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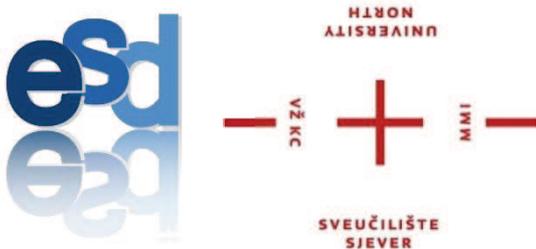
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DOES THE RELATION BETWEEN STATE AND MARKET AFFECT THE RETIREMENT AGE? A CROSS-SECTION STUDY FOR OECD COUNTRIES

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ABSTRACT

The paper discusses the very timely and important topic of retirement age. This problem seems to be crucial for contemporary pension reforms in many countries forced by deteriorating demographics. Many of them face the challenge of an increasing pensionable age, which usually meets with social resistance, although the economic reasoning for such a policy is rather obvious. However, in this study the problem of retirement age is related to pension regimes theory. The paper contributes to the literature on optimal retirement age as well as comparative studies on pension systems, including pension regimes typology. The main goal is to answer the question whether the relation between state and market in a pension system affects the statutory and effective retirement age. The results of the study generally confirm the negative relation between the involvement of the state in a pension system and the statutory as well as the effective age of retirement. The empirical study is conducted on the basis of statistical data for 30 OECD countries. The method employed is mainly based on comparative analysis of selected statistical parameters, a hypothesis test for difference between means as well as correlation analysis. The paper consists of following sections. After an initial part of an introductory character, the literature on retirement age and pension regimes typology is reviewed. Then the conceptual framework for pension regimes typology employed in the study is presented. The next section includes the empirical study. The paper ends with a short and succinct conclusion.
Keywords: Labour market, Pension, Pensionable age, Retirement, Retirement age

1. INTRODUCTION

The pension systems of many countries have undergone reforms concerning their models as well as parameters. These reforms result not only in the alteration of benefit formulas (usually defined benefit DB into defined contribution DC) or replace the pure unfunded model of a mandatory system with a mix of both an unfunded and funded one. They very often affect the more general dimension, which is the relation between the state and the market in a pension system. As far as the parameters of a pension system are concerned, one of the crucial ones is the statutory retirement age (pensionable age). The contemporary trend in this age is rather of an increasing nature, which results from the deteriorating demographics and ageing population. The involvement of the state in a pension system may obviously affect the behaviour of agents including their decision about when to retire. Therefore, the main problem discussed in this paper is the relation between the pension regime and retirement age. The pension regimes typology employed is mainly based on the relation between the state and the market in a pension system. However, I perceive this relation two-dimensionally. First, the relation between state and market refers to the relation between public and private management in a pension system. This seems to be obvious. Second, the relation between state and market is also a measure of the liberalism of a pension system and this is reflected mainly by the relation between compulsoriness and voluntariness of participation in a pension system. As far as a retirement age is concerned, I use two different types. The first one is the statutory retirement age, which means the age at which an agent is permitted to retire and receive benefits. The other is the effective retirement age, which is the actual age at which people retire. The difference between

these two retirement ages may be perceived as a measure of the effectiveness of a pension system in the sense of keeping agents economically active instead of retiring.

The main goal of this paper is to answer the question whether the relation between the state and the market in a pension system affects the statutory and effective retirement age. The method employed is mainly based on the comparative analysis of selected statistical parameters, a hypothesis test for difference between means as well as correlation analysis. In the paper, I firstly review the literature on retirement age and pension regimes typology. Then, the conceptual framework for pension regimes typology employed in the study is presented. The next section includes the empirical study. The paper ends with the short and succinct conclusion.

2. LITERATURE REVIEW

The problem of retirement timing has been discussed in literature many times, since it is perceived as one of the main problems faced by contemporary economies. Dittrich, Busch and Micheel (2011) try to answer questions concerning the willingness to work beyond the legal retirement age and the driving forces of it. They conclude, on the basis of empirical study, that the main factors encouraging people to remain economically active longer are work motivation, reflected mainly through a positive effect on self-reported work ability as well as an agent's disposition for further education. Job reward is also a stimulant for working longer, beyond the legal retirement age. Hansen and Lonstrup (2009) search for the optimal legal retirement age with the use of an OLG model with the endogenous labour supply. Their main finding is that the legal retirement age has an important welfare implication in the long-term prospect and an optimal relative (to the total length of life) legal retirement age really exists. This optimal age is characterized by decreasing distortions of the labour supply and savings from unfunded PAYG public pension schemes. Hansen and Lonstrup emphasize that their results are based on the assumption that the government is able to perfectly control when workers decide to retire. Therefore, as a possible research project to further develop their study, they indicate one relying on the autonomous decision of agents about the time of retirement. Then, many different models of pension systems could be taken into account. Other authors also studied and confirm generally that another important factor determining the decision about when to retire is the presence of unemployment in the age group near the legal retirement age (see e.g. Casamattta, Paoli 2010; Merkuryeva, 2012). Staubli and Zweimuller (2012) show in their study based on the empirical data for Austria that increasing the legal early retirement age delays retirement significantly.

Since a pension system is a mix of public and private management as well as the mandatory and voluntary participation of agents in pension schemes, the decision about when to retire is determined by government policy (statutory retirement age) on the one hand and by individual choice on the other hand (a real retirement age). Thus, the research question whether the relation between the state and the market perceived two-dimensionally - as the relation between public and private management as well as the relation between the compulsoriness and voluntariness of participation in pension schemes - influences the legal and effective retirement age seems to be fully justified. Such a question and study leading to an answer to this question need to be embedded not only in the literature referring to the issue of retirement timing but also in the literature on pension regimes. Radl (2013) discusses the problem of welfare regimes and early retirement. He refers to the famous work by Esping-Andersen (1990) who argues that the welfare state influences the timing of retirement through the combination of labour-supply and labour-demand effects. In continental Europe, conservative welfare-state intervention is dominant and early retirement has long been an element of policy supporting youth entering the labour market. In Scandinavia, representing the universalist regime, the policy is quite different and encourages older people to remain economically active longer, which results in

relatively low early exit rates. In Anglo-Saxon countries, which represent a liberal regime, high employment rates among older people are achieved by applying few early retirement incentives and by keeping the unemployment rate down on low-wage labour markets (Radl, 2013, p. 47). Radl, referring to Esping-Andersen, indicates also two main patterns of retirement. The first one is the generosity of a pension system and this affects the decision about retirement in a direct manner. The other is labour market policy, since a welfare state may shape the labour market structure and therefore alter the extent of early retirement through demand-side effects. However, this interaction is rather of an indirect character (see Radl, 2013, p. 47-48).

Esping-Andersen, aside from the welfare state regimes typology, also proposed a pension regimes typology (Esping-Andersen, 1990). His study is based mainly on the two following criteria: 1) the relationship between the state and the market in pension insurance, i.e. between the public and private sector, 2) the importance of pension privileges or privileged professional groups' share in the pension system. He proposes three pension regimes: corporatist, residual, and universalist. Esping-Andersen, although reflecting the relation between state and market in his typology, disregards the relation between the mandatory and voluntary participation in pension schemes, which may affect the decision about when to retire. Other authors try to modify or develop Esping-Andersen's typology and include other important criteria as e.g. Bismarcian vs. Beverigian roots, liberalism vs. socialism in pension provisions, public vs. social administration, social security vs. multi-pillar systems (Rhodes, Natali, 2003); and the generosity of pension systems (Borsch-Supan, 2007). A very interesting and relatively complex pensions regime typology is proposed by Soede and Vrooman (2008). They apply 34 quantitative and qualitative variables that characterize the mandatory part of different pension systems. However, they conclude that there are in fact two dimensions that differentiate pension regimes. The first is the generosity of the mandatory pension schemes and the second is the division between publicly and privately managed mandatory pension plans. Based on these two dimensions, they identify four groups of pension regimes: corporatist, liberal, modest pensions, and mandatory private. What is important in this study in the context of this paper is the reference of pension regimes to the retirement age. In the corporatist regime, where the state is dominant in a pension system, there is a relatively high pension promise which is fully provided by a PAYG scheme. The high sense of pension security ensured by the state results in relatively low employment rates among the elderly and a low early retirement age. In the case of the liberal regime, the situation is quite different. The role of the state in a pension system is limited. The market plays an important role here. The state provides rather low pension benefits and therefore agents decide to remain economically active longer, which results in a relatively high real retirement age. In the modest pensions regime, the state is dominant in the pension system and the main model is based on the PAYG formula, however pension benefits are relatively low as opposed to another regime with the domination of the state – a corporatist one. Therefore, in a modest pension regime, agents decide to work longer. Thus, retirement age in this regime is higher in comparison to the corporatist regime. In the last regime – mandatory private – the state cooperates with the market in a pension system. The retirement age and labour market participation indicators for the elderly are relatively high; however, this group of countries is rather diverse.

3. A CONCEPTUAL FRAMEWORK FOR PENSION REGIMES TYPOLOGY

My research question refers to the liberalism of a pension system, defined with the use of two dimensions. However, the first dimension is consistent with the literature and refers to public and private management in a pension system. The second dimension has been rather disregarded in the literature so far but seems to be no less important for the pension regimes typology. This is the relation between the compulsoriness and voluntariness of participation in a pension system. In such a combination of these two dimensions, perceived as the most liberal

regime is the one in which private sector plays an important role in administrating pension schemes and the mandatory participation is relatively low. On the opposite side is the most social regime in which the state plays a dominant role in a pension system and generally is the sole pension provider. Simultaneously, participation in public pension schemes is mandatory and pension contribution is relatively high.

For grouping the 30 countries studied into pension regimes, the following variables referring to the relation between public and private management as well as to the relation between compulsoriness and voluntariness in a pension system have been employed (see Marcinkiewicz, Chybalski, 2016):

X1 – the ratio between the expenditure on old-age pension provision from the mandatory public schemes, and total expenditure on old-age pensions (public and private mandatory and voluntary private). This measures the share of mandatory and publicly managed schemes in the whole pension system (OECD data from 2011);

X2 – the ratio between the expenditure on old-age pension provisions from the mandatory private schemes, and total expenditure on old-age pensions (public and private mandatory and voluntary private). This measures the share of mandatory and privately managed schemes in the whole pension system (OECD data from 2011);

X3 – the ratio between the expenditure on old-age pension provisions from the voluntary private schemes, and total expenditure on old-age pensions (public and private mandatory and voluntary private). This measures the share of privately managed voluntary schemes in the whole pension system (OECD data from 2011);

X4 – measures the contribution of a mandatory public pension system in ensuring income adequacy. It is obtained by the formula: $X4 = P1/(P1+P2+P3)$[1];

X5 - measures contribution of a mandatory private pension system in ensuring income adequacy. It is obtained by the formula: $X5 = P2/(P1+P2+P3)$;

X6 – measures the contribution of voluntary pension system in ensuring income adequacy. It is obtained by the formula: $X6 = P3/(P1+P2+P3)$;

X7 – coverage of mandatory private pension schemes by type of plan, expressed as a percentage of the working age population (15-64 years) (OECD data from 2011);

X8 – coverage of voluntary private pension schemes by type of plan, expressed as a percentage of the working age population (15-64 years), calculated as the maximum of two values: coverage of voluntary occupational schemes and coverage of voluntary personal schemes (OECD data from 2011);

X9 – the rate of public mandatory pension contribution (if it does not exist, X9=0) (OECD data from 2012);

X10 – the share of public minimum pension provision in the whole retirement income package in the mandatory system (the first and the second tier according to OECD classification). X10 contains the provision from the first tier, which serves for ensuring an absolute minimum standard of living (OECD data from 2012);

X11 – the share of public ER (earnings related) or DC provision in the whole retirement income package in the mandatory system. This contains the provision from the public part of the second tier (according to OECD classification) (OECD data from 2012);

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[1] *P1* denotes the net pension replacement rate from the public pension system; *P2* denotes the net pension replacement rate from the mandatory private pension system; *P3* denotes the net pension replacement rate from the voluntary pension system. For all the *P1-P3* variables the net replacement rates projected for the person entering labor market in 2012 and earning an average wage, with no career breaks, were employed (according to OECD methodology).

X12 – the share of private pension provision in the whole retirement package in the mandatory system. This contains the provision from private DB and private DC schemes, thus from the private part of the second tier (OECD data from 2012).

The variable *X9* reflects the mandatory character of a pension system (regardless of whether it is publicly or privately managed). *X1*, *X4*, and *X11* express the importance of the mandatory and public part of a pension system. *X2, X5, X7, X12* refer to the mandatory and private character whereas *X3, X6* and *X8* to the voluntary and private character of a pension system. *X10* measures the importance of a minimum pension provision for a retirement-income package from the mandatory system. Variables *X1-X3* refer to contemporary beneficiaries whereas variables *X4-X12* to contemporary contributors since in the case of the OECD pension database, pension entitlements relate to workers entering the labour market in 2012 at age 20. Presented this way, the set of variables reflects the dynamic character of pension systems caused by permanent reforms of them. The two studied relations – public vs. private management and mandatory vs. voluntary participation in a pension system – refer not only to the contemporary beneficiaries, but also to contemporary contributors. Moreover, such an approach is also justified by the fact that a pension system includes both these groups of participants. One group pays, the other is paid (Marcinkiewicz, Chybalski, 2016).

Two following methods – hierarchical clustering and *k*-means clustering, supported by Pearson's correlation coefficient analysis allowed identification of the following pension regimes (Marcinkiewicz, Chybalski, 2016):

I regime of significant voluntary pension schemes (Canada, Ireland, New Zealand, United Kingdom, and United States),

II regime of significant mandatory participation in private schemes (Australia, Denmark, Estonia, Iceland, Israel, Netherlands, Norway, Poland, Slovak Rep., Sweden, and Switzerland),

III mandatory public regime (Austria, Belgium, Czech Rep., Finland, France, Germany, Greece, Hungary, Italy, Luxembourg, Portugal, Slovenia, Spain, and Turkey).

The I regime includes countries with pension systems with the most significant liberal character. The role of privately managed and voluntary pension schemes is important in pension security, whereas the role of the state is limited in this regime. The feature distinguishing the II regime is the important role played by privately managed and mandatory pension schemes. This regime may be perceived as an intermediate model – between a liberal and a social one. The III regime is the most social one. Here, the state plays a dominant role in providing pensions and the significance of the private sector is rather marginal.

4. THE EMPIRICAL STUDY
4.1. Methodological framework for comparative analysis and data

In the comparative study, I employ the three pension regimes typology mentioned above. However, I aggregate these regimes into two in order to distinguish mainly between two models of pension systems: first, with a significant role of the market (next to the state) and the other with the absolute domination of the state. Thus, *the state plus market pension regime* consists of the I and II regime in the previous typology. *The state pension regime* reflects the III regime in the previous typology.

I compare selected statistical parameters (means and medians) across two aggregated pension regimes in terms of statutory retirement age, average effective age of retirement as well as the difference between these two measures. Statutory (normal) retirement age (pensionable age in OECD terminology, *PA*) is the age at which people become eligible to be paid pension entitlements at normal rates. However, because of many factors, such stimulants of early retirement or stimulants of late retirement, agents can leave the labour market before or after the statutory retirement age. The indicator measuring when people actually retire is the average

effective age of retirement (*AAR*). According to OECD terminology, "the average effective age of retirement can be thought of as the average age of all persons withdrawing from the labour force in a given period, whether during the course of any particular year or over any five-year period. The average age of retirement (*AAR*) is thus simply the sum of each year of age weighted by the proportion of all withdrawals from the labour force occurring at that year of age".[2] I also study the difference between these two retirement ages: *DAR=AAR-PA*. This indicator informs how the pensionable age differs from the average effective age of retirement. *DAR*=0 means that on average, people leave the labour market at pensionable age. One can then suppose that agents are not encouraged (e.g. by the state) either to stop working before or after reaching pensionable age. *DAR*<0 may be a symptom of some factors encouraging people to leave labour market before pensionable age. *DAR*>0 suggests that there are some stimulants encouraging people to leave the labour market later than at pensionable age. I also use the mandatory public pension contribution (*PPC*) in this study, since this contribution may be perceived as the measure of compulsoriness of participation in a pension system. The higher the contribution, the greater the compulsoriness; the lower the contribution, the greater the voluntariness (and the liberalism) of a pension system. The data on pensionable age and average effective age of retirement are obtained from OECD database and refer to 2014.

4.2. Results

In Table 1 and Figure 1, *state plus market pension regime* and *state pension regime* are compared in terms of retirement ages as well as public pension contributions.

Table 1. Statistical parameters for PA, AAR and DAR across regimes

Pension regime	Statistical parameter	*AAR* male	*PA* male	*AAR* female	*PA* female	*DAR* male	*DAR* female	*PPC*
State plus market	mean	64.8	64.9	63.1	64.0	-0.1	-0.9	10.1
	median	64.8	65.0	62.8	65.0	0.0	-0.8	9.9
	standard deviation	2.1	1.3	2.6	1.9	1.5	2.3	9.2
State	mean	62.5	62.9	61.7	62.1	-0.3	-0.4	19.6
	median	62.2	62.5	60.9	61.6	-0.7	-0.8	20.0
	standard deviation	2.0	2.5	2.1	2.9	2.4	2.2	9.7

Source: own computations on the basis of OECD data

Figure following on the next page

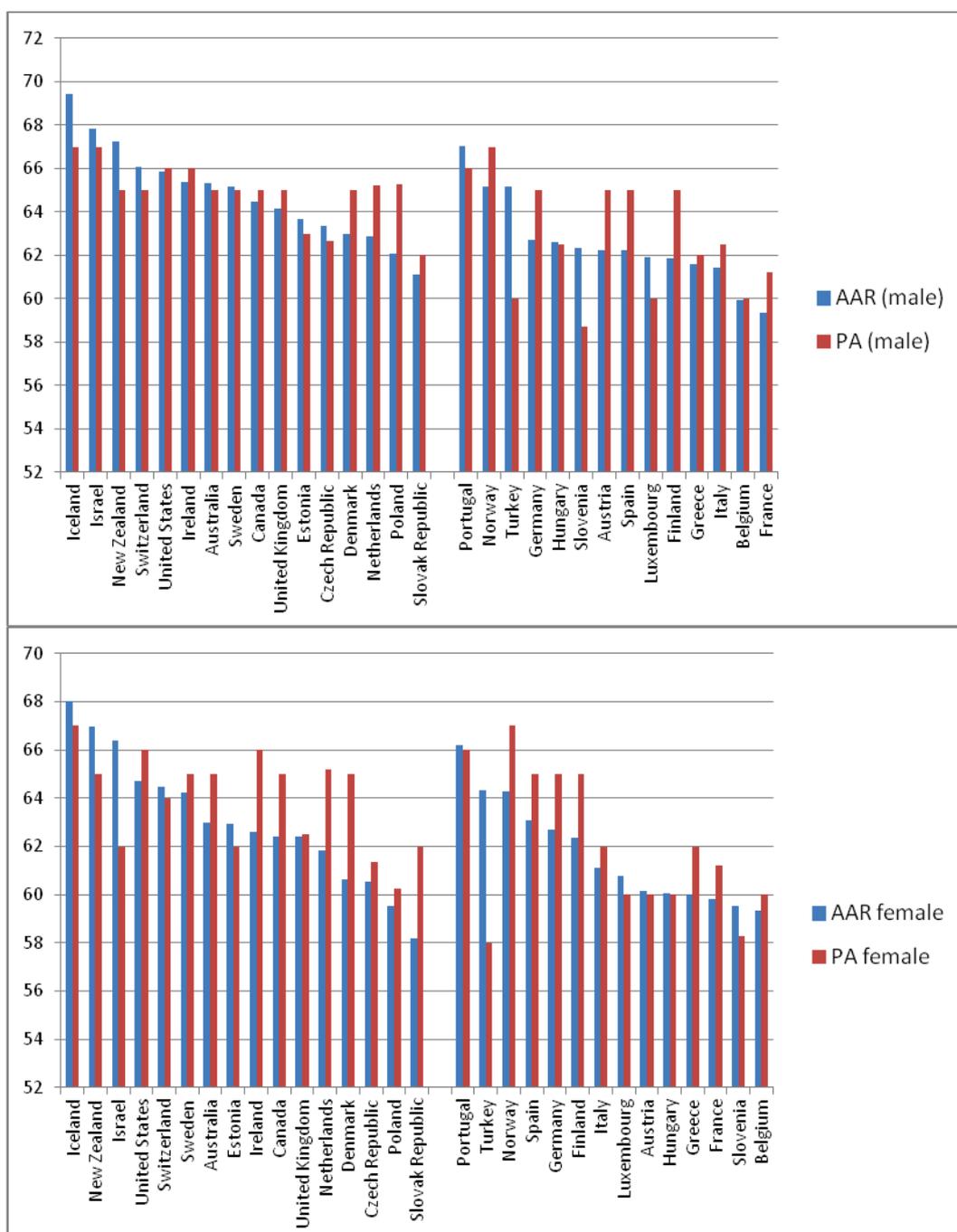[2] Cited from http://www.oecd.org/els/emp/39371923.pdf

Figure 1. PA and AAR across two pension regimes
Source: own computations on the basis of OECD data

On the basis of the calculations seen in Table 1 and Figure 1, one can draw the conclusion that as far as men are concerned, in *the state plus market pension regime* the average effective age of retirement as well as pensionable age are on average two years higher than in *the state pension regime*. This refers to both statistical parameters mean and median. In the case of women, the differences between the regimes are very similar, especially in terms of pensionable age (in the case of the median, they are even greater). As far as the differences between the average effective age of retirement and pensionable age are concerned, they are generally negative for both regimes and take values from the interval [-0.9; 0]. However, in the case of *state pension regime DAR* values are very similar for both men and women, whereas in the case of *state plus market pension regime* differences across genders are significant. Men leave labour

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market at pensionable age on average. Women retire almost one year before reaching pensionable age. Although some differences between the two regimes are observed, these regimes are very heterogeneous internally. Therefore, I also employed a hypothesis test for the difference between means. The results at the significance level of 0.05 were as follows: (1) the average effective age of retirement and pensionable age for men are greater in *the state plus market pension regime* than in *the state pension regime*; (2) in the case of women, the difference between the average effective age of retirement in both regimes is statistically insignificant, whereas the inter-regime difference in pensionable age is statistically significant (in favour of *the state plus market regime*). For $p=0.07$, all the differences are statistically significant (average effective and pensionable age are greater in *the state plus market pension regime*).

The above results suggest that a higher involvement of the state in a pension system is accompanied by a lower pensionable age and average effective age of retirement for both genders, however in the case of women the difference between the regimes in terms of the average effective age of retirement is statistically significant for $p=0.07>0.05$. This conclusion resulting from the comparative analysis of pension regimes is also confirmed by the correlation analysis between the average effective age of retirement (*AAR*) and public pension contribution (*PPC*). *PPC* may be here perceived as the measure of involvement of the state in a pension system in the sense of imposing agents to participate in (publicly or privately managed) pension schemes (see Figure 2).
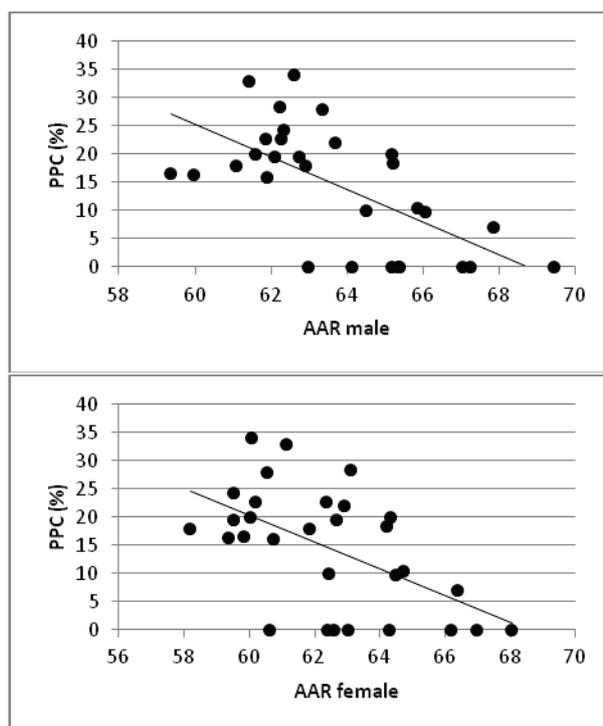

Figure 2. Correlation plots for AAR and PPC across OECD pension systems
Source: own computations on the basis of OECD data

Pearson's correlation coefficients for *AAR* and *PPC* for both genders are significant at a $p=0.05$ significance level. Therefore, one can draw a cautious conclusion that the higher the public pension contribution, the lower the average effective age of retirement. This suggests that the greater the compulsoriness of the participation in a pension system (or the greater the mandatory pension system) the lower the real age of retirement (measured by *AAR*). Pensionable age is also statistically significantly correlated with public pension contribution for both genders at $p=0.05$.

5. CONCLUSION

The empirical study conducted in the paper generally confirms that in pension regimes with a lesser role of the state agents retire later than in the most social regimes. According to Esping-Andersen's (1990) typology, the most liberal regime is a residual one and it includes e.g. United States, United Kingdom, Australia, Canada, and Switzerland. In Soede and Vrooman's (2008) typology, this regime is named liberal and includes very similar countries (United Kingdom, Ireland, Canada, United States). On the opposite side is corporatist regime in Esping-Andersen's or in Soede and Vrooman's typology and it includes Germany, France, Austria, and Belgium. Between these regimes are those which are a "good" mix of the state and market in a pension system; however, in the typology employed in this paper, this model of a pension system is classified together with the liberal one because in both of them the market plays an important role and is more or less supported by the state. Although the differences in average effective age of retirement as well as in pensionable age between *the state plus market pension regime* and *the state pension regime* are not great, they are statistically significant (in majority for $p<0.05$, and in all cases for $p<0.07$). The negative relation between the state involvement in a pension systems and the two studied retirement ages (statutory and real) are observed. Additionally, this relation is confirmed by correlation analysis. In some countries like e.g. Iceland, New Zealand, Ireland, Australia, United Kingdom or Denmark, there is not a separate public pension contribution and benefits in the mandatory public pension system are financed from taxes. These countries are examples of *the state plus market pension regime*. Only two countries in *the state pension regime* – Portugal and Norway – do not have a separate public pension contribution and they have the highest pensionable age and average effective age of retirement in this regime. Therefore, further studies could address the relation between the method of financing in a pension system (taxes vs contributions) and the retirement age.

LITERATURE

1. Borsch-Supan, A. (2007). *European welfare state regimes and their generosity towards the elderly*. MEA discussion paper series, 07128.
2. Casamatta, G. and Paoli C. (2011). Choosing the legal retirement age of unemployment. *Louvain Economic Review*. Retrieved 20.02.2016 from http://works.bepress.com/georges_casamatta/12/
3. Dittrich, D., Busch, V. and Micheel F. (2011). Working beyond retirement age in Germany: The employee's perspective. In R. Ennals, R.H. Salomon (eds.) *Older workers in a sustainable society* (p. 189-201). Frankfurt am Main: Peter Lang.
4. Esping-Andersen, G. (1990). *The Three Worlds of Welfare Capitalism*. Cambridge: Politi Press.
5. Hansen, C.W. and Lønstrup, L., 2009. *The optimal legal age in an OLG model with endogenous labour supply*, Discussion Papers on Business and Economics No. 5/2009. Odense: University of Southern Denmark.
6. Macinkiewicz, E. and Chybalski F. (2016). *A new proposal of pension regimes typology: Empirical analysis of OECD countries* [paper in review process].
7. Merkuryeva, I. (2012). *Late Career Unemployment and the Decision to Retire*. Madison: University of Wisconsin-Madison. Retrieved 10.02.206 from http://paa2013.princeton.edu/papers/130709.

8. Radl, J. (2013). *Retirement Timing and Social Stratification: A comparative Study of Labor Market Exit and Age Norms in Western Europe*. London: Versita.

9. Rhodes, M., and D. Natali. 2003. *Welfare regimes and pension reform agendas*. Paper given at the Conference 'Pension Reform in Europe: Shared Problems, Sharing Solutions', London, 5 December. Retrieved 17.02.2016 from http://www.lse.ac.uk/europeanInstitute/research/hellenicObservatory/pdf/pensions_conference/Rhodes-Pensions.pdf.

10. Soede, A. and Vrooman, C. (2008). *A comparative typology of pension regimes*. Enepri Research Report No. 54, Brussels: Centre for European Policy Studies.

11. Staubli, S. and Zweimuller, J. (2012). *Does Raising the Retirement Age Increase Employment of Older Workers?* Working Paper No. 20. Zurich: University of Zurich. Retrieved 20.02.2016 from http://webcache.googleusercontent.com/search?q=cache:sH03wd9OD5sJ:ftp.iza.org/dp5863.pdf+&cd=5&hl=pl&ct=clnk&gl=pl.