The determinants of savings rates in OECD countries: The role of private pensions

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ABSTRACT

The design of pension schemes is crucial in determining savings behavior. The impact of pension schemes on saving rates across countries remains to be an intriguing empirical question considering the complicated nature of the relationship between saving patterns and pension wealth. This paper investigates the effect of the private pension contributions on savings rates in 25 selected OECD countries between the period 2001−2019 by employing quantile regression analysis which takes the heterogeneity of the data into account and provides information about not only the midpoint but also the extreme points of the distribution. According to the results, the savings rate is negatively associated with private pensions at all quantile levels. The empirical findings indicate that pension contributions tend to be strong substitutes for voluntary savings in countries with low tendencies to save. This result is especially important for its policy design implications as the policy makers tend to provide incentives either in the form of tax reliefs or direct substitutions for private pension contributions with the motivation to raise domestic savings.

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1. Introduction

The impact of pension schemes on saving rates across countries remains to be an intriguing empirical question considering the complicated nature of the relationship between saving patterns and pension wealth. Understanding the impact of pension schemes on savings matter to optimize the design of pension systems that conveys far-reaching policy implications concerning domestic savings. However, the measurement of the effect of pensions on savings is an empirical task. The results suggested by the literature vary considerably according to the data, methodology, variables, countries, and time periods. Despite these variations, a great part of the previous studies provide support for the crowding-out effect of pay-as-you-go pension schemes (Kohl and O'Brien, 1998). Therefore, private pensions gained increasing attention as a complementary alternative to compulsory pension schemes.

A significant number of OECD countries provided various incentives to promote long term savings via private pension systems. These incentives that often took the form of tax exemptions, direct matching contributions or auto-enrollment schemes recently, targeted manifold goals such as boosting long term funds and economic growth, alleviating fiscal burden on public pension schemes, mitigating the effects of poverty due to longevity etc. The incentives provided were expected to enhance long-term savings via promotion of private pension contributions. The nature of contributions to private pension schemes is mostly voluntary except for a limited number of countries that introduced compulsory private pension schemes or a variety of auto enrollment schemes. Hence, the substitution effect remains an important factor to consider in order to understand the costs and benefits of certain incentives. For instance, Yoo and de Serres (2004) estimate that the net tax costs incurred by the states that provide favorable tax treatments for private pensions account for at least 10 cents per dollar of pretax contributions for slightly more than half of the OECD countries and even more than 20 cents for the rest of the OECD countries. The sizeable net tax cost associated with the favorable tax treatment incentives provided indicates the importance that policy makers attribute to the promotion of retirement saving (Yoo and de Serres, 2004).

In addition to the net tax costs incurred to promote private

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pensions and the fiscal burden associated with direct matching contributions, various incentives introduced to private pension schemes to increase domestic savings imply distributional consequences. Any kind of incentive provided by the governments represent a form of income transfer from the nonparticipants of the private pension system to the participants although the magnitude of the transfer varies with the specific kind of incentives embedded in the private pension scheme. For instance, low-income earners may be excluded from receiving the benefits when compared to higher income earners who can afford to contribute a higher portion of their income to complementary long-term savings. Hence, investigating the effect of private pensions on savings remains to be a high priority in the agenda of policy makers and motivates the researchers to explore the complexity of the relationship between savings and private pensions.

This study attempts to investigate the effect of private pension contributions on savings rates. The paper presents new contributions to the existing literature by extending previous empirical research in several dimensions. First, the data set spans 25 selected OECD countries between the periods 2001−2019. Second, it employs the quantile regression methodology which takes the heterogeneity of the data into account and provides information about not only the midpoint but also the extreme points of the distribution. Put differently, it investigates the differences in the effects of pension contributions on savings for different savings rate groups for quantiles. One can observe throughout the literature that a great part of the panel data methods is interested in analyzing the conditional mean of the dependent variable in the model. However, the quantile regression approach lets researchers examine how the median or different percentiles of the dependent variable reacts to the independent variables. Besides, the quantile regression technique can be performed when the variables in the empirical model do not have a normal distribution.

The paper is organized as follows. Section 2 presents an overview of the previous studies investigating the effect of pensions on savings. Section 3 presents the data and the empirical model. Estimation methodology is given in Section 4. Empirical findings are reported in Section 5. Section 6 concludes the paper.

2. Literature review

Saving rates are expected to be positively associated with income levels. On the other hand, pensions are expected to crowd out savings based on a restricted standard version of life cycle model of intertemporal decision-making (Blau, 2016). Although the relationship between private pensions and domestic savings is extensively investigated in the literature, the empirical results are far from reconciliation. In other words, the previous research does not exhibit clear-cut evidence about the impact of private pensions on domestic savings.

The usual empirical approach in the literature is to employ regression analysis by using a measure of pension wealth. The pioneering study by Feldstein (1974) indicates that social security wealth depresses personal savings based on an extended life cycle model and time series data for the US between 1929 and 1971 periods. Later, Feldstein (1978) discussed how private pension schemes differ with respect to their effects on aggregate national savings when compared to public social security programs and conducted a time series analysis for the US between the period 1930−1974 and concluded that the growth of private pensions did not have a negative effect on private savings and may even have increased savings by a small amount. Since then, most of the time-series studies investigated the effects of voluntary pension schemes on domestic savings or the savings rates. Empirical evidence in favor of private savings motivated policy makers to introduce

incentives to private pension schemes which usually tend to be voluntary in most countries. Hence, the time-series studies in the empirical literature focused on the impact of these incentives, such as tax favors, direct subsidies, etc. on savings. Feldstein (1980) investigate the effects of social security benefits on savings within the framework of an extended life cycle model for 12 countries and conclude that social security benefits significantly decrease savings. Poterba et al. (1996) argues that individual retirement account (IRA) and 401(k) contributions (a defined contribution, tax advantaged, employer sponsored retirement plan referring to the sub section 401 (k) of the US Internal Revenue Code) represent new savings rather than simply being a substitute for other financial asset savings in the US. Baillu and Reisen (1998) conduct a cross country analysis for 11 countries between 1982 and 1993 periods and conclude that funded pension schemes increase private spending under certain conditions such as pension schemes being compulsory instead of voluntary, tax exemptions should be limited to low savers only and borrowing against accumulated pension assets is discouraged. Kohl and O'Brien (1998) provide a comprehensive literature survey and argue that no a priori expectation for either the sign or the size of the effect of pension systems on private savings can be made and the final net effect is dependent on the perceptions of individuals in their expected pension wealth and the availability of economic conditions that foster substitutability between the pension wealth and other forms of savings. Attanasio and Rohwedder (2003) investigate the relationship between pension wealth and household savings using three major UK pension reforms and confirm Feldstein (1974)'s findings that were based on time series data. Attanasio and Rohwedder (2003) define pension wealth as the sum of future benefits assuming continued participation until retirement, minus future contributions, and use the computed net present value of future pension wealth as an estimate of perceived pension wealth and then analyze the regression results of savings rate and consumption on expected pension wealth by conditioning on group and time effects. They also stress that their results might not extend to the poorer parts of the population. Lopez Murphy and Musalem (2004) and Bebczuk and Musalem (2006) employed panel data models in order to investigate the effect of pension systems on savings. Lopez Murphy and Musalem (2004) conduct a panel data analysis for 43 countries between 1960 and 2002 periods and conclude that compulsory funded pension schemes might increase national savings contrary to voluntary pension schemes. Bebczuk and Musalem (2006) investigate 48 developing and developed countries for the period between 1980 and 2004 and find that increases in pension savings raise national savings and the drivers of saving rates are not the compulsory or voluntary nature of pensions but the maturity of the system. Börsch- Supan et al. (2012) investigates Riester pensions that are designed as voluntary matching contribution pension schemes in Germany and conclude that they had been effective in creating new savings rather than crowding out the existing savings. Paiella and Tiseno (2014) find that tax-favored private pension schemes create a substitution effect between nontax favored and tax-favored savings and hence do not increase household savings in Italy for the period 1989−2006. Antón et al. (2014) concludes that tax-favored contributions to pension plans are not associated with rising national savings but merely increasing private household savings via higher disposable income enabled by the tax relief for the case of Spain for the period 2002−2005. Blau (2016) enriches the stylized version of the life cycle model by introducing certain restrictions such as employment and pension claiming decisions, bequest motive along with liquidity constraints, and several sources of uncertainty and conclude that model specification significantly affects the extent of the crowd out. Ertugrul et al. (2018) compare various incentives provided with the private pensions in

Turkey and conclude that direct matching contributions are more successful compared to tax favors in terms of increasing private pension contributions. Ertugrul and Gebesoglu (2020) provide empirical evidence that the private pension scheme increased domestic savings between 2003 and 2018 periods in Turkey.

It can be observed throughout the empirical literature that previous studies which employ panel data models do not deal with the distribution of the data set and do not perform the quantile regression methodology. Hence, a key strength of this paper is that it is the first paper that carries out the panel quantile regression approach while focusing on the influence of private pensions on savings.

3. Data and the model

The paper investigates the effect of pension contributions on savings rates in 25 selected OECD countries. The annual data spans the period between 2001 and 2019. The countries included in the data set are listed in Annex 1 and the selection is made solely based on comparative data availability. Saving rate (SAV) is obtained from the OECD database and the specific data included in the model indicates savings net of depreciation as a percentage of the GDP. Saving is equal to the difference between disposable income (including an adjustment for the change in employment-related pension entitlements) and final consumption expenditure. The saving rate included in this paper is compiled according to the 2008 System of National Accounts (SNA) and corresponds to net saving, as percentage of gross domestic product (GDP) (OECD, 2023). Interest rate (INT) is the short-term interest rate based on three-month money market rates and the data is obtained from the OECD database. Pension assets as a percentage of GDP (PEN) is used for the pension variable and the data is obtained from the OECD database. The natural logarithm of GDP per capita in constant 2015 USD (lnY) is used as an indicator for income variable, domestic credit to the private sector as a percentage of GDP (CRED) is used for credit variable, urban population as a percentage of total population (URBAN) is used to indicate urbanization and the ratio of dependents to the working-age population (ADR) is used to indicate age dependency ratio and the data are obtained from the World Bank. Finally, the employment rate (ER) is calculated as the ratio of employed people to the working age population and obtained from the OECD database. Hence, the empirical model, in which ε is the error term, in this paper can be described as follows:

$$SAV_{it} = \beta_{0i} + \beta_{1i}INT_{it} + \beta_{2i}PEN_{it} + \beta_{3i}lnY_{it} + \beta_{4i}ADR_{it}$$
$$+ \beta_{5i}URBAN_{it} + \beta_{6i}CRED_{it} + \beta_{7i}ER_{it} + \varepsilon_{it} \qquad (1)$$

The net effect of interest rates on savings is ambiguous as income and substitution effects tend to counteract (Grigoli et al., 2014). Pension assets are expected to have an ambiguous effect on total savings as other wealth indicators like wealth and its other components (Baillu and Reisen 1998). Saving rates are generally expected to be positively associated with income levels (Loayza et al., 2000; Grigoli et al., 2014). Age dependency ratio which is defined as the ratio of non-working population (i.e., age 15 or younger and age 64 and older) to working-age population is expected to affect saving rates negatively in the sense that the increase in the non-working population explains the future path of savings rates in a country (Bebczuk and Cavallo, 2014). The share of the urban population as a percentage of the total population has more ambiguous effects on the domestic savings rate. There are various channels through which urbanization affects savings such as income level, income uncertainty, and access to insurance and credit availability. Urban population tends to access various forms of insurance and credit more easily which decreases the urge to

save. On the other hand, urban population tends to earn a higher share of income which motivates savings, implying ambiguity concerning the total net effect (Grigoli et al., 2014). Availability of credit represents the depth of the financial sector. The fundamentals of the McKinnon (1973) and Shaw (1973) hypothesis indicate that the liberalization and the development of the financial sector which is often proxied by volume of credit stock or credit growth in the literature is expected to increase savings via raising the efficiency of financial intermediation. Yet, the availability of credit is also expected to provide incentives to increase consumption via alleviation of liquidity constraints. Hence, the empirical literature reached contradictory results over the years on the effects of credit stock on saving rates (Reinhart and Tokatlidis 2005, Loayza et al., 2000). The employment rate represents the ratio of employed to the working age population and is expected to increase the capacity to save in line with the life cycle hypothesis (Khaled A et al., 1999). All the variables used in our model and their expected signs based on the previous empirical studies are summarized in Annex 2.

4. Estimation methodology

The conventional panel data estimators, namely pooled ordinary least squares, the fixed effects model, and the random effects model, may present biased and inefficient output when the data set exhibits heterogeneity and does not have a normal distribution (Allard et al., 2018; Cheng et al., 2019; Kocak et al., 2019). Besides, these methods give information only about the midpoint of the distribution and do not consider the extreme points of the distribution (Kocak et al., 2019). In such a case, the panel quantile regression technique can present a more efficient output compared to the conventional panel data methods.

In their pioneering paper, Koenker and Bassett (1978) propound the quantile regression method. This method considers the heterogeneity of the data and provides researchers with information about not only the midpoint but also the extreme points of the distribution (Kocak et al., 2019). Accordingly, the quantile regression method can be formulated as the following (Hadj and Ghodbane, 2021):

$$Q_{yi}(\tau|x_i) = x_i^T \beta_\tau \qquad (2)$$

where y_i, x_i, and β_τ respectively stand for the conditional quantile, a k dimensional vector of explanatory variables, and the slope coefficients. Besides, τ is the quantile index which takes the value between 0 and 1. In the present paper, following the panel quantile method with the fixed effects model and thus allowing the individual heterogeneity, we describe the panel quantile model as follows (Koenker, 2004; Kocak et al., 2019):

$$Q_{yi}(\tau|\alpha_i, x_{it}) = \alpha_i + x_{it}^T \beta(\tau) \qquad (3)$$

where α_i denotes the individual specific effects parameter. To estimate the model in Equation (3) for several quantiles simultaneously, Koenker (2004) propose the following solving procedure:

$$\min_{(\alpha,\beta)} \sum_{k=1}^{K} \sum_{t=1}^{T} \sum_{i=1}^{N} w_{it} p_{\tau k} \left(y_{it} - \alpha_i - x_{it}^T \beta(\tau_k) \right) \qquad (4)$$

where K, T, and N show the number of quantiles, time span, and the number of cross sections, respectively. Additionally, the weights, w_{it}, control the relative effect of the k quantiles on the estimation of the α_i parameters. If we assume that $y_{it} - \alpha_i - x_{it}^T \beta(\tau_k) = \varphi$, then the weights can be described as below (Wang et al., 2019):

Table 1
Descriptive statistics.

Variable	Mean	Median	Max.	Min.	Std. Dev.	Jarque-Bera
SAV	7.734	7.598	27.505	−6.191	5.621	12.540[a]
INT	2.198	1.946	15.715	−0.783	2.181	255.186[a]
PEN	33.972	10.909	194.404	0.794	39.148	200.298[a]
lnY	10.415	10.600	11.357	8.916	0.563	43.669[a]
ADR	50.631	51.153	66.929	36.214	5.435	13.419[a]
URBAN	77.300	79.583	98.041	55.044	10.542	13.016[a]
CRED	103.310	99.684	206.670	12.869	44.033	11.138[a]
ER	67.962	68.941	79.700	51.200	6.435	21.067[a]

Note: [a] denotes significance at 1% level.

Table 2
Correlation matrix.

Variable	SAV	INT	PEN	lnY	ADR	URBAN	CRED	ER
SAV	1							
INT	0.069	1						
PEN	−0.024	−0.106	1					
lnY	0.342	−0.299	0.473	1				
ADR	−0.115	−0.273	0.120	0.241	1			
URBAN	0.225	−0.025	0.324	0.366	0.384	1		
CRED	−0.006	−0.165	0.410	0.602	−0.062	0.186	1	
ER	0.372	−0.229	0.473	0.624	0.147	0.204	0.460	1

If $\varphi < 0$, $w_{it} = \tau$

If $\varphi > 0$, $w_{it} = 1 - \tau$

To test for heteroskedasticity, Koenker and Bassett (1982) examine whether the discrepancies among the estimated slope parameters are significant. More clearly, they test whether the slope parameters across the quantiles are the same. The null hypothesis of this testing procedure is described as

$$H_0 = \beta(\tau_1) = \beta(\tau_2) = \ldots = \beta(\tau_k) \tag{5}$$

The null hypothesis is tested via the Wald test. The rejection of the null hypothesis implies that the slope parameters differ across the quantile values, presenting evidence in favor of the utilization of the panel quantile method.

5. Empirical findings

Table 1 and Table 2 demonstrate descriptive statistics and the correlation matrix respectively.

According to Table 1, the Jarque-Bera statistic implies that the null hypothesis of the normal distribution of the data is rejected at 1% level of significance for all variables, meaning the data set does not have a normal distribution. For this reason, the Jarque-Bera statistic may indicate that the panel quantile regression method could be employed to estimate the coefficients in the model.

According to Table 2, the correlation among the independent variables is not high, which suggests no multicollinearity problem in the empirical model. The findings obtained from the panel quantile regression model are reported in Table 3.
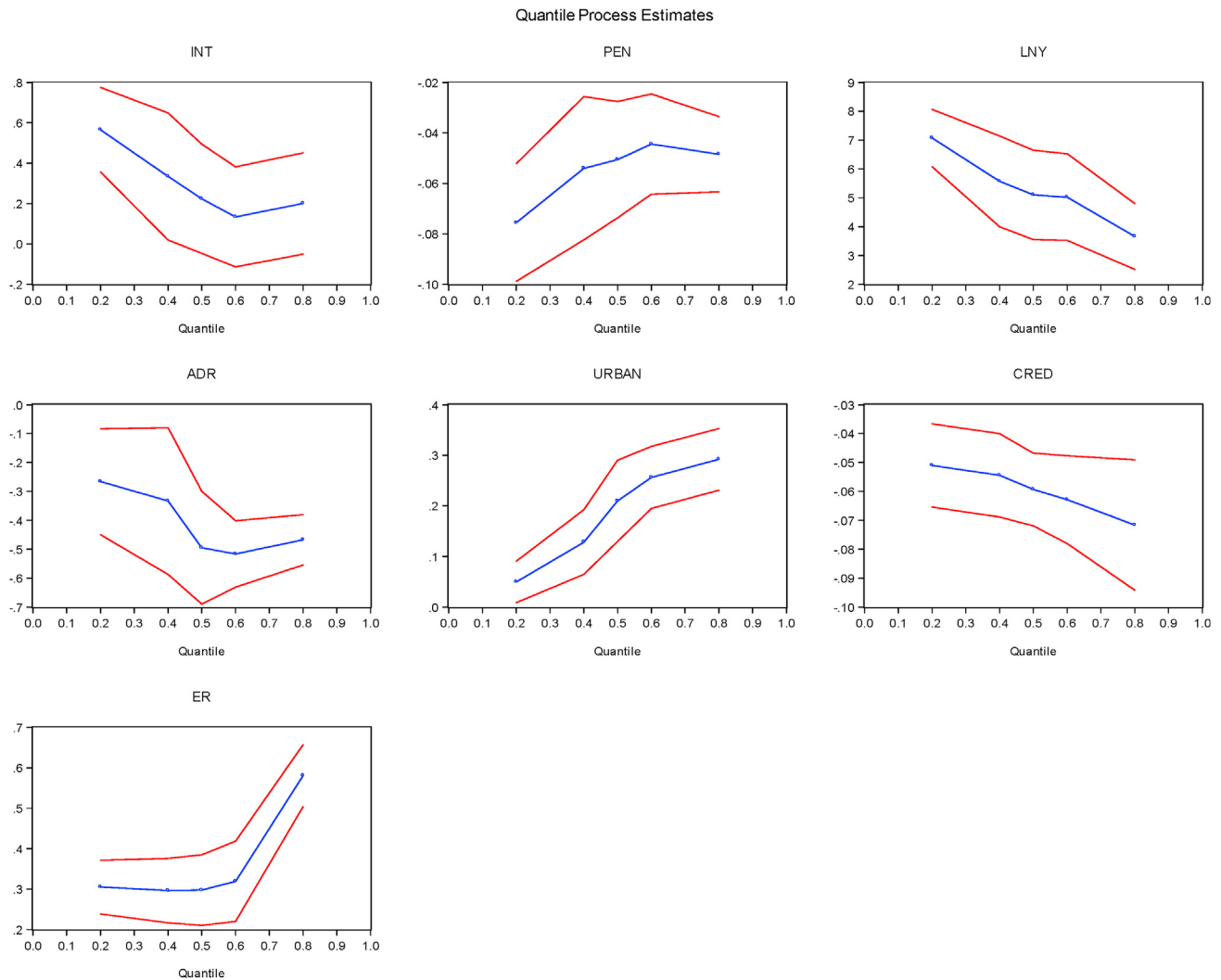
Table 3 indicates that the null hypothesis that the slope parameters across the quantiles are the same is rejected at 1% level of significance, meaning the slope parameters differ across the quantile values. The results indicated by the panel quantile regression technique present the following outputs: (i) Interest rates have an increasing impact on the savings rate for the countries with low savings rates. (ii) Pensions have a reducing effect on the savings rate at all quantile levels. This finding implies that the savings rate is closely and negatively related to pensions for the countries in the data set. (iii) The savings rate is positively related to GDP per capita at all quantile levels. (iv) Age dependency ratio has a reducing effect on the savings rate at all quantile levels. (v) Urbanization has an increasing influence on the savings rate at all quantile levels. (vi) The savings rate is negatively associated with credit at all quantile levels. (vii) Employment rate has an increasing impact on the savings rate at all quantile levels.

Panel quantile regression results are demonstrated graphically in Fig. 1.

In addition to the findings explained above, some more outputs can be presented considering both Table 3 and Fig. 1. These outputs are as follows.

(i) The savings rate is sensitive to the interest rate in countries with low savings rates (20th and 40th quantile levels), whereas it is not sensitive to the interest rates in countries with higher savings rates.

(ii) The savings rate is further affected by pensions in countries with low savings rate (20th and 40th quantile levels), while it is less affected by pensions in countries with high savings rates (60th and 80th quantile levels).

(iii) The savings rate is more affected by GDP per capita in countries with low savings rates (20th and 40th quantile levels), whereas it is less influenced by GDP per capita in countries with high savings rates (60th and 80th quantile levels).

(iv) The savings rate is less affected by the age dependency ratio in the countries with low savings rates (20th and 40th quantile levels), whereas it is more influenced by the age dependency ratio in the countries with higher savings rates (50th, 60th and 80th quantile levels).

(v) The impact of urbanization on the savings rate is the highest for the countries with high savings rates (80th quantile level) and the lowest for the countries with low savings rates (20th quantile level).

(vi) Although the coefficients of credit appear to be close to each other at different quantile levels, the savings rate is affected

Table 3
Panel quantile regression findings.

Variable	Quantile levels (τ)				
	20th	40th	50th	60th	80th
INT	0.565[a] [4.444]	0.334[c] [1.749]	0.223 [1.358]	0.133 [0.888]	0.201 [1.317]
PEN	−0.075[a] [−5.326]	−0.054[a] [−3.130]	−0.050[a] [−3.613]	−0.044[a] [−3.687]	−0.048[a] [−5.334]
lnY	7.073[a] [11.685]	5.569[a] [5.806]	5.097[a] [5.413]	5.021[a] [5.494]	3.658[a] [5.278]
ADR	−0.266[b] [−2.392]	−0.333[b] [−2.161]	−0.494[a] [−4.179]	−0.516[a] [−7.408]	−0.467[a] [−8.812]
URBAN	0.049[b] [1.996]	0.128[a] [3.307]	0.209[a] [4.300]	0.256[a] [6.871]	0.291[a] [7.887]
CRED	−0.051[a] [−5.824]	−0.054[a] [−6.219]	−0.059[a] [−7.778]	−0.063[a] [−6.817]	−0.071[a] [−5.227]
ER	0.304[a] [7.530]	0.296[a] [6.119]	0.297[a] [5.619]	0.319[a] [5.291]	0.508[a] [12.453]
Slope equality test					
Wald test statistic: 175.767 (0.000)					

Notes: Values in brackets show t-statistics, whereas the value in parenthesis indicates prob. values. [a], [b], and [c] respectively show statistical significance at 1%, 5%, and 10% levels.

Fig. 1. Dynamics of panel quantile regression coefficients
Note: The red lines indicate the 90% confidence interval, while the blue lines show the coefficients.

by credit further in the countries with the high savings rate (80th quantile level).

(vii) The savings rate is further influenced by the employment rate in countries with the high savings rate (80th quantile level), while the coefficients of the employment rate seem to be close to each other at other quantile levels.

6. Conclusion

Macroeconomic theory presents ambiguous predictions concerning the determinants of saving rates. Empirical findings vary considerably depending on a large set of parameters, such as the assumptions used, time periods chosen, variables selected, models employed, countries analyzed, etc. The limitations and contradictory empirical results of the previous studies provide an incentive for further research. Our paper attempts to investigate the effects of pension contributions on savings rates across a selected set of OECD countries with respect to different savings rate groups. We analyze the effect of the private pension contributions on savings rates in 25 selected OECD countries covering the period 2001−2019 by employing the panel quantile regression analysis which takes the heterogeneity of the data into account and provides information about not only the midpoint but also the extreme points of the

distribution. Although our focus is on the effect of private pensions, several independent variables, such as income, rates of return, availability of credit, and demographic factors, that are proven to affect saving rates by the previous empirical literature are also included in the empirical model of this study.

The empirical findings about the determinants of savings rates indicate that increases in short-term interest rates tend to increase the savings rates for countries with lower saving rates, yet the significance of interest rates on saving rates tends to decline in countries with comparatively higher saving rates. The interest rates do not significantly affect savings rates in the country groups with the highest savings rate. The empirical findings also point out that pension contributions tend to be strong substitutes for voluntary savings in countries with low tendencies to save. This result is crucial in policy design for private pension schemes because the policy makers have recently displayed a tendency to provide incentives either in the form of tax reliefs or direct substitutions for private pension contributions with the motivation to raise domestic savings. In case the contributions to individual retirement accounts merely represent an already inherent propensity to save there is a high probability that the incentives provided may as well end up producing reshuffling of existing portfolios and hence result in income transfer from taxpayers to savers. The empirical results also indicate that the income effect denoted by the GDP per capita

is positive and significant at all quantiles of saving rates which is consistent with the macroeconomic theory and the literature. Countries with the lowest initial saving rates tend to be influenced more by the increases in per capita GDP. The savings rate declines as the age dependency ratio increases and the coefficient for the age dependency ratio is statistically significant at all quantile levels which is consistent with the empirical literature. Additionally, the percentage of urban population to total population is statistically significant at all quantile levels although the impact of urbanization tends to increase with the saving rates. The studies which expect a negative coefficient for urbanization emphasize uncertainty as a motivation for higher savings and hence expect that the rural population depending more on agricultural activities would choose to save more as a buffer for climate risks (Lopez et al., 2004). Our empirical findings contradict this approach but rather provide support for the predominance of the income effect on determining saving rates. Lopez Murphy and Musalem (2004) suggests another explanation for the positive coefficient of urbanization by emphasizing that the urbanization process represents the weakening of transgenerational responsibility to take care of family members. Financial depth, often measured by the ratio of private sector credit to GDP in the empirical literature, may reduce the need for precautionary saving via alleviation of liquidity constraints (Amaglobeli et al., 2019). According to our findings, the availability of credit decreases saving rates significantly at all quantile levels which is also consistent with the previous empirical literature (Baillu and Reisen, 1998; Ferrucci and Miralles 2007; Amaglobeli et al., 2019). Finally, the savings rate appears to be positively influenced by the employment rate at all quantile levels.

Based on our empirical results, further research should elaborate on the net effect of promoting private pension schemes via various incentives, such as tax reliefs, direct matching contributions, or the introduction of auto-enrollment schemes. The set of policy tools chosen by the policy makers to increase private pension contributions to stimulate domestic savings should be thoroughly investigated with respect to the substitution effects, associated fiscal costs, and implications on income distribution. It is of crucial importance to analyze and understand which groups of the population benefit most from the incentives introduced either in the form of direct or indirect subsidies and to measure empirically if the costs incurred efficiently serve the purpose of increasing domestic saving rates.

ANNEX 1: List of 25 Selected OECD Countries

1. Australia
2. Austria
3. Belgium
4. Canada
5. Switzerland
6. Czech Republic
7. Germany
8. Denmark
9. Spain
10. Estonia
11. Finland
12. United Kingdom
13. Ireland
14. Israel
15. Italy
16. Korea
17. Latvia
18. Mexico
19. Holland
20. New Zealand
21. Norway
22. Poland
23. Portugal
24. Sweden
25. USA

ANNEX 2: Description of the variables under consideration

Variable	Specific Variable	Source	Expected Sign	References
Income	GDP per capita (constant 2015 USD)	https://data.worldbank.org/indicator/ny.gdp.pcap.kd	Positive with specific exemptions[a]	Grigoli et al. (2014) Samwick (2000) Loayza et al. (2000)
Interest rates	Three-month money market rates	https://data.oecd.org/interest/short-term-interest-rates.htm	Ambiguous	Loayza et al. (2000) IMF (2005)
Age dependency ratio	Ratio of dependents–people younger than 15 or older than 64–to the working-age population–those ages 15−64. Data are shown as the proportion of dependents per 100 working-age population	https://databank.worldbank.org/reports.aspx?dsid=2&series=SP.POP.DPND	Negative	Bebczuk and Cavallo (2014) Loayza et al. (2000)
Private pensions	Pension assets as a percentage of GDP	(https://data.oecd.org/pension/pension-funds-assets.htm	Ambiguous	Grigoli et al. (2014) Baillu and Reisen (1998)
Credits	Domestic Credit to Private Sector (% of GDP)	https://data.worldbank.org/indicator/FS.AST.PRVT.GD.ZS?view=chart	Ambiguous	Reinhart and Tokatlidis (2005) Grigoli et al. (2014) IMF (2005)
Urbanization rate	Urban Population (% of total population)	https://data.worldbank.org/indicator/SP.URB.TOTL.IN.ZS	Ambiguous	Bebczuk and Cavallo (2014) Loayza et al. (2000)
Employment rate	The ratio of employed people to the working age population	https://data.oecd.org/emp/employment-rate.htm	Positive	Khaled A et al. (1999)
Saving rate	Savings net of depreciation as a percentage of the GDP	https://data.oecd.org/natincome/saving-rate.htm	Independent variable	

[a] Exemptions include specific conditions such as the increase in income signaling the expectation of higher income in the future or the case of poor consumers who consume close to their subsistence income level (Grigoli et al., 2014).

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