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HOW DOES MARKET SHARE AFFECT THE INCREASE IN THE VALUE OF INVESTMENT UNIT OF VOLUNTARY PENSION FUNDS?*

Kako tržišno učešće utiče na povećanje vrednosti investicione jedinice dobrovoljnih penzijskih fondova?

Abstract

The importance of this research stems from highly concentrated markets of voluntary pension funds, on the one hand, and intensive competition pressure among market participants, on the other. The main purpose of this paper is to evaluate the static and dynamic relationship between a pension fund's market share and value of its investment unit. The research was designed to monitor the changes in the size of market share and investment units in the period from 2008 to 2017 in the funds in the Republic of Serbia. The main findings suggest that the size of market share of individual voluntary pension funds has no influence on the growth of investment unit value. Contrary to the static approach, the dynamic approach argues that the changes of market share affect the performance of voluntary pension funds. The obtained results indicate that the performances of individual pension funds do not depend on their size, but rather on their ability to occupy a larger portion of the market and increase their market share. This paper provides a systematic review of the relevant empirical literature on internal and external determinants of a pension fund's performance. It represents a significant contribution to the understanding of market factors, such as market share and value of investment units.

Keywords: *voluntary pension fund, market share, investment units.*

Sažetak

Važnost ovog istraživanja proizlazi iz visoke koncentracije tržišta dobrovoljnih penzijskih fondova, s jedne strane, i intenzivnog pritiska konkurencije među učesnicima na tržištu, s druge strane. Glavna svrha ovog rada je procena statičkog i dinamičkog odnosa između tržišnog učešća dobrovoljnih penzijskih fondova i vrednosti njihovih investicionih jedinica. Istraživanje je osmišljeno sa ciljem praćenja promene veličine tržišnog učešća i promene njihovih investicionih jedinica u periodu od 2008. do 2017. godine u Republici Srbiji. Glavni rezultati istraživanja upućuju na to da veličina tržišnog učešća pojedinačnih penzijskih fondova ne utiče na rast vrednosti investicionih jedinica. Suprotno statičkom pristupu, dinamički pristup tvrdi da promene tržišnog učešća utiču na performanse dobrovoljnih penzijskih fondova. Dobijeni rezultati ukazuju na to da performanse pojedinačnih penzijskih fondova ne zavise od njihove veličine, nego od njihove sposobnosti širenja na tržištu i povećanja njihovog tržišnog učešća. Ovaj rad daje sistematičan pregled relevantne empirijske literature o unutrašnjim i spoljnim determinantama funkcionisanja dobrovoljnih penzijskih fondova. Rad predstavlja značajan doprinos razumevanju tržišnih faktora, kao što su tržišno učešće i vrednost investicionih jedinica.

Ključne reči: *dobrovoljni penzijski fond, tržišno učešće, investicione jedinice.*

Introduction

Large potential of a pension fund's performance has been argued on a theoretical basis and demonstrated empirically. In general, the performance of pension funds is conditioned by the influence of a number of factors which can by nature be either internal or external. Internal factors relate to the specific characteristics of individual funds, such as the structure of investment portfolios, financial structure, size, and age of the fund. On the other hand, external factors include characteristics of the macroeconomic environment and, due to their systemic character, affect the performance of the overall pension system to a greater or lesser extent. Considering the fact that the primary function of a pension fund is reflected in providing economic and social protection from risks, it is logical that examination of the factors that determine the performance of funds appears as a key part of a comprehensive economic analysis.

The subject matter of the analysis is comprehensive evaluation of whether the market share really affects the value of investment units of voluntary pension funds in the Republic of Serbia. Faced with intense market competition, voluntary pension funds strive to maintain and improve their market position, as the main source of growth, better performance, and value creation for shareholders. Changes in the market share, as one of the crucial performance determinants of pension funds, become very important in the volatile macroeconomic conditions under which companies in Serbia operate. This paper aims to expand the existing empirical literature on the impact of market share of voluntary pension funds on the increase in the value of their investment units. It seems reasonable to assume that a change in a company's market share will, more or less, be reflected in the company's performance. Therefore, the present research seeks to investigate whether the changes in the size of market share of a pension fund really affected its investment unit value in the period from 2008 to 2017.

This paper is organized as follows. The Introduction is followed by a summary of literature review about the main trends and variables which determine a pension fund's performance. The third part of this paper describes the dataset and relevant methodological basis of the research. The fourth includes the econometric analysis and discussion of the obtained empirical results. Finally, the paper ends with the summary and conclusions.

Literature review

The objective of any pension system is to provide adequate, sustainable, and robust benefits. It should help protect countries against economic shocks and long-term demographic changes [15]. On the one hand, the pension fund industry has witnessed a significant growth in the past few years. This phenomenal growth trend is likely to continue in the coming decades [28]. Nevertheless, over the last twenty years the pension fund industry has undergone significant concentration. Major concern about such concentration is that firms might be able to exercise market power. However, it could result in their positive performance, especially if economies of scale are present in the industry [11, p. 63], [4]. In this context, this paper contributes to current literature by examining market share volatility effects on a pension fund's performance.

The scope of transitory changes in pension systems determines the market structure and the pension fund's performance. These changes are covered in literature with a special focus on the time of crisis [14], [8], [25]. In the case of Hungary, "the pension policies were erratic and served short-term electoral demands without offering long-term solutions for structural problems" [1, p. 350]. In this respect, the changes in multi-pillar systems in Central and Eastern Europe, according to the simulations, will have a relatively small impact on the value of future old-age pensions, particularly in countries that decided to make a temporary change in pension contributions. "The net outcome of post-crisis pension system modifications depends on the magnitude of fully-funded contribution reduction, but also on the design of Pay-As-You-Go component and the way individual pension rights are accrued. These results indicate the rise in implicit liability of pension system in Slovakia to be higher than the reduction of the explicit liability caused by the pension system change and the lower rise of implicit liability in Poland and Latvia" [7, p. 110]. Additionally, the latest research studies in this

field have analyzed the behavior of second pillar pension fund participants. The results in Lithuania show that the majority of participants make irrational choices when selecting the pension fund. Moreover, the participants are passive and tend not to change their pension funds during the accumulation period [21].

Some authors point out that pension privatization would not only enable higher pensions for future beneficiaries at the micro level, but would also accelerate economic growth and increase national saving at the macro level [3]. Hence, examining the case of the Swedish pension system, Czech [9] illustrates the fact that privatization of the public sphere brings not only benefits, but also market failures that used to be addressed by traditional welfare states. Actually, the contemporary re-designing of the pension system was aimed at two goals: relief to public finance and expanding pension funding by financial intermediaries. Consequently, Ząbkowicz [30] argues that they are in contradiction to each other, which makes the paradox of reforming pensions.

Some studies investigate scale economies and the optimal scale of pension funds, estimating different cost functions with varying assumptions about the shape of the underlying average cost function. Based on the data provided by the Dutch pension funds over the 1992-2009 period, the authors of one study found that "unused scale economies for both administrative activities are indeed large and concave, that is, huge for small pension funds and decreasing with pension fund size. We observe a clear optimal scale of around 40,000 participants during 1992–2000 (pointing to a U-shaped average cost function), which increases in subsequent years to size above the largest pension fund, pointing to monotonically decreasing average costs" [5, p. 25].

In order to determine whether pension funds are good monitors, it is necessary to identify the influence of the control structure of pension funds over the financial performance and market value of public companies. Using dynamic models of linear and non-linear regressions in an unbalanced panel from 1995 to 2015, it is shown that pension funds in Brazil do not play a good monitoring role, as the control structure of pension funds is negatively related to the financial performance

of a company or, in other words, the higher the stake, the worse the performance of the company [27]. Some authors create a new liability benchmark for referencing the asset performance. Measuring the asset performance with respect to the liability benchmark yields the Asset-Liability-Result approach. This approach, that uses the liability benchmark for analyzing the entire pension fund markets' performance and as an operational tool for individual pension funds, shows that the pension funds' recovery from the recent financial crisis took much longer than the value increase of the asset portfolios suggests. Furthermore, this model can be used as a market model to analyze various pension markets around the world [6].

Papík [24] monitors the composition of assets and describes the relation between equity and mixed pension funds' profit and components of assets they own. Accordingly, the obtained results contribute to a better understanding of the importance of certain types of financial assets owned by equity and mixed funds and their impact on pension funds' profit. On the other hand, the relationship between the performance and degree of diversification of a pension fund's portfolios suggests contradictory results [20]. Lee [19] systematized the effects of macroeconomic variables and market factors on profitability and proved empirically that the influence of insurance portfolio concentration on company's performance, although negative, is not significant. As regards the effects of micro and macroeconomic factors on performance, some findings of studies conducted in Jordan show that liquidity, leverage and underwriting risks have a negative and significant effect, whereas the size of the company, market share and GDP statistically have a positive and significant effect on the profitability of the Jordanian insurance industry [2]. Hailegebreal [13] examined macroeconomic and firm-specific determinants of profitability of Ethiopian insurance industry. Knežević et al. [17] measured the efficiency of the insurance companies operating in Serbia using the DEA method. A recent study has shown a statistically significant positive impact of the change in market share on the change of the profit margin of companies [26], [16]. Empirical findings indicate a significant and negative influence of the combined ratio, financial leverage and retention rate on the profitability of non-life insurers,

as measured by the return on assets (ROA), while the influence of the written premium growth rate, return on investment and company size is significant and positive. One should not neglect the fact that it is desirable to achieve a delicate balance between business principles due to, in the short run, excessive requirements for profitability that may threaten the safety of operations [18]. The increase in the premium growth rate will ensure the growth of the company and its market share. In addition, companies set prices according to the prices of competitive companies concerned that they might lose market share [23, p. 518].

Based on the literature that examines the relationship between the market share and performance of companies that operate in a certain market, we have defined the basic research hypothesis of the present paper as follows: There is a statistically significant positive impact of market share size (MS) on the movements in investment unit value (rVIUvpf) in the Serbian pension fund market.

Voluntary pension funds have a special importance for the Serbian pension system because they reduce the pressure on public finance in terms of expenditures and raise the level of life quality of individuals after the end of their working life. At the end of the fourth quarter of 2018, the market of voluntary pension funds in the Republic of Serbia included four companies managing seven voluntary pension funds, one custodian bank and five agent banks. According to the National Bank of Serbia [22, pp. 4], the voluntary pension funds' net assets expanded by 2.7% in 2018. In addition, the changes in the value of net assets reflect net contributions, withdrawals and investment returns. Measured by the Herfindahl-Hirschman Index, market concentration amounted to about 2,780 points, which indicates high concentration in the voluntary pension funds market. According to the size of net assets relative to total net assets of the sector, two funds were classified as large and two as medium. Together, they held 95% of the market share, with the largest fund accounting for around 40%. At the end of the fourth quarter of 2018, 192,295 users were in the accumulation phase (when contributions are made). The number of users is the number of people who are members of voluntary pension funds. This number is lower than the number of membership contracts, as there is a significant number of users with more than one

membership contract in one or several voluntary pension fund. Total membership contracts in voluntary pension funds stood at 261,726, and voluntary pension fund users accounted for 9% of the total number of employees [22].

Methodological basis of the research and data sources

In order to increase the transparency of operations of voluntary pension funds and improve the comparability of movements in their investment unit values, the National Bank of Serbia has devised the FONDex index, a unique indicator of movements in the voluntary pension fund system. To illustrate, FONDex may be viewed as an investment unit value of an imaginary fund representing all funds operating in Serbia. The FONDex value is calculated on a daily basis. Its value for the selected date is obtained by multiplying the index value for the previous business day with the weighted average of chain indices of investment unit values for each fund. A fund's net value is taken as a weighting factor; hence the effect of each fund's investment unit value on the formation of FONDex value is proportional to that fund's market share. The first calculation date was 15 November 2006, while the initial FONDex value is 1,000. The following should be noted (the National Bank of Serbia):

a)   Previous index values (of investment units) do not guarantee future results. Future values may be higher or lower than the previous ones.

b)   A percentage-wise change in the FONDex index (as with any other index), relative to an earlier date, is more significant than its present absolute value. This is particularly important when movements in investment unit values of voluntary pension funds are compared to movements in FONDex values.

The FONDex index can be calculated using the following formula:

$$FONDex(t) = FONDex(t\text{-}1)\frac{\sum_{i=1}^{n}\frac{IJ(i,t)}{IJ(i,t\text{-}1)}NI(i,t)}{\sum_{i=1}^{n}NI(i,t)} \quad (1)$$

$$FONDex(t_0) = 1000 \quad (2)$$

where:

FONDex(t) – FONDex value on selected day t

FONDex(*t-1*) – FONDex value on the business day preceding day *t*

n – number of VPFs operating on day *t*

IJ (*i,t*) – fund's investment unit value *i* on day *t*

IJ (*i,t-1*) – fund's investment unit value *i* on the business day preceding day *t*

NI (*i,t*) – fund's net asset value *i* on day *t*

FONDex (*t_0* – FONDex value on the first calculation date (15 November 2006).

Bearing in mind the abovementioned, the investment unit value (VIUvpf) is considered to be the best indicator of a voluntary pension fund's performance and the basis for investors' decision-making when investing. The investment decision does not depend that much on the absolute value of the investment unit, but rather on the rate of its growth (rVIUvpf). The reason for this lies in the fact that the value of these units (at least in Serbia) has a constant tendency of growth; thus, it may happen that a fund that subsequently enters the market has a lower investment unit value. It can then be attractive for investments only if the growth of its investment unit is greater than the growth of other pension funds' investment units. The movement of FONDex as a composite index, which shows the trend of movement in the Serbian voluntary pension fund system, indicates constant growth of voluntary pension funds' investment unit values in Serbia (Figure 1).

Figure 1: Movement in FONDex values between 2008 and 2017 in RSD
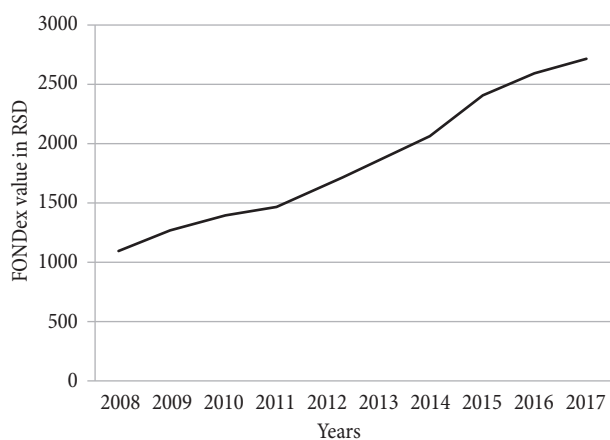
Source: Authors' calculations.

Bearing in mind the fact that the FONDex value shows a constant tendency of growth, it can be said that the investment unit value is greater for those funds that

have entered the market earlier. We conclude that the absolute value of an investment unit cannot be the measure of a fund's performance and a basis for investing. The increase in investment unit value can be used better for this purpose.

In the analysis of the impact of market share on the increase in the value of investment units of individual voluntary pension funds (rVIUvpf), the authors used a linear panel-data model. The panel regression model involves observing and analyzing the behavior of multiple entities over time. Namely, the analysis repeats the measurements of the same entities over time in order to examine the relationship between the observed phenomena. The regression model used in the study has had the following form [29]:

$$Y_{i,t} = c + \beta_1 X_{i,t} + \alpha_i + u_{i,t} \quad (i = 1,2,...n) \quad (3)$$

where $Y_{i,t}$ is a dependent variable of entity *i* (in this case pension fund) in month *t*, $X_{i,t}$ is an independent (explanatory) variable of entity *i* in month *t*, β_1 is a coefficient in front of an independent (explanatory) variable that measures the impact of the independent variable on the dependent one, α_i is an unknown intercept for each entity, and $u_{i,t}$ is a residual or statistical error. In this paper, the dependent variable is a change in the investment unit value of a voluntary pension fund (rVIUvpf). Independent (explanatory) variable is the size of a pension fund's market share (MS), determined as the share of pension fund's net assets in the total net assets of all voluntary pension funds in Serbia. In addition to this explanatory variable, there are also two control variables: absolute net asset value (NAV) and absolute value of investment unit (VIUvpf) with a one-month lag. VIUvpf with a one-month lag means that the value of investment unit from the beginning of each month is important for its growth at the end of the month. According to this, the following regression equation was used for the conducted research:

$$rVIUvpf_{i,t} = c + b_1 MS_{i,t} + b_2 NAV_{i,t}$$
$$+ b_3 VIUvpf_{i,t-1} + \alpha_i + u_{i,t} \quad (i = 1,2,...n) \quad (4)$$

In equation 4, $rVIUvpf_{i,t}$ is the change in the investment unit value of voluntary investment fund *i* in month *t*, which is obtained using the formula $\frac{VIUvpf_{i,t} - VIUvpf_{i,t-1}}{VIUvpf_{i,t-1}}$, where $VIUvpf_{i,t}$ is the investment unit value of pension fund *i* in month *t*. Variable $MS_{i,t}$ is the market share of voluntary

pension fund i in month t. Variable $NAV_{i,t}$ is net asset value of pension fund i in month t and $VIUvpf_{i,t-1}$ is the absolute value of investment unit for fund i in month $t-1$.

An alternative regression model was also used in the research in the following form:

$$rVIUvpf_{i,t} = c + b_1 \Delta MS_{i,t} + b_2 NAV_{i,t} + b_3 VIUvpf_{i,t-1} + \alpha_i + u_{i,t} \quad (i = 1,2,...n) \quad (5)$$

where $\Delta MS_{i,t}$ is the change in the market share of fund i in month t, which is obtained using the formula $MS_{i,t} - MS_{i,t-1}$. It is the first difference of the MS value.

For both alternative regression models, we used the fixed effects model or the LSDV model. We tested the appropriateness of regression models using two tests: the Hausman test and the Wald test (Tables 2 to 5 in Appendix). The source of data for the conducted research was the database of the National Bank of Serbia (NBS). The data were processed in the EViews7 statistical program.

Research results and discussion

As already stated, the performance of a voluntary pension fund can be measured through the increase in its investment unit value. The researchers were interested in whether such increase was influenced by the size of market share or greater market share meant that the company also had a higher growth of the investment unit value. The diagram of the trend in market share size and the increase in investment unit value is presented in Figure 2.

As can be seen from Appendix (Table 1), the maximum value of an individual fund's market share in the observed

Figure 2: Diagram of the trend in market share size (MS) and increase in investment unit value (rVIUvpf) for all active voluntary pension funds in Serbia between 2008 and 2017 (monthly data)
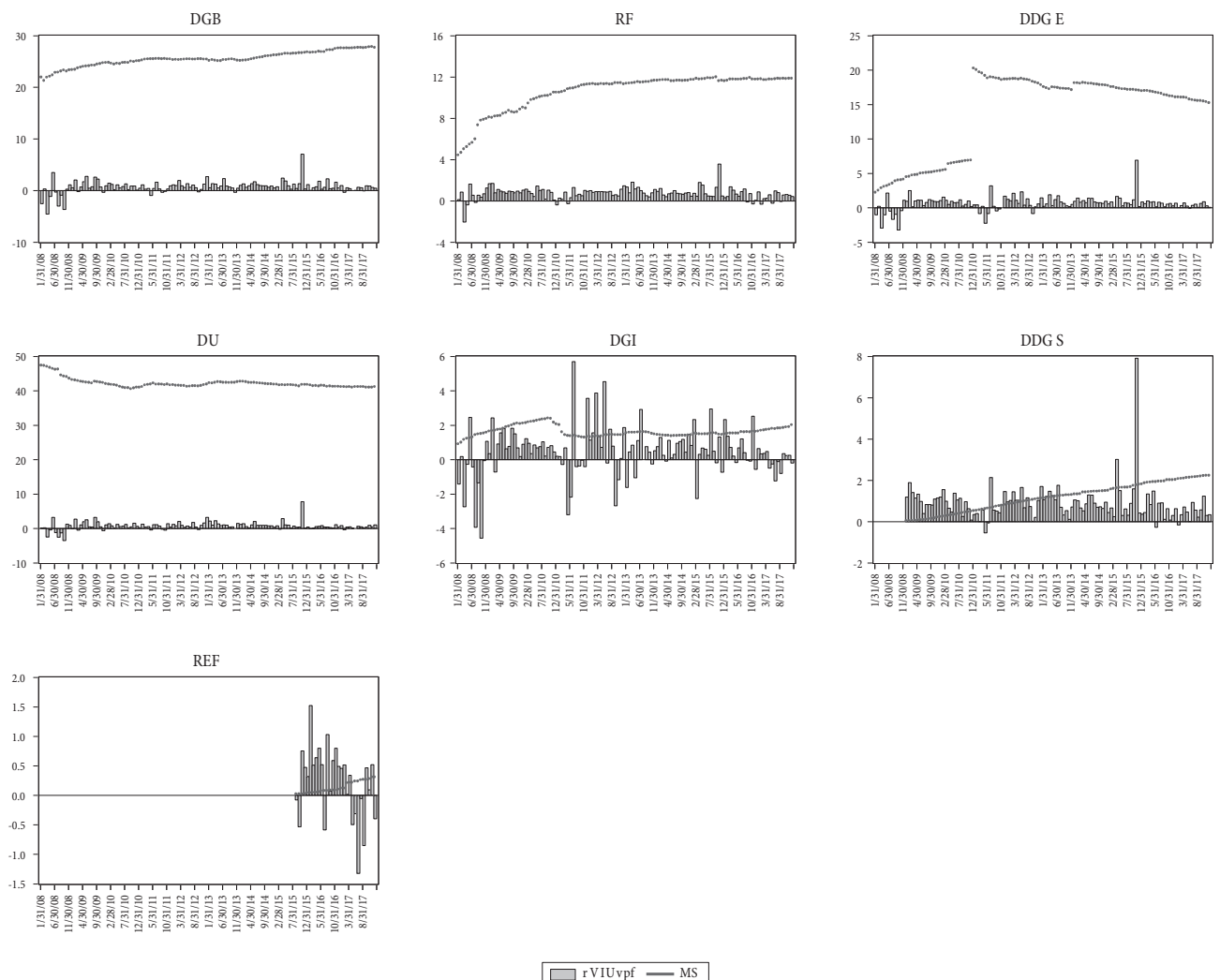
Source: Authors' calculations in EViews7.

period was 47.20%, while the minimum was 0.004%. The average fund's market share size in the voluntary pension fund market in Serbia was 15.33%. Between 2008 and 2017, maximum monthly increase in investment unit value was 7.91%, and minimal increase (in this case, decrease) was -4.56%. The average monthly growth of investment unit value of voluntary pension funds in Serbia was 0.66%. The same table shows that the highest growth of market share in the analyzed period amounted to 13.37%, while the biggest decrease was 1.80%. The average change in market share was 0.032%.

The first regression model shows that there is a positive impact of the size of pension fund's market share on the movement in investment unit value; however, this impact is not statistically significant (p=0.86; p>0.01). The same goes for net assets. Only the value of investment unit with a one-month lag has a statistically significant negative impact on the growth of this value. If we talk only about the impact of market share on the movement in investment unit value, our research hypothesis should be rejected (Table 1).

Given that there is no statistically significant impact of market share size on the increase in investment unit value, the following question arises: Which part of an entity's

market position can lead to an increase in its investment unit value? The response should be sought in the change in market share, which is why further research should include the analysis of the impact of changes in company's market share on the increase in its investment unit value. The changes of market share (the first difference of this value) and investment unit value are given in Figure 3.

The alternative regression model shows that there is a statistically significant positive impact of the change in the market share of voluntary pension funds on the increase in their investment unit value (p=0.0048; p<0.01) (Table 2).

The impact of the changes in market share, net assets and investment unit value of pension funds on the increase in their investment unit value in Serbia can be shown through the following equation:

$$rVIUvpf_{i,t} = c + 0.137\Delta MS_t + 0.00003NAV_t - 0.00054VIUvpf_{t-1} + \alpha_i + u_{i,t} \; (i = 1,2,...7) \quad (6)$$

The statistical analysis (Table 2) showed that the increase of one percentage point in the market share of a voluntary pension fund in Serbia leads to an increase in the value of its investment unit by slightly less than 0.14 percent. The impact of the other two variables is not statistically significant at the level of 5% (p>0.05). The R-squared value of 0.70 shows that this regression

Table 1: The results of the panel analysis of the impact of market share size (MS), net assets value (NAV) and investment unit value on the increase in investment unit value (rVIUvpf)

Dependent variable: *rVIUvpf*				
Method: Panel Least Squares				
Date: 03/26/19 Time: 16:18				
Sample (adjusted): 2/29/2008 10/31/2017				
Periods included: 117				
Cross-sections included: 7				
Total panel (unbalanced) observations: 719				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.469630	0.485907	3.024507	0.0026
MS	0.001995	0.011255	0.177290	0.8593
NAV	3.17E-05	2.03E-05	1.559275	0.1195
VIUvpf(-1)	-0.000567	0.000305	-1.859646	0.0634
Effects specification				
Cross-section fixed (dummy variables)				
Period fixed (dummy variables)				
R-squared	0.697753	Mean dependent var		0.680582
Adjusted R-squared	0.634041	S.D. dependent var		1.091740
F-statistic	10.95176	Durbin-Watson stat		1.824278
Prob(F-statistic)	0.000000			

Source: Authors' calculations in EViews7.

Table 2: The results of the panel analysis of the impact of changes in market share (*ΔMS*), net assets (NAV) and investment unit value on the increase in investment unit value (rVIUvpf)

Dependent variable: rVIUvpf				
Method: Panel Least Squares				
Date: 03/28/19 Time: 18:01				
Sample (adjusted): 2/29/2008 10/31/2017				
Periods included: 117				
Cross-sections included: 7				
Total panel (unbalanced) observations: 717				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.457284	0.466531	3.123657	0.0019
ΔMS	0.137142	0.051607	2.657399	0.0081
NAV	2.79E-05	2.03E-05	1.376729	0.1691
VIUvpf(-1)	-0.000536	0.000304	-1.764921	0.0781
Effects specification				
Cross-section fixed (dummy variables)				
Period fixed (dummy variables)				
R-squared	0.701093	Mean dependent var		0.680936
Adjusted R-squared	0.637873	S.D. dependent var		1.092736
F-statistic	11.08964	Durbin-Watson stat		1.828168
Prob(F-statistic)	0.000000			

Source: Authors' calculations in EViews7.

**Figure 3: Diagram of the changes in market share (ΔMS) and investment unit value (rVIUvpf)
for all active voluntary pension funds in Serbia between 2008 and 2017 (monthly data)**
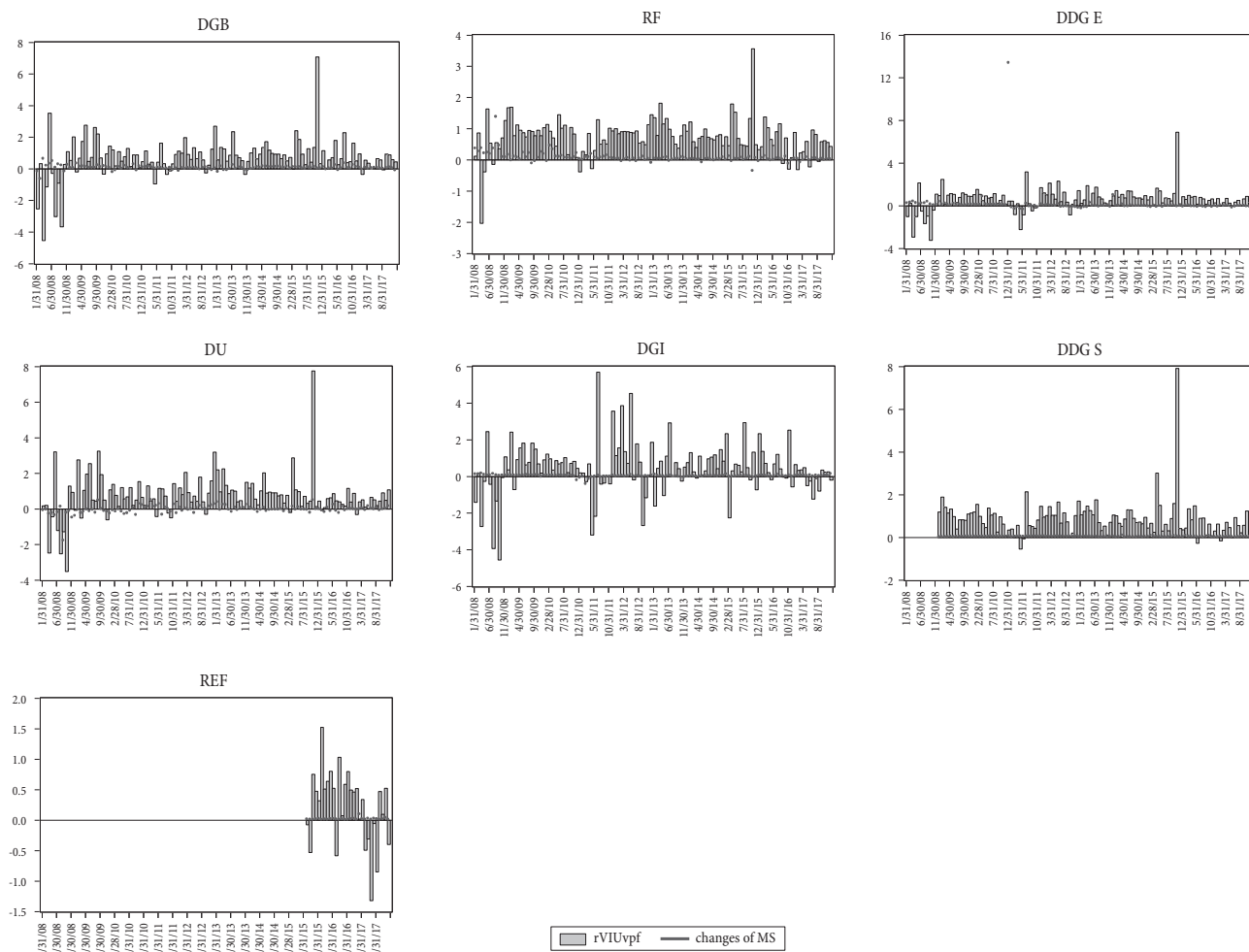
Source: Authors' calculations in EViews7.

equation represents the impact of change in market share on the increase in investment unit value well, that is, 70% of changes in the value of an investment unit can be explained by this regression model, while the remaining 30% can be explained by other factors. Autocorrelation was tested using the Durbin-Watson statistic (DW = 1.83); the results indicated that there was no autocorrelation problem in the model: Field [12] considers that values below 1 and above 3 are worrying, while Dufour and Dagenais [10] claim that the values of concern fall above 2.50 and below 1.50.

Concluding remarks

High market concentration in the pension fund industry and a relatively small number of participants have influenced the pension funds' performance. This paper summarizes

whether and to what extent market share really affects the value of investment unit.

It can be concluded that in the Serbian voluntary pension fund market, the market share size of individual pension funds has no impact on the increase in their investment unit values. This means that the size of a company, measured through the size of market share, does not have an impact on business performance, measured through the increase in investment unit value. Thus, the basic hypothesis of the research is rejected. However, further research has led to the conclusion that the dynamics of the change in market share actually influences the business performance of voluntary pension funds. The value of investment unit grows with the growth of market share. If a pension fund increases its market share by one percentage point, the value of its investment unit increases by slightly less than 0.14%. It can be said that the performance of a

fund depends primarily on its ability to win the market and to seize the share from other companies. The level of change in investment unit value caused by the change in company's market share can relativize this conclusion. Therefore, if a VPF management company wants to increase the value of its investment unit by 1%, it has to increase its market share by more than 7%, which is not easy in contemporary market conditions. In the end, it can be said that the market share impacts the investment unit value through its changes. However, that impact is not as great as one might think.

The presented research yields new findings about the relationship between a pension fund's market share and the value of its investment unit. The originality of this paper derives from the fact that it highlights a new approach to measuring the mentioned relationship in the voluntary pension fund market which seems to be a rather unexplored topic.

Further research should be conducted in two directions: empirically and methodologically. The first refers to the expansion of the sample of analyzed countries in order to get a wider picture about the interdependence of the two variables. The second relates to the extension of the methodological concept. This paper investigated the connection between market structure and performance, and its authors propose the application of the famous structure-conduct-performance paradigm in the field of industrial organization, which would provide a complete causal explanation.

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APPENDIX:

Table 1: Descriptive statistics of all used variables

	MS in %	ΔMS in %	NAV in million RSD	VIUvpf in RSD	rVIUvpf in %
Mean	15.39676	0.032879	2766.795	1613.016	0.680936
Median	11.60796	0.016053	1609.560	1501.700	0.684904
Maximum	47.14549	13.36772	14443.60	2817.170	7.912402
Minimum	0.007650	-1.803500	0.375077	876.1300	-4.564853
Std. Dev.	14.56366	0.522099	3269.974	489.5439	1.092736
Skewness	0.705736	23.25521	1.552056	0.629991	0.668580
Kurtosis	2.208361	595.4803	4.967058	2.336442	14.30608
Jarque-Bera	78.24102	10551735	403.4567	60.58245	3872.262
Probability	0.000000	0.000000	0.000000	0.000000	0.000000
Sum	11039.48	23.57438	1983792.	1156532.	488.2310
Sum Sq. Dev.	151863.7	195.1723	7.66E+09	1.72E+08	854.9548
Observations	717	717	717	717	717

Source: Authors' calculations in EViews7.

Table 2: Hausman test for the first regression model

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. df	Prob.
Cross-section random	12.422073	3	0.0061

Source: Authors' calculations in EViews7.

Table 3: Wald test for the first regression model

Wald Test:
Equation: Untitled

Test Statistic	Value	df	Probability
F-statistic	2.994459	(6, 709)	0.0068
Chi-square	17.96676	6	0.0063

Source: Authors' calculations in EViews7.

Table 4: Hausman test for the second regression model

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. df	Prob.
Cross-section random	11.588705	3	0.0089

** WARNING: estimated cross-section random effects variance is zero.
Source: Authors' calculations in EViews7.

Table 5: Wald test for the second regression model

Wald Test:
Equation: Untitled

Test Statistic	Value	df	Probability
F-statistic	2.887049	(5, 707)	0.0137
Chi-square	14.43525	5	0.0131

Source: Authors' calculations in EViews7.

Table 6: Full results for the first regression model

Dependent Variable: *rVIUvpf*
Method: Panel Least Squares
Date: 03/26/19   Time: 16:18
Sample (adjusted): 2/29/2008 10/31/2017
Periods included: 117
Cross-sections included: 7
Total panel (unbalanced) observations: 719

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.469630	0.485907	3.024507	0.0026
MS	0.001995	0.011255	0.177290	0.8593
NAV	3.17E-05	2.03E-05	1.559275	0.1195
VIUvpf(-1)	-0.000567	0.000305	-1.859646	0.0634
Effects Specification				
Cross-section fixed (dummy variables)				
Period fixed (dummy variables)				
R-squared	0.697753	Mean dependent var		0.680582
Adjusted R-squared	0.634041	S.D. dependent var		1.091740
S.E. of regression	0.660443	Akaike info criterion		2.166007
Sum squared resid	258.6575	Schwarz criterion		2.968247
Log likelihood	-652.6796	Hannan-Quinn criter.		2.475736
F-statistic	10.95176	Durbin-Watson stat		1.824278
Prob(F-statistic)	0.000000			

Source: Authors' calculations in EViews7.

Table 7: Full results for the second regression model

Dependent Variable: *rVIUvpf*
Method: Panel Least Squares
Date: 03/28/19   Time: 18:01
Sample (adjusted): 2/29/2008 10/31/2017
Periods included: 117
Cross-sections included: 7
Total panel (unbalanced) observations: 717

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.457284	0.466531	3.123657	0.0019
ΔMS	0.137142	0.051607	2.657399	0.0081
NAV	2.79E-05	2.03E-05	1.376729	0.1691
VIUvpf(-1)	-0.000536	0.000304	-1.764921	0.0781
Effects Specification				
Cross-section fixed (dummy variables)				
Period fixed (dummy variables)				
R-squared	0.701093	Mean dependent var		0.680936
Adjusted R-squared	0.637873	S.D. dependent var		1.092736
S.E. of regression	0.657576	Akaike info criterion		2.157691
Sum squared resid	255.5519	Schwarz criterion		2.961679
Log likelihood	-647.5322	Hannan-Quinn criter.		2.468135
F-statistic	11.08964	Durbin-Watson stat		1.828168
Prob(F-statistic)	0.000000			

Source: Authors' calculations in EViews7.

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