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Issues of the World Economy's Assessment: The Demographic Factor

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Abstract:

The article analyzes the impact of the demographic factor on the prospects for the development of the world economy.

The basis of the methodology is an analysis of the dynamics of macro indicators of the world's 10 leading economies, whose contribution exceeds 61% of world GDP. In the article the dynamics of macroeconomic and demographic indicators were analyzed, and their interrelation was established.

The study analyzes the dynamics of the world economy. In the course of the study, it was shown that globalization brings not only advantages, but notable threats. The economic growth within the last 21 years led to the accumulation of colossal debts, which in future will become a limitation of the development of the world economy.

The article shows that attempts to overcome demographic problems in the last decades did not have any success, and consequently, in the future it will be a barrier to the sustainable development of the world economy.

Keywords: *Systemic crisis, Gross Domestic Product, government debt, global debt, demography, the cultural tendencies.*

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1. Introduction

The beginning of the 1990s was marked by the collapse of the USSR, and, in general, the socialist model of economic development. Modern communist China or Vietnam in economic terms are slightly different from any capitalist country in the Western world. From 1945 until the late 1980s there was a bipolar model of the world, which was fully relayed to the economy. In fact, there were two alternative models of economic development, two closed economies.

The collapse of the USSR led to a change in world architecture and the formation of a unipolar world model and a single global economy. Actually, it was precisely from the 1990s that the concept of "globalization" entered the economic life, which is connected with the transnationalization of business; changing the world division of labor, increasing the mobility of the labor market and capital; standardization of national legislation and the fusion of different cultures.

By the beginning of the 2000s, in fact, a single world economy had been formed. One of the main advantages of globalization (for which its supporters advocate) is economic growth. Usually, the indicator of the gross domestic product (hereinafter GDP) is used to describe the dynamics of economic growth. For intercountry comparison, the GDP indicator calculated at purchasing power parity (hereinafter referred to as PPP) is the most obvious (Table 1).

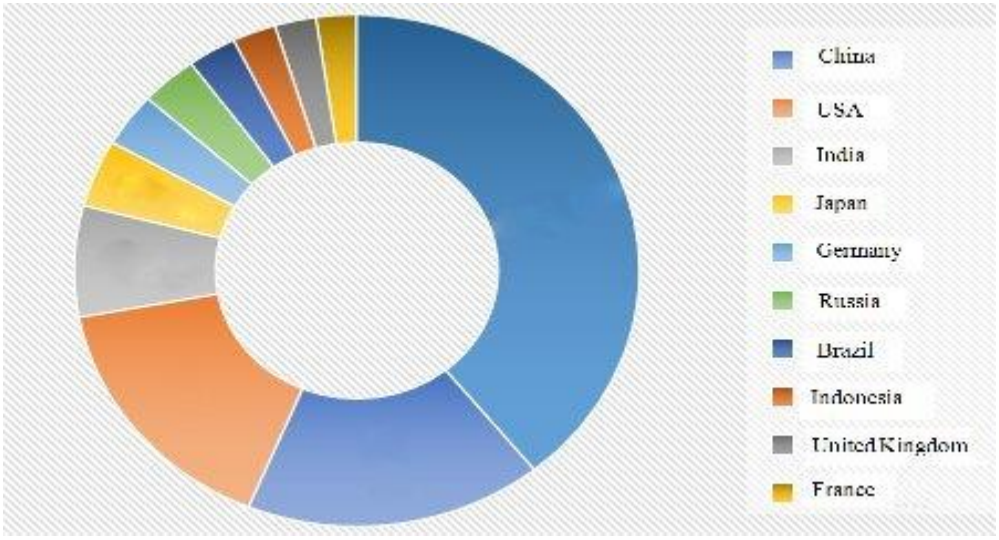
Table 1. *Dynamics of GDP for PPP for the period 1995-2016 (IMF Data, 2017).*

Country	SubjectDescriptor	Units	1995	2000	2005	2010	2015	2016	Growth rate 2016/1995
Brazil	GDP for PPP	USA Dollars Billions	1306.756	1579.824	2046.98	2803.368	3216.167	3141.335	240.4%
China	GDP for PPP	USA Dollars Billions	2254.642	3698.622	6617.286	12405.881	19695.741	21291.766	944.4%
France	GDP for PPP	USA Dollars Billions	1337.635	1678.332	2046.601	2340.155	2665.863	2733.678	204.4%
Germany	GDP for PPP	USA Dollars Billions	2033.711	2430.427	2804.578	3279.529	3860.114	3980.282	195.7%
India	GDP for PPP	USA Dollars Billions	1426.298	2077.843	3238.203	5312.261	8003.405	8662.35	607.3%

Indonesia	GDP for PPP	USA Dollars Billions	849.679	958.481	1356.414	2003.959	2849.796	3032.092	356.9%
Japan	GDP for PPP	USA Dollars Billions	2965.536	3405.45	4056.757	4485.871	5118.682	5237.79	176.6%
Russia	GDP for PPP	USA Dollars Billions	1389.47	1635.277	2474.758	3240.905	3759.692	3799.696	273.5%
Great Britain	GDP for PPP	USA Dollars Billions	1224.054	1556.051	2008.467	2251.123	2700.627	2785.563	227.6%
USA	GDP for PPP	USA Dollars Billions	7664.05	10284.75	13093.7	14964.4	18036.65	18569.1	242.3%

The world economy consists of almost 200 countries, however, the top 10 economies as of 1995 accounted for 58.9% of global GDP. By 2016, this share had risen to 61.1% (Figure 1). In fact, this means that the main benefits of globalization are gained by the rich countries.

Figure. 1. *The share of the first 10 economies in world GDP by PPP (Sutyagin et al., 2017).*



However, together with positive moments, globalization has also brought tangible losses. In particular, local, country crises began to "spread" to neighboring countries, having a regional or even global effect.

A classic example is the "Asian financial crisis", which was originally formed in the bowels of the Thai economy (once one of the four "Asian tigers"). In May-June

1997, it resulted in a sharp devaluation of the Thai baht and the collapse of the Thai stock market. However, within a month or two the crisis spread to Malaysia, Indonesia and South Korea. Eventually, by 1998, the crisis affected most of the countries of Southeast Asia (including Japan, Hong Kong, Laos, the Philippines, China, India and Vietnam). Moreover, the crisis led to a massive outflow of capital from emerging markets, which ultimately contributed to Russia's default in 1998, and then Argentina's default in 2001.

The situation with the "World Financial Crisis", which "matured" in the bowels of the US mortgage market during 2008-2009, touched the whole world. It is also remarkable that, starting from 2008-2009, the world economy still cannot "grope" for sustainable rates of development. There are many reasons for this, but within the framework of this article, we would like to focus on the demographic aspect of this problem.

2. Methods

The general theoretical basis of the study was a dialectical method, as well as the methods of analysis and induction. In addition to general scientific methods, statistical methods such as the dynamic analysis method (trend analysis), sampling methods, grouping method, extrapolation and interpolation methods, and others were widely used in the study. For the purposes of this study, we analyzed the dynamics of the macro indicators of these 10 leading countries for the period 1995-2016, including:

- Macroeconomic indicators (Gross Domestic Product (nominal and purchasing power parity, public debt (nominal amount);
- Demographic indicators (number of working population, average age of the population).

In addition, in the process of research, the authors also calculated the labor productivity index. The labor productivity index (LP) is calculated as:

$$LP = GDP/P \quad (1)$$

where: GDP - gross domestic product; P - number of employees.

The choice of time horizon analysis is determined by the need for comparability of numerical series of macro-indicators of different countries, which was a separate problem. The fact is that the data of individual countries, mainly Indonesia, India, Brazil, data earlier than 1995 are not available in public sources. In some cases, there was no data (selectively by years or earlier than a certain year) until the year 2000. To bring the numerical series of analyzed indicators into a comparable form, the data for missing periods were filled with extrapolation and interpolation methods based on trend analysis (Prytkova, 2017; Vasin *et al.*, 2017).

Another important aspect is important, which implicitly leaves an imprint on the choice of the time horizon for analysis, namely, by 1995-1996 it became obvious that there started a formation of a unipolar world, and as a consequence, a single world economy centered in the United States. Information basis of this study was the data of:

- The International Monetary Fund (http://www.imf.org) (for macroeconomic and demographic indicators);
- Department of Economic and Social Affairs of the United Nations (http://www.un.org/) (for retrospective and forecast data on the average age of the population).

3. Results

The basis of the analysis is macro statistics of 10 leading countries in the world. The basic parameter of development is the GDP indicator. Table 1 (in the introduction) shows the dynamics of GDP by PPP (and the growth rate estimate) for the period 1995-2016. In Table 2 similar estimates of nominal GDP are given. For intercountry analysis, we used the estimation approach of the GDP for PPP. However, in some cases, to calculate the relative indicators, we considered the nominal GDP estimates (for example, the level of public debt to GDP).

Table 2. *Dynamics of nominal GDP for the period 1995-2016. (IMF Data, 2017)*

Country	SubjectDescriptor	Units	1995	2000	2005	2010	2015	2016	Growth rate, %
Brazil	Gross domestic product, current prices	Nationalcurrency, billions	720,985	1199,093	2170,584	3885,847	6000,572	6266,895	869%
China	Gross domestic product, current prices	Nationalcurrency, billions	6153,905	10057,683	18919,039	41070,826	69910,944	74539,62	1211%
France	Gross domestic product, current prices	Nationalcurrency, billions	1224,967	1485,303	1771,978	1998,481	2181,064	2225,92	182%
Germany	Gross domestic product, current prices	Nationalcurrency, billions	1898,88	2116,48	2300,86	2580,06	3032,82	3132,67	165%
India	Gross domestic product, current prices	Nationalcurrency, billions	12267,249	21774,127	36933,688	77841,2	136753,3	151904,814	1238%
Indonesia	Gross domestic product, current prices	Nationalcurrency, billions	549170,8	1511556,6	3017393,8	6864133,1	11531716,9	12406809,8	2259%
Japan	Gross domestic product, current prices	Nationalcurrency, billions	512541,8	526706	524132,9	500354	530465,7	537289,4	105%
Russia	Gross domestic product, current prices	Nationalcurrency, billions	1535	7849,4	23218,8	49756,7	83232,6	85880,6	5595%
UnitedKingdom	Gross domestic product, current	Nationalcurrency, billions	836,646	1080,863	1379,457	1572,439	1872,714	1939,637	232%

	prices								
UnitedStates	Gross domestic product, current prices	Nationalcurrency, billions	7664,05	10284,75	13093,7	14964,4	18036,65	18569,1	242%

Globalization brought not only economic growth, but strangely enough, it provoked a rapid growth of public debts. Table 3 shows the dynamics of the size of the public debt of the world's 10 leading economies (and growth rate).

Table 3. *The dynamics of the size of the public debt for the period 1995-2016. (IMF Data, 2017)*

Country	SubjectDescriptor	Units	1995	2000	2005	2010	2015	2016	Growth rate, %
Brazil	Generalgovernmentgross debt	Nationalcurrency, billions	357,60856	786,135	1488,699	2449,83	4351,321	4908,003	1372 %
China	Generalgovernmentgross debt	Nationalcurrency, billions	1319,843	2294,05	4937,582	13858,254	29786,551	34460,525	2611 %
France	Generalgovernmentgross debt	Nationalcurrency, billions	683,6	870,4	1189,8	1631,7	2097,4	2151,308	315%
Germany	Generalgovernmentgross debt	Nationalcurrency, billions	1038,995	1245,785	1541,352	2088,726	2157,88	2119,175	204%
India	Generalgovernmentgross debt	Nationalcurrency, billions	8544,61	16036,426	29877,018	52509,832	95113,919	105629,616	1236 %
Indonesia	Generalgovernmentgross debt	Nationalcurrency, billions	169144,6064	1321664,26	1285763,615	1683400	3098640	3455448,965	2043 %
Japan	Generalgovernmentgross debt	Nationalcurrency, billions	471118,9	732167,7	968916,5	1080282,2	1262336,9	1285111,12	273%
Russia	Generalgovernmentgross debt	Nationalcurrency, billions	577,589	4373,08	3438,5	5254,2	13270,516	14629,958	2533 %
United Kingdom	Generalgovernmentgross debt	Nationalcurrency, billions	371,852	403,133	552,591	1194,338	1665,974	1729,281	465%
United States	Generalgovernmentgross debt	Nationalcurrency, billions	4990	5660	8555,659	14314,019	19048,025	19934,076	399%

The issues of correlating of the economic growth of GDP and the growth of the debt burden will be discussed in more detail in the next section of the "Discussion". Such a rapid increase in the amount of debts raises a problem for the economies of the leading countries, and therefore the world economy as a whole, and in the future, threatens with potential defaults. The traditional approach to debt management suggests that the economy (GDP) should grow faster than the debt will grow. Otherwise, in the long term (at a constant rate), debt servicing will be more and more complicated. This means that more resources will be spent on debt servicing, which will further restrain economic growth.

In this sense, the economy needs to influence the market in terms of economic growth: in practice, this will manifest itself in a sharp increase in GDP growth rates. In this case, the growth itself can be both extensive and intense. An intensive scenario of development is provided by means of outstripping increase in labor productivity. Labor productivity can be calculated by means of Formula 1. Below

we give information on the dynamics of the number of the employed in the economy (Table 4).

Table 4. *Dynamics of the number of employees for the period 1995-2016. (IMF Data, 2017)*

			1995	2000	2005	2010	2015	2016
Brazil	Employment	Persons, millions	75,739	78,488	86,500	93,100	92,800	90,300
China	Employment	Persons, millions	681	721	746	761	775	776
France	Employment	Persons, millions	22,812	22,768	23,831	24,503	24,976	25,092
Germany	Employment	Persons, millions	35,762	36,065	35,683	37,72	40,073	41,212
India	Employment	Persons, millions	313,90	365,40	408,20	400,00	431,76	433,39
Indonesia	Employment	Persons, millions	83,5	89,8	93,9	108,2	121	121
Japan	Employment	Persons, millions	64,573	64,458	63,566	62,984	64,016	64,645
Russia	Employment	Persons, millions	66,2	64,8	68,3	69,9	72,3	72,8
UnitedKingdom	Employment	Persons, millions	25,819	27,484	28,85	29,229	31,297	31,741
UnitedStates	Employment	Persons, millions	124,908	136,901	141,71	139,077	148,841	151,437

Next, let's calculate the indicator of labor productivity (Table 5). Note that in the calculations we took into account the estimates of GDP for PPP. Also, note that the growth rate of labor productivity is lower than the GDP growth rate for PPPs (lower than the growth rate of nominal GDP).

Table 5. *Dynamics of labor productivity for the period 1995-2016.*

			1995	2000	2005	2010	2015	2016	Growth rate, %
Brazil	Laborproductivity	ths. $ per person	17,253	20,128	23,665	30,111	34,657	34,788	202%
China	Laborproductivity	ths. $ perperson	3,311	5,130	8,870	16,302	25,414	27,438	829%
France	Laborproductivity	ths. $ perperson	58,637	73,715	85,880	95,505	106,737	108,946	186%
Germany	Laborproductivity	ths. $ perperson	56,868	67,390	78,597	86,944	96,327	96,581	170%
India	Laborproductivity	ths. $ perperson	4,544	5,686	7,933	13,281	18,537	19,987	440%
Indonesia	Laborproductivity	ths. $ perperson	10,176	10,674	14,445	18,521	23,552	25,059	246%
Japan	Laborproductivity	ths. $ perperson	45,925	52,832	63,820	71,222	79,959	81,024	176%
Russia	Laborproductivity	ths. $ perperson	20,989	25,236	36,213	46,343	51,984	52,194	249%
UnitedKingdom	Laborproductivity	ths. $ perperson	47,409	56,617	69,618	77,017	86,290	87,759	185%
UnitedStates	Laborproductivity	ths. $ perperson	61,358	75,125	92,398	107,598	121,181	122,619	200%

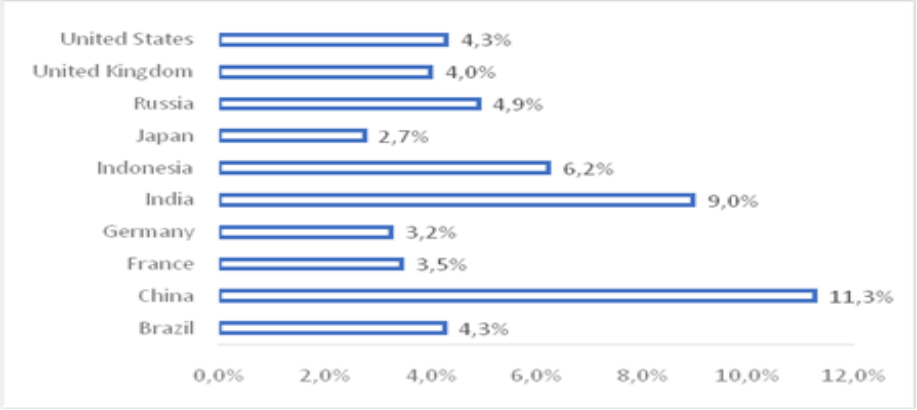
Conclusions about the growth of labor productivity of the leading economies of the world can be relayed to the whole world economy. The substantive side of the issue will be disclosed in the "Discussions" section. An extensive version of economic development requires more and more involvement of resources. In practice, such a scenario of growth will be manifested in an increase in the number of people

employed in the economy and in the utilization of production capacities. In this sense, the demographic situation in all analyzed countries becomes crucial. In detail, demographic issues and conclusions will be discussed in the "Discussions" section.

4. Discussions

In general, for the analyzed 21-year period the world economy has shown good results as shown in Figure 2.

Figure 2. *Average growth rate of GDP for PPP for the period 1995-2016.*



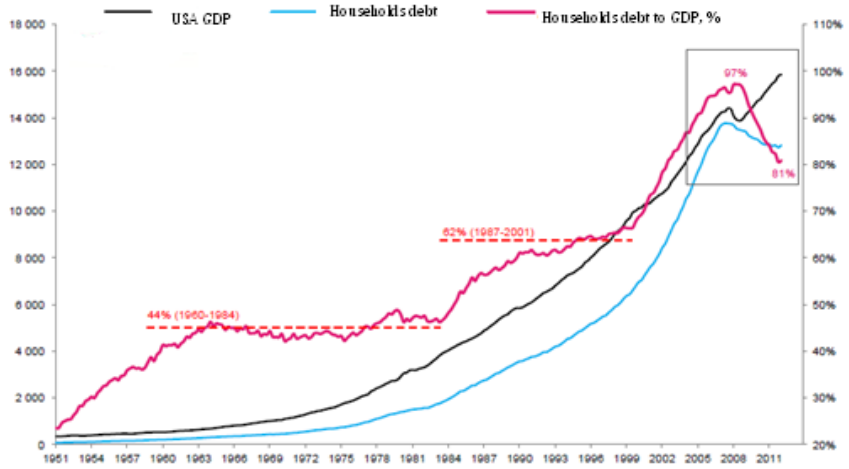
Of course, someone managed to pass this period better, someone worse. But speaking in general, these decades are the time of developing countries despite a number of regional crises and despite the global financial crisis of 2008-2009. However, what is noteworthy, the huge debt burden of almost all leading countries has become a payoff for economic growth. Now we are talking, first of all, about public debts; however, this is only because the statistics in the field of public borrowing is open.

We don't consider the reasons for such a rapid growth of public debts. Let's make only a reference to our earlier publications (Sutyagin *et al.*, 2017). Let us note that this process is natural within the framework of the paradigm of modern credit money.

We note only that for the vast majority of countries, there is a clear relationship between economic growth and the public debt (in some cases, the growth rate of public debts is twice as high as GDP dynamics). The only exception, perhaps, on this list is Russia. The detailed analysis confirms rather than refutes the revealed tendency. Speaking of Russia, a sharp reduction in public debt occurred in a relatively short time interval between 2000-2010. This period was marked by a rapid increase in the world oil prices, due to currency proceeds from the sale, which managed to sharply reduce the national debt from $ 158.7 billion in 2000 to $ 37.6 billion in 2010. The rest of the time interval is characterized by a previously

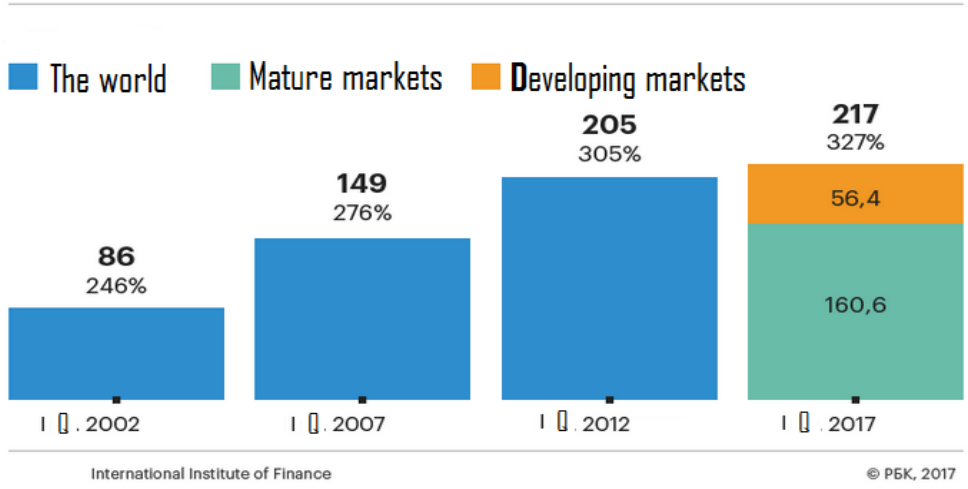
revealed trend: economic growth is accompanied by an increase in public debt. Should we assume that economic growth is accompanied by an increase in liabilities only in the public sector? Probably, not. However, statistics on the dynamics of corporate debt and the household sector of all countries is not so open. But we can operate with specific examples: in particular, the US macroeconomic statistics show that household debts in the 1990s-2010 rapidly increased. By the end of the first quarter of 2017, the size of household debt in absolute terms reached 12.730 billion. (Note that the size of the US federal debt at the end of 2016 was $ 19934.076 billion (IMF Data, 2017), not counting state debts) (Figure 3).

Figure 3. *Dynamics of the debt of US households (percentage of GDP) (Shagardin, 2013)*



A similar situation is observed in the corporate sphere. In general, at the end of the first quarter of 2015, the Federal Reserve reported that the total debt of the United States reached 64.1 trillion. (Finam,, 2016), which is almost 3.5 times the US GDP (345% of GDP). Credible andverifiable estimatesconcerning the world debt, are difficult to obtain. Expert estimates are quite different. However, we can show the assessment of the Institute of International Finance. By early 2017, the global debt had reached 217 trillion (327% of the world GDP) (Figure 4). For 15 years, the ratio of the total debt to GDP has increased from 246% to 327% (almost 1.5 times), which once again emphasizes that the economic growth in the modern paradigm is based on credit incentives (and is accompanied by an increase in the debt burden) .At the same time, debt financing of the economic growth is a time bomb. Indeed, if the debt grows faster than the economy, this means that in the future it will be necessary to spend more and more money on debt servicing. The alternative is default. The easing of the situation may be the reduction of interest rates on debt servicing, in part, therefore, leading central banks, since 2008, have reduced interest rates. However, now they are close to zero, which led to the exhaustion of the debt management mechanism.

Figure 4. *Dynamics of total world debt for the period of the first quarter of 2002-the first quarter of 2017 (RBC, 2017).*



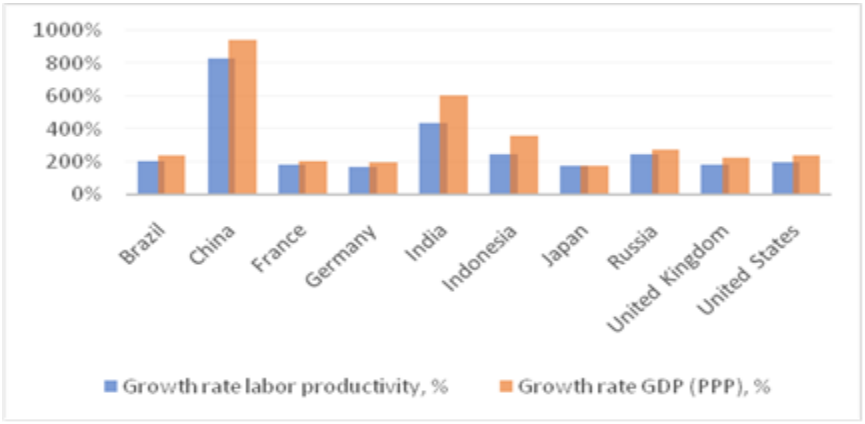
As an alternative, we can suggest a sharp increase in the rate of the economic growth. We emphasize that this in itself is doubtful, and we are only talking about the mathematical probability of such a growth. Now we do not understand the methods of such stimulation (we note once again that in recent years it has been solved by means of credit pumping). We should say that the growth itself is still questionable, since it requires a steady demand. If there was such a demand, this would be confirmed by the dynamics of prices for energy resources, which, unfortunately, is not observed and is not expected in the foreseeable future.

In itself, the economic growth can occur in an extensive or intensive scenario. Intensive growth in theory is accompanied by a faster dynamics of labor productivity. In practice, it should be an industrial revolution. However, attention is paid to tables 1 and 5: for the period 1995-2016 the economies of all 10 countries grew faster than the labor productivity (Figure 5).

In principle, there is nothing new here, and this phenomenon is well described by the law of diminishing marginal productivity. The law itself is stable in the short term, when the technological level is unchanged. We do not want to draw conclusions regarding the prospects for changes in labor productivity in the future. It is important only that now the scenario of intensive growth has no visual confirmation despite all the technical innovations that the world saw in the 1990-2000s.

The extensive growth must be accompanied by an increasing involvement of labor and capital. All this is possible only with a favorable demographic situation. In other words, an extensive development path is possible in case of the demographic growth.

Figure 5. *Comparison of growth rates of labor productivity and GDP for PPP for the period 1995-2016.*



On the contrary, a negative demographic situation is a big threat to the economy. The "working hands" are really needed for a growing economy. The negative demographic situation, first of all, manifests itself in the form of an aging population. The latter leads to an increase in the burden on the pension system (in fact, the number and proportion of pensioners is growing). The pension system of a lifetime working through mandatory or voluntary payments accumulates funds that, for the purpose of increasing them, are invested by pension funds. As a rule, pension funds implement a conservative investment policy: the basis of investment is government bonds.

However, in many developed countries (USA, Japan, EU countries), the level of interest rates is close to zero (or, at least, comparable with the rate of inflation), which prevents pension funds from implementing an effective investment policy (to increase pension accumulation). We should note that the situation in developing countries (Russia, China, Indonesia, India) is not much better: a higher level of rates is compensated by a higher level of inflation. All this leads to huge deficits in the pension systems of different countries, which are most often solved through transfers from state budgets, which, in a spiral, further increases the burden on public finances.

And this shows how important a positive demographic situation is for sustainable economic growth. However, many countries have already faced a demographic crisis. From 1995 to 2015 even in prosperous China, the United States, India, Brazil, the proportion of the working population hasn’t risen. The situation is worsein Europe (including Russia) and Japan. The situation becomesmore clear if we analyze the dynamics of the average age of the population (monitored by the Department of Economic and Social Affairs of the United Nations). In all the 10 countries, the population is noticeably aging (Table 6). In addition, according to the UN assessment, by 2050 the problem will have become even more critical (Table 6).

Table 6. *The prognosis of the average age of the population and comparison with the retirement age (World Population Prospects, 2016; Your pension, 2017).*

Country	Index	Unit	1995	2015	2050	Reference: Retirementage	
						Male	Female
China	Median age	years	27.0	37.0	45.0	60	50-55
USA	Median age	years	30.7	38.0	41.1	65	65
India	Median age	years	21.8	26.6	38.6	60	60
Japan	Median age	years	39.6	46.5	54.9	65	65
Germany	Median age	years	38.4	46.2	49.4	65-67	65-67
Russia	Median age	years	35.0	38.7	45.3	60	55
Brazil	Median age	years	23.8	31.3	40.4	65	60
Indonesia	Median age	years	22.8	28.4	41.1	55	55
UK	Median age	years	36.4	40.0	43.5	65	60
France	Median age	years	36.4	41.2	44.7	60	60

The increase in the average age of the population means an increase in the number of pensioners, and, consequently, creates an additional burden on the pension system and public finances. This situation can be called a trap "Debt - demography", when because of the deteriorating demographics low returns make the pension system bankrupt.

Unfortunately, the demographic situation is likely to worsen in all countries. For example, at present the most favorable situation with population growth is observed in Indonesia. However, UN estimates show that by 2050-2055 growth will be replaced by a reduction (United Nations, 2004). For many European countries (including Russia) and Japan, the demographic problem in general becomes a matter of survival. And there are few ways out of this situation: increasing the birth rate and encouraging migration. Both methods have no simple solutions.

The stimulation of childbirth has very limited potential, which is mainly due to the economic and cultural constraints, which are closely intertwined. It should be noted that a "big family" (a family with 3 or more children) has ceased to be an ideal for young people. Let's characterize the restrictions.

Economic restrictions, as we called them, are associated with the deterioration of the economic situation and the complication of the processes of professional socialization of young people. For example, the research of Smith (2000) showed that inprosperous USA (note that the studies were conducted before the crisis of 2008), the level of economic activity of women increased from 49% in 1970 to 71.5% in 1995 , mainly as a result of increased economic activity of women with young children. The share of traditional families with a housewife in 1972 was 53% of officially registered families; by 1998, it had fallen to 21%. On the contrary, the share of families with two economically active spouses increased to 59% of married couples in 1995, compared to 32% in 1972. Moreover, the contribution of women to family income does not cease to grow. Since 1994, in 22.5% of families, the wife's income exceeds her husband's income (OECD, 2016). Undoubtedly, partially this is the result of cultural shifts. However, if in richfamilies the main reason is emancipation, in working familiesthe most important thing is an economic necessity.

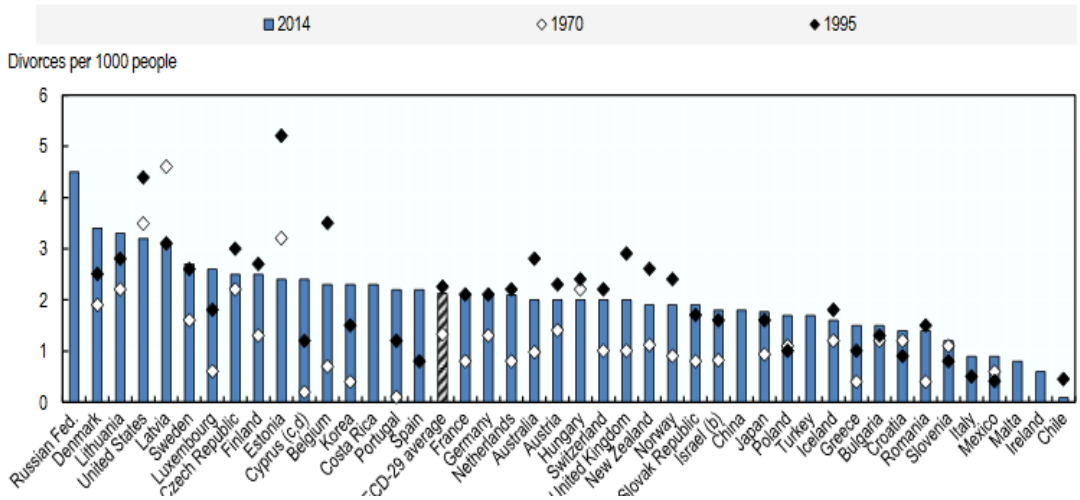
In addition, education is getting more and more important, which forces young people to postpone the terms of marriage for the sake of education and career. Studies of T. Smith have shown that the percentage of adults who had never been married increased from 15 to 23% between 1972 and 1998. In addition, during the period 1960-1997 the average age of marriage increased from 22.8 to 26.8 years for men and from 20.3 to 25 years for women (OECD, 2016).

Cultural restrictions are associated with the transformation of cultural values that have occurred over the past 25-35 years. Let us focus on a few cultural trends of these years:

- Formation of self-centered ideology in the youth environment (provokes an increase in the number of divorces);
- The growth of the same-sex ties and the legalization of the same-sex marriages;
- Development of the "child free" ideology.

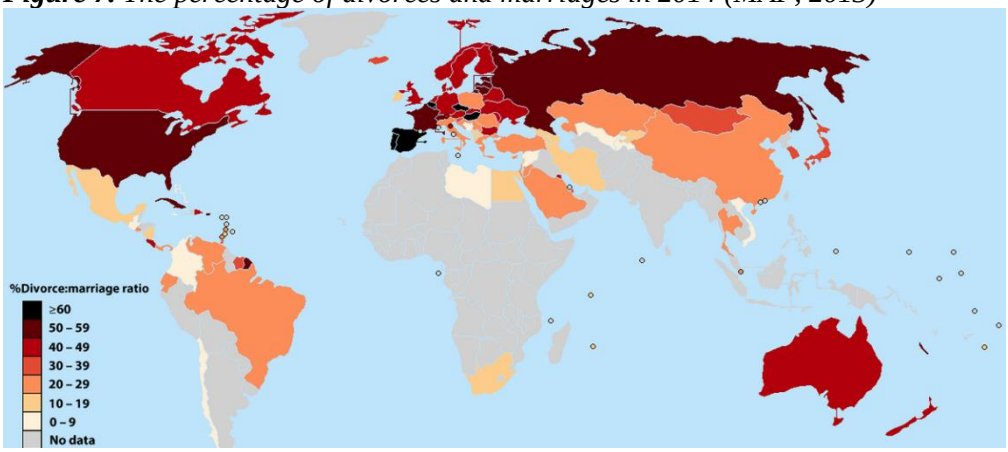
Each of the indicated trends does not seem to be significant. However, together they create a fairly strong cultural background, working against the cult of the "big family". For example, studies of the Economic Cooperation Organization showed that the overall divorce rate (per 1000 people) in different countries in 1970, 1995 and 2014 was biased (Figure 6).

Figure 6. *Total number of divorces per 1000 people (OECD, 2016)*



Note that the trend is quite evident (there are rare exceptions, especially if we compare the estimates of 1970 and 1995) and is valid for different countries with different religious traditions. We note that since the mid-1990s, the trend has slowed down significantly, but it's too early to speak about any turning point. We are going to show a map of the ratio of divorces to marriages (Figure 7).

Figure 7. *The percentage of divorces and marriages in 2014 (MAP, 2013)*



Note that high rates of divorces are typical for developed countries. And in just five European countries the share of divorces exceeds 60%. So we can conclude that it works against the cult of the "big family".

The second notable cultural trend in recent decades is the growth in the number and share of the same-sex couples who, in many countries, have the rights of heterosexual couples. We are not going to give any moral assessment of this trend. Let's talk only about the figures: for example, in mid-2016, there were 24 countries in the world where gay marriage was legalized, and 18 other countries where other forms of the same-sex unions (civil partnerships or civil unions) were registered (Figure 7). It is interesting how this map is correlated with the notion of a "developed" economy.

The dynamics of the trend is clearly illustrated by the results of a 2006 study by G.J. Gates. The analysis showed that for the period from 2000 to 2005 the number of the same-sex couples in the US increased from 600 thousand pairs to 770 thousand pairs, or by 28.3% (Gates, 2006). Moreover, the research of Gates showed that in the USA in 2000-2005 in some states the number of the same-sex couples increased by 1.5-2 times (Kolesnichenko *et al.*, 2017) (Figure 8).

Finally, we give another indicator - the proportion of homosexuals and bisexuals from the total number of adults (Figure 9). At the same time, G.J. Gates's research shows that the main contribution to this trend is made by the large cities of the United States. In itself, the growth in the number of the same-sex couples and the legalization of marriages, as it seems, has nothing to do with demography. In fact, everything is somewhat more complicated. Firstly, the same-sex couples do not have their own children - children in such families are adopted (so, they do not participate in population growth, but rather in its "redistribution"). Secondly, there are still no sociological studies on how the same-sex couples affect the future of their children. And, in principle, this topic is a taboo.

Figure 8. *Ten states-leaders in increase in the number of same-sex couples for the period 2000-2005. (Gary J. Gates, 2006).*

Rank	% Increase in Same-sex couples, 2000 to 2005	
1	New Hampshire	106%
2	Wisconsin	81%
3	Minnesota	76%
4	Nebraska	71%
5	Kansas	68%
6	Ohio	62%
7	Colorado	58%
8	Iowa	58%
9	Missouri	56%
10	Indiana	54%

Figure 9. *Ten leading states with a share of homosexuals and bisexuals from the total number of adults (Gary J. Gates, 2006)*

Rank	Estimated % of gay men, lesbians, and bisexuals in the adult population	
1	District of Columbia	8.1%
2	New Hampshire	6.6%
3	Washington	5.7%
4	Massachusetts	5.7%
5	Maine	5.2%
6	California	5.2%
7	Colorado	5.1%
8	Vermont	5.1%
9	New Mexico	4.9%
10	Minnesota	4.7%

One of the few studies of recent years of the American sociologist Sullins (2016) shows that children who have been brought up by the same-sex couples, at an older age (after 20 years), often have psychological problems. The research by Sullins shows that by the age of 28 the children brought up by same-sex parents face the risk of suffering from depression by 2.25 times. According to the scientist, 37% of adults who grew up in ordinary families and 72% brought up by the same-sex parents suffer from obesity. In addition, the sociological research of Sullins showed that 7% of those brought up in ordinary and 37% brought up in the same-sex families think of suicide from time to time (Sillins, 2016). Anyway, but we can hardly say that the growth of the same-sex couples is unlikely to contribute to the spread of large families.

The third cultural shift in recent years has been made by the development of the "childfree" ideology, the essence of which is the deliberate refusal from the birth of children by healthy families (families who physiologically can have children). As a rule, the main leitmotif of justifying the adherents of this ideology is that the child restricts personal freedom.

Sociological surveys show that the share of adherents of "childfree" in Japan reaches 30% of respondents; in Sweden, 29% (Kazachikhina, 2014). Similar polls in Russia in 2014 showed that 17 percent of Muscovites stated this position; in the whole country - 6 percent of citizens (Fedotova and Chepovskaya, 2015). It is quite obvious that these families (being healthy) fall out of the process of reproduction of labor resources.

To sum up, all of the above factors work against the traditional views on the family. At the same time, such tendencies are typical not only for the United States, but also for all the countries of the Western world (and Japan). It resulted in a decrease in the birth rate (per woman). For example, in the US for the period of 1950 - 2015 it decreased from 3.09 to 1.84; in Japan from 3.65 to 1.4; in Germany from 2.1 to 1.5 (Demoscope, 2017) (provided that for the population growth the coefficient should be more than 2).

Realizing that the process of self-reproduction is objectively going too low, many countries of the West consciously encourage migration. However, the practice of the European Union shows that migration poses more problems rather than benefits; the growth of crime, ethnic conflicts, displacement of indigenous people, etc. At the same time, the basis for the influx is a low-skilled labor force, and there are not enough jobs. In addition, the experience of the EU as a whole, Germany in particular, shows that migrants do not seek to assimilate, live in their communities and do not seek to work (counting on unemployment benefits) (Shapilov, 2014). In Germany, for example, the social benefit is 400 euros, which is much more than the wages of most migrants in their homeland.

In this regard, the "migration method" cannot solve the demographic problem, and the costs are quite real. According to the estimates of the Institute of World Economy (IWE), the money to be spent on migrants in Germany for the period 2016-2022 is going to be 385 billion euros (Feliakhov, 2016). Undoubtedly, the current wave of European migration is largely a "force majeure", but it is provoked by certain geopolitical interests, including European countries, and migrants move not to the poorest EU countries, but mostly to Germany and France. At the same time, the problem of migration and socialization of migrants is topical not only in Europe, but also in the United States.

Thus, migration as a way of solving demographic problems has a questionable effectiveness. In this connection, returning to the initial premise, the demographic problem is a kind of doom, that is, the problems of pension provision will increase in

the future, creating an additional burden on public finances and further on the economy as a whole. Another important fact is that the influence of demography on the economy is long-term and manifests itself with a large time lag. In addition, in most countries the steps made within the last decades to improve the demographic situation can hardly be considered successful.

4. Conclusion

Thus, the study of the financial engineering functionality in addition to the modeling of corporate strategies for attracting financial resources has allowed drawing the conclusion that the analytical support of financial engineering, as a process of selection and balancing financial tools attracted by the corporation, allows reducing the level of risks and costs on their hedging. Corporate structures should form for themselves the most optimal configuration of financing tools, depending on the scale of operation, financial stability, cost of financing tools servicing, belonging to the industry segmentation and the type of the used production technology.

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