

# **PENSION FUNDS AND CAPITAL MARKET DEVELOPMENT: HOW MUCH BANG FOR THE BUCK?**

## **POLICY NOTE**

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Institutional investors have become increasingly important for both asset management and the development of financial systems. In fact, institutional investors are likely among the most important conduits of private and public savings, supplying capital for firms and countries to grow. Among institutional investors, privately-managed, defined-contribution pension funds (henceforth pension funds) have played a crucial role across countries. They have gained popularity as countries decided to shift away from publicly administered, pay-as-you-go, defined-benefit pension systems towards systems that rely mainly on mandatory, privately administered, defined-contribution pension funds. They have become popular even at the corporate level, where changes in the pension systems have entailed a shift away from defined-benefit towards defined-contribution schemes to transfer risk from corporations to individuals.

One key motivation for countries to reform the pension systems has been the expectation that these funds would play a dynamic role in the development of capital markets, fostering private sector savings and reducing the cost of capital for corporations, in the context of a broader strategy to achieve more developed, market-oriented financial systems. Since pensioners save for the long run, pension funds (unlike other institutional or retail investors) are expected to be able to provide long-term financing to domestic

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\* This note is a very short summary of the paper under the same name, available online at the Gemloc website or by contacting the authors at: [craddatz@worldbank.org](mailto:craddatz@worldbank.org) and [sschmukler@worldbank.org](mailto:sschmukler@worldbank.org). The views expressed here do not necessarily represent those of the World Bank.

corporations (fundamentally), as well as governments. Moreover, pensioners (by law) provide a steady flow of funds for many years to pension funds, enabling the latter to be a stable source of capital. Importantly, since pensioners are required to hold their investments in at least one pension fund until retirement, this gives stability to the system as a whole. Furthermore, given their size and commission fees, pension funds should be able to professionally manage the asset allocation, diversify risk appropriately, and overcome problems of asymmetric information and transaction costs that pervade financial markets. Also, given that pension funds have to allocate a large fraction of their capital domestically and the large size of their capital, they are expected to invest in a broad range of domestic assets and diversify risk as much as possible within the country. Therefore, relative to other institutional investors, pension funds are thought to be the ones who contribute the most to the development of capital markets.

With these expectations in mind, many countries have reformed their pension fund systems. The first country to embrace the new pension fund model was Chile in May 1981, by replacing the public pension system with a defined-contribution (DC) pension system. Many developed and developing countries have followed suit and introduced substantial changes to their pension systems. As a result of the reforms implemented across countries, the assets managed by pension funds have become substantial. By accumulating large private savings, pension funds have become important players in domestic capital markets. Moreover, these funds may also become relevant international investors as the regulatory restrictions to invest abroad progressively fade.

Despite the initial expectations, the actual impact that the increasing prominence of pension funds has had on the development of local capital markets is still subject to

debate. Some authors argue that pension funds foster the deepening of domestic equity and debt markets through their demand for investment instruments, and add to the liquidity of these markets through their trading activity. Others maintain that pension funds do not contribute as expected to the development of capital markets, and are not investing pensioners' savings optimally.

Our study aims to shed light on the debate of how pension funds affect capital market development by providing a systematic analysis of the pension fund investment behavior and the factors that constrain it. This is done by: (i) studying in detail, at the micro level, how pension funds invest; and (ii) discussing how their strategies vary with factors that can significantly restrict the funds' ability to allocate assets and to contribute to local capital market development. In particular, the factors analyzed in this study are: regulations, managers' incentives, and liquidity.

We analyze the investment behavior of pension funds using a unique and rich dataset from the case of Chile that contains the detailed portfolios over time of the universe of funds in the country at a monthly frequency for ten years (1996 to 2005). This dataset is matched with a separate dataset that has the returns of each instrument included in these portfolios. The combined and cleaned dataset contains 7,501,210 observations, with information on the holdings and returns of 104,789 different securities, for up to 57 pension funds. All the information is analyzed by taking into account the regulatory framework in which funds operate and its changes over time. These regulations include macro and micro restrictions such as the list of investable assets.

We use these data to address a series of questions regarding pension fund portfolio allocations and trading strategies. The questions related to portfolio allocations

that guide our research are: Where do pension funds invest (both in terms of asset classes, type of assets, country origin, and maturity)? To what extent do pension funds diversify their holdings? How do pension fund portfolios vary with different degrees of regulatory restrictions? The questions related to pension fund trading behavior are: How actively do pension funds trade and do they buy/sell the same assets simultaneously? Is their trading activity associated with variations in returns? Have there been changes over time in their trading behavior, perhaps determined by regulatory modifications? Is their trading pattern different across asset classes? Many of these questions are already answered in the current study, while others remain material for future research.

The main results from our analysis can be summarized as follows. First, pension funds hold a large fraction of their portfolios in assets that can be easily liquidated, namely, bank deposits, government bonds, and more generally short-term instruments among fixed-term securities. This is not fully explained by the lack of investable instruments since pension funds do not even invest in all the available and pre-approved assets. Second, our results indicate that funds do indeed tend to hold similar portfolios at the asset-class level and herd in their investment decisions, especially among domestic equities, domestic corporate bonds, and quotas of foreign and mutual investment funds. Third, we find relatively low turnover measures; that is, pension fund administrators infrequently change their positions. Moreover, once a PFA buys a fixed-income instrument, it holds it up to maturity in almost all cases. This evidence of a buy-and-hold strategy is consistent with the evidence on the number of active trades, which are surprisingly low. Thus, our broad characterization suggests that, to an important extent, pension fund administrators do not actively manage their positions as a trading strategy.

Fourth, we compute several statistics (widely used in the finance literature) that measure the correlation between the change in a fund's position in a given asset and that asset's past performance. The results indicate that there is a significant fraction of funds whose trading follows a momentum strategy, that is, they buy past winners and sell past losers (in terms of asset returns). This type of strategy seems particularly important for certain asset classes, especially government bonds, domestic equities, and quotas of foreign (international) investment and mutual funds. We find no significant evidence of contrarian trading (buying past losers and selling past winners) at any level, nor do we find evidence that momentum trading is the main cause of the herding observed in domestic assets such as equities. Furthermore, we find some evidence that liquidity considerations might play a role when comparing strategies across asset classes with different aggregate levels of liquidity. Fifth, most of the patterns of trading behavior mentioned above do not change significantly around regulatory changes in the band of minimum return (that PFAs must achieve for their overall portfolios) or across fund types facing different regulatory return requirements. This suggests that regulatory restrictions on returns are unlikely to be the main cause of trading patterns such as herding. However, regulations on foreign holdings notably affect pension fund investments over time, and trading behavior experiences a change after the introduction of the multi-fund system with a significant decline in the degree of herding and momentum across PFAs. Finally, the onset of the Russian crisis in 1998 coincides with a temporary decline in herding and an increase in turnover, which suggests that the turmoil in financial markets associated with this episode disrupted the trading strategies of Chilean PFAs.

Overall, the patterns described in our study do not seem to confirm all initial expectations about the role of pension funds as drivers of capital market development. On the bright side, pension funds seem to absorb a large amount of bonds, likely allowing the corporate sector to issue that type of securities and effectively helping in the development of that market. But the characterization, taken as a whole, is difficult to align with the initial ideas about pension funds as agents that contribute in many different ways to the development of domestic capital markets. For example, it is difficult to reconcile the fact that pension funds hold a large fraction of bank deposits, government paper, and short-term assets with the idea that they help foster long-term financing for corporations. At first sight, these holdings do not seem to respond to the pension fund needs for retiring pensioners. Furthermore, the fact that pension funds tend to display little turnover does not seem to square well with the idea that they contribute to the liquidity of secondary markets. Also, the high degree of herding behavior indicating that all funds invest in the same assets suggests that funds follow each other in their investment strategies. Moreover, the finding that pension funds follow momentum strategies in their trading activities (with respect to past returns but not current returns) does not hold well with the idea that pension fund managers collect independent and superior information (relative to other market participants) and invest accordingly. If fund managers knew which stocks would do well they would not purchase a security after its price has increased (and right before its price is about to stay flat or fall), they would purchase it in advance. In sum, our findings suggest that at least the initial ideas that motivated the introduction of pension funds as dynamic agents of capital market development would need to be revisited.

Determining the extent to which the patterns documented in this study are the result of the regulatory environment, managers' incentives or the liquidity of different assets, should be an important part of future work, but some hypotheses can already be drawn from this work.

First, the evidence does not suggest that regulations fully determine the trading patterns of pension funds. The only aggregate constraint that has become binding over time is the quantitative restriction on holdings to invest up to 30 percent of their portfolio abroad; but even in this case pension funds did not hit the investment limit for almost two years after the limits were increased from the previous 20 percent limit. Other restrictions do not appear at first hand to be very constraining. For example, pension funds only invest in a subset of all the investable instruments. Moreover, when regulations were relaxed such that the minimum return band was expanded (giving funds effectively more flexibility to allocate their investments), the amount of herding behavior did not diminish.

Second, the fact that pension funds continue to herd after regulations have been relaxed suggest that there is something inherent to the competition among funds that leads them to hold similar portfolios and make similar adjustments over time. That is, the incentives for managers might also play a role in the way that pension funds invest.

Third, the liquidity of certain assets might also be explaining to some degree the patterns described in this study. This liquidity might be behind the low turnover ratios found. This low turnover might be driven by the limited availability of assets in which pension funds want to invest. Thus, pension funds purchase any security that they like and that becomes available, and hold it. Moreover, the fact that pension funds seem to hold bonds up to maturity might be explained by the liquidity of those instruments.

Holding them up to maturity allows funds not to trade those bonds in illiquid secondary markets; furthermore, this feature of bonds might also explain the pension funds' preference for that type of security relative to equity, which will force them to participate in secondary markets. However, one would still need to explain why pension funds hold even government paper up to maturity, given that this is usually perceived to be a liquid instrument. Alternatively, one could argue that government bonds are kept because there are no other liquid and desirable instrument in which to invest. Or perhaps pension funds just prefer not to trade and hold all fixed-term asset to maturity. In any case, we cannot reject that pension funds might be holding bonds because they are preferred relative to the alternatives in terms of risk-adjusted returns. Furthermore, the fact that pension funds follow dynamic herding (especially so when trading domestic equity) is consistent with the hypothesis that funds make trades sequentially (as supposed to all at once) to avoid affecting prices with their trades (which often happens in illiquid markets).