Journal of Academic Value Studies
(JAVStudies)
ISSN:2149-8598 | Vol: 5, Issue: 4, pp. 639-650
javstudies.com | javstudies@gmail.com
This article was checked by intihal.net

Makale geliş tarihi/Article arrival date: 14.06.2019 – Makale Kabul Tarihi/ The Published Rel. Date: 08.09.2019
VERBERİ, C. (2019). "The Effects of Individual Retirement System on Savings and Capital Markets in Turkey", Journal of Academic Value Studies, Vol:5, Issue:4; pp: 639-650 (ISSN:2149-8598).

THE EFFECTS OF INDIVIDUAL RETIREMENT SYSTEM ON SAVINGS AND CAPITAL MARKETS IN TURKEY*

Türkiye'de Bireysel Emeklililik Sistemi'nin Tasarruflar ve Sermaye Piyasaları Üzerindeki Etkileri

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ABSTRACT

Keywords

Individual Retirement System, Capital Markets, Savings, Corporate Bonds, Stock Market, Growth, Investment, Social Security System.

Anahtar Kelimeler

Bireysel Emeklilik Sistemi, Sermaye Piyasaları, Tasarruflar, Özel Sektör Tahvilleri, Hisse Senedi Piyasası, Büyüme, Yatırım, Sosyal Güvenlik Sistemi.

The aim of this study is to examine Individual Retirement System and its effects on savings and capital market in Turkey. In addition, saving levels in Turkey will be interpreted by comparing other countries and, effects of savings level in Turkey will debate. In the emipirical part, Johansen Cointegration Test and was applied for finding long run relationships and, Pairwise Granger Causality Test applied for finding causality way. Results of empirical analysis show that the total amount of participant´s funds in Individual Retirement System affect positively corporate bond and stock markets in the long run. Pairwise Granger Causality Test indicates that there is causality from the total amount of participant´s funds in Individual Retirement System to the market value of corporate bonds and, Bist100 index causes the total amount of participant´s funds in Individual Retirement System.

ÖZ

Bu çalışmanın amacı, Bireysel Emeklilik Sistemini ve onun Türkiye'deki tasarruflar ve sermaye piyasaları üzerindeki etkilerini incelemektir. Ayrıca, Türkiye'deki tasarruf seviyeleri diğer ülkelerle karşılaştırılarak yorumlanacak ve Türkiye'deki tasarruf düzeyinin etkisi tartışılacaktır. Ampirik bölümde, uzun süreli ilişkiler bulmak için Johansen Eşbütünleşme Testi ve nedensellik yönünü bulmak için ise Pairwise Granger Nedensellik Testi uygulanmıştır. Ampirik analizlerin sonuçları, Bireysel Emeklilik Sistemi'ndeki katılımcıların toplam fon tutarının uzun vadede şirket tahvillerini ve hisse senedi piyasasını olumlu yönde etkilediğini göstermektedir. Pairwise Granger Nedensellik Testi, Bireysel Emeklilik Sistemi'ndeki toplam katılımcı fon tutarından özel sektör tahvillerinin piyasa değerine doğru nedenselliğin var olduğunu ve Bist100 endeksinin Bireysel Emeklilik Sistemi'ndeki katılımcıların toplam fon tutarına neden olduğunu göstermektedir.

* This study was presented as conference presentation at Şırnak University International Congress on Economic and Administrative Sciences.

1. INTRODUCTION

The Social Security System, which was established as a result of the economic expansion in the post-World War II period and the Welfare State implementation in developed countries, didn't cause a significant financial burden for the countries due to the demographic developments and the positive macroeconomic economic indicators of these countries in the same period. However, at the end of the economic expansion period, due to the reasons such as the budget deficits arising from the Social Security System, the decline in the macroeconomic performance of the countries, the decrease in the birth rates and the increasing share of the elderly population in the total population due to demographic changes, it was important economic burden for the countries. Neo-liberalism, the economic thought that emerged in the 1980s, argues minimizing government intervention into the economy and the minimization of public spending. As a result of the economic policy implementations proposed by liberal economic thought gaining importance for governments, governments tend to produce policies to reduce social security deficits and to find new tools to complement the Social Security System. At the time of these developments, to be a complementary element to the Social Security System, to decrease the social security expenditures of the governments and to increase the income level of retired people, Individual Retirement System was constructed in 1981 in Chile. With financial liberalization in the 1980s, which was presented by emerging neo-liberal thought, long term funds begin to be essential for the countries, because of the purpose of increasing growth rate. So, collected contributions in Individual Retirement System are important for the development of economics. A lot of financial assets are invested by collected funds in Individual Retirement System. Returns of private pension funds depend on investment amounts for each financial asset by collected funds individual retirement contributions and, return rate of financial assets. When examined Individual Retirement System, after the establishment of Individual Retirement System, many countries completed to transition process in the following years. In contrast, Individual Retirement System was established too late in Turkey, when compared to establishment years of Individiual Retirement System with other countries, owing to be established in 2003. Therefore, Turkey has less private pension fund accumulations than these countries and, the social security burden in Turkish economics could not decrease enough. With collected funds in Individual Retirement System, respectively, Public Debt Securities, corporate bonds and stocks are invested mostly and, Individual Retirement System effects capital markets by these financial assets. In this study, the effects of Individual Retirement System on capital markets are analyzed empirically. In addition, the development process of Individual Retirement System in Turkey and the effects of Individual Retirement System on savings are investigated.

There are many empirical studies about the effects of Individual Retirement System on capital markets. Korkmaz, Uygurtürk , and Çevik (2010) analyze affecting factors of Individual Pension Funds' trading volume. Empirical results indicate that Euro exchange rate and IMKB Index are related to Individual Pension Funds. Enache et al. (2015), in the period 2001-2010, as a result of the causality analysis that Bulgaria, Czech Republic, Hungary, Estonia, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia based on the vector error correction model, both short-term and long-term, have concluded that private pension funds support the development of the capital market. In terms of financial development, Meng and Pfau (2010) examined the relationship between private pension funds and the development of the capital markets in 16 developed and 16 underdeveloped countries by using panel data analysis. The findings of the analysis show that only in developed countries pension funds support the development of capital markets. In countries with less developed financial markets, capital accumulation in private pension funds does not affect the development of capital markets. Niggemann and Rocholl (2010) 's event analysis on 57 countries for the period 1976-2007 showed that private pension funds contributed to the development of the capital market.

Turkey has a limited number of studies on the effects of Individual Retirement System on capital markets. Bayar (2016) examined the impact of private pension funds on capital markets through debt securities markets and stock market. In this study, Hatemi Cointegration Test and Toda Yamamoto Causality Test are used in the analysis with monthly data between October 2016 and

May 2015. When the results of the study are examined, the long-term private pension funds have a positive effect on debt securities and the stock markets. At the same time, there is a causality relationships between private pension funds to debt securities and equity markets. Şahin, Özdemir , and Önal (2018), using the Toda Yamamoto causality test in the analysis by monthly data in October 2006 and September 2017, analyze the impact of private pension funds on stock and debt securities markets. The findings of the study show that private pension funds have a positive effect on the stock market in the long run and no significant causality relationship are found in the short term. However, in the short term, the stock market reacts positively to the change in private pension funds. This means that private pension funds only have a positive impact on capital markets in the long run. In addition, the debt securities markets have a positive effect on private pension funds.

2. FUND VOLUMES OF INDIVIDUAL RETIREMENT SYSTEM AND SAVING RATES IN TURKEY AND OTHER COUNTRIES

Individual Retirement System, established in 1981 in Chile, was applied in the followingyears by many countries. Nowadays, many countries use it. In table 1, the volumes of private pension funds in Oecd countries in 2016 are shown. According to statistics in table 1, USA has the highest share with %59,94 in total private pension funds of the countries in table 1. In contrast, Turkey reaches %0,14 share in total private pension funds of the countries in table 1. When analyzed ratio of the total amount of private pension funds to GDP, USA has %79,87, the total amount of private pension funds to GDP in Holland, which has the highest ratio, is %180,27, but this rate is %4,78 in Turkey. As a result, the volume of private pension funds in Turkey is relatively low level, when compared to other OECD countries. The most important causes of this situation are that Turkey has entered into the Individual Retirement System too late, lacks of incentives and low awareness of Individual Retirement System.

Table 1. The Volume of Private Pension Funds in Oecd Countries in 2016

Country	Million USD	Share in Total (%)	% of GDP	Country	Million USD	Share in Total (%)	% of GDP
Australia	1.483.720,16	5,98	120,69	Netherlands	1.335.227,42	5,38	180,277
Austria	21.980,46	0,089	5,97	New Zealand	45.109,44	0,18	24,358
Belgium	30.612,23	0,12	6,88	Norway	36.898,97	0,15	10,204
Canada	1.289.361,73	5,19	85,38	Poland	36.930,22	0,15	8,338
Czech Rep.	15.683,88	0,06	8,42	Portugal	19.467,16	0,08	9,986
Denmark	138.345,17	0,56	47,25	Slovak Rep.	9.522,57	0,04	11,159
Finland	116.075,32	0,47	51,07	Spain	112.021,35	0,45	9,541
France	14.757,40	0,06	0,63	Sweden	20.129,00	0,08	4,169
Germany	223.905,60	0,9	6,76	Switzerland	808.631,83	3,26	126,571
Greece	1.254,12	0,005	0,68	Turkey	35.216,58	0,14	4,788
Hungary	5.105,46	0,02	4,28	UK	2.273.713,46	9,16	95,288
Iceland	30.524,31	0,12	142,19	USA	14.877.121	59,94	79,879
Ireland	112.224,76	0,45	38,63	Chile	174.479,80	0,7	69,623
Italy	130334,195	0,52	7,39	Estonia	3263,81	0,01	14,676
Japan	967.680,19	3,9	21,03	Israel	175.958,33	0,71	55,267
South Korea	122.620,26	0,49	9,04	Latvia	402,758	0,001	1,527
Luxembourg	1.659,00	0,0067	2,9	Slovenia	2.436,37	0,01	5,719
Mexico	145.819,63	0,59	15,52	Lithuania	2.713,30	0,011	6,663

Source: data.oecd.org

Table 2. Average Savings Rate of Countries Between 2008 and 2017

Country Name	Average Saving Rate (%)
Turkey	23,42
European Union	21,23
Central Europe and the Baltics	21,05
Germany	26,52
Malaysia	31,4
Netherlands	28,48
Norway	37,02
Singapore	47,55
Switzerland	34,02
Korea, Rep.	34,6
Indonesia	30,82
Denmark	26,79
India	34,13
China	49,26

Source: data.worldbank.org

Saving rates are one of the most important indicators of economics. Countries could increase production levels with low financial costs by more using domestic savings. When the average saving rates of the countries between 2008 and 2017 in Table 2 are examined, the high saving rates of China and India with high growth rates are noteworthy. In addition, high savings rates in countries such as the Netherlands, Norway and Switzerland, which are among the countries with high welfare levels in Europe, are also noteworthy. If we are to interpret the table in terms of Turkey, Turkey needs to increase its current savings rate to reach a higher level of development level. Participation to Individual Retirement System of households in Turkey is important for the development of Individual Retirement System and current saving rates. With Individual Retirement System, domestic savings could be increased by decreased high marginal propensity to consumption and, by this way, fund accumulations of Individual Retirement System could be risen up.

2. 1. Portfolio Distribution of Private Pension Funds in Turkey

With the private pension funds, various financial assets are invested in order to obtain a return. Through invested financial assets, private pension funds transfer funds to financial markets. In this respect, it is necessary to determine the rate at which the financial markets are invested by private pension funds. When the data in Table 3 are analyzed, private pension funds invest mostly in Treasury Bills and Government Bonds, corporate bonds, foreign securities and stocks, respectively. On the basis of financial assets issued from domestic markets, investments are made on Treasury Bills and Government Bonds, corporate bonds and stocks, respectively. To sum up, with private pension funds, a significant amount of capital market instruments has been invested.

Table 3: Portfolio Distribution of Private Pension Funds in December 2018

Hisse Senetleri (%)	Treasury Bills and Government Bonds (%)	Reverse Repo (%)	Money Market Instruments (%)	Foreign Securities (%)	Corporate Bonds (%)	Time Deposit (%)	Other (%)
12,47	33,53	4,61	2,40	13,58	14,37	10,82	8,22

Source. www.spk.gov.tr

3. DATASET, VARIABLES AND EMPIRICAL MODELS

In order to examine the effects of private pension funds on capital markets, it is necessary to examine the effect of private pension funds on capital market instruments invested. The portfolio distribution of private pension funds shows that the capital market instruments invested by private pension funds are Public Debt Securities (Treasury Bills and Government Bonds), stocks and corporate bonds. Since there are Treasury Bills within the Public Debt Securities, it is not right to examine the impact of private pension funds on Public Debt Securities. Therefore, in empirical analysis, when the effects of private pension funds on capital markets investigated, stock and private sector bond markets will be examined as a market. Dataset of Total Amount of Participant´s Funds in Individual Retirement System is obtained by Pension Monitoring Center. Datasets of Bist100 Index (Price), Market Value of Private Sector Domestic Debt Securities (Million TL), Weighted Average Interest Rates for Deposits (up to 1 Month)(% Stock), M1 NarrowMoney (Thousand TL) and Exchange Rate (USD Dolar (Selling)) are taken by Turkish Central Bank Electronic Data Delivery System.

When observation intervals are set, due to fact that observation interval has condition of the ratio of total amount of private pension funds to the market value of Bist100 Index, the ratio of stock assets in private pension funds to the market value of Bist100 Index, the ratio of the private pension funds to the market values of private sector domestic debt securities and the ratio of corporate bond assets in private pension funds to the market values of private sector domestic debt securities to be greater than %1 are used in the empirical analysis. Thus, the weekly data between 09/10/2015 and 05/04/2019 are used in econometric analysis. Variables and models used in empirical analysis are below;

Model I: $\log(bist100)_t = a_1 + a_2\log(fppf)_t + a_3\log(int1)_t + a_4\log(m1)_t + a_5\log(usd)_t + \varepsilon_1$
Model II: $\log(cbond)_t = a_6 + a_7\log(fppf)_t + a_8\log(int1)_t + a_9\log(m1)_t + \varepsilon_2$

bist100: Bist100 Index (Price), fppf: Total Amount of Participant´s Funds in Individual Retirement System

int1: Weighted Average Interest Rates for Deposits (up to 1 Month) (% Stock), m1: M1 NarrowMoney (Thousand TL), usd: Exchange Rate (USD Dolar (Selling))

cbond: Market Value of Private Sector Domestic Debt Securities (Million TL), ε_1: Error Term in Model 1, ε_2: Error Term in Model 2

4. EMPIRICAL RESULTS

In this chapter, the empirical results of the models built with the variables are interpreted. Long term relationships between variables in regression analysis could not be found when taking difference them. Accordingly, cointegration analysis is the empirical method that analyzes long term relationships in time series. Johansen Cointegration Test, which is long term analysis, is applied in empirical analysis owing to fact that capital markets make up long term funds and, all series are stationary in first differences (I(1)). The econometric theory claims that there are causality if variables have cointegraed relations. Therewithal, causality analysis needs to state impact direction, in another saying, it is used for determining which variable effects to other variable. So, Pairwise Granger Causality Test is operated as causality analysis.

4. 1. Johansen Cointegration Test

The prior condition for variables moving cointegrated in Johansen Cointegration Test is that all variables are the integrated order of 1. Accordingly, the stationary level of series must be defined. There are various unit root tests for determining the stationary level of time series. In the study, Ng-Perron unit root test, developed newly, is applied for determining stationary level. Ng-Perron unit root test is developed for adjusting problems in Phillips-Perron (PP) unit root test. Ng-Perron unit root test contains four unit root tests that are MZa and MZt tests, which are modified versions of Phillips-Perron unit root test, MSB test, which is a modified version of Bhargava unit root test, and MPT test, which are modified version of ADF-GLS unit root test. According to Ng-Perron unit root test results in Table 4, Table 5, Table 6, Table 7, Table 8 and Table 9, all variables are not stationary in level since they are not stationary at %5 significance level. All variables are stationary in level at %1 signifcance level when taken a first difference. Thus, all variables are suitable for Johansen Cointegration Test because all variables are the integrated order of 1.

Appropriate lag interval needs to set for a constructing model. Appropriate lag interval is selected 6 weeks because average transformation to investment of contributions are 6 weeks. After selected lag interval, the most convenient model must be chosen. For determining a convenient model, Akaike and Schwarz criteria are often preferred. Therefore, Schwarz criteria are based on for selecting a model. Examined Johansen Cointegration Test results in Table 10 and Table 11, Trace ve Maximum Eigenvalue test results indicate one cointegrated vector for both two models. Long run normalized coefficients obtained by Johansen Cointegration test results in table 12 demonstrate that the coefficient of log(fppf) is statistically significant for both two models and, increase in log(fppf) effects postively Bist100 Index and market value of corporate bonds in the long run.

Table 4. Ng-Perron Unit Root Test Results of log(bist100)

Variable: log(bist100) (Constant)					
		MZa	MZt	MSB	MPT
Ng-Perron Test Statistics		-0,12242	-0,09968	0,81430	38,3226
Asymptotic Critical Values	1%	-13,8000	-2,58000	0,17400	1,78000
	5%	-8,10000	-1,98000	0,23300	3,17000
	10%	-5,70000	-1,62000	0,27500	4,45000
Significance Level (%)		>10%	>10%	>10%	>10%
Variable: log(bist100) (Constant, Linear Trend)					
		MZa	MZt	MSB	MPT
Ng-Perron Test Statistics		-3,80861	-1,27756	0,33544	22,5677
Asymptotic Critical Values	1%	-23,8000	-3,42000	0,14300	4,03000
	5%	-17,3000	-2,91000	0,16800	5,48000
	10%	-14,2000	-2,62000	0,18500	6,67000
Significance Level (%)		>10%	>10%	>10%	>10%
Variable: d(log(bist100)) (Constant)					
		MZa	MZt	MSB	MPT
Ng-Perron Test Statistics		-90,2607	-6,69458	0,07417	0,31783
Asymptotic Critical Values	1%	-13,8000	-2,58000	0,17400	1,78000
	5%	-8,10000	-1,98000	0,23300	3,17000
	10%	-5,70000	-1,62000	0,27500	4,45000
Significance Level (%)		1%	1%	1%	1%
Variable: d(log(bist100)) (Constant, Linear Trend)					
		MZa	MZt	MSB	MPT
Ng-Perron Test Statistics		-90,0877	-6,70342	0,07441	1,04369
Asymptotic Critical Values	1%	-23,8000	-3,42000	0,14300	4,03000
	5%	-17,3000	-2,91000	0,16800	5,48000
	10%	-14,2000	-2,62000	0,18500	6,67000
Significance Level (%)		1%	1%	1%	1%

Table 5: Ng-Perron Unit Root Test Results of log(fppf)

Variable: log(fppf) (Constant)					
		MZa	MZt	MSB	MPT
Ng-Perron Test Statistics		1,45865	5,15592	3,53471	872,929
Asymptotic Critical Values	1%	-13,8000	-2,58000	0,17400	1,78000
	5%	-8,10000	-1,98000	0,23300	3,17000
	10%	-5,70000	-1,62000	0,27500	4,45000
Significance Level (%)		>10%	>10%	>10%	>10%
Variable: log(fppf) (Constant, Linear Trend)					
		MZa	MZt	MSB	MPT
Ng-Perron Test Statistics		-5,39839	-1,50042	0,27794	16,4719
Asymptotic Critical Values	1%	-23,8000	-3,42000	0,14300	4,03000
	5%	-17,3000	-2,91000	0,16800	5,48000
	10%	-14,2000	-2,62000	0,18500	6,67000
Significance Level (%)		>10%	>10%	>10%	>10%
Variable: d(log(fppf)) (Constant)					
		MZa	MZt	MSB	MPT
Ng-Perron Test Statistics		-90,3643	-6,67220	0,07384	0,36943
Asymptotic Critical Values	1%	-13,8000	-2,58000	0,17400	1,78000
	5%	-8,10000	-1,98000	0,23300	3,17000
	10%	-5,70000	-1,62000	0,27500	4,45000
Significance Level (%)		1%	1%	1%	1%
Variable: d(log(fppf)) (Constant, Linear Trend)					
		MZa	MZt	MSB	MPT
Ng-Perron Test Statistics		-90,1502	-6,66095	0,07389	1,22112
Asymptotic Critical Values	1%	-23,8000	-3,42000	0,14300	4,03000
	5%	-17,3000	-2,91000	0,16800	5,48000
	10%	-14,2000	-2,62000	0,18500	6,67000
Significance Level (%)		1%	1%	1%	1%

Table 6. Ng-Perron Unit Root Test Results of log(int1)

Variable: log(int1) (Constant)					
		MZa	MZt	MSB	MPT
Ng-Perron Test Statistics		0,57347	0,35390	0,61711	28,6629
Asymptotic Critical Values	1%	-13,8000	-2,58000	0,17400	1,78000
	5%	-8,10000	-1,98000	0,23300	3,17000
	10%	-5,70000	-1,62000	0,27500	4,45000
Significance Level (%)		>10%	>10%	>10%	>10%
Variable: log(int1) (Constant, Linear Trend)					
		MZa	MZt	MSB	MPT
Ng-Perron Test Statistics		-3,27572	-1,23414	0,37675	26,8796
Asymptotic Critical Values	1%	-23,8000	-3,42000	0,14300	4,03000
	5%	-17,3000	-2,91000	0,16800	5,48000
	10%	-14,2000	-2,62000	0,18500	6,67000
Significance Level (%)		>10%	>10%	>10%	>10%
Variable: d(log(int1)) (Constant)					
		MZa	MZt	MSB	MPT
Ng-Perron Test Statistics		-14,4140	-2,67972	0,18591	1,71879
Asymptotic Critical Values	1%	-13,8000	-2,58000	0,17400	1,78000
	5%	-8,10000	-1,98000	0,23300	3,17000
	10%	-5,70000	-1,62000	0,27500	4,45000
Significance Level (%)		1%	1%	5%	1%
Variable: d(log(int1)) (Constant, Linear Trend)					
		MZa	MZt	MSB	MPT
Ng-Perron Test Statistics		-41,8528	-4,54071	0,10849	2,35769
Asymptotic Critical Values	1%	-23,8000	-3,42000	0,14300	4,03000
	5%	-17,3000	-2,91000	0,16800	5,48000
	10%	-14,2000	-2,62000	0,18500	6,67000
Significance Level (%)		1%	1%	1%	1%

Table 7. Ng-Perron Unit Root Test Results of log(m1)

Variable: log(m1) (Constant)					
		MZa	MZt	MSB	MPT
Ng-Perron Test Statistics		1,09147	1,05883	0,97010	67,3768
Asymptotic Critical Values	1%	-13,8000	-2,58000	0,17400	1,78000
	5%	-8,10000	-1,98000	0,23300	3,17000
	10%	-5,70000	-1,62000	0,27500	4,45000
Significance Level (%)		>10%	>10%	>10%	>10%
Variable: log(m1) (Constant, Linear Trend)					
		MZa	MZt	MSB	MPT
Ng-Perron Test Statistics		-17,6944	-2,97350	0,16805	5,15570
Asymptotic Critical Values	1%	-23,8000	-3,42000	0,14300	4,03000
	5%	-17,3000	-2,91000	0,16800	5,48000
	10%	-14,2000	-2,62000	0,18500	6,67000
Significance Level (%)		5%	5%	10%	5%
Variable: d(log(m1)) (Constant)					
		MZa	MZt	MSB	MPT
Ng-Perron Test Statistics		-90,4871	-6,62762	0,07324	0,46571
Asymptotic Critical Values	1%	-13,8000	-2,58000	0,17400	1,78000
	5%	-8,10000	-1,98000	0,23300	3,17000
	10%	-5,70000	-1,62000	0,27500	4,45000
Significance Level (%)		1%	1%	1%	1%
Variable: d(log(m1)) (Constant, Linear Trend)					
		MZa	MZt	MSB	MPT
Ng-Perron Test Statistics		-90,4599	-6,68230	0,07387	1,17842
Asymptotic Critical Values	1%	-23,8000	-3,42000	0,14300	4,03000
	5%	-17,3000	-2,91000	0,16800	5,48000
	10%	-14,2000	-2,62000	0,18500	6,67000
Significance Level (%)		1%	1%	1%	1%

Table 8. Ng-Perron Unit Root Test Results of log(usd)

Variable: log(usd) (Constant)					
		MZa	MZt	MSB	MPT
Ng-Perron Test Statistics		1,21758	1,00917	0,82883	52,2668
Asymptotic Critical Values	1%	-13,8000	-2,58000	0,17400	1,78000
	5%	-8,10000	-1,98000	0,23300	3,17000
	10%	-5,70000	-1,62000	0,27500	4,45000
Significance Level (%)		>10%	>10%	>10%	>10%
Variable: log(usd) (Constant, Linear Trend)					
		MZa	MZt	MSB	MPT
Ng-Perron Test Statistics		-5,37883	-1,61345	0,29996	16,8606
Asymptotic Critical Values	1%	-23,8000	-3,42000	0,14300	4,03000
	5%	-17,3000	-2,91000	0,16800	5,48000
	10%	-14,2000	-2,62000	0,18500	6,67000
Significance Level (%)		>10%	>10%	>10%	>10%
Variable: d(log(usd)) (Constant)					
		MZa	MZt	MSB	MPT
Ng-Perron Test Statistics		-18,1978	-2,96493	0,16293	1,53647
Asymptotic Critical Values	1%	-13,8000	-2,58000	0,17400	1,78000
	5%	-8,10000	-1,98000	0,23300	3,17000
	10%	-5,70000	-1,62000	0,27500	4,45000
Significance Level (%)		1%	1%	1%	1%
Variable: d(log(usd)) (Constant, Linear Trend)					
		MZa	MZt	MSB	MPT
Ng-Perron Test Statistics		-33,4760	-4,09086	0,12220	2,72412
Asymptotic Critical Values	1%	-23,8000	-3,42000	0,14300	4,03000
	5%	-17,3000	-2,91000	0,16800	5,48000
	10%	-14,2000	-2,62000	0,18500	6,67000
Significance Level (%)		1%	1%	1%	1%

Table 9. Ng-Perron Unit Root Test Results of log(cbond)

Variable: log(cbond) (Constant)					
		MZa	MZt	MSB	MPT
Ng-Perron Test Statistics		2,67090	4,15677	1,55632	215,720
Asymptotic Critical Values	1%	-13,8000	-2,58000	0,17400	1,78000
	5%	-8,10000	-1,98000	0,23300	3,17000
	10%	-5,70000	-1,62000	0,27500	4,45000
Significance Level (%)		>10%	>10%	>10%	>10%
Variable: log(cbond) (Constant, Linear Trend)					
		MZa	MZt	MSB	MPT
Ng-Perron Test Statistics		-1,34218	-0,53890	0,40151	37,5610
Asymptotic Critical Values	1%	-23,8000	-3,42000	0,14300	4,03000
	5%	-17,3000	-2,91000	0,16800	5,48000
	10%	-14,2000	-2,62000	0,18500	6,67000
Significance Level (%)		>10%	>10%	>10%	>10%
Variable: d(log(cbond)) (Constant)					
		MZa	MZt	MSB	MPT
Ng-Perron Test Statistics		-89,9508	-6,67323	0,07419	0,33832
Asymptotic Critical Values	1%	-13,8000	-2,58000	0,17400	1,78000
	5%	-8,10000	-1,98000	0,23300	3,17000
	10%	-5,70000	-1,62000	0,27500	4,45000
Significance Level (%)		%1	%1	%1	%1
Variable: d(log(cbond)) (Constant, Linear Trend)					
		MZa	MZt	MSB	MPT
Ng-Perron Test Statistics		-90,1300	-6,68628	0,07418	1,11776
Asymptotic Critical Values	1%	-13,8000	-2,58000	0,17400	1,78000
	5%	-8,10000	-1,98000	0,23300	3,17000
	10%	-5,70000	-1,62000	0,27500	4,45000
Significance Level (%)		%1	%1	%1	%1

Table 10. Johansen Cointegration Test Results for Model I

Equation: $log(bist100)= a_1 + a_2 log(fppf) + a_3 log(int1) + a_4 log(m1) + a_5 log(usd) + ε$				
Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0,05 Critical Value	Probability
None*	0,206065	92,53229	88,80380	0,0262
At most 1	0,161751	51,91966	63,87610	0,3326
At most 2	0,056854	20,86611	42,91525	0,9428
At most 3	0,038512	10,56406	25,87211	0,8987
At most 4	0,020536	3,652033	12,51798	0,7917
Trace test indicates 1 cointegrating eqn(s) at the 0,05 level				
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0,05 Critical Value	Probability
None*	0,206065	40,61263	38,33101	0,0269
At most 1	0,161751	31,05355	32,11832	0,0670
At most 2	0,056854	10,30205	25,82321	0,9536
At most 3	0,038512	6,912017	19,38704	0,9066
At most 4	0,020536	3,652033	12,51798	0,7917
Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0,05 level				

Table 11. Johansen Cointegration Test Results for Model II

Equation: log(cbond)= $a_6 + a_7$log(ppf) + $a_8$log(int1) + $a_9$log(m1)+ ε				
Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0,05 Critical Value	Probability
None*	0,161533	58,83238	47,85613	0,0034
At most 1	0,091598	27,82479	29,79707	0,0830
At most 2	0,059364	10,91671	15,49471	0,2167
At most 3	0,000827	0,145655	3,841466	0,7027
Trace test indicates 1 cointegrating eqn(s) at the 0,05 level				
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0,05 Critical Value	Probability
None*	0,161533	31,00759	27,58434	0,0174
At most 1	0,091598	16,90807	21,13162	0,1764
At most 2	0,059364	10,77106	14,26460	0,1661
At most 3	0,000827	0,145655	3,841466	0,7027
Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0,05 level				

Table 12. Long Run Normalized Cointegrating Coeffcient

Dependent Variable: log(bist100)			
Variable	Coefficient	Standard Error	t-statistic
log(fppf)	8,061338	1,03974	7,75322484
log(int1)	0,475535	0,12380	3,84115509
log(m1)	-2,624845	0,46089	-5,69516587
log(usd)	0,224986	0,22551	0,99767638
Dependent Variable: log(cbond)			
Variable	Coefficient	Standard Error	t-statistic
log(ppf)	3,123897	0,52375	5,96448115
log(int1)	0,657678	0,10119	6,4994367
log(m1)	-3,397823	0,64272	-5,28663026

4. 2. Pairwise Granger Causality Test Results

Econometric theory argues that there is least one causality way when variables are cointegrated. Also, causality analysis needs to find causality way of cointegrated variables, in other words, which variables impact other variables. Pairwise Granger Causality Test, used often in empirical analysis, is applied in causality analysis. Nonstationary series must be taken difference since Pairwise Granger Causality Test makes analyze for stationary series. Thus, in causality analysis, all series are taken the first difference. Lag intervals are selected as 12 weeks for funds transferred to financial markets showing impacts completely in financial markets. Results of Pairwise Granger Causality Test in table 13 represent that Bist100 Index causes the total amount of participant´s funds in Individual Retirement System and, the total amount of participant´s funds in Individual Retirement System cause corporate bonds.

Table 13: Results of Pairwise Granger Causality Test

Null Hypothesis	Observation	F-Statistics	Probability
d(log(fppf)) does not Granger Cause d(log(bist100))	170	0,73997	0,7104
d(log(bist100)) does not Granger Cause d(log(fppf))	170	1,94749	0,0333
Boş Hipotez	Observation	F-Statistics	Probability
d(log(fppf)) does not Granger Cause d(log(cbond))	170	3,15948	0,0005
d(log(cbond)) does not Granger Cause d(log(fppf))	170	1,08302	0,3786

CONCLUSION

In the beginning, Individual Retirement System, which established in Chile in 1981, was a tool that is used to decrease social security burden in economics. By Financial liberalization, emerging in the 1980s as a result of liberalist thought to gain importance, capital mobility rise and long term funds are a necessity for economic development. Due to these causes, private pension funds, which have long term fund structure, are important for economics. At the same period, many countries applied Individual Retirement System. Individual Retirement System is established too late, so, the volume of private pension funds don't increase enough. Saving rates in Turkey are less than countries with high growth rates and developed countries. Since the Individual Retirement System may increase savings by decreasing marginal propensity to consume, expansion of participants and achievement of high fund accumulation in Individual Retirement System have importance in terms of macroeconomic parameters.

Investigated portfolio distribution of private pension funds, it is looked that private sector capital market tools are invested in important percentages. When the effects of Individual Retirement System on corporate bonds market and stocks market analyzed empirically, Johansen Cointegration Test show that increase in private pension funds influence positively market value of corporate bonds and Bist100 Index in the long run and, Pairwise Granger Causality Test exposes that Bist100 Index causes private pension funds and, private pension funds causes market value of corporate bonds.

As a result, Individual Retirement System is important for macroeconomic parameters and capital markets in Turkey. For companies to find lower-cost funding to finance their investments and thus to achieve higher growth rates, private pension funds should invest in stocks instead of private sector bonds that are sensitive to interest rates.

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