
THE IMPACT OF GLOBAL AGING ON ASSET PRICES AND RETURNS

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Abstract

Numerous studies have tried to model the connection between the structure of population and the financial markets, showing the possibility of a future meltdown in the financial markets, via lower savings and investments given the reaching of the baby-boom cohorts at the age of retirement. In general the research has focused on the case of more industrialized countries, where the aging phenomenon is more felt in the present. The case of Central and Eastern European countries was somehow left aside, although the issue of aging should be an important one, considering also the current state of developing CEE capital markets. Our empirical work, based on the Romanian experience, suggests also that the demographic dynamics have had a detectable impact on the domestic stock market.

Key words: *aging, stock markets, life-cycle theory*

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The motivation for our research is pointed out by Daniel Dennett Professor of Philosophy at Tufts University, who said in June 2011 in Bucharest that:

“The individual is responsible for the way he uses the “moral competence”: the ability to respond to reason and the ability to recognize and counteract manipulation by other individuals.”

This is not entirely true because it is not a question of psychology but one of sociology. A person seeks membership in a social group and people are connected in a global network.

To realize a survey is still a challenge because as Devi (2008) said, in the world only 26% of investors are women, although the returns obtained by women traders are beyond that of men (2010) Christiansen.

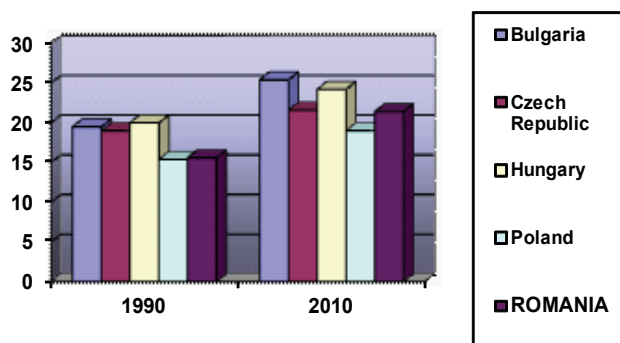
The problem encountered in attempts to achieve this survey is that men tend to be too self confident, due to overconfidence theories based on biased self-attribution, Glaser et al., (2009)

There is a growing body of literature which analyses the connection between aging and the possibility of a future meltdown in the financial markets, via lower capital accumulation and investment. The general conclusion is that the demographic change is likely to have a negative influence on the capital markets, both in their rates of return and their financial assets volume. The majority of the research focused though on the case of the industrialized countries. Our work aims on bringing more light on this issue, being based on the experience of one Central and Eastern European country, member of the European Union, Romania.

The paper is structured as follows: it provides a brief review of the demographic dynamics in Romania, placing it alongside other CEE countries with a similar trend and developing a line of economic reasoning that could link this dynamics with some negative effects for the financial markets. Also, it presents the main conclusions of the previous empirical research in this respect and it proposes a first methodological attempt for an empirical investigation of the connection between aging and the Romanian capital market. Finally, it summarizes the results of the research.

The population of European Union is aging, without any exception (old and new member states). All these factors had a strong influence on the old-age dependency ratio, both in its level and rate of growth, showing an increased economic burden on people in work. As far as concerns the Romanian case, although we are not in the top of the EU-12 countries with the highest level of old-age dependency ratios, we had one of the highest level of growth of this indicator (of 37 %).

Old-age dependency ratios. Comparative levels 1990/2010



Source: Eurostat (2012)

Moreover, if we look at the Romanian age structure diagram, it shows as well that from a relatively stable pyramid, we are gradually passing to a constrictive pyramid till 2050, to a greying population, as the country has longer life expectancy, lower death rate and also lower birth rates.

The life-cycle hypothesis (introduced by Modigliani and Brumberg, 1954) outlines the negative connection between aging and saving, considering that a larger share of elderly people could lead to a smaller aggregate saving rate. Goyal (2004) points out that an increase in the level of saving is mainly determined by the middle-aged individuals for two reasons: the increasing wealth of this share of population and the desire to save for old age, when the incomes are low. Jacklin and Goldsticker (2007) define the 40-64 middle-aged individuals as primary asset accumulators in comparison with those over 65, which are disinvesting in order to maintain their previous standard of living.

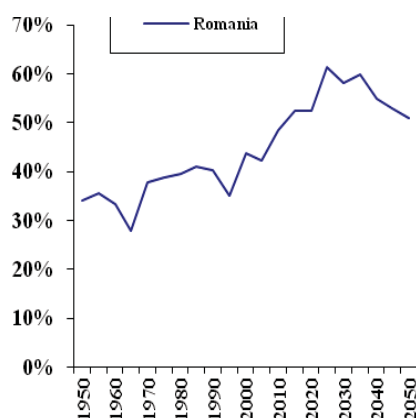
The researchers have focused lately on the negative effects that the demographic shift might bring on the domestic financial markets in general and on the stock markets, in particular. Chawla et. al. (2007) analyses the influence of aging on portfolio structure, stating that the people's risk aversion is a function of their age. The older they are, the less risk they are willing to take. Consequently, the process of aging determine people to shift from high-risk instruments to safer instruments, like fixed-income ones. The subject of lifecycle investment is of particular interest for investment professionals wishing to analyse the investment patterns and now, with the baby boom generation almost reaching the retirement age, the influence of changing age distributions becomes even more important.

Still, little empirical work has been done, to our knowledge, on the case of some Central and Eastern European countries. Therefore, due to the negative demographic trend registered in Romania we consider worth trying an empirical

approach in order to see whether a decrease in the share of the middle-aged individuals (the so-called savers who are thought to have positive net savings, usually considered in the literature as the share of population between 40 and 64) may generate an effect on the domestic stock market. In this way we are also verifying the scenario of a possible meltdown of the financial market in the Romanian case.

Chawla et al. (2007) describe the asset meltdown as specific to those countries where the size of the cohorts that tend to have positive net savings is shrinking over time. We can notice this trend, starting with 2030 if we look again both at Romania and the other EU countries.

Dynamics of the ratio of savers to dissavers in Romania



Source: United Nations (2012)

Practically, the potential meltdown process of the financial markets is expected to appear when the retirement age generation starts selling their assets, generating an imbalance between the demand (the smaller cohort eager to buy) and offer of financial assets, contributing to the lowering of asset prices. This process may be fostered by the retirement of the baby boom generation, the demand being in this case insufficient to absorb a massive sell-off of financial assets (Siegel, 2006). However, till now, no model predicted a significant movement that would qualify as asset meltdown and would be comparable to any of the historic crashes.

Nevertheless, not all the studies share the same opinion that aging will lead to a downturn of the financial markets, regardless of its magnitude. There are some authors which consider unrealistic some constraints like the fixed rate of saving rate for young cohorts, the fixed capital supply or the lack of mobility of the capital, often mentioned by the studies which predict

a meltdown of the financial markets (Lim and Weil, 2003) and others who actually claim, based on their empirical approaches, that the asset prices on the stock markets may actually rise once with aging (Brooks, 2006).

The majority of the empirical works have focused on the case of US financial markets. From these studies, we can outline Poterba's one (2004) which explores the importance of changing demographic structure for asset returns, asset prices, and the composition of household balance sheets in the United States. He basically finds that asset holdings rise sharply when households are in their 30s or 40s, but when he wants to forecast the asset demand in the future in accordance with the demographic shift, he does not find a sharp decline in the asset demand between 2020 and 2050. Then Yoo (1994) analyses the influence of different measures of the age distribution on the real returns on stocks, bonds and Treasury bills in the US, but only finds a relevant link between demographics and treasury bills. Bergantino (1998) finds a statistically significant link between the effects of changes in the age distribution of the U.S. population and the housing, stock, and bond prices over the post World War II period.

Then there are a number of papers which focus on the case of the industrialized countries. Ang and Maddaloni (2003), using a relatively long sample over the whole 20th century find that demographic variables predict excess returns internationally, but this connection is stronger in the case of the countries with well developed social security systems. Davis and Li (2003), on the contrary, find that the proportion of savers (age groups 40-64) is positively and significantly correlated with changes in real stock prices, while it is negatively correlated with real bond yields. Brooks (2006) empirically proves that the relationship between middle-aged cohorts and relatively high real stock and bond prices does not hold for countries with strong equity market participation among households.

Fewer studies have aimed at proving empirically the impact of population aging on the Central and Eastern European stock markets. Chawla et al. (2007) outline in their study that aging is proceeding rapidly in all EU15 countries, whereas the countries in Eastern Europe and the former Soviet Union are a more heterogeneous group. For a number of these countries, dependency rates are not projected to decline over the next two decades, so demographically driven concerns about declining saving rates are not relevant. Holzmann et. al. (2009) presents some key aspects of the impact of aging on the rates of return paid by pension schemes. They conclude that although changes in demographic structure are likely to affect the supply and demand for financial assets and consequently their returns, the increase in dissavers in relation to savers across are unlikely to lead to a meltdown in financial asset

prices in the case of Central and Eastern European Union states. They see the worst case scenario as a downturn between 50 and 100 basis points for the retirement assets only.

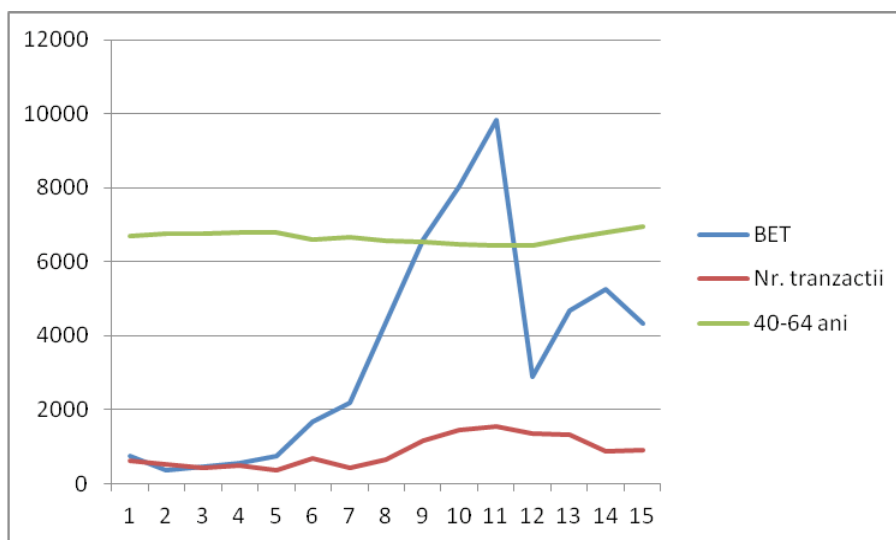
The data analyzed were obtained from the National Institute of Statistics website and from EUROSTAT website for the variables that refer to the structure of Romania's population. These were recorded for the period 1990 to 2011. Regarding the variables provided by Bucharest Stock Exchange (BSE) website, these are divided into two categories: variables that analyze the annual values of BSE indices and variables that characterize shares transactions. The first category includes absolute values and yields for all BSE indices. For BET values we found available data for the period 1997 to 2012. Second category includes the following variables:

- The annual number of trading sessions;
- The annual number of transactions in shares;
- The annual volume traded (number of shares traded);
- Annual value traded (RON);
- The average daily traded;
- Market capitalization;
- Number of the issuing companies;
- Number of new issuing companies;
- Number of delisted companies;
- Number of intermediaries.

The values of these variables were obtained for the period 1996-2012. Thus, crossing the two periods, the analysis performed in this study takes place with annual frequency for the period 1996-2011.

Considering as a exogenous variable the „savers”, the number of people included in the age category 40-64 years and applying regression models, we see that the only strong correlation with the endogenous variables are BET and the annual number of transactions in shares. This is illustrated in the figure below (Figure 4):

Correlation between age group 40-64 years, BET and the annual number of transactions with shares



The relationship between the age group 40-64 years and BET

Considering a linear regression model for the period 1997-2011, between the two variables we get:

$$BET = 78,470.12 - 0.01125 * NPS;$$

where: BET = BET value;

NPS = number of persons 40-64 years group;

The regression model is valid because the calculated statistic of test F is 5.83889 and the Significance F is 0.031116 which is less than 0.05 relevant threshold. This result is guaranteed with a probability of 95%.

This model shows that 55% of the BET index variation is explained by the variation of the number of individuals ranging in age group 40-64 years.

This model shows that a person increase in the number of individuals ranging in the age group 40-64 years decreases BET value by 0.01125 units.

The two parameters are statistically significant for the probability of 95%, considering that the p value is 0.25166 and 0.0311 respectively, both less than 5% significance level.

The relationship between age group 40-64 years and the number of yearly transactions on BSE

Considering a linear regression model for the period 1996-2011, between the two variables we get:

$$\text{NAT} = 14048382 - 1.98784 * \text{NPS};$$

where: NAT = annual number of transactions on the BSE;

NPS = number of persons 40-64 years group;

The regression model is valid because the calculated statistic of test F is 9.461226 and Significance F is 0.008216 which is less than 0.05 relevant threshold. This result is guaranteed with a probability of 95%. This model shows that 40.32% of the variation in the number of yearly transactions on BSE is explained by variation in the number of individuals ranging in age group 40-64 years. This model shows that a person increase in the number of individuals ranging in the age group 40-64 years, decreased the number of yearly value transactions on BSE by 1.98784 units. The two parameters are statistically significant for the probability of 95%, considering that the p value is 0.005691 and 0.008216 respectively both less than 5% significance level.

The correlation between the BET index (annual values) and the difference between the number of male and female in urban area – period 1997-2010

Considering a linear regression model for the period 1997-2010, between the two variables we get:

$$\text{BET} = -19684,3 - 0,04982 * \text{DMFU};$$

where: BET = BET value;

DMFU = difference between the number of male and female in urban area;

The regression model is valid because the calculated statistic of test F is 18,80285 and the Significance F is 0,000968 which is less than 0.05 relevant threshold. This result is guaranteed with a probability of 95%.

This model shows that 61% of the BET index variation is explained by the variation of the difference between the number of male and female in urban area.

This model shows that if the difference increases by one person, the BET value will decrease by 0.04982 units.

The two parameters are statistically significant for the probability of 95%, considering that the p value is 0,003207 and 0,000968 respectively, both less than 5% significance level.

The correlation between the Daily Medium Value(annual values) and the difference between the number of male and female in urban area and the difference between the urban and rural population in Romania – period 1997-2010

Considering a linear regression model for the period 1997-2011, between the two variables we get:

$$DMV = -1,4E+08+21,01267*DMFU -243,854 *DUR;$$

where: DMV = Daily Medium Value;

DMFU = difference between the number of male and female in urban area;

DUR= difference between the urban and rural population in Romania

This is still a linear regression model but it is a multiple one considering the two exogenous variables.

The regression model is valid because the calculated statistic of test F is 15,83676 and the Significance F is 0,000328 which is less than 0.05 relevant threshold. This result is guaranteed with a probability of 95%.

This model shows that 66,42% of the Daily Medium Value(annual values) variation is explained by the variation of the difference between the number of male and female in urban area and the difference between the urban and rural population in Romania

The three parameters of the model are statistically significant for the probability of 95%, considering that the p value is 0,000358, 0,035908 and 0,000136 respectively, the three of them being less than 5% significance level.

Our results, which appear to be statistically significant, seem to contradict the previous results of the empirical research, but are of course subject to some limits. First, the reduced period of analysis. Then, the narrow range of dependent and independent variables. Future attempts will try to quantify more variables that might be influencing on the development of the domestic stock market (i.e inflation, capital openness of the economy, bank size, GDP per capita, investment freedom, law and order index etc.). And at last, we could take into consideration in our future working paper the case of other Central and Eastern European countries. The first three models show that (2010) Christiansen was right.

The last model shows that Devi (2008) was right. In Romania as in every country when the number of male in urban area increases the Daily Medium Value will increase but the BET value will decrease.

In general, trying to establish the influence of aging on the Central and Eastern European capital markets represents quite a challenging task in the context of controlling for all the variables that might affect the development of the domestic capital markets. The saving pattern of households and individuals

may differ from the Western European countries, given the transition period. There might be that savings increase in these countries due to the wish of people of „replenishing depleted assets from the early years of transition” (Chawla et al., 2007). Secondly, the savings rate could be also enhanced when moving from the stage of bank-based financial system, once with the implementation of reforms meant to deepen the financial markets and foster the financial innovations. A determinant for the development of the domestic capital market could be represented therefore by the type of existing financial system in the country of analysis. Romania, as well as the other Central and Eastern European countries have relatively developed capital markets, their financial system being rather a bank-based than a market oriented one. This is the reason why, while assessing aging impact, it would be essential to consider how financial structures evolve as countries develop, and factors that influence such development.

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