.0]	2.2	2.1	2.5
8. **Chronic Obstructive Lung Disease** [ICD9 : 490-493, 496]	2.6	2.5	2.4
9. **Nephritis, Nephrotic Syndrome & Nephrosis** [ICD9 : 580-589]	2.0	2.1	2.3
10. **Diabetes Mellitus** [ICD9 : 250]	3.6	2.7	1.7

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Global Demographic Change

Scenarios of shrinking and growing regions/ states, estimations and assumptions about the future political/economic power and influence as well as wealth evolution, taking Islamic countries into particular account given their considerable population growing forecasts.

Topic No. 4

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November 2010
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Megatrend “Global Demographic Change”
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Executive Summary

Demographic change is a phenomenon which is known to academia, managers, and policy makers for decades. However, its implications are often neglected. Until 2050 it is expected that more than 8.5 billion people will inhabit the world. This growth will mainly take place in developing countries, whereas developed countries will experience a sharp decrease in population as well as rapid ageing of their societies. These trends challenge the economic and social development of countries across the globe. This paper tries to identify the challenges different regions and countries face. A special focus is put on Islamic countries as they are expected to grow significantly over the coming decades. In particular, this paper will present three countries, namely (1) Iran, (2) Pakistan and (3) Nigeria, elaborating in detail specific challenges and problems they are facing.

Iran is an emerging economy which was able to capitalize its vast oil and gas reserves for its economic development. It is expected that Iran's working population will increase by 17 million people until 2050 challenging policy makers and mangers to create enough jobs, giving the Iran the possibility of preserving social peace and a prosperous economic development.

Pakistan, on the other hand, is a society dominated by a feudalistic and agricultural structure. Currently, 184 million live within Pakistan, whereas approximately 24% of population lives below the poverty line. Until 2050 it is expected that the population will increase up to 332 million. Terrorism and political conflicts in and outside Pakistan are already major problems for the economic and social development. Demographic change will therefore be an immense challenge for policy makers and managers to at least preserve the status quo.

Nigeria, like Pakistan, represents a highly impoverished country, which will experience a huge growth in population over the coming 40 years. The working force alone is expected to double until 2050 from 83 million in 2010 up to 192 million in 2050. Problems like HIV/AIDS or an underdeveloped infrastructure already challenge Nigeria's economic and social development. The immense population growth over the coming decades will even enhance the already existing problems.

Demographic change has an impact on all countries. However the challenges might be different for the countries. In addition, demographic change will certainly modify the world in terms of political and economic power - some countries will win some countries will lose power.

1 Introduction

The world's population is growing significantly since decades. The growth over the last 60 years accumulates to approximately 4 billion people what constitutes an annual growth rate of 1.7% between 1950 and 2010 (see Table 2.1.a.). Currently approximately 7 billion people live on the globe. This is an unprecedented number and this dramatic growth will continue over the coming decades, being expected a world population growth of app. 0.7% over the coming 40 years (UN, 2010). However some countries will experience an increase in population, others will see a stagnation of their population and other will experience a decrease in population. Thus different countries face different challenges.

Demographic change challenges regions and countries on a variety of dimensions. First of all these additional people need access to food and water to satisfy their fundamental needs. And this basic issue already challenges many countries. Many countries, mainly less developed countries can't even tackle this issue. As a result the potential of social unrest due to demographic change is enormous. On the other hand developed countries like Germany or Japan face negative population growth, meaning that their population will shrink over the coming years. The later challenges especially the social systems of these countries as less and less young people have to financially support more and more elderly people. Additionally, elderly care and health care costs exploded over the last decades and will eventually increase over the coming years, challenging a decent and affordable care for ageing people.

It seems clear, that demographic change challenges every country over the globe. However, it also challenges the power structure in economic and political terms. Therefore countries need to find ways to tackle their specific problems with demographic change to be able to either secure or gain wealth.

The following paper is an attempt to show the effects of demographic change on certain regions and countries. A specific focus is set on countries with a majority of Muslims, as these countries belong to most growing countries in the world.

2 Future Prospects

2.1. Global Developments

In 2050 more than 8.5 billion people will inhabit the world. However this increase in population is unequally spread around the globe. Apparently the population in less developed and least developed countries will grow significantly faster than in developed countries. It is estimated that the compound annual growth rate (CAGR) between 2010 and 2050 for the population in less developed countries will be 0.83%, for least developed countries 1.42%, and 0.09 for developed countries (UN, 2010).Apparently the expected population growth is spread unequally among countries with different levels of development. But it is also possible to identify differences among regions in terms of population growth. Some regions experience rapid growth, other regions experience stagnation and others also experience a decrease in population.

In 2010, the age pyramid of the world could be described as an expanding pyramid, with a high proportion of children. This implies a fast growth of world's population a relatively low proportion of elderly people. However until 2050 this world age pyramid will transform to stationary form, which indicates a relatively low number of children per woman (fertility rate) and a low mortality (see Table 2.2.).

2.2. Regional Developments

Between 2010 and 2050, Asia, Africa, North America, South America and Oceania will experience a population growth. Asia will grow by app. 0.6%, annually which is translated in an absolute population increase of 1.1 billion people. Africa will experience a population growth of 900 million people which constitutes 1.6% annual growth rate. Until 2050, North America will grow by 0.6% annually which will add up to 90 million more people than in 2010. South America will grow by 0.5% annually, thus gain 92 million inhabitants and Oceania will grow by 0,9% annually which will result in an increase of 16 million inhabitants. Europe will be the only region which will experience a negative population growth. It will decrease by app. -0.2% which constitutes a reduction of 51 million inhabitants until 2050 (UN, 2010).

2.2.1. Africa

Apparently, Africa's population growth will outpace the growth of all other regions in the world and gain 900 million inhabitants until 2050. Within Africa, there are huge differences among countries in terms of population growth. Especially Sub-Saharan Africa is expected to grow significantly with app. 1.7% annually between 2010 and

2050 (UN, 2010). This is due to the extremely high fertility rates of app. twice as much as in Northern Africa. This is especially true for the rural areas of Sub-Saharan Africa. In coming years/decades, Africa will face several other challenges in addition to this rapid growth in population, namely (1) negative effects due to climate change (e.g. spreading aridization of farmland), (2)an underdeveloped social and economic infrastructure and (3) diseases like HIV or Ebola. Due to these critical issues, many Africans already migrated and will migrate in the coming decades to more promising regions/countries in the proximity, namely Europe. Thus Africa will experience a negative net migration rate over the coming decades, ranging from -0.4 per 1.000 inhabitants in 2010 to -0.2 in 2050. Apparently, many African countries are already facing these issues and in this context, rapid population growth, as expected, will be the ultimate challenge for most African countries. Therefore, first of all African governments have to find solutions to generate enough food and water to feed the current and future inhabitants. After this critical issue has been solved African governments could try to shape the coming demographic changes more actively by upgrading their countries' infrastructure and human capital.

2.2.2. Asia

Asia's growth between 2010 and 2050 is forecasted to be 0.6% which constitutes an increase of app. 1.1 billion people. This growth will mainly take place in India and China. Over the coming years the life expectancy in both countries will eventually rise due to the continuously prospering economy and the related growth in economic wealth. China's population growth is however decelerated significantly by the one-child policy which eventually will result in China reaching its population peak around 2030 with app. 1.45 million people. However China and especially its social systems face huge challenges because it is one of the fastest aging countries in the world. But China is still a developing country which puts a lot of pressure on the social development of the country. India's growth in population is mainly due to improvements in life expectancy and a relatively high fertility rate (app. 2 children per woman). But like China, India faces challenges due to the demographic change in terms of deficits within the social security systems, lacking infrastructure as well as huge economic disparities between the urban and rural population.

2.2.3. Europe

Europe will decrease between 2010 and 2050 by 0.2% annually. Life expectancy is estimated to rise even higher than today´s but this positive population growth effect is diminished by a decreasing fertility rate. Despite the positive net migration in Europe,

this extremely low fertility rate is not balanced out. Even if the net migration will of course have a positive influence on the economic development of Europe, integration problems which already exist in 2010 will even be more dramatic.

2.2.4. South America

South America is expected to grow between 2010 and 2050 by 0.5% which is a growth rate lower than the average (UN, 2010). This is mainly explained by the increasing emigration to North America, especially the USA, and the rapidly diminishing fertility rate. Despite the continent's economic development, the huge economic and social disparity between rural and urban population still exists and will remain in the future. Some countries like Brazil or Argentina might be able to capitalize their recent economic development to develop social security systems which will enable them to tackle the challenges of demographic change. However, the decomposition of central authority can be observed in many countries in South America (e.g.: civil war in Colombia or natural catastrophes like in Haiti) show the fragile situation of many countries in this region. It remains question whether these countries can handle the challenges of demographic change.

2.2.5. North America

According to estimates, it is believed that the population of North America (USA, Canada and Mexico) will increase from currently 350 million people to app. 450 million in 2050. Most of this increase is accredited to a positive net migration, as fertility rates and life expectancy will remain the same. The fact that Canada and the USA are socially and politically stable enables the capitalization of their population growth, translating it directly into economic development.

2.2.6. Oceania

It could be said, that Oceania is only a residual of the world's population, because only 0.5% of the worldwide population lives in this region of the world. In the future the trend of immigration from other continents like Asia and Europe will continue (Caldwell, Missingham, & Marck, 2001). One interesting fact is that it is estimated, that the proportion of Oceania's population will increase from 0.2% in 1950 up to 1.3% in 2020.

3 Country Cases

3.1. Growing country: USA

Since decades, the USA is economically and politically the most powerful country in the world. In 2009, the GDP of the USA approximated up to 12.8 trillion USD. Currently, the USA are inhabited by 317 million people which ranks the USA as the 3rd most populated country in the world (1st : China; 2nd : India). In 2010 the annual growth rate for the USA will be app. 0.8% and decrease until 2050 down to app. 0.4%. This below the global average growth rate is however rather exceptional among the developed countries (UN, 2010).

- Over the coming decades, all age groups of the US population will experience a growth. The current population structure in the USA is transferring from a stationary to a constrictive population pyramid, with a narrow base and a wider body that has a steady upwards narrowing. 20.2% of the population is below the age 15 (64.227). In 2010 app. 60% of the US population is between 20 and 64. Apparently a predominant part of the population is in an employable age. The baby boom generation which is currently between 46 and 64 years old, is the predominantly shaping the US population. This generation will age over the coming years and thus rapidly increase the share of people being above 64 from today 13% to 19% in 2030 (Vicent & Velkhoff, 2010). In addition to that, immigration will remain a major driver for the population growth within the US. In contrast to other developed countries, the US experiences an influx of people from all over the world. However, the majority of these immigrants, either illegal or legal are from South/Latin America. In 2003, people from South/Latin American origin constituted 13% of the total population and the share is still rising. However in contrast to all other immigrants, these immigrants from South/Latin America seem not to be willing or be able to integrate into the US society (Gobbicchi, 2007). The rise of Spanish as a second 'inofficial' language can be seen as a sign of this unwillingness or inability to integrate. In addition to that, the US faces huge social challenges due to demographic change. Compared with other developed countries, it could be argued, that the US have relatively underdeveloped or constrained social system and a relatively huge inequality in terms of wealth and income. Thus, demographic change in terms of naturally growing population, a rapidly ageing society and the huge influx of immigrants challenges the social infrastructure of the US. However, the US has the financial resources to expand and improve their social system to handle the adverse effects of demographic change (Gobbicchi, 2007). In general it can be said, that the US can be a winner of demographic change because the growing population will foster a positive economic development. Especially the influx of immigrants could increase the diversity of the US and thus the innovative potential of its economy. But in general, a highly developed country which is able to accommodate and capitalize the potential of a growing population is very likely to gain from demographic change.

3.2. Shrinking country: Germany

Germany is currently inhabited by app. 80 million people and it is the 15th most populated country in the world. In terms of economic strength measured by the GDP it is the 4th strongest country in the world with a GDP of app. USD 2.81 trillion in 2009 (IMF, 2010).

Between 2010 and 2050 it is expected that the population will decrease by app. 12 million., thus Germany can be seen as example of developed countries which do not experience a huge influx of immigration like the US, and thus will decrease in terms of population size over the coming decades. Germany has like the US a relatively big baby boomer generation which is currently still in labor. However, over the coming decades these people will age and thus rapidly increase the share of elderly people in Germany. According to estimation, the population above the age of 65 will increase from currently 20.5% up to 32.5% in 2050. In comparison to the US, Germany experiences a relatively lower migration rate, which will remain between 1 and 2 for the coming decades. The fertility rate will also remain relatively stable between 1.5 and 1.8 over the coming years. Therefore it becomes clear that Germany faces immense demographic challenges because neither migration nor natural population growth will balance the negative effects of an ageing society.

One major problem Germany faces concerns the pension schemes and elderly care. The pensions system in Germany is mainly based on generation equity, meaning that the current working population pays the pension for the elderly who earned their right to receive a pension through working. Such a system functions well in a country with a stable or growing population. However, such a system can't work properly in a country like Germany which is expected to experience a decrease in population. The later will ultimately result in a decrease of working population and an increase of elderly people. The reason: less and less young people need to support more and more elderly people. Combining this fact with increasing costs for elderly and health care, would mean that the young population would have more and more deductions from their salaries to finance the ageing society. Therefore, this system was complemented in 2000/2001 with the 'Riester-Rente' which is a state-subsidized private pension, which aims to decrease the amount needed in order to finance the ageing population by today's working population (Bundesministerium für Arbeit und Soziales, 2010). Another initiative to counterbalance the adverse effects of ageing in Germany is the prolongation of the working time, meaning that people have to work into higher ages to decrease the pressure from the pension system (Deutsche Rentenversicherung, 2010).

Germany representing a highly developed country faces the challenges of tackling a decreasing population size and simultaneously allowing its elderly people decently grow in age. Therefore, Germany needs to find solutions to keep its citizens in employment for a longer period of time in order to ensure its economic development. While a functioning economy needs employees, a decreasing population represents a true challenge for a healthy economy.

3.3. Stagnating country: China

Currently China's population is estimated to be app. 1.3 billion people and it is growing. This positive trend will probably continue until 2030, when China is expected to reach its population maximum with app. 1.45 billion inhabitants. After this point, China will experience the effects of the one-child policy, which was introduced in 1979, meaning that the population growth will have slowed down over the last decades and will eventually turn out to be negative. The population growth over the coming years can be explained by an expected decrease in infant and adult mortality due to economic and social improvements in China's social systems. These trends will balance China's relatively low fertility rate of app. 1.8 in 2010 out (UN, 2010).

Today, the population structure in China is characterized by a constrictive pyramid with an overweight of males in the population (see Table 3.3.). The general form of the population structure as well as males representing the majority of the population won't change significantly over the coming decades. The age structure of China is very beneficial for China especially until 2033, because until then, China will have a work force of app. 1 billion people. However, it is obvious, that China will age at a rapid pace over the coming years. According to estimations, 322.4 million people above the age of 65 will live in China in 2050. Today this group of people accounts for app. 8.2% of China's total population but this share will rise until 2050 up to 23.3% of the total population (UN, 2010). At this point the share of elderly people on the total population will exceed the share of children (Wei & Jinju, 2009). This underlines the rapid ageing of China over the coming decades. Taking into account, that China is still and most probably will be in 2050 a developing country, it is clear that the social systems face a huge challenge. Most of the inhabitants of China can't receive a decent pension. The government undertook several initiatives to improve the situation of elderly people within China; however the magnitude of this ageing process seriously challenges China's ability. It will take a long time until China can establish decent social security systems to allow its elderly people to retire in a

respectable manner. Until then, elderly people have to rely on their relatives/children to support them.

Therefore, the effects of demographic change on China are two-folded. On the one hand, China will experience a growth in population as well as in working population, which will improve China's economic development. On the other hand, China will hit a point after which the population will decrease and at the same time the number of elderly people who need to be supported rapidly grow (Sun, 1998). Thus, China can on the one hand benefit from the demographic change but on the other hand needs to prepare for the future. China's population is growing, which means that its voice in the world will be even more important in the future. But the challenge for China is to accommodate and capitalize the growing population until 2030 in order to prepare for the decreasing population after 2030.

4 The demographics of the Islamic countries

The world population growth during the past five years has been 1.18% and is forecasted to drop to 0.34 % by 2050 (UN, 2010). Resulting from the decline of the growth rates of the developed countries, the combined populations of North America and Europe, which accounted for a 28.43 of the world´s population in 1950, today only represent a 15.70, which is expected to decline to a 12.45 in 2050 (UN, 2010).

Despite the fact that the population growth rate of the Muslim-majority countries has also declined, it is still above the world´s average and was about 2 % between 1995 and 2000 (Abbasi-Shavazi, M. & Jones, G.2001). Hence, the drop in the population weight of the developed countries is automatically translated into an increase of the relative population weight of the Muslim countries. Consequently, Muslims are expected to be one quarter of the world´s population by 2025.

By 1950, the combined populations of Indonesia, Pakistan, India, Bangladesh, Egypt, Turkey and Iran added 247 million Muslims. Today, those seven countries held the world´s largest Muslim population and have a combined population of 895 million Muslims. Only the populations of these seven countries are forecasted to amount 1.2 billion Muslims by 2050.

In order to give a clearer picture, of the 48 fastest-growing countries today (those with annual population growth of 2% or more), 28 are majority Muslim or have minorities of 33% or more (Goldstone, J., 2010).

The fact that these Muslim countries present a specific cultural, political, economical and religious reality implies a need to pursue a separate analysis of the demographic trends during the last years. In order to understand the context we need to describe their specific current population changes, discover the possible commonalities or differences and highlight the challenges that the forecasted demographic trends represent for the future.

4.1. The distribution of Muslims across the globe

As one of the world´s biggest monotheistic religions, the Islam is followed by approximately 1.55 billion people in the world, representing the second largest religion. The ten largest Muslim populations are situated in Indonesia, Pakistan, India, Bangladesh, Egypt, Turkey, Iran, Nigeria and the Philippines (table 4.1.a).

Muslims can be distinguished between Sunnis and Shiites. The former believe that Prophet Mohammad didn't appoint a successor, while the latter believe that the Prophet had designated Ali. In relation to its demographic distribution, only between 10 and 12 % are Shiites, constituting the main group in countries like Iran, Iraq, Azerbaijan, Yemen and Bahrain (Abbasi-Shavazi, M. & Jones, G., 2001, p.3).

It is important to consider that Islam is a religion with a percentage of Muslims varying in each country. This explains the impossibility of talking about Muslim countries without taking these numerical differences into account. More precisely, it is recommended to distinguish between Muslim-majority countries, where more than 50 % of the population follows the Islam, from those Muslim-minority countries, where the Muslim population represents less than 50 %.

Currently, there are 46 countries in the world with a population from which more than 50% are Muslims. The ten largest Muslim-majority countries today are Indonesia, Pakistan, Bangladesh, Egypt, Turkey, Iran, Algeria, Morocco, Sudan and Iraq, many also having the top positions in the list of world largest Muslim populations. The total Muslim-majority countries´ population adds up to 1.15 billion (Table 4.1.b).

On the other hand, there are 406 million Muslims living in Minority-Muslim countries. The largest Muslim populations in Muslim-minority countries are India, Nigeria, Philippines, Ethiopia, China, Tanzania, Russia, Ivory Coast, Kazakhstan and Mozambique (Table 4.1.c).

It is remarkable that the Muslim populations are either a very high % age of the overall country population where they live, or a very low % age. This is highlighted by

the fact that almost all the Muslim-Majority countries have Muslim population % ages higher than 80 %, while almost all the Muslim-minority countries have Muslim population % ages lower than 10 %. As a result, it can be said that there are countries with Muslim majorities or countries where Muslims are a minority, but countries with a Muslin-Non-Muslim balance don't exist (Abbasi-Shavazi, M. & Jones, G., 2001, p.3).

Regarding the weight of the Muslims in relation with the overall population, in Africa, 41 % of the population is Muslim while Asia has 26 % of Muslims among its populations (UN, 2010). Considering the concentration of the world´s Muslim population in the different regions, 71 % of the Muslims in the world live in Asia, especially in Indonesia, Pakistan, Bangladesh, India and Iran, and 27.3 % of all the Muslims are in Africa, especially in the countries of Northern Africa (e.g. Egypt, Nigeria, Algeria, Morocco and Sudan (Table 4.1.d).

4.2. Demographic patterns. The cases of Iran, Pakistan and Nigeria

4.2.1. Iran

Iran has a population of 75 million people, 99.5 %of which are Muslims. It currently holds the 18th position among the world´s most populated countries and it is the 8th most populated Muslim country. The UN forecasts that Iran will have a population of 96.97 million people by the year 2050. (Table 4.2.1.a)

By the year 1950 the population growth rate of the country was of 2.42 (table 4.2.1.b), and achieving a peak of 4.16 in 1985, when the world´s population growth rate was 1.76. Today this rate has dropped to the same level as the world´s rate, 1.18 and it has been forecasted to drop to 0.16 by 2050, staying even below the world´s population growth rate of 0.34, mainly responding to the forecasted decrease in the fertility rate.

Age structure

- The current population structure in Iran is represented by a constrictive population pyramid, with a narrow base and a wider body that has a steady upwards narrowing. Iran has a 23 % of the population under age 14, and as the pyramid shows, the biggest concentration of population, this is a 42.8%, has an age between the range 15 and 35 years old. This working age cohort is the result of a high fertility rate that Iran experienced during the 1970´s and the 1980´s (table 4.2.1.1.a).

- Iran also has a low % age of elderly, with a 4.8% of the population above 65 years. These figures are also reflected in Iran´s dependency ratio of 40, relatively low as a result of the large population in the main working ages, contrasted with a low fertility and a small elderly group.
- According to the UN estimates and the forecasted future patterns, the population pyramid of 2050 will present a tendency to an inverted pyramid. By 2050, due to the maintenance of a low fertility rate, the base and the body of the pyramid are stable (table 4.2.1.1.b). Iran will have a 17.1% of the population under 14 years. However, the reduction of mortality rates implies a growing elderly. This elderly group will be even enlarged by the influx of the current young bulk that will be by then entering the elderly age, representing a 28.1% of the overall population. As a result, the dependency ratio will increase.

Fertility

After the Islamic Revolution, in 1967 the government cancelled the family planning program and promoted a pro-natalist policy encouraging marriage (Lutz, Crespo & Abbasi, 2010). As a result, the fertility rate rebounded from 7 children in 1966 to a 6.5 in 1976. However, in 1989 the government reversed this approach by introducing a new family planning program in order to avoid massive unemployment after the war with Iraq and to fulfill its plans of universal education for boys and girls. As a result, and combating the rapid growth through formal and informal education, the fertility rate experienced a dramatic decline, being 1.8 children per woman today. This represents the most rapid fertility decline in the world.

This has been the result of several combined factors. First, the age of marriage has increased from 19.7 in 1976 to 23.3 in 2006. As a result, while in the time of the Islamic Revolution a 78% of the people between 20 and 24 years were married, today just 50 % of the population in that age range is married. Additionally, infant mortality has experienced a huge reduction due to the expansion of the health network system (Abbasi-Shavazi, M., Lutz, W., Hosseini-Chavosi, M. ,2008).

Regarding urbanization, Iran has shifted from a rural population to a population that today mainly lives in urban areas. Another important factor has been the expansion in the use of contraception. While its use rapidly increased between 1976 and 1992, the increase slowed between 1992 and 1994, being today stagnated. However, there has been a shift to the use of more efficient contraceptive methods, helping to further reduce the fertility rate.

Finally, education has been proved to have an effect on the reduction of fertility rates.

Young Iranians are better educated than old Iranians (Lutz, Crespo & Abbasi, 2010), and this improvement is even higher for women (tables 4.2.1.2 b).This might have been the result of the expansion of mass formal education pursued by the government as well as the consequence of informal channels of education like the Literacy Movement, a group created to educate the illiterate. Additionally, the wide expansion of electricity and hence, of television and other media communications might have helped to this results.

According to the study of Lutz, Crespo & Abbasi (2010), this trend will continue its development and by 2030, the % age of population with no formal education will be almost inexistent, and the % age of population with further education like secondary school will increase. As a result, Iran will have an educational structure of an industrialized country.

Income and labour

Iran has a transition economy with a large public sector and an estimated 50 % centrally planned economy. The GDP per capita of 4.484 US$ is far from the indicators that assume a figure of 1.000US$ as the poverty line. When using the GDP adjusted for purchasing power parity in order to give a more realistic indication, the figure is 11.024 US$, corresponding to figures of an emerging or developing economies. This GDP is mainly attained through the industry (45.2%) and the service (43.9 %) sectors. Iran is a country positioned in the post-industrial era, and has an economy that relies on oil, enabling high earnings. However, the export price from oil averages 55$ and the declining oil production leads to budget limitations (CIA, 2010).

Despite a high labor force of 25.2 million, the rate of unemployment is 11.8%. The fact that Iran possesses a largely educated population, lack of employment has caused a brain drain of qualified people.

Future prospects

By 2050 the population of Iran is estimated to count 97 million people. However, the population growth rate will decline from 1.18 to 0.16, showing a population structure closer to the one of developed countries. Causes for this development are: further discrepancies in urban and rural fertility, the continuing urbanization and education, the increasing age of marriage. However, Iran´s population is forecasted to age in the future due to the decrease of mortality and the low birth rates and the increase of dependency ratios. Despite the forecasts that attribute a potential growing economy, the fact that by 2050 Iran will have an increase in the work force of 17 million people

puts an emphasis on the need to enhance employment. However, the current position of the government regarding the future population policy is still not clear,. However, current declarations of the president Mahmoud Ahmadinejad seem to point to a pro-natalist direction, despite the expert recommendations to maintain the fertility rate in the replacement level. Finally, several studies have shown that there exist a positive relationship between degree of education and degree of political rights (Lutz, Crespo & Abbasi, 2010). The huge population groups between 30-45 and between 60-70 can also be considered as a driving force for a path to democracy (Lutz, Crespo & Abbasi, 2010). These cohorts were born during the fertility boom of the eighties and they are also the ones benefiting the most from educational programs and therefore demand higher political space today and in the future.

4.2.2. Pakistan

Pakistan currently has a population of 184.8 million people, of which a 95% are Muslims. It holds the 6th position among the world largest countries in the world and the 2nd most populated Muslim country after Indonesia. The UN forecasts that by 2050 the population will be 335.2 million people, which implies that Pakistan will be the most populated Muslim country, and the 4th most populated country in the world (table 4.2.3.a).

Consequently, Pakistan has a population growth rate of 2.16%, above the world´s 1,18%, being the main contributor of this population growth the high fertility. However, this rate has been declining since the 80´s and it is forecasted to still decrease in the future (table 4.2.3.b).

Age structure

The current population structure in Pakistan is represented by an expansive pyramid which a wide base indicating a high proportion of children. A 36.6% of the population is under 14 years old. It also has a steady upwards narrowing, which implies that more people die at each higher age band, showing also that infant mortality is high and has an effect in the overall population structure (table 4.2.3.1.a).

According to the current demographic pattern and to the UN estimates, the population pyramid in 2050 will have a wide basis, with a wide body and a narrow top (table 4.2.3.1.b). Despite the decline in fertility rates forecasted for the future years, the improvement of health conditions and of wellbeing will also lead to a decrease in mortality. Therefore Pakistan faces a situation of ongoing population growth and

even higher growth of working age population which leads to the opportunity of capturing the “demographic dividend”.

The dependency ratio in Pakistan increased during the 1970´s, due to the rise of the child dependency ratio as a result of the reduction of infant mortality. However, since 1980 it has declined and it is expected to drop further. The decline of the fertility rate and the large young population entering the labor force by 2050 are the main explanations for this reduction.

Fertility in Pakistan

Pakistan has followed an official anti-natalist policy since 1965. Despite the efforts, fertility did not start to change until two decades after the implementation of these measures. Between 1970 and 1975 Pakistan had a fertility peak with 7 children per woman. However, this rate did not start declining until the 1990´s. Today, Pakistan´s fertility rate is at 4 children per woman, still representing a high rate compared to the world´s mean 2.16 (Table 4.2.3.2.a).

A feature that makes Pakistan’s demography very unique is the fact that, despite introducing family planning policies at the same time as neighboring India and Bangladesh, the fertility rate started declining later than in other Asian countries (Sathar, Z.,2001).The reasons for this pattern are numerous.

The major contributor to this decline in fertility rate was the increasing use of contraceptive methods, which experienced a high rise in the 1990´s (Sathar, Z.,2001). Another contributor is the increase of the age of marriage throughout the last thirty years, reducing the spousal age gap. Additionally, it seems that the rapid urbanization of Pakistan during the 1980´s had also an impact on fertility. Despite the fact that fertility is still considerably high as a whole, the fertility rate in urban areas has decreased and in rural areas is slowly showing changes.

Despite the unsuccessful beginning of the Population Program, where women were accountable of looking for planning information, the government has revived the policies in 1990, providing further funds to proactively bringing family planning services to the women in their locations.

The Pakistani government aims to provide education to the entire population. Despite the fact that the literacy rates have improved, they are still low. In 2008 41% of the men and 56% of the women were illiterate (Sathar, Z., 2010). The highest part of this rate corresponds to rural areas as well as female population, and hence constrains the goal to decline fertility rates.

Income and wellbeing

Pakistan has a very impoverished economy and is highly reliable on foreign investment. The GDP per capita is 1'049.3 US$ and the GDP (PPP) is of 2'789.75 US$ and a 24% of the population lives under the poverty. The country has for long time suffered political conflicts and it is still a feudal and agricultural society (Sathar, Z., 2001).

Pakistan has a huge labor force with 53.78 million people that are in working age. However, it still is a feudal country, where 43% of the population is employed in the agriculture sector. Only a 20% is employed in the industry sector, where textiles are the main source of the country´s exports earnings (CIA, 2010).

Regarding woman employment, there are not reliable statistics on the number of employed women. However, women are the population with less educational preparation and traditionally responsible of the house duties.

According to the forecasts, by 2050 there will be 123.61 million Pakistanis in the age group between 20 and 44. The need to shift the current weak economic situation and the high dependency on foreign aid are musts in order to absorb the high labor force in the upcoming years (Hussain, S., Malik, S.&Hayat, M., 2009).

Future prospects

Pakistan is going through the third stage of the demographic transition. Due to a phase of mortality decline Pakistan is going through a decline in the fertility rate. As a result, the age structures are experiencing a change: with a large group of children born today that will enter the working age by 2030, the current working age group's proportion will be doubled. However, this concerns the agricultural economy.

Despite the fact that improved structures of lower dependency ratios offer an opportunity to economic growth, they have to be accompanied by measures that ensure the provision of labor opportunities for the incoming large number of workers. Hence, in order to avoid falling in a demographic trap, there is a tremendous need to properly execute the execution of the family planning measures. More specifically the focus needs to be in rural areas and on education.

4.2.3. Nigeria

Nigeria is the most populated African country and currently has a population of 158.26 million people, of which a 43%are Muslims. Nigeria holds the 8th position in the world ranking of the most populated countries after Bangladesh and the 9th

position among the most populated Muslim countries, after Iran. The UN forecasts show that Nigeria will have a population of 289 million people by 2050. This means that it will be the 5th most populated country of the world, after Pakistan (table 4.2.4.a).

Nigeria currently has a population growth rate of 2.33%, above the world´s 1.18%, being the main contributor to this rate the high fertility. After achieving a peak in 1980, this rate has been declining and it is forecasted to still decline in the future. However, despite the efforts, it is expected to still double the world´s growth rate by 2050.

Age structure

The current population structure in Nigeria is represented by an expansive pyramid indicating the high amount of young population. Currently, a 42.4% of the population is below 14 years old. However, the top of the pyramid narrows, showing a low 3.14% of people above 65 years old. As a result, Nigeria has a high dependency ratio of 83 due to the large cohort of children. The wide basis of the pyramid also indicates a future fast population growth due to the large group of children which will enter the reproductive age soon (table 4.2.4.1.a).

As a consequence from the above and according to the UN estimates, Nigeria will have a population of 289 million people by 2050 which will be distributed between 27.3 % under 14 years old, 66.5% of population in working age, and a 6.2% of elderly population. As a result the dependency ratio will be reduced to 50 (table 4.2.4.1.b)

Fertility

Fertility in Nigeria has traditionally been very high. From the 1950´s untill the 1970´s Nigeria had a fertility rate average of 6.55 children per couple. The reasons for the high levels of fertility are several. The high levels of infant mortality, the very early marriage along with child bearing and the whole reproductive life are the main reasons. Additionally, Nigerian women rarely used contraception due to the negative associations. Contraceptives are considered to violate natural contraception. Polygamy has also been considered a factor by some authors (Feyisetan, B. & Bankole, A., 2002) as it promotes competition for childbearing among the wives.

Due to these dramatic figures the government put a policy in 1989 for family planning into effect (Odimegwu, C., 1999), integrating it in a national development plan. Ever since, the fertility rate has slowly declined and today counts 5.32.

One of the causes that have lead to this decline is the decrease of demand for children (Feyisetan, B. & Bankole, A., 2002). The proportion of married women is also declining as well as the polygamous unions representing 33% of the current marital status (NDHS, 2008). In addition the age of marriage is also increasing. Today the mean age of marriage is 18.3 years. Additionally, the use of contraceptive methods has increased. While in 1990 6 % of the women were using contraception, today it is used by 13 % of the women.

Currently, 48% of the population lives in urban areas and the differences of the above mentioned indicators between urban and rural areas are still high. As a result, the decline of fertility rates in these rural areas is harder. The strong patriarchal society, reliable on kinship networks was one of the reasons of maintaining high fertility levels. The urbanization of the country entails the weakening of these community structures and hence influences the drop of the fertility levels.

Education represents a key factor in the reduction of fertility rates. Although the majority of the population age 6 and older has some education, 43.9% of the females and 39.7% of the males of this age never attended school. The proportion of non-educated population increases with age. This shows that the current educational plans are reducing the illiterate population (NDHS, 2008), and that youth is today better educated than has been in the past. As a whole, 68% of the population is literate. There are significant differences between the rural and the urban population, with education levels higher in the latter.

Income and labour

Nigeria carries 70% of the population below the poverty line. It currently has a GDP per capita of 1.324 US$ and a GDP (PPP) of 2.398 USS. Nigeria´s economy is highly dependent on the oil production, becoming a 37.3%of the GDP from the oil industry (CIA, 2010). Another 31.7 % of the GDP is provided from the agriculture sector, having the industry and services sectors a very low relevance.

Nigeria has a large labor force, with 83 million of the population forming the working age cohort. According to the UN estimates, this work force will be of 192 million by 2050, what imposes the duty to closely manage the population policy and to develop future measures to provide the future large population with jobs.

Future prospects

Despite the current government initiatives to face the demographic challenge and to achieve a replacement level by 2050, the experts (Feyisetan, B. & Bankole, A., 2002) do not forecast such a rapid decline for several reasons.

First of all, the infant mortality rate in Nigeria is still very high, with a rate of 109.4 deaths per 1000 births. The achievement of a replacement level rate with such a high infant mortality is very improbable, due to the positive relationship that infant mortality has with fertility. Secondly, Nigeria has a 3.10% of the population living with HIV/AIDS. The impact of the disease in the fertility rate is uncertain. While some state that the disease might lead to lower fertility due to women sickness and death, or due to child mortality, others defend the position that the fear of contracting AIDS may produce a desire of marrying and having children sooner.

The success in achieving a low fertility rate is highly linked to the expansion of family programs and contraceptive information. The high dependency of the Nigerian government of NGO´s due to their lack of resources results in a limitation to guarantee the success of the needed measures. Finally, a political factor may also influence the success or failure to attain a replacement level. Nigeria is a country conformed by different ethnical groups that historically have confronted each other to control the power. The concern of losing relative weight due to the reduction of the number of births may have an effect on the fertility rates of these different ethnical groups.

4.3. Conclusion

The term Muslim countries cannot be referred directly to different countries but to those countries which have a Muslim-majority population. However, this leaves aside the large number of Muslims still counting large numbers although representing countries' population minorities. The fact that this term embraces a wide concept implies that there are not uniform demographic indicators, patterns and prospects for Muslim countries as a whole. On the contrary, the demographic indicators, patterns and future prospects are specific for each country and strongly linked to its specific ethnical, cultural, political and economical reality. Consequently, the affirmations stating that the Muslim countries present higher growth rates in comparison to the world´s growth levels can only be made when looking at the aggregate indicators of all the countries included in the Muslim-majority countries. Despite this affirmation, generalizations cannot be made. While a country like Iran is experiencing a

population growth rate similar to the world´s rate and forecasts to achieve replacement, other countries still present high population growth indicators.

What seems to be a commonality extracted from the cases reviewed is that Muslim countries seem to have a younger age structure and lower percentages of old population compared with the rest of the world. This large number of youth implies that these countries have a large cohort of working age population. These large numbers can be used as an engine to enhance the economic progress in those countries with economic development possibilities. However, in those countries where the creation of labor is not feasible, the future large labor force can be converted, due to unemployment, in a huge force of conflict and civil strife.

In spite of the estimated decrease of the fertility rate, the high fertility rates that these countries have maintained lead to the existence of a large cohort of young people. This large cohort of youth will soon enter the reproductive age, and as a result countries like Nigeria can still experience a “baby boom”. Additionally, in countries like Iran, the policies for fertility decline have been institutionalized and accompanied by measures that have fostered education, urbanization and economical development. However, the fact that in these countries the age of marriage and child bearing has increased cannot be understood as a long term indicator. The cohort of women that have postponed child bearing could decide to create a family and hence affect the fertility rate, with the difference that the results will be seen in a later stage of time.

As seen in the reviewed cases, Islam permits family planning. Also, the Sunni and Shiite positions regarding birth control are very little different. The only differences rely on the positions of the different religious leaders in different countries. There have been scholars studying the direct effect of Muslim patterns of marriage, polygamy, and divorce on high natality, as well as the indirect effect of the woman status in Islam (Makhlouf, C., 1992). A factor representing considerable influence in the demographic patterns in Nigeria, polygamy is practiced by a very low % age (12 %) of the global Muslim population. Divorce, a unilateral men´s right, presents very different % ages among regions, what leads to think that the patterns of divorce are not related to religion.

The high fertility levels have responded to the measures taken by governments with different levels of success depending on the country. However, what can be said is that the high fertility levels do not seem to be a direct consequent of Muslims, but a

result of the policies adopted by the government according to their interests regarding population issues.

Another commonality to highlight is that the three countries are going through a demographic transition. While Pakistan and Nigeria have just entered a third stage after reducing mortality and aiming to reduce birth rate, Iran is a bit more advanced due to the accelerated change in fertility and is aiming to enter a fourth stage of population stability. In order to succeed, further efforts have to be made in education, provision and awareness of contraception, along with fostering the economic development. The position of the governments and the degree of institutionalization and execution of the measures will determine the success of the transition. However, factors such as population density and its contribution to global warming may lead to climate catastrophes. Hence, they may have an effect on the demographic patterns that, along with other uncertainties, may accelerate or slow down the change to a sustainable demographic pattern.

5 Conclusion

Demographic change challenges every country in this world. However, it also challenges the power structure of the world. Currently most institutional power structures are dominated by Western countries, which already represent just a minority on this world. Taking demographic change and the rapid growth of population of especially non-western countries will ultimately challenge these power structures. This year's change in voting rights within the IMF, which was in especially in favor of China is a first sign of the destruction of the global dominance of the Western countries. Apparently economic power and population is to a certain degree interlinked and with a rapidly growing population. Predominantly in developing countries like India and China it becomes clear that demographic change will modify the economic power in the world and ultimately have an impact on the political power. Western countries need to find ways to tackle the challenge of a decreasing population by prolonging the working-life time. This needs to be done to increase or keep the work force stable but also to finance the costs of ageing. For developing countries, the main issue is to satisfy the basic needs of their rapidly growing population. After this issue is solved, governments can focus on upgrading the country's human capital by improving education, etc. to capitalize the potential benefits of a growing population.

It became clear, that different countries face different challenges and that different countries are in a better situation to translate demographic change into economic development. Yet in general, it can be said, that demographic change will ultimately change the institutional power structure in the world. Western countries can no longer neglect the growing population in developing countries and the need for their representation. Thus, more representation rights for countries like China and India can be expected in institutions like the United Nations, the IMF, the Worldbank or the G20.

6 Appendix: Table of Figures

Table 2.1.a.: Global Population Development (Total)(Source: UN, 2010)

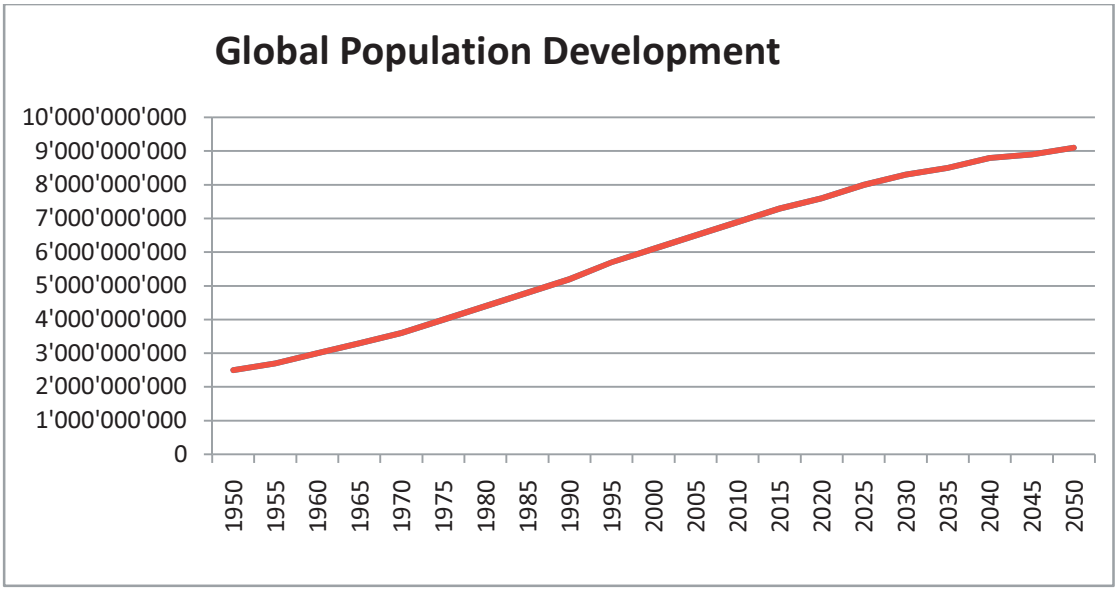


Table 2.1.b.: Global Population Development (Developed vs. less developed countries)

(Source: UN, 2010)

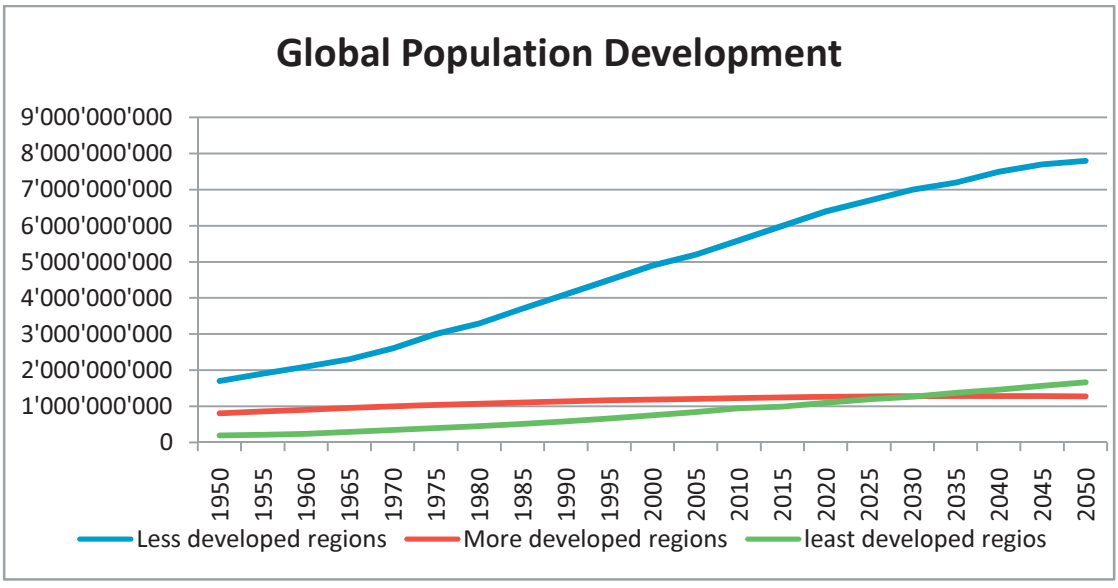
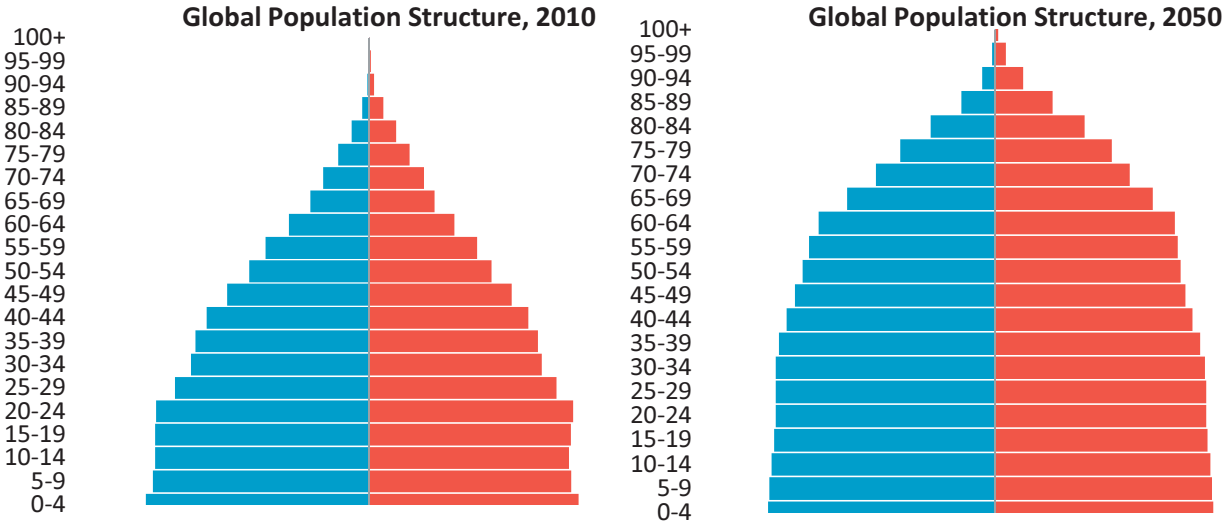


Table 2.2.: Global Population Structure 2010 and



2050(Source: UN, 2010)

Table 2.3.: Global Population Development (Regions)(Source: UN, 2010)

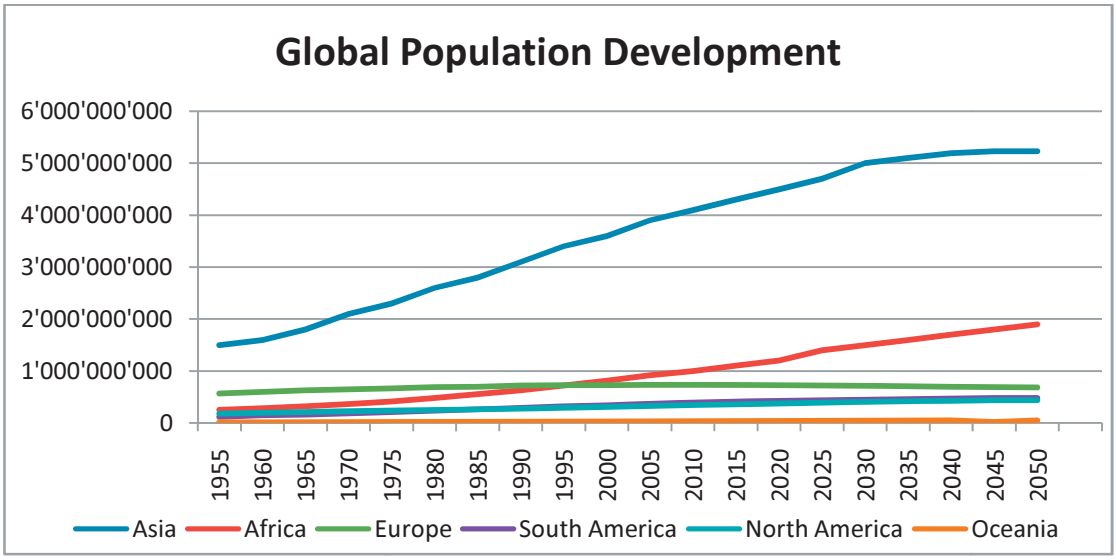


Table 2.4.: Total fertility per region (Source: UN, 2010)

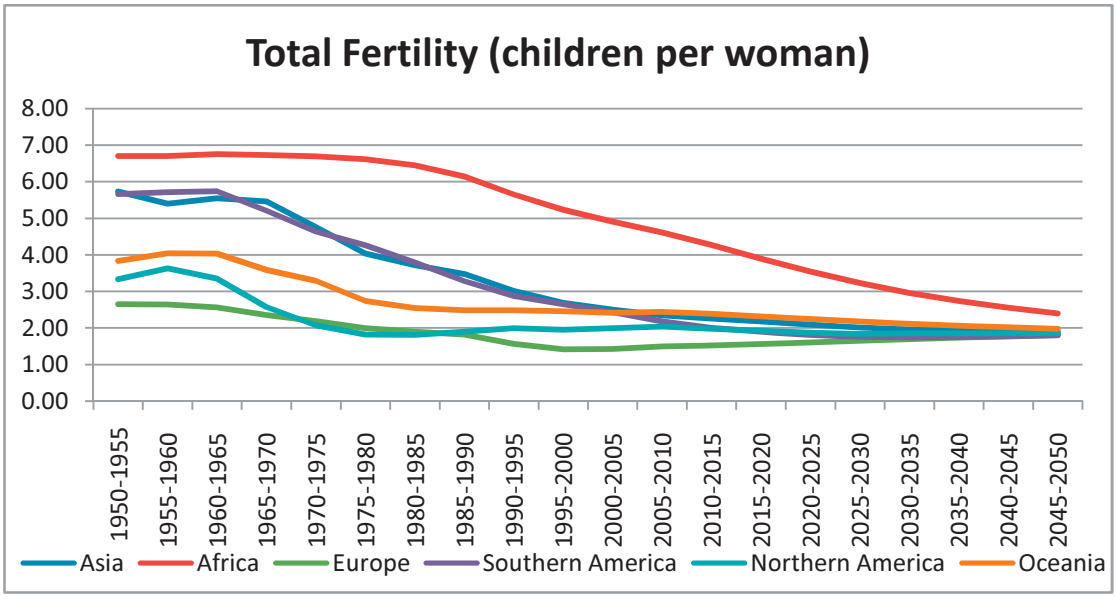


Table 2.5.: Net migration per region (Source: UN, 2010)

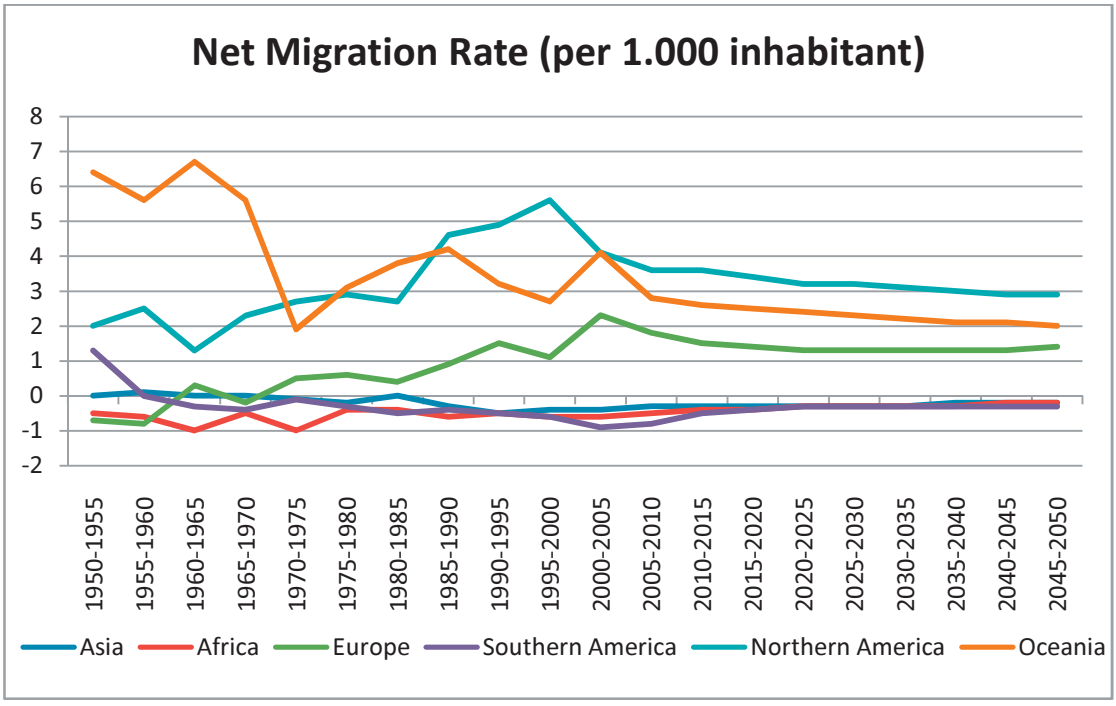


Table 2.6.: Population between 15 and 65 (in %)(Source: UN, 2010)

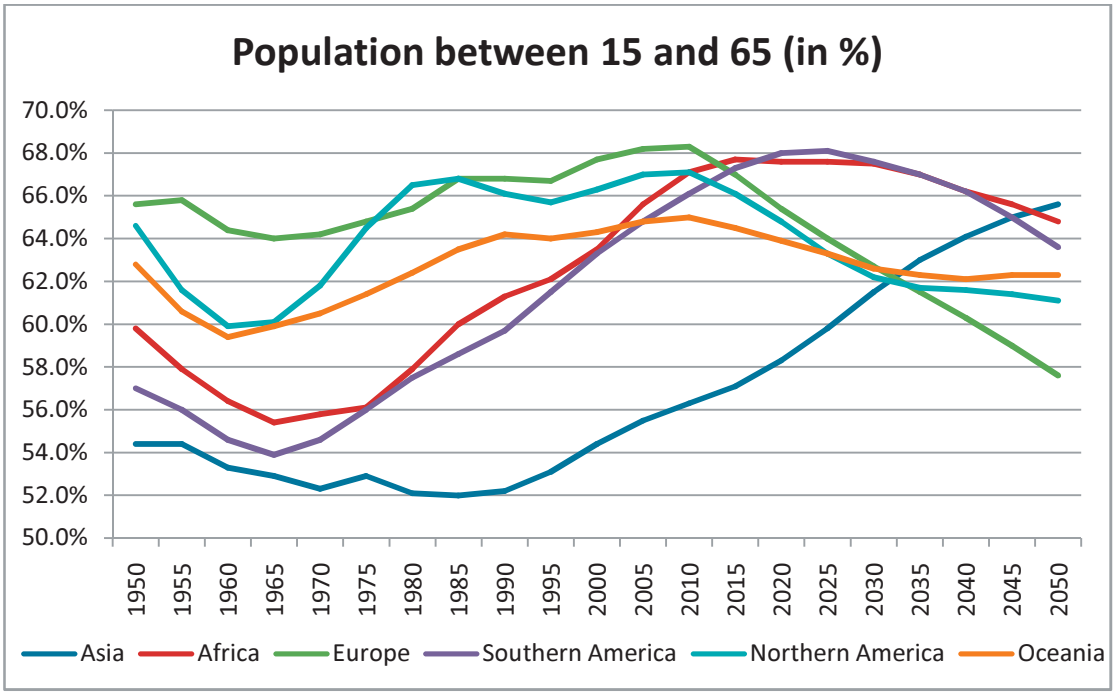


Table 2.7.: Population between 15 and 65 (in %)(Source: UN, 2010)

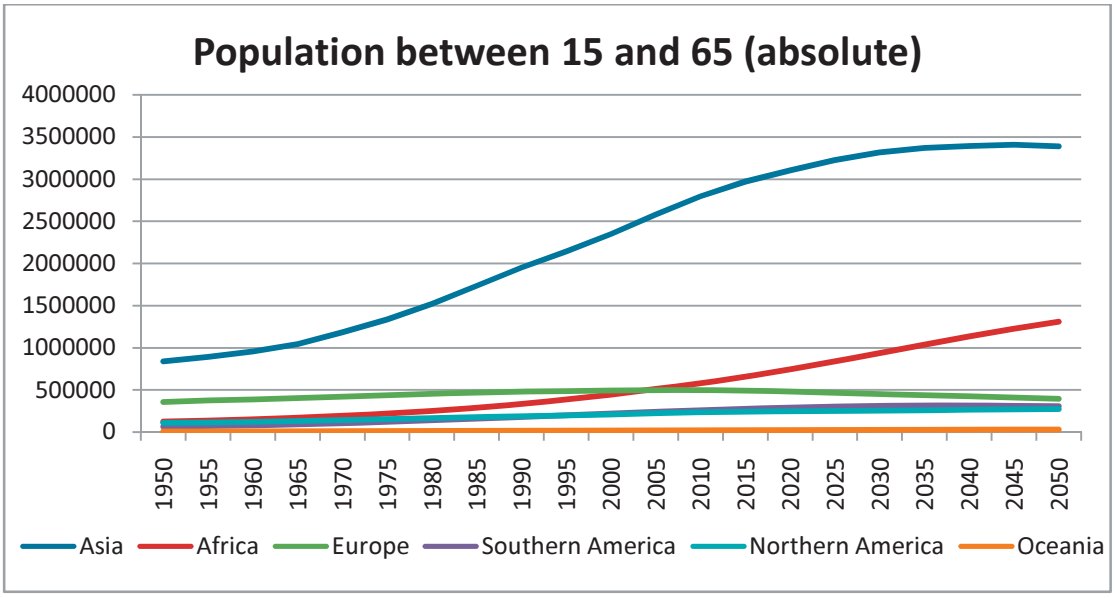


Table 2.8.: Total fertility in Africa (Source: UN, 2010)

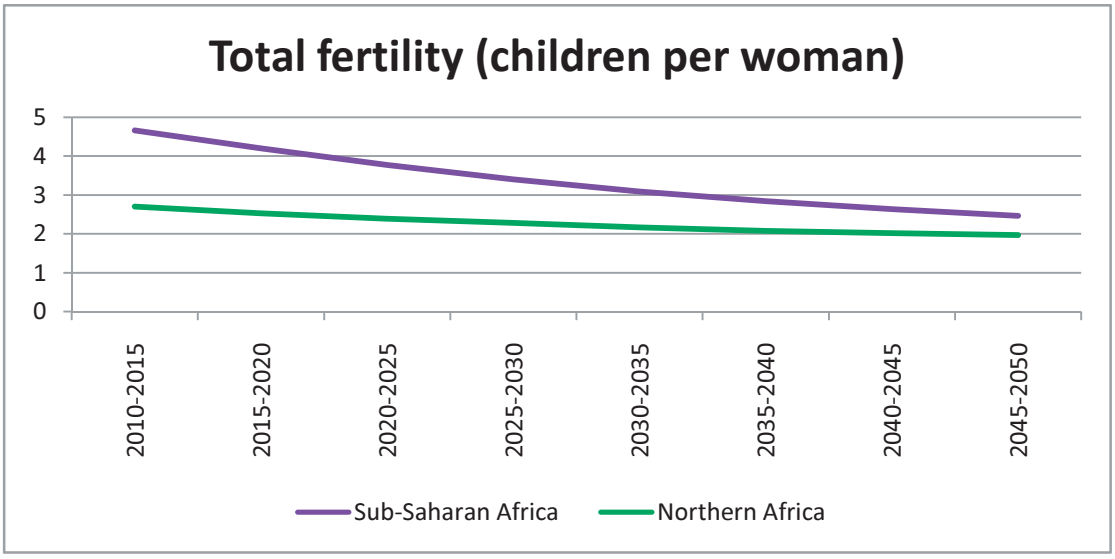


Table 3.1.: Population in China, USA and Germany

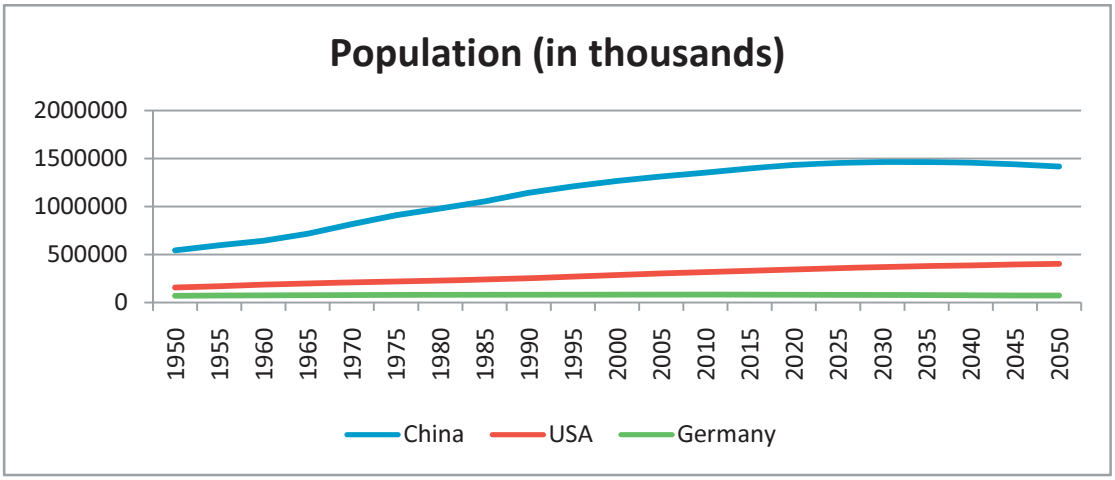


Table 3.2.:Net migration rate in China, USA and Germany
(Source: UN, 2010)

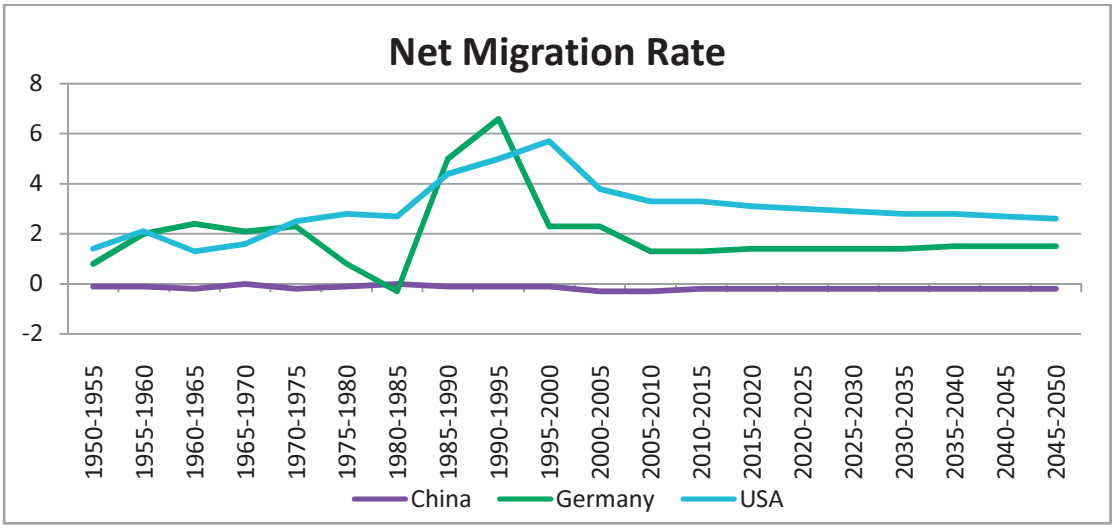


Table 3.3.: Total Fertility in China, USA and Germany
(Source: UN, 2010)

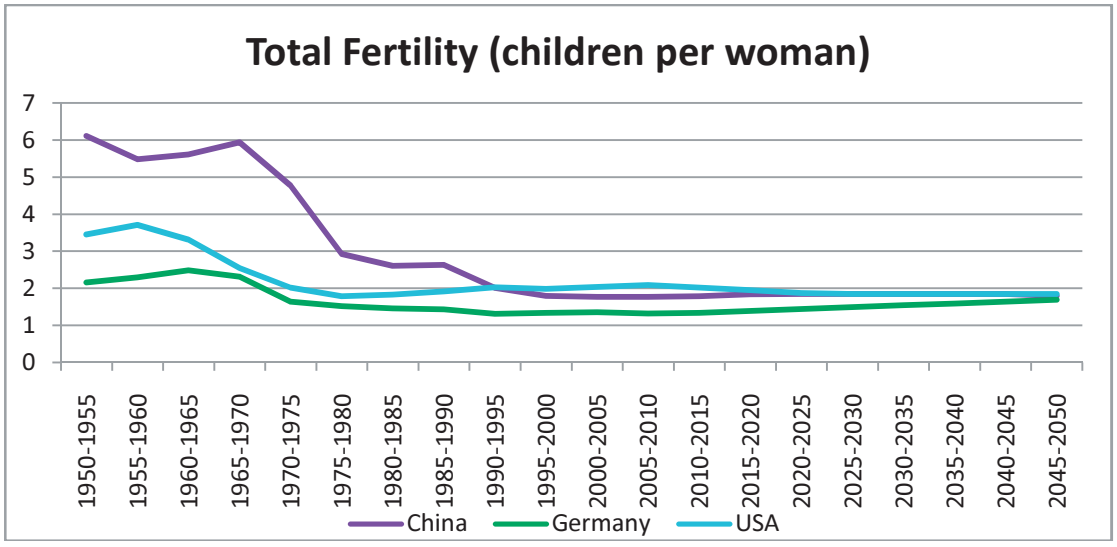


Table 3.4.: Population above 65 in China, USA and Germany (Source: UN, 2010)

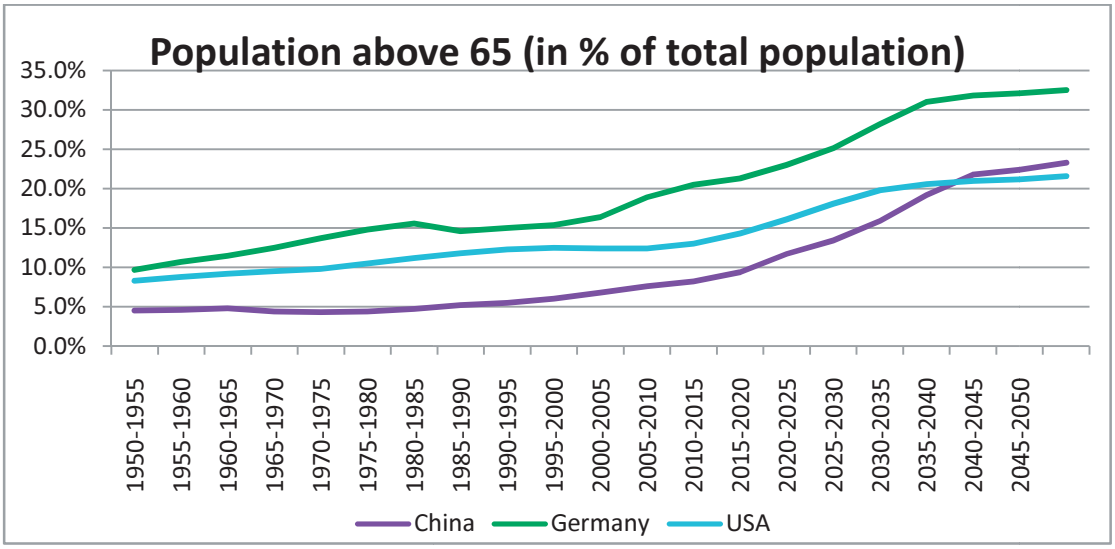


Table 3.5.: Population Structure in the USA (Source: UN, 2010)

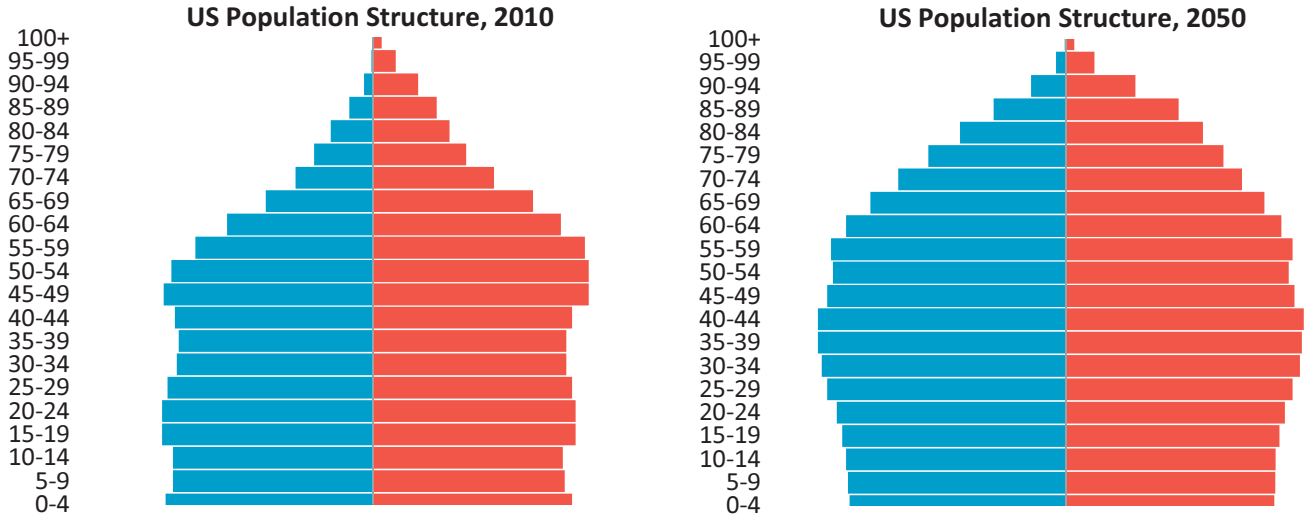
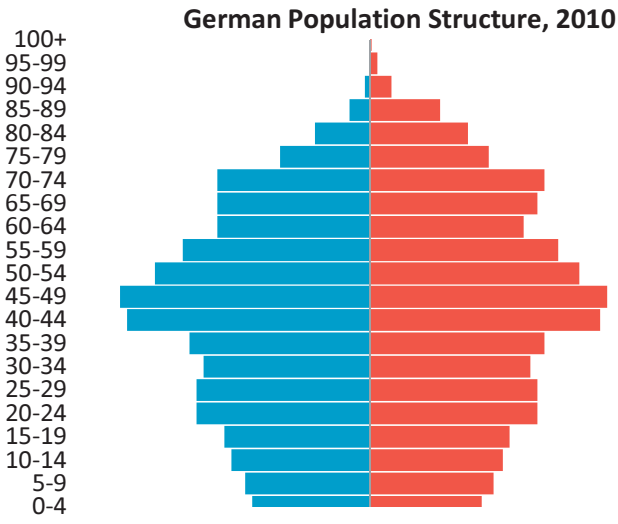


Table 3.6.: Population Structure in Germany (Source: UN, 2010)



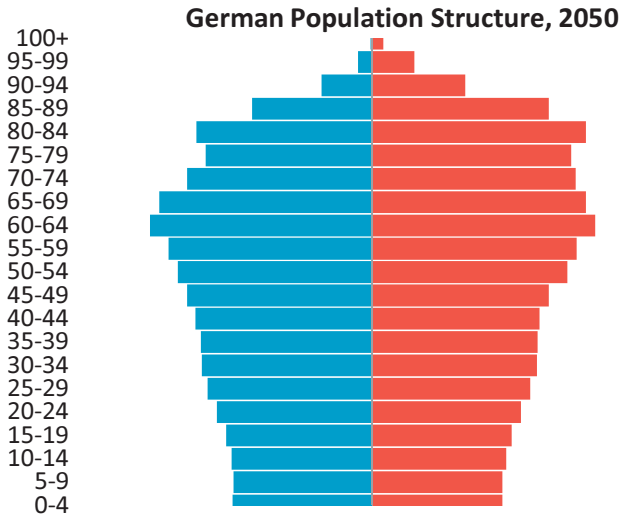
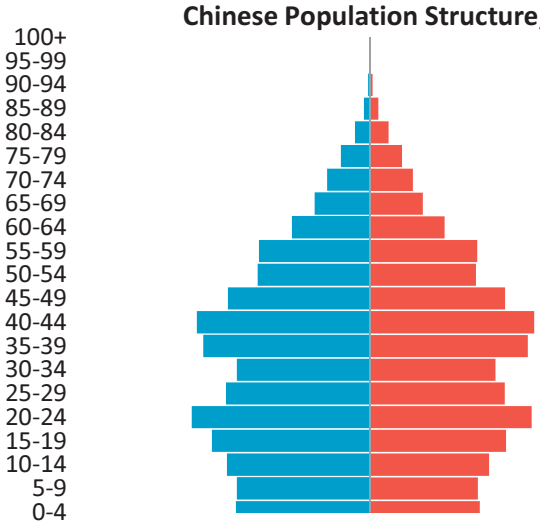


Table 3.7.: Population Structure in China (Source: UN, 2010)



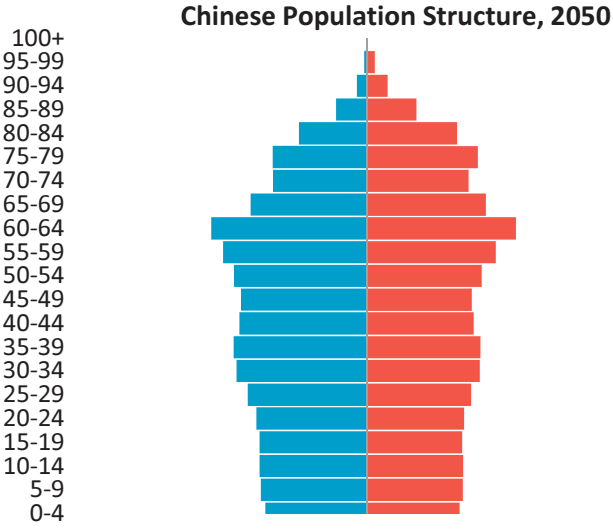


Table 4.1.a Ranking of Muslim-Majority Countries

Ranking of Muslim-Majority Countries 2010				
	Country/region	Population in 2010	% Muslim[1]	Estimated Muslim Population 2010
1	Indonesia	232517	87,2	202754,82
2	Pakistan	184753	95	175515,35
3	Bangladesh	164425	88,3	145187,28
4	Egypt	84474,00	90	76026,60
5	Turkey	75705	99,8	75553,59
6	Iran	75078	99,5	74702,61
7	Algeria	35423	99,9	35387,58
8	Morocco	32381	99,8	32316,24
9	Sudan	43192	72	31098,24
10	Iraq	31467	97	30522,99
11	Afghanistan	29117	99	28825,83
12	Saudi Arabia	26246	96,6	25353,64
13	Uzbakistan	27794	88	24458,72
14	Yemen	24256	99,9	24231,74
15	Syria	22505	86	19354,30
16	Niger	15891	88,7	14095,32
17	Mali	13323	90	11990,70
18	Senegal	12861	92	11832,12
19	Tunisia	10374	99,5	10322,13
20	Somalia	9359	99,9	9349,64
21	Azarbaijan	8934	93	8308,62
22	Brukina Faso	16287	50	8143,50
23	Guinea	10324	69	7123,56
24	Libya	6546	97	6349,62
25	Jordan	6472	96,5	6245,48
26	Chad	11506	53,9	6201,73
27	Tajikistan	7075	85	6013,75
28	United Arab E	4707	96	4518,72
29	Turkmenistan	5177	87	4503,99
30	Occupied Palestina	4409	98	4320,82
31	Kirzyzistan	5550	70	3885,00
32	Sierra leone	5836	60	3501,60
33	Mauritania	3366	99,5	3349,17
34	Kuwait	3051	85	2593,35
35	Oman	2905	87,7	2547,69
36	Lebanon	4255	55,3	2353,02
37	Albania	3169	70	2218,30
38	Gambia	1751	95	1663,45
39	Qatar	1508	95	1432,60
40	Djibouti	879	97,2	854,39
41	Comoro	691	99,3	686,16
42	Bahrain	807	81,8	660,13
43	West Sahara	530	100	530,00
44	Maldives	314	100	314,00
45	Brunei	407	67,2	273,50
46	Mayotte	199	98	195,02

Ranking of Muslim-Majority Countries 2050				
	Country/region	Population in 2050	% Muslim[1]	Estimated Muslim Population in 2050
1	Pakistan	335195	95	318435,25
2	Indonesia	288110	87,2	251231,92
3	Bangladesh	222495	88,3	196463,09
4	Egypt	129533	90	116579,70
5	Turkey	97389	99,8	97194,22
6	Iran	96975	99,5	96490,13
7	Afghanistan	73938	99	73198,62
8	Iraq	63995	97	62075,15
9	Sudan	75884	72	54636,48
10	Yemen	53689	99,9	53635,31
11	Niger	58216	88,7	51637,59
12	Algeria	49610	99,9	49560,39
13	Morocco	42583	99,8	42497,83
14	Saudi Arabia	43658	96,6	42173,63
15	Uzbakistan	36439	88	32066,32
16	Syria	36911	86	31743,46
17	Mali	28260	90	25434,00
18	Senegal	26102	92	24013,84
19	Somalia	23522	99,9	23498,48
20	Brukina Faso	40830	50	20415,00
21	Guinea	23975	69	16542,75
22	Chad	27776	53,9	14971,26
23	Tunisia	12711	99,5	12647,45
24	Jordan	10241	96,5	9882,57
25	Azarbaijan	10579	93	9838,47
26	Libya	9819	97	9524,43
27	Tajikistan	11111	85	9444,35
28	United Arab E	8253	96	7922,88
29	Sierra leone	12446	60	7467,60
30	Occupied Palestina	7320	98	7173,60
31	Mauritania	6061	99,5	6030,70
32	Turkmenistan	6796	87	5912,52
33	Kirzyzistan	6882	70	4817,40
34	Kuwait	5240	85	4454,00
35	Oman	4878	87,7	4278,01
36	Gambia	3763	95	3574,85
37	Lebanon	5033	55,3	2783,25
38	Albania	3303	70	2312,10
39	Qatar	2316	95	2200,20
40	Djibouti	1469	97,2	1427,87
41	Comoro	1226	99,3	1217,42
42	Bahrain	1277	81,8	1044,59
43	West Sahara	938	100	938,00
44	Maldives	455	100	455,00
45	Brunei	658	67,2	442,18
46	Mayotte	386	98	378,28

Source:
United Nations, World Population Prospects: The 2008 Revision
[1]Muslim %ages obtained from CIA, The World Fact book, Country Profiles
(in thousands)

Table 4.1b: Muslim Majority Countries

Country/region	Population in 2010	% Muslim[1]	Estimated Muslim Population 2010	Population in 2050	Estimated Muslim Population in 2050	Country/region	Population in 2010	% Muslim[1]	Estimated Muslim Population 2010	Population in 2050	Estimated Muslim Population in 2050
Africa	**1033043**			**1998466**		**South/Central Asia**	**1780473**			**2493681**	
Eastern Africa	**327186**			**711430**		Maldives	314	100	314,00	455	455,00
Somalia	9359	99,9	9349,64	23522	23498,48	Iran	75078	99,5	74702,61	96975	96490,13
Comoro	691	99,3	686,16	1226	1217,42	Afghanistan	29117	99	28825,83	73938	73198,62
Mayotte	199	98	195,02	386	378,28	Pakistan	184753	95	175515,35	335195	318435,25
Djibouti	879	97,2	854,39	1469	1427,87	Bangladesh	164425	88,3	145187,28	222495	196463,09
						Uzbakistan	27794	88	24458,72	36439	32066,32
Northern Africa	**212921**			**321077**		Turkmenistan	5177	87	4503,99	6796	5912,52
West Sahara	530	100	530,00	938	938,00	Tajikistan	7075	85	6013,75	11111	9444,35
Algeria	35423	99,9	35387,58	49610	49560,39	Kirzyzistan	5550	70	3885,00	6882	4817,40
Morocco	32381	99,8	32316,24	42583	42497,83						
Tunisia	10374	99,5	10322,13	12711	12647,45	**Western Asia**	**232702**			**371833**	
Libya	6546	97	6349,62	9819	9524,43	Yemen	24256	99,9	24231,74	53689	53635,31
Egypt	84474,00	90	76026,60	129533	116579,70	Turkey	75705	99,8	75553,59	97389	97194,22
Sudan	43192	72	31098,24	75884	54636,48	Occupied Palestina	4409	98	4320,82	7320	7173,60
						Iraq	31467	97	30522,99	63995	62075,15
Western Africa	**306058**			**625601**		Saudi Arabia	26246	96,6	25353,64	43658	42173,63
Mauritania	3366	99,5	3349,17	6061	6030,70	Jordan	6472	96,5	6245,48	10241	9882,57
Gambia	1751	95	1663,45	3763	3574,85	United Arab E	4707	96	4518,72	8253	7922,88
Senegal	12861	92	11832,12	26102	24013,84	Qatar	1508	95	1432,60	2316	2200,20
Mali	13323	90	11990,70	28260	25434,00	Azarbaijan	8934	93	8308,62	10579	9838,47
Niger	15891	88,7	14095,32	58216	51637,59	Oman	2905	87,7	2547,69	4878	4278,01
Guinea	10324	69	7123,56	23975	16542,75	Syria	22505	86	19354,30	36911	31743,46
Sierra leone	5836	60	3501,60	12446	7467,60	Kuwait	3051	85	2593,35	5240	4454,00
Chad	11506	53,9	6201,73	27776	14971,26	Bahrain	807	81,8	660,13	1277	1044,59
Brukina Faso	16287	50	8143,50	40830	20415,00	Lebanon	4255	55,3	2353,02	5033	2783,25
Asia	**4166741**			**5231485**		**Europe**					
Southeast Asia	**589615**			**765966**		Albania	3169	70	2218,30	3303	2312,10
Indonesia	232517	87,2	202754,82	288110	251231,92						
Brunei	407	67,2	273,50	658	442,18	**Total Majority**			1.147.666,60		1.810.662,11

Table 4.1.c: Muslim-Minority Countries (thousands)

Country/region	Population in 2010	% Muslim	Estimated Muslim Population 2010	Population in 2050	Estimated Muslim Population in 2050
Africa					
Eastern Africa	**327.186,00**		63.574,49	**711.430,00**	139.489,85
Eritrea	5.224,00	48,0	2.507,52	10.787,00	5.177,76
Tanzania	45.040,00	35,0	15.764,00	109.450,00	38.307,50
Ethiopia	84.976,00	30,1	25.577,78	173.811,00	52.317,11
Mozambique	23.406,00	28,2	6.600,49	44.148,00	12.449,74
Malawi	15.692,00	20,0	3.138,40	36.575,00	7.315,00
Mauritius	1.297,00	16,3	211,41	1.426,00	232,44
Uganda	33.796,00	16,0	5.407,36	91.271,00	14.603,36
Madagascar	20.146,00	7,0	1.410,22	42.693,00	2.988,51
Kenya	40.863,00	6,0	2.451,78	85.410,00	5.124,60
Reunion	837,00	2,4	20,09	1.096,00	26,30
Burundi	8.519,00	1,6	136,30	14.846,00	237,54
Rwanda	10.277,00	1,0	102,77	22.082,00	220,82
Zambia	13.257,00	1,0	132,57	28.957,00	289,57
Zimbabwe	12.644,00	0,9	113,80	22.178,00	199,60
Middle Africa	**128.909,00**		**5.680,76**	**272.969,00**	**10.716,68**
Cameroon	19.958,00	21,8	4.350,84	36.736,00	8.008,45
Central African Republic	4.506,00	8,0	360,48	7.603,00	608,24
Democratic Republic of Congo	67.827,00	1,4	949,58	147.512,00	2.065,17
Gabon	1.501,00	1,0	15,01	2.471,00	24,71
Equitorial Guinea	693,00	0,7	4,85	1.445,00	10,12
Western Africa	**306.058,00**			**625.601,00**	
Nigeria	158.259,00	43,0	68.051,37	289.083,00	124.305,69
Cote d´Ivore	21.571,00	38,7	8.347,98	43.373,00	16.785,35
Guinea Bissau	1.647,00	30,0	494,10	3.555,00	1.066,50
Liberia	4.102,00	16,0	656,32	8.841,00	1.414,56
Togo	6.780,00	15,0	1.017,00	13.196,00	1.979,40
Ghana	24.333,00	14,4	3.503,95	45.213,00	6.510,67
Benin	9.212,00	12,0	1.105,44	21.982,00	2.637,84
Southern Africa	**57.968,00**			**67.388,00**	
South Africa	50.492,00	1,1	555,41	56.802,00	624,82
North America	**351.659,00**			**448.464,00**	
Canada	33.890,00	0,9	305,01	44.414,00	399,73
United States	317.641,00	0,6	1.905,85	403.932,00	2.423,59
Latin America & Caribbean	**588.649,00**			**729.184,00**	
Panama	3.508,00	4,5	157,86	5.092,00	229,14
Trinidad & Tobago	1.344,00	5,9	79,30	1.278,00	75,40
Suriname	524,00	19,6	102,70	619,00	121,32
Guyana	761,00	9,0	68,49	558,00	50,22

Table 4.1.c: Muslim-Minority Countries (in thousands) Part II

Country/region	Population in 2010	% Muslim	Estimated Muslim Population 2010	Population in 2050	Estimated Muslim Population in 2050
Asia					
South/Central Asia					
Kazakhstan	15.753,00	47,0	7.403,91	17.848,00	8.388,56
India	1.214.464,00	12,0	145.735,68	1.613.800,00	193.656,00
Sri Lanka	20.410,00	8,0	1.632,80	21.705,00	1.736,40
Bhutan	708,00	5,0	35,40	1.013,00	50,65
Nepal	29.853,00	3,5	1.044,86	49.028,00	1.715,98
Southeast Asia	589.615,00			765.966,00	
Singapore	4.837,00	14,9	720,71	5.221,00	777,93
Philippines	93.617,00	46,0	43.063,82	146.156,00	67.231,76
Thailand	68.139,00	4,0	2.725,56	73.361,00	2.934,44
Myanmar	50.496,00	3,8	1.918,85	63.373,00	2.408,17
Cambodia	15.053,00	2,0	301,06	23.795,00	475,90
Vietnam	89.029,00	1,0	890,29	111.666,00	1.116,66
Western Asia	232.702,00			371.833,00	
Cyprus	880,00	18,5	162,80	1.175,00	217,38
Israel	7.285,00	14,6	1.063,61	10.649,00	1.554,75
East Asia	1.563.951,00			1.600.005,00	
Mongolia	2.701,00	4,0	108,04	3.446,00	137,84
China	1.354.146,00	1,5	20.312,19	1.417.045,00	21.255,68
Europe	**732.759,00**			**691.048,00**	
Eastern Europe	291.485,00			239.961,00	
Bulgaria	7.497,00	13,1	982,11	5.392,00	706,35
Russia	140.367,00	10,0	14.036,70	116.097,00	11.609,70
Romania	21.190,00	0,2	42,38	17.279,00	34,56
Southern Europe	153.778,00			153.654,00	
Bosnia & Herzegovina	3.760,00	40,0	1.504,00	3.008,00	1.203,20
Macedonia	2.043,00	30,0	612,90	1.857,00	557,10
Greece	11.183,00	1,3	145,38	10.939,00	142,21
Western Europe	188.587,00			184.908,00	
Belgium	10.698,00	2,5	267,45	11.493,00	287,33
France	62.637,00	1,0	626,37	67.668,00	676,68
Germany	82.057,00	5,0	4.102,85	70.504,00	3.525,20
Northern Europe	**98.909,00**			**112.524,00**	
United Kingdom	61.899,00	1,4	866,59	72.365,00	1.013,11
Oceania	**35.838,00**			**51.338,00**	
Fiji	854,00	7,8	66,61	910,00	70,98
Australia	21.512,00	0,9	193,61	28.724,00	258,52
Total			**406.172,55**		

Table 4.1.d: World distribution of Muslims
Source: CIA Factsheet, 2010

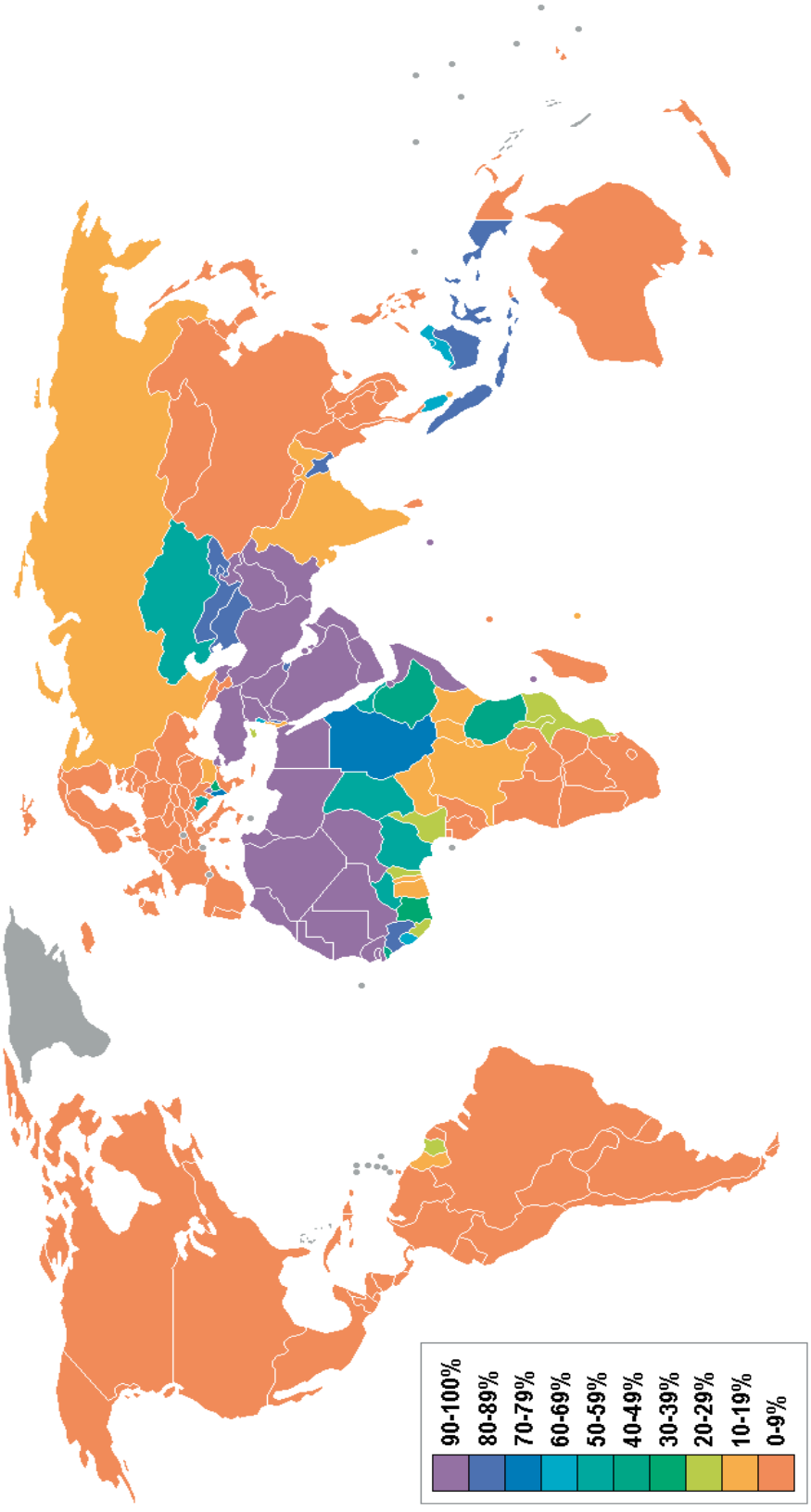


Table 4.2.1.a: Population of Iran 1950-2050

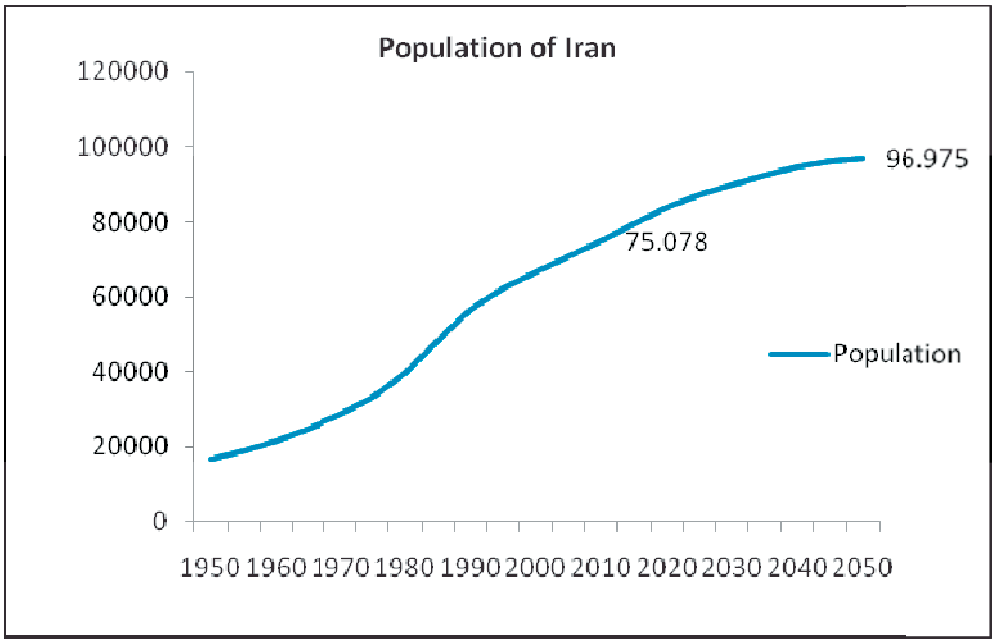


Table 4.2.1.b: Population Growth Rate in Iran

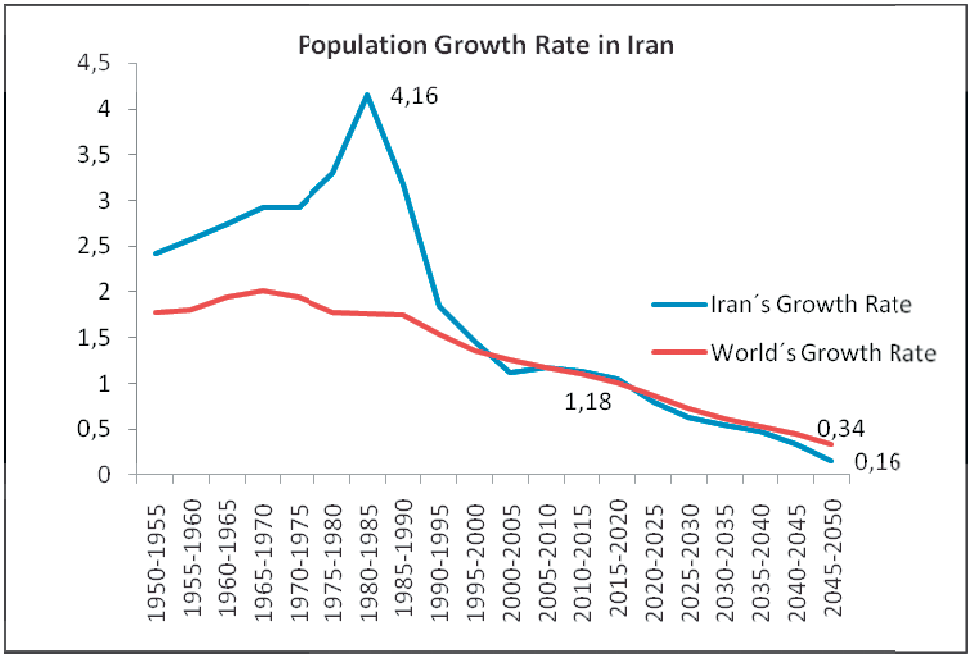


Table 4.2.1.1.a: Population Structure of Iran in 2010

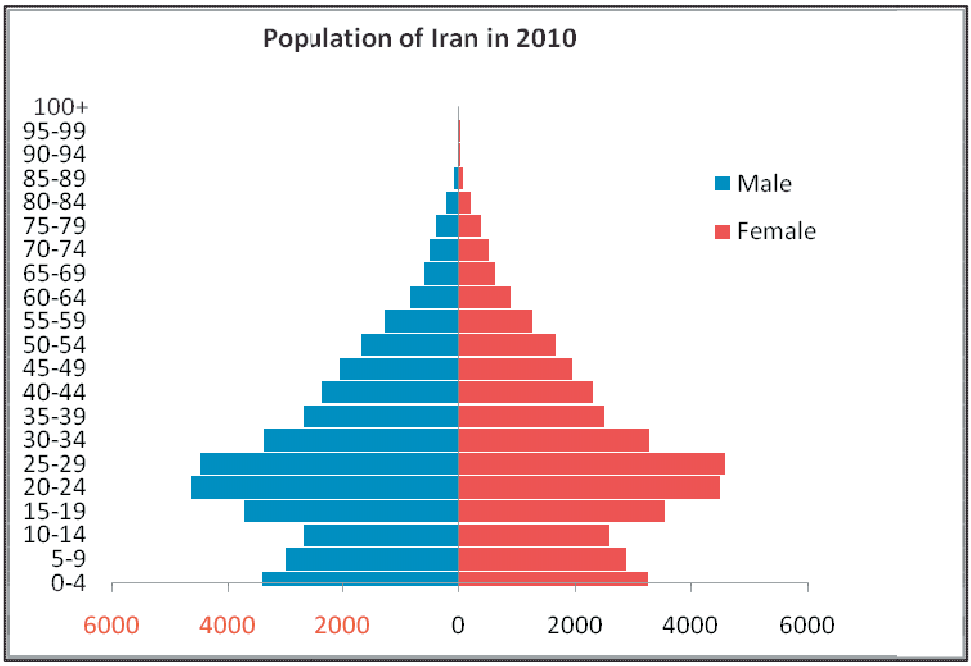


Table 4.2.1.1.b: Population Structure of Iran in 2050

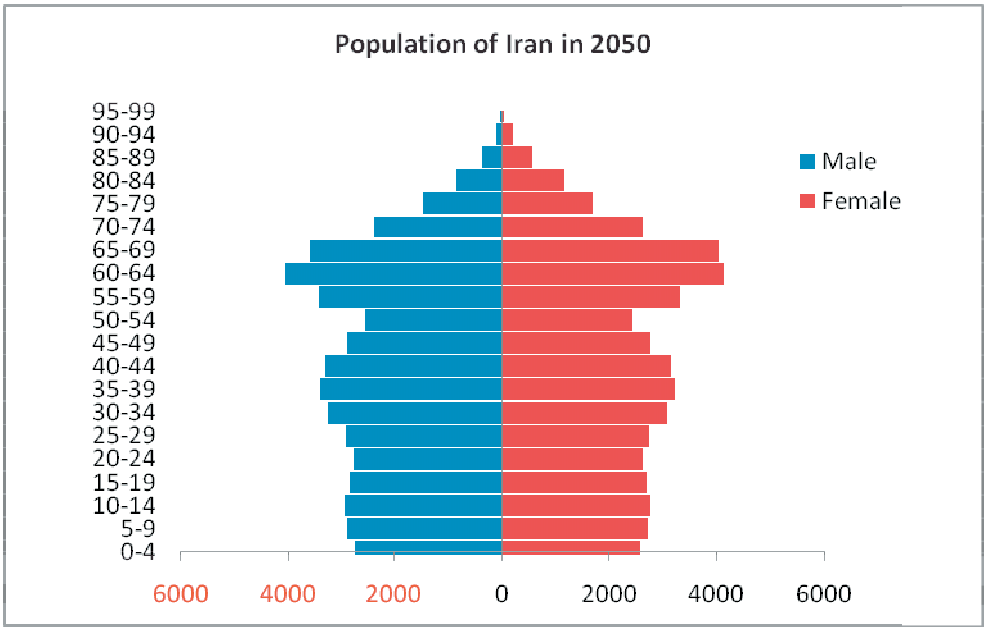


Table 4.2.1.2.a: Fertility Rate in Iran

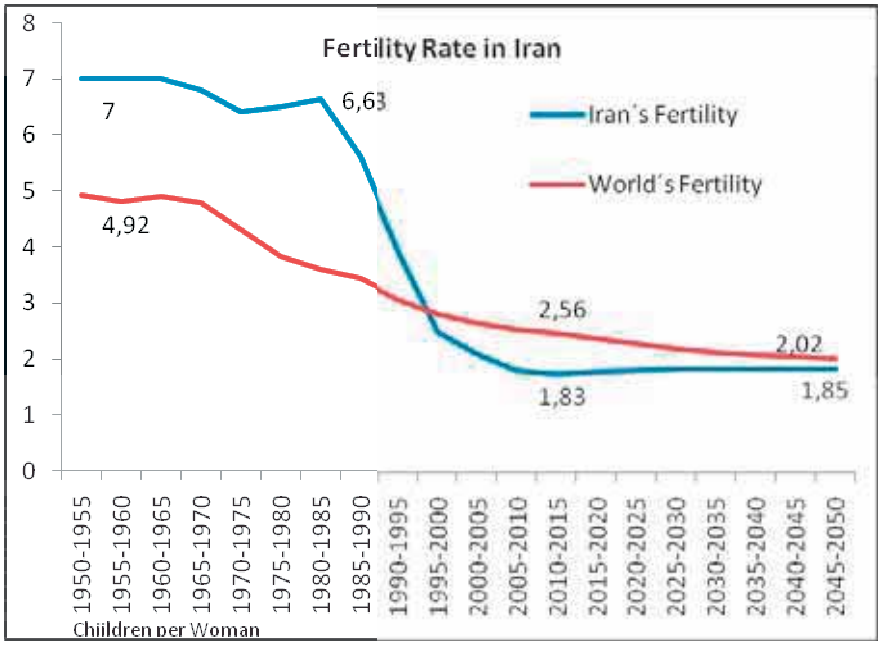
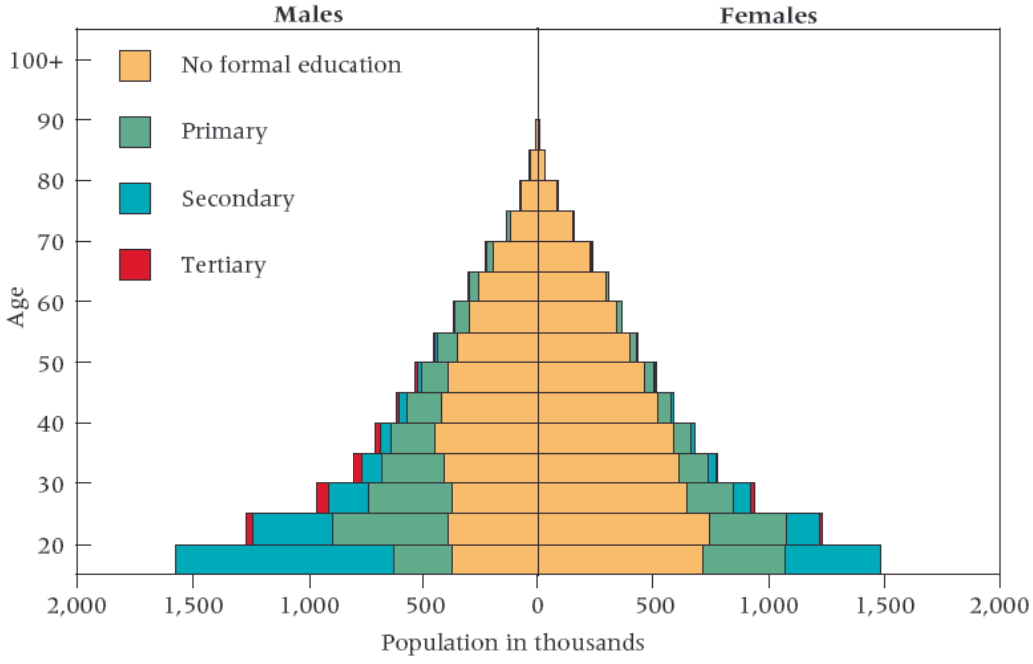


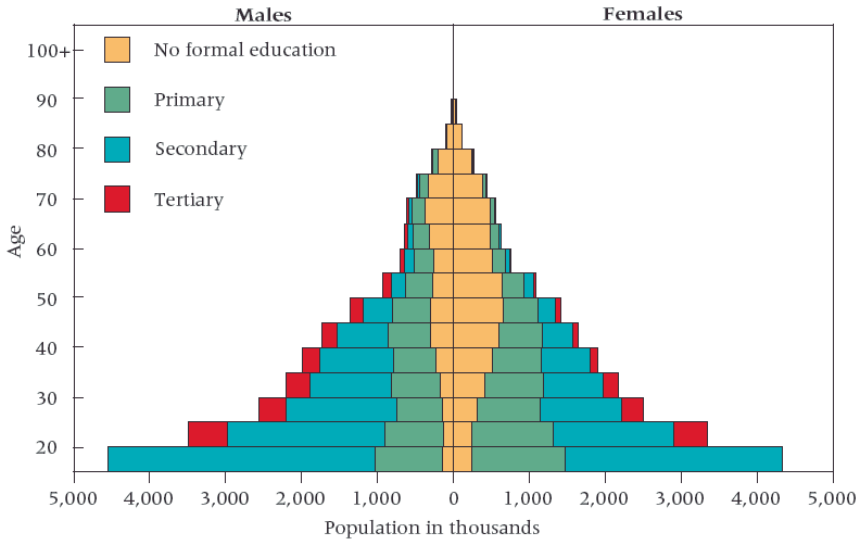
Table 4.2.1.2.b: Education in Iran

Education in Iran, 1970



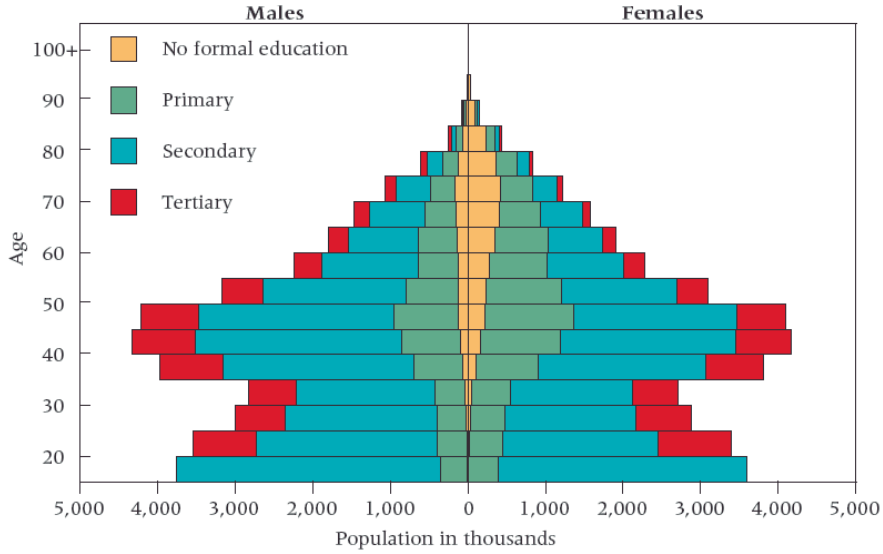
SOURCE: Lutz et al. 2007

Education in Iran 2000



SOURCE: Lutz et al. 2007.

Education in Iran 2030



SOURCE: Lutzt et al. 2007

Table 4.2.3.a: Population of Pakistan 1950-2050

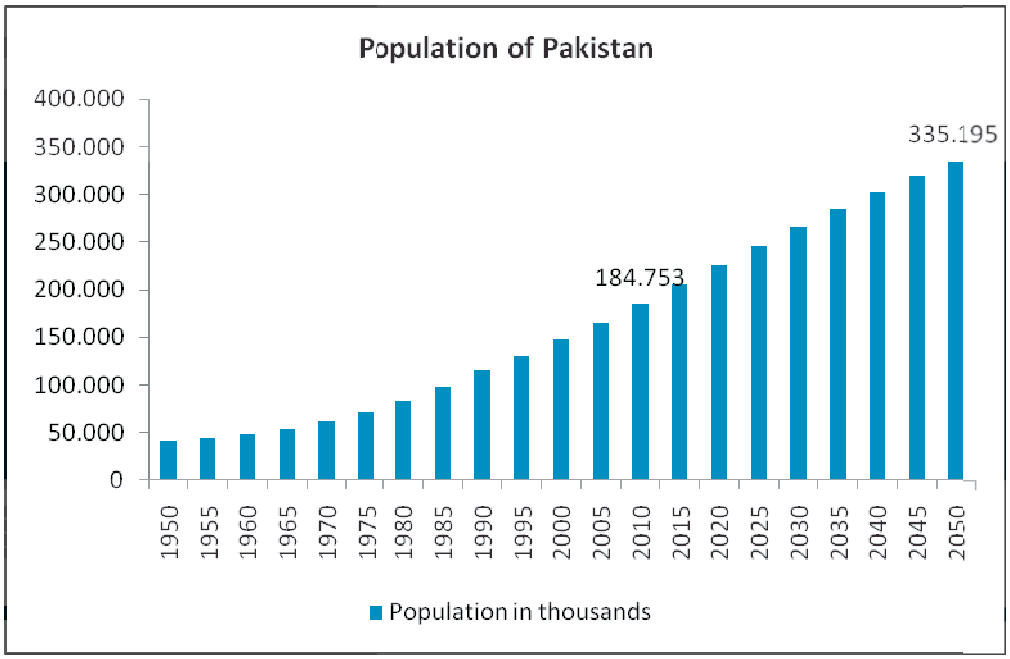


Table 4.2.3.b: Population Growth Rate of Pakistan

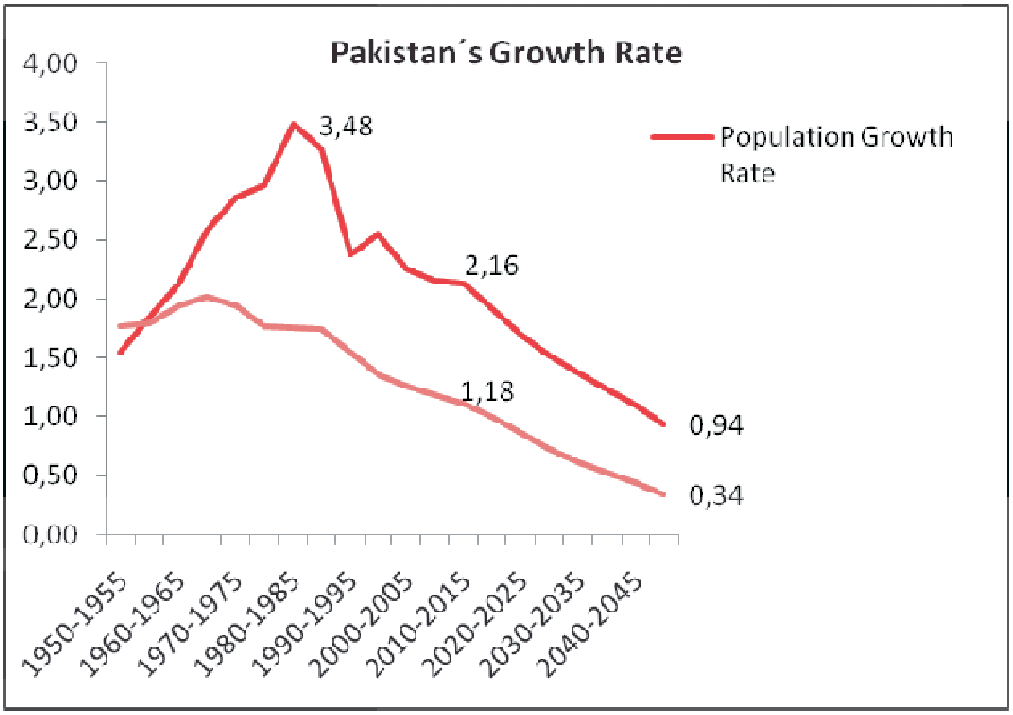


Table 4.2.3.1.a: Population Structure of Pakistan in 2010

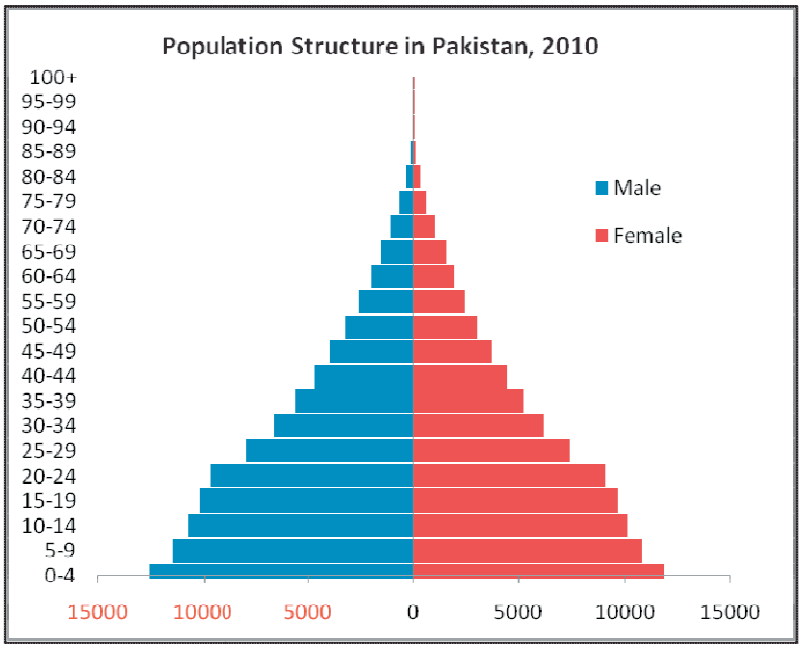


Table 4.2.3.1.b: Population Structure of Pakistan in 2050

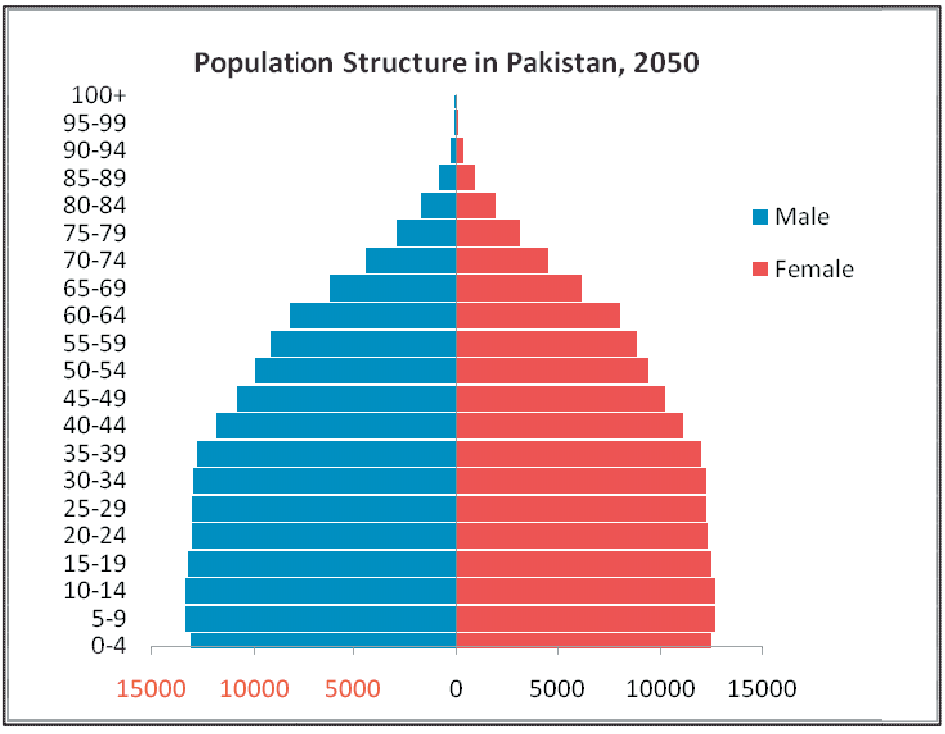


Table 4.2.3.2.a: Fertility in Pakistan

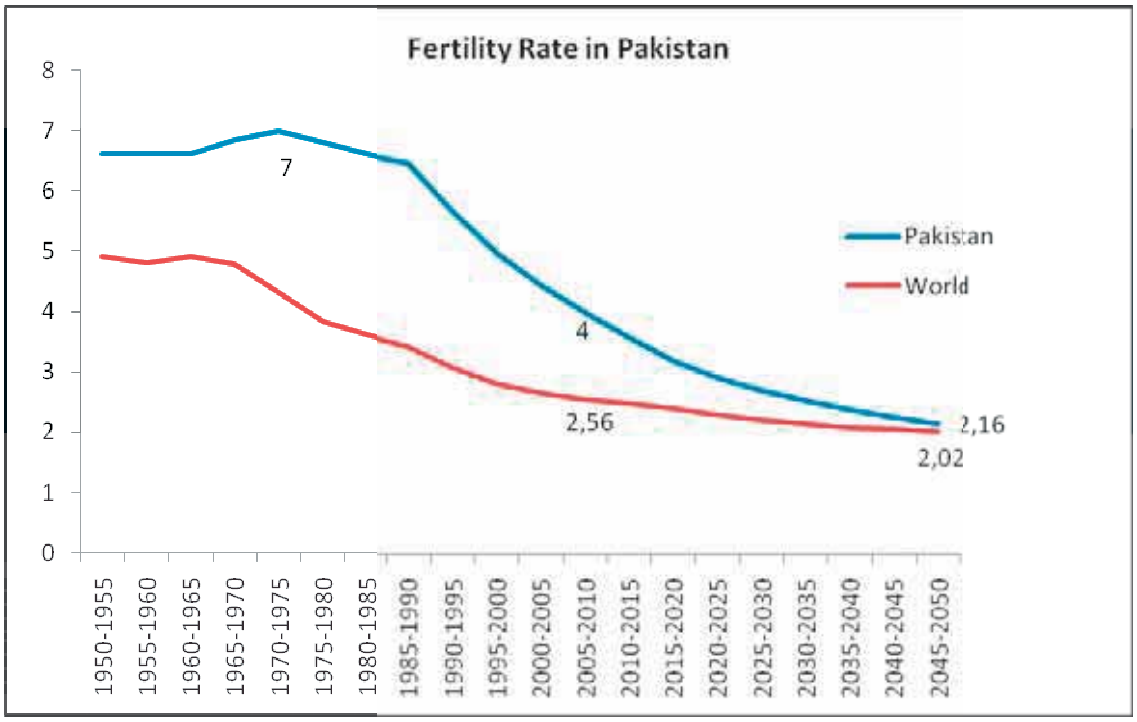


Table 4.2.4.a: Population of Nigeria 1950-2050

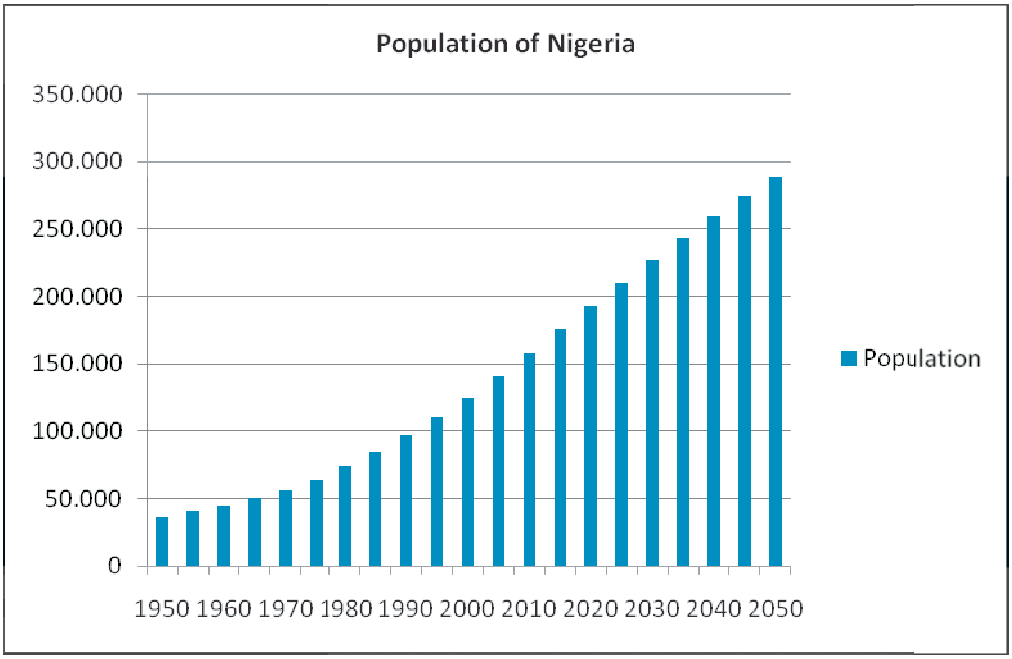


Table 4.2.4.b: Population Growth Rate of Nigeria

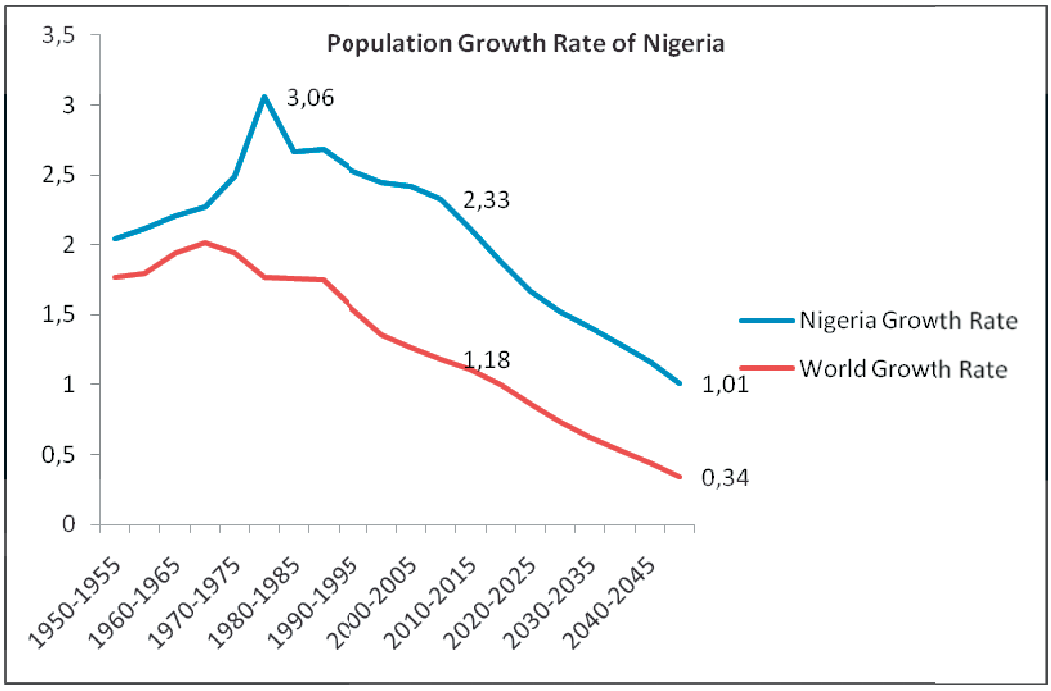


Table 4.2.4.1.a: Population Structure of Nigeria in 2010

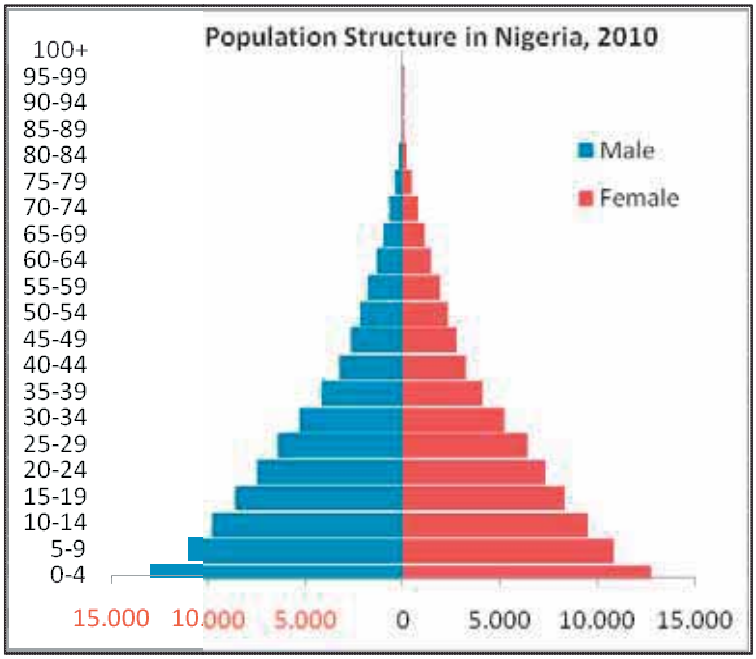


Table 4.2.4.1.b: Population Structure of Nigeria in 2050

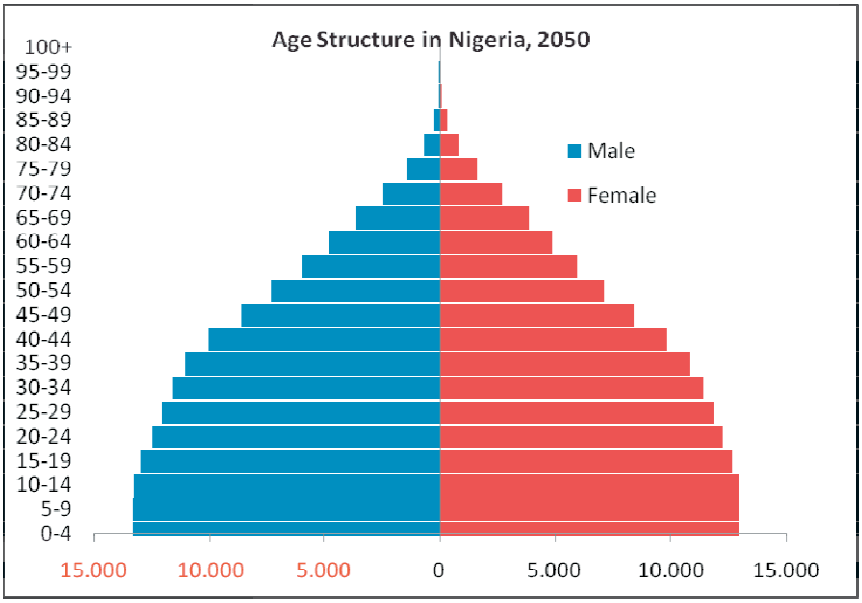
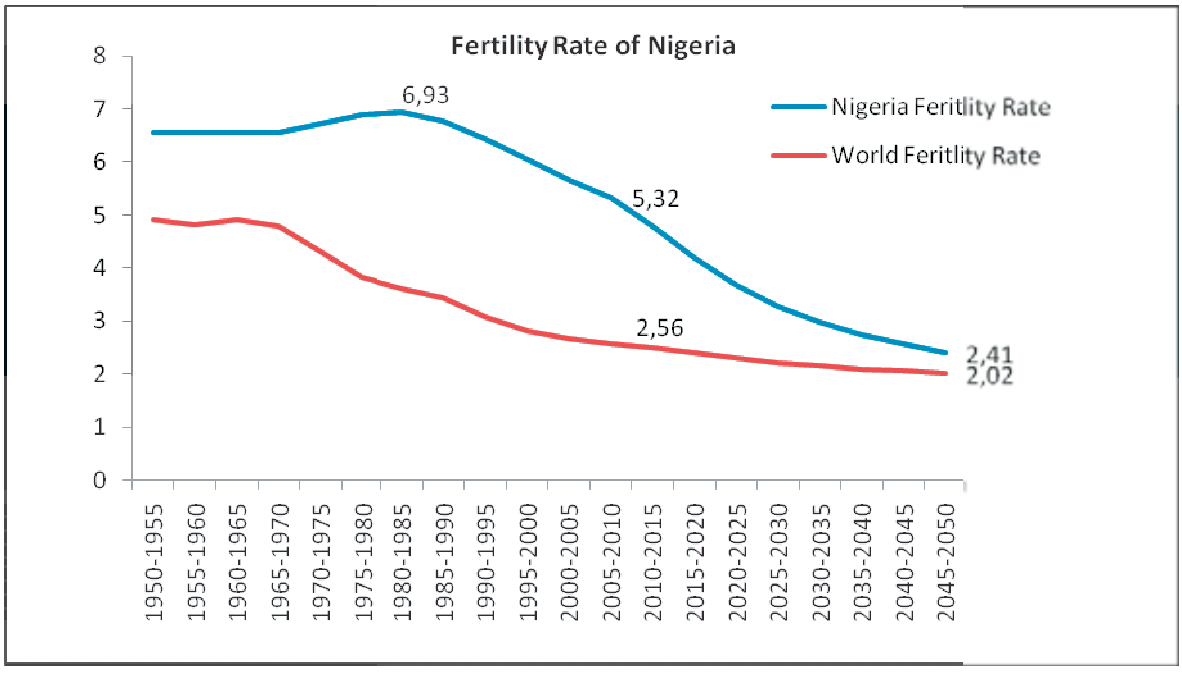


Table 1.2.4.2: Fertility Rate of Nigeria



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Demographic Change in the Developed World

An Analysis of the Attractiveness of Industries and Services in a Time of Aging Populations

Topic No. 5

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Megatrend “Global Demographic Change”
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Executive Summary

This paper deals with the consequences of demographic change for certain industries in the developed world, thereby focusing on Europe, USA, and Japan. Furthermore, the analysis aims to evaluate specific ramifications for the attractiveness of industries and deducts opportunities to remain competitive in spite of the changing customer landscape.

The strongest demographic trends identified for the future are rising longevity and declining fertility rates. This will flip the demographic pyramid upside down and, in order for companies and industries to remain competitive, services and products will have to be adapted. An analysis of the banking industry showed that products need to address changing risk profiles and different investment horizons, whereas overall the financial sector is very likely to remain attractive. The insurance and health industry will face major challenges, as claims will increase in both sectors. The only possibility to remain attractive for the insurance companies is by generating innovative products targeting elderly people. Furthermore, both industries are likely to intensify cooperation with the governments concerning specific products (e.g. Riester Rente in Germany). However, this will not prevent a consolidation of the insurance market. The welfare state is likely to be dismantled as the current system in many countries will not be sustainable for the future. If states want to avoid bankruptcy, major reforms will become indispensable. A typical unexpected winner of demographic change could be the pet industry, as demand by old people will increase. Already today in Japan more dogs are held in households than children.

1 Introduction

The world is in the midst of a major demographic transition. Many major industrial countries will experience significant population aging and declining fertility rates over the next decades. In Japan and much of Western Europe national populations are even likely to decline. In the United States the situation seems less dramatic, but still alarming. The US Fertility and immigration rates will most likely delay the major demographic changes that the other industrialized countries are currently experiencing.

The following paper will focus on the two major demographic megatrends. First, historical reductions in fertility rates over the twentieth century have shifted the age composition of most developed societies from having a preponderance of children to having a preponderance of adults. Second, increased longevity means that most individuals can now expect to live into the old age, and many even into the advanced old age. The effects of this demographic megatrend will further be increased by the post-World-War-II baby boom that created a bulge in the population structure that will bring an aged society with the percentage of older adults rising to fruition.

These paradigmatic changes do not only affect demographics in an unprecedented way though, moreover they bear substantial implications for all economies around the world. In this sense, it is becoming more important for industries and services as well as individual businesses to address this paradigm shift with its numerous challenges. Nevertheless, promising opportunities to remain competitive and successful in the long run will present themselves.

The aim of the underlying paper is to analyze the impact of the demographic changes and the changing attractiveness of certain industries, services and products. In particular the paper will analyze the financial, health, and entertainment industries while focusing on the developed world. Integrated into the analysis of the industries is an out-of-the-box analysis of how the products and services have to be adopted and which new products and services potentially may emerge.

2 Demographic Change in the Developed World

2.1. Demographic Megatrends

The following section will concentrate on the two demographic megatrends declining fertility rates and rising longevity in the developed world.

2.1.1. Declining Fertility Rates

Declining birth rates should be seen “as global and historical” (Magnus, 2009). The decline has been especially steep since the 1960s. Except for the baby boomers, the trend to declining fertility has been going on for a very long time. There are several reasons for this megatrend including economical, social, emotional, religious, medical, and cultural ones. However, there are two factors that should be highlighted in that context. The first is the medical development of the birth control contraception and in vitro fertilization – the latter resulting in people bearing children at an older age, which at the same time leads to these people giving birth to fewer children due to greater complications. The second and increasingly more important factor is the cost related to having children which should not only be understood in a pure economical context, but also in social opportunity costs. The introduction of social security and insurance systems has significantly reduced the importance of one of the key benefits of having children. In addition, people are facing many more choices than they did a hundred years ago, increasing the opportunity costs of having children. Moreover for women the opening of education, employment, and income opportunities in the last couple of decades has increased their opportunity cost to give up a fulfilling education, a potential lucrative career, and a certain lifestyle with social embedment in society. However, some offsetting factors also need to be mentioned. Higher productivity in the households, improved access to childcare, the introduction of robotics into the home and many more future developments may potentially reduce the strength of the decrease in fertility rates.

All in all, the described developments can be expected to continue in the future, leading to an aging of the population. The question is not whether these changes will happen, but how big their effects on the economy and society will be as a whole.

2.1.2. Rising Longevity

The reasons for the rising longevity are not as complex and detailed as are those of the declining fertility rates and are mostly self-explanatory. The most important ones are: increasing health, better hygiene and medication treatment, higher quality of food, and increasing wealth, which makes the before mentioned factors more affordable.

The rise in longevity substantially increases the life expectancies of the populations of the developed world. Ceteris paribus this would lead to a more equal distribution of the population on the population pyramid age structure amongst the range between about 0 and 80. However, if the megatrend of declining fertility rates is also taken into account, the picture looks somewhat different, as will be shown in the next subchapter.

2.2. Implications of the Two Demographic Megatrends for Japan, Western Europe, and the USA

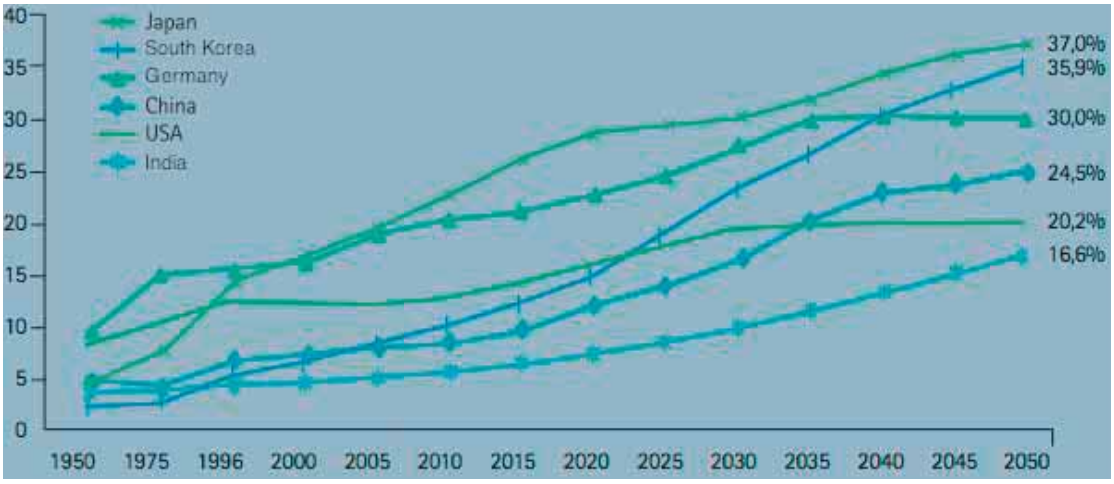
When the two megatrends of declining fertility rates and rising longevity simultaneously happen, the population age structure experiences a paradigm shift – it changes from a normal pyramid to a top-down shaped pyramid, implying an inverted structure. This demographic change in the structure of the age pyramid provides tremendous challenges and opportunities for industries and companies.

As described above, the paper focuses on the developed world, which will most likely incur this paradigm shift in the next decades. According to the timeliness of the probable occurrence of the change this paper will first focus on Japan, then Western Europe, and ultimately the USA.

2.2.1. Japan

Japan's transformation to the hyper-old society is steadily increasing and is already the fastest in the world, as can be seen in the below figure (Kohlbacher, Gudorf & Herstatt, 2009).

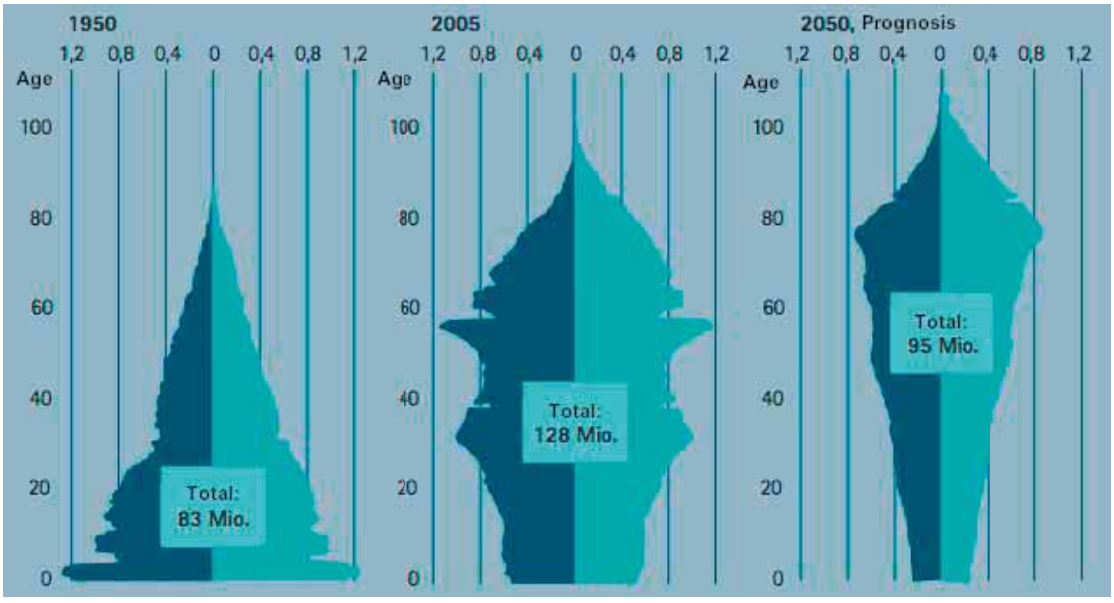
Figure 1: Aging as Global Trend: Percentage of the over 65 Year-Olds of the Total Population



Source: US Census Bureau International Data Base and United Nations Population Division

The trend of declining fertility rates outweighs that of rising longevity since 2005 (Coulmas, 2007). For the whole country the medium variant of the birth rate was 1.27 between 2005 and 2010 (Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, 2008). In 2006, the only age segment that was growing was the one of people aged 65 and older (Coulmas, 2007). Overall, the maximum population peak has already been topped in 2005 and therewith its labor force has been shrinking. According to the below figure of the National Institute of Population and Social Security Research, the Japanese population and its labor force are estimated to shrink about 30% to one third until 2050. Already until 2030, the labor force is estimated to have decreased by more than a sixth. Life expectancy, on the contrary, is estimated to increase about 4.5 years from 82.7 to 87.2 years from now to 2050 (Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, 2008).

Figure 2: From the Pyramid to the Rhombus: Development of the Japanese Population Structure 1950 – 2050 (Dark Blue: Men; Light Blue: Women)



Source: National Institute of Population and Social Security Research

In addition, the retirement of about 7 million baby boomers in 2007 has led to a decrease in the labor force and therefore challenged the retirement system (Coulmas, 2007). As more and more women enter the work force, the negative impact on the fertility rates increases. Additionally, as a result of the neoliberal reforms of the last century, companies in Japan have largely reduced the number of permanent positions, which has led to a higher uncertainty under younger work entrants and therewith to a reduction in the willingness of them to found a family. As can be seen in the above figure Japan is

already experiencing an inversion of the population pyramid age structure. The Japanese society can be characterized as old, rich and lacking children.

2.2.2. Western Europe

In Western Europe Germany, Italy, Sweden, and Greece take on a “leading role” when it comes to experiencing demographic change. In this analysis the focus within Western Europe will lie foremost on the developments in Germany. As Gassmann & Reepemeyer (2006, cit. in Gassmann & Keupp, 2010) put it “similar effects can be expected for all other European societies” as in Germany. Of course there are also some differences amongst the Western European Countries. For example, amongst a few other countries, Switzerland will be more likely to offset some of the declining fertility rates and its effects due to ongoing immigration.

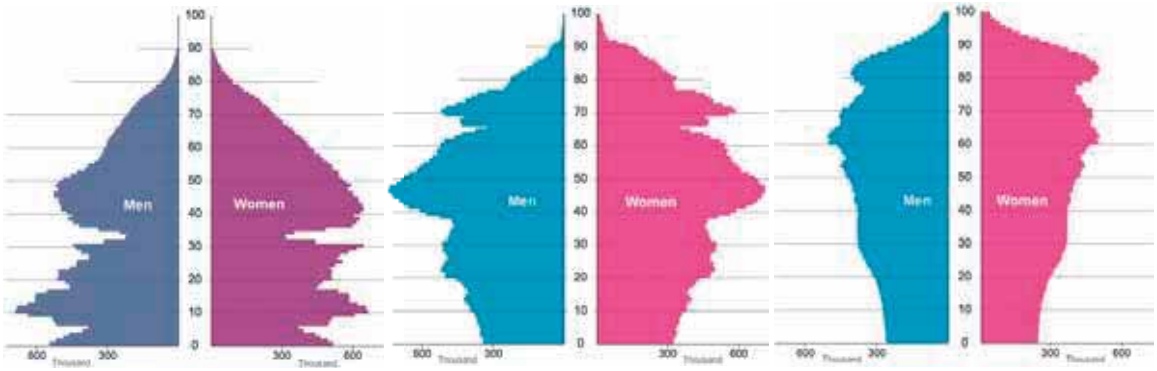
Overall, the fertility rates of almost all Western European states are around 1.6 (Germany: 1.3) (Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, 2008). If the predictions of the declining fertility rates continue to withhold, the proportions of the young aged and old aged populations will undergo a historic crossover. Combined with the increasing longevity there will be a clear inversion of the population pyramid age structure. Between 2004 and 2050 a moderate projection for the EU suggests that the population aged 65 and above will increase by about 77%, while the labor force population will decrease by about 16% (Malanowski, 2008). This implies that the EU aged-dependency rate will likely be in the range of two to one, instead of the current ratio of about four to one. Even though all EU Member States will experience an aging population, there will be several differences in timing, nature, and scale (Malanowski, 2008).

Additionally, also in Europe the particularly sizeable generation of the baby boomers has started to retire, which will again lead to a faster aging population, a stronger decrease in the labor force and higher burden for the retirement system.

The inversion of the population pyramid age structure in Germany can be seen in the below figure. The life expectancy is estimated to increase 6.4 years from 75.1 to 81.5 years in Europe and 4.5 years from 79.9 to 84.4 years in Germany (Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, 2008). Yet the aging will not reach the speed of that achieved in Japan as stated in figure 1. According to this figure the amount of people aged 65+ will be around 30% in Germany compared to 37% in Japan. At the same time though also the population in Germany will

shrink about 10% as can be seen in figure 4 - still substantially less though than the estimated 30% decline in the population of Japan.

Figure 3:From the Pyramid to the Rhombus: Development of the German Population Structure 1950 – 2010 – 2050 (from left to right)



Source: StatistischesBundesamt 2009

In conclusion, Germany will take a leading role for demographic change in Europe, because it will face a declining fertility rate, largely increasing longevity, and in total a net decrease in the overall population earlier than the other industrialized European countries.

2.2.3. USA

The medium variant fertility rate in the USA is around 2.1 children per woman between 2005 and 2010 is still considerably high compared to the rates of Western Europe (1.6; Germany: 1.3) and Japan (1.27). This fertility rate would lead to a more or less stable population. But when considering the scenarios of the Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat (2008) it is clear that from now on the USA will face a declining fertility rate. By 2030 the rate shall have decreased to 1.85, where it will, according to current estimates, stabilize until 2050.

At the same time, the average American can expect to live to 78.3 years, 30 years more than he or she could expect to live in 1900. In 2050 the average life expectancy in the USA will be approximately 5 years higher at 83.3 years (Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, 2008). The U.S. aged-dependency rate is therefore predicted to climb from 20 percent today to 35 percent in 2030 and 38 percent in 2050 according to forecasts of the Social Security Actuary (Bosworth, Bryant & Burtless, 2004).

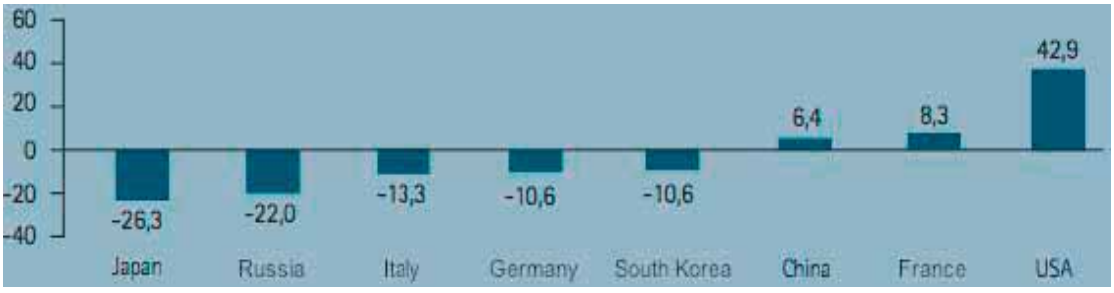
In addition, the first members of the baby-boom generation began receiving early retirement benefits from the Social Security Administration on January 1st, 2008. In 2011,

the first baby boomers will reach age 65 and begin a long anticipated cascade of 76 million individuals who will enter their retirement years over the next several decades (Kohlbacher & Herstatt, 2008).

Therefore, also in the USA the three demographics trends of declining fertility rates, increasing longevity, and the retirement of the baby boomers occur simultaneously. But apart from the declining fertility rates that remain relatively high compared to the other industrialized countries, there is one other major factor that substantially influences the demographic setting in the USA: immigration. The medium variant net migration rate per 1'000 population in the USA will sink from 3.3 to 2.9 in 2030 to 2.6 in 2050, but will still be significantly higher than that of Western Europe (currently: 1.7; 2030: 1.5; 2050: 1.6 and in Germany currently: 1.3; 2030: 1.4; 2050: 1.5) and Japan (currently: 0.4; 2030-2050: 0.5) (Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, 2008).

In conclusion, the USA is able to postpone, or at least temporarily offset, some of the effects of the declining fertility rates and increasing longevity by maintaining a high net migration rate. However, because immigrants themselves will also age, this kind of influence can be considered temporarily. Contrary to Japan and most of Western Europe though, the USA will still experience a net increase in total population up to 2050, as seen in the figure below.

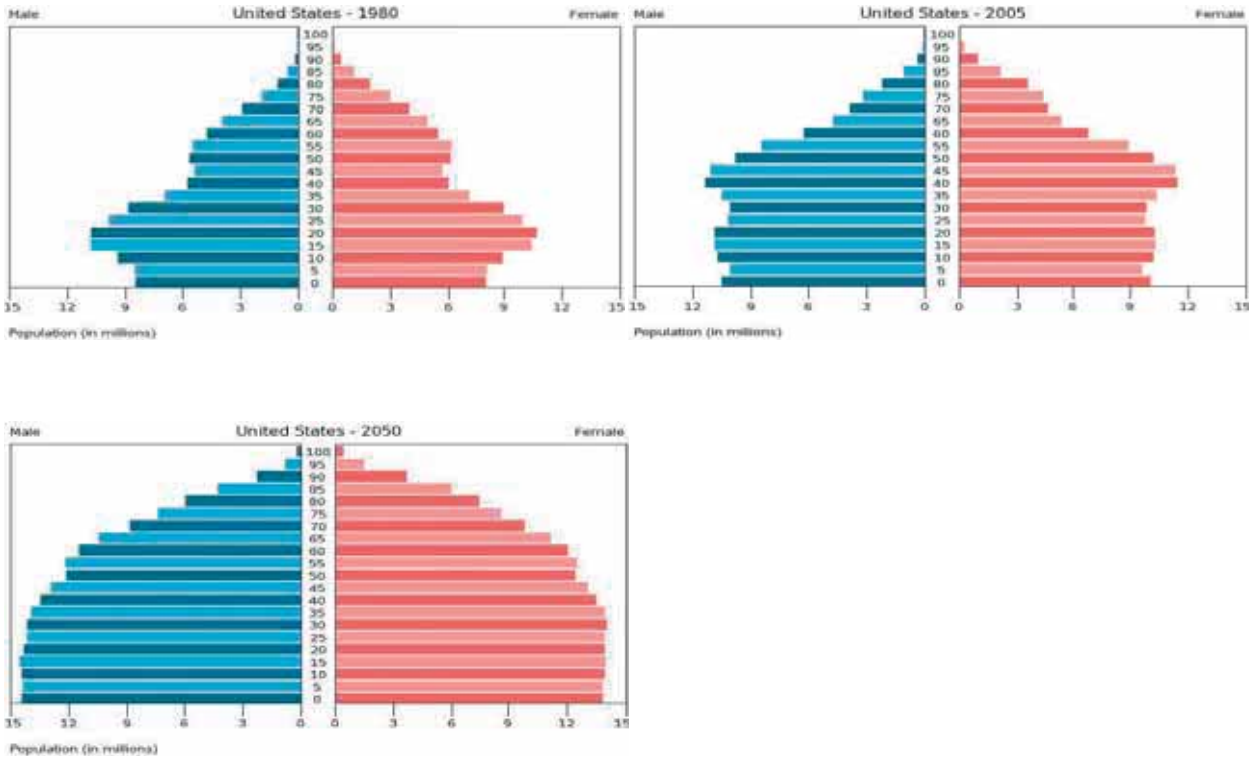
Figure 4: Many Industrialized Countries Are Shrinking: Population Development from 2008 to 2050 in %



Source: U.S. Census Bureau International Data Base

Additionally, it can be seen from the following figure that the population pyramid age structure does not show a true inversion of the pyramid, but rather a more equal distribution of the people aged between 0 and 80 in 2050.

Figure 5: The Population Pyramid Age Structure in the USA: Development of the American Population Structure 1980 – 2005 – 2050 (from left to right)



Source: US Census Bureau, International Data Base

2.2.4. Conclusion

From the above scenarios it becomes clear that most of the developed world will be facing a major demographic change in the next decades. It is not a question of whether this demographic change will occur but rather when it will occur. Sooner or later it will affect most of the industrialized countries. Japan is taking in a “leading role” in the transition of demographic change, whereas Germany will take in this position in Europe. The European and Japanese aged-dependency rates (the ratio of persons aged 65 and over to the population aged 15-64) will exceed 40 percent by 2030 and 50 percent by 2050, substantially above today’s rate of about 25 percent or the rate of the USA in 2050 of about 38% (Kohlbacher & Herstatt, 2008)

Japan is already confronted with the reality of such an inverted population pyramid together with a net decrease of the population. This means that Japan is now at a development point that other countries in the developed world will most likely experience in the coming decades. Therefore, in the succeeding analysis, Japan will serve as role model for the other industrialized countries. Last but not least, the USA will face the same

challenges and opportunities of demographic change, even though a delay of a couple of decades may occur before the transition starts to expand its full effects.

3 Development of Industries in the Future

Building upon the trends and developments analyzed before, most of the industries will need to adapt somehow to occurring demographic trends in order to remain attractive. The following industry analysis shall give a picture of the changes that will likely occur and shows possible counter strategies that firms could follow in order to remain competitive.

3.1. Financial Industry

The financial sector has been shaped by continuous changes throughout the last years and is well known for its dynamism. A strive for the development of new and innovative products has led to rapid changes in the financial industry. The question is whether this momentum can be maintained when demographic change will affect demand in various areas.

Considering an aging population as described earlier, the product demand is also likely to change whereas the supply side is constantly shrinking.

3.1.1. Banking Industry

Because people have started to realize that governments cannot support their citizens indefinitely and because the financial markets are volatile and imperfect, distrust of many citizens has been increasing. This trend is likely to continue since many governments, such as the United States, are seemingly increasing their debt and therefore their state insecurity. Already, in a few years people might realize that current demographic trends force the state to reduce its services, which will trigger a new wave of increased household savings. This can have negative macroeconomic repercussions, but at the same time it represents a good opportunity for the banking industry. During the crisis in 2008 capital flight from stock markets into government bonds and conventional saving accounts showed how people react when financial insecurity is high. As demographic change will trigger a similar period of financial insecurity (reduced public spending, political insecurity and increased likelihood of state bankruptcies) this is likely to introduce a new epoch of high household savings. Banks should address this opportunity and design products for this consumer group. Products like RiesterRente in Germany have already met huge demand. RiesterRente is a private pension scheme subsidized by the

state[17], whereas the state only adds money to the private pension, but does not own it. Following this concept, the insecurity for fund bankruptcy (due to political reasons) is limited, whereas the saver in exchange has to pay a large portion of the pension himself. This scheme is an attractive way of reducing the financial burden for the state and the risk of the fund recipient. As people have realized that the social state will be coerced to dismantle if current demographic trends continue, demand for those products is increasing.

Research has also shown that elderly people are typically risk averse. They prefer to maintain their wealth securely, rather than augment it at a higher risk rate (Steenbeeck et al., 2007). Hence, in the medium run the average investment horizon will shrink with an aging clientele. Demand for security will increase and products and services have to reflect this change in demand. With this, not only the asset management, but also wealth management industry will change. The average age of the private client will go up and services at large banks should particularly address this client group with tailor-made products. Asset management companies like DWS in Germany already today offer products particularly designed for retirement provisions. DWS strongly focuses on DWS RiesterRente, estimating that similar products will gain in importance over the next years (Ivan Rancic, Interview October 22nd, 2010). A focus on services for older clients will also lead to changes in the structure of banks. Wealth management divisions could open up departments particularly focusing on consulting services for pensioners. The wealth management industry has already seen major challenges during the crisis, and experienced how clients demand changes under different circumstances. In the future, the sector will have to adapt its services and address clients with different investment horizons and risk profiles (Christoph Zellenberg, Inverview October 20th, 2010). Private pension schemes are hence likely to gain in attractiveness and the financial industry will retain its competitive advantage if it caters clients with adequate products.

This shows that the banking sector will be affected by the expected demographic changes. Especially divisions like asset management and wealth management have to modify their services and products to remain competitive. Overall, it is likely that the industry per se will remain profitable and attractive for investors and employees, as the need for money management and search for investment opportunities will not cease to exist. However, product innovation and fair pricing will be important to retain the clients over the long term. Traditionally, the two divisions mentioned above have produced the most continuous cash flow for banks. Investment banking on the other hand has the

[17] http://www.riesterrente-info.de/

potential to generate large profits, but has strong systematic risks and is an inconsistent business (little influenced by demographic change and hence only serves as a comparison in this paper).

Overall, it can be stated that the banking industry will not lose attractiveness, but in order to stay profitable it will have to adapt its products and services for the growing elderly client groups.

3.1.2. (Health-) Insurance Industry

The insurance industry is very likely to undergo major changes in the next decade as the demographic environment changes in the developed world. Traditionally, insurances operated on the basis that there are more people buying new insurances than there are claims. Insurance premiums were therefore comparatively low, as the younger generation paid for the older (e.g. life insurances). Over the next decade this is going to change dramatically and premiums will have to be increased manifold. Clients will not be able to afford the entire range of insurances offered and are likely to select fewer products more critically. This will not only lead to higher claim rates, but will also reduce overall demand.

People in industrialized nations are living longer than ever before. In the last century alone, average life expectancy in the developed world from birth has increased by more than 25 years, and nearly five of those 25 years has been added to average life expectancy from base age 65. Indeed, the most rapidly growing age group comprises those aged 80 and above, and in some countries people over the age of 100 are leading the way in the rate of population growth by age. In most parts of the world women tend to live longer than men – nearly seven years longer in industrialized nations. In addition, reports from Japan, the United States, and Europe show that people are living not only longer, but also more healthily. In the United States, for example, the rate of disability has decreased noticeably despite population aging.

The health care industry is a highly cost-driven sector. Therefore, in order to determine the effects of demographic change on the future economic attractiveness of the health care industry in the developed world, one must first estimate the impact of the demographic changes on future health care costs. However, answering this question is not as simple as one might think.

A popular theme running through the debate on US health policy, for example, is that the aging of the population is a major driver of the demand for health care and thus of the annual growth in national health spending. This is a widespread believe that cannot only be found in the United States, but also in practically every other developed country. What

is true for a cross section of Americans at a point in time, however, is not a reliable guide to what happens when a country's entire population ages gradually over time. Research on the latter issue has shown consistently that the aging of a population, by itself, tends to be only a minor determinant of the annual growth in aggregate health care use and spending, other things being equal. Apparently, this insight has not been transmitted from the research community to the policy-making community as effectively as it should have been.

In thinking about the impact of this gradual aging of the US population on national health spending, a distinction must be made, of course, between the casual flow from aging to health spending through the demand side of the health sector and that going through the supply side. In their 2003 report, the Trustees of the Hospital Insurance and Supplementary Medical Insurance Trust Funds projected that the numbers of workers per Medicare beneficiary will decline from its current level. Unless an increase in fertility in the United States, more massive immigration, or important new labor saving technology can offset this projected increase in the age-dependency ratio, any labor-intensive US industry, health care included, will see the unit cost of its output increase. By driving up per capita health spending for all age groups, such increases in the unit costs of health care naturally will amplify somewhat the modest impact that aging by itself will have on health spending through the demand side.

After reviewing the various factors that drive this growth rate in spending – medical care price inflation, greater resource intensity of treatments, including the availability of new technology, overall population growth; and so on – Burner and colleagues (1992) concluded that "the aging of the population adds another 0.5 percent per year to expenditure growth", which means that the aging of the population explains only a fraction of about 0.06 of the total projected annual spending growth of 8.4%. Evidently, this finding puts population aging into the minor league of demand drivers in health care.

In a more recent analysis, Bradley Strunk and Paul Ginsburg (2001) concluded that "despite widespread believe to the contrary, aging baby boomers are not the major driver of rapidly rising health care costs for Americans under age 65."

Jeff Richardson and Iain Robertson (1999) surveyed similar studies for Australia and reported on their own research into the link between aging and health spending under various assumed future scenarios. Although they focused most of their work on Australian data, they included a cross-sectional analysis of spending patterns in 21 OECD countries and found no discernible relationship between the fraction of a country's population age sixty-five or older or the fraction of gross domestic product (GDP) it

spends on health care, after controlling statistically for the powerful effect of per capita GDP on per capita health spending.

In their more extensive cross-national regression analysis of the effect of aging on social spending in general, Jonathan Gruber and David Wise similarly did not find any statistically significant relationship between the percentage of a nation's population aged 65 or older and the total national health spending as a percentage of GDP, even after controlling for a full set of country and year fixed effects that might affect such spending as well.

Paul Krugman (2007) gives one possible answer to this seemingly missing link between health care costs and aging. He observed correctly that in 2007, America had almost twice the health care spending per capita than any other developed country. Nevertheless, 15% of the population had no health insurance at all with the remainder receiving less per person than any other state in the developed world. Put it simply, although America spent much more on health care than anyone else, it didn't seem to buy significantly more care. Krugman (2007) gives a clear answer: the US health care system in its old form (before Obama's health care reform) spends large sums of money not on providing health care, but on denying it. Private insurance companies don't make money by paying for health care. They make money by collecting premiums while not paying for health care, to the extent that they can get away with it. Indeed, in the health insurance industry actual payments for care, such as paying the costs of a major operation, are literally referred to as medical losses. Insurances therefore try to increase their gains through the use of "risk selection", also known as "underwriting" (both are terms for refusing to sell insurance to people who are likely to need it – or charging them a very high price). In addition, as a second line of defense, private insurers are constantly looking for ways of why they can refuse to pay, even though they already collected the premiums. It is important to note that none of these costs arise in a universal health care system in which the government acts as insurer. If everyone is entitled to health insurance, there is no need to screen people to eliminate high-risk clients. As a result, government health insurance programs are much less bureaucratic and spend much less on administration than do private insurers. Furthermore, the United States doesn't have a centralized drug agency bargaining with pharmaceutical companies over drug prices. As a result, America actually uses fewer drugs per person than the average foreign country but pays far more for it.

If not aging, what else is the main driver of the increase in health care costs? The answer, perversely, is medical progress. Advances in medical technologies mean that

doctors can treat many previously untreatable problems, but only at great expense. Insurance companies pay for these treatments but compensate with higher premiums. In addition to that, current medical diseases like adiposity in America and Europe are going to unfold its effects. Adiposity related diseases (e.g. heart attacks, vascular diseases, apoplexy, joint problems, etc.) will cost insurance companies large sums if they are not compensated by cost reductions that could potentially be achieved through more frequent monitoring services etc. However, health care insurance premiums are likely to skyrocket. Insurance companies already today are increasingly reluctant to pay for patients' hospitalization (Dr. Harald Salzmann, Interview October 21st, 2010) and as budgets are going to tighten further, clients will more often go away empty-handed. Services are hence likely to either deteriorate or go up in price to compensate for higher claim rates.

The above events are likely to lead to a consolidation of the entire industry. All health and life related insurance services will undergo major changes and from an investors point of view these industries will lose their attractiveness, as profits will decrease while risks increase. However, with every change there also come opportunities and if insurance companies are able to adapt their product range, overcome financial difficulties, and tailor insurance services that address the elderly generation's needs, they could potentially compensate demographically induced challenges. Such innovations could range from pension systems in cooperation with the state (like RiesterRente) and insurances with discounts for people of healthy nutrition habits. One possibility would be to offer a health insurance that reduces its premium if combined with a seminar on nutrition and a regular cholesterol check. This would educate clients and could potentially be subsidized by the public sector (as health costs decrease if nutritional habits are improved).

3.1.3. Other Sectors within the Health Care Industry

A health sector that will certainly increase in attractiveness is the so-called monitoring service industry for chronic diseases such as sleep apnea and diabetes. Such monitoring services significantly reduce the health care costs of chronic diseases, which arise increasingly more often due to the aging of populations.

Furthermore, unintentional weight loss and malnutrition are common problems of the elderly. Taste and smell changes, as well as feelings of loneliness and depression, contribute to decreased appetite, while many elderly people may eat less because of chewing difficulties, fatigue, and social reasons. Furthermore, elderly people often have increased nutritional needs because of disease or injury. Weight loss and malnutrition have been shown to result in a loss of muscle mass, causing a further decrease in

strength, which may impair mobility and the ability to care for oneself. It is also clear from scientific and medical research that poor nutrition leads to a slower recovery from illness, increased risk of infection and complications of surgery or hospitalization and poor healing. Unfortunately, these factors further impair one's appetite, making it a vicious cycle. It is critical that the elderly and their caregivers understand the value of nutritious foods, and make them a regular part of their daily routine. The nutritionally dense supplement industry, making it easier to ensure that adequate nutrition is received by the elders, will therefore most certainly also increase in attractiveness.

Furthermore, scientists believe that people who live to 100 years or more hold valuable secrets in their genes that can reveal targets for medicines to tackle a wide range of age-related diseases, as well as improving longevity itself. "If you make it to 100, you must have had good health and a good life – otherwise you wouldn't be at the tail end of the age distribution curve," Kaare Christensen (2010) of the Danish Aging Research Center told Reuters in an interview. "So basically, we're trying to figure out how they do it." Of course, genes are not the whole story: experts believe genetic factors account for only a fraction of longevity. Other factors like a healthy lifestyle, good diet and safe environment combine to play a role in determining when one dies. Yet so-called "longevity genes" certainly exist, and their importance grows the longer a person lives, so identifying them and finding out what they do to fight off killer diseases is a hot area of research. With life spans already increasing at a breathtaking rate – an average of three months is being added to life expectancy every year at the moment – scientists stress that a "magic pill" to help people live ever longer is not what anyone should be seeking. Instead the aim is known as "compression of morbidity" – improving the health of rapidly aging populations and squeezing to a minimum the amount of time at the end of their lives when they are sick, in pain, or dependent.

"None of us, probably, wants another five years in a nursing home," said Linda Partridge (2010), director of University College London's Institute of Healthy Aging. "But an additional five years without any particular health problems would be another matter" (Partridge, 2010). One thing is sure: the pool of people to work with is growing fast. There are around 450,000 centenarians in the world today and experts estimate that thanks to aging baby boomers, there could be a million across the world by 2030.

Genetic science and technology is developing rapidly too, allowing scientists to scan the genes of the super-old in search of the secrets of long life – and drugs to mimic them are starting to appear.

3.1.4. Conclusion

From the text above it becomes clear that the best future potential for business lies in products and services, and industries that directly increase the health of the population or that decrease the costs of health care treatments, thereby increasing their efficiency. This can be achieved through either monitoring services of chronic diseases, the increased focus on healthy nutrition or through the development of new pharmaceutical products that increase healthy life expectancy. The health care industry, in particular insurers and medical institutions, can be expected to lose attractiveness due to the higher costs of medical treatments. However, since those higher costs are mainly a result of other than demographic factors, it cannot be concluded that the health care sector loses its attractiveness due to demographic changes. In addition, due to the high cost pressures, these industries are likely to undergo a phase of consolidation. This will reshape the landscape of largest players. New business opportunities go along with the challenges and the most innovative players re-establishing an attractive and profitable industry will be the winners of tomorrow.

3.3. Welfare State

With the age of industrialization social responsibilities were gradually transferred from the family to the state and the rise of public insurance services at the end of the 19th century represented a further pillar in the newly arising welfare state (Fleiner, 2004). When Bismarck introduced a pension system for every citizen at the age of 65, life expectancy in Germany was 57 years. Today pension age has been raised to 67, correspondingly life expectancy (at birth) climbed to 79,26 years (CIA World Factbook, 2010). It is clear that this situation is not sustainable and will either lead to a collapse of the entire system and bankruptcy or to a complete reform of the spending policy (Biedenkopf, 2006).

Global demographic change in the developed world will further accelerate the financing bottleneck of the system and increase the need for reform. Considering that not only Greece, Portugal, Spain and Italy have high debt levels, but also UK's GDP deficit was at 11,4% in 2009 (UK Office for National Statistics, 2010), reform will have to tighten budgets soon if a revolution is to be avoided. Unfortunately, the financial crisis in 2008 triggered new debt records and showed that few governments seem to have realized that liabilities will eventually have to be paid back. Bankruptcy of just one EU member state can jeopardize the common currency and would slip the world into a dire economic

recession. Hence, current public spending for the welfare state cannot be maintained over the medium run with a change of the demographic landscape.

The main areas of social expenditure that will be affected by demographic change are increasing health care expenditures and pensions. As people get older they will survive more diseases, take longer medication and have numerous operations, simultaneously increasing health care spending. Secondly, the traditional intergenerational contract (where young generations pay the pensions of the elderly) will collapse.

Reforms that could have immediate impacts on those two areas are a sharp raise of the retirement age (in countries like Italy currently at 57 years). This will relieve public budgets and increase the pool of the tax-paying population. It is politically unpopular, but would show an immediate effect. Innovative cooperations with insurance companies (for private pension products like RiesterRente) should be intensified, as a partly private pension scheme is the only viable way for the future.

In addition, migration will have to be controlled, as “negative” migration can be costly for the state. This is a very delicate issue and there is no easy solution to it. Switzerland is a country that manages to attract brainpower. On the one hand, these immigrants usually get well-paid jobs and pay taxes. On the other hand, the more immigrants live on social expenditures because they are not able or willing to find a job, the higher the future financial burdens put on the states. Hence, migration can have a short-term very positive effect, but it could also rebound negatively if immigrants represent an unskilled, uneducated or unmotivated workforce. Overall the withdrawal of the welfare state will continue, as it is not possible for young people to pay pensions if the demographic pyramid continues to turn upside down (Fleiner, 1999).

According to Creveld (1999) even countries with a high individualistic attitude (a small welfare state) have not experienced tax cuts after bureaucracy was reduced (as the case in the U.S. under Ronald Reagan). However, if the welfare state is dismantled whereas the tax burden stays the same, retirement age is increased and other unfavorable political measures are taken, it could potentially create strong social uproar. A look back in history shows that the revolution in 1848 was foremost triggered by a working class that felt exploited by the ruling class. The dismantling of the social state will first and foremost affect the poor people, which could create a similar situation as in 1848. The only difference is that democracy gives citizens participation rights and hence indirectly involves people in the decision making process. However, social dismay could persist, which then either leads to a revolution or an opportunity for populists with lax monetary policies.

Hence, the problems faced by welfare states are huge in the light of demographic change. The ability to solve these problems democratically will therefore eventually depend on the level of education in the affected states of the developed world.

3.4. Entertainment Industry

3.4.1. Technological Entertainment Industry

Older people have been participating more and more in social life. The new generation of the old aged population is increasingly characterized by a cultural rejuvenation, meaning that their demands become younger. This is foremost visible in their recreational activities, which are experiencing an increasing presence of entertainment electronics. Wahl & Mollenkopf (2003, cit. in Gassmann & Keupp, 2010) conducted an empirical study and looked at how older people use technological applications in entertainment electronics, to which extent they use these products, and what their experiences were using them. They found out that the older generation has a considerable demand for improvements by reducing the amount of bad experiences older people have when using something and their fear of breaking something. This yields great potential for product innovation, especially regarding user-friendly computers, Internet access, but also software – markets, where demand by the elderly is increasing rapidly. As seen in the Japanese market, first innovations have already been launched. In 2008 the Fujitsu Raku-Raku Notebook that incorporates the same successful concept and principles of the Raku-Raku Phone, which is described in more detail below, was brought to the market. Fujitsu aims at the older customers by designing a bigger keyboard and by offering telephone support regarding any questions to the usage of the notebook.

But also, as mentioned above, Internet usage under older people is increasing rapidly, both for private and business purposes. The increase of older Internet users already now significantly exceeds the increase for the whole population. Whereas online chatting is less attractive for older users, online travel arrangement and booking services have experienced a significant increase in popularity. Today about 59% of users older than 64, but only 36% of users aged 15 to 34 use the Internet for travel arrangements (Destatis, 2005, cit. in Gassmann & Keupp, 2010).

An additional very interesting area is mobile phone technology and design. According to Gassmann & Keupp (2010) less than 10% of the older population owns a mobile phone, but actually 20% would buy one if their demands of better user-friendliness and less

superfluous functionalities were met. Older users see their mobile phone rather as a way to make and receive calls than as the younger users as a lifestyle product. An excellent example for this is the Fujitsu's "Raku-Raku Phone" – raku = simple. With 15 Million sold mobile phones it is a full success in Japan. The Raku-Raku mobile phone series does not only convince seniors with its easy-to-read writing on the display, the bigger buttons, less complex functions and easier and more intuitive handling, but also other age groups. In the meanwhile there are also several different kinds of models from Raku-Raku Phone Premium with digital TV and other high-end functions to the Raku-Raku Phone Simple.

More very promising examples of products in the entertainment industry that could profit from the demographic change are video consoles and video games. In this sense the best examples so far are the Nintendo Wii and the Nintendo DS "Touch Generations". These products seem like especially catching the attention of the younger generations but in fact they are true trans-generational products, which also catch the attention of seniors, independent of their age and condition. While whole families can play tennis or box together on the Wii, older aged people can do brain jogging or refresh their English in a refreshing and playful way on the Nintendo DS. The opening of the target groups for older generations is a true success to Nintendo without having lost the true former target group. These examples show that through a new definition of a seeming age-dependent practice (video games) it is possible to connect generations and thereby enlarge the business market.

3.4.2. Pet Industry

Another industry that is enjoying large increase in demand is the pet industry in Japan. According to Silverstein & Abramson (2008, in "The Silver Market Phenomenon" from Kohlbacher & Herstatt, 2008) the Japanese attitude toward pets has changed "from 'animals' to 'family members'" mainly because of the decline in family size, population aging, and the increase in the number of empty nest households. Japan has now more cats and dogs than children. The market is seen as worth about 9 billion US-Dollars and expected to grow. The enormous demand for pets has also rapidly increased the demand for related products and services, including pet food, magazines, books, pet insurance, grooming, training, pharmaceuticals, and even clothing. Furthermore rising concerns of the Japanese over the quality of life of their pets increased demand for pet health care, vaccines and medication, veterinary clinics, more health products, and even leisure activities for pets, such as amusement parks, hot springs, and tracks for exercising dogs. But not only can pets be seen as part of the entertainment of the older getting generation, partially the effects of having pets goes into the health industry. Then pets can improve

the quality of life among older people by increasing their well being, because of the benefit of a pet to counter feelings of loneliness and to provide a basis for social interaction. In addition, pets help to regulate daily routines of the elderly, increase their physical activities, maintain an emotional balance, and are objects of affection, leisure, and extended circles of friendships (e.g. communities of pet-lovers).

4 Conclusion

The two megatrends of declining fertility rates and aging populations will certainly affect the demand and supply of all the industries, products and services that currently exist. In addition, these trends will also influence future products and services and foster future innovation.

It is very difficult to make clear projections since the influencing factors are many and diverse. The banking industry will certainly remain attractive, even though the supply and demand of the products and services in this industry are going to change. The increase in the older population will lead to changes in the demanded maturity as well as the risk profile of the products.

Furthermore, due to increasing cost pressures, the (health-) insurance industries can be expected to consolidate. The current organization of the firms within these industries is certainly not sustainable and needs to be changed in order that the functioning of these very important industries can be guaranteed. In addition, the use of technologies that will help to reduce the costs in such difficult environments will certainly increase.

Last but not least, the entertainment industries will also undergo many changes. Older people are increasingly willing to use such entertainment technologies. As time goes by, older people will rely more and more on the use of such technologies. The demand of the older population for entertainment goods and services will therefore certainly increase in the future.

All in all, Kohlbacher & Herstatt (2008) find two major findings in recent literature. First, the most crucial insight is without doubt the fact that the silver market is by no means a homogenous market segment in that the so-called 50-plus market covers a wide range of different customers and consumers with an equally wide range of values, attitudes, needs and wants. Thus, the silver market actually consists of various different silver markets[18].

[18] For an example of a possible division of the older customers into segments, see the appendix under point (1).

In a similar vein, one should not forget that marketing has, for a long time, already gone beyond the simplistic segmentation by age and that, despite the tremendous business potential of the 50-plus, one should resist the temptation of merely looking at a person's age.

The second crucial insight is that the silver market is not necessarily restricted to the silver generation only. Or, put differently, who is silver is not determined by age (alone) and that younger consumers can also have silver hair, so to speak. This of course refers to the powerful concepts of universal and trans-generational design. Managers and scholars alike should bear in mind that the best products, services and solutions are often those that can be attractive to a variety of customers regardless of their age and that they can also be used or consumed regardless of age and physical or mental condition. Beware of ageism, think trans-generationally and avoid the stigmatization of products and services as quasi only for seniors.

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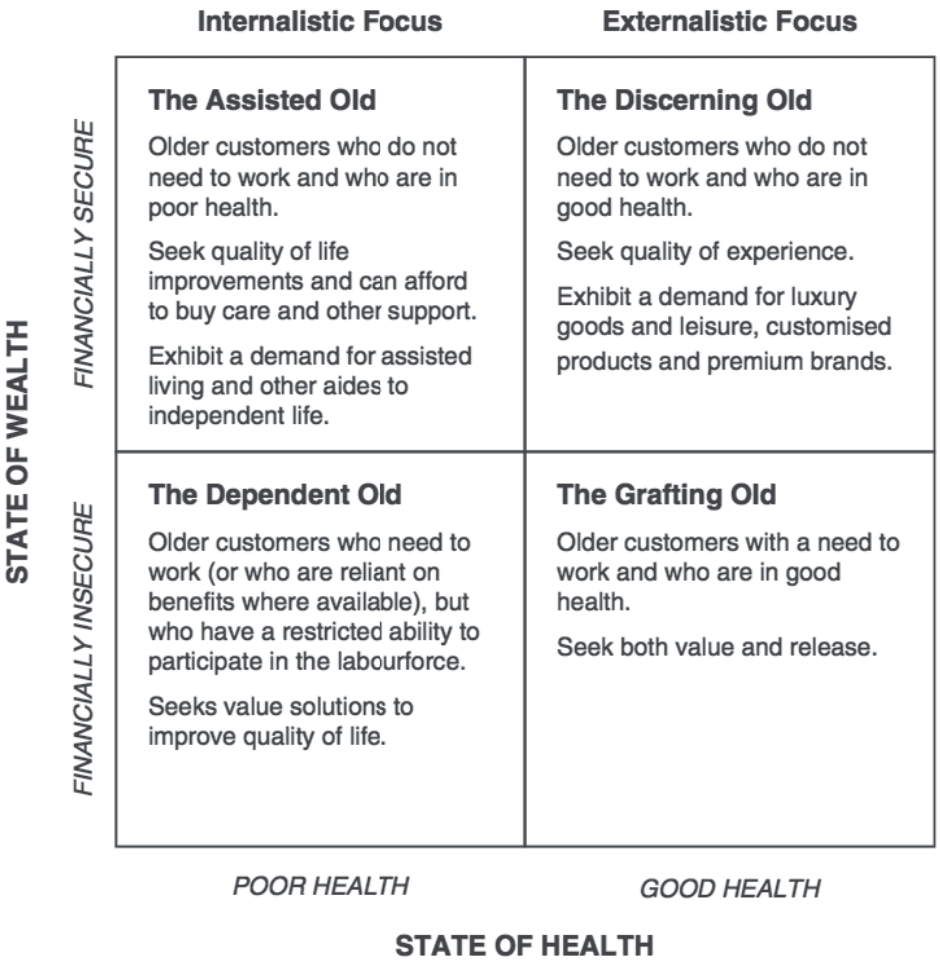
Appendix

(1) The Older Customer Wealth/Health Segmentation Matrix



Source:Kohlbacher & Herstatt, (2008)

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Demography and public debt in Europe, the US, and Japan

Analysis of the current situation
Interdependencies between demography and state budgets
Scenarios and recommendations till 2030

Topic No. 6

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November 2010
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Megatrend “Global Demographic Change”
Dr. Hans Groth

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1 Executive Summary

The financial crisis that erupted in mid-2008, still convulsing the Euro-zone in 2010, led to an explosion of public debt. Governments were forced to increase the gross governmental debt dramatically in order to recapitalize banks and needed to introduce large stimulus programs to revive demand. These actions were indispensable in order to ensure the success of the fragile global recovery. This, according to the OECD, lead to the increase of the industrialized countries' average rate of indebtedness drastically during 2008-2010 by 24% in terms of gross government debt to gross domestic productivity (Debt-to-GDP).

Throughout history there have always been periods of high public indebtedness for industrialized countries. An example is the period after World War II with levels of 121% for the United States and 300% for Great Britain. The current situation is different though due to the changing demographic situation and the corresponding consequences. The demographic development for Western Europe, the United States and Japan forecasts stagnating or shrinking workforces and increasing retirement populations. This goes in hand with exploding social spending commitments and lower economic growth rates.

The topic of this paper is to analyze the impact of the demographic change on public debt levels for the European Union, United States and Japan until 2030. In order to reach this goal, an extensive status-quo analysis has been developed together with a projection on the debt levels of the discussed regions in the next 20 years.

Finally possible actions are suggested which are aimed to fighting high and non-sustainable debt levels, thus helping the discussed regions to avoid the “debt-trap” and bankruptcy.

2 Introduction

The financial crisis that erupted in mid-2008, convulsing the Euro-zone in 2010 with Greece in particular facing huge public sector indebtedness, led to an explosion of public debt. Governments were forced to increase the gross governmental debt dramatically in order to recapitalize banks (such as for example the UBS and Citigroup) and introduce large stimulus programs to revive demand (for example the American Recovery and Reinvestment Act of 2009 with $ 787b up to date[19]). These actions were indispensable in order to ensure the success of the fragile global recovery. Nevertheless, according to the OECD, the industrialized countries' average rate of indebtedness increased drastically during the last two years by 24% in terms of gross government debt to gross domestic productivity (Debt-to-GDP).

Thought history there have always been periods of high public indebtedness for industrialized countries. An example is the period after World War II with levels of 121% for the United States and 300% for Great Britain. In more recent years Japan showed debt rates of 150% and above in the last two decades, nevertheless remaining productive. Economical growth was in the past the main driver for the reduction of public debts based on increasing tax revenues from the growing working population and higher productivity rates. The current situation is different though due to the changing demographic situation and the corresponding consequences. Demographic population forecasts for Western Europe, the United States and Japan stagnating or shrinking workforces and increasing retirement populations. This goes in hand with exploding social spending commitments and lower economic growth rates.

As a consequence, nowadays literally every developed country faces a fiscal trade-off problem. On the one hand, fiscal actions are necessary in order to reduce the debt ratio while on the other hand, the economy is still in recovery and therefore unable to withstand large spending cuts.

2.1. Objective and goal

The topic of this paper is to analyze the impact of the demographic change on public debt levels for the developed countries until 2030. Recently, there has been a surge in research on public debt and the consequences of the financial crisis such as working papers of the Bank for International Settlement (The future of public debt: prospectus and implications, March 2010), International Monetary Fund (Public Debt

[19] Source: www.recovery.gov, Overview of funding

and growth, July 2010) and Reinhart and Rogoff (This time is different, 2008; Higher Debt May Stunt economic growth, January 2010). We investigate the following research questions in order to deepen our understanding of the problem:

- **Status quo of the EU, the United States and Japan:** What is the current situation in these countries in terms of public debt, economy and economic grow? Furthermore, we focus on the analysis of the demographic change of the population.
- **Driver of public debt:** Which factors drive the public debt and how can the government debt ratio be influenced, seen from a demographic perspective?
- **Development until 2030:** What are the possible scenarios for these countries until 2030 in terms of indebtedness, the economy and demographic change?

Based on recent research on public debt and economic growth, this paper shows the status quo of some developed countries, constructs a most likely scenario until year 2030 and examines some possible counteractions and measurements for the corresponding authorities. The investigation of the research questions above allows us to clarify the topic while pointing out the following goals:

- The investigation points out the differences in public debt and the economic situation after the financial crisis among the three regions.
- Based on the analysis of the status quo, a scenario until 2030 is developed, deriving the consequences for public indebtedness and policy commitments.
- The scenario analysis allows us to define adequate policy actions and measurements in order to face the issue of higher social spending under a moderate economic growth.

2.2. Methodology and structure

For the analysis of the current situation within the European Union, the United States and Japan, we apply a modified version of the PEST framework dating back to Aguilar (1967). PEST stands for Political, Economic, Social and Technological factors which are used to analyse the macro-environment of an entity or country with the purpose to use this information to review a situation and guide strategic decision making. Main advantages of the framework are the simplicity, the understanding of complex interconnections and the wider environment respectively. Moreover, it allows the exploration of new threats, opportunities and their impact (CIPD, 2008). PEST analysis has been used for investigations on countries in several studies such

as the Country Analysis Report (Datamonitor, 2010), Healey (1994) and Howard (2007). In the following paper, we focus on debt rather than on technology as one of the factors of the PEST framework, resulting in the according to our knowledge new PEDS model. Based on our opinion this is a necessary modification of the analysis in order to deal with the complexity and importance of public debt within the analysis.

In order to derive the most likely scenarios until 2030 for the investigated countries, we follow the Adolf Guyer-Zeller approach. He built the “Jungfrau Bahn” (1894-1899) with confidence and self-esteem, following an innovative spirit while using a trial and error framework. In forecasting a scenario until 2030, we see similarities to the vision of reaching the Jungfrau by train in terms of a high degree of uncertain factors, a wide range of possibilities and because always when discussing the future, visions are essential.

The paper at hand is divided into five chapters: the current Chapter 1 introduces the topic and describes the initial situation, thus defining the problem. Moreover, the research questions and goals of the paper are discussed. Chapter 2 analyzes the status quo of the different countries following the PEDS-analysis, highlights the fundamental impact the financial crisis had on public debt and points out the current challenges. In chapter 3, the future scenarios for the investigated countries are derived and analysed with a focus on the demographic transition. Chapter 4 suggests possible policy actions of the developed countries in order to solve the current and future issues. Moreover, measurements for the level of public debt and governmental liabilities in relation to the assets of a national economy are investigated. Finally, chapter 5 reflects the findings and summarizes the paper.

3 Status quo - 2010

The following chapter gives an insight into the global demographic transformation and current public debt situation for industrialized countries from Western Europe, the United States and Japan. We further examine the state of the economy and demographic population while applying the PEDS analysis.

3.1 Demographic Transformation

The world is in a fundamental demographic transformation process where population ageing is a central element. For the purpose of this paper, population ageing is defined as the growth of older age groups as share of the total population (such as

65+ or 80+ aged groups), which has recently occurred in many regions of the world. In 2009, an estimated 737 million people were aged 60+ years of the world, of whom 56% lived in developing countries. Based on the forecast of the United Nations Population Division (Population Ageing and Development 2009), the amount of elderly people (60+ years) will increase by a factor of 2.7; in percent of the world's total population doubling from 11% in 2009 to 22% by 2050.

This is a result of the astonishing increase in life expectancy from 48 years in the mid-20th century to 68 years in 2010. By 2030, average life expectancy at birth is to reach 85 years in the developed countries. Fertility rates below reproduction levels, especially in the more developed regions, further accelerate the ageing process of societies. Nevertheless, the extent of ageing differs significantly within countries. Japans population, for example, is the oldest worldwide with over 22% of the population being 65 years or older. Figure 1 shows the development and forecast of ageing in Japan, the European Union and the United States. The Forecast of the United Nations Population Division expects an increase of elderly people until 2030 of 36% for Japan, 52% for the United States and 39% for the European Union.

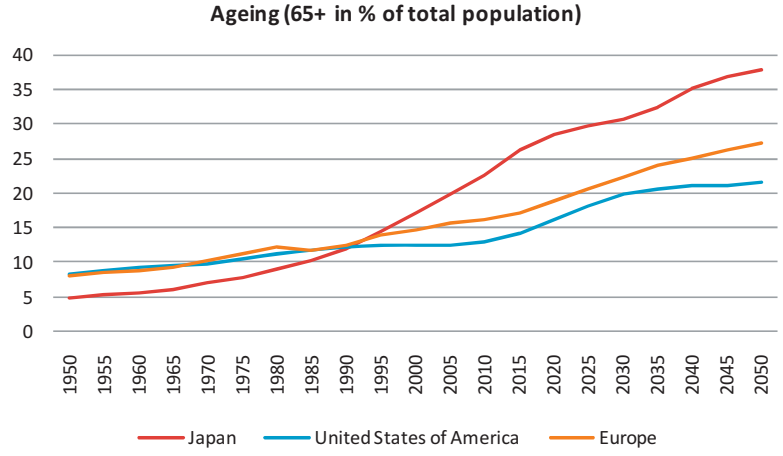


Figure 10: Development and forecast of the percentage of population aged 65 years or older for Japan, the European Union and the United States. Source: United Nations, Population Division, 2009

These demographic changes are taking place in the context of the existing social security laws, institutional structures and benefit programs. Although there is a wide variation of the scale and scope of social commitments between countries, the demographic changes already now affect nearly all countries essentially. The high old-age share will have significant implications for government finances, the need for delivery of health care and economic security to the elderly, while simultaneously

facing a decreasing working population (Bloom & McKinnon, 2010). The industrialized world in particular is massively affected due to the relatively high advancement of population ageing compared to less developed countries.

3.2. The European Union

The development of public debt and budget deficits are an essential issue in literally all Western Europe countries nowadays. Recently, one of the most widely discussed topics in political debates is the future course of fiscal policy and the sustainability of public finances (Neck & Sturm, 2010). With the financial crisis starting in 2008, the common public debt related indicators such as the gross domestic debt over the gross domestic production (Debt-to-GDP) increased dramatically. Nevertheless, public debt had ratcheted up over many decades in most Western Europe countries as a shock absorber – rising in bad times but not really declining in good times (IMF, 2010). This last rise however goes in hand with the foreseeable demographic change, resulting in a reducing working age pool and higher ageing-related commitments. Nowadays overspending poses a threat for the wealth and stability of future generations, due to the open question in financing future liabilities.

Politics and legal factors

Since the world war two, the political situation in Western Europe constantly emerged to a stable equilibrium, resulting in a trade and currency union. The European Union is the most important institution defining political and legal criteria regarding the stability of the member's economy such as the "Maastricht contract". It defines four criteria in order to participate in the Euro union: an inflation rate of maximal 1.5% higher than the average of the three lowest inflation member states of the EU; the government's annual deficit to GDP ratio must not exceed 3% and the government debt to GDP ratio must not exceed 60%; countries should have joined the exchange-rate mechanism under the European Monetary System and should not have devalued its currency for applicant countries; the long term interest rate is maximal 2% higher than in the three lowest inflation member states[20]. Nevertheless, near default of Greece and others in 2010 showed that a stable currency union does not automatically counteract massive public indebtedness and country defaults in case the corresponding measurement are not applied. Based on the recommendation of the council, the future trend in regulation on public debt can be expected to strengthen its Stability and Growth Pacts (SGP) and enhance economic governance.

[20] Treaty on European Union (TEU), Art. 140, signed in Maastricht February 7, 1992, in force November 1, 1993.

This means that fiscal surveillance will be increased by debt development and operational debt criteria in the application of the SGP. Moreover, the EU's special committee on the economic crisis (CRIS) has decided to extend its mandate through July 2011 in order to conclude its analysis and bring up concrete measures to overcome the current and future crisis (CRIS, 2010).

The institutional framework and the rules of the fiscal policy in the EU are built on the theoretical basis that firstly, the need to reduce the high level of public deficit and debt, fiscal imbalances leads to a high real interest rate. Secondly, that both fiscal imbalances and large size of public revenues, expenditures respectively, have a negative impact on the economic activity and growth. These assumptions and the difficulties of managing the optimal fiscal policy of single national economies on EU level are the reason for a relatively low importance of fiscal policy (Ferreiro et al., 2008). Citing the President of the European Central Bank, the fiscal policy of Europe has to be tightened in order to support growth. The 2011 budgets need to reflect the commitment to ambitious fiscal consolidation in order to strengthen confidence in the capability of governments to return to sustainable public finances (European Central Bank, 2010).

Social systems, especially the pension system are broadly developed within Western Europe with the aim to prevent poverty of the elderly. There is a wide variety of different programs across the countries. The main differences are the mixes between funded pillars (with a capital stock) and unfunded pillars (pay-as-you-go). The impact of the crisis on pension funds according to OECD (2009) estimates ranges from a loss of -8.5% for Germany to -37.5% for Ireland (average of -15.8%). Recent pension reforms in Western Europe were characterized by the tightening eligibility conditions for early retirement and disability pension schemes; decrease of public pension benefits and increasing official retirement age up to 70 until 2070 corresponding to the European Centre (2010). In addition, incentives for higher fertility rates, enhancing employment rates and flexible pension fund systems are in discussion.

Economic factors

- Western Europe's economy got severely hit by the financial crisis, nevertheless the economy, while still fragile, is recovering at a faster pace than previously envisaged. In terms of GDP, the third quarter of 2009 shows a return to growth in Europe after negative growth rates during the global recession since mid of 2008. The current year-to-date GDP growth rate is at 1%, while the forecast for 2010 is

at 1.8%[21]. The investigated region is highly dependent on global trade, which as a matter of the crisis, show significant deterioration in external trade even by the end of 2009 when GDP started to stabilise. The import and export in goods and services both grow in the first half year of 2010 by 4.4% and the seasonally adjusted euro-area trade balance with the rest of the world showed a deficit of 0.2 bn Euro as of July 2010[22]. Inflation was in August 2010 at 1.6%, while the Commission's interim forecast is now marginally down to 1.4% from 1.5% in spring. The interest rate went down to 1% as a response to the financial and economical crisis in 2008 and remained unchanged[23]. The stock market indices such as the Euro Stoxx 50 kept a positive momentum until Spring 2010, mainly due to encouraging macroeconomic data and company earnings. After broad losses in May and June, markets somewhat recovered in summer and since late summer an upward trend can be stated, overlapped by readjustments indicating careful investors constantly reassessing their outlook[24].

Debt

The government deficits and debt levels in Europe, in particular for Greece, Ireland, Italy, Portugal and Spain (the "PIIGS") forced the EU and the IMF to speak a 750bn euro rescue package in 2010 aimed at ensuring financial stability and harsh the austerity measures with the European Financial Stability Facility (BBC, 2010). The debt level of the Euro area in terms of public debt is 7,063bn euro, equal to 78.7% of GDP as of 2009. As a result of the financial and economic crisis the public deficit as of 2009 increased to -801 bn euro, or in relation to GDP -6.8%[25]. Figure 1 shows that gross debt to GDP ratios were already before the crisis on high levels, however massively increased since 2007.

[21] European Commission (EC), Economic and Financial Affairs: Interim forecast September 2010.
[22] EC, Eurostat news release euro indicators: Euro area external trade deficit, January 2010 and July 2010.
[23] EC, Eurostat statistical books: Europe in figures: Eurostat yearbook 2010
[24] EC, Economic and Financial Affairs: Key Indicators for the Euro Area, September 2010.
[25] EC, Eurostat: General government gross debt, September 2010.

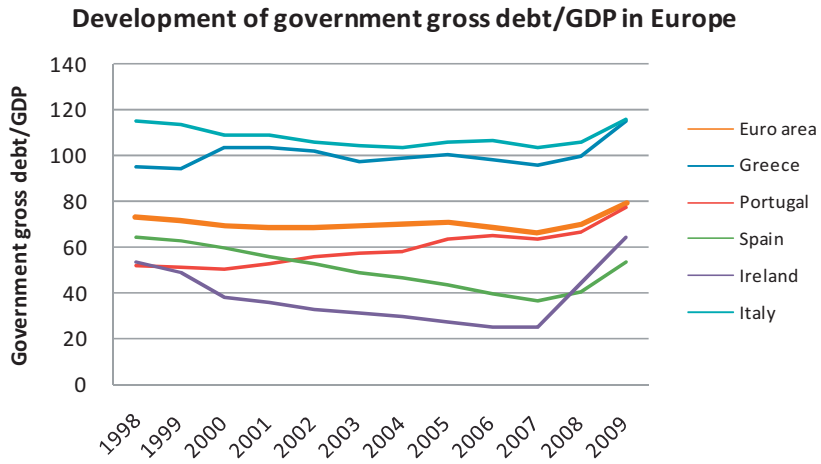


Figure 11: Development of the government debt to GDP ratio for the Euro area and selected countries (PIIGS). Source: Eurostat, 2010

Governmental bonds are usually called as risk-free. This goes in line with the short-sighted view of bond traders, assuming to get out in time before the crash. Therefore having a time horizon of days or weeks and not decades (BIS, 2010). Nevertheless, the almost default of some countries dramatically increased their bond yield spread and risk insurance on Credit Default Swaps spread (measures the gap of the observed capital costs to the risk free capital costs, which implicitly is the risk premium).

Figure 12: Credit Default Swaps for Europe, Japan and the United States between 2000 and 2010. Source: Bloomberg, 2010

With the downgrading of European government debt, highlighted the lack in confidence that the corresponding governments are able to pay back their obligations. For some governments the conditions to raise debt in the future significantly deteriorated and got more expensive. This increased the “debt trap” risk, implicating that some countries have to issue new debt in order to pay the current

interest of previously issued debt. In the global outlook 2010 the IMF said, that a "widespread public scare across major advanced economies appears unlikely". However, the question if and how long the stable members of the European Union are going to finance the "PIIGS" in case they fail to reduce their deficits is still widely discussed. In order to reduce budget deficits, the Swiss "Schuldenbremse" currently got attention as a possible austerity measure and adaption to other countries are currently discussed. Switzerland is one of the only developed countries that managed to reduce the budget deficit within the crisis (NZZ, 2010).

Societal and environmental factors

The life expectancy in Western Europe is among the highest in the world. Leader in Europe is Iceland with over 80 years, followed by Switzerland (79.8 for males and 84.8 for females[26]). An increase in life expectancy, alongside a fall in fertility rates is leading to an accelerated ageing of the population in Western Europe. Depending on the forecast, the retirement group (aged 65 plus) is increasing by up to 50% until 2030. If this goes in hand with negative population growth such as for Example in Germany or Italy, the part of the working population not only is declining but it also has to finance more people. However, some countries like Switzerland may be able to keep the working population quite stable due to high migration. The income distribution is usually measured by the ratio of the total income received by the 20% of the population with the highest income to that received by the 20% with the lowest income. In Europe, the inequality of income distribution shows per 2008 a ratio of approximately 5 compared to 4.5 in 2000. This means that the top quintile in income is five times higher than the lowest quintile[27]. The income distribution within Europe is highly unequally distributed, but since 2005 showing a converting trend. There are no accurate data, nevertheless it is assumed that with the financial crisis the gap in inequality will further increase (WISO, 2010).

3.3. United States

Interest rates on the US government securities are usually considered as risk free. The country has never failed to pay its debts. Even during the current crisis, when debt to GDP ratio has increased almost by 30 p.p., the ability of the US to satisfy its creditors was hardly questioned as can be observed in the CDS spread graph above.

[26] Bundesamt für Statistik, Bevölkerungsbewegungen – Indikatoren: Lebenserwartung 2009.
[27] EC, Eurostat: Inequality of income distribution 2009.

But the upcoming aging of the population implies new unprecedented dynamics of the government debt.

Politics and legal factors

Healthcare system in the US has the most influence on government spending and therefore on public debt. According to the existing laws, a major part of Americans are somehow covered by the government health programs, the largest of which are Medicaid and Medicare. Social Security benefits are another significant part of government spending. All these programs guarantee support and care to the citizens not only while they are working, but also after their retirement. Thus an increase in the share of the elderly population will extend spending of major programs, but considering working force ratio constant, revenues will stay at the same level. Therefore, the net impact of aging on budget gap (revenues minus outlays) will be negative.

The primary source of financing these programs is taxes. Even now healthcare and Social Security outlays exceed revenues and this situation is only expected to worsen in the future. According to the Congressional Budget Office (CBO) calculations, actuarial balance for Social Security and healthcare programs till 2035 is negative and the gap consists approximately 7% of GDP. These means that to avoid debt skyrocketing the government needs to increase revenues or to reduce spending by 7% of GDP in all subsequent years, which equals to around $1 trillion.

Among the latest changes in health care legislation is the Patient Protection and Affordable Care Act, which became law on March 23, 2010, providing for major changes in the health-insurance. It requires most legal residents of the US to obtain health insurance by 2014. It will expand eligibility for Medicaid program and provide federal subsidies to reduce cost of purchasing private coverage, further increasing government spending. But on the other hand it will substantially reduce the growth of Medicare's payment rates for most services (relative to the growth rates projected under prior law) and impose excise tax on insurance plans with relatively high premiums, what will help to hold back growth of unfunded liabilities. The net impact of the recent legislation is to increase federal spending for most of the next 20 years; but by 2035, incremental effect of the legislation is a net reduction in projected expenditures. By that point, the savings in Medicare are expected to exceed the combined increase in outlays for Medicaid (CBO, 2010).

We can conclude that the main traps for the government borrowings of the US from the political and legal point of view are hidden within the current Healthcare and Social Security programs, which in sum with the changing demographic situation (will be discussed later in this Chapter) can lead to enormous new amounts of debt.

Economic factors

The economic effects of growth in federal debt depend partly on the economic conditions that prevail when deficits are incurred. When the long-term outlook for the budget appears sustainable, running deficits for a limited time is not necessarily damaging the economy. Indeed, when the economy has substantial unemployment and unused factories, offices, and equipment running deficits generally increases output and employment relative to what would occur with a balanced budget. As an example, it is estimated that the spending increases and tax cuts enacted in the American Recovery and Reinvestment Act of 2009 boosted output and employment significantly during the past year compared with what would have happened in the absence of that legislation. Thus, the federal government's ability to run budget deficits enables fiscal policy to offset some of the negative effects of recessions.

Even temporary deficits, however, produce increases in debt that have harmful consequences in the long run. Moreover, economic fluctuations resulting from business cycles are not the fundamental source of the long-term budgetary pressures facing the nation. Instead, outlays are projected to rise above the amount that can be funded from current rates of taxation because of increases in Social Security and health care programs spending. If those developments are not prevented or offset through changes elsewhere in the budget, the resulting increase in deficits will hurt the US economy through several channels, as described below.

Increased government borrowing tends to crowd out private investment in productive capital, leading to a smaller capital stock and lower output in the long run than would otherwise be the case. Deficits tend to have that effect on private investment because the portion of people's savings used to buy government bonds is not available to pay for such investment. An exception is that government borrowing to finance public investment, such as improvements in infrastructure, need not reduce future output if the public investment is as productive as private investment. However, the long-term rise in debt projected by CBO is driven by increases in government transfer payments rather than increases in government investment.

CBO's analysis suggests that delaying action for 10 years—and thus allowing the debt-to-GDP ratio to rise by an additional 30 percentage points would cause output to be about 2 percent to 4 percent lower in the long run than it would be if the ratio was stabilized earlier at lower levels, depending on the policy used to stabilize the debt. (Despite those reductions, output would continue to be higher than current levels because of growth in productivity.) Most of the reduction in output would stem from two factors: the crowding out of investment in productive capital, which would cause the capital stock to be 6 percent to 10 percent smaller if action was delayed, and the effects of higher marginal tax rates on incentives to work and save (CBO, 2010).

Debt

- Figure 4 provides the debt distribution of the United States for the next decades. We can easily see the large blocks maturing in the next 5 years, as well as the relatively big interest payments, which the government has to provide early.

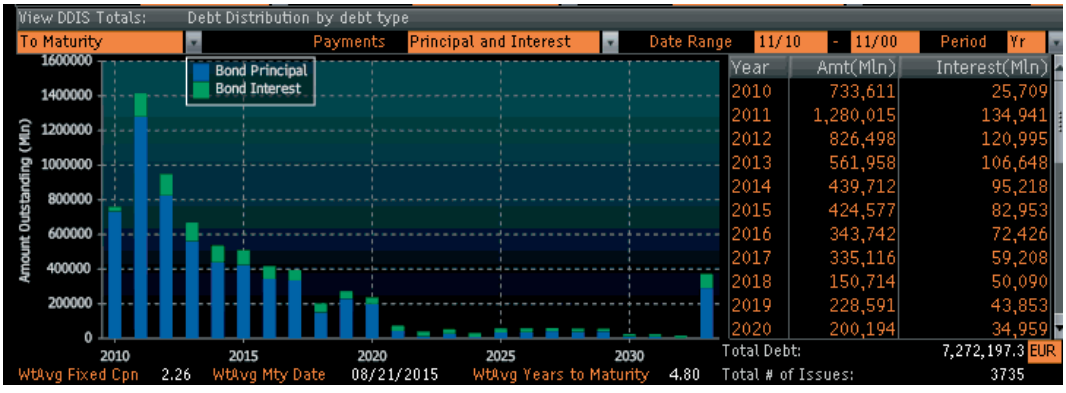


Figure 13: Public debt distribution of the United States by year of maturity. Source: Bloomberg, 2010

Recently, the US government has been recording the largest budget deficits, as a share of the economy, since the end of World War II. As a result of those deficits, the amount of federal debt held by the public has surged. At the end of 2008, that debt equaled 70 per cent of the nation's annual economic output (as measured by gross domestic product, or GDP), a little above the 20-year average of 63 per cent. Since then, large budget deficits have caused debt held by the public to shoot upward; CBO projects that federal debt will reach 92 per cent of GDP by the end of this year—the highest percentage since after World War II. The sharp rise in debt stems partly from lower tax revenues and higher federal spending related to the recent severe recession and turmoil in financial markets. However, how it was already mentioned, the future upward trend in debt to GDP ratio incorporates imbalance

between spending and revenues that already existed before the crisis and in the future will only aggravate.

Social and environmental factors

Unlike the EU and Japan, the US are in the far more advantageous situation in terms of demography. Country still enjoys relatively high fertility rate of 2.08. In other words, the nation is on the stable path of reproducing. Aside from that, immigration policy is not so strict as in the EU or Japan, what gives the country substantial net inflow (1250 thou in 2010) of new population. Life expectancy is relatively high (75.8 for men and 80.4 for women) and will increase by roughly 4 years till 2030 (Social Security Trustees Report, 2010).

Even taking into account such positive situation, the demography stays the most critical source of problems for the future 20 years in the US economy. The working force will increase by roughly 7 per cent till 2030. At the same time, the share of elderly population will rise by almost 80 per cent, pushing aged dependency ratio up by 15 p.p. (Social Security Trustees Report, 2010).

From the government debt position such dynamics will lead to skyrocketing spending (to provide benefits to old people guaranteed by law), while the revenue inflow will stay almost the same. Therefore, if no changes will be undertaken in the nearest future, the country will end up with the enormous amount of public debt (quantitative evaluation of debt to GDP ratio will be provided in the Chapter 3).

3.4. Japan

Politics and legal factors

Japan is one of the world's largest economies with a very strong democratic set up. Politics in Japan is conducted in a framework of a parliamentary representative democratic monarchy, where the Prime Minister of Japan is the head of government. The Executive power is exercised by the government.

On the international front, Japan's international relations with China and South Korea are improving. (Datamonitor, 2010) As a member state of the United Nations and a non-permanent member of the Security Council; it is currently one of the "G4 nations" seeking permanent membership, Japan is in a very good political relation with the rest of the council members.

Legislative power is vested in the Diet, with the House of Representatives and the House of Councilors. The legal system of Japan is similar to that of Germany and the US. Having previously followed the Chinese system, it later switched over to a system that resembles German law. The Judiciary system of Japan is an independent entity. In other academic studies, Japan is generally considered a constitutional monarchy with a system of civil law.

The judicial system is dogged by political interference and discrimination of minorities by the police officials, due to which there has been a recent move to adopt a new quasi-jury system. This would allow the general public to participate in judicial hearings, which could bring accountability to the system. (Datamonitor, 2010)

Economic factors

The Japanese economy is facing a severe crisis in the form of mounting government debt, weak domestic consumption and an inherited weak banking system. The downturn for Japan started after the booming 80s lead to the burst of the Japanese asset bubble in the 90s. This economic crisis is more widely known as the Lost Decade of Japan from 1991 to 2000. Being able to barely just exit the deflation driven environment in 2006-2007, Japan had to deal with the new global financial crisis. In 2008, the economy recorded a negative GDP growth of 0.3, which declined further in 2009 to - 5.2%. The broad equity Nikkei 225 index dropped 69% from its highest point in 2007. The Yen weakened 47.5% against the euro by 2009 and 58% by mid-2010. Although these signs show how hard Japan was hit by the crisis, a healthy recovery is expected for 2010 with a 3% growth and a subsequent smaller increase of 1.1% in 2011 (J.P. Morgan, Recovery stagnates after a pop in 3Q). With unemployment rates of 5.1 in 2009 and near to 4% to 5% in the past 10 years, Japan at least does not have the employment issues of the other major developed countries. Nevertheless the mounting indebtedness of the government together with the economical struggle is a major concern.

Debt

Figure 5 shows the indebtedness of Japan with the debt distribution of its public debt until 2035. With a staggering EUR 8.145 trillion in outstanding debt, one can observe that it has been well allocated through the future, but that a high amount is to mature in the next 5 years. One can also see that the government has so far only tapped the 2030 bonds as the once with the longest maturity.

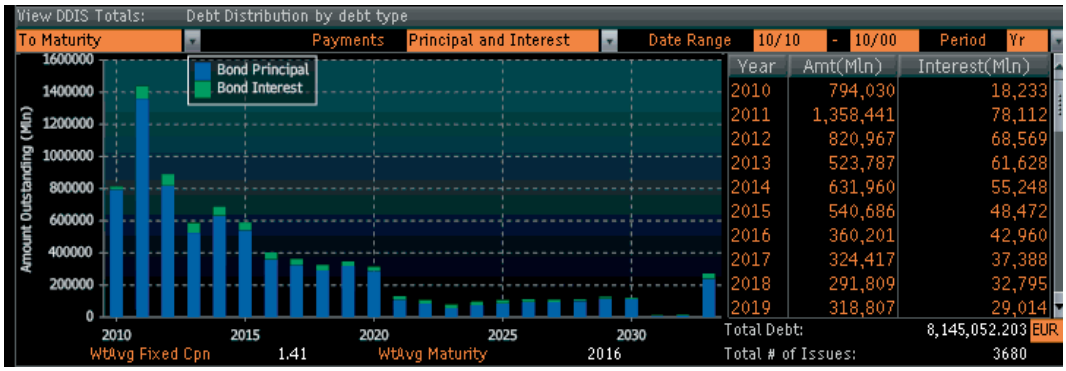


Figure 14: Public debt distribution of Japan by year of maturity. Source: Bloomberg, 2010

Japan has the highest Public Debt as Percentage of GDP ratio from all the developed countries in the world. With a 197% Debt to GDP for 2010 and a forecast of more than 200% for 2011 (some analysts arguing that the 200% level has already been breached), it might be considered a miracle that Japan has not yet defaulted on its public debt and that the spreads on its bonds are actually that low. There is however a plausible explanation for this. A staggering 94% (Wall Street Journal, March 2010) of Japan's public debt is owned by Japanese firms or individuals. The locals are happy to accept the very low returns on the bonds, because they have always considered it to be a risk free investment. Therefore there would be only a marginal spread on the government bonds over the official lending rate. As long as Japanese buy their own debt, no foreigners will have a strong word at what the risk premium should be, therefore the Government can continue to pay low spreads. On the other hand, due to the Lost Decade, the Bank of Japan has been implementing a Zero Rate policy with the main idea to actually keep the economy running and minimize the liquidity problems of the banks in the country. Therefore a 0% lending rate plus a very low spread means the debt interest costs to the government are minimal. It currently consists of just below 5% of Japan's GDP and is therefore not an issue which Japan is too worried about. Putting it in another way:

> "If domestic investors keep purchasing JGBs—whether it is motivated by moral duty, patriotism, lack of other investment opportunities, or for economic profits—the Japanese government does not have to worry extensively about insolvency or increasing the burden for debt financing. (Myung-koo Kang, 2010)

Therefore, although statistically it looks like Japan is in a bad position from a Debt/GDP prospective, its monetary and fiscal policy have helped to keep the country in a fairly stable financial condition. A pure debt-to-GDP comparison is

therefore not deep enough to grasp the differences between the interests paid on the debt levels. This is to be seen in the Figure 6 provided by the Ministry of Finance, showing that although Government debt has almost doubled in the past decade, the fraction of the GDP used to service the National Debt has actually fallen by 2%.

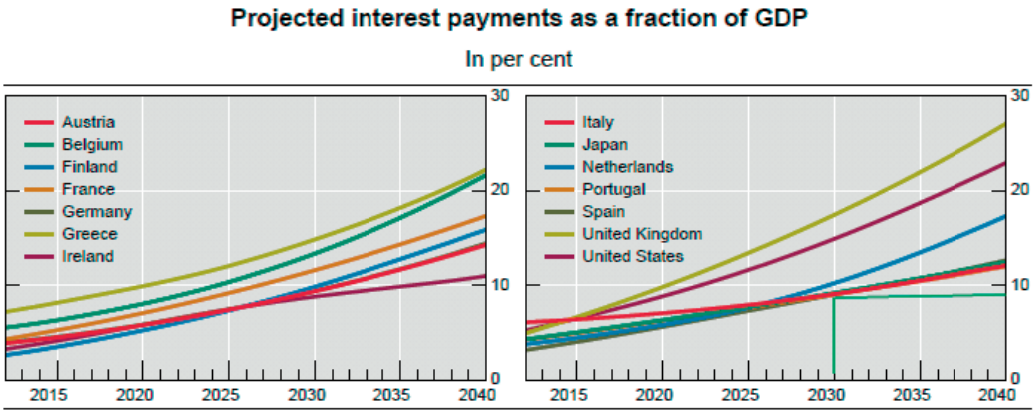


Figure 15: Projected Interest Payments as fraction of GDP. Source: The future of public debt: prospects and implications by Stephen G. Cecchetti, M. S. Mohanty and F Zampolli

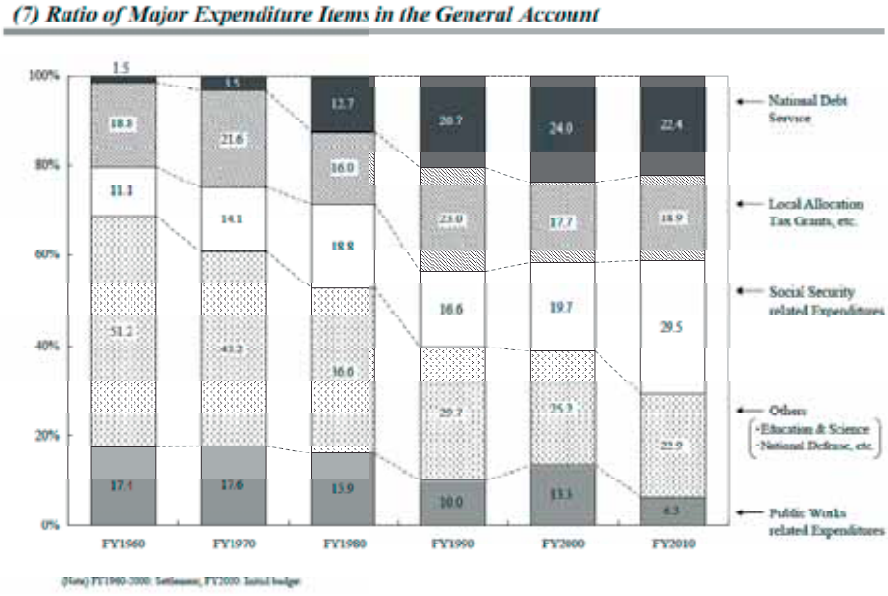


Figure 16: Expenditures of Japan as Percentage of Total Expenditures. Source: Japan Government Budget 2010

Although the status quo in Japan doesn't look that disturbing a glance in the future would give us a rather different prospective. "[…] If this situation changes in the future, it will be much more difficult for the government to roll over existing debt and to finance new funds at low costs. In short, the absorptive capacity of government debt financing may be constrained in the future, and such a gloomy prospect has

intensified political conflicts about the appropriate way to achieve fiscal consolidation in the future.“ (Myung-koo Kang, 2010).

Social and environmental factors

The economy is being hit by the growing proportion of elderly people in the country. Japan has the highest ratio of old-age to working-age population of around 40% in 2010. Consequently, the government has been trying to address the problems associated with ageing population, and has increased the budgetary allocation for the social-welfare with 10% in the last decade. In order to fight the initial problem and not only its symptoms, the government has also implemented policies supporting and encouraging families to have more children. Despite these actions, scientists are proposing a rather dark future for Japan’s society and thus economy. Komine and Kabe(K&K) propose that Japan is an example of how the demographic changes will affect every other Asian country.

Stating that the population in Japan has already began to decrease leads us to the question of how long this decrease is going to last. According to the National Institute of Population and Social Security Research, Japan’s population will fall by 11 million to 115million by 2030 and by a staggering 30 million to 95 million by 2050 (Population Projections for Japan,2008). This population decrease will obviously have a negative effect on the economy of the country. From the current prospective it is difficult to be assessed, whether or not Japan’s economy will be able to sustain its competitive advantage against the other developed countries or against the emerging markets of the region. Having in mind that China already surpassed Japan as the second largest economy in 2010, one might argue that Japan will not be able to maintain its leading position on the global markets.

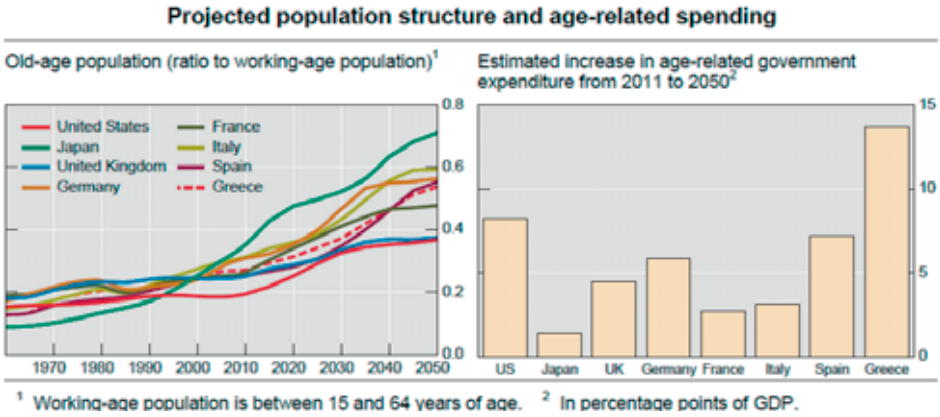


Figure 17: Projected population structure and age-related speeding increase. Source: The future of public debt: prospects and implications by S. G Cecchetti, M. S. Mohanty and F. Zampolli

Looking at the current situation from a somewhat more positive prospective, Figure 8 shows that Japans estimated increase in age related government expenditure is the lowest of all developed countries and is very near to zero. This suggests that the government will rather have the issue of finding the sources to fund the existing spending.

4 Forecast – 2030

In the following chapter, we discuss and derive a model to generate the future debt to GDP ratio until 2030 based on previous research. Our results based on three different scenarios are in essence similar to other findings and show the urgent need for sustainable changes in order to face the demographic transmission. In the last part, we enhance our model in order to simulate the different parameters such as age-related spending, government revenues and debt levels. This allows us to better understand the nature of public indebtedness and provide an insight on the range of possible outcomes as basis for the recommendations in Chapter 4.

4.1. Methodology and Data

For the forecast of the future public debt to GDP ratio, we use the methodology applied by the Bank for International Settlement (BIS, 2010). We use this approach because no strong assumptions on the future path of fiscal policy (which is unlikely to be constant) are necessary. Moreover, the government total revenues and non-age-related spending remain a constant percentage of GDP in the baseline scenario. This allows us to derive the real effect of ageing population on public debt, while dividing government spending on elderly and non-elderly related expenditures.

The debt to GDP ratio for a specific year is calculated as the sum of last year's debt plus interest rates plus total government spending minus government revenues (for the detailed budget accounting and debt dynamics we refer to the appendix).

We use the official projections for age-related governmental spending (Congress Budget Office of the United States, European Commission and the Japanese Ministry of Finance) in order to generate a path for total primary government spending and the primary balance until 2030. For the sample period, the real interest rates that determine the costs of funding are assumed to remain constant at its long term average (2000 – 2009), and real GDP growth equal to the post-crisis rates. Data are from the OECD and IMF data base as of 2009.

We derived three scenarios: First, the baseline case, where government revenues and non-age-related costs are constant on the 2009 level. Second, given the fact, that governments are able to decrease their deficit per GDP according to the official announcements, we assume that primary balance improves by 1% of GDP in each year from 2012 to 2017. An alternative to traditional cuts in spending and higher revenues is the third scenario, assuming that future age-related liabilities are reduced. This might not very likely at the moment but interesting from a theoretical point of view. Therefore, we expect age-related spending to GDP at the level per 2009 with fiscal improvement according to scenario 2.

4.2. Results

Based on the three different scenarios, we generated the future development of the debt to GDP ratio until 2030 for the industrialized areas European Union, the United States and Japan. The following figures show the baseline scenario (red), primary balance improvement (blue) and reduction in age-related spending (green). Under the assumption that no changes to current policies will be introduced, the debt to GDP ratio will increase to 200% for the European Union by 2030, 440% for Japan and almost 300% for the United States. This massive growth is driven by the increasing costs in age-related spending, which stands in contrast to stagnating governmental revenues.

For the second scenario our model forecasts for the European Union a moderate increase to 96% in terms of debt to GDP ratio, where the growth of public indebtedness can only be slowed to 320% for Japan, 183% respectively for the United States. The effectiveness of this action is for the European Union in particular interesting, enhancing the chances to stabilize debt to GDP in the short run, while working on sustainable programs to strengthen the primary balance.

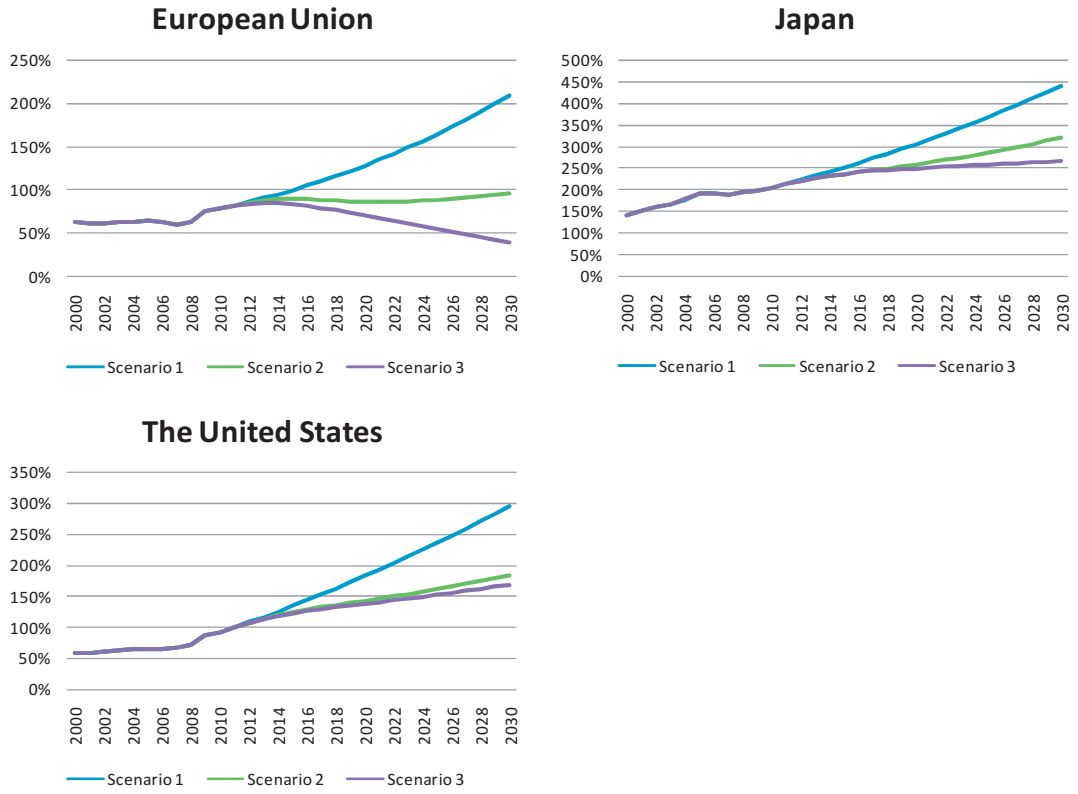


Figure 18: Public Debt to GDP projection (in %). Source: Own calculation following the Bank of International Settlement (BIS, 2010).

Hence, the third scenario reduces debt to GDP by 2030 for approximately additional 50% compared to the previous scenario. Nevertheless, the effect is quite small (15% only) for the United States because of a relatively high real interest rate (adjusted on real GDP growth) compared to the other investigated countries. In addition the assumptions of constant revenues assume deficits on the primary balance for the United States.

4.3. Deficit control

The financial and economical crisis severely influenced the indebtedness of all investigated regions. This leads to the question, what level of primary balance would be required in order to bring the debt to GDP ratio back to its pre-crisis level as of 2007. Obviously, countries with low levels in 2007 might never need to come back to its old level, the question is interesting. Table 1 shows the average primary surplus required to bring debt ratios back to the 2007 level over different time horizons.

	Over 5years	Over 10years	Over 20years	Forecast 2011
EU	6.1%	4.3%	3.8%	-4.8%
Japan	9.1%	7.1%	6.5%	-8.0%
United States	10.1%	7.4%	6.3%	-7.1%

Table 1: Average primary balance required to come back to pre-crisis 2007 debt to GDP ratio. Source: own calculation following the Bank of International Settlement (BIS, 2010) and OECD Forecasts.

Aggressive adjustment to achieve this objective within 5 years would require surpluses of between 6% for the European Union to 10% for the United States. A more smoothing adjustment policy over 20 years would reduce the target surplus to 4 – 6% per year. Nevertheless, the OECD forecast for 2011 with deficits between 5 – 8% indicate that a short term recurrence to old levels is rather unlikely. Hence, the pressure on the primary balance will further increase in the near future.

Moreover, using our model we assessed that to put public on the stable path (i.e. no debt increase in the long-run) governments need to decrease budget deficits by a certain amount in the following years. This is for the US 9-10% of GDP, for Japan 12%, and 7% for EU. It means that either spending should be reduced or revenues should be increased by this amount (or more realistic a combination of these two extreme solutions should be used).

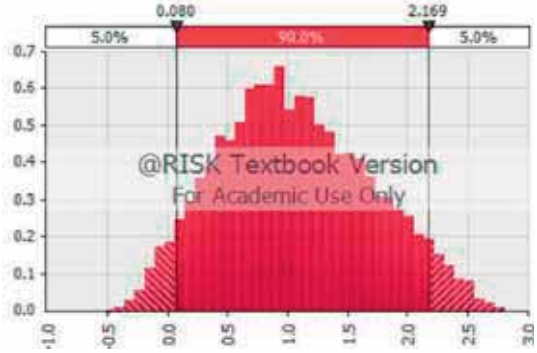
4.4. Sensitivity and Probability of outcome

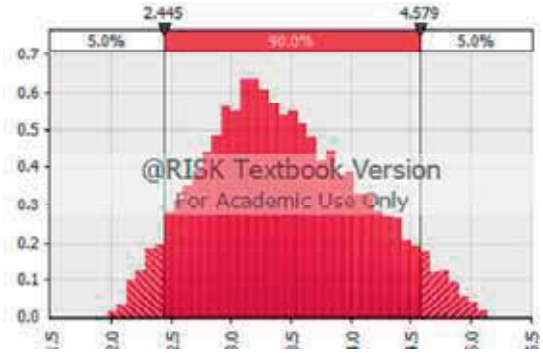
We enhance our model to run a simulation on the different parameters age-related and non-age-related spending, government revenues and debt levels. This allows us to better understand the nature of public indebtedness and provide an insight on the range of possible outcomes.

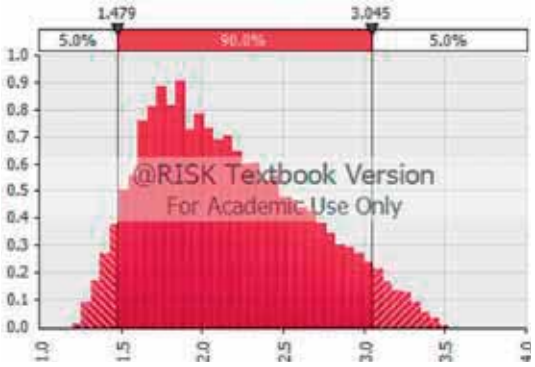
The baseline scenario is again the starting point of our analysis with effective starting values as of 2009. We then define the possible range of the parameter distribution with min, max and most likely scenario for 2030. The distribution is triangular with a skew according to the most likely value. We run a stochastic simulation with 10,000 iterations on all uncertain parameters such as age-related spending, non-age-related spending, government revenues and previous debt level including actual interest payments with an excel add-in[28]. For the assumptions and rational of the parameter distribution in detail, we refer to the appendix.

[28] @Risk – Academic Version for Excel: Risk Analysis Add-in for Microsoft Excel. Version 5.5.0, Palisade, 2009.

Figure 10 shows the results for public debt in 2030 according to our simulation. The red range on top of the distribution shows the 90% confidence interval, where the table on the right provides the statistics.







	EU	Japan	United States
Min	-43.6%	197.5%	124.6%
Max	286.9%	515.67%	349.8%
Mean	106.7%	343.73%	215.6%
Std. Dev.	63.0%	64.35%	48.4%
Skew	0.209	0.254	0.458
Kurtosis	2.424	2.405	2.408
Values	10000	10000	10000
5% CI	8.1%	244.3%	147.7%
95% CI	216.8%	457.9%	304.5%

Figure 19: Simulation of public debt to GDP ratios in 2030 for the European Union (top left), Japan (top right) and the United States (bottom left). Source: Own calculation.

Findings suggest a most likely level of indebtedness of 107% for the European Union, 344% for Japan and 216% for the United States. All distributions are slightly skewed, indicating that a very high level of debt to GDP is statistically unlikely but might occur, especially in the United States. Our findings for the debt to GDP ratio are in between the results of the baseline and second scenario (primary balance improvement of 1% for 2012 – 2017) debt generation path. Further, it can be stated, that small variations in the different parameters do not sustainably impact the debt outcome.

In the next chapter we discuss possible measures how to prevent debt enlargement. Although it is almost impossible to give any quantitative evaluation of these measures with more or less adequate degree of confidence, we at least know the level of aggregated impact needed to preserve stable public debt. And this can be valuable orienteer for the policy makers.

In fact, our projections understate the severity of the long-term budget problem because they do not incorporate the significant negative effects that accumulating substantial amounts of additional federal debt would have on the economy:

- Large budget deficits would reduce national saving, leading to higher interest rates, more borrowing from abroad, and less domestic investment—which in turn would lower income growth in the country.
- Growing debt would also reduce lawmakers' ability to respond to economic downturns and other challenges.
- Over time, higher debt would increase the probability of a fiscal crisis in which investors would lose confidence in the government's ability to manage its budget, and the government would be forced to pay much more to borrow money.

5 Measurements and policy actions

In the following we are discussing three promising ways to deal with the problem of increasing debt ratios, such as irredeemable bonds, complementary currency and the transfer from public to private.

5.1. Irredeemable bonds

Irredeemable bonds incorporate the option, that the government calls the bond, thus choosing the optimal maturity, usually a healthy time period after the crisis has ended. The very idea of those types of securities is that they are offered to mainly domestic retail clients, which feel they are fulfilling a morally good and patriotic action by helping their country to finance the budget. Therefore yields are much lower than the market levels. This is where their name is also derived from, as although these bonds are callable, it is highly unlikely that the government would refinance them, because of the very low yields which they pay. Although from an economical prospective these financial instruments should be either very expensive to issue or highly undesirable for investors, they have actually already been used in the past. During the World War II, as well as in a handful of previous wars, the governments of the major economies have financed their campaigns by issuing the so called "war bonds", which are conceptually very similar to the irredeemable bonds. Advocates of this theory (Zusho & Gemki, 2009) suggest that this action, if implemented correctly, can bring down the public debt burden of the developing countries to manageable levels.

On the other hand, if the population would learn from the past, it would know that post-war debt levels are usually brought down by inflation or even hyper inflation of the domestic currency, due to the government's unwillingness or inability to repay their debts in any other way. Common sense would suggest that as an active citizen of his or her country, every individual should prefer buying an irredeemable bond and thus helping their motherland out, instead declining that option and then living in a hyper inflation environment. Remembering that the last time the developed countries were facing the current leverage levels was right after the World War II ended, the analogy between the war and the irredeemable bonds seems even more plausible.

It is important to mention that this proposition will not in itself solve the problem of mounting debts. This will much rather give the affected countries the required time period to implement the solutions additionally discussed in this chapter. Note that the 2010 near-bankruptcy of Greece was not due to a vast change in its public debt amounts, but to the increased interest costs it had to pay on its re-rolled old public debt. Therefore it is important to state that cutting the interest payments with the help of the irredeemable bonds will ensure that countries do not face the financial difficulties of Greece, while actively fighting their demographic and financial issues. Lastly, the subject of "irredeemable government bonds" has already been proposed and discussed by Zusho, Gemki, Satoshi, & Manabu in 2009 as a plausible solution for Japan's problems.

5.2. Complementary currency

Another proposition is the so-called complementary currency, which addresses to the "disease" of the soaring public debt itself. As Bernard A. Lietaer, the major supporter of this strategy defines it,

> "A complementary currency refers to an agreement among a group of people, and/or corporations, to accept a non-traditional currency as a means of payment. They are called complementary because their intent is not to replace the conventional national currency but to perform social functions that the official currency was not designed to fulfil. (P. 41, The future of money, Bernard A. Lietaer, 1999)

Let us start with discussing how this can help the society by focusing on a real life example, which shows that such a solution has its bases within the society itself and will therefore inevitably improve the social system of the existing (western) world.

> "In order to face this rapidly rising problem, the Japanese have implemented a new type of Health-Care Currency called "Fureai Kippu" or a "Caring Relationship Ticket". In this system, the hours that a volunteer spends helping older or handicapped persons in their daily routines is credited to that volunteer's "Time Account." This Time Account is managed exactly as a savings account, except that the unit of account is hours of service instead of Yen. The Time Account Credits are available to complement normal health insurance programs.
>
> Different values apply to different kinds of tasks. For instance, a meal served between 9 a.m. and 5 p.m. has a lower credit value than those served outside that time slot; household chores and shopping have a lower credit value than personal body care.
>
> These […] credits are guaranteed to be available to the volunteers themselves, or to someone else of their choice, within or outside of the family, whenever they may need similar help."(Lietaer, 1999)

What is fascinating about this system is not its rather simple mechanics but the effect it has on the society and on the social system. It has been observed that as a result volunteer help has increased greatly and people return to helping older individuals in their societies. Many feel they are helping their own parents by transferring the Social Hours back home. Some save their hours for later times and some even give away their hours to people who need them. "It works like a matching grant: for every credit hour of service, the amount of care provided to society is two hours." More importantly it has been observed the elderly prefer this type of payment, because of the emotional point, in which they do not feel embarrassed to ask for these services. Even the quality of the services has improved, according to Lieter's researches. As a last point this new currency is practically a way in which, the government prints money and swaps their future age-related spending with the "Fureai Kippu" currency. The final, purely economical advantage is that, this immensely reduces the indebtedness of the governments, as it will not need to raise new capital in the capital markets to fund its social care related costs. This decision is obviously not limited to Japan and can be implemented by every government, which is the reason why this suggestion is a plausible counteraction to the currently observed demographic development.

Nevertheless, one of the major disadvantages and thus objections to the complementary money approach is that their introduction may be economically less

efficient than a single national currency. Let us allow Bernard A. Lietaer answer to those critics by quoting his work:

> "This objection is valid from a purely theoretical economic viewpoint. However, in practice, some 80% of complementary currencies use the national currency as a reference (e.g. "Green Pounds" in the UK, "green dollars" in Australia, etc.). In those cases, the efficiency of the price formation process in not affected at all. Most of the other ones tend to use the hour as a unit, which particularly in the services domain doesn't create a problem either.
>
> However, conceptually the possibility nevertheless exists that new units would be introduced in the exchanges (e.g. Miles for the airline industry). In those cases, price efficiency could indeed be affected. However, it should be noted that the economy is only a subpart of society, and human society a small part of the global ecosystem. Not the other way around. In any system, the implications of the optimization of a subpart should take into account its impact on the larger system. If your stomach were to optimize its throughput regardless of the impact on the rest of your body, it may kill you. Not a good outcome for yourself or - for that matter - your stomach in the long run." (Lietaer, 1999)

5.3. From public to private

As we can see from the analysis above, the main reason for increasing deficits are unfunded liabilities with regard to pensions and healthcare. These liabilities could be covered, while the economy enjoys low dependency ratios. But in the coming 20 years these ratios will grow substantially, forcing governments to issue new bigger volumes of debt, while revenues will stay at the present level or even drop.

This leads us to a logical conclusion, that to avoid long-run public debt inconsistency there should be fundamental shift from unfunded government programs to the asset funded pension systems and health care programs organized with increasing role of insurers. Lee states, that this shift could be much more easily implemented by developing countries, which could spend a portion of the first demographic dividend[29] on it (Lee, 2005). Developed countries, like EU, the US and Japan, will bear much higher costs if this transition take place. The population aging for these countries is already reality, therefore in such a transition some generations would have to support

[29] The first demographic dividend is a rise in the rate of economic growth due to a rising share of working age people in a population

their elderly part of population, thus repaying the debt, while at the same time saving for their own retirement, thus freeing the young generation of the obligation of supporting them in old age. The same mechanism will work in case with transition to funded healthcare programs. There should be people who are still paying high taxes to provide benefits to elderly generations and at the same paying insurance premiums, ensuring much lower taxes for next generations.

Summarizing the last paragraph – people have to start thinking of their pensions and healthcare on their own. Taking this line of discussion to the extreme point, the best way to get rid of unbalanced public budgets would be eliminating of all social and healthcare taxes, while at the same time cancelling all benefits such as pensions and public healthcare. In such a situation people would count on their own savings, while governments would no longer be responsible. This would also help to prevent falling saving rates (as the result of aging society) (Lee, 2005).But of course such shift has only small probability to appear due to several obstacles.

First of all, it assumes very altruistic behavior from several generations. As it was already discussed, during this reformation they would have to pay pensions to current retired as well as saving for their own old age. Considering the latest strikes in France against rising pension age up to 62 years we couldn't expect that more scale transformation will cause less negative reaction. And we also have to keep in mind that it will be harder and harder for governments to issue any type of policies reducing benefits of retired, because pensioners are becoming the largest political power and they simply won't accept such policies.

Second, even if society would accept such legislations, this may appear even worse disaster then government debt equaling threefold GDP. Taking into account very low level of financial literacy, discovered in the surveys across the OECD, it will be very hard to explain people how to save for their retirement properly. The following example illustrates this problem: During one of the surveys among US employees 41 percent of respondents said they were in defined benefit plan, but 62 percent said they expected to receive a pension from such a plan. This means that even if people know that they do not have any pension plan they will expect to receive pension. Therefore, to make discussed pension and healthcare reforms successful we need to eliminate the habit to expect that "government or someone else will care of me" and to greatly increase level of financial education among population.

We have already mentioned recent legislation in France regarding raise in the retirement age. In case of unfunded systems such a measure could really help, but

with a certain number of stipulations. To make such raises effective, governments have to implement a wide array of labor market policies. These policies are about creating incentives to employers to recruit older workers or punishing them according to the law for age discrimination. Raising retirement age standalone will replace pension-financing problem by an unemployment-financing one.

6 Conclusion

In order to answer our first research question, we found high levels of public indebtedness for all investigated regions. Especially the financial crisis put pressure on debt levels and primary balance deficits, which resulted in the near-default of some European Union member states. While the current crisis will still be felt for a decade or even less, population ageing is unique and will still be an important issue even after the demise of the baby-boom generation around 2050.

Given our assumptions, we expect the debt to GDP ratio by 2030 to reach approximately 106% for the European Union, 344% for Japan and 216% for the United States. In order to achieve budgetary sustainability, governments need to raise revenues in the medium to long run in order to achieve primary balance surpluses.

Answering our second research question, we found three ways which help to reduce debt burden of developed countries in the future. None of them alone can be stated as the solution (stand-alone 100 percent shift from government social benefits to private one would possibly work, but the probability of such scenario is indeed very small), but a combination of all measures is likely to succeed.

Enhancement of the current discussion, which is beyond the scope of this paper, can be to focus not only on public debt, but to take private indebtedness in to account as well. This will enable the reader to reach a conclusion on this equally critical point for a country's economic sustainability. Moreover, the model could be improved by the implementation of stochastic factors towards a multi factor model.

7 Table of Figures

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Annex

Budget accounting and debt dynamics

The core equation of our model is the consolidated government sector budget identity:

$$G_t + i_t D_{t-1} = T_t + (D_t - D_{t-1}) + (H_t - H_{t-1}) \quad (1)$$

; where *G* is the nominal level of primary government expenditure and *i* is the nominal interest rate paid on nominal public debt *D*. *T* stands for taxes, which is the primary source of revenues. Another alternative to finance expenditures is issuing new debt and seigniorage (*H*). Seigniorage as the possible source of public finance such as central bank liabilities, monetary base respectively, was then excluded from the analysis, because there is no evidence that this instrument is widely used by advanced economies since at least mid-1980s.

Then, dividing both parts of the equation by nominal GDP and rearranging terms we have the following:

$$d_t - d_{t-1} = \tau d_{t-1} + w_t \quad (2)$$
$$w_t = g_t - \tau_t$$

; where the small letters represent ratios of the original variables to GDP. According to (2), the change in the public debt/GDP ratio depends on real interest payments (adjusted for real output growth) and the primary deficit w_t (all expressed as a share of GDP). As it follows from (2), to generate future path of debt to GDP ratio for each country we need forecasted government spending, revenues, real interest rate and real GDP growth.

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Determinants and Management of Fertility in Developing and Developed Countries

Historic overview, ideal management of fertility considering global population growth forecast

Topic No. 7

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Jonas Huber
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November 2010
St. Gallen University
Megatrend “Global Demographic Change”
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Executive Summary

The following paper analyzes the mechanisms of fertility whose decline is, besides rising longevity, the main driver for demographic transition. In order to develop a catalogue of factors which influence fertility, the main determinants of fertility (identified by a review of research papers) have been categorized by using the PESTEL analysis.

The framework applied a holistic view on the determinants of fertility. It consists of political factors (the provision of contraceptives, family planning programs and child subsidies), economic factors (income level and women's share in the workforce), societal factors (most notably female education and culture), technological factors (especially contraceptives and medical treatments), environmental factors (above all climate conditions) as well as historical events and legal factors (principally child policies and contraceptive laws).

Two country case studies, covering Japan as a developed country and Bangladesh as a developing country, serve as a projection surface to analyze changes in fertility over time.

Our cases underline that in developed countries the drivers determining declining fertility are situated in a vicious circle. Demographic, sociological and economic developments represent a self-reinforcing process. However, the relation between rising development and declining fertility rates is reversed at a certain level, probably due to better working conditions for women. However, developing countries, which still demonstrate high population growth, experience the same decline in fertility rates as developed countries did in the past, mainly due to family planning programs. In this respect, it is remarkable that they experience this process in much shorter time. During the transition process in developing countries, a onetime window of opportunities emerges. Falling fertility rates lead to fewer children while elderly people cohorts will not increase for some time. A large number of working age people will then be able to produce the unique onetime demographic dividend.

With regard to the management of fertility in developed countries, especially the working conditions for women have to be improved, meaning creating more flexible labor models. Other points of importance are immigration, child subsidies and childcare, as well as the appropriate management of urbanization. In developing countries, education programs and the promotion of contraceptives proved to be efficient for the decrease of fertility rates.

1 Introduction

The median age of the world's population, in other words the age at which half of the population is younger and half of it is older, is expected to rise from currently 28 to 38 in 2050. This fundamental aging process is the result of two reverse megatrends. On one hand, societies experience a rising longevity, due to improved healthcare and better living conditions. Contrary, on the other hand, these societies face a decreasing fertility (Magnus, 2009, p.xxi). This development is reflected in the transition theory, the classic model to explain the process which formed the characteristic of modern societies. The theory claims that the modernization process of societies directly impacts food, education and health quality, which results in a strong decline of death rates, while birth rates remain at elevated levels. However, with time, the altering socioeconomic changes, as well an accompaniment of modernization processes, emphasize small families, leading to declining birth rates (Freedman, 1979).

The *focus* of this discourse lies on the second determinant, the decreasing fertility. In the recent future, the world's fertility rate is anticipated to attain a milestone, when "only half of humanity will be having enough children to replace itself. That is, the fertility rate of half the world will be 2.1 or below." (Economist, 2009a).

The *objective* of this paper is to develop a catalogue of factors which determine fertility and have been discussed controversially in the pertinent literature. Subsequently, two country case studies serve as projection surfaces to recover these factors in real world and as a basis to conclude whether the application of this catalogue is able to provide guidance for the management of fertility.

Therefore, the *structure* of the paper consists of three parts. First, the theoretical part introduces the topic of fertility and an analysis of its determinants. Then, country cases for Japan and Bangladesh focus on the historical and future development of fertility in developed and developing countries. Finally, the conclusion connects the theoretical considerations and the country cases and raises the question of the impact and management of fertility.

In order to obtain this aim, the following *research method* is applied. Based on the review of scientific papers, reports and statistics, the factors and country case studies were developed. Surprisingly, the current academic discourse does not offer a commonly accepted model to explain changes in fertility rates, but rather a multitudinous array of studies on single factors. Consequently, the catalogue of factors

might not represent a conclusive list. Instead, it reflects the attempt to include the most relevant and widely discussed factors.

The *relevance* of this paper is underlined by the pivotal relevance of seemingly small differences in fertility rates. McDonald (2004) argues that a stable population with a Total Fertility Rate of 1.3 would decline at a rate of 1.5% each year. This would result in a population of only a quarter of its original size at the end of a century. In comparison, a population with a Total Fertility Rate of 1.9 would decline at a much smaller rate, 0.2 per annum, and therewith only decrease to 80% of its original size. Several scholars identify low fertility rates, which implicate declines of population sizes of this magnitude, as a much greater problem than the often highlighted issue of population aging (Castles, 2003).

2 Theoretical Part

The *objective* of this chapter is to develop a catalogue of factors which influence fertility. With the attempt to identify drivers which are as universal as possible, the resulting framework should be applicable to either developing or developed countries.

Therefore, the chapter features the following *structure*. First, in order to clarify relevant terms, fertility and its measurement methods are defined. Second, using the PESTEL analysis, the factors which determine fertility are presented and categorized.

2.1 Definition and Measurement of Fertility

With regard to demographic considerations, fertility is understood as the general natural capability of giving life. In the academic discourse, a wide array of more specific definitions is used. In the following, three main rates are introduced:

- Total Fertility Rate (TFR). *This rate defines the average number of children that would be born alive to a woman during her lifetime, given the assumption that current conditions apply to her whole life and that she survives until the end of her reproductive life –which is usually defined as the period between 15 and 45 (Euphix, 2010).*
- Crude Birth Rate (CBR). *Defined as the number of children born in a year as a share of the total population, this rate is considered to be the general period measure. However, it is influenced by the age structure of the population (Euphix, 2010).*
- Net Reproduction Rate (NRR). *Representing the degree to which a population is replacing itself, this rate is defined as the average number of daughters born to mothers during their reproductive years. Basically, a number over 1 implies a growing population, and a number below 1 signifies a population decline (UN, 2010).*

According to Castles (2003), the Total Fertility Rate represents the best estimate of the number of children currently being born by women of a specific age set. Nevertheless, the measure also inhibits disadvantages and limitations. The most relevant conceptual issue is the aspect that the rate does not only represent shifts in couples' preferences for children, but also changes in the timing of those children's births. Given the fact that between 1970 and 2000, the mean average at which women, living in OECD countries, gave birth to their first child, has risen by more than three years (Economist, 2009b), it is possible that a share of the steep decline in the respective fertility rates could be a consequence of the trend towards later family formation –and therewith only being a

temporary phenomenon (Castles, 2003). In the subsequent analysis, the discussion of adequate measurement ratios is excluded, since this discourse is secondary with regard to the definition of a catalogue of factors which impact fertility.

2.2 Determinants of Fertility

As a guiding tool, the PESTEL analysis, a holistic instrument to dissect the environment, serves to categorize the factors which determine fertility. The aim of this approach is to identify factors which are as isolated as possible. Consequently, the interrelations between these factors are not considered in detail. Furthermore, the categorization is based on the attempt to reduce as much complexity as possible. Therefore, some factors which belong to several categories, appear only once in the list.

Contrary to this approach, the classic model to determine fertility factors, based on the work of Davis and Blake (1956), defined by Bongaarts (1978) and revised by Stover (1998), differentiates between indirect and direct variables. Nevertheless, the PESTEL framework, which is genuinely tailored towards indirect environmental factors, can also be used to place direct factors. For instance, contraceptives are part of the technological environment, and sexual habits belong to the societal environment.

2.2.1 Political Factors

Political factors describe the scope and extent by which governments influence the fertility on an indirect, national level. In other words, these factors represent the set of governmental actions, regulations as well as laws which affect the fertility through mediate impacts on issues such as health conditions.

In general, two kinds of political measures are applied. On one side, mainly in developing countries, governments aim at reducing fertility. On the other side, political initiatives target at increasing or at least stabilizing fertility rates.

- Family planning programs. *According to Speidel et al. (2009), family planning programs are at least responsible for 40% of the decline in fertility in developing countries. Consulting services for family planning, combined with enlightenment concerning the existence and use of contraceptives, especially affects women with higher incomes, since the usage of contraceptives increases (Economist, 2009a). Another component of family planning programs is financial subsidies –which alter the "price" of a marginal child. A study on married Israeli women between 1999 and*

2005 concluded that subsidies have a positive effect on fertility, regardless of religion or ethnicity (Cohen et al., 2007).

- Availability of contraceptives and possibility of abortion. *The example of Thailand, where different contraceptive methods were made available by the government in 1970, underlines the strong impact on fertility: Until the late 1980s, Thailand's fertility rate had dropped to fewer than 2 births per woman –compared to about 7 in 1960 (Speidel et al., 2009). Supplementary, access to safe abortion methods is of high importance in order to assure women's control about their fertility. Without the already provided abortions today, approximately 42 million per year, population growth would be much faster (McDonald, 2006). In 2003, about half of these abortions were unsafe and caused 13% of all maternal deaths. In addition, 97% of these medically unsafe abortions took place in developing countries. Since a decrease in maternal mortality leads to higher investments in human capital and thereby lower fertility rates, the access to safe abortion procedures could be an effective lever for developing countries to control population growth.*
- Access to childcare and flexible working contracts. *Castles (2003) concludes that access to childcare as well as the possibility of flexible working hours help women to balance the demands of work and maternity –and therefore could have a positive effect on fertility rates. Moreover, he stresses the relevance of policies enhancing the probability of employment and the chances of staying employed regardless of the women's fertility behavior.*

Generally, political factors include all measures aimed at allowing parents to have the desired number of children. Besides the points above, these include as well tax systems, as exercised in France where an increasing number of children results in lower taxes, or early childhood education. Recently, the origin of such initiatives, either the government or the private sector, became less relevant (Castles, 2003), since companies have started to offer childcare, flexible working hours and new job profiles by themselves (Economist, 2010a). Nevertheless, public sector contracts seem to have a more positive impact on working women's fertility, as compared to private sector contracts (Adsera, 2006).

2.2.2 Economic Factors

Economic factors comprise macro economic factors such as growth, inflation or interest rates which are reflected in the labor market's condition and the individual

spending power. With regard to the current situation as well as the expected future circumstances, these factors affect the fertility rate importantly.

- Wealth and economic development. *Ironically, increasing wealth is negatively related to fertility. Low fertility is explained as a strategy to achieve wealth and prestige –since in more developed countries, couples usually associate more children with more costs than benefits (Alam & Casterline, 1984, Prada & Ojeda, 1986). Macroeconomic studies exactly defined the annual income level at which fertility starts to decrease –from an income level of USD 1,000-2,000, fertility decreases to the replacement level at an income per head of USD 4,000-10,000. This shift exactly represents the transition from poverty to middle-income and can be observed even inside countries. "India's poorest state, Bihar, has a fertility rate of 4; richer Tamil Nadu and Kerala have rates below 2. Shanghai has had a fertility rate of less than 1.7 since 1975; in Guizhou, China's poorest province, the rate is 2.2." (Economist, 2009a). The relation between national GDP and fertility is shown in appendix 1.*
- Unemployment rate. *A high unemployment rate, often combined with unstable working contracts, is accompanied with an elevated uncertainty concerning the future. In order to minimize uncertainty and increase lifetime income, young women favor to focus on the acquisition of working skills and therefore postpone the foundation of a family (Adsera, 2001). A study of Spain analyzed the effect of worsening economic conditions between 1985 and 1999 and came to the conclusion that "women facing high unemployment rates in their mid-twenties tend to restrict their fertility below their ideal level" (Adsera, 2005).*
- General share of women in the workforce. *The rise in demand for female workforce has been driven by the decline of manufacturing and the corresponding rise of the service sector in industrialized countries. This shift has increasingly allowed women to compete with their male counterparts for job vacancies. From a demographic point of view, this development is challenging, since many women are still forced to choose between career and motherhood. In countries such as the USA, where childless women can earn as much as men, the opportunity costs for women to have children, will become even higher, given the expectedly increasing "war for talents" (Economist, 2010a).*

2.2.3 Societal Factors

Societal factors describe cultural aspects as well as demographic factors as for instance the population growth rate or the age distribution. In the following, an array of societal factors is depicted, with focus on the most discussed trends in the fertility discussion.

- Cultural and personal background. *Culture is a widely discussed factor in literature. However, it is hard to measure, difficult to define and usually an indirect factor of influence. Overall, academics agree on the fact that couples from cultures with high numbers of children tend to have many children as well. Distinguished from culture, a woman's personal experiences influence her fertility behavior. Fernández and Fogli (2006) define personal experience as the number of a woman's siblings. They present evidence in their research that culture as well as personal experiences are important to determine fertility. Taken into account that personal experience is, at least partly, influenced by the culture, the study still provides statistical significance for both factors.*
- Religion. *In the view of McQuillan (2004), the presence of three elements highly suggests that religion influences fertility. First, the articulation of behavioral norms linked to fertility. Second, the religious group's ability to communicate and enforce its teachings. And third, the sense of attachment felt by the religious community. Despite the general belief that religions tend to increase fertility, in order to enlarge the community, also the opposite influence is observable. Castles (1999) identified the shift form positive to negative correlation between Catholic adherence and fertility between 1974 and 1993. In addition, English speaking and Scandinavian countries had higher fertility rates than countries from southern Europe, where Catholic adherence is more widely spread. Simultaneously, English speaking and Scandinavian countries experienced higher rates of divorce, cohabitation and extra marital births –all factors not endorsed by the Catholic Church (Castles, 2003).*

  The example of Iran accentuates the nexus of religious and political forces. In 1979, when the clerical regime took over and eliminated the country's family planning system, fertility rate rose up to 7 until 1984 (Economist, 2009a). Faced with enormous population growth, a new system had to be established, for which the Islamic ideology had to be adapted (Aghajanian & Merhyar, 1999). These efforts resulted in a reduction of the fertility rate to a level of 1.9 in 2006. Aghajanian and Merhyar (1999) argue that a relevant factor for the new family program's acceptance was the clerical rank's support.

A last aspect of religious impacts on fertility is differences in faith inside couples. According to Adsera (2006), the increasing share of couples with different religions has a negative effect on fertility.

- Social norms and public opinion. *The prevalent norms affect fertility through the shaping of attitudes towards several subjects. On one hand, the women's personal attitude towards work and motherhood is subdued to changes. In low fertility countries, analyzed by the example of Australia, "women with more traditional attitudes have larger desired and actual family sizes" (Holton et al., 2009). This view is consistent with Kaufmann (2000), who states that women with more traditional attitudes consider motherhood as cardinal in their lives, not just as one facet of it. Additionally, traditional attitudes also correlate with stronger religious affiliation (Callan, 1985, Brewster & Padavic, 2000).*

  On the other hand, the public opinion towards motherhood and work, impacts fertility. Public disapproval, as in the case of Germany, move women to either "give up work or give up having children. About a quarter of the current generation of German women in their 40s have remained childless" (Economist, 2009b).

  Finally, traditional gender preferences strongly impact fertility. In a first step, the preference for sons leads to highly unbalanced societies. In China, "within ten years […], one in five young men would be unable to find a bride because of the dearth of young women." (Economist, 2010b). The negative effect on fertility is, in parts, compensated by the fact that higher son ratios in developing countries result in lower financial burdens, since sons generate more earnings, and thus larger actual family sizes (Repetto, 1972).

- Female education. *All countries which have experienced the sharpest decreases in fertility show remarkable literacy programs. Education decreases fertility rates by increasing the age of marriage, women's independence and the likelihood to use contraceptives (Schultz, 2002, Rubin-Kurtzmann, 1987). Iran's family planning program, already mentioned above, included female education. In 1976, only 10% of rural women were literate, changing to today's 91% (Aghajanian & Merhyar, 1999). As a result, "educated women are more likely to go out to work, more likely to demand contraception and less likely to want large families" (Economist, 2009a). The causality of the negative relationship between female education and fertility was confirmed by Osili and Long (2007), who examined the impact of the introduction of universal primary education in Nigeria in 1976 and concluded that increasing education by 1 year reduces fertility by 0.26 births.*

- Mortality. *The fertility decline is also considered to be a function of reductions in disease and mortality. This enables parents to have fewer children without a reduction in the number of children surviving until maturity. Especially in industrialized countries, the decrease in infant mortality was accompanied by reductions of fertility. However, the model does not explain why fertility rate has fallen under the rate of 2.1 which represents the rate required for population replacement (Economist, 2009a).*

  Another perspective is brought forward by Soares and Falcão (2008), who developed a theory which states that longevity increases the returns on investments in human capital. Therefore, more women decide to enter employment, thereby shifting from quantity to quality, meaning towards fewer and better educated children.

2.2.4 Technological Factors

The category of technological factors concerns the technological possibilities, incentives and trends. The herewith connected main topic is medical innovations directly impacting the ability to reproduce, the possibility of contraception and child mortality.

- Availability of contraceptives. *In addition to the knowledge about the existence, the availability and the usage of contraceptives, their invention had a major impact on fertility. Despite the fact that the following example is rather linked to political or social factors, it is stated here, in order to underline the implication of contraceptives. Between 1960 and 2008, the use of contraceptive methods in less developed countries increased substantially from 9 to 62% among married women of reproductive age. During this period, the Total Fertility Rate decreased from 6 to 2.8, representing a reduction of almost 50% (McDonald, 2006).*
- Medical treatments and procedures to give birth at higher ages. *Without elaborating on medical details, the development in medical possibilities alters fertility timing patterns. However, the possibility to have children at higher ages might also be offset by a trend towards having children later.*
- Treatments for infertility and possibility of artificial fertilization. *These factors include direct possibilities to create, enhance or restore the ability to reproduce. A main aspect is sterility (Bongaarts, 1978), but also sperm density (Bostofte et al., 1982) and motility as well as semen volume (Pol et al., 1989; Politoff et al., 1989, as cited in Salisbury, 1998).*

2.2.5 Environmental Factors

Environmental factors include ecological conditions and developments. This sphere addresses aspects such as weather conditions or climate change. With regard to the fertility discussion, also superimposed historical events might be seen as environmental factors. Since these factors are not directly influenceable by governments and also part of another political megatrend discussion, they are not treated in detail here.

- Geographical and climatic locality. *Weather and temperature conditions influence fertility rates, as outlined by Seiver (1985) and Lam et al. (1994). Additionally, fertility rates are higher among rural woman than among urban women (Suifan, 2000). Plus, the corresponding status of agriculture might be considered (Spencer & Hum, 1977).*
- Higher level historical events and uncertainty. *On one hand, events such as World War II, directly and indirectly influence societies, either by the immediate consequences of the war or by creating uncertainty about the future. To the latter aspect, all political instabilities may be included (Rosenberg, 1966).*

2.2.6 Legal Factors

Legal factors describe the individual juridical framework, in which citizens take decisions concerning reproduction. Put another way, legal factors constitute the possibilities and restrictions which are set to individuals by laws and regulations.

- Child policies. *Generally, governmental policies can be divided into either pro-natalist directions of impact, such as in Japan or Thailand, where citizens are granted special incentives for bearing more children, or anti-natalist tendencies, as for instance represented by China's one child policy. In combination with the traditional preference for boys, this policy has led to a high number of baby girl abortions, as outline above. The effectiveness of these laws is however controversial. In China, it was not possible to control all rural areas and consequently, a separate two child policy emerged (Economist, 2010b).*
- Abortion and contraception laws. *As mentioned earlier, the usage of contraceptive methods has a profound impact on fertility. Bailey (2009) provides new evidence of the accelerating effect of the Pill on fertility reduction. By comparing different regions within the United States, where sales of the Pill was allowed, respectively banned, she analyzed the effect of legal changes concerning contraceptives. The results showed that regions where sales were not legal had a much slower decline in fertility.*

3 Country Case Studies

The growing concern about the global decline of fertility rates culminates in the OECD countries since some of them already face the prospect of population decline as well (Ehrlich & Kim, 2007, p.2).

The *objective* of this chapter is on one hand to exemplify this trend using the example of a developed country. On the other hand, in order to provide an integrated view, also the demographics of a developing country are examined.

Therefore, the chapter features the following *structure*. First, the demographic development of Japan is analyzed in detail. Second, a population study of Bangladesh, one of the least developed countries of the world, is depicted.

3.1 Example of a Developed Country: Japan

The island nation Japan, often referred to as the "Land of the Rising Sun", is a country with an enormous rise in the proportion of elderly citizens (The New York Times, 2006). The aging of Japan outweighs all other nations with a share of elderly citizens of 21% over the age of 65. By nominal GDP, Japan has the world's second largest economy and the third largest in purchasing power parity (World Factbook, 2010a). Additionally, Japan is the world's fourth largest exporter and fifth largest importer.

Japan is a highly developed country with very high living standards –with the 10th highest Human Development Index. Additionally, the country has the highest life expectancy in the world, combined with the third lowest infant mortality rate (World Factbook, 2010a). The average life expectancy for Japanese women and men in 2007 was 86 and 79 years, respectively, and it is projected to increase to 90 and 84 years by 2055 (Lam, 2009, p.1).

Before providing an in-depth analysis of the factors that have influenced fertility in Japan, the graph in appendix 2 illustrates the Total Fertility Rate of Japan, the replacement level as well as assumptions concerning the next 40 years.

Japanese fertility and mortality trends shifted from the post-war period of high births / low deaths to the phase of low births / low deaths in the late 1950s (Japanese Nursing Association, 2010). Between 1947 and 1957, the Total Fertility Rate was more than halved, from 4.54 to 2.04. Between 1957 and 1973, it stagnated close to the replacement level, and in 1973, it resumed (at a slower rate) its secular decline

(Owaga & Retherford, 1993).The Total Fertility Rate was on a downward trend after dipping below 2.00 in 1975. However, it rose in 2006 for the first time in six years and continued to rise for three consecutive years until 2009, at which point the rate turned out to be unchanged from the previous year's level, 1.37. According to Suzuki (2010), the medium variant assumes a Total Fertility Rate of just 1.26 in 2055 (p.97).

From the 18th century through the first half of the 19th century, Japan's population remained steady at about 30 million (Statistics Bureau of Japan, 2010). However, following the Meiji Restoration in 1868, it began to expand in tandem with the drive to build a modern nation state as illustrated in the graph in appendix 3. Japans population reached 60 million in 1926, and in 1967, it surpassed the 100 million mark. However, Japan's population growth has slowed in recent years, with the annual pace of population growth averaging about 1% from the 1960s through the 1970s. Since the 1980s, it has declined sharply. Japan's total population peaked at 127.84 million in 2004. In 2005 the population of Japan declined for the first time after World War II. Total population of Japan in 2009 was 127.51 million according to the Statistics Bureau of Japan, down by 183,000 from the year before (2010).

With the establishment of the Meiji government, Japanese feudalism ended (Ogawa & Suits, 1982, p.196). One of the primary political concerns of the new government was to mobilize all available resources to widen and strengthen the economic base for industrialization. Due to the Japanese fear of colonization by advanced foreign powers, the Meiji government avoided any major capital inflow from Western countries. Thus, most of the financial resources required for industrialization had to be generated internally, particularly by the huge increase in productivity of the agricultural sector.

Additionally, Japan imported technologies and machinery as well as service of experts from Western countries in order to boost industrialization. Also the sale of government-owned industrial facilities to private entrepreneurs contributed to the take-off of Japanese economic development, which started in the beginning of the 1880s (Ogawa & Suits, 1982, p.197). The demand for labor in urban, modern sectors increased. With both, capital and abundant labor, Japan completed its take-off stage around the turn of the century, primary in the textile industry, the railway industry, and the mining of coal, followed by the grow of the heavy industry. As shown in the graph in appendix 4, Japan had a slow population growth during the early Meiji. The rise in the growth rate is attributable principally to a considerable decline in mortality and a modest rise in fertility.

These demographic changes resulted from the gradual disappearance of infanticide and improved living conditions due to the economic development (Ogawa & Suits, 1982, p.199). The rate reached its peak in the period between 1910 and 1915. After 1920, the data indicates a sustained reduction of fertility. This trend can be described by the "demographic transition" of Japan, caused by falls in the rates of death and birth. Improvements in public health, hygiene, nutrition, and vaccination for childhood diseases lead to the fall of death rates (Japanese Nursing Association, 2010).

The rapid fall in birth rates is based on improvements in the rights and social status of women, and the availability of cheap and effective contraception. Since 1999, also the birth control pill is legalized (Cosgrove-Mather, 2004). Japanese birth control policy has often been determined by politics. Abortions were banned in 1907 and all kinds of birth control were made illegal in World War II. In the 1950s, when the population was growing rapidly and women were added in the labor force, abortions were legalized for "economic and health" reasons. Together with condoms, they represent the main forms of birth control.

The sudden drop in birth rates in 1966, and its immediate recovery in 1967, is striking. According to Hodge and Ogawa (1991), there is a traditional belief in Japanese culture about the year of the horse, which occurs once every 60 years, stating that a female born in a year of the horse is destined to both an unhappy life and killing her husband. Therefore, many couples time their birth accordingly.

This drop is also indicated in the population pyramid depicted in appendix 5. Additionally, the population pyramid illustrates the decline of birth rates around the end of World War II. After World War II, the population pyramid of 1950 shows that Japan had a standard-shaped pyramid marked by a broad base –see appendix 6.

It also shows the increase during the first baby boom period between 1947 and 1949. During the second baby boom (1971-1974), the birth rate was at a level of 19 (per 1,000). However, since the late 1970s, it continued to drop and hit a record low of 8.4 in 2005. In 2009, the rate marked 8.5 (Statistics Bureau of Japan, 2010).

However, the shape of the pyramid has changed as both the birth rate and death rate have declined. In 2009, 22.7% of the total population was 65 years and older, which is the highest in the world (Statistics Bureau of Japan, 2010). This is also illustrated in the figure below which shows the proportion of elderly population, aged 65 years an older, for various countries. The comparison displayed in appendix 7 clearly highlights the rapid progress of demographic aging in Japan.

The decline in birth rates can partly be attributed to the rising maternal age at childbirth which rose from 25.6 in 1970 to 29.7 in 2009 (Statistics Bureau of Japan, 2010). It is illustrated in the table in appendix 8.

Finally, the number of marriages has determined fertility in Japan. In 2009, the mean age of first marriage was 30.4 for men and 28.6 for women, indicating a rise by 2 years (men) and 2.7 years (women) over the past twenty years. Besides the rising marrying age, also the declining marriage rate (1970: 1 million; 2009: 708,000) offers an explanation for the dropping birth rate (Statistics Bureau of Japan, 2010).

As illustrated in appendix 9, divorces have shown an upward trend since the 1960s, which also lowers the fertility. This is also connected to the number of persons living in a household. Since the late 1950s, the size of household members has steadily declined.

The study by Ogawa, Retherford & Matsukara (2006) found out that most of the decline of the Total Fertility Rate between 1973 and 2006 occurred because of later and less marriage. The main reasons for later and less marriage are remarkable educational gains by women, massive increases in the proportion of women who work outside the home, decrease in the number of arranged marriages, decrease in residence of young couples with parents and associated higher living costs as well as a major increase in premarital sex. For detailed numbers, see appendix 10.

In addition, marital fertility has changed according to Ogawa, Retherford and Matsukara (2006). To a considerable extent, marital fertility has declined after 1973 due to the following reasons:

- Direct costs of rising children. *Among them, higher education is a major component of rising direct costs, which involves a substitution of quality for quantity of children.*
- Opportunity costs of children for women. *The rise in opportunity costs of children for women results from lost income due to the temporal unemployment.*
- Preferences. *A general shift in preferences away from children.*
- Actual and perceived family security. *The fact that family structure became less secure.*
- Changing household patterns. *The reality that women expect more help from husbands in childrearing and housework.*

3.2 Example of a Developing Country: Bangladesh

Bangladesh is the 7th most populous country (162.2 million people) and the 7th most densely populated country -and still displaying a high poverty rate (World Bank, 2007). However, Human Poverty Index for Bangladesh fell from 61 in 1983 to 36.1 in 2009, an achievement that was all the more remarkable, given that the pace of income poverty reduction was only 1% point per year (United Nations Bangladesh, 2010, United Nations Development Program, 2010). This is due to the high growth in GDP. Throughout the 1990s, the economy grew by an average of 4.75% per year. GDP per capita has grown steadily from USD 273 in 1990 to USD 583 (or USD 1,478 in PPP) in 2009. Nonetheless, 63 million people continue to live below the poverty line.

The population growth of Bangladesh was among the highest in the world in the 1960s and 1970s, when the country swelled from 50 to 90 million. The figure in appendix 11 illustrates the population pyramid of Bangladesh in 2005. This bottom-heavy pyramid represents the rapid growth rate. The illustrated indentations and spikes represent natural, environmental and human phenomena that have affected population growth over time. They are examined in this section. For instance, the promotion of birth control in the 1980s slowed the growth rate. However, much will need to be done to ensure the right to survival and to achieve the Millennium Development Goal target of halving the proportion of the poor, the hungry and malnourished. Currently, the forecasted population pyramid of Bangladesh in 2050 looks as displayed in appendix 12.

According to the theory of „demographic transition“, Bangladesh went through the second stage of demographic transition with high Crude Birth Rates and low Crude Death Rate –thus causing a high population growth. Now, the country is in the third stage with decreasing Crude birth Rates and low Crude Death Rates –meaning that the population growth begins to stabilize. It is projected, that Bangladesh’s population will reach replacement rate around 2050. However, when this occurs, the population will still be increasing due to the large amount of its population at reproductive age.

In the last years, Bangladesh has made significant strides in lowering its population growth rates (United Nations Bangladesh, 2010). Bangladesh had one of the highest population growth rates in the world in the 1960s and 1970s. Since then, however, it has seen a marked reduction in its Total Fertility Rate. Over a period of three decades, it dropped from 6.2 to 3.2, according to UNDP figures from 2003. Since 1996, a gradual increase in the Total Fertility Rate among poorer households has been observed. Factors that could explain this include low educational levels, continued son

preference, high infant mortality, unfulfilled realization of gender rights and the lack of alternative economic opportunities (United Nations, 2005). The illustrations in appendix 13 and 14 show the Total Fertility Rate for Bangladesh as well as the Total Fertility Rate by economic strata.

According to the World Factbook (2010b), the population growth rate is 1.28 (2009 est.), birth rate is 24.68 births per 1,000 population (2009 est.), death rate is 8 deaths per 1,000 population (2009 est.) and Total Fertility Rate is 2.74 born children per woman (2009 est.).

The factors determining human fertility in any population are quite complex (Centre for Economic and Social Studies, Begumpet & Bangaldesh Institute of Devlelopment Studies, 2002). A number of factors that could explain this increase include low educational levels, cultural and social changes regarding education and literacy, continued son preference, high infant mortality, weak implementation of gender rights, mitigation of preventable diseases (through basic healthcare, sanitation, hygiene, and immunizations), health care (maternal, antenatal and postnatal), agricultural revolutions, increase in food supply, better nutrition, women's employment, contraception and suppression of fertility, as well as a rise of human (women's) rights (El-Ghannam, 2005). In the following section, the factors that mainly determine fertility in Bangladesh are analyzed in more detail.

- Family planning. *Family planning is an important influencing factor of fertility in Bangladesh. The main reasons why people in Bangladesh are using family planning are shown in the table in appendix 15.*

  The country has made notable progress towards increasing the Contraceptive Prevalence Rate (CPR) from 5% in 1975 to 48% in 2007 as illustrated in the graph in appendix 16. However, much of this increase was due to the use of traditional methods among married women, with only a modest increase of 4% in modern method use between 1999 and 2004 –as indicated in the figure in appendix 17.

  A major concern regarding family planning methods is that nearly 50% of women who use contraceptives discontinue usage within the first year. Some success has been achieved through the use of "doorstep" delivery methods to reach uneducated and rural women, especially those living in more conservative parts of the country. However, with a growing reliance on clinic-based services, it can be argued that the most marginalized members of society will not be reached. This suggests that further thought needs to be given to how best to combine the use of clinic-based

services with more aggressive outreach and education campaigns to ensure that all women in Bangladesh are able to make informed choices with regard to their reproductive rights.

- Age of first marriage. *An important strategy to reduce fertility rates over the medium and long term will be to promote higher ages at first marriage for women and safe motherhood practices (United Nations, 2005, p. 29). Although the mean age of marriage for women in the 20-24 year age group has increased to 16 years, it is still below the legal age of marriage. Early marriage, coupled with limited family planning, has resulted in 57.3%of all married women having initiated childbearing by the age of 19.6.*

  Consequently, the age at which women marry and the proportion of singles are important influence factors on fertility levels. Since there is an appreciable rise in the proportion never married among women under age 25 since 1975, this also determines fertility. The proportion of single women has increased from 30% in 1975 to 49% in 1989 and then 52% in 2000 –see graph in appendix 18.

- Male contraceptive usage. *The involvement of the male in increasing contraceptive use is one of the most cost-effective ways, especially in patriarchal societies such as Bangladesh, but it is still neglected within the public health domain (United Nations, 2005, p.30). Policy measures have failed to aggressively promote new procedures such as non-scalpel method of vasectomy or use of low cost alternatives such as condoms. Despite the high failure rates, traditional methods are most frequently practiced (10.8%). The increase in the use of condoms (4.2%) and male sterilization (0.6%) has been small in comparison. In the case of male involvement in reproductive health, including family planning, a number of strategies designed specifically to change attitudes and behavior need to be promoted in the future, in order to turn the fertility rate towards replacement level. These include wider publicity in the mass media, encouraging greater male involvement and its implication for the family and society, more male focused activities to motivate and inform people about the benefits of male family planning methods, the introduction of male units for counseling on family planning and increased awareness of male methods, raising awareness in the school system and the community especially among community leaders and service providers.*
- Rural poverty. *As noted earlier, Bangladesh's fertility rate was almost cut in half within 16 years. One factor affecting family size was spreading land poverty as land was divided and subdivided from one generation to the next (Brown, 2001, p.225).*

Among families with relatively small plots of land to begin with, fragmentation leads to basic changes in thinking. Once, economic security came from owning land. It was always a source of employment and food. But as the land per family shrinks, this security diminishes, leading many couples to define economic security for their children, and thus indirectly for themselves, in the form of a wage-paying job. Getting such a job requires education. This is costly, leading to a conscious reduction in family size that is not necessarily dependent on any gains in income or female literacy. As people are exposed to higher living standards elsewhere in the world, the people in Bangladesh begin to think about how to achieve the same thing for their children and come back to education. Investment in education is the key both to a better life for their children and to secure old age security. Large families, which were an asset when there was more land to farm, have now become a liability.

- Female education. *Since female education and fertility are highly related in Bangladesh, it is important to have closer look at the education level of women. Fortunately, the percentage of females aged 6 and above with no education has significantly declined from 1993 to 2007, as illustrated in appendix 19.*

  The Gross Enrolment Rate in primary for male and female education in 2002 was 99%, though enrolment rates in urban slums remain significantly lower (United Nations Bangladesh, 2010). Bangladesh has more or less achieved gender parity in education at the primary school level. Despite these positive developments, one in five children is still not enrolled in school. Furthermore, while two thirds of those enrolled complete the five year primary school cycle, upwards of 25% of children drop out before reaching the fifth grade –even though this is a significant improvement over the 38% drop out rate recorded in 1995. Under the most optimistic scenario of population stabilization by 2035, Bangladesh will need some USD 1.7 billion to maintain current momentum. Therefore, significantly increased investments in the education sector are needed. The link between fertility and education is also indicated in the graph and table in appendix 20 and 21.

  Concerted efforts to boost female enrolment and educational achievement through the introduction of stipend schemes has significantly reduced gender gaps in secondary education (United Nations, 2005, p.49). Gross enrolment for girls in 2000 at all levels of secondary school was 42% compared to 33.9% a decade ago. Girls make up nearly half of the total student population in secondary education, but this falls to a third at the higher secondary level. Drop out (24.5%) and repetition rates (13.2%) for boys in grades six through eight are higher than for girls (18.4 and 8%,

respectively). However, this picture changes dramatically at the higher secondary level where overall dropout rates are 52% with female dropout rates being 57.9%. A number of factors contribute to this phenomenon including physical security, limits on the mobility of girls including real risks of assault and kidnapping, classroom over-crowding, shortage of female teachers and lack of role models as well as social pressure for girls to get married –especially in rural areas. Therefore, improvements have to be made in order to achieve the desired fertility rates of educated women which are illustrated in appendix 22.

In short, it can be stated that education is increasing for women in Bangladesh and those women desire smaller families. Therefore, the fertility rates of educated women decreased. Additionally, they took part in family planning services. Therefore, increasing education levels in Bangladesh have an important influence in achieving replacement-level fertility, which is nearly the case for women with secondary education in urban areas, and have to be further improved.

In the struggle to slow population growth, government leadership, access to family planning services, and improvement in social conditions are proving to be more important than the growth of the economy. The government in Bangladesh has realized the value of investing in population stabilization. One study found that the government of Bangladesh spends USD 62 to prevent a birth, but saves USD 615 on social services expenditures for each birth –a 10-fold difference in cost. Based on the study's estimate, the program prevents 890,000 births annually (Brown, 2001, p.226). The net savings to the government total USD 547 million each year, leaving more to invest in education and health care.

3.3 Conclusion

The example of *Japan* illustrates the trend of declining fertility rates in developed countries –reaching in some cases levels below replacement level.

Since fertility dropped below replacement level in Japan, the question arises how the government can respond to those changes and make it more attractive for women to have a better balance between career and childbirth. In 1999, the state promulgated a "Basic Law on Gender Equality" to set the legal framework and norms to encourage working women to have more children. However, it represents an essentially toothless law (Lam, 2009, p.7). There is neither compulsion nor penalties against corporations which do not abide by the norms of gender equality. Also, the social norms indicate otherwise, because men assist only very rare in childcare, since husbands are

expected to spend long hours at their workplaces and do not take paternity leaves even though it is granted by law (Lam, 2009, p.8).

Therefore, the impediment to Japanese women producing more babies is neither a lack of governmental interest nor legislation for paternal and maternal leave, but the corporate and social norms which make it difficult for women to keep their career on track after childbirth and husbands to support their wives in childrearing. For example, corporations have a dual track employment system. One track rewards staff, mostly men, towards lifetime employment and training for management, while another track, mostly for women, aims at performing routine office work –where females are expected to leave after giving birth to care for their babies (Lam, 2009, p.14).

In order to make it more attractive for women to bear children, the state has to be more supportive of working mothers. There is a strong need to build more childcare centers to assist working mothers. Shortly, the state has to be more natalistic in order to increase the fertility rate.

In comparison, the example of *Bangladesh* offers insights into the situation of developing countries. There, the demographic structure is totally different from Japan. The country successfully reduced its fertility rate through strongly emphasizing on family planning services and focusing on female education. Nevertheless, this process has to be improved further.

As an exponent of developing countries, Bangladesh also shifts the focus towards the sustainability of population growth. With regard to the future development, the question of resource scarcity gains unprecedented significance. As for instance, water supply for a vast human population is not guaranteed. Each year, the drop in the aquifer is greater than the year before, setting the stage for an eventual dramatic reduction in the water supply as an aquifer is depleted and the amount pumped out is reduced to the recharge level (Brown, 2001, p.228). Subsequent drops in water supply could be traumatic –and disrupting food production. Societies with water demands surpassing the sustainable yield of the aquifers and desiring more water per person in future will have to consider the possibility of reducing population size.

Although population projections for the world have been available since the 1950s, remarkably little has been done to analyze the relationship between the size of current and future populations and the earth's capacity to satisfy people's needs for basic resources, such as water and cropland.

The seemingly innocuous growth of 3% per year, which has been common in many developing countries, would result in a 20-fold increase in one century and a 400-fold increase in two centuries. The total population of Africa is estimated to have reached 1 billion in 2009 (BBC, 2009) –it is impossible to visualize a 20-fold increase there. Therefore, the only viable long-term option is a two children per couple policy (Brown, 2001, p.231-232).

The good news is that the world is making progress in achieving replacement-level fertility. 54 countries have now reduced average family size to two children or less. Despite these trends, the threat of continuing population growth in more than a 100 developing countries remains real, where political leaders have to focus on such investments as family planning services.

4 Final Considerations

The *objective* of this chapter is to recapitulate the main findings of the theoretical and practical parts, to outline the impact of the identified patterns and to point towards possibilities how to manage fertility in future.

Therefore, the chapter features the following *structure*. First, the determinants of fertility are summarized and identified as a vicious circle and the conclusions of the country case studies are presented as a repetitive pattern of declining fertility. Second, the challenges and changes that arise with this development are discussed. Finally, ways how to manage fertility and their issues are brought forward.

4.1 Extrapolation of the Findings

4.1.1 Theoretical Part: The Mechanism of Fertility

Fertility is determined by various factors which exert influence in a mediate and an immediate way. These determinants are interrelated –a circumstance which was not considered in this paper, but possesses a high relevance for the governance of fertility.

Seen as environmental forces which affect reproduction decisions, the array of political, economic, social, technological, environmental and legal factors offers a holistic view on the issue. The main factors of these forces are displayed in the graph below.

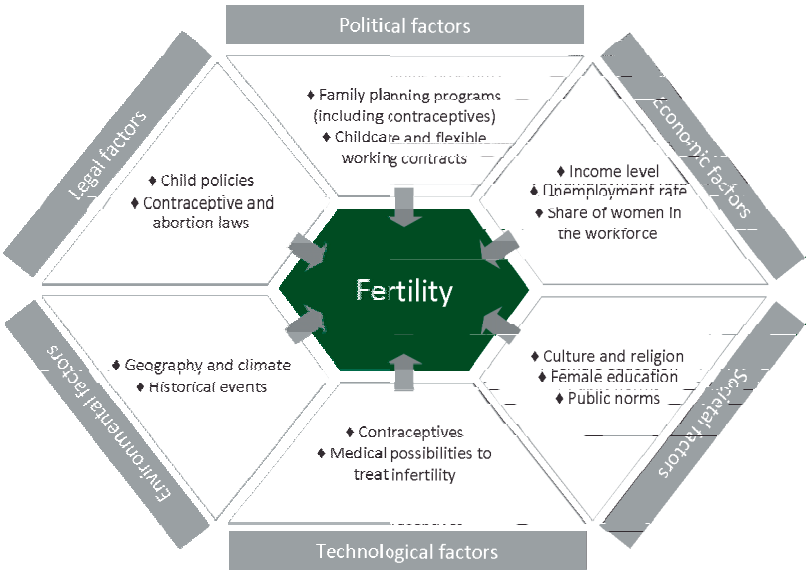

Figure 20: Determinants of fertility (own graph, 2010)

A short review of the factors elucidates that the academic discourse emphasizes the dominant importance of factors which influence women's attitudes, perceptions of the future, incomes and information level concerning contraceptives –this focus on female "aspects" should be reflected in the management of fertility.

The identified factors fit into the "fertility trap" model which describes plausible self-reinforcing mechanisms that might result in a continued fertility decrease, at least in Europe. The model, depicted in appendix 24, is based on three hypotheses. First, as the demographic argument, the negative population growth momentum equals the fact that "fewer potential mothers in the future will result in fewer births" (Lutz et al., 2007). Second, the sociological assumption states that the perceived ideal family size is declining as a result of the experienced lower family size of previous generations. Third, the economic hypothesis claims that the expected lower incomes of younger generations, partly due to rising costs related to the society's aging process, result in lower fertility. In short, "all three factors would work towards a downward spiral in births in the future" (Lutz et al., 2007).

4.1.2 Country Case Studies: The Repetitive Pattern of Declining Fertility

The country case studies illustrate two major facts. On one hand, it becomes obvious that developing countries experience the same demographic transition than developed countries have experienced in the past. On the other hand, this process occurs at a much higher speed in developing countries. In the following, these two findings are elaborated more finely.

Although almost all developing countries had high fertility rates in the 1950s, most of these nations "have experienced substantial declines and a growing number has reached replacement levels" (Bongaarts, 2008). In light of the historical developments in the developed world, it is expected that an ongoing fertility decline usually continues without interruptions until the replacement level is reached. The declines in fertility have been most rapid in developing countries which experienced robust social and economic development, meaning in Asia, North Africa and Latin America.

However, Bongaart's (2008) study of sub-Saharan countries revealed that the average pace of fertility decline slowed down significantly in the 1990s. This trend can be explained by socioeconomic development and its direct negative impact on fertility. During the 1990s, GDP per capita, as well as life expectancy, in sub-Saharan Africa declined. Additionally, governments seem to have assigned lower priority to family planning programs recently.

Consequently, developing countries are anticipated to traverse the same process as developed countries –just with the "transition lag". Additionally, the span of this lag is affected by varying socioeconomic and political environmental factors –as seen in the example of sub-Saharan countries, where the transition process has slowed down.

Nevertheless, the second aspect, meaning the higher transition speed, still remains valid for the general notion of "developing countries". "Between 1950 and 2000, the average fertility rate in developing countries fell by half from 6 to 3 […]" (Economist, 2009a). This fall is similar to what happened in Europe during the 19th and early 20th century –however, "what took place in Britain over 130 years, took place in South Korea over just 20 years." (Economist, 2009a).

4.2 The Impact of Declining Fertility

The consequences of decreasing fertility rates have to be considered in two ways. First, the long-term effects of low fertility rates impose tremendous challenges –to both developing and developed countries. Second, the currently decreasing fertility patterns in developing countries offer an attractive timeframe for development.

- The challenge of low fertility. *In combination with the rising longevity, decreasing fertility will have vast economic, social and political impacts. Put simply, labor forces "are now beginning to shrink and numbers of pensioners are starting to rise" (Economist, 2009d).*

McDonald (2004) stresses the importance of seemingly small differences in Total Fertility Rates. He argues that a stable population with a Total Fertility Rate of 1.3 would decline at a rate of 1.5% p.a. This would lead to a population of only a quarter of its original size at the end of a century. In contrast, a population with a Total Fertility Rate of 1.9 would decline at a much smaller rate, 0.2 p.a., decreasing to 80% of its original size.

Castles (2003) points to some scholars that identify low fertility that leads to a decline in population of this magnitude as a much greater problem than the often mentioned problem of population ageing. With regard to the above mentioned vicious circle of self-reinforcing trends towards lower fertility rates, the consequences of population aging are expected to be "more dramatic than currently assumed" (Lutz et al., 2007). Consequently, potential steps to counteract this progress should be taken as soon as possible –another implication for the management of fertility.

However, it is misleading to assume that the value of replacement level fertility is everywhere 2.1. Espenshade et al. (2003) highlight that the global variation in replacement fertility ranges from less than 2.1 to almost 3.5. This variation is caused by the differences in mortality rates around the world.

- The "Goldilocks" generation. *Contrary, falling fertility rates also have positive outcomes. First, falling fertility alters the population's age structure. Relative to the numbers of children and old people, the size of the workforce is increased. In the transition from high to low fertility, a "Goldilocks" generation emerges. "Because fertility is falling, there are relatively few children. Because of high mortality earlier, there are relatively few grandparents. Instead, countries have a bulge of working age adults" (Economist, 2009a). In Europe, after the baby boom, this mechanism generated "les trentes glorieuses", meaning 30 years of growth –and the same trend now happens in Asia and Latin America. Obviously, developing countries will face the same aging challenges as developed countries, but for the moment, they profit from a "demographic dividend" which "accounted for a third of East Asian's growth in 1965-1990" (Economist, 2009a).*

4.3 Management of Fertility

The management of fertility is highly complex. On one hand, the factors influencing fertility are interrelated. On the other hand, predictions about the impact of changes of individual or several determinants are highly uncertain. Consequently, the following

paragraph comprises considerations on a general level, as “causes for thought”, as well as more specific ideas, which crystallized during the evolution of this paper. Of course, the latter ones can’t be seen as a concluding list.

First of all, a general note concerning the future development of fertility rates is expedient. A recent study which compared the Total Fertility Rate and the Human Development Index, which is defined by life expectancy, average income and level of education, between 1975 and 2005, suggests “that as development continues, the demographic transition goes into reverse” (Myrskyla, 2009, cited in Economist, 2009e). In other words, the classic mechanism that richer countries have fewer children would be inverted. This “J-shaped” curve, see appendix 25, is derived from statistics. In order to explain the phenomenon, Myrskyla (2009, cited in Economist, 2009e) points towards socioeconomic changes, such as “the introduction of female friendly employment policies […] that allow women to have the best of both worlds”.

Nevertheless, the overall emergence and sustained existence of this development remains highly questionable. As a consequence, governments have to address the challenges imposed by changing fertility rates. Since both developing and developed countries are facing declining fertility rates, the hereafter discussed issues are focused on increasing fertility –as a means to counteract the challenges outlined above.

- Immigration. *One option to offset the declining fertility is increased immigration. However, the United Nations (2001, cited in Castles, 2003, p.210), call attention to the fact that “where fertility is below about 1.6, the levels of migration required for replacement of the population become impossibly large”. Two factors to explain the cited limitations of this approach are the challenges connected to integration programs and the general public resentment towards increasing immigration. Nevertheless, immigration and corresponding integration can be expected to gain further relevance. Consequently, governmental steps might include the focus of immigration policies on families or the earlier integration of foreign children.*
- Child subsidies and availability of childcare. *First, the income and price effect of changes in child subsidies on fertility is positive (Cohen et al., 2007). Regardless of ethnic, religious or age subgroups, the income effect on fertility is small compared to the price effect on fertility. In other words, increasing incomes will not substantially decrease fertility rates whilst an increasing “price” of a marginal child will. Therefore, governments which aim at increasing fertility rates are advised to reduce the price of a marginal child by corresponding child subsidies.*

Second, the knowledge that there is good as well as affordable childcare available would have a beneficial impact on fertility. It would reduce the perceived risk of young couples to become parents at an early stage of their lives (McDonald, 2006).

- Improving the status of women and their position in the workforce. *As the main driver of fertility, the situation of women lies in the centre of all governmental efforts. When aiming at increasing fertility rates, the trade-off between motherhood and career should be diluted. The adoption of more flexible working agreements, the improvement of working mothers' public images as well as efforts to change women's personal attitudes towards motherhood constitute reference points to start political initiatives.*

  Nonetheless, the role of men should not be neglected. Innovative approaches, such as paternal leaves or pointedly paternal policies are anticipated to become more important.

- Counteract the urbanization effect. *Urbanization is another fundamental megatrend –with currently half of the world's population living in cities, this share is expected to increase further. Total Fertility Rates are higher among rural women than among urban women (Alam & Casterline, 1984, Rubin-Kurtzman, 1987, Prada & Ojeda, 1986). The higher the percentage of the urban population, the lower the Total Fertility Rate, since people living in cities lead a more modern life which is reflected in smaller family sizes.*

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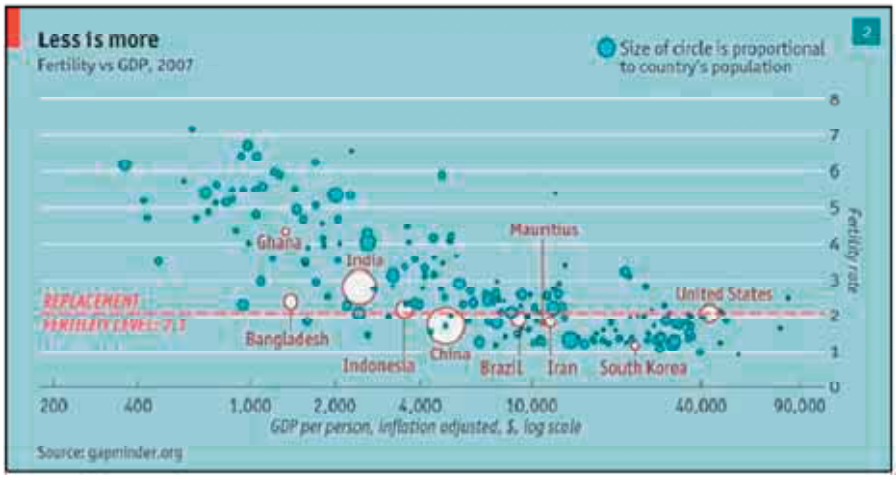
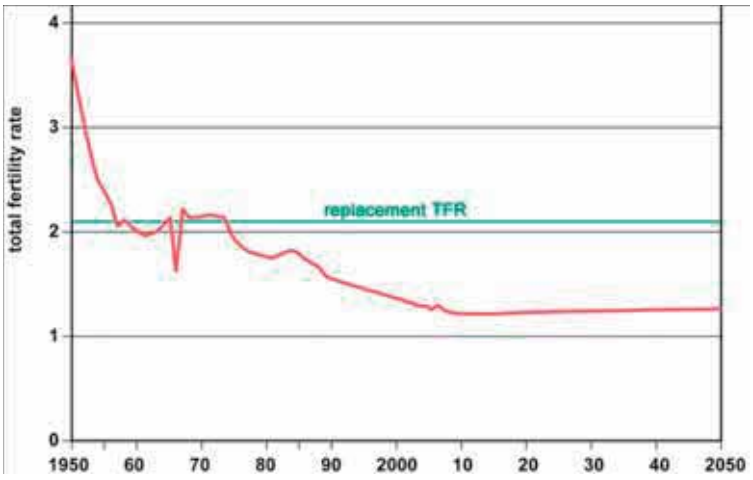
Appendix

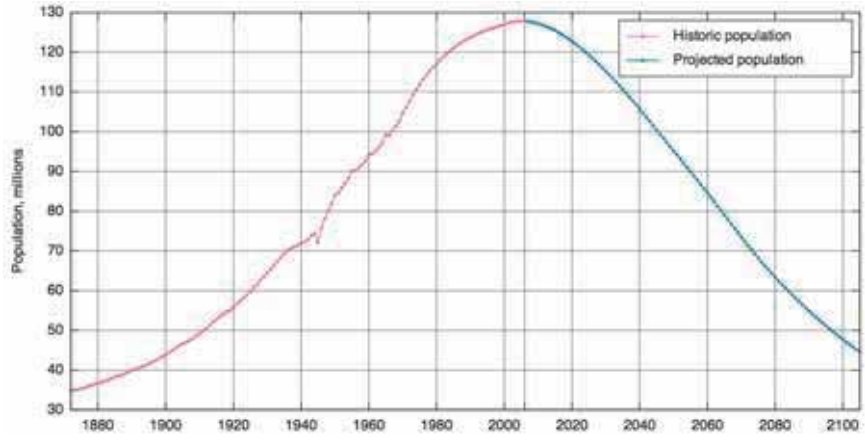
- Appendix 1: “Less is more” (Economist, 2009a)



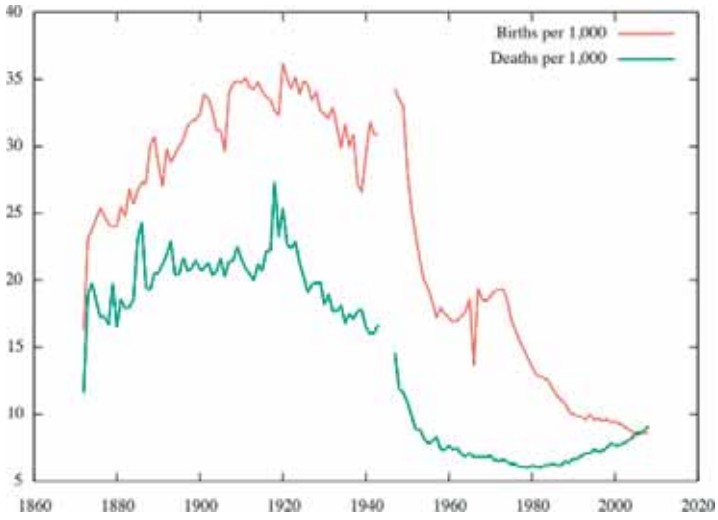
- Appendix 2: “Total Fertility Rate in Japan, 1950-2050” (Smil, 2007)



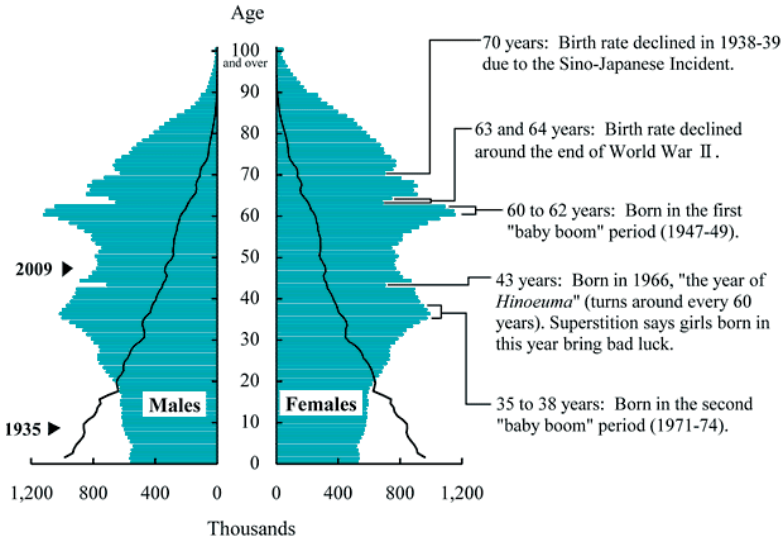
- Appendix 3: “Japan’s population, 1872-2006, projections from 2007 onwards” (Statistics Bureau of Japan, 2010)



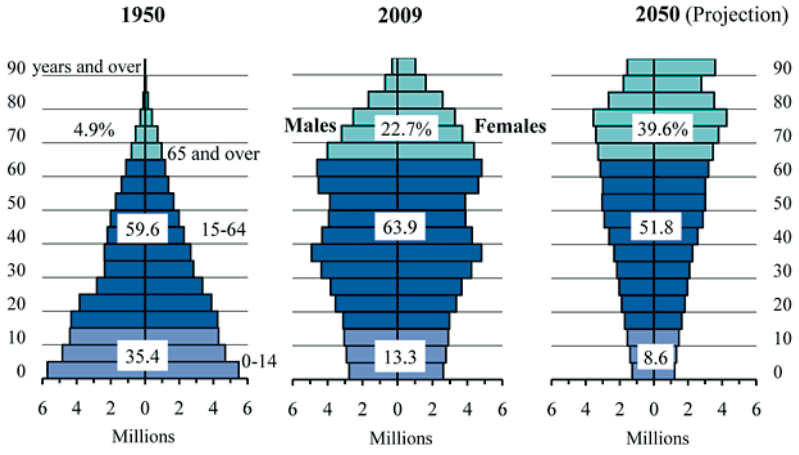
- Appendix 4: “Crude Birth and Death Rates for Japan, 1872-2008, per 1,000” (Statistics Bureau of Japan, 2010)



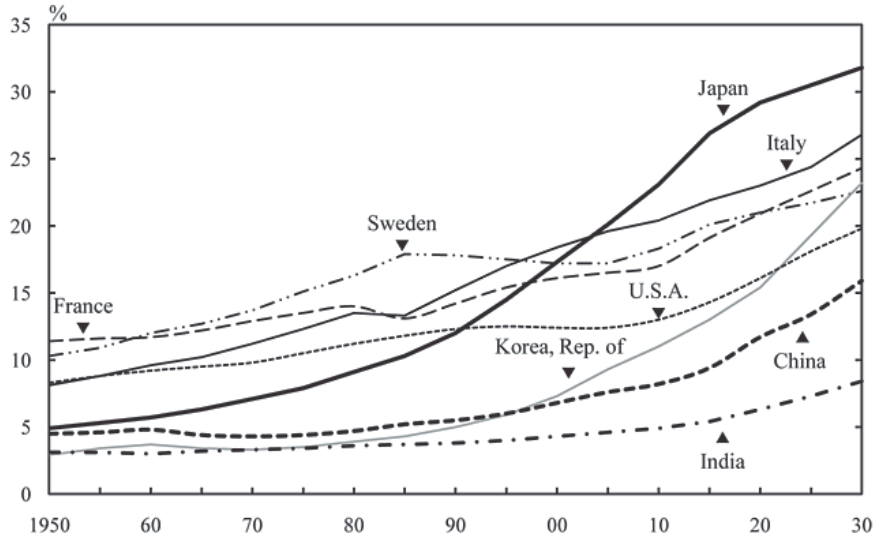
- Appendix 5: “Populaton pyramid of Japan” (Statistics Bureau of Japan, 2010)



- Appendix 6: “Changes in Japan’s population pyramid” (Statistics Bureau of Japan, 2010)



- Appendix 7: “Proportion of elderly population by country, aged over 65” (Statistics Bureau of Japan, 2010)



- Appendix 8: “Changes of mothers’ ages at childbirth” (Statistics Bureau of Japan, 2010)

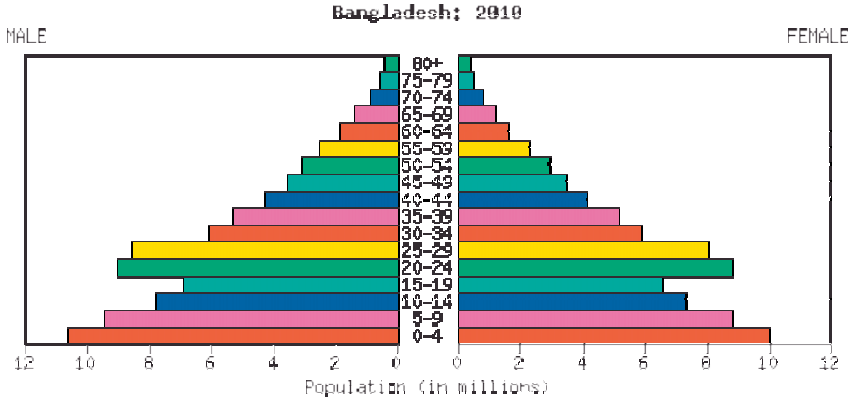
Year	Number of babies (1,000)	Distribution of mothers' age (%)						Mean age bearing first child
		-19	20-24	25-29	30-34	35-39	40 and over	
1970	1,934	1.0	26.5	49.2	18.5	4.2	0.5	25.6
1975	1,901	0.8	25.2	53.4	16.8	3.3	0.5	25.7
1980	1,577	0.9	18.8	51.4	24.7	3.7	0.5	26.4
1985	1,432	1.2	17.3	47.7	26.6	6.5	0.6	26.7
1990	1,222	1.4	15.7	45.1	29.1	7.6	1.0	27.0
1995	1,187	1.4	16.3	41.5	31.3	8.4	1.1	27.5
2000	1,191	1.7	13.6	39.5	33.3	10.6	1.3	28.0
2005	1,063	1.6	12.1	31.9	38.1	14.4	1.9	29.1
2007	1,090	1.4	11.6	29.7	37.9	17.1	2.3	29.4
2008	1,091	1.4	11.4	29.1	37.1	18.4	2.6	29.5
2009 *	1,070	1.4	10.9	28.8	36.4	19.6	2.9	29.7

- Appendix 9: “Mean age of first marriages and changes in marriage and divorce rates in Japan” (Statistics Bureau of Japan, 2010)

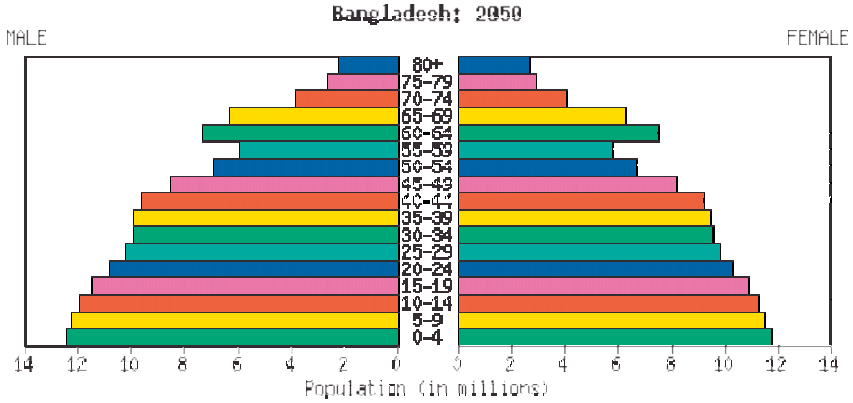
Year	Groom	Bride
1950	25.9	23.0
1955	26.6	23.8
1960	27.2	24.4
1965	27.2	24.5
1970	26.9	24.2
1975	27.0	24.7
1980	27.8	25.2
1985	28.2	25.5
1990	28.4	25.9
1995	28.5	26.3
2000	28.8	27.0
2005	29.8	28.0
2006	30.0	28.2
2007	30.1	28.3
2008	30.2	28.5
2009 *	30.4	28.6

- Appendix 10: “Reasons for later and less marriage” (Ogawa et al., 2006)
  - *Remarkable educational gains by women. The proportion of women of the relevant age enrolled into tertiary education increased from 5% in 1955 to 50% in 2005.*
  - *Massive increases in the proportion of women who work for pay outside the home. In 2002, 99% of women work before they marry, and almost all of them are in paid employment. Therefore, they have no financial incentive for getting married.*
  - *Number of arranges marriages. This number declined from 63% in 1955 to 2% in 2002.*
  - *Residence with parents. A major decline occurred in the proportion of young couples who reside with parents when they get married, i.e., from 64% in 1955 to 29% in 2002. Young couples increasingly do not want to live with their parents –a development which makes it financially more difficult to get married and set up a household.*
  - *A major increase in premarital sex. This change implies that one does not have to get married to be in a sexual relationship. Between 1990 and 2004, the proportion of single women aged 20 and over who reported that they were currently using contraception rose from 39 to 57%.*

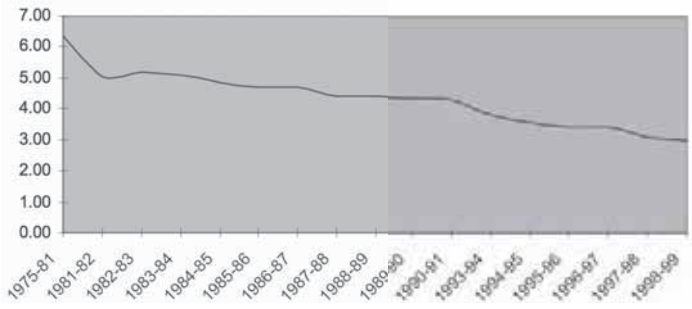
- Appendix 11: “Bangladesh’s population pyramid, 2010” (U.S. Census Bureau, 2003)



- Appendix 12: “Bangladesh’s population pyramid, 2050 (U.S. Census Bureau, 2003)



- Appendix 13: “Total Fertility Rate in Bangladesh, 1975-1998” (Centre for Economic and Social Studies, Begumpet & Bangladesh Institute of Development Studies, 2002)



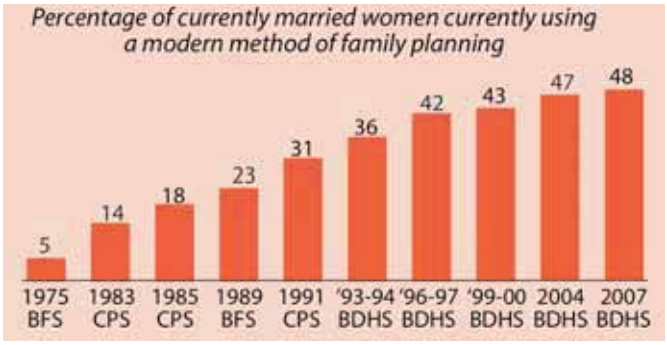
- Appendix 14: “Total Fertility Rate be Economic Strata” (United Nations, 2005)

	Economic Quintiles				
	1 (Poor)	2	3	4	5 (Rich)
1993	3.8	3.6	3.6	3.3	2.9
1996	3.6	3.7	3.4	3.3	2.5
2000	4.1	3.5	3.3	2.9	2.5
2001	4.2	3.7	3.2	2.9	2.4
Average	3.9	3.6	3.4	4.1	2.6

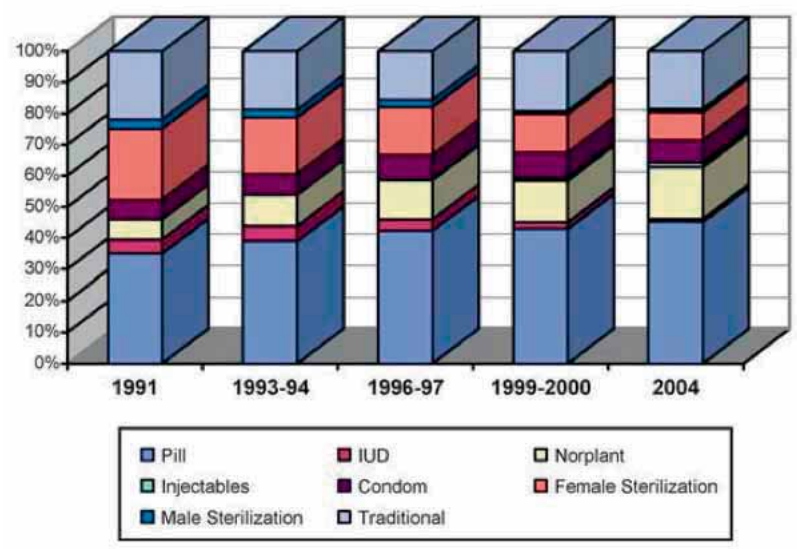
- Appendix 15: “Why people are using family planning” (Caldwell et al., 1999, p.75)

Reason given by respondents	Main reason (percent of respondents)			All reasons given (percent of respondents)		
	Males	Females	Both sexes	Males	Females	Both sexes
Child mortality is lower	1	(0.2)	1	1	1	1
To protect mother's health	0	(0.2)	(0.1)	1	1	1
To allow investment in children's education and other family needs	20	18	19	42	46	44
Social change	4	1	2	7	3	5
Too little land	4	3	4	12	5	9
Large family is too expensive	18	12	14	39	25	31
Awareness of contraceptive methods	14	14	14	27	25	26
Availability of contraceptive methods	7	13	11	12	22	18
Persuasion by family planning workers	13	11	12	21	19	20
No idea, no discussion	19	28	23	19	28	23
Total	100	100	100	181	175	178
Sample size	379	456	855	379	456	855

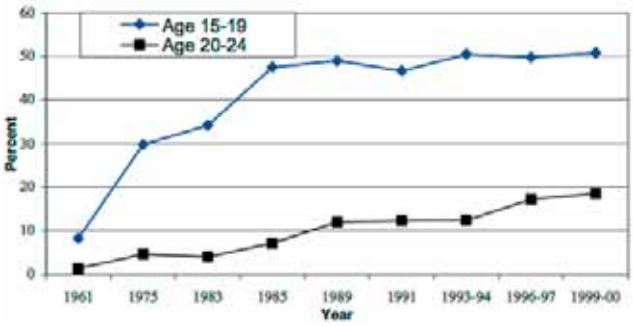
- Appendix 16: “Trends in use of contraception” (Bangladesh Demographic and Health Survey, 2007)



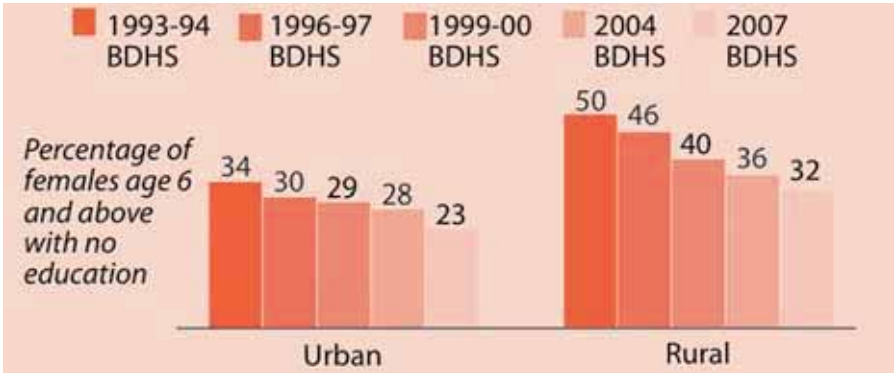
- Appendix 17: “Contraception Method Mix, 1991-2004” (United Nations, 2005)



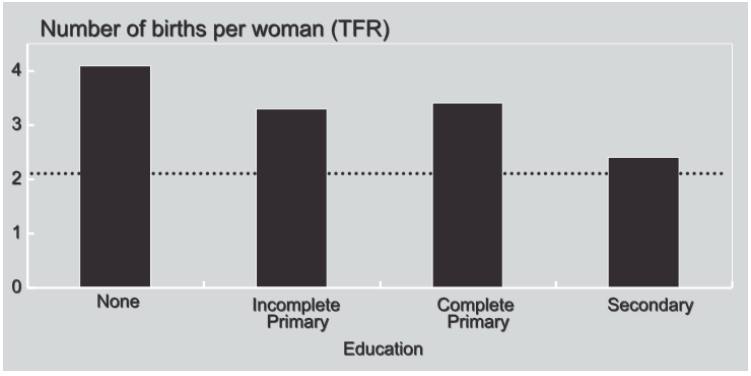
- Appendix 18: “Trends in proportion never married women” (Centre for Policy Dialogue Bangladesh, 2002)



- Appendix 19: “Trends in female household population with no education” (Bangladesh Demographic and Health Survey, 2007)



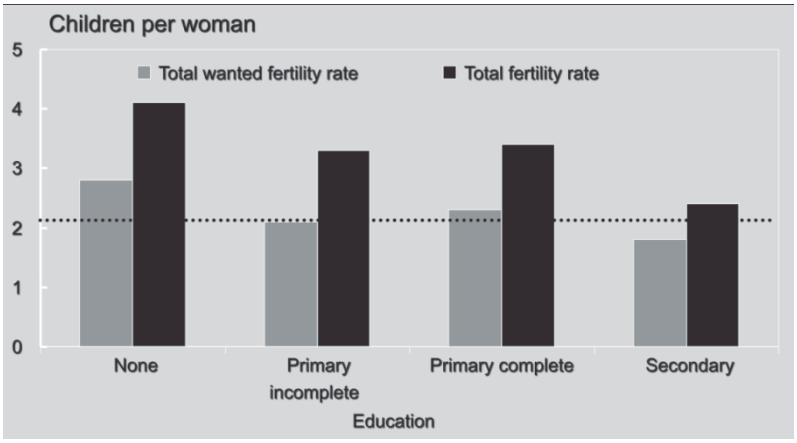
- Appendix 20: “Total Fertility Rate and women’s education, 2000” (Bangladesh Demographic and Health, 2007)



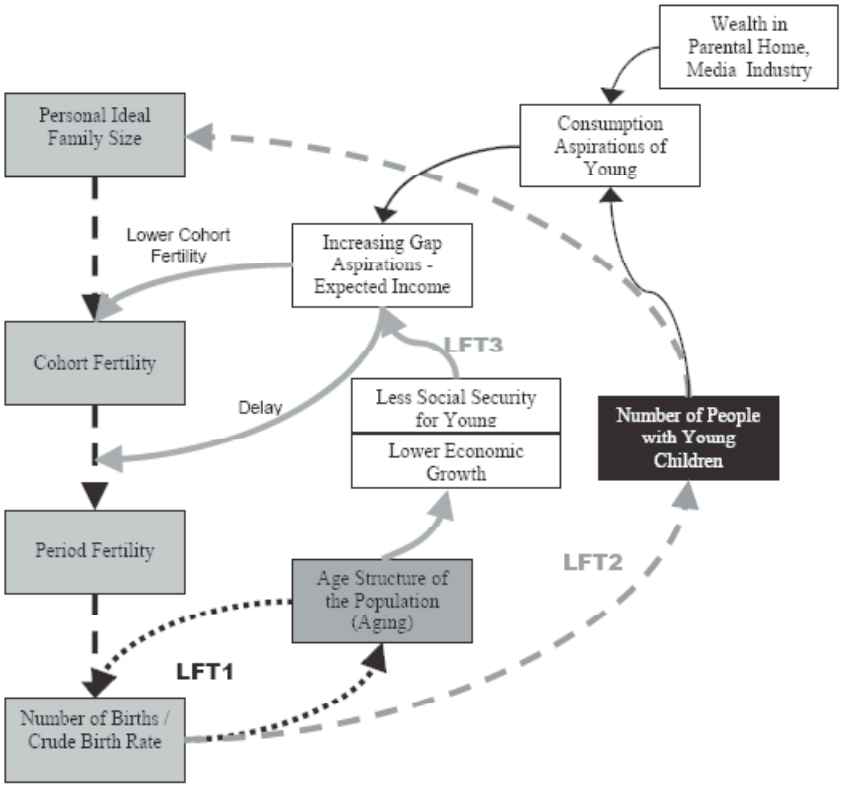
- Appendix 21: “Maternal health indicators by level of mother’s education” (Pathfinder International, 2006)

	Age at first birth (currently ages 25-29)	% girls ages 15-19 pregnant or already mothers	% who receive antenatal care	% who receive postnatal care	% who give birth with qualified attendant
No education	16.8	46.5	37.6	6.7	4.4
Primary incomplete	17.2	45.8	52.9	13.4	8.7
Secondary incomplete	18.3	27.2	72.5	26.8	20.7
Secondary complete or more	23.4	15.5	93.6	56.9	55.2

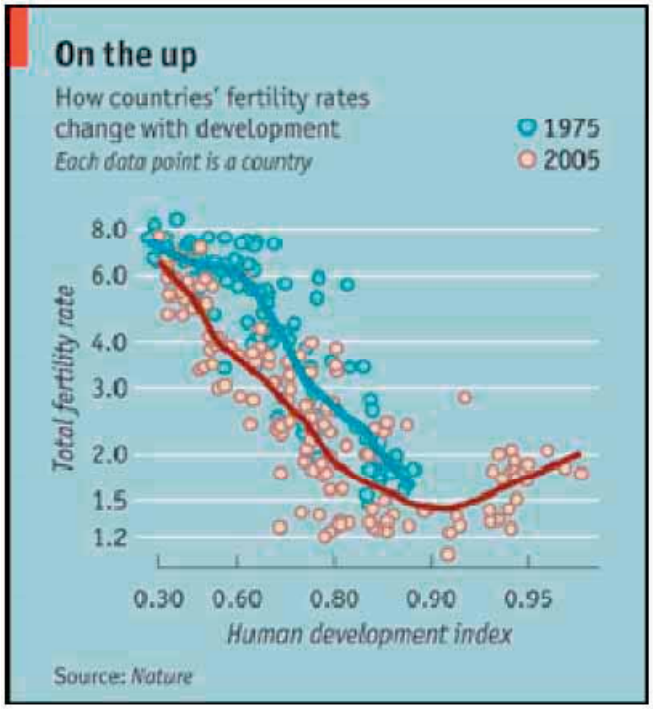
- Appendix 22: “Total Wanted Fertility Rate and Total Fertility Rate, 2000” (Bangladesh Demographic and Health Survey, 2007)



- Appendix 24: “The fertility trap” (Lutz et al., 2007)



- Appendix 25: “On the up” (Economist, 2009e)



Universität St.Gallen
Hochschule für Wirtschafts-, Rechts- und Sozialwissenschaften
(HSG)

Lessons Learned from the Youth Perspective

WDA Expert Congress 'Demographic Challenges in Islamic Countries'
Rüschlikon, November 1-3, 2010
SwissRE Center for Global Dialogue

Topic No. 8

Authors
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Coskun Bedel
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November 2010
St. Gallen University
Megatrend "Global Demographic Change"
Dr. Hans Groth

Rationale for this Expert Congress

Demographic change is a global phenomenon of the 21st century affecting both the developed and the developing world. This inevitable change is not just about the simple size of a given nation – it is also about a new and unprecedented equilibrium among generations. On a national level, this new equilibrium implies potential challenges concerning the economy, wealth, health, political governance and social structures. In addition, this change might also affect the quality of relations between single nations and regions. Furthermore, there is a likelihood that new alliances will occur – some countries will gain influence while others will become less influential and powerful.

While European nations are increasingly concerned that they are becoming an ageing and shrinking continent, their knowledge about unfolding demographic trends in developing regions such as Africa, Asia and the Middle East is limited and thus, does not currently receive the public attention it deserves. However, in a globalizing world such knowledge is critical for current and future leaders from both a business and societal perspective.

The objective of this WDA Expert Symposium "Future Demographic Changes in Islamic Countries" is an attempt to close this knowledge gap regarding the entire global Muslim community, especially considering the forecasts which indicate that they will represent more than one quarter of the world's population by 2030.

Challenges in Population Sizes with Geopolitical Impact

	2010 (Mio)	2030 (Mio)	vs 2010 (%)
Global Population (193 Nations)	6'909	8'309	20.3
Organisation of the Islamic Conference (57 Members)	1'588	2'150	35.4
	+ 562 Mio		
EU-15, Norway, Switzerland	407	422	3.7
	+ 15 Mio		

Source: http://esa.un.org – medium variant

Following a general demographic overview over the Islamic world, a deeper analysis of demographic trends in countries such as Turkey, Egypt, I.R. Iran, Gulf States, Indonesia, Pakistan, Yemen, Jordan and Algeria will be given. The reason for selecting these countries is not arbitrary; these nations are either highly visible from a political and economic perspective, have more intense relations to Europe or they are characterized by unique demographic features.

To meet these objectives, expert knowledge about the following demographic areas will provided and discussed:

1. History of population evolution
2. Public health, education level and training
3. Fertility trends and gender balances
4. Labor participation rates and how to capture the “demographic dividend”
5. Social structures, the role of families, current and future relationships between generations
6. Religion, culture and values
7. Economic and wealth creation forecast, the role of solid governance
8. Aspirations of the youth or the youth bulge and migration
9. Potential lessons for the Western world and lessons for Islamic countries

Conclusions of Four HSG Students

Although demographic change affects every nation worldwide, the reasons underlying it, its speed of occurrence, and the stages through which it passes differ greatly. Nevertheless, even though challenges and possibilities vary among nations, some aspects of change are common to all countries while others will inevitably have to be shared.

These topics were the subject of discussion during the WDA Forum Expert Symposium „Upcoming Demographic Changes in Islamic Countries". As regards the rapid transition expected in the not-so-distant future in not only Islamic countries but also other parts of the globe, five particularly important themes emerge that can be categorized under the general heading „Next Steps Based on Lessons Learned: A Younger Generation's Perspective".

First, for the Islamic countries covered in the symposium particularly, the importance of religion cannot be neglected, because religion, and to some extent tradition, provides many answers on how and why certain changes do or do not take place. Hence, the important role of religious leaders in these matters cannot be underestimated. One especially important key to managing demographic change worldwide is the female part of the population: the education and empowerment of women leads to better health for both mothers and children, increased age at marriage, and higher social status and societal involvement. All of these factors contribute to lower and more controlled fertility rates.

Acting on these insights, however, requires micro- and macro-level strategies that accommodate both autonomy and advocacy. There is also a need for overarching initiatives on health, education, and family planning.

One major challenge for the Islamic world is the huge youth bulge – generally defined as a high proportion of (frequently unemployed) 15 to 29-year olds relative to adults – which generates a need for a large number of jobs. That is, to ensure future income for these large cohorts and maintain national and global stability, employment must be created in these areas for hundreds of millions of individuals.

Nevertheless, despite seemingly overwhelming challenges, rapid change is possible. For example, solid evidence exists for a decrease in crude birth rates in some

countries. Likewise, as has become apparent over the last two decades, new industries can emerge and grow large enough almost overnight to employ a significant share of the population.

If future needs are to be met and a shift facilitated from description of change to managing transitions, these five areas – religion, female education and empowerment, micro and macro strategies for both autonomy and advocacy, reduction of birth rates, and provision of employment opportunities – are in need of immediate focus. These five aspects together present a „framework" general enough to have relevance across both diverse Islamic countries and the rest of the world.

Most important, this relevance holds true on both micro- and macro levels and no matter whether the changes are related to increasing or decreasing populations.

For goals to be met, however, there must be interaction between cultures, generations, and the public and private sectors. In addition, steps to address the issues must not only identify causality but should inspire awareness and instill trust. Thus, commitment and loyalty should be combined with political will, and protectionism and nationalism avoided. Finally, to ensure facilitation and encouragement of appropriate actions, change must occur in an organized manner, one in which the many approaches are coordinated and synergies achieved.

PS: For further information, abstracts and slides from this expert congress, please contact the World Demographic and Ageing Forum (WDA) (www.wdaforum.org).

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