Change in a Pension System: A Manageable and Measurable Process?

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Abstract:

Purpose: This paper aims to answer whether a change process in a pension system is manageable and measurable. And if so, how it can be measured and assessed.
Design/Methodology/Approach: In the theoretical part of the paper, the multidimensionality of a change process in a pension system is analyzed. In the empirical part, a procedure for measuring the effectiveness of change management in a pension system is proposed. It is based on ratio analysis and linear ordering. The cross-country analysis is carried out from 2005 to 2018 for eleven CEE countries, i.e., Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, and Slovenia. The choice of states is justified by converging historical, political, and economic conditions. The use of ratio analysis combined with linear ordering enables the identification of benchmarks in the group of analyzed countries.
Findings: Change in a pension system can be perceived as a manageable and measurable process. One of the categories in which the change management process in a pension system can be evaluated is the effectiveness, understood as a measure of the convergence between the result obtained and the goal defined.
Practical Implications: Countries characterized by the highest effectiveness in the period considered are Slovakia, Bulgaria, Poland, and Croatia. Estonia and Latvia are countries represented by the lowest effectiveness.
Originality/Value: The conducted research allowed for the development and application of the measuring procedure, which can be used to assess the effectiveness of the change management process in a pension system.

Keywords: Change, change management, pension system, effectiveness.

JEL classification: J14, O10.

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1. Introduction

Changes are an integral part of current pension systems. Recently, European pension systems have undergone numerous reforms, both of parametric and structural character. This is caused by changing demographic, economic, social, and political conditions, which influence considerably social security systems. On the other hand, pension systems should be characterized by relative legal and organizational stability if they are to realize their primary goals. These opposing needs enforce rational implementation and carrying out of changes if they are to succeed. Therefore, changes should not be only introduced in pension systems, but they should also be supported with effective and efficient management.

The change management concept with regard to a pension system is rather an innovative approach, which has not been thoroughly analyzed in the literature so far. Pension systems are usually studied from economics, social policy, finance, or law perspectives. The management issue in a pension system is not a popular subject, and so far, it has been mainly discussed in relation to pension funds (Musalem and Palacios, 2003; Tonks, 2006). This indicates a significant research gap theoretical in its nature, referring to the application of the management concept (change management concept in particular) into the pension system's reforms. Furthermore, empirical studies related to the change measurement in a pension system are hardly found in the existing literature.

Open Method of Coordination (OMC), implemented in 2001 in pension security, defined some evaluation criteria within which particular indicators are identified. Nevertheless, they do not refer to the measurement of change itself, and they do not take the concept of change management into account. In the literature, there are some studies in which pension reforms are discussed and evaluated in general terms (Hinrichs, 2021), with the use of econometric models (Grech, 2013; Schneider, 2009) or in relation to specific indicators (Carone *et al.,* 2016). Nevertheless, in a change measurement, a difference between an initial and final state is what matters most. Therefore, to assess changes, emphasis should be put on the progress which was made. This shows a research gap of an empirical nature.

The goal of this paper is to reduce the research gap which has been identified. Theoretical considerations in section 2 enable answering whether a change process in a pension system is manageable and measurable. The empirical study described in section 3 allows for measuring and assessing changes in considered pension systems. Finally, in conclusion, both the results and limitations of the study are synthetically discussed.

2. Literature Review

A pension system is a tool for providing people with an adequate standard of living after reaching retirement age. It can be perceived from micro and macro

perspectives. In the former, its goal is to smooth consumption over the individual's life cycle. In the latter, its aim is to divide the current GDP between generations of working age and post-working age people (Barr and Diamond, 2006; Góra, 2003). The functioning of a pension system (and thus, its ability to achieve its primary goals) depends on numerous conditions. The most important are demographic ones, which have a significant impact on the age structure of the society. An increasing number of people of post-production age and decreasing number of people of production age negatively affect the level of pension benefits and the financial stability of a pension system.

The next group of conditions relates to the national economy. They refer mainly to the situation on the domestic labor market, as decreasing number of people working and paying contributions negatively affects the finance of the system. Economic factors are also important, particularly in case of funded schemes, as they influence the returns on investment in the financial market. Political conditions also matter as politicians are responsible for establishing the pension law and changing it. The confrontation of short-term planning (characteristic for politics) and long-term planning (feature for economics) is particularly significant in that case.

Finally, historical and institutional factors influence path dependence, affecting social awareness and perception of the pension system's rules. As all aspects discussed keep changing over time, the pension system itself must change as well. The changing surroundings of a pension system constitute an external source of changes which seems to play an overriding role in a change process (Nizard, 1998). The internal sources of changes that relate to the malfunction of current solutions cannot be neglected either.

Generally, a change takes place when a part of a specific entirety is modified significantly (Griffin, 2005). As a result, the final state differs considerably from the initial one. Therefore, a change can be defined as a difference between one state (at time t_1) and another (at time t_2) (Nizard, 1998). In the public sector changes are often identified with reforms, despite some differences between these two terms. Once a reform was perceived as a one-off set of interventions, but it has recently become a dynamic process inseparable from public policy-making (Meloni, 2010). Furthermore, a change can be an intentional or unintentional phenomenon, while a reform needs to be a more planned and structured process, which can speed the improvement (Caiden, 1968; Melchor, 2008). Such reasoning gives the change a more stochastic character and the reform a deterministic one.

On the other hand, it is difficult to imagine a change in the public sector, particularly in a pension system, which is unplanned and unintended. Therefore, in the present paper, a change is understood as a single transformation carried out in a pension system. At the same time, reform is perceived as a series of changes in a particular

direction. The former often takes a parametric form, which refers to specific pension system parameters such as retirement age or a level of pension contribution/benefit. The latter is often equated with a paradigmatic (structural) transformation, which relates to general principles of a pension system such as a model of funds accumulation or sources of financing (Kalina-Prasznic, 2016).

Change in a pension system is a multidimensional transformation in light of numerous conditions discussed above and due to a growing number of stakeholders (Gumola, 2019). This is mainly caused by implementing multi-pillar solutions in many European countries in line with recommendations provided by the World Bank. Such a transformation divided the responsibility for pension security between the state, public institutions, private organizations, and individuals and required collaboration between the public and private sectors. A multitude of entities involved makes a change even more challenging. The transformation can be perceived from different perspectives, and the communication process can be complicated due to contradictory interests.

Changes in a pension system are usually characterized by a top-down nature, which are most often imposed on the pension system's participants. Such directive changes block the involvement of various entities in the transformation process and reduce their motivation to act by a plan (Hersey and Blanchard, 2012). Furthermore, as changes in pension systems are implemented gradually, several change initiatives are often carried out at the same time. This, in turn, can cause misunderstanding and resistance in society, whose knowledge on pension security is still shallow (Barrett, Mosca, and Whelan, 2013; Holzmann, Orenstein, and Rutkowski, 2003).

In addition, too many changes implemented at one time may affect the legal and organizational stability of a pension system, as some time is necessary to root new solutions and stabilize related processes. The change process in a pension system is a long-term one, which means that the final results are visible and possible to assess not earlier than after dozen or even several dozen years. As a result, their assessment can only be made in a significantly different reality from the one in which changes were designed.

Considering all the above challenges, it is hard to imagine success in changing or reforming a pension system without managing nor measuring the effects of such a process. The goal of change management is to prepare and implement a change in such a way as to weaken or eliminate the factors preventing change and to strengthen those supporting the change (Mikołajczyk, 1997; Tien, 2012). Change assessment aims to keep on the right track, identify unexpected problems and make some amendments. Therefore, change management and evaluation may positively influence the effects of a given transformation.

3. Research Study

A general framework: According to the change definition, while assessing its result(s), a difference between one state (at time t_1) and another (at time t_2) should be measured. Thus, to assess the effects of a particular change, the difference between a starting stage (before a change) and a final stage (during or after a change) should be measured. Therefore, a change can be perceived as a distance between the initial and the final stage of a process (Gumola and Chybalski, 2017). While determining such distance, the level of goal achievement is measured. Thus, to measure the change, a praxeological category can be employed, which is effectiveness. Effectiveness is defined as a measure of the convergence between a result and a goal (Kotarbiński, 1973). If the result is concurrent with the plan, the change can be assessed as an effective one. If the result differs significantly from the assumed goal, the change can be evaluated as ineffective. A transformation can also be partially effective.

Nevertheless, defining the boundaries between effectiveness and ineffectiveness can be difficult if some reference points are not defined in advance. In pension systems, the goals of changes are usually general, and they indicate the direction which should be followed and not precise results that should be achieved. Therefore, the change assessment can be quite tricky. A benchmarking method can constitute a response to this problem, but one has to be aware that it results in the relativity of evaluation.

While assessing a change in a pension system, another praxeological category, which is efficiency, can be employed (Gumola and Chybalski, 2017). Efficiency accounts additionally for the process input. Therefore, while assessing the efficiency of a change, a difference between an initial and a final stage of the transformation is taken into account and the efforts incurred in the process. Nevertheless, in the following paper, only the effectiveness measurement is conducted, which allows answering the question to what extent goals of change(s) introduced in a pension system are achieved.

Countries and time span selection: The assessment of change management effectiveness in a pension system requires, above all, the specification of a change that is supposed to be evaluated. In the following paper, changes introduced in the decades around the millennium 2000 are assessed as they had a significant impact on the current state of pension systems in a great majority of European countries. The study covers 11 states with similar historical, economic, and political backgrounds, which significantly influences pension systems' functioning. They are as follows, Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, and Slovenia. Even though introduced changes differed in individual countries, their goals were in line with the recommendations of the World Bank.

Therefore, the identification of the general direction of changes is possible. Regardless of solutions applied, Central and Eastern European (CEE) countries mentioned above aimed at (Barr and Diamond, 2014; Hirose, 2011; Żukowski, 2006):

1) increasing the adequacy of pensions,
2) reducing the risk of poverty among older people,
3) diversifying pension funds,
4) increasing the financial stability of a pension system,
5) prolonging economic activity.

The analysis is carried out for the period from 2005 to 2018. As the effectiveness measurement is based on the calculation of differences between the final and initial state of the transformation, data used in the study relates mainly to years 2005 and 2018. In case of any data gaps, data from the nearest year is adopted. Data used in the study is obtained from Eurostat and OECD databases.

Indicators and data: To measure the effectiveness of change management, each of goals identified in the previous section has to be defined in a measurable way. Therefore, special indicators are assigned and gathered in Table 1.

Table 1. *Selected set of indicators*

Symbol	Indicator	Definition	Source
1a	Aggregate replacement ratio for pensions (ARR)	Ratio of median individual gross pensions of 65-74 age category relative to median individual gross earnings of 50-59 age category, excluding other social benefits.	Eurostat
1b	Relative median income ratio (RMI)	Ratio of the median equivalized disposable income of persons aged 65 and over to the median equivalized disposable income of persons aged 0-64.	Eurostat
2a	At-risk-of-poverty rate of pensioners (ARP)	Share of pensioners with an equivalized disposable income below the at-risk-of-poverty threshold, which is set at 60% of the national median equivalized disposable income.	Eurostat
2b	Severe material deprivation rate (SMD)	Share of persons aged 65 and over, who cannot afford some items (at least four of the deprivation items among) considered to be desirable or even necessary to lead an adequate life.	Eurostat
3	Autonomous pension funds' assets (APF)	Ratio of total investment made by pension funds (an independent legal entity) to the size of gross domestic product.	OECD
4a	Average effective age of retirement	Weighted average of withdrawals from the labor market over a 5-year period for	OECD

	(ERA)	workers initially aged 40 and over.	
4b	Duration of working life (DWL)	Number of years a person aged 15 is expected to be active on the labor market throughout the entire life.	Eurostat
4c	Relative employment rate of older people (RER)	Share of people in employment and aged 55-64 in the total working population aged 15-64.	Own calculatio n based on Eurostat
4d	Hiring rate for workers aged 55-64 (HR)	Ratio of employees aged 55-64 with job tenure of less than one year to the total number of employees.	OECD
4e	Retention rate for workers aged 60-64 (RR)	Ratio of all employees currently aged 60-64 with job tenure of five years or more to the total number of employees aged 55-59 5-years previously.	OECD
5	Total current pension expenditure/ Old-age-dependency ratio (PE/ODR)	Ratio of total pension expenditure to old-age-dependency ratio (ratio between the number of persons aged 65 and over and the number of persons aged 15-64).	Own calculatio n based on Eurostat

Source: *Own elaboration based on Eurostat and OECD databases.*

4. Research Methodology

The change assessment in a pension system requires a multidimensional approach due to the multidimensionality of introduced changes. Therefore, to measure the effectiveness of implemented changes, ratio analysis is conducted. Furthermore, to identify some benchmarks within the group of countries studied, a linear ordering is applied.

Firstly, the goals of changes subject to assessment are defined, and particular indicators are assigned to each (Table 1). Secondly, each indicator is classified as a stimulant (the greater-the-better) or a destimulant (the lower-the-better). Nominants (a nominal value desired) are not distinguished in the set of specified indicators. As it has been already mentioned, in pension systems, the goals of changes generally indicate only the direction that should be followed and not optimal values that should be achieved. The great majority of selected indicators are stimulants. Nevertheless, three destimulants can be distinguished as well. These are ARP, SMD, and PE/ODR.

Thirdly, the difference between a final and an initial value of each indicator is determined according to the following formula:

$$\Delta x_{ij} = x_{ijt} - x_{ij0} \tag{1}$$

where x_{ijt} denotes the *j-th* variable (indicator) value for the *i-th* country at the period t (the final state) and x_{ij0} denotes the *j-th* variable value for the *i-th* country at the period 0 (the initial state). For each indicator the difference between 2018 and 2005 is calculated. Due to data availability constraints, for RR the difference between 2016 and 2006 is determined, for HR between 2018 and 2006 and finally, for PE/ODR between 2017 and 2005.

Next step includes the stimulation of previously identified destimulants (ARP, SMD and PE/ODR). The lower-the-better variables are transformed into the greater-the-better ones using the following formula:

$$\Delta x'_{ij} = \max(\Delta x_{ij}) - \Delta x_{ij} \tag{2}$$

After the stimulation, the unitarization of data is conducted as a result of which all variables take values from the range [0,1]. The normalization is carried out with the use of the following formula:

$$z_{ij} = \frac{\Delta x_{ij} - min\Delta x_{ij}}{max\Delta x_{ij} - min\Delta x_{ij}} \tag{3}$$

Next, an aggregation procedure with the use of an unweighted arithmetic mean is applied. The general formula for a synthetic measure is as follows:

$$SM = \frac{1}{m} \sum_{i,j=1}^{m} z_{ij} \tag{4}$$

where *m* denotes the number of variables for which the aggregation procedure is applied.

Firstly, synthetic measures are created within particular change goals according to the following formulas:

$$CM1 = \frac{1}{2}(\Delta ARR' + \Delta RMI') \tag{5}$$

$$CM2 = \frac{1}{2}(\Delta ARP' + \Delta SMD') \tag{6}$$

$$CM3 = \Delta APF' \tag{7}$$

$$CM4 = \frac{1}{5}(\Delta ERA' + \Delta DWL' + \Delta RER' + \Delta HR' + \Delta RR') \tag{8}$$

$$CM5 = \Delta(PE/ODR)' \tag{9}$$

where ' means the value after stimulation and unitarization.

Secondly, the aggregation procedure for all five objectives is applied with the use of the following formula:

$$CM_{effect.} = \frac{1}{5}(CM1 + CM2 + CM3 + CM4 + CM5) \qquad (10)$$

Finally, the results for synthetic measures are ordered in an ascending order, which enables the identification of benchmarks and anti-benchmarks in the group of countries studied.

5. Results

The results are gathered in Table 2.

**Table 2.** *Synthetic measures for particular change goals and for the change management effectiveness*

	CM1	**CM2**	**CM3**	**CM4**	**CM5**	**CM**effect.
Slovakia	0.84	0.65	0.57	0.53	0.28	0.57
Bulgaria	0.65	0.76	0.53	0.69	0.23	0.57
Poland	0.40	0.72	0.12	0.51	1.00	0.55
Croatia	0.80	0.48	1.00	0.28	0.14	0.54
Romania	0.98	0.93	0.35	0.14	0.07	0.49
Hungary	0.55	0.55	0.00	0.74	0.62	0.49
Slovenia	0.68	0.46	0.28	0.47	0.55	0.49
Czech Republic	0.49	0.39	0.36	0.47	0.48	0.44
Lithuania	0.26	0.45	0.28	0.68	0.27	0.39
Estonia	0.29	0.12	0.62	0.48	0.00	0.30
Latvia	0.02	0.55	0.20	0.43	0.09	0.26

Source: *Own calculation based on Eurostat and OECD data.*

To make the relations between analyzed countries more visible, the results are presented in the form of a scatter diagram (Figure 1).

Based on the scatter diagram, three subgroups of countries with different levels of change management effectiveness can be distinguished. The highest effectiveness characterizes the first one composed of Slovakia, Bulgaria, Poland, and Croatia. The second one, including Romania, Hungary, Slovenia, the Czech Republic, and Lithuania, is medium effective. Finally, the last group of the lowest effectiveness consists of Estonia and Latvia. Such conclusions are relative and relate only to the group of countries studied.

Figure 1. *Scatter diagram for a linear ordering with marked subgroups of countries characterized by a similar level of effectiveness*
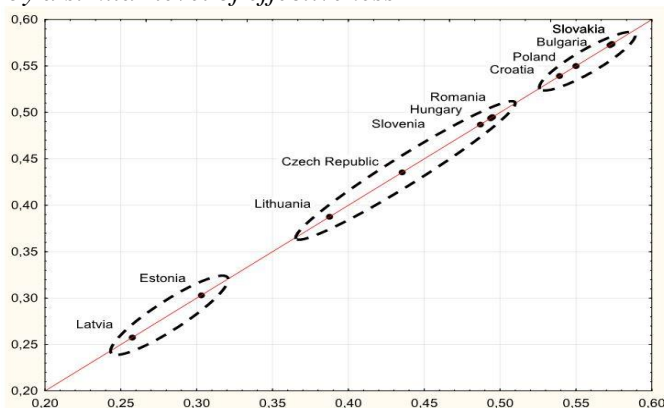
It is worth emphasizing that Slovakia, which can be treated as a benchmark in change management effectiveness, did not record the result close to 1. It means that it did not realize all change management goals to the highest degree among countries studied. To be precise, it did not turn out to be a benchmark for any of the defined objectives. A similar situation relates to Bulgaria. Both countries achieved good (but not the best) results for the first four goals and a moderate result for the last one compared to other countries.

On the other hand, Poland turned out to be a benchmark in terms of the financial stability increase. It did not take a higher position in the overall ranking due to meager results for pension funds diversification. Croatia, which took the last place in the group with the highest effectiveness, was a benchmark in the diversification of pension funds. Nevertheless, it managed worse with prolonging the economic activity as well as increasing the financial stability.

The subgroup characterized by the medium effectiveness is the most numerous one. Romania, as the only country among considered, turned out to be a benchmark for two goals. It achieved the best results for increasing the adequacy of pensions and reducing the risk of poverty among older people. At the same time, however, it managed the worst with the economic activity prolongation. Hungary took the first position for economic activity prolongation and the last post for pension funds diversification. It can be surprising because Hungary was a precursor in implementing a multi-pillar solution in Central and Eastern Europe. Nevertheless, one must be aware that the starting point in the research is 2005, when Hungary was already seven years after pension reform implementation. Therefore, it was characterized by a higher level of autonomous pension funds than the rest of the countries at that time, and thus, it had less room for improvement.

Following three countries, Slovenia, the Czech Republic, and Lithuania turned out to be neither benchmark nor anti-benchmark for any of the considered goals. Slovenia reached the position very close to two already discussed states from that subgroup. The Czech Republic and Lithuania did worse, but still, they achieved far better results than countries characterized by the lowest effectiveness.

The last subgroup consists of two ~~the~~ Baltic States. Estonia was the only country studied, which turned out to be an anti-benchmark for two goals, preventing the poverty risk among the elderly and increasing the financial stability of the pension system. On the other hand, Latvia was an anti-benchmark for expanding the adequacy of pensions, but it also achieved inferior results for all other goals.

6. Discussion and Conclusions

Change in a pension system can be perceived as a manageable and measurable process. Change management should be an integral part of the reform implementation if it is to ~~brings~~ long-term results. Changes introduced to pension systems are subject to numerous assessments (Carone *et al.,* 2016; Domonkos and Simonovits, 2017; Grech, 2013). However, the fundamental question arises whether the changes are assessed in most cases or a pension system itself (or its parameters).

To assess a change, the progress that was made should be measured. Therefore, a difference between the final and the initial state is the one that matters most and not the starting or final values of particular indicators. This results from the fact that there are no two identical states with the same economic, demographic, and political situation. If their initial situation is different, the final one will be as well, even if the same change is implemented. Therefore, if an average effective retirement age in two states increased by two years due to implemented change, the effectiveness (understood as progress) was the same (even if the final age is different in each country). The input needed to achieve such a result could be different, but it influences the efficiency of a change (not its effectiveness), which is not assessed in the paper.

The results of the research show that the change management effectiveness varied across analyzed states. Furthermore, none of the countries proved to be a benchmark in terms of all defined reform goals. Nevertheless, one can imagine an ideal theoretical model, which should be like Romania in terms of increasing the adequacy of pensions and reducing the risk of poverty among the elderly, like Croatia referring to the diversification of pension funds, like Hungary about the prolongation of economic activity, and like Poland as for increasing the financial stability of a pension system. Such an ideal benchmark does not exist. However, the experience of particular countries can be used to draw some lessons in terms of goals realization for the future. Such research would be more comprehensive if it was enriched with efficient evaluation. This results from the fact that the level of goals'

realization in particular countries is known due to the effectiveness measurement. However, both the input that had to be involved and conditions that could contribute to such results are not considered. Nevertheless, the efficiency evaluation is not the goal of this study and can constitute the excellent direction of further research.

The proposed measurement procedure is associated with some limitations. One must be aware that pension reforms in considered countries were introduced in the decades around the millennium 2000. Still, the exact years of implementation were different depending on the state. Furthermore, data on pensions is quite limited, which reduced the number of countries studied and required adjusting data from the closest years in the case of few indicators. The next constraint relates to the relativity of drawn conclusions resulting from the benchmarking method.

Last but not least, one has to be aware that the effectiveness measurement results are dependent to some extent on the initial values of particular indicators. If a country did well on a specific issue in 2005, it had less room for improvement till 2018 than a country that did worse at the beginning. Therefore, the possibilities to make progress were different depending on the state.

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