The Resilience of Pension Systems in the CEE Countries to Financial and Economic Crisis: the Need for Higher Diversification

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Abstract
During the present economic crisis, several CEE countries decided to reduce the pension contribution paid to the private 2nd pillar. It is an obvious retraction from the pension reforms initiated in the last decade. The aim of the article is to assess the resilience of pension systems in the CEE countries to financial and economic crisis. The thesis put forward in the article is that the CEE countries should increase the potential diversification in the mandatory pension systems in three dimensions: division of the contributions between the unfunded and funded pillars, between public and private management in the pension systems, and between allocation of pension assets in domestic and foreign financial markets. The paper includes a description of the structure of the pension systems in the CEE countries and the latest political decisions related to these systems in the context of their potential resilience to economic crisis, a review of the literature related to the impact of the crisis on the pension systems, an argument for multi-dimensional diversification in mandatory pension systems, and an assessment of this diversification in the CEE countries.

Keywords: pension system, financial crisis, economic crisis, diversification.
JEL codes: E21, E44, G23, H55

1. Introduction

Countries of Central and Eastern Europe (CEE) started reforming their pension systems at the end of the last decade of the 20th century. The leaders in the region were Hungary and Poland. The directions of the reforms were very similar and in most countries of the region their objective was to replace systems generally based on one, mandatory pay-as-you-go pillar with a three-pillar system. In the new system, the first pillar, which is mandatory and publically managed, constitutes an unfunded, pay-as-you-go scheme. The second pillar, which is mandatory and based on a funded scheme, takes the form of a marketplace for privately managed capital pension funds. The last pillar, also a funded one, is optional. The financial crisis that started in 2008 was the turning point in the pension system reforms in the CEE countries and has resulted in the slowing, if not reversal, of privatization of the pension systems. The aim of the article is to assess the resilience of pension systems in the CEE countries to financial and economic crisis. The thesis put forward in the article is that the CEE countries should increase the potential diversification in the mandatory pension systems in three dimensions: division of the contributions between the unfunded and funded pillars, between public and private management in the pension systems, and between allocation of pension assets in domestic and foreign financial markets. The assessment covers the structures of the pension systems, the participation of the public sector and the private sector in management of the mandatory pension systems, the methods of financing of the benefits (unfunded vs. funded), and the openness of the pension systems to foreign financial markets. The conclusions and recommendations presented in this article are based on a review of the relevant literature, on theoretical considerations, and on a comparative analysis of the structures of the mandatory pension systems in the CEE countries.

2. Changes in pension systems in the CEE countries during the crisis

A comparative analysis of the general structures of retirement systems in the CEE countries can be based on a three-pillar model of a pension system, in accordance with the World Bank taxonomy (World Bank, 1994). The relevant data that characterizes the pension systems, in their form before the outbreak of the financial crisis in 2008, is shown in tables 1 and 2.

Table 1: General structure of the pension systems in selected CEE countries (as of 1 January 2008)

Country	1st pillar – unfunded (PAYG)	2nd pillar – funded
Bulgaria	DB	Mandatory pension funds
Croatia	DB	Mandatory pension funds
Czech Rep.	DB (since 2010 DC)	No pension funds
Estonia	DB	Mandatory pension funds
Hungary	DB	Mandatory pension funds
Latvia	DC	Mandatory pension funds
Lithuania	DB	Voluntary pension funds
Poland	DC	Mandatory pension funds
Romania	DB	Since 2008 mandatory pension funds
Slovakia	DB	Mandatory pension funds
Slovenia	DB	Pension funds (mandatory for selected occupations)

Source: Prepared by the author on the basis of Allianz Global Investors (2007): *Central and Eastern European Pensions 2007*; Dupont G. (2004): *Pension reform in acceding countries*, Revue de I'OFCE, vol. 91 bis, issue 5, pp. 55-81

Table 2: Pension contribution rates in the CEE countries

Country	Overall pension contribution [%]	1st pillar contribution [%]	2nd pillar contribution [%]
Bulgaria	23,00	18,00	5,00
Croatia	20,00	15,00	5,00
Czech Rep.	28,00	28,00	-
Estonia	22,00	16,00	6,00
Hungary	26,50	18,50	8,00
Latvia	20,00	10,00	10,00
Lithuania*	23,70	18,20	5,50
Poland	19,52	12,22	7,30
Romania	27,50	25,50	2,00**
Slovakia	18,00	9,00	9,00
Slovenia	24,35	24,35	-

* voluntary 2nd pillar ** fixed or gradually increasing

Source: Prepared by the author on the basis of Allianz Global Investors (2007): *Central and Eastern European Pensions 2007*

All of the countries covered by the analysis, with the exception of Poland and Latvia, have completed a partial reform of the 1st pillar, while maintaining a defined benefit (DB) scheme. In the Czech Republic, the defined contribution (DC) scheme began operating in 2010. Moreover, the Czech Republic is the only country that has not introduced a 2nd pillar into the pension system. In Slovenia, on the other hand, the 2nd pillar is mandatory only for selected occupational groups (the public service, the banking sector, occupations with high occupational risks) and optional for the remaining occupational groups. In Latvia, too, workers can decide whether their contributions are paid fully into the 1st pillar or split between the 1st and the 2nd pillar. The remaining countries of the region have decided to make contributions to pension funds (2nd pillar) mandatory.

The highest total pension contribution is in the Czech Republic, where the contribution paid to the 1st pillar amounts to 28% while payments to pension funds are optional. Pension contributions are high also in such countries as Romania (a total of 27.50%), Hungary (a total of 26.5%), and in

Slovenia (24.35% - the whole contribution is paid to the 1st pillar). On the other hand, the lowest pension contributions are collected in Slovakia (a total of 18%) and in Poland (a total of 19,52%).

During the financial crisis (since 2008), some countries of the CEE implemented changes pertaining to the 2nd pension pillar (World Bank, 2009, Velculescu, 2011):

- in Bulgaria, the contributions paid to the 2nd pillar were fixed at the level of 5% until 2014, with an increase to 7% planned starting in 2015;
- in Estonia, the whole 2nd pillar contribution was moved to the 1st pillar; in 2011 the contribution will be restored and will be equal to 2%; in the years 2012-2013 it will be equal to 4% and after 2014 – to 6%, with possible increase of the contribution until 2017 to compensate for the losses incurred in the period of 2009-2013;
- in Hungary, the full contribution in the mandatory pension system was redirected to the 1st pillar, with the 2nd pillar made optional;
- in Latvia, the 2nd pillar contribution was lowered to 2% in May 2009; in 2010 it was increased to 4% and in 2011 – to 6%;
- in Lithuania, the 2nd pillar contribution was lowered from 5.5% to 2% in 2009 and 2010; in the years 2012-2014, the contribution is to be increased to 6%;
- in Poland, the 2nd pillar contribution was reduced in 2011 from 7.3% to 2.3%; the contribution is to increase gradually and to reach 3.5% in 2017;
- in Romania, the 2nd pillar contribution was fixed at the level of 2%, although it was supposed to be increased to 2.5%;
- in Slovakia, the 2nd pillar was made optional after January 2008 for persons entering the job market and members of the pension funds were allowed to exit the funds within a certain period.

The tendency to lower the 2nd pillar contributions in the CEE countries is unquestionable and constitutes a retreat from the pension reforms started a decade earlier. This way, the importance of the unfunded pay-as-you-go schemes in the pension systems increases again to the detriment of the funded schemes. The changes were implemented as a result of the outbreak of the financial crisis in 2008 and were forced most of all by the deteriorating condition of public finances and the increasing public debt, which was exacerbated by the slow or negative economic growth in the countries in question. The failure to complete the necessary economic reforms in the transformation period had resulted in a search for savings in the pension system. The essence of the changes was to move the 2nd pillar contributions to the 1st pillar. This resulted in more money flowing to the 1st pillar, which improved its standing and, consequently, reduced the need for subsidies from the government budget. This way the public debt increases at a rate that is slower than if the 2nd pillar contributions were higher. However, it must be emphasized that the savings are fictitious, as they do lower the deficit in the public finances shown in the statistics but they increase the so-called hidden debt having the form of future pension obligations of the state. As a result of the growing contributions to the 1st pillar, which is publically managed, the state assumes greater obligations to cover the entitlements of the future retirees. On the other hand, the obligations of the pension funds, i.e. the private sector, are reduced. After all, the idea of the pension reforms was to divide the obligations regarding the payment of pensions between the state and the market.

In addition to reducing the role of the 2nd pillar, during the economic crisis, the CEE countries introduced other important changes in their pension systems. The most important are (Velculescu, 2011):

- increase of the pension contribution in Romania from 27.5% to 31.3% until 2009;
- periodic suspension or lowering of the indexation of pension benefits in Hungary and Croatia;
- lowering of the pension benefits paid from the 1st pillar in Latvia by 10% in the case of non-working retirees and by 70% to working retirees;
- increase of the retirement age in Hungary from 62 to 65 years starting in 2012.

These changes, in particular those pertaining to the pension benefits level, demonstrate that the 1st pillar, which is publically managed and is unfunded, is based on the promise that the state will pay the pensions from the pillar in the future. However, the credibility of this promise is very limited and the state is unable to guarantee that it will be kept, as both the contribution period and the benefit payment period is too long for forecasting the economic outlooks in the whole period. As it turns out, if the need arises, it is very easy to make changes to the principles of payment of the pension benefits.

The only thing that is required is parliamentary majority. Even though the 2nd pillar, which is privately managed, is believed to be more immune to political decisions than the 1st pillar, such immunity is also limited. The changes described above demonstrate that the government can quite easily limit the role of the 2nd pillar – and thus the market – in the overall pension system. In the context of the aforementioned changes, the questions arise of whether the changes are advisable and whether there are other steps that can be taken to increase the resilience of the pension systems in the time of crisis. We will strive to give the answer to these questions in further parts of the paper.

3. The impact of the economic crisis on the financial stability of the pension systems in the CEE countries

The current economic crisis is the first one since the pension reforms were implemented in the CEE countries. Thus, while earlier the researchers focused mostly on the structures of the reformed pension systems and on the investment activities of the pension funds in the newly-established 2nd pillars, since 2008, several works have been published on the impact of the economic crisis on the financing of the pension systems in the CEE countries. Several of them are discussed below.

In his paper, Antolin (2009) asks two questions which are important to the discussion of the impact of the economic crisis on the pension system: 1) How can the effects of market risk on DC pension plans be alleviated? 2) How can retirement income be protected during the payout phase? In his analysis of the first question, which pertains to the capital accumulation phase, Antolin points at the fact that capital collected in DC plans is sensitive to the situation in the financial markets and poor outlooks are the greatest hazard to accumulation of pension capital in the final phase, i.e. directly before retirement. He enumerates the following actions aimed to reduce the risks associated with DC plans: using a guaranteed rate of return and different investment strategies that reflect the lifecycle of the pension plan member, with risk decreasing with the member's age. In trying to answer the second question, which pertains to the pension payout phase, Antolin finds it necessary to implement indexation equal to the inflation rate in DC plans, in particular in those pension funds where the share of the DC plans is significant. It must be noted that establishing indexation of benefits equal to the inflation rate (or any other) in laws in a public system is no guarantee that such indexation will be implemented, as demonstrated by the changes, mentioned in the previous section, made in the CEE countries, where indexation was temporarily suspended.

A financial crisis constitutes a threat not only to funded DC pension plans, whose success depends on a positive rate of return on investments in the financial markets. It also affects public pay-as-you-go schemes, i.e. unfunded plans based on real economic processes where the long-term rate of return is, theoretically, equal to the rate of economic growth. This matter is discussed by Hinz et al. (2009). Economic crises lead not only to lower rates of return on investments in financial markets, but also to a reduction in the employment rate, slower growth of wages or their reduction; this directly affects public pay-as-you-go schemes. In discussing the impact of wages and employment on the pension systems, based on their observation of earlier crises, the authors note that the reduction of the covered wage bill is usually greater than the reduction of the GDP. This is due to the fact that the former is affected by both a reduction of wages and a reduction of the employment rate. The authors believe that the following actions must be taken in order to increase the resilience of pension systems to financial crises: increase the retirement age, which in the case of the CEE countries would significantly contribute to improving the pension system funding; and replace indexation of benefits based on wage increases with indexation based on the inflation rate, which would protect the retirees in periods of decreasing wages. The last proposal, which will be analyzed the most thoroughly in the further part of this article, is to change the proportion of the pension contributions paid to the public pay-as-you-go schemes and the private funded schemes. In the opinion of the authors, in the time of crisis this proportion should be changed to the benefit of the pay-as-you-go schemes. They emphasize that the consequences of such an intervention in the pension system may be very different and that it should be conducted taking into account the specific situation of each country. The authors believe that the main reason for increasing the revenues of the public pension schemes to the detriment of the private schemes is to demonstrate an improved balance of the public pension schemes and, consequently, a better balance of the public finance systems. In their opinion, the effect in the CEE

countries would be significant but, as they emphasize, it would mostly be a short-term effect and in the long term it would lead to a significant increase in the states' obligations related to pension benefits.

In another publication (World Bank, 2009), the authors start by proposing a thesis, one that is very likely considered to be true by everyone, that no pension systems are resilient to economic crises. With regards to the 1st pillar, based on the pay-as-you-go model, the authors note that crises not only negatively affect its revenues but also usually lead to an increase in the expenditures as, for fear of losing their jobs, people opt for early retirement. This way the financial deficit of the pension system becomes deeper. As far as the 2nd pillar is concerned, financial crises are dangerous mostly in the case of people in the pre-retirement age group because they have no opportunity to make up for the losses resulting from the financial market drops. On the other hand, the younger members of pension funds will still have this opportunity. The authors believe that the real crisis is still ahead of us. In this context, the CEE countries should be careful not to exacerbate the crisis by taking actions such as the aforementioned recent changes in the pension systems. Examples of bad political decisions in previous crises include facilitation of early retirement in order to counter growing unemployment rates, increases in pension contributions to the public system which lead to increases in future liabilities (especially in DC schemes), and transfer of contributions from the 2nd to the 1st pillar. In their opinion, in order to enhance the resilience of pension systems in the post-communist countries, their governments should take the following steps: First, they should adopt inflation-based indexation instead of wages-based indexation; on the one hand, it will protect the retirees during the crisis and, on the other hand, it will have a positive effect on the balance of the pension system finances in the long term, as the benefits will increase at a slower rate (in the long term wages increase faster than prices). Second, as has been pointed out before, the retirement age should be increased. Third, the safety of members of the funded 2nd pillar pension funds must be increased by adopting investment strategies that take into account the lifecycle of the fund members. This can be done mostly by introducing pension funds with different risk profiles. Fourth, the regulations pertaining to the functioning of the funds and their supervisions should be amended so as to increase the effectiveness of their investments. The authors recommend the following actions in this regard: more liberal allocation limits, which will allow the funds to better optimize the investment risk, and changes in the remuneration schemes of pension funds.

4. Diversification in pension systems as a way to enhance their resilience to economic crisis

The actions recommended in the literature, intended to increase the resilience of pension systems, such as inflation-based indexation and increase of the retirement age, are obvious and unquestionable. Similarly, there are no doubts as to the need to take actions intended to increase the effectiveness of pension funds. However, there are some publications, besides those mentioned in the previous section, that point at the need to thoroughly reform the pension systems and identify diversification as the main factor enhancing the resilience of the pension systems to crisis (Eich, 2009; Dorfman et al., 2008). Even though diversification is not broadly discussed in the literature, it is in fact of major significance to an enhanced security of retirees. The basis of diversification is to use proper relations between the state and the market in the mandatory pension schemes. Diversification must be defined as multi-dimensional, because it may refer to:

1) the method of financing of the benefits (unfunded vs. funded);
2) the investment in the domestic public debt (government bonds) and in the private sector;
3) the geographic aspects (investments in different financial markets).

The analysis of diversification in this paper does not pertain to the degree of its application at any given time, but rather focuses on the permissible degree of its application. The objective is to be able, in specific conditions, to properly distribute the risks related to the financing of pensions. Thus, the discussion here focuses on the potential multi-dimensional diversification in pension systems.

Arguments supporting the implementation of multi-dimensional diversification in pension systems require broad substantiation, especially that the recent changes in the pension systems in the CEE countries went in the opposite direction, as they limited diversification. The starting point for further discussion should be the basic purpose of pension systems, namely consumption smoothing – a process which enables a person to transfer consumption from her productive middle years to her retired years (Barr and Diamond, 2006). Consumption smoothing takes place in strictly defined

conditions that pertain to both the period of accumulation and the period of payout of the pension capital. The former refers to the purchase of future consumption (during the retirement period) which takes place during the work activity by paying the pension contributions. The latter refers to the implementation of consumption. Both phases depend (in a simplified model) on the current division of the GDP between the professionally active generations and the retirees. The pension contributions paid are recorded in the pension account in the 1st or 2nd pillar, in the unfunded or funded scheme. Assuming that all pension assets are spent on the current payouts of benefits or on investments in the domestic financial market, the future benefits will be paid out from the future GDP of the country. If the GDP is low, then regardless of how it is divided between the different generations and in what scheme the contributions are paid, the pension benefits will be low. The reason is very clear: the low GDP. The first basic question is: Is it safe for the pension system finances of a given country to base the whole pension system on the country's own economic growth? In such systems, the rate of return will, in the long term, be close to the rate of the GDP growth. Examples of such pension systems are systems with one, pay-as-you-go pillar and systems with two pillars: a pay-as-you-go pillar and a funded pillar with a zero (or close to zero) limit for allocation of the pension funds in foreign financial markets.

For the pension finance it is crucial whether the contributions are paid to the unfunded scheme or to the funded scheme, regardless of the limits for foreign investments of pension funds. Barr (2006) described the two schemes in the following manner: "Funded schemes are based on accumulations of financial assets, PAYG schemes – on promises." Changes pertaining to indexation of benefits or to their reduction in the 1st pillar (see the above-mentioned example of Latvia) implemented by governments in the CEE countries during the current crisis clearly confirm Barr's statement. In unfunded schemes, pensions are financed from the current pension contributions. The value of the contributions depends on the covered wage bill which depends on the incomes, which, in turn, depend on the economic situation. In such schemes the rate of return fully depends on the real economic processes. In addition, unfunded schemes, which constitute a part of the mandatory pension system, are managed publicly, which leads to the fact that the obligations to future generations do become a promise to pay the pension benefits. Those benefits will be financed from the current GDP, to be exact from the pension contributions paid in the future; thus, they will be fully dependent on the future economic situation in the country and on the status of the public finances. In funded schemes, benefits are financed by way of liquidation of pension assets in financial markets. The achieved rate of return of the capital invested in those markets depends on effectiveness of asset management, on the ability to invest the capital in various financial instruments, and on where the capital can be invested. In funded schemes assets can be invested in public debt (government bonds) or in the private sector (stocks and corporate bonds). Allocation limits imposed on pension funds determine the level of diversification that can be implemented by the funds in order to divide the risk between the public sector and the private sector. It is important that the funds be able to properly distribute the investment risks between government bonds and financial instruments issued by corporations. As an example, if the whole pension portfolio consists of government bonds, then the high rate of return of such a portfolio may be the result of high public debt which leads to lower ratings of the bonds and higher risk premiums. The premium is included in the rate of return. There is no guarantee that the state will buy the bonds back. On the other hand, a high rate of return from a diversified portfolio is a better guarantee that the actual profits achieved will be paid to the retirees in the future.

What is also important is the possible impact of the pension funds (the funded pillar) on the economic growth. This depends mostly on what part of their assets they invest in the capital market and whether they invest in companies. This is linked to the level of savings – in a dynamically effective economy its increase results in an increase of the GDP. With reference to the public debate in the years 2009-2011 in Poland, which pertained to the change of the proportion of the pension contribution paid to the different pillars, Góra (2010) and Stańko (2010) pointed out that the Polish economy is dynamically effective and that lowering the portion of the pension contribution paid to the Open Pension Funds (2nd pillar) will be harmful. Thus, the pension system does have a positive impact on the economy, which demonstrates its broadly defined effectiveness. There is a virtuous cycle effect, as a faster growing economy has a beneficial impact on the pension system. Another concept of division of the pension contribution between the unfunded scheme and the funded scheme is the so-called Aaron condition, which considers funded schemes to be more advantageous than unfunded

schemes, as the rate of return from invested capital is higher than the rate of population growth multiplied by the rate of increase of the medium wages, i.e. on the rate of increase of the payroll fund (Aaron, 1966). The ability to apply geographic diversification of the pension portfolio makes meeting this condition highly likely. Thus, in the long term, systems with larger shares of the funded schemes should be more effective.

Other reasons to use funded schemes in addition to unfunded schemes in the mandatory pension systems, i.e. to use both public and private management, are as follows:

- the state does not assume the full pension obligation but, instead, shares it with the private sector;
- in the mandatory pension system there is no monopoly to provide pension products as the funded system takes the form of a competitive pension funds market;
- citizens can affect the value of their future pension benefits and, consequently, become responsible for it and can select the pension fund to which their contributions will be paid.

However, it has been noted that implementation of a combination of the unfunded and funded schemes in the pension systems is insufficient to assure the systems' financial safety. Of equal importance is the possibility to make the rate of return in the pension systems partially independent of the economic growth and the rates of return in the financial markets in the given country. This can be achieved by geographic diversification of allocation of the pension assets, which is possible in the funded part of the system and is subject to limits on allocation of pension funds in foreign financial markets. The various reasons for such diversifications are discussed below.

The first reason is the demographic situation. Given the ageing of the societies, the competition between the different countries to increase the labor pools by attracting immigrants will grow. Those countries which will see their labor pools decrease will have worse growth prospects, which will have a significant impact on their pension systems in the part in which they are dependent on the real economic processes in the country and on the rates of return in the domestic financial markets. In order to prevent that, the countries must have largely open pension systems, i.e. systems which allow for investing a large part of pension assets abroad.

The second reason is related to the size of the domestic financial markets and their structure, as well as the economic outlooks. Of course it is a matter of discussion to what extent pension funds' assets should be used to stimulate economic growth in the country of their origin and to what extent they can support the growth of other countries. However, if the assets cannot be invested effectively in the country, for example due to the too low capitalization of the domestic capital market in relation to the value of the pension funds' assets, to poor corporate management, or to too restrictive investment limits that force the funds to invest in government bonds, the assets will not necessarily contribute to the country's economic growth. Thus, they cannot be grown as effectively as if they were invested more extensively in foreign financial markets. The objective is not to invest the pension funds' assets abroad, but rather to have such a possibility in the event that foreign investments have much higher rates of return. Pension systems that are closed to investments abroad have lower financial safety due to the excessive concentration of the pension funds' assets in domestic investments and, consequently, in particular in countries whose economies are in bad shape, to the assets' lower effectiveness.

Another reason for geographic diversification of pension systems is the difference in the rates of return in the various financial markets. Table 3 shows the rates of return in selected stock exchanges in various countries. The data in the table demonstrates that the differences between the rates of return are significant, both in the short term and in the long term. Of course, the exchange rate risk in the case of investments abroad is significant, but there are ways to protect against it. The ability to use geographic diversification is limited by the allocation limits imposed on pension funds; if such limits are highly restrictive, geographic diversification is practically impossible.

Table 3: Rates of return in selected stock exchanges in various countries
(as of 23 September 2011)

Country	Index	2-year rate of return in %	5-year rate of return in %
USA	S&P 500	8,15	-14,32
Brazil	BOVESPA	-11,46	52,21
Argentina	MERVAL	23,77	53,83
Germany	DAX	-7,39	-11,95

United Kingdom	FTSE 100	-0,61	-12,84
Japan	NIKKEI	-18,82	-45,25
Poland	WIG	-4,36	-17,35

Source: The author's calculations based on information available at www.czasnazysk.pl

5. The diversification levels in the pension systems in the CEE countries

The information provided in tables 2 and 4 allows for evaluating the degree of possible diversification in the mandatory pension systems in the CEE countries. The evaluation covers diversification in the three dimensions mentioned before, namely:

1) the method of financing of the benefits (unfunded vs. funded);
2) the investments in the domestic public debt (government bonds) and in the private sector;
3) the geographic dimension.

Before the transfer of the full contribution or its part from the 2nd pillar to the 1st pillar, the contribution paid to the funded schemes, i.e. the pension funds, was quite large in many countries and constituted as much as 50% of the total pension contribution in the mandatory system (see the examples of Latvia and Slovakia). The countries that did not implement diversification with regards to the method of funding of the benefits were Czech Republic and Slovenia. In Romania, the diversification level was negligible and in the remaining countries, it must be considered as fairly significant, as the contributions paid to the 2nd pillar were not less than 27% of the total contributions.

Table 4**:** Investment limits for mandatory pension funds in selected CEE countries (% of assets)

Country	Corporate bonds	Equities	Foreign investments
Bulgaria	No limits	20%	15%
Croatia	30%	30%	15%
Estonia (pension funds with different risk/return characteristics)	No limits	25% for balanced funds and 50% for progressive funds	No limits for EFTA and CEFTA countries
Hungary	30%	50%	30%
Latvia (pension funds with different risk/return characteristics)	No limits	15% for balanced funds and 30% for active funds	No limits for EFTA and CEFTA countries
Poland	40%	40% for equities from the regulated Stock Exchange market 10% for equities from regulated non-exchange markets	5%
Romania	No limits	50%	No limits for UE and EEA countries
Slovakia (pension funds with different risk/return characteristics)	No limits	50% for balanced funds and 80% for growth funds	70%
Slovenia	No limits	30%	No limits for OECD countries; however, due to the regulation stipulating that 80% of assets must be denominated in the same currency as liabilities, there is an effective 20% limit on non-Euro investments

Source: Prepared by the author on the basis of Allianz Global Investors (2007): *Central and Eastern European Pensions 2007*; OECD (2007): *Survey of investment regulations of pension funds*

As far as diversification consisting in investing in the domestic public debt and in the private sector is concerned, the evaluation must cover most of all the allocation limits for investments in corporate bonds and stocks (see table 4). The relevant data indicates that the level of this potential diversification is quite significant, as the total limits on investments in corporate bonds and stocks are not less than 60%, apart from the balanced funds whose objective is rather to protect the assets of the older members of the funds.

As far as geographic diversification is concerned, it is very different in the respective countries. In Poland, it is marginal due to the 5% limit on investments abroad, while in such countries as Estonia, Latvia, Romania, and Slovenia, a significant level of geographic diversification is allowed in the funded pillar.

An analysis of the second and third dimension of diversification must make references to the first dimension, as investments in the private sector and in foreign financial markets is possible only in the funded schemes. If the share of the funded schemes in the total pension system is negligible, then even if the limits on investments in corporate bonds and stocks or on investments abroad are high, their contribution to diversification of the financial risk in the pension system is minimal.

Before the changes implemented in the pension systems in the CEE countries in 2008-2010, the ability to implement the aforementioned diversification measures was much greater. The significant reduction of the portion of the pension contributions paid to the 2nd pillar in some countries significantly limited diversification and lead to its insignificance to the mandatory pension systems. This is especially true in the case of Estonia, Hungary, Romania and, to a large extent, Poland, Latvia, and Lithuania. Bulgaria has maintained fairly large possibilities for diversification. However, it must be noted that some of the countries in question plan to gradually increase the pension contributions paid to the funded pillars, which will be conducive to increases of potential diversification in all the analyzed dimensions. Moreover, for example Poland is planning to increase the limit on investments in stocks which, to an extent, will mitigate the negative impact of the lower contribution to the pension funds on the ability to invest the assets in the private sector. A similar impact on potential geographic diversification would result from an increase in the limit on investments in foreign financial markets.

6. Conclusions

The article discusses both the actions indicated in the literature as aimed to increase the resilience of the pension system and the very important tool to achieve this objective, namely the multi-dimensional diversification of the pension systems, which would reduce the risks related to future payouts of pensions. Even though the literature does not pay a lot of attention to this matter, it appears that the positive effects of such diversification may be significant. As has been noted, the differences in the rates of return in different stock exchanges, in both the short and the long term, are significant, which supports the implementation of geographic diversification. Moreover, the events that have taken place since 2008 have brought down the notion that the credibility of states is unlimited. The vision of bankrupt states becomes more and more likely, as demonstrated by the examples of Greece and Iceland but also by the lowering of the ratings of the government bonds of other states (USA, Italy). Thus, any claims that public pay-as-you-go schemes will always be solvent are unfounded. The events taking place in the economies of many countries in the recent years are a source of many arguments supporting multi-dimensional diversification of risk in the mandatory pension systems of the CEE states, especially that so far the optional 3rd pillar is of marginal importance to the overall pension system. The conclusions reached in this paper raise doubts as to the advisability of the changes implemented in the pension systems of the post-communist states, especially if it turns out that, contrary to the declarations of the governments, they are not temporary.

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