
The World Demographic Evolution and their Impact on Economic Growth

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ABSTRACT

The paper aims to reveal the main aspects of the global demographic evolution between 1800-2017 and the prospect until 2100, as well as the shocks recorded in different parts of the globe. The analysis begins with the real view of the demographic situation of the world population of the twentieth century. The increase in population is quite fast, but the share of the population in the continents should not be neglected, so that Europe has a quarter of the world's population at the end of the 20th century, and today holds only 10%. Demographic expansion and economic development have evolved interactively by mutually reinforcing, which continued throughout the 21st century. The impact of demographic shock on growth is evident in the economic evolution of the most populous countries like China and India. In conclusion, local and planetary sustainable development policies and programs require food, housing, health care, education, transport and infrastructure, social organization, entertainment, security, etc., which implies an integration of the demographic evolution with the economic evolution.

Keywords: demographic evolution, economic growth, variables of the demographic evolution, economic growth indicators, development policies

JEL classification: J11, J16, O11, O47

1. INTRODUCTION

Is often-repeated by more sociologists and economists the statement: „Demography is destiny”. It means that population trends and distributions determine the future of a country, region, continent or even the entire world. Those who are studying the future of mankind say that the world is heading for a demographic catastrophe. The developing countries are heading in the same direction, and fast. An important transformation in the economic history of countries occurs when they move from a system characterized by low living conditions, high child mortality and high fertility to a state of welfare, low child mortality and low fertility.

For more than a half of century, economists, historical and social researchers have analysed the relations between population and economic

growth. Three different approaches are sustained: the pessimistic view (Malthusian legacy), that population growth negatively affects economic growth; the optimistic view, that population growth is beneficial for economic growth; and the neutral view, that population is unrelated to economic performance (Bloom et al; 2003). The partisan's of each theory can find support and detailed explanations. All of these explanations are based on population *size*, population *growth* and the *age structure* of the population, which can change dramatically as the population grows.

There is a real demographic explosion that continues in the 21st century when, according to Jacques Lesourne's forecasts, the population of the world will register in 2025 a supplement of 1.8 billion people compared to 2000 and another 1.2 billion in 2050. Unfortunately, the main contributors to these figures are developing countries from Africa. The first nine of the 20 countries with the highest fertility rates in 2016 are African. Eighteen are African and two are Asian. Between the developed countries, we encounter a group of countries characterized by a sharp fall in population, generated by the considerable decline in the fecundity index. Fertility rates have been falling across the globe for more than 45 years. Israel has the highest birth rate in the developed world and is the only country where women have enough babies to sustain their population. Less than 5 percent of the world's population live in a country where the fertility rate does not decrease. As fertility falls, populations decrease, and as a consequence the economies of the countries will break. Developed European countries will struggle to support too many retirees without enough workers, and the rest of the world such as China and Russia will be challenged just to maintain order as societies change in unprecedented ways. "In fact, the Chinese economy witnessed unforeseeable growth during the transition phase, though the demographic process will now contribute to the faster ageing of the Chinese population. Interestingly, India is currently in a phase where the population is relatively young; it will witness continual decline in the share of dependents (children and elderly). This also provides an opportunity to harness the demographic dividend. In many countries, there is increasing evidence to suggest that demographic transition has mostly supported economic growth. Two of the most populous countries in the world (China and India) are also its two fastest growing economies; this compels us to discard the pessimistic view. Also, it is obvious that the demographic dividend captures the impact of young population age structure on economic growth via pathways such as increased savings and investment and reduced dependency burden" (W. Joe, A. Dash, P. Agrawal, 2015).

2. LITERATURE REVIEW

Researchers have proposed various theories based on a lot of argue to explain how demographic transitions have like main consequence economic growth. Globally, the interdependence between demographic transition and economic growth has been an important, controversial discourse that has led to academic debates, giving rise to increased attention among researchers, academics and, of course, political decision-makers. For decades, various ideas and recommendations have been presented on the most appropriate way of addressing the link between demography and progress (Myrdal, G. 1940, Kuznets, S. 1967, Ehrlich, P. 1968, Simon, J. 1986, Srinivasan, T. 1988, Barro, R. and Becker, G. 1989, Becker, G., Murphy, K. and Tamura, R. 1990, Kelley, A. and Schmidt, R. 1995, Ehrlich, I. and Lui, F. 1997, Williamson, J. 1997, Bloom, D. and Williamson, J. 2001, Bloom, D., Canning, D. and Sevilla, J. 2003). This highlights the fact that there is a vast, but very disparate, expansion of literature on the demographics and growth dialogue, showing its diversity and the constantly changing perspective.

A key question for economists is whether economic growth causes the demographic transition or vice versa. Demographic transition is a process involving the transition from a young-aged population structure (high birth and death rates) to an old-age population structure (low birth and death rates). Such shifts in population age structure have significant developmental consequences for large and populous countries, such as China and India. A lower dependency ratio (dependents to working age population) allows for an accelerated economic growth; and the net growth benefits derived from demographic transition (from high to low birth and death rates) is referred to as the demographic dividend (Gribble and Bemner 2012). Countries moved from a regime of high mortality and high fertility to a regime of low mortality and low fertility, a process that researchers call *the first demographic transition* (Kalemli- Ozcan, 2002). In their analysis of the relation between economic growth and demographic transition, D. Bloom, D. Canning, and J. Sevilla (2001) conclude that " a large share of resources is needed by a relatively less productive segment of the population, which likewise can inhibit economic growth".

As developing countries, where the vast majority of the world's population lives, are at different stages of demographic transition from high to low mortality and fertility rates, understanding the relationship between demographic transition and economic growth has been of increasing importance in last years (N. Birdsall, A. C. Kelley, and S. W. Sinding 2001, Williamson, J. 2013). For this reason, decision-makers and international

organizations should use a clear understanding of the relationship between economic development and changes in the age structure resulting from the demographic transition (topics analyzed by UN-Department of Economic and Social Affairs, World Bank, IMF and OECD reports). The main problem is that most researchers reveal the discrepancy between demographic growth and resources in the form of an ecological impact of nations, as the world population exceeds 20% the capacity of the planet to meet needs (Veyret Y. & Jalta J. 2010).

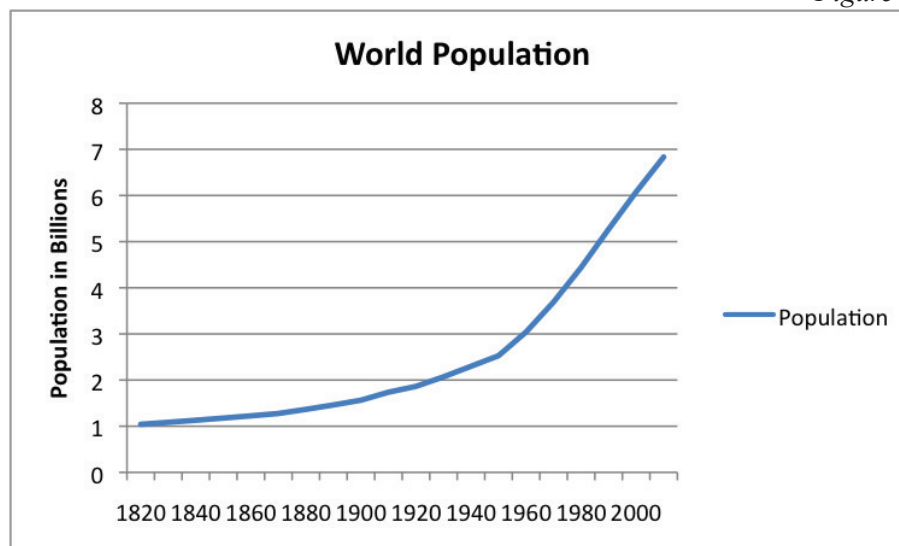
3. RESEARCH METHODOLOGY, DATA, RESULTS AND DISCUSSIONS

1.1 Global demographic evolution

Our analysis should start with the real picture of the demographic situation of the world population of the twentieth century. If in 1930 the world's population was 2.5 billion, in 1980 it reached 5 billion and in the beginning of the 21st century it was 6.5 billion (figure 1).

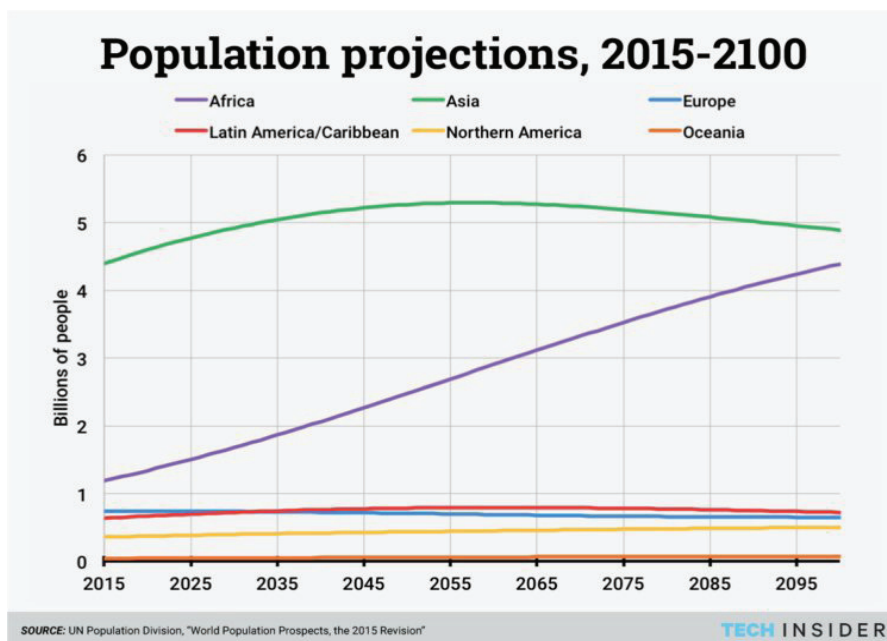
World Population, based on Angus Maddison estimates, interpolated where necessary

Figure 1



Population growth is fast enough, so that in 2011 it has reached about 7 billion, given that in the last 30 years the world population has grown by 60%, or about 2.4 billion. We must not neglect the share of the population on the

continents, which, according to a study by Catherine Rollet, finds that Europe had a quarter of the world's population at the end of the century, and today has only 10%, while the African population increases from 8% in 2005 to 18% in 2020, going to double by 2030 (see below the UN Population Projections). On the one hand, the explosive population growth in Africa, India and Latin America is predicted. On the other hand, there will be demographic stagnation in Central and Eastern Europe, China, Russia and Japan as well as in North America, which will cause a real demographic decline. The world population's predictions are quite contradictory. From exaggerated projections which they provided 7 billion inhabitants in 2000, 20 billion in 2050 and 55 billion in 2100 (Pascal Boniface), and up to 10 billion at the end of the 21st century or 5.5 billion meaning one billion less than the current population, figures advanced within the UN system. Also according to UN estimates, the USA population will be in 2025 equal to that of Japan, double that of France, inferior to Nigeria and Iraq, and the population of Canada will have a population comparable to that of Nepal and Madagascar (Pascal Boniface).



“The United Nations publishes projections of populations around the world and breaks these down by age and sex. Traditionally, they are produced with standard demographic methods based on assumptions about future fertility rates, survival probabilities, and migration counts. Such projections,

however, were not accompanied by formal statements of uncertainty expressed in probabilistic terms. In July 2014 the UN for the first time issued official probabilistic population projections for all countries to 2100. These projections quantify uncertainty associated with future fertility and mortality trends worldwide” (Alkema, L., Gerland, P., Raftery, A., & Wilmoth, J., 2015).

If today around 55% of the world’s population live in urban areas in 2050, an urban population of over 68% is estimated and the number of cities with more than 10 million inhabitants will exceed 40. As a consequence, rural-urban migration within countries has contributed to the reduction of fertility rates at country level.

In the developed countries, we encounter a group of countries characterized by a sharp fall in population, generated by the considerable decline in the fecundity index such as Italy, Germany, Spain, and another group in which the population is in a fair balance, as a result of an average fecundity slightly below the generational renewal threshold, that is, at 2.1 children for a woman capable of procreation (Veyret Y., Jalta J.).

It should be noted that the demographic explosion today diminishes as a global rhythm but is violent in various regions of Africa and Asia (Saint-Etienne, C.). If in 2007 the growth rate is about 1.2%, in 2030 the general growth rate is estimated at 0.7 (Gnesotta, N., Grevi, G.). From the forecasts of international organizations, a process of stabilization of the world population was starting in the 20th century, which is confirmed by the fact that the index of fecundity per capita woman able to produce declined from 4.7 to 2.6 value that demonstrates a situation of uncertainty of demographic growth (Veyret Y., Jalta J.).

We also have to recall here that about half of the world’s population is in China, India, Indonesia, the Philippines and Japan, which makes about 70% of the world’s population focus on 12% of the world’s surface. Thus we have an unequal distribution of population with a density of up to 600 inhabitants / km² in the plains of China and Java. At the same time we find urban agglomerations that exceed 30 million inhabitants, such as Tokyo, Jakarta, or 20 million such as Manila, Delhi, Seoul, Shanghai, etc. We also encounter very low density areas such as Kazakhstan and Siberia in central Asia, the large Sahara and Kalahari deserts, the tropical forests of Congo and Amazonia, as well as in the areas of northern Canada and Greenland. Referring now to the fact that sustainable development cannot be conceived without preserving the natural balance of the planet, we can say that for the future, not only relative overpopulation is the greatest danger, but the exploitation of natural and food resources (Rollet, C.).

The demographic evolution in our country has gloomy colors. Migration, about two-thirds of the “contribution” and negative natural

increase, has led to a rapid decline in the Romanian population. “On 1 January 2016, the resident population of Romania was 19,760,3 thousand inhabitants, of which 10,1 million women (51,2%). The negative values of the natural increase, coupled with those of the external migration balance, caused the country’s resident population to decrease between July 1, 2013 and January 1, 2016, by 228.4 thousand people. The age structure of the resident population is marked by a demographic aging process, mainly due to the drop in birth rate, which led to the absolute and relative reduction of the young population (0-14 years) and to the increase in the share of the elderly population and over. On January 1, 2016, compared with July 1, 2013, there is a reduction in the share of the young population (0-14 years) from 15.6% to 15.5% and the increase in the elderly (60 years and over), 0% to 24.2%” (www.insse.ro).

More than three million Romanians left the country to work abroad between 2000 and 2015, according to a UN report from 2015. The Romanian diaspora grew by 7.3% a year during this period. After Syria, it was the second fastest annual growth rate in the world. This migration abroad is one of the most important trends shaping modern Romania, and yet little things are known about it. Syria ranks the first (with an average annual growth of 13.1% in the number of citizens living abroad), followed by Romania (with an annual increase of 7.3%), Poland (5.1%) and India (4.5%). Romania therefore registered the fastest growing number of immigrants from a state that did not face war, armed conflict, etc. (on Syria, mentions the UN analysis, the community from abroad has been significantly expanding since 2011, when the war broke up). If we consider the country’s population, the situation changes, as proportion of 4.4 million citizens to the total Poland’s population of 38.5 million equals 11%, while 3.4 million to Romania’s population living in the country (January 1, 2016) means over 17% representing the Romanian diaspora. For comparison, 3.3% of the worldwide population lived in 2015 in a country other than the birth country, as compared to 2.8% in 2000. We lose a quarter of total population in the last 25 years.

1.2 How will demographic changes affect the economies of the countries?

Analyzing demographic developments around the globe, we can see that in the future, India will move first, ahead of China, the United States will be in third place, Indonesia will be fourth, Pakistan will overtake Brazil and will be fifth and Nigeria will be in sixth place.

In addition to changing the share between countries, we will also witness a series of demographic changes within countries, so that Western

states will become multicultural societies, as former minorities and immigrants will gradually form important social groups.

In the 21st century, Europe's population will drop its share from 20% to 5%, and the American population will be under 5% of the world's population, representing a 50% reduction over the course of a century. If China had 34% of the world's population a century ago, the percentage would fall to 18% in 2030.

Interestingly, the population of Germany will drop from 83 million in 2005 to 74 million in 2050 and Turkey will grow from 73 million to 99 million in 2050, which will overturn the demographic and economic power ratio in Europe.

But Africa will see the fastest growth, reaching 18% in 2030, doubling the population between 1950-2030, and Asia, such as Indonesia, Pakistan, Vietnam and Korea, will have a 22% share in 2030.

Looking at the evolution of the world's population in the period 1804-2054, we will notice that the world's population has evolved from 1 billion to 9 billion, in only 250 years, the demographic shock occurred in the 1870s and 1880s but the shock wave has reverberations in the first decades of the 21st century.

As a result, in 2000, the world economy was dominated by six large groups of countries, such as the US, EU, India, China, Japan and the Asian Southeast Group, which gave 73% of world GDP and held 57% of the population. The rest of the world, including South America, Africa and Eastern Europe, holding 43% of the population, gave 27% of world production.

Of course, the most alarming will be the relative decline of EU with its 28 members, due equally to economic stagnation and modest GDP growth.

It should be noted that demographic expansion and economic development have evolved interactively by supporting each other, which will continue throughout the 21st century. The most eloquent example being the U.S.A. where the population increases from 39 million in 1880 to 305 million in 2010, with an immigration of 20 million Europeans between 1870-1920.

The impact of demographic shocks on economic growth appears in the economic evolution of China and India. In the case of India, we find the demographic factor as a support of an economic growth of 6-7% per year since 1996. Restrictions and obstacles to the future development of the Indian economy are political and socio-cultural constraints such as tensions between the Hindu and Muslim populations, those between different ethnic groups and those generated by the caste system. We must also remember that 2/3 of the population lives in the countryside and about 40% of the population is illiterate and labour productivity in agriculture is halfway through the Chinese. If we

take into account China, its GDP will reach three times the world's world production in 2000, or 123,000 billion dollars in 2040, and per capita income is estimated at 2040 to \$ 85,000, double the forecast for Europe and over India and Japan. China has made and made serious investments in education at all levels, there will be a massive transfer of the agricultural population to industry and services and will prolong the length of schooling to increase the quality of the workforce.

Demographic changes can affect GDP growth through several channels. First, lower growth in population directly implies reduced labour input. Second, lower population growth has an indirect potentially negative impact on individual labour supply insofar as it leads to higher tax rates which reduce the incentive to work. Third, under the life-cycle hypothesis, consumption smoothing through the lifetime would imply that people move from being net borrowers in their youth to being net savers in their working years and finally to dis-savers in their elderly years. Therefore, if the share of elderly in the population rises, aggregate savings would fall, leading to lower investment growth, and, in turn, lower GDP growth. One study that analyzes the importance of demographic change for global economic growth was presented in the September 2004 issue of the World Economic Outlook by the International Monetary Fund, IMF (2004). Using a large multi-country panel regression framework relating economic growth to the age structure of the population, this study found that a 1 basis-point increase in the share of working-age (15 to 64) population would increase per capita real GDP growth (in PPP terms) by as much as 8 basis points. Conversely, a 1 basis-point increase in the share of elderly population (65 and up) would decrease economic growth by about 4 basis points. In contrast to the IMF study and others, this note has a narrower geographical coverage as it focuses only on advanced OECD economies but has more up-to-date coverage, with data going through 2010.

“Take into account that people’s economic behaviour varies at different stages of life, changes in a country’s age structure can have significant effects on its economic performance. Nations with a high proportion of children are likely to devote a high proportion of resources to their care, which tends to depress the rhythm of economic growth. By contrast, if most of a nation’s population falls within the working ages, the added productivity of this group can produce a “demographic dividend” of economic growth, assuming that policies to take advantage of this are in place. In fact, the combined effect of this large working-age population and health, family, labour, financial, and

human capital policies can create virtuous cycles of wealth creation. And if a large proportion of a nation's population consists of the elderly, the effects can be similar to those of a very young population. A large share of resources is needed by a relatively less productive segment of the population, which likewise can inhibit economic growth" (D. Bloom, D. Canning, J. Sevilla, 2001).

1.3 Are demographic changes having an important effect on the economies of advanced and developing countries?

In order to answer this question, a series of econometric models were developed describing the relationships between the variables of the demographic evolution (fertility rate, working-age population, population aging, life expectancy, mortality rate, net immigration, gender factors, etc) and economic growth indicators or factors (GDP per capita, saving, current account, budget balance, human capital, pension systems, labour force etc). These include the analysis of representatives of the Research Department of the IMF, Tim Callen, Nicoletta Batini, and Nicola Spatafora, with directly implications of demographic variables to economic growth indicators. Another approach by Professors Shyam Ranganathan, Ranjula Bali Swain and David JT Sumpter at Swedish Universities, somehow in reverse, shows that economic growth does not directly impact the fertility rate, but influences it through the intermediate variable child mortality.

"The econometric results should be interpreted with some caution as historical correlations may not reflect causality. In particular, econometric analysis of demographic issues is subject to problems of endogeneity and omitted variables. For instance, income itself is an important determinant of fertility, mortality, and hence the age structure of populations (Lee, 2003); this may introduce biases into the estimated coefficients. Other correlation is the association between declining fertility and increased female labour force participation also strengthens the impact of lower youth dependency—the ratio of those aged 0–14 to the working-age population—on per capita growth".

Macroeconomic Impact of Demographic Changes: Panel Instrumental Variable Regressions

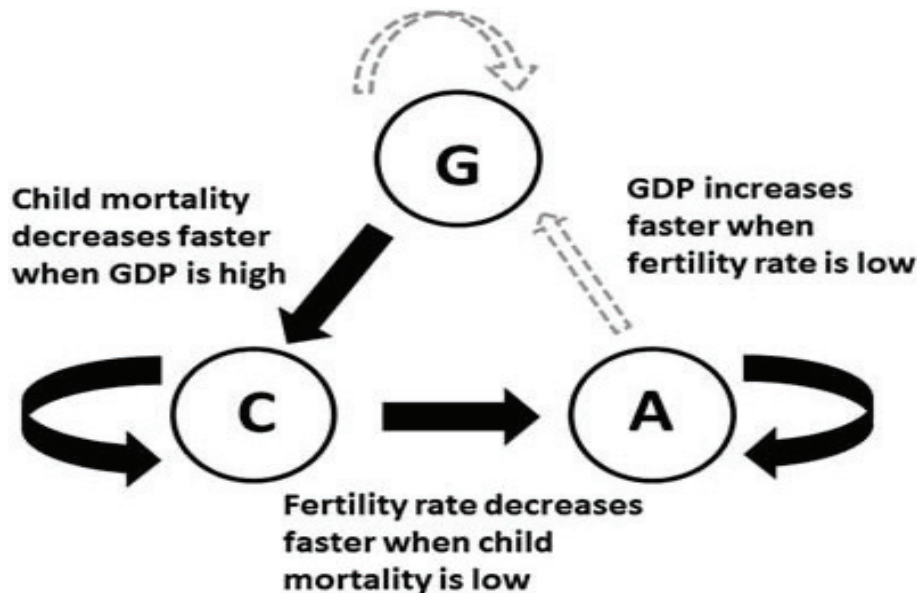
Table 1

	<i>Growth in Real GDP per Capita</i>	<i>Saving/GDP</i>	<i>Investment/GDP</i>	<i>Current Account/GDP</i>	<i>Budget Balance/GDP</i>
Impact of:					
Share of working-age population:	0.08	0.72	0.31	0.05	0.06
Share of elderly population:	-0.041	-0.35	-0.14	-0.25	-0.46

“The econometric results suggest that projected demographic changes could have an important impact on future economic performance. Combining the estimated coefficients reported in Table 1 with the UN’s population projections yields a sense of the potential magnitudes, and how they may vary across regions”.

The main conclusions about the interdependences between demographic variables and economic growth indicators, that result from econometric analysis done by Tim Callen, Nicoletta Batini, and Nicola Spatafora (in semi-annual report *World Economic Outlook*, made by International Monetary Fund; 2004; Chapter III: How will demographic change affect the global economy?) are: Per capita GDP growth is positively correlated with changes in the relative size of the working-age population, and negatively correlated with changes in the share of the elderly; There is a statistically significant association between demographic variables and saving; The share of the working-age population is also correlated with investment; Current account balances increase with the relative size of the working-age population, and decrease when the elderly dependency ratio rises; Demographic factors affect the fiscal balance; In advanced countries, the impact of upcoming demographic changes on growth could be substantial; The impact on growth in developing countries will vary by region; Future demographic changes could lead to large changes in current account balances.

In the model of the Swedish researchers, mortality and fertility decline and economic growth are endogenized by considering a simultaneous system of equations in the change variables. The model shows that the transition is best described in terms of a development cycle involving child mortality, fertility and GDP per capita. Fertility rate decreases when child mortality is low, and is weakly dependent on GDP. As fertility rates fall, GDP increases, and as GDP increases, child mortality falls (see below).



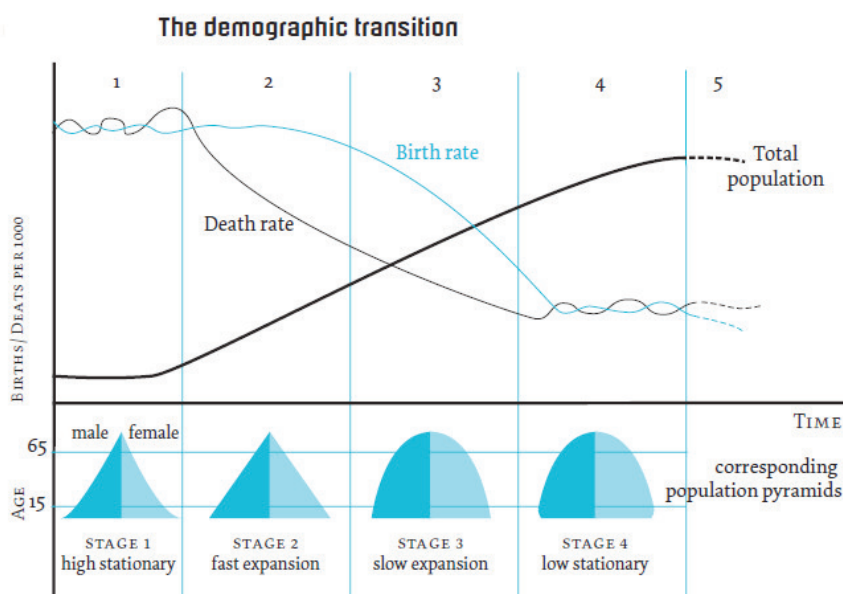
As De Keyzer (*chief economist at BNP Paribas Fortis*) writes in his book *“Growth Makes You Happy”*: “Studies show that lower birth rates are in fact the result of a consistent policy of ensuring the literacy and education of girls (that is, the future mothers). The literacy, education and emancipation of women are probably the best strategies for reducing child mortality in the first place, and the birth rate in the second. Women are thus the key to a lower birth rate and a successful demographic transition.”

Has been confirmed by studies the hypothesis that when women are better educated, countries are more likely to see a balanced economic growth, because their demographic transition is more balanced, too. In such societies, the demographic pyramid is more likely to be one of “slow expansion” or “low stationary” rather than “fast expansion” (see figure 2). And also when a country’s population grows too fast, it is likely to run into trouble: studies show that the higher the percentage of “fighting age” population (16 to 30 year-olds) in a country, the higher its chances for civil unrest, instability and war. The tipping point is when more than 60% of the population is younger than 30. In that case, the chance for civil war is a staggering one in two. It helps explain the difficult transition countries like Congo, Iran, Iraq, Pakistan and Palestine are going through. And that is only the demographic effect. A recent study by the International Monetary Fund showed the other primary effect of giving more women access to better education. It said that “increasing education spending by 1% of GDP in India could boost female labour force

participation by 2 percentage points.” Policies in this vein will ultimately create economic growth that is higher and more balanced. Or as Christine Lagarde put it: “by creating opportunities for women and by promoting their economic participation, policymakers can also tackle income inequality.”

Stage of Demographic Transition

Figure 2



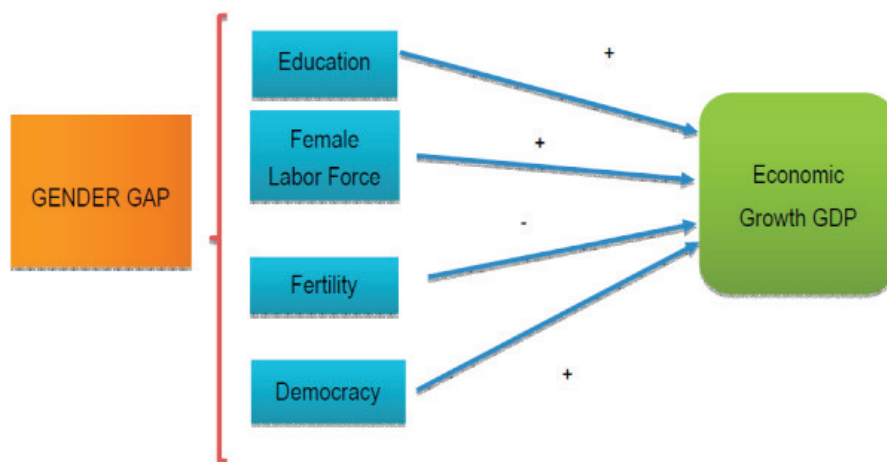
Source: assets.weforum.org

Robert B. Zoellick, president of The World Bank Group says: “Gender equality is at the heart of development. It’s the right development objective, and it’s smart economic policy. The World Development Report 2012 can help both countries and international partners think through and integrate a focus on gender equality into development policy making and programming”.

“A significant number of studies showed that, on a micro level, gender gaps negatively affect macroeconomic results and economic growth, and that the influence of gender factors on economic growth seems to be determined by variables such as the economic system, education of women, distribution of work between sexes, and political regime. Other studies investigated the effects of gender gaps, determining that the higher the gap, the higher the economic growth by keeping women in a role that

balances the family, favours the education of the children, and reduces the available labour force. A third group of studies found the significance of the relationship between the gender gap and economic growth varied according to whether the impact was measured in the short or long term”. The negative impact of education on female fertility resulted in a negative impact on the creation of human capital in the following generation and, therefore, a reduction in long-term economic growth. The gender factors which influence economic growth were investigated by Laura Cabeza-García, Esther B. Del Brio and Mery Luz Oscanoa-Victorio, 2018 study. “To address these gender factors, four characteristic dimensions of gender inclusion were considered: education, access to the labour market, fertility, and democracy. The relationship between economic growth and gender factors was analyzed in a sample of 127 countries. Value and robustness were added to the results using dynamic models applied to panel data while accounting for endogeneity”. The conclusions were that: high fertility in women has negative effects on economic growth; when women have greater access to secondary education and the labour market in conditions of equality, the effects are positive; the access of women to active political participation has significant effects on economic growth. Overall, the study helps identify which gender factors may promote inclusive economic growth, which is economic growth achieved when both men and women are incorporated in equal conditions.

The report quotes recent estimates that suggest economic gender parity could add an additional \$250 billion to the GDP of the UK, \$1,750 billion to that of the US and \$2.5 trillion to China’s GDP. At the current rate of progress the overall global gender gap will take a hundred years to close, while the gap in the workplace will now not be closed for 217 years. It is a gap the world can’t afford to ignore.



Overall, these results suggest that the demographic transition is already, and will increasingly, impact global growth and the distribution of this growth across regions. The econometric models conclude that despite that we don't have enough constant data because of many differences between country's legislation and so on, the interdependences between demographic evolution and economic development are very important.

If we try to apply these correlations to our country it's obvious that:

- Migration and aging have important influences to labour force and active population and will have serious socio-economic on long-term consequences, the only chance is to increase productivity;
- We lost 3.4 million potential employees due to migration. An estimate of the BNR showed that the GDP in 2014 would have been 50 billion euro higher if Romanians abroad worked in the country in the same sectors where they are employed abroad;
- From 2000 to last year, diaspora Romanians sent more than 60 billion euro to the country, but after 2008 the amounts gradually began to decline. The reasons stem from the crisis that struck the EU after that year, but also from the fact that the Romanians from abroad began to move their families to the countries where they left and had no reasons to send money home;
- Compared to other states, the degree of involvement of women in our country is high, hence resulting, on the one hand, from a sharp drop in birth rates, but on the other hand their contribution to GDP, which is undisputed;

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- The sustainability of the Romanian social security system, excluding the level of migration, is predicted for a maximum of 15 years, and that due to the large number of deaths;
 - With the numerical increase of the elderly population, there will be an increasing pressure on the targeting of health-related funds to third-age population.

Romania remained without a quarter of the population in the last quarter of a century. “Romania is losing the population and because those who leave the country are young and are fertile and decide to make the children there.” (Silvia Pisica - INS). A quarter of those who emigrated are graduates of higher education. In 3 years, Romania fell 15 places in the global ranking of competitiveness, conducted by the World Economic Forum.

4. CONCLUSIONS

We can conclude that the interdependence between economic growth and demographic changes is in both directions with the emphasis of the influence of demographic variables on developing countries. Demographics do not determine the fate of economic growth, but they are certainly a key determinant for an economy’s growth potential. Poorest countries are experiencing age-structure changes that could boost development. An increase in the share of working-age population leads to higher per capita income growth and poverty reduction and results are mostly driven by the reduction in child-dependency ratios. The International Monetary Fund called on Asian economies to learn from Japan’s experience and act early to cope with rapidly ageing populations, warning that parts of the region risk “getting old before becoming rich.” Asia has enjoyed substantial demographic dividends in the past decades, but the growing number of elderly is set to create a demographic “tax” on growth, the IMF said in its economic outlook report for the Asia-Pacific region from May 2017. For countries that no longer have a demographic “dividend” of growing populations, the only other way to increase their future wealth is to engineer the second economic growth component: productivity growth. Such is the case for many western countries today; countries such as Japan and Germany have already passed “peak population”. Necessity is the mother of invention, as Plato knew long ago. It is no coincidence then that the upcoming “Fourth Industrial Revolution” and its accompanying explosion of productivity seem to take off first in countries like Japan and Germany. Japan is increasingly inventing robots that have the

artificial intelligence to take on a broad variety of jobs, while Germany leads the push towards “smart factories” in its industry. Development progress, both income- and non-income-based, is thus a critical driver over time of changes in age structure and population size.

The conclusions from International Monetary Fund publications catalogue 2004-2005, about the Global Demographic Transition are that: “The world is in the midst of a demographic transition that is resulting in an unprecedented aging of its population. Different countries, however, are at different stages of this transition. In most advanced countries, population aging is already well under way, and the share of the working-age population is projected to decline quite significantly over the next 50 years. In contrast, the relative size of the working-age population in many developing countries will rise in the coming years before aging then begins. The impact of these demographic shifts will be wide ranging. In advanced countries, population aging will strain the finances of governments, especially pension and health care systems, while per capita growth rates are likely to be reduced. In developing countries, however, increases in the relative size of the working-age population could lead to stronger per capita growth provided the additional labour resources are effectively utilized. International capital flows could also be substantially affected. The results have suggested that large changes in saving, investment, and current account balances could take place over the next 50 years. There are, however, considerable uncertainties, and our understanding of how demographic change will affect economic performance is far from complete”.

Education seems to play a decisive role in getting the world back on the economic growth track. To ensure demographic growth leads to economic growth in emerging markets, the emphasis should lie on a smooth demographic transition. That depends on how well educated women are. To ensure the demographic decline in the developed world doesn't lead to an economic slump, an increased focus on productivity growth is necessary. In the 21st century, that will come mostly from an increased focus on education, research and development in general.

The OECD expresses similar views: “International migration is an integral part of the labour market. The management of labour migration should be sufficiently responsive to short-term labour market conditions, without denying the more structural needs. In the long run, international migration is expected to be integrated more fully in the processes that are referred to as globalisation. The recession is speeding up the integration of new countries into the global economy. China and India are benefitting from a demographic bonus and can invest huge amounts of money in infrastructure projects whereas Europe.

The United States and Japan require funds to pay for an ageing population. However, also China is confronted with significant population ageing in the coming decades. The new forms of social protection that are currently being introduced in Europe and elsewhere, will remove major barriers to international migration and integration of migrant communities. Today entitlement schemes differ greatly between countries and are based on the unsustainable principles of defined benefits and intergenerational transfers. A system of portable individual accounts coupled with universal basic coverage to accommodate those left behind in the race for economic advancement will provide a new basis for the management of international migration and the integration of migrants. The financial crisis and the economic recession have created the sense of urgency to take on the changes that are necessary in a flexible and globalising economy”.

Finally is obvious that demographic change presents opportunities and challenges also in developing and developed countries. In each case, policies will make a critical difference in how countries manage their demographic change. Policies must understand and react to demographic change depending on the particularities of each state. Selected policy priorities include mobilizing savings for productive investment in human and physical capital and designing welfare systems—pensions, health care, and long-term care—while ensuring fiscal sustainability and protection for the elderly and vulnerable. With the right set of policies, this era of intense demographic change can be turned into one of sustained development progress. Global demography is changing and has the potential to profoundly modify the trajectory of global development. To make progress, countries need to raise efforts to sustain on all sides growth, invest in people, and insure the poor and vulnerable against evolving risks. But they need to understand and correctly use the interdependencies between economic growth and demographic change. Where possible, they must capture demographic dividends. For each country, adaptation is needed. On the whole planet, demographic change must be transformed into opportunities for development and increase the quality of life.

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