Global Economics Review (GER)
URL: http://dx.doi.org/10.31703/ger.2022(VII-I).15

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Shifting Patterns from Defined Benefit to Defined Contributions: An Empirical Analysis of Selected OECD Countries

Pages: 177 – 193 | Vol. VII, No. I (Winter 2022) | DOI: 10.31703/ger.2022(VII-I).15
p-ISSN: 2521-2974 | e-ISSN: 2707-0093 | L-ISSN: 2521-2974

Contents

Abstract: *The goal of the study is to find out how the growth of pension funds and their accumulation factors are related. Step-wise regression approach was utilized on a dynamic panel data model to verify the individual significance of included variables in the model systematically in order to bring out the core accumulation elements which are driving the pension fund's development, and R2-change was observed for this purpose. The study explores that OECD economies behave differently on the bases of their growth perspective i.e., Defined Benefits, and Employers' Contributions are positively contributing to pension funds in HGO economies and negative in LGO ones, showing that DB is hardly practised in the latter ones and is replaced by DC plan. The approach utilized in this article could be of practical value to policymakers and data analysts in OECD pension funds departments when making decisions on pension fund governance and the underlying fundamental drivers.*

Key Words: Pension Funds' Growth, Defined Contribution, Defined Benefit, Occupation Pension Funds, Employee Contribution, Employer Contribution

JEL Classification:

Introduction

Pension funds play a key part in the healthy functioning of people's social lives, especially senior individuals who seek a factor of confidence against unsafe situations, i.e. when they are unemployed. Pension fund performance and governance have been studied. The current study attempts to highlight the important growth and use characteristics of pension funds. OECD pension funds forecast only presents the descriptive study for pension fund utilization, not their particular major implications.

These institutions assist workers to save for retirement during their working lives. In most countries, pension funds cannot be withdrawn early, which creates long-term holdings by pension corporations and opens doors for investment opportunities to provide higher returns. When analysing OECD economies, pension funds must be considered. OECD pension funds' average asset weight is 89%. (OECD, 2020). Considering governance and growth determinants of pension funds is a must.

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Citation: Qayyum, A., Arslan, A., & Ayyubi, S. (2022). Shifting Patterns from Defined Benefit to Defined Contributions: An Empirical Analysis of Selected OECD Countries. *Global Economics Review, VII*(I), 177-193. https://doi.org/10.31703/ger.2022(VII-I).15

Moreover, the ageing factor in OECD economies makes pension fund management increasingly crucial.

A number of past studies were surveyed to form the current study and support its formation. Table 1. Describes them briefly.

Table1. Accumulation-Factors of Pension Funds in Selected-OECD Countries

Abbr.	Construct	Association	Past Studies	Theoretical Relation
PFG	Pension Funds Growth	DV	Roce, Kaminker, & Stewart (2011); Casey, (2014); Alonso, et al. (2010)	Immunization Theory
OPF	Occupational Pension Funds	P	Lamla, & Coppola, (2013); Haukenes, (2011); Ahola, (2009); Palme, & Svensson, (1997); Faccio, & Lasfer, (2000)	Theory of Pooling+ Welfarists Approach
PPF	Private Pension Funds	P	Poterba, Venti, & Wise, (2001); Perozek, & Reinsdorf, (2002); Konstantin, (2007); Augusto, & Dimitri, (1992); Mayhew, & Smith, (2014);	Theory of Pooling + Prodigal Father Probability Theory
PIC	Pension Insurance Contracts	P	Guo et al. (2016); Ha, (2017); Cheng, (2015); Chen, Hentschel, & Klein, (2015); Van Praag, B. M. S., & Hop, (2018);	Theory of Pooling
DBF	Defined Benefit Funds	PN	Copeland, & VanDerhei (2009); Poterba et al. (2007); Pesando, (2008); Stiff, Sharpe, & Atkinson, (2005); Lucas, & Zeldes, (2007);	Theory of Pooling + Life Cycle Theory+ Human Capital Spill-over Theory
DBT	Defined Benefit Traditional	PN	Clark, Glickstein, & Hill, (2013); Zhu, Hardy, & Saunders, (2017); Heeder, (2010); Dydo, (2005);	Theory of Pooling
DBM	Defined Benefit Mixed or Hybrid	PN	Zhu, Hardy, & Saunders, (2018); Poterba et al. (2007)	Theory of Pooling
DC	Defined Contribution Fund	P	Benartzi, & Thaler, (2001); Holzmann, & Palmer, (2006); Choi et al. (2002); Cairns, Blake, & Dowd,	Theory of Pooling+ Prodigal Father Probability Theory

Abbr.	Construct	Association	Past Studies	Theoretical Relation
			(2006); Huberman, Iyengar, & Jiang, (2007);	
DCP	Defined Contribution Protected Fund	P	Boulier, Huang, & Taillard, (2001); Fronstin, (2001); Auerbach, & Lee, (2006); Gerrard, Huberman, & Vigna, (2004); Holzmann, Palmer, & Robalino, (2012);	Theory of Pooling
DCU	Defined Contribution Unprotected Fund	P		Theory of Pooling
ESTC	Employees' Contributions	P	Byrne, (2007); Toshiki, (2009); Zhang, (2011); Njogu, (2014);	Theory of Pooling
ERTC	Employers' Contributions	PN	Olsen, & VanDerhei, (1997); Engelhardt, (2011); Chen, & Wu, (2014); Ghilarducci, & Sun, (2006); Pensions, (2004);	Theory of Pooling+ Welfarists Approach
OE	Operating Expenses	N	Bateman, & Mitchell, (2004); Jiang, (2011); Collins, (2003); Obinata, (2000); Militaru, (2015);	Accounting Profitability Theory+ Absolute Matching Concept

Table 2. Depicts the relationship of each of the above hypotheses with pension fund growth.

Accumulation-Factors of Pension Funds in Selected-OECD Countries			
Abbreviation	Construct	Criteria	Formula
PFG	Pension Funds Growth	Per cent	(Recent funds - Last years' funds)/Last year funds*100) Korkmaz, (2015)
OPA	Occupational Pension Funds	US. Million Dollars	Total assets of Occupational Pension Funds as measured by OECD Library Palme, & Svensson, (1997); Faccio, & Lasfer, (2000)
PPF	Private Pension Funds	The US. Million Dollars	Total assets of private pension funds as measured by OECD Library Augusto, & Dimitri, (1992); Mayhew, & Smith, (2014);
PIC	Pension Insurance Contracts	US. Million Dollars	Total assets of pension insurance contracts as measured by OECD Library.

Accumulation-Factors of Pension Funds in Selected-OECD Countries			
			Chen, Hentschel, & Klein, (2015); Van Praag, B. M. S., & Hop, (2018);
DB	Defined Benefit Funds	US. Million Dollars	Total assets of defined benefit funds as measured by OECD Library Stiff, Sharpe, & Atkinson, (2005); Lucas, & Zeldes, (2007);
DBT	Defined Benefit Traditional	US. Million Dollars	Total assets of defined benefit traditional funds as measured by OECD Library. Zhu, Hardy, & Saunders, (2018); Poterba et al. (2007)
DBM	Defined Benefit Mixed or Hybrid	US. Million Dollars	Total assets of defined benefit mixed or hybrid funds as measured by OECD Library. Zhu, Hardy, & Saunders, (2018); Poterba et al. (2007)
DC	Defined Contribution Fund	US. Million Dollars	Total assets of defined contribution funds as measured by OECD Library. Cairns, Blake, & Dowd, (2006); Huberman, Iyengar, & Jiang, (2007);
DCP	Defined Contribution Protected Fund	US. Million Dollars	Total assets of defined contribution protected funds as measured by OECD Library. Gerrard, Haberman, & Vigna, (2004); Holzmann, Palmer, & Robalino, (2012);
DCU	Defined Contribution Unprotected Fund	US. Million Dollars	Total assets of defined contribution unprotected funds as measured by OECD Library. Gerrard, Haberman, & Vigna, (2004); Holzmann, Palmer, & Robalino, (2012);
ESTC	Employees' Contributions	US. Million Dollars	Total assets of employees' contributions as measured by OECD Library. Ag & C, (2002); Njogu, (2014);
ERTC	Emloyers' Contributions	US. Million Dollars	Total assets of employers' contributions as measured by OECD Library. Ghilarducci, & Sun, (2006); Pensions, (2005);
OE	Operating Expenses	US. Million Dollars	Total expenses of pension management as measured by OECD Library.); Obinata, (2000); Militaru, (2015);

Theoretical Framework

Figure 2 describes the factors of accumulation i.e. firstly; three main contributing factors are occupational pension funds (OPA), private pension funds (PPF), and pension insurance contract assets (PIC). Secondly, occupational pension funds are then further divided into defined benefits (DB), defined contributions (DC), employees' contributions (EMPSC), and employers' contributions (EMPRC). Thirdly, DB and DC are further subdivided into defined benefit mixed or hybrid (DBM) plus traditional defined benefit pension assets (TDB) and protected defined contributions (PDC) plus unprotected defined contribution pension funds (UDC) respectively. The purpose of this part of the study is to analyze the significant impact (along with the magnitude and

direction) of each of the above-mentioned described factors on the growth of pension funds. Moreover, from the literature review, it is observed that administrative and legal expenses also play a vital role in the growth of pension funds. Hence, this factor is also considered important to be a part of this analysis.

Figure 2: Model designed for this study

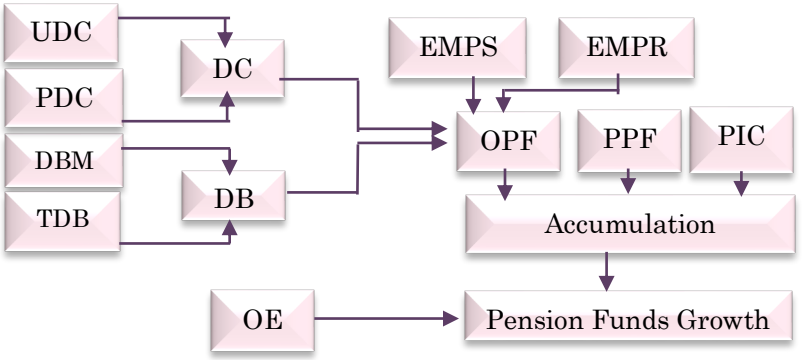

Figure 1: Model designed for this study

Data and Methodology

Data were obtained from many sources, including the OECD and the profile of each country. The Organization for Economic Co-operation and Development (OECD) had 36 members by the end of 2018. Only 24 countries that joined the OECD before 1975 were included. It includes statistics from 1975 to 2017 from 24 selected OECD nations, totalling 43 years. This balanced panel data has 1032 total observations. Twelve nations were deleted from the 36-country OECD because of a delay in joining after 1975.

The countries selected are separated into two groups on the basis of their median GDP growth. For this reason, an average of each country's pension funds to GDP ratio was calculated. These averages of 24 countries were then used to calculate the median value. As a rule of thumb, countries with a PF/GDP ratio over the median level are regarded higher-growth countries, while those with a PF/GDP ratio below the threshold level are deemed lower-growth nations.

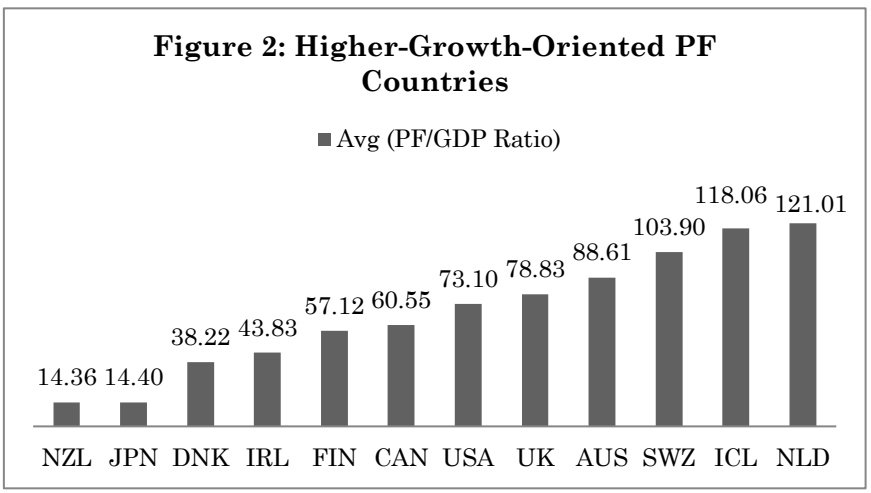

Figure 2: High Growth OECD countries

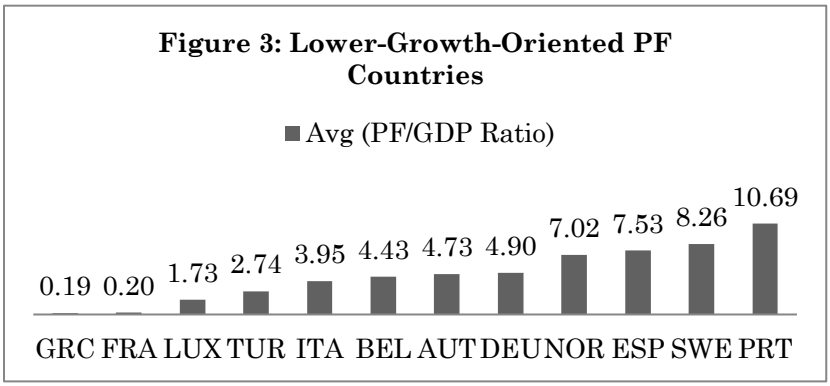

Figure 3: Low Growth OECD countries

Using dynamic panel data and forward stepwise regression, the study compares high-growth-oriented nations with low-growth-oriented countries based on the observed characteristics of selected OECD countries.

Economic Model

General economic functions are provided by the models listed below. With the use of accumulation factors, the growth of a country's pension funds can be modelled mathematically using Equation 1. In addition, these country-based characteristics are expanded upon in (2), which states that they are occupational pension assets (OPA), private pension funds' assets (PPFA), private insurance contract assets (PICA), defined benefit pension funds (DB), defined benefit traditional funds (DBT), defined benefit mixed funds (DBM), defined contributions (DC), defined contributions protected funds (DCP), defined contributions unprotected funds (DCU), employees' contributions (ESTC), employers' contributions (ERTC), and operating and administrative expenses (OE) which are incurred to generate revenue.

$$PFG = f(Accumulation\ Factors\ of\ PF)\ldots(1)$$

$$PFG = (PFG_{t-1}, OPA, PPFA, PICA, DB, DBT, DBM, DC, DCP, DCU, ESTC, ERTC, OE) \text{ --- (2)}$$

Econometric Model

On the basis of the model presented above, a dynamic panel data technique was employed, and the three equations that follow i.e.; model-1 show the effect of three main accumulation factors on PFG, i.e., OPA, PPFA and PICA. This model is extended in equation (4) and OPA was subdivided into DB and DC funds and the other two variables PPFA and PICA remain the same in the model. Moreover, equation (5) further segregates the model and subdivides the DB funds into DBT & DBM and DC funds into DCP & DCU respectively.

$$PFG_{(OECD)\,it} = \beta_0 + \alpha_i D_{it} + \beta_1 (PFG)_{i,\,t-1} + \beta_2 (OPA)_{it} + \beta_3 (PPFA)_{it} + \beta_4 (PICA)_{it} + \varepsilon_{it} \quad (3)$$

$$PFG_{(OECD)\,it} = \beta_0 + \alpha_i D_{it} + \beta_1 (PFG)_{i,\,t-1} + \beta_2 (DBA)_{it} + \beta_3 (DCA)_{it} + \beta_4 (PPFA)_{it} + \beta_5 (PICA)_{it} + \varepsilon_{it} \quad (4)$$

$$PFG_{(OECD)\,it} = \beta_0 + \alpha_i D_{it} + \beta_1 (PFG)_{i,\,t-1} + \beta_2 (DBT)_{it} + \beta_3 (DBM)_{it} + \beta_4 (DCP)_{it} + \beta_5 (DCU)_{it} + \beta_6 (ESTC)_{it} + \beta_7 (ESRC)_{it} + \beta_8 (OE)_{it} + \varepsilon_{it} \quad (5)$$

Where:

- PFG = Pension Funds Growth
- OPA = Occupational Pension Funds' Assets
- PPFA = Personal Pension Funds' Assets
- PICA = Pension Insurance Contracts' Assets
- DB = Defined Benefit Funds
- DBT = Defined Benefits Traditional
- DBM = Defined Benefit Mixed/Hybrid
- DC = Defined Contribution Funds
- DCP = Protected Defined Contributions
- DCU = Unprotected Defined Contributions
- ESTC = Employees' Contributions
- ERTC = Employers' Contributions

- OE = Operating and Administrative Expenses
- ε = the error term

Results Analysis and Discussion

Table 3 shows the summary and there is also a correlation matrix and VIF analysis of the data in tables 4, 5, and 6. Using DPD-Hierarchical regression analysis, Table 7 presents a comparison of the Whole-sample, HGO-Countries, and LGO-Countries. Three models were created for each analysis based on the already mentioned three equations i.e., 3, 4 and 5: model 1, model 2, and model 3. For this study, the growth of pension funds is used as the observed dependent variable, while the lagged values of PFG, OPA, PPFA, PICA, DB, DC, DBT, DBM, DCP, DCU, ESTC, ERTC, and OE are used as independent variables based on the literature.

Table 3. Summary Statistics for this Study

	All-OECD Countries		Higher-Growth-Oriented Countries		Lower-Growth-Oriented Countries	
Variable	Mean	SD	Mean	SD	Mean	SD
PF (Bill. US $)	527.68	1861.91	632.34	2131.11	345.56	1215.22
OPF/TPF (%)	63.35	37.56	67.55	38.91	61.75	25.56
PPF/TPF (%)	25.94	34.69	20.22	20.42	26.03	30.69
PIC/TPF (%)	10.71	13.39	12.23	35.1	12.22	15.39
DBF/OPF (%)	73.58	29.62	78.61	15.4	70.35	34.62
DBT/DB (%)	79.86	30.4	83.33	30.2	79.86	25.4
DBM/DB (%)	20.14	26.05	16.67	25.23	20.14	34.05
DCF/OPF (%)	26.42	18.21	21.39	21.03	29.65	32.21
DCP/DCF (%)	87.67	26.61	78.68	19.41	90.03	15.61
DCU/DCF (%)	12.33	19.7	21.32	10.32	9.97	23.22
ESTC/TC (%)	43.89	29.01	45.59	24.07	51.68	22.05
ERTC/TC (%)	56.75	27.72	54.59	10.66	48.32	18.73
OE/TPF (%)	1.68	2.17	6.44	4.59	7.23	6.77

Table 4. Correlation Matrix

Factors for Accumulation of Pension Funds and Their Relationships														
Variables	VIF	PFG	OPA	PPFA	PICA	DB	DBT	DBM	DC	DCP	DCU	ESTC	ERTC	OE
PFG		1												
OPA	9.89	0.730*	1											
PPFA	8.76	0.344*	0.396*	1										

Factors for Accumulation of Pension Funds and Their Relationships											
	OE	ERTC	ESTC	DCU	DCP	DC	DBM	DBT	DB	PICA	
OE	1.12										
ERTC	-0.302**	1.34									
ESTC	-0.317**	0.310**	2.64								
DCU	0.225**	-0.282**	3.67								
DCP	0.209**	-0.09	-0.086	4.05							
DC	0.062	0.116	0.101	-0.059	-0.082	5.86					
DBM	0.305**	0.589**	0.381**	0.478**	0.039	0.210**	6.11				
DBT	0.115**	-0.082	0.039	-0.047	-0.044	0.308**	0.518**	6.41			
DB	0.308**	0.489**	0.484**	0.577**	0.582**	0.489**	-0.045	-0.076	7.97		
PICA	0.518**	-0.045	-0.076	0.066	-0.025	-0.033	1				
	0.337**	0.268**	0.372**	0.396**	1						
	0.385**	0.667**	0.270**	1							
	0.365**	0.284**	1								
	0.332**										

Table 5. Forward-Step-Wise DPD Hierarchical Regression Analysis for this Study

Whole-Sample of Countries		Selected OECD		Higher-Growth-Oriented Countries			Lower-Growth-Oriented Countries		
Variables	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
PFG (L1)	0.355***	0.145**	0.149***	0.139**	0.312*	0.224*	0.323***	0.192**	0.341**
	(0.03)	(0.12)	(0.07)	(0.02)	(0.03)	(0.03)	(0.01)	(0.25)	(0.21)

Whole-Sample of Countries		Selected OECD		Higher-Growth-Oriented Countries		Lower-Growth-Oriented Countries		
OPF	0.620***			0.740**		0.698**		
	(0.0314)			(0.07)		(0.09)		
PPF	0.625***	0.517***		0.433**	0.130**	0.539**	0.744***	
	(0.033)	(0.0441)		(0.27)	(0.24)	(0.02)	(0.75)	
PICF	0.101***	0.0865**		0.120**	0.235**	0.213**	0.251***	
	(0.0379)	(0.0357)		(0.09)	(0.03)	(0.16)	(0.07)	
DBF		0.240**			0.140**		-0.242*	
		(0.029)			(0.01)		(0.03)	
DCF		0.271***			0.224*		0.308**	
		(0.032)			(0.03)		(0.06)	
DBT			0.137**			0.169*		-0.269**
			(0.26)			(0.15)		(0.06)
DBM			0.179**			0.146*		-0.121*
			(0.419)			(0.04)		(0.01)
DCP			0.37***			0.226*		0.323**
			(0.018)			(0.13)		(0.05)
DCU			0.281**			0.238**		0.434*
			(0.122)			(0.42)		(0.16)
ESTC			0.237**			0.266**		0.166*
			(0.107)			(0.11)		(0.02)
ERTC			0.038***			0.069**		-0.013**
			(0.449)			(0.04)		(0.01)
OE			-0.238***			-0.112**		-0.306*
			(0.254)			(0.03)		(0.01)

Whole-Sample of Selected OECD Countries				Higher-Growth-Oriented Countries			Lower-Growth-Oriented Countries		
Constant	9.255***	16.99***	12.148***	5.721**	8.744**	6.272***	4.232***	6.690**	6.842***
	(0.29)	(0.924)	(0.737)	(0.76)	(0.13)	(0.45)	(0.35)	(0.25)	(0.76)

Table 6. Diagnostic Tests for the Study

Whole-Sample of Selected OECD Countries				Higher-Growth-Oriented Countries			Lower-Growth-Oriented Countries		
Variables	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
R-squared	0.887	0.934	0.963	0.894	0.942	0.967	0.903	0.945	0.971
F-Test	56.03***	67.94***	80.74***	58.12***	70.21***	83.72***	54.30***	69.29***	81.23***
Hetero (P-value)	0.0622	0.0715	0.0822	0.0625	0.0667	0.0528	0.0742	0.0730	0.0683
Serial Auto (P-value)	0.0719	0.0712	0.0871	0.0831	0.0782	0.0812	0.0712	0.0732	0.0633
Hausman-Test	FE	FE	FE	FE	FE	FE	FE	FE	FE
AIC	1105.59	961.67	836.59	910.16	897.11	840.62	997.99	981.85	918.63
BIC	1068.63	929.54	808.62	906.41	867.16	812.54	964.65	949.43	887.92

The OPF is showing a momentous relationship through the development of pension funds in selected OECD countries at 1%, 5% and 5% levels of significance in whole-sample, HGO-Countries and LGO-Countries respectively. It describes that if the OPF of a country is increased by one per cent, the PFG will also be increased by 0.620%, 0.740% and 0.698% in

whole-sample, HGO-Countries and LGO-Countries respectively. This connection is also reinforced in the works by (Lamla, & Coppola, 2013; Haukenes, 2011; Ahola, 2009). It also provides sustenance to the theory of pooling and the Welfarist approach in the sense that occupational pension funds are a major source of pooling funds. Hence, pooling makes it easier for pension firms to invest in a huge amount of different types of assets to generate a steady return over an extended time. In sum, it provides strong support to the first developed hypothesis for this study i.e., H1 which mentions a strong positive association between OPA and PFG. It is obvious that the coefficient of HGO countries (0.740) is higher as compared to LGO countries (0.698). Hence, it can be said that occupational pension funds are contributing more in HGO countries as compared to LGO countries.

Private Pension Funds (PPF)

While talking about the model (1), the PPF depicts a positive relationship with the growth of pension funds in selected OECD countries at 1%, 5% and 5% levels of significance in whole-sample, HGO-Countries and LGO-Countries respectively. It describes that if the PPF of a country is increased by one per cent, the PFG will also be increased by 0.625%, 0.433% and 0.539% in whole-sample, HGO-Countries and LGO-Countries respectively. Moreover, model (2) and model (3) are also depicting the same type of relationship between PPF and PFG. This relationship is also supported in the literature by (Poterba, Venti, & Wise, 2001; Perozek, & Reinsdorf, 2002; Konstantin, 2007). It also provides backing to the theory of pooling according to which private pooling of current resources can give them support when they will be older in the future. It provides strong support to the second developed hypothesis for this study i.e., H_2 which mentions a strong positive association between PPA and PFG. By comparing HGO and LGO countries, the coefficients of LGO countries (0.539 and 0.744) are larger as compared to HGO countries (0.433 and 0.130) in model-1 and model-2 respectively. It means the private pension funds are growing faster in LGO countries and more and more people are motivated to have a private pension plan for their future.

Pension Insurance Contracts (PIC)

The PICF highlights a positive relationship with the PFG in selected OECD countries at 1%, 5% and 5% levels of significance in whole-sample, HGO-Countries and LGO-Countries respectively. It describes that if the PICF of a country is increased by one per cent, the PFG will also be increased by 0.101%, 0.120% and 0.213% in whole-sample, HGO-Countries and LGO-Countries respectively. Moreover, model (2) and model (3) are also depicting the same type of relationship between PICF and PFG. This relationship is also supported in the literature by (Guo et al. 2016; Ha, 2017; Cheng, 2015). It also provides sustenance to the theory of pooling i.e.; insurance companies provide a platform for pooling funds and investing in different types of investments for the purpose of generating a stable return in the long run. It provides strong support to the third developed hypothesis for this study i.e., H_3 which mentions a strong positive association between PICA and PFG. By comparing HGO and LGO countries, the coefficients of LGO countries (0.213 and 0.251) are larger as compared to HGO countries (0.120 and 0.235) in model-1 and model-2 respectively. It means the pension insurance funds are growing faster in LGO countries and more and more people are motivated to have private pension insurance plans for their future.

Defined Benefit Funds (DBF)

Defined benefit funds (DBF) is presenting a significant relationship with the growth of pension funds whereas it is showing a significant negative relationship at a 10% level of significance in LGO-Countries. It describes that if the DBF of a country is increased by one per cent, its PFG will also be increased by 0.240% and 0.140% in whole-sample and HGO-Countries respectively. On the other hand, a 1% increase in DBF will decrease the PFG by 0.242% in LGO-Countries. This relationship is also supported in the literature

by (Copeland, & VanDerhei 2009; Poterba et al. 2007; Pesando, 2008). It also provides sustenance to the theory of pooling, life cycle theory, and human capital spill-over theory. According to life cycle theory and human capital spill-over theory, current generations should save to feed the elder ones and with the passage of time, when they will be older, their children will feed them in a defined benefit scheme under the PAYG system. In sum, it provides strong support to the fourth developed hypothesis for this study i.e. H_4 which mentions a strong positive association between DBF and PFG. By comparing HGO and LGO countries, the coefficient of LGO countries (-0.242) is showing a negative relationship and the coefficient of HGO (0.140) is showing a positive relationship with PFG. It means that with the passage of time, the DBF schemes are becoming fewer in LGO countries and they are moving towards DC schemes. It points out an important phenomenon where the countries are trying to shift their DB schemes towards DC schemes.

Defined Contribution Fund (DC)

Defined contribution funds (DCF) is portraying a relationship with the PFG in selected OECD countries at 1%, 10% and 5% levels of significance in whole-sample, HGO-Countries and LGO-Countries respectively. It describes that if the DCF of a country is increased by one per cent, the PFG will also be increased by 0.271%, 0.224% and 0.308% in whole-sample, HGO-Countries and LGO-Countries respectively. This relationship is also supported in the literature by (Benartzi, & Thaler, 2001; Holzmann, & Palmer, 2006; Choi et al. 2002; Cairns, Blake, & Dowd, 2006; Huberman, Iyengar, & Jiang, 2007). It also provides sustenance to the theory of pooling and prodigal father probability theory in the sense that every generating should save for its future. In sum, it provides strong support to the first developed hypothesis for this study i.e. H_7 which mentions a strong positive association between DCF and PFG. By comparing HGO and LGO countries, we come to know that HGO countries have a lower coefficient (0.224) as linked to LGO countries (0.308). It indicates that in LGO countries the defined contribution schemes are growing faster as compared to HGO countries.

Employees' Contributions (ESTC)

Employees' contributions (ESTC) have a significant and positive relationship with the growth of pension funds in selected OECD countries at 5%, 5% and 10% levels of significance in whole-sample, HGO-Countries and LGO-Countries respectively. It describes that if the ESTC of a country is increased by one per cent, the PFG will also be increased by 0.237%, 0.266% and 0.166% in whole-sample, HGO-Countries and LGO-Countries respectively. This relationship is also supported in the literature by (Byrne, 2007; Toshiki, 2009; Zhang, 2011). It also provides sustenance to the theory of pooling because employees pool together to save for their future. In sum, it provides strong support to the 8th developed hypothesis for this study i.e. H_8 which mentions a strong positive association between ESTC and PFG. By comparing HGO and LGO countries, the coefficients of ESTC (0.266) in HGO countries are larger as compared to (0.166) in LGO countries. It means that employees are contributing much more in HGO countries to fund their retirement plans as compared to LGO countries.

Employers' Contributions (ERTC)

Employers' contributions is showing a significant and positive relationship with PFG in selected OECD countries at 1% and 5% levels of significance in whole-sample and HGO-Countries respectively. It is showing a significant negative relationship at a 5% level of significance in LGO-Countries. It describes that if the ERTC of a country is increased by one per cent, the PFG will be increased by 0.038% and 0.069% in whole-sample and HGO-Countries respectively. On the other hand, a 1% increase in ERTC will decrease the PFG by 0.013% in LGO-Countries. This relationship is also supported in the literature by (Chen, & Wu, 2014; Ghilarducci, & Sun, 2006; Pensions, (2005). It also provides sustenance to the theory of pooling and the

Welfarist approach in the sense that it is the employer's duty to take care of his employees even after their retirement. That's why he contributes to the pooled funds to feed them in the future. In sum, it provides strong support to the 9th developed hypothesis for this study i.e. H_9 which mentions a strong positive association between ERTC and PFG. It is interesting to know that LGO countries have a negative relationship with the growth of pension funds. The reason behind this phenomenon is that in LGO countries, employers are decreasing their contributions towards pooled funds and rather they are trying to put more burdens on the shoulder of employees.

Operating Expenses (OE)

Operating and administrative expenses (OE) is depicting a negative and significant relationship with the PFG at 1%, 5% and 10% levels of significance in whole-sample, HGO-Countries and LGO-Countries respectively. It describes that if the OE of a country is increased by one per cent, the PFG will be decreased by 0.238%, 0.112% and 0.306% in whole-sample, HGO-Countries and LGO-Countries respectively. It also provides sustenance to the theory of accounting profitability theory and absolute matching concept in the sense that expenses must be minimized to generate good profits to meet current and future liabilities. Moreover, the current expenses must be written off from the current revenues to make the correct accounting procedure. Nonetheless, the increasing amount of expenses will lead to a decrease in profits and the pension fund will not grow. In sum, it provides strong support to the 10th developed hypothesis for this study i.e. H_{10} which mentions a strong negative association between OE and PFG. By comparing HGO and LGO countries, the coefficient 0.306 of for LGO countries is much larger as compared to 0.112 for HGO countries. It means that the relationship between OE and PFG is much stronger in LGO countries as compared to HGO countries.

Conclusion

This study examines the importance of pension fund accumulation elements that affect the growth of pension funds. With the help of the fixed effect technique, we built a dynamic panel data regression model. With the increase of pension funds in HGO and LGO countries, results demonstrate that PFG (lag-1), PPF (lag-2), PICF, DCF, DCP, DCU, and ESTC are displaying good and significant results. There is some evidence to suggest that DB, DBT, and DBM are effective in high-income nations, but that they are less effective in low-income ones, with inconsistent outcomes. It shows that with the passage of time, LGO countries are trying to shift their pension system from the DB system to the DC system. Moreover, OE shows negative and significant behaviour with PFG.

The fixed effect is good on the basis of R-square, F-value, AIC and BIC. Moreover, the Hausman specification test also favours the application of a fixed-effect approach. The p-values for testing the heteroskedasticity and serial correlation do not show their presence in the data by accepting their null hypothesis of having no heteroskedasticity and no serial correlation in the data. The VIF column in the correlation matrix does not show the presence of a multicollinearity problem in the observed variables. As a result, ideas such as utility theories, the theory of pooling, Institutionists' approaches and theory of immunization, life-cycle theory and accounting profitability theory, human capital spillover theory and absolute matching concepts are all supported. All in all, we can conclude that the elements outlined above have a contributory impact on the expansion of pension funds.

Research Implication or Contribution

This research adds to the body of knowledge by dividing OECD nations into LGO & HGO categories based on the rate of growth of their pension funds. In the case of defined benefit plans, LGO countries behave differently from HGO countries. OE for LGO countries is larger than those for HGO countries, which indicates that LGOs face higher legal and administrative costs in the management of pension funds.

Using DPD-hierarchical regression, we were able to add all of the accumulation components that were lacking from past studies.

Researchers at the OECD can make use of this study to discover trends in the rise of pensions in high- and low-income nations. OECD-pension-outlook can publish these statistics to highlight the contrasting behaviour of LGO nations in relation to DB funds, DC funds, employers' contributions, and OE in comparison to HGO countries. OECD pension outlook LGO countries are transitioning from a DB to a DC pension system, and pension fund officials can offer policy proposals to help those who have reached retirement age.

Research Limitations and Recommendations

The Gini coefficient can also be used to split OECD countries based on other indicators, such as the growth of pension funds, however, this study focused on the latter. Research into the move from DB to DC systems and its causes and outcomes can be explored further.

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