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CORRELATION OF DEMOGRAPHIC-ECONOMIC EVOLUTIONS IN ROMANIA AFTER THE 2008 ECONOMIC CRISIS

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Abstract: *The paper aims to clarify the extent to which economic developments after 2008, largely due to the global economic crisis, have had an impact on demographic indicators in Romania. From the correlation analysis between the series of economic and demographic data (with a delay of one year), concluded that unemployment strongly influence live births and total fertility rate (especially for first-born), and in a medium measure the natural population change, and GDP is strongly correlated with the natural growth of the population, and medium correlated with the number of live births, total fertility rate and the number of marriages.*

Key words: *economic crisis, correlation coefficient, demographic indicators.*

1. Introduction

2013 is the 5-th year since the beginning of the world economic crisis. Started on September 2008, after the collapse of the investment bank Lehman Brothers, the crisis materialized in a lot of banks, investment funds and American companies bankruptcies, and the effects quickly spread in Europe.

Far from a satisfactory economical development stage, Romania had to face a new challenge: a decline in economical indicators, followed by questionable governmental measures in order to keep the budget at the waterline, leading to social tensions and incertitude.

Already a country with a low level of the average income per inhabitant and a poor standard of living, after the crisis began, economic problems first arose to Romanian people the problem of the possibilities of earning their living, and not the last the possibilities of supporting a new member in their own family.

Even if the issue of the demographic dynamics related to economical decline has been often tackled, it's accepted that fertility follows the economic cycle, falling in periods of recession and vice-versa, though scientific evidence is still not unanimous on this.

This paper aims at testing how sensitive the demographic indicators have been for the case of Romania, at the economic decline after 2008.

2. General economic context

Romania has not been avoided by the general crisis came from America. A contribution to increasing the effects of crisis brought the external high deficit of the country. There were also other factors that

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heighten the pressure came from outside: revenues and fiscal-budgetary policies relaxing accompanying the parliamentary elections from November 2008, budgetary deficit growth, the sudden brakes bank credit at the end of the year after an excessive rise in the first quarters that fed an overfilling demand. The only positive aspects of the period were the bumper harvest and the decrease in oil and some rough materials prices, helping in decreasing the inflation pressure at the end of the year.

Romania faced new challenges in 2009, like the contraction of the main export markets for our national products, the reduction of the external private credit lines from the mother banks, increasing the risk aversion for the foreign investors, national currency depreciation and strong decreasing for many assets value. As a result, major economical effects were: significant decreasing of GDP, budgetary deficit growth, national currency depreciation, current account deficit diminution.

The effects of world economic-financial crisis were also felt by 2010, inside the Romanian economy. Instead, our country wasn't able to play the tactic of lax monetary and financial policies, in order to go out of recession, as was the case of the U.S.A., being restrained by the budgetary deficit, still on a high level. As a result, the fiscal-budgetary measures pack set out in July 2010 (consisting of the diminution by 25% of public sector wages, and put up standard quota of V.A.T. from 19% to 24%) led to a diminution of about 11 percentages of the wages in the budgetary sector. Generally, entire labor market was affected: not only dismissals in the public sector, but also restraints of the employees in the private sector, jobs being kept blocked (since May 2009) and early retiring in anticipation of the new law of pensions.

One of the most important characteristics of the period 2009-2010 was the change of the economic growth type, from one mostly based on consumption, to one more balanced, with a stronger role played by exports.

The macroeconomic indicators had a light improvement by next year, in 2011 being noticed: a tiny level of GDP growth, a reduction in budgetary deficit, a slow reviving of the labor market conditions manifested by a modest increase in the employees number. Instead, the long-term unemployment raised; while the registered unemployment rate decreased, the ILO unemployment rate grew up, as a result of a modest economic growth and a rigid labor market.

The dependence of the economic evolution on the agricultural production, investment demand and net export explains the slowing down of the economic growth in 2012. Budgetary deficit decreased, exports stopped from raising, imports lowered. On the labor market, by the end of 2012, less than 1/3 from the employees number lost in the previous years (since the beginning of the crisis) was recovered, even if in the budgetary sector the restraint process of the employees number stopped, and in some private sectors increased the demand for labor force.

This general economic context was felt by the population in their standard of living depreciation. Continuous increasing of the exchange rate brought more expensive bills. Budgetary wages were cut by 25%, VAT increased by 5%, massive dismissals, the fall of the foreign investments caused by the uncertainty and distrust led to social effects in multiple domains.

3. Economic and demographic correlations study

Studying the connection between economic evolutions and demographic ones, it's interesting to answer the question:

to what extent do actual economic evolutions and prospective expectations affect the reproductive behaviour of the Romanian population? It is considered a population with a much lower standard of living, as compared to other European states, in whose families a new-born member may raise the question of financial supporting in the future. After this crisis begun, were people more sensitive to having a (another) child? The evolution of demographic indicators can be related by the economic indicators decline?

In the following assay was taken into account that having a child is a delayed process related to the decision of having one, therefore I considered the demographic phenomenon at one year gap from the economic events.

The correlation analysis between demographic and economic indicators confirmed the existence of a very strong cause-effect connection between unemployment rate during 2007-2011 and live births number 2008-2012, with a correlation coefficient of -0,92. The growth of the unemployment rate during the mentioned period of time influenced the decrease in the number of births in the next years. Divided into the 2 components, urban-rural, the births number fall seems almost equally strong correlated with the unemployment threat, with a correlation coefficient of -0,91 in rural area and -0,89 in urban, even if it would be expected that urban families, totally dependent on having a job, be more reticent in having a child compared to rural families, which mostly produce in their own household a part of the foodstuff necessary for the living.

Unemployment rate and live births Table 1

Years	**Unemployment rate [%]**	Live births Total	Live births Urban	Live births Rural
2007	6.4			
2008	5.8	221900	121518	100382
2009	6.9	222388	121864	100524
2010	7.3	212199	117851	94348
2011	7.4	196242	106667	89575
2012	7.0	201104	108425	92679

Source: Eurostat Yearbook

An extremely strong connection also appears to be between unemployment evolution during 2007-2010 and total fertility rate during 2008-2011, marked by a correlation coefficient of -0,93. Unemployment threat changed couples perception regarding the number of the children they would like to have.

But is interesting to compare the correlation between unemployment evolution 2007-2010 and total fertility rate 2008-2011, with the correlation between the same indicators, but during a longer period of time (unemployment 2002-2010 and fertility total rate 2003-2011). In numbers, the fertility is influenced by unemployment in a medium extent during a longer time (with a correlation coefficient of -0,66), while, soon after the crisis installed, the correlation became very strong (correlation coefficient was -0,93), suggesting that a threat as the economic crisis has visible modified the reproductive behaviour; after the sustained decrease of the total fertility rate, it reached a minimum level in 2011, an average of 1,25 children born by a woman during her fertile life, under the level registered in 2003, of 1,27

children. 2002-2008/2009 period had the specific trend of fertility rates growth in the entire Europe, explained by the analysts from the domain as a recuperation phase after postponement of childbearing (they saw this phenomenon of fertility temporary increasing not as a real increase in the fertility dimension, but only a tempo effect; postponement of the event for a while was compensated by the recuperation after, in this way was attained the same level of fertility overall). Even though none of the European countries had the fertility rate under 1,3 in 2008, considered by some scholars as the "lowest-low fertility", the births recuperation process seemed to be stopped by 2009, however only in three countries (and among them was Romania) the indicator value fell below 1,3 live-births for a woman.

Unemployment rate and total fertility rate Table 2

Years	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Unemployment rate (%)	7.5	6.8	8.0	7.2	7.3	6.4	5.8	6.9	7.3	7.4
Total fertility rate (live births per woman)	-	1.27	1.29	1.32	1.32	1.3	1.35	1.38	1.33	1.25

Source: Eurostat Yearbook

A very strong correlation resulted when analysing two data series: unemployment rate 2007-2010 and total fertility rate percentage attributable to live births of first order (TFR1) 2008-2011 (-0,92 correlation coefficient), respective total fertility rate percentage attributable to live births of order two or over (TFR 2+) (+0,92). The decrease of the total fertility rate percentage is more visible when refers to the first child, than for an order two or over birth. As a conclusion, families without children are more willing to postpone the first child birth, than the families having already one or a few, to have another one.

In the fertility by women employment status analysis, it can be observed that fertility rate is usually lower for the women having a job, than for the unemployed women, and the decline in its value is bigger for the employed women (from an average of 1,39 children for an employed woman in 2008, to 1,14 in 2011), compared to fertility rate of women without a job (an average of 1,55 children for an unemployed woman in 2008, to 1,43 in 2011). But both evolutions of fertility rates, for employed women and for unemployed ones, are highly related to unemployment evolution (correlation coefficient of -0,80 or -0,85).

Unemployment rate and total fertility rate Table 3

Years	**Unemployment rate [%]**	TFR 1 (live births per woman)	TFR 2+ (live births per woman)	TFR employed women (live births per woman)	TFR non employed women (live births per woman)
2007	6.4	52.8	47.2	1.35	1.44
2008	5.8	54.0	46.0	1.39	1.55
2009	6.9	54.0	46.0	1.37	1.52
2010	7.3	53.6	46.4	1.30	1.45
2011	7.4	53.3	46.7	1.14	1.43

Source: Eurostat Yearbook

The most representative indicator for economic trend, real GDP growth rate (2006-2010), provided a strong correlation coefficient (+0,79) when related to natural population change, 2007-2011. On the other side, real GDP growth rate was medium correlated to live-births number 2008-2012 (+0,52 correlation coefficient), to total fertility rate (+0,54 correlation coefficient) and to marriages number evolution (+0,70 correlation coefficient). A medium influence also proved on natural population change between 2007-2011, unemployment evolution during 2006-2010 (with a correlation coefficient of -0,62), but there is an inverse connection, the diminution of the unemployment rate lead to the increase of the natural population change.

Inflation rate, unemployment rate, natural population change, live births, total fertility rate and marriages number Table 4

Years	**Inflation rate (CPI) %**	**Natural population change** (per 1000 inhabitants)	**Live births Total**	**Total fertility rate** (live births per woman)	**Marriages number**	**Unemployment rate [%]**
2006	6.6	-	-	1.32	-	-
2007	4.9	-1.7	-	1.30	189240	6.4
2008	7.9	-1.5	221900	1.35	149439	5.8
2009	5.6	-1.6	222388	1.38	134275	6.9
2010	6.1	-2.2	212199	1.33	115778	7.3
2011	5.8	-2.6	196242	1.25	105599	7.4
2012	3.3	-	201104	-	107760	-

Source: Eurostat Yearbook

After the analysis of the inflation rate evolution during 2007-2011 and the evolution of live-births number, natural population change number and total fertility rate in the next years, no connections were found. As a conclusion, the demographic indicators are stronger correlated to macroeconomic indicators like unemployment and economic growth, with one year lag.

Not all the demographic developments after 2008 can be attributed to the economic crisis. Recent evolutions of the birth rate are under the sign of the demographic change process known as *the second demographic transition*, and Romania took part of it, beside the other European countries, process marked by fertility decrease as a result of the modifications in attitudes and behaviour regarding marriage, age to get married, number of wanted children, age to became mother, cohabitation, divorce, children out of marriage, sexuality. The reproductive pattern, built up in the West Europe countries, was adopted by Romania after 1989, and can be resumed at a family with smaller number of children, born at an older age of the parents, and a larger proportion of unmarried mothers. Even if the economic conditions took an important place among all the causes influencing the demographic evolutions, they have not totally conditioned them, because the evolution of the society brought woman emancipation, higher involvement of woman in economic activity, increase of the functions importance hold by women at the workplace, multiplying of the professional

tasks and reduction of the spare time, reevaluation of family size (family accomplishment) / professional fulfillment ratio, etc.

Future perspectives of the effects of current economic and demographic developments

In the long run, economic crisis will deepen the demographic trends already begun since 1990. Among them, we can mention:

- Romania population diminution;
- change in population age group weights, with higher percentage of older people, and diminution of young and adult share;
- difficulties in financing the pension system, given that in the future, the number of pensioners per one employee will be increasingly more;
- Regarding capitalized pension schemes, funded pensions are directly affected by the financial crisis, as the crisis devalues funds that have been accumulated before the crisis. In general, the crisis is estimated to have reduced the assets accumulated in pension funds by 15.8%.
- Public pension systems will be affected by the financial crisis in a less dramatic and immediate. Ongoing global recession will reduce contributions to public pension systems revenues as a result of rising unemployment or reduced wages to which contribution rates. Public pension expenditure will rise as increasingly more people will retire, seeking to protect their income at least a period of economic recession.

After the UN Population Division forecasts, current level of female fertility - 1.3 children per woman -, without external migration and a further increase in life expectancy at birth, Romania's population could reach 16 million in 2050 and 8 million in 2100.

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