Pension funds and stock market volatility: An empirical analysis of OECD countries☆

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ABSTRACT

The paper explores the empirical relationship between the share of pension funds assets invested in stocks and stock market volatility in OECD markets. For this purpose, by using panel data of 34 OECD countries from 2000 to 2010, we estimate both a random-effects panel model and a Prais–Winsten regression with panel-corrected standard errors and autoregressive errors. The estimations document that there is a significant negative relationship between the share of pension funds assets invested in stocks and stock market volatility in OECD markets. The binary probit and logit models further validate the argument that pension funds as institutional investors can dampen stock market volatility.

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1. Introduction

Pension funds (PF henceforth) have accumulated large amounts of assets over the years in most of the OECD countries (see Table 1). With increasing ageing population and less reliance on pay-as-you-go public pensions, in many developed economies the size of complementary social security is expected to increase even further in the future.

The shift from the traditional defined-benefit (DB) scheme to the defined-contribution scheme (DC) since the early 2000s is one of the main features characterizing the recent growth path of PF. Such a shift has been primarily originated by the dramatic changes both in the industrial structure and in the labor markets triggered by the globalisation, which have led both capital and workforce to be increasingly mobile. As a consequence, many countries have implemented reforms aiming at coping with the deterioration in

the funding of DB pension plans and with some longstanding concerns regarding the effect of complex, opaque pension accounting methods.

Thanks to such a growth, not only will PF grant a significant share of the old-age retirement income, but they are currently playing as important institutional investors in most of the OECD countries. For example, the share of assets managed by occupational PF as a percentage of GDP in the last decade has grown from 15% to 31%, despite in the same period two intense crises have affected the financial markets of these economies.

Given such an unprecedented scenario, the analysis of the effects of the aforementioned trend on financial markets is a crucial issue. In particular, in this paper we aim at assessing the role of PF investments in shares on the stock market volatility.

Earlier literature has highlighted that PF can be beneficial to financial development[1] through different channels: (1) PF long term planning horizon favors more efficient and innovative investment opportunities (Davis, 1995; Vittas, 1996; Meng and Pfau,

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[1] We recall here that several authors have produced evidence of the fact that financial development can trigger economic growth. For theoretical studies see Bencivenga and Smith (1991), Obstfeld (1995); horizontal cross analysis includes King and Levine (1993), Levine (1997), Levine and Zervos (1998), Beck and Levine (2004); international analysis comprises studies by Rajan and Zingales (1998), Demirgüç-Kunt and Maksimovic (1998).

Table 1
Assets managed by PF as a share of GDP and of total assets held by institutional investors (in parenthesis) of selected OECD countries over the period from 2001 to 2010, selected years (% values).

Country	2001	2005	2008	2010
Australia	75.29 (47.19)	80.38 (50.48)	93.00 (52.82)	90.94 (56.91)
Canada	52.48 (42.19)	58.15 (40.62)	51.43 (39.96)	64.65(39.49)
Chile	– (60.80)	59.35 (63.52)	52.76 (59.04)	66.97 (61.46)
Denmark	27.18 (34.80)	33.70 (29.49)	47.54 (32.96)	49.71 (31.58)
Germany	3.44 (52.04)	4.03 (51.99)	4.73 (52.51)	5.14 (49.26)
Iceland	83.96 (78.39)	119.57 (70.13)	114.05(82.71)	123.91 (81.89)
Israel	25.10 (–)	34.01 (25.64)	42.80 (36.89)	48.94 (34.53)
Italy	2.24 (1.73)	2.79 (1.60)	3.41 (2.08)	4.57 (2.48)
Netherlands	102.61 (55.11)	121.72 (59.43)	112.72 (59.65)	128.51 (50.41)
Switzerland	102.45 (44.75)	117.02 (42.90)	101.15 (39.17)	113.72 (37.92)
United Kingdom	72.00 (35.82)	78.63 (36.89)	64.29 (34.97)	88.68 (37.59)
United States	71.51 (39.67)	74.84 (38.64)	57.92 (33.91)	72.67 (35.97)

Source: OECD Global Pension Statistics, Institutional Investor Statistics.

2010; Rocholl and Niggemann, 2010); as for developing economies, see (Catalan et al., 2000; Impavido and Musalem, 2000; Walker and Lefort, 2002; Impavido et al., 2002). (2) PF may stimulate both private and national savings (Schmidt-Hebbel, 1998; Kohl and O'brien, 1998; James, 1998; Bailliu and Reisen, 1998; Murphy and Musalem, 2004; Rezk et al., 2009; Antón et al., 2011) (3) PF may boost economic growth via improved corporate performance[2] (Myners, 2002; Coronado et al., 2003; Clark and Hebb, 2004) and improve the performance of firms (Guercio and Hawkins, 1999). (4) PF can influence the stock prices and equity market volatility.

The analysis of the last channel is the focus of our paper, through which we aim to add new empirical evidence by testing whether volatility diminishes as PF increase their investments in stocks. More precisely we base our analysis on macro data and we focus on a panel of 34 OECD countries, from year 2000 to 2010.

The work is organized as follows: Section 2 reviews the related literature on the role of PF on financial market volatility. Section 3 describes the dataset used in the empirical analysis. Section 4 presents the estimated empirical models and discusses their respective results. Section 5 concludes.

2. Pension funds and financial market volatility: related literature

The general argument that institutional investors can reduce market volatility is contained in some pioneering theoretical works, such as Friedman (1953), who argues that the role of rational speculators is to stabilize asset prices. Later, Fama (1965) argues that although heterogeneous agents can trade irrationally due to poor information processing, the presence of sophisticated and well informed institutional investors could help eliminate huge disparities in the deviation of equity prices from their fundamentals. By the same token, later contributions by Aggarwal and Rao (1990), Chopra et al. (1992), Daigler and Wiley (1999), Brennan (2004), Kaniel et al. (2008) argue that institutional investors are more likely to behave rationally in that they are less sensitive to noise and fads. According to such a view, institutional investors are depicted as "smart money" investors that stabilize asset prices by offsetting the irrational trades of individual investors.

Other studies by Cohen (1998) and Dennis and Strickland (2002) document that institutions and individuals differ in their trading

behaviours due to their difference in gathering and processing available information. In fact, they argue that institutional investors can help financial markets restore the long term equilibrium by avoiding huge volatility in the markets. Further, empirical evidence is provided by Faugere and Shawky (2003) who investigate the differences in the holdings of institutional investors relative to individual investors when the Nasdaq Composite index fell 46.23% in year 2000. They find the evidence that during that market decline institutional investors held stocks with less price volatility than individual investors. This argument is further accepted in the works looking at the relationship between noise trading and market efficiency: according to such works, the fact that risk aversion keeps rational speculators (such as PF) from taking large arbitrage positions can avoid any situation in which noise traders produce huge swings in the asset prices (see also Figlewski, 1979; Kyle, 1985; Campbell and Kyle, 1993).

Finally, other authors claim that PF can stabilize the market because they are governed by prudent man rules[3] (Arbel et al., 1983; Badrinath et al., 1989), aiding in accumulating less risky stocks and thus indirectly reducing the overall volatility in the equity markets.

Summarizing, according to these works, lower levels of noise trading and/or the stabilizing behaviour of institutional investors should result in lower volatility for those securities in which the presence of institutional investors like PF is predominant.[4]

As for the relationship between PF and financial market volatility, the literature has been intensely flourishing in the last two decades, with a particular focus on micro-level analysis and on the US.[5]

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[2] A contradicting opinion has been raised by some authors reporting that institutional owners are largely ineffective as monitors (Wahal, 1996; Gillan and Starks, 2000) and do not enhance shareholder value by monitoring firms. Some studies also find that institutional shareholders can even reduce firm performance either because they lack adequate monitoring skills or because their objectives conflict with value maximization (See Carleton et al., 2002; Woidtke, 2002).

[3] The prudent man standard could be summarized according to one or a combination of the following three fundamental rules (see Badrinath et al., 1989) (1) Buy and sell as others do in similar circumstances. (2) Buy and sell from an approved universe of investments (such as those listed in the Trust Fund Investment Act). (3) Buy and sell at the level at which the trust beneficiaries feel comfortable. Age, low volatility, and stable dividends have been used in past studies as indicators of prudence (Smith, 1996).

[4] On the other hand, there are reasons to suspect that markets dominated by institutional investors may exhibit larger return volatilities. First, securities that display greater volatility may attract institutional investors, in that the latter might view riskier securities as more likely than other stocks to outperform market benchmarks. Thus institutional investors like PF tend to trade in larger volumes than individual investors, which may induce greater volatility in the market (Kothare and Laux, 1995; Falkenstein, 1995; Gompers and Metrick, 2001; Ang and Maddaloni, 2005; Gabaix et al., 2006). Also, PF may engage in "positive feedback" trading (Klemkosky, 1977; De Long et al., 1990) and "herding behaviour" (Nofsinger and Sias, 1999; Sias, 2004) due to the close-knit nature of the institutional investor community, which might exacerbate price movements and increase volatility.

[5] Other works find negative relation between volatility and institutional trading for the US and for some other developed markets (Grier and Albin, 1973; Reilly,