



INTERNATIONAL CENTRE  
FOR PENSION MANAGEMENT

# The Four Ways Through Which Pension Funds Increase the Productivity of Firms They Invest In

RESEARCH

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### Executive Summary

This white paper is the outcome of a Working Group formed by the International Centre for Pension Management (ICPM). The Working Group, which consists of academic researchers and senior officials of large pension funds active in different parts of the world, investigated the channels through which pension funds as long-term investors are able to generate productivity gains in the firms they invest in. Key findings from the white paper are summarized below:

- Recent research based on Danish data has found that investments made by pension funds increase the productivity of the firms they invest in by, on average, between 3% and 5% (Beetsma, Jensen, Pozzoli and Pinkus 2023).
- The productivity effect is larger when the equity stake is larger and is held for a longer period. It is also more concentrated among the non-listed and smaller firms.
- The positive productivity effect raises the firm's value. If the valuation benefit outweighs the cost of selection and engagement with the investee, the pension fund would benefit from the deal.
- The four primary channels promoting this productivity effect are the supply of funds channel, the long-term commitment channel, the engagement channel, and the signalling channel.
- Several real-world cases of pension fund investments described in the white paper corroborate the role of the above channels. The case studies demonstrate that multiple channels often operate at the same time and mutually reinforce each other.
- No role is found for selection effects in the productivity estimates. However, pension funds do not randomly select investees. They select firms that have the potential to generate productivity gains but cannot achieve those gains without the pension fund's help.
- The findings of the white paper suggest that the aggregate economy can benefit from governments stimulating funded pension provision and providing (regulatory) incentives for pension funds to engage in long-term investments in firms that benefit from the abovementioned channels.

<sup>1</sup> We thank participants of the ICPM Discussion Forum Session on Long-Term Investing in Copenhagen on October 2, 2023, for their very valuable comments. Data on the duration on pension assets and liabilities were kindly provided by Damiaan Chen of the Dutch Central Bank. We also thank the following individuals for their valuable contributions to this project: Rutger van Wersch (APG), Win Yan Lam (APG), Philippe Charette (CDPQ), Jimena Romero (ICPM), Jamie MacLean (ICPM)

<sup>2</sup> *Disclaimer:* The views expressed in this article are those of the members of the working group and do not necessarily reflect the views or policies of ICPM or any organisations they are affiliated with.

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## 1. Introduction

In the coming decades, the world faces major investments in the energy transition, the digital transition, climate adaptation, as well as investments in other areas. In other words, the investment needs will be unprecedented. At the same time, the so-called savings glut that held interest rates down for a long time seems to be coming to an end.

The dissaving by the increasing shares of retirees in the rich world populations, as well as China, will weigh on the overall volume of savings. Hence, we can expect a gradual but substantial shift in the savings-investment balance in the medium-to-long term. The period of ultra-low interest rates may well be over, even once inflationary pressures have abated.

Some countries have already accumulated substantial pension assets and are likely to continue doing so. Other countries, where pensions are paid out of current taxes, have come to realise that pension reform is necessary to secure adequate pension provision for the future. Therefore, they are gradually increasing the funded component of their pension system. Overall, the volume of pension assets can be expected to continue to grow for quite some time.

The rise in pension savings is likely to add more “long-termism” to the profile of real investments. Indeed, for younger workers, retirement is typically some four decades away, and this characteristic clearly contributes to giving pension fund liabilities a long duration. Moreover, the importance of this feature will increase with the prospect of higher life expectancy.

To reduce the risk of mismatch between assets and liabilities, pension funds generally match their long liabilities with long-term assets. This phenomenon makes pension funds a priori ideal investors in, for example, clean energy projects and the associated infrastructure, or digital infrastructure projects. These are typically investments that apply cutting-edge technology or even technology that needs to be developed “along the way”. These projects require a long time to generate return on investment.

The key theme addressed in this report is the following: how, and to what extent, does pension fund investment affect the productivity of firms that pension funds invest in? We measure productivity as value-added. Hence an increase in productivity means that, for given inputs (capital and labour) in the production process, value-added goes up. There are four conceivable channels through which the pension fund investment may affect the productivity of the firm.

First, it simply alleviates the credit constraint faced by the firm. Second, it provides a long-term financing commitment enabling the firm to engage in investments with long payback periods. Third, pension funds may engage with the firm, thereby providing useful expertise and discipline. Fourth, a pension fund’s willingness to invest in a firm provides a positive signal not only to other potential investors but also to the labour market, allowing the firm to attract better employees.

This paper discusses recent empirical evidence for Denmark about the positive effect of pension fund equity investment on the productivity of firms receiving those investments. It finds that the productivity effects appear to be largely concentrated among unlisted and smaller firms. We explore to what extent these results are supported by practical cases and through which channels the productivity effects materialize.<sup>3</sup>

While none of the cases discussed here are of an ideal “textbook format”, as there are always a variety of different influences operating, we do find clear roles of the four above-mentioned channels. And, importantly, multiple channels sometimes unfold at the same time in ways that strengthen each other.

The results and their implications reported in this paper are the outcomes of an ICPM Working Group in which the econometric findings by the academic participants based on Danish data are confronted with the experience of senior investors of large pension funds. The latter put forward a number of interesting cases that corroborated the channels exposed in the econometric analysis as well as other channels that were less explicitly visible from the econometric analysis. The investors agreed that the productivity-enhancing effect of pension funds taking equity stakes in firms should be most relevant in private markets, i.e. for unlisted firms.

What makes pension funds different from other (institutional) investors when it comes to their capacity to enhance firm productivity? First, pension funds typically have a long-term horizon, allowing the different channels to operate simultaneously, which may take time to materialise. Second, pension funds often have access to investment opportunities that other investors do not have due to their specific societal position.

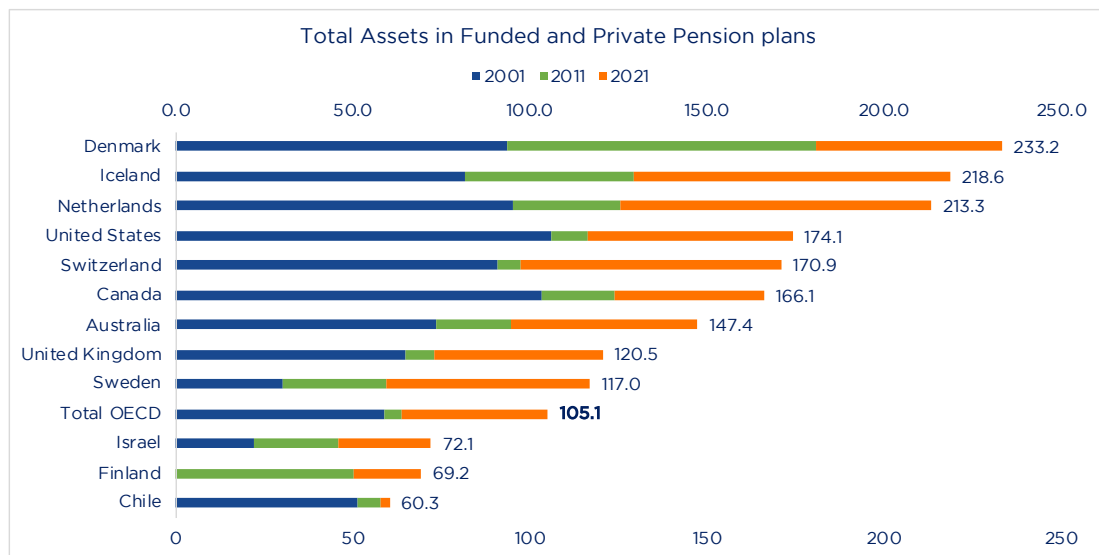
From here, the roadmap is as follows: Section 2 reports data on the development of pension assets and characteristics of funded pensions. Section 3 delves into the academic findings and introduces the four productivity channels. Section 4 presents a number of case studies that illustrate the four channels in action. Section 5 discusses the potential implications of our findings for the broader economy. Section 6 concludes.

<sup>3</sup> The practical cases are provided by Working Group members as well as participants of an ICPM Discussion Forum held in Copenhagen on October 2, 2023.

## 2. Pension savings: Key statistics

To address the burden imposed by ageing populations, many countries are gradually shifting towards more pension funding. Figure 1 shows the evolution of assets in funded and private pension plans across 12 OECD countries over the past 20 years.

Figure 1: Total Assets in Funded and Private Pension plans



Source: OECD Global Pension Statistics

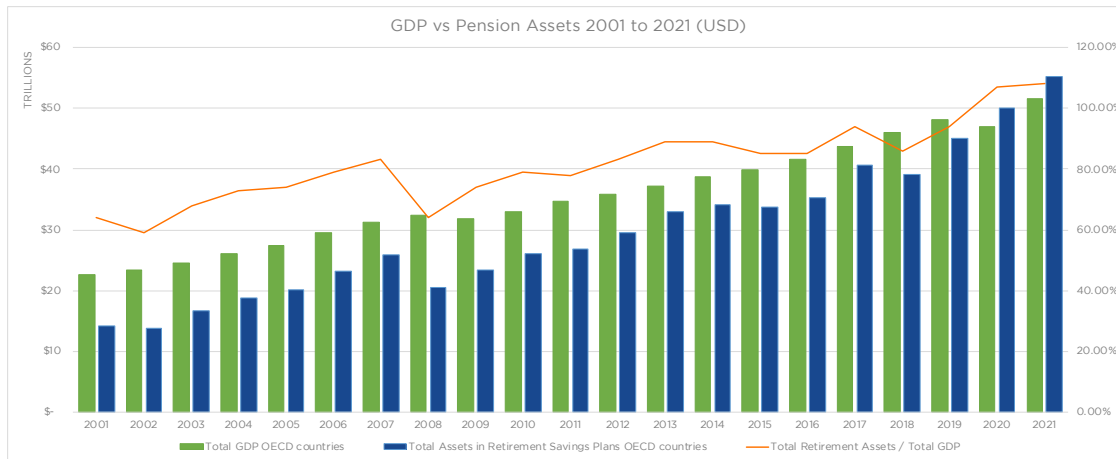
Note: Values as percentage of GDP. If data is unavailable, nearest year is used.

All countries experienced growth in pension assets as a percentage of GDP throughout the two decades. It is remarkable that, while for the OECD as a whole the total assets in funded and private pension plans amounted to only slightly above 50% of GDP in 2001, their share is now well above 100%.

Another noteworthy observation is that the list is topped by the same three countries that are also the three highest ranked countries on the Mercer CFA Institute Global Pension Index 2023: the Netherlands, Iceland, and Denmark. This clearly indicates that accumulation of pension assets serves to strengthen the pension system.

A similar pattern is evident from Figure 2, showing that the growth in pension assets is much higher than growth in GDP at the aggregate world level.

Figure 2: Development of Pension Assets versus GDP at World Level



Source: Pension Assets: OECD; World GDP: World Bank

Note: The values are indexed to the year 2010. For the pension assets growth path, only countries for which the OECD has full data availability for the time horizon of the graph are considered. The countries included are Australia, Bulgaria, Canada, Chile, Colombia, Costa Rica, Czech Republic, Denmark, Estonia, Finland, Germany, Hongkong, Iceland, Indonesia, Ireland, Israel, Latvia, Italia, Netherlands, New Zealand, Poland, Spain, Sweden, United Kingdom and United States. The right-hand scale applies to total retirement assets / total GDP, while the left-hand scale refers to bars.

Pension funds try to avoid a mismatch between their assets and liabilities. Because their liabilities are generally long-term, they can typically afford to have long investment horizons. It is not easy to find a systematic cross-country overview of the duration of pension fund assets and liabilities. However, such data are available for The Netherlands.

Table 1 reports the distribution across pension funds of the duration of the assets and the liabilities by the end of 2021 in The Netherlands. The duration of the liabilities ranges from 14.6 years for the 5th percentile to 29.8 for the 95th percentile. By contrast, the duration of the assets ranges from 4.5 to 16.6 over the same percentiles.

It is interesting to see that the durations of the assets are lower than the durations of the liabilities, suggesting there is room for pension funds to increase the fraction of long-term investments. Some carefulness in drawing this conclusion is warranted, however. First, durations vary substantially across pension funds, which is not surprising as the pension funds themselves differ a lot, in particular when it comes to their age profile. Second, measurement issues make it difficult to measure the duration of the assets, for example because some assets are illiquid and prospective cashflows are difficult to project.

Table 1: Durations of liabilities and assets for Dutch pension funds - 2021

2021 Percentile	Assets (years)	Liabilities (years)
5	4.5	14.6
10	5.9	16.2
50 (median)	10.2	20.7
90	14.7	27.6
95	16.6	29.8
Unweighted average	10.3	20.9
Average weighted by liabilities	9.1	20.6

*Note: Duration of the assets is defined as the “modified duration” of the total assets including derivatives, hence of the total balance of the pension fund. It is measured as the change in the value of the assets resulting from a parallel shift in the yield curve by one basis point, multiplied by 100. The duration of the liabilities is defined as the modified duration of the aggregate liabilities towards all pension fund participants (active, retired, “sleepers” (not yet retired, but no longer contributing)). A detailed explanation is found in De Nederlandsche Bank (2020).*

Overall, it is fair to conclude that due to the generally high duration of their liabilities, pension funds can afford to commit their investments over a long horizon, making them “ideal” investors in energy transition projects, infrastructure projects and other investment projects with a long horizon. By matching their long-term liabilities towards their participants with long-term assets, pension funds are able to reduce so-called “mismatch risk”.



### 3. Research results

#### 3.1. Key findings of the empirical analysis

##### Set-up of the analysis

Beetsma, Jensen, Pozzoli and Pinkus (2023, henceforth BJPP) study the effect of a pension fund equity investment on productivity in firms. To this end, they use a panel of ownership relations between Danish firms from data provider Experian, where they run through ownership levels to identify the ultimate owner.

BJPP also use administrative data on firms from Statistics Denmark, which contain information on the sectors firms operate in: value added, capital, labour, and intermediate inputs, the wage bill, investment, and firm age. Hence, they match firm accounting and pension fund investment. The authors confine themselves to firms with at least 10 employees over the period 2003-2019, leading to a sample of almost 15,000 firms, of which almost 600 received pension fund investment.

##### Baseline results

The baseline results are summarized in Table 2. The table is based on estimations of an equation that regresses productivity, measured as value-added, on a variable capturing an equity stake by a pension fund (which can be either a 1 – 0 dummy variable “PFI” that indicates whether a pension fund invests in the firm, yes or no; or a variable “Intensity” capturing the size of the equity stake of a pension fund in a firm; or a variable “Length” capturing for how long a pension fund has been investing in a firm), the production input factors (capital and labour), and a number of control variables.

BJPP also show the effects of pension equity investments when they only consider those with a stake of at least 5% in a company and a variant in which they control for whether the investee is an exporting firm. Here, we report only the effect of the pension equity investment variable on productivity and not the other coefficient estimates from the regressions, as these are not of specific interest for this paper. We see that, on average, an equity investment by at least one pension fund raises firm productivity by 3-3.5% compared to otherwise identical firms without an equity stake by a pension fund.

Table 2: Productivity Estimates: Different Measures of Pension Fund Investment

PFI	3.36***	3.46***	2.97***
Intensity	0.22***	0.22***	0.21**
Length	0.46**	0.49**	0.41**
PFI ≥ 5%	N	Y	N
Exporter	N	N	Y

Note: Row for “PFI” (“pension fund investment”) estimates the productivity effect of a pension fund investment by at least one pension fund (no or yes, no matter how large) measured in percent. The row for “Intensity” estimates the percent increase in productivity of a one-percentage point increase in the equity stake. Finally, “Length” estimates the productivity effect in percent of holding the equity stake by one additional year. Note that each of the nine numbers in the table corresponds to a separate regression. The first column includes all observations; the second column limits the cases of a pension investment to those where the equity stake is at least 5%; and, the third column adds a 0 - 1 dummy variable for whether the firm is an exporter. Hence, each number in the table corresponds to a different regression. \*\* indicates statistical significance at the 5% level; \*\*\* indicates statistical significance at the 1% level.

When it comes to the size of the equity stake, an increase by one percentage point in the combined equity stake of all funds investing in a firm raises productivity by 0.21 – 0.22%. An increase by one year of one or more pension funds maintaining a positive equity stake leads to a productivity gain of between 0.40 and 0.50%.

These findings are highly robust. For example, controlling for whether the investee is an exporting firm does not affect these findings. Limiting the cases of a pension investment to those where the equity stake is at least 5% yields very similar estimates. The presence of potential co-investors and their type (not reported here) also does not affect the results.

### Listed versus non-listed firms

Table 3 compares the effects of pension fund equity investments for non-listed versus listed firms. We observe that listed firms are on average between 7 and 8% more productive than non-listed firms. That is, given the same amount of inputs in terms of capital and labour, they generate 7-8% higher value-added. A potential reason is that being listed exerts stronger pressure on a firm to be efficient. Also, listed firms may be able to attract higher quality employees who perceive better career perspectives at such firms. In addition, listed firms are on average larger, which may contribute to exploiting economies-of-scale, although the results presented below for small versus large firms fail to provide an indication in this direction. However, the productivity effect of a pension fund equity investment is between 6.5 and 7% larger for non-listed than for listed firms, as indicated by the interaction term PFI\* List.

**Table 3: Productivity Estimates: Listed versus Non-Listed Firms**

PFI	3.87***	3.47***
List	7.29***	7.84***
PFI * List	-6.82***	-6.57***
Exporter	N	Y

Note: Row for "PFI" ("pension fund investment") estimates the productivity effect of a pension fund investment (no or yes, no matter how large) measured in percent. "List" is a dummy variable indicating that a firm is publicly listed. The row "PFI \* List" reports the coefficient of the interaction between the PFI dummy and the "List" dummy. The second column adds a 0 - 1 dummy variable for whether the firm is an exporter. Each column reports the results of one regression. \*\*\* indicates statistical significance at the 1% level.

### Small versus large firms

Table 4 explores the effects of pension fund equity investments once we distinguish between small firms and large firms, where small firms are defined as below median in terms of employees, and large firms are the remaining firms in the population. Again, the direct productivity effect of a pension fund investment is significantly positive, with a magnitude ranging from 1.7 to 2.6%. Moreover, the productivity increase is stronger for smaller firms, ranging from 8.7 to 10%, as indicated by the interaction term PFI \* Small.

**Table 4: Productivity Estimates: Distinguishing Small and Large Firms**

PFI	2.08**	2.59**	1.72*
Small	-0.95	-0.91	-0.64
PFI * Small	10.1**	8.68**	9.73**
PFI ≥ 5%	N	Y	N
Exporter	N	N	Y

Note: Row for "PFI" ("pension fund investment") estimates the productivity effect of a pension fund investment (no or yes, no matter how large) measured in percent. "Small" is a dummy variable indicating whether the firm is below or above the median in terms of number of employees. The row "PFI \* Small" reports the coefficient of the interaction between the PFI dummy and the dummy "Small". The second column limits the cases of a pension investment to those where the equity stake is at least 5% and the third column adds a 0 - 1 dummy variable for whether the firm is an exporter. Each column reports the results of one regression. \* indicates statistical significance at the 10% level; \*\* indicates statistical significance at the 5% level.

### Controlling for selection effects

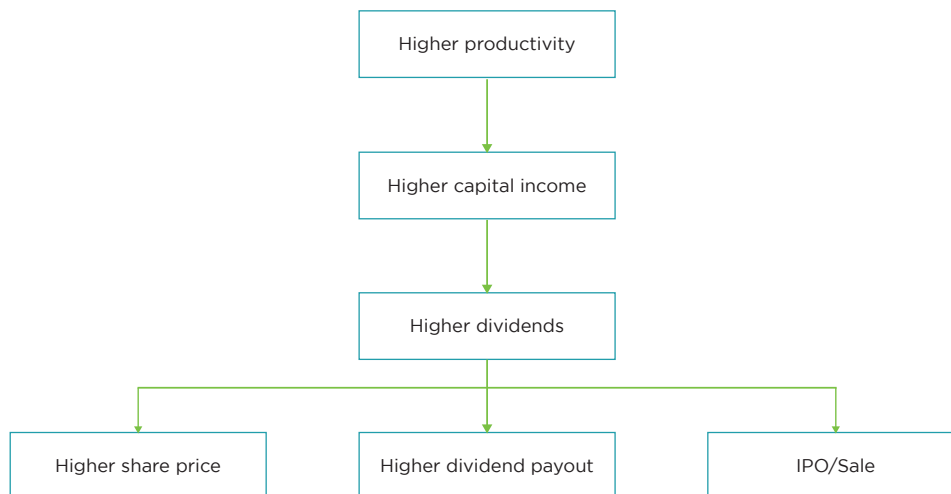
One might ask whether pension funds are simply not better at picking the more productive firms for their equity portfolio. BJPP dismiss this “identification effect” with an event study that shows that, before the moment of investment, the productivity levels are not statistically different between the group of firms that does receive investment and the group that does not receive investment.

The effect is also taken care of in the econometric estimation by controlling for past firm productivity. The absence of productivity differences before the “investment event” is not to say that pension funds randomly select firms they invest in. The discussions in the Working Group make clear that pension funds carefully select the firms they invest in – firms in which pension investment can help unlock their potential.

### Productivity, return generation, and GDP

The economic benefits of higher productivity and investor return generation are two sides of the same coin. This is illustrated in Figure 3. Higher productivity with given inputs generates higher profits, which in turn translates into a higher share price, a higher dividend or an IPO/Sale of the company, if it is unlisted and the owners aim to cash in some of the extra value created.

Figure 3: Relationship between productivity and value creation



Pension equity positions may have macroeconomic implications. A country’s gross domestic product (GDP) is the sum of all revenues minus costs, i.e., the value added. A more productive firm generates more revenues at given cost and, hence, raises GDP. Therefore, by boosting productivity more than other financiers do, pension fund equity stakes raise GDP.

### 3.2. Which channels can produce the above results?

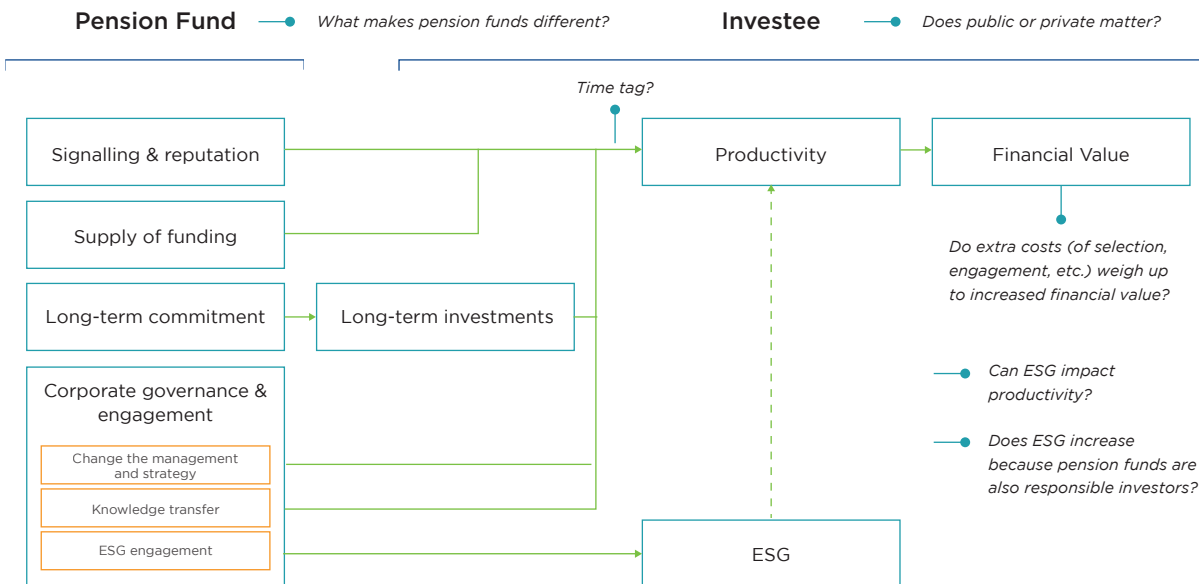
Pension funds and policymakers both have a keen interest in obtaining detailed insights into the potential channels driving the above results. Such insights allow funds to tailor their interactions with the firms and policymakers to incentivise the funds to deploy investment strategies that contribute to the economy at large.

#### The four channels

Figure 4 depicts the different possible channels through which a pension fund equity stake can affect firm productivity.

First, with a pension fund prepared to invest in the firm, the financing constraint of the firm is loosened. In other words, the supply of capital to the firm rises, which implies a reduction in the required rate of return on the firm’s investments, leading it to expand investment until the marginal investment return and the required return are equal again. We label this the “supply of funds channel.” The increased supply of funding may allow the firm to make productivity-increasing investments, which it would otherwise be unable to make or only at a higher financing cost.

Figure 4: From pension fund to investee



Second, because pension funds have long-term liabilities, they have an interest in acquiring long-term assets to reduce mismatch risk. Through their long investment horizons, they can commit funding for a

long time. This allows firms to invest in projects that favour long-term objectives, such as productivity enhancement or the deployment of a promising new technology that has not been fully developed and is expected to take quite some time to reach that stage, rather than invest in projects with shorter horizons or a need to improve margins on a short-term basis. Typically, such projects will have high required returns ex ante, and may have high realized returns ex post, but they tend to be illiquid and earn the returns only over a longer time horizon. A related advantage is that through their long-term financing commitment, pension funds can alleviate entrepreneurs from their daily worry to secure financing and allow them to focus on what they prefer to do, namely developing innovative products. We label this the “long-term commitment channel.”

Third, a pension fund investing in a firm may give a positive signal to other financiers, for example, about the competence of the firm’s management or the promise of the new products it plans to develop. This may persuade investors to step in as well, especially if the fund has a reputation of doing its research and due diligence with respect to potential investees. It may also provide a positive effect to the labour market, enabling the firm to attract the best employees. We label this as the “signalling channel.” Moreover, if the fund has a reputation of attaching a high weight to ESG factors, this may draw in additional financing from investors who care equally about those factors. In addition, such a fund may sometimes be granted investment opportunities by authorities that other investors may not have. For example, a pension fund known for giving priority to ESG may team up with a party that wants to develop a neighbourhood or piece of land for environmentally-friendly use.

A fourth channel includes corporate governance and engagement with the investee to improve how it is run, thereby raising its productivity. Engagement may take the form of changing the management and strategy, including through a seat on the company’s board in return for taking an equity stake, as well as by providing expert advice. An example is when a firm develops an interesting new product but lacks the knowledge on how to organise the process from development to bringing the product to the market. Direct engagement with a development team of a pension fund that has experience with these trajectories might help. Also, the fund may engage with the firm in relation to its ESG strategy. We label this channel the “engagement channel.”

In view of the various possible channels, we expect that the pension fund investor effect will be most pronounced in private markets for small firms and with direct investments. This is because (i) large, public companies can typically retain maximum productivity without the help of shareholders, and (ii) because of the small stakes that asset owners of public companies typically have, their influence on the company behaviour will be limited. Moreover, non-listed and small firms benefit comparatively more from long-term financing commitments, intensive engagement (such as management advice) and signalling to the market of their promise.

Indeed, the fact that an increase in the pension fund equity stake has larger productivity effects suggests a role for the “supply of funds channel”, while the effect of a longer investment relationship

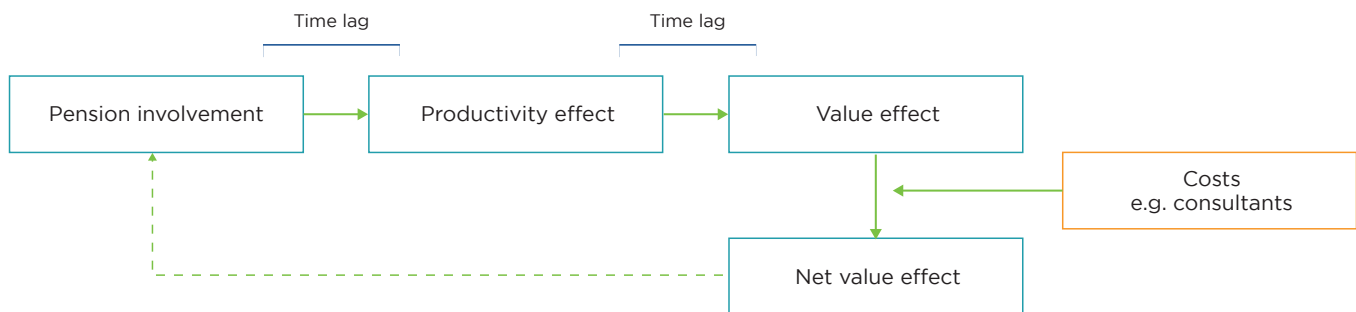
on productivity also suggests a role for the “long-term commitment channel” (see Table 2). Finally, it is important to realise that the different channels may strengthen each other. For example, the benefit from long-term financing commitment is likely to be larger when the pension fund directly engages with the firm by providing expert and managerial knowledge.

### Potential limitations on net value creation

The potential financial gains from pension fund involvement with a firm take time to materialise, in particular because it takes time for the synergy of the different channels to realise. Also, the higher productivity does not come as a free lunch.

Figure 5 illustrates the chain of steps from a pension fund getting involved with a firm and the net value effect. The net value effect for pension funds taking an equity stake is not necessarily positive by definition. First, not all firms have the potential to raise productivity. Hence, pension funds need to do detailed research to identify promising firms to invest in. They also need to conduct a thorough due diligence with respect to potential investees, for example in relation to the firm’s ESG policies.

Figure 5: chain from pension fund involvement to net value



Second, even if such a firm is identified, effort needs to be put into making the firm more productive. Direct engagement requires effort and resources. Special teams are needed to carry out these activities. Third, investment in promising firms may be relatively risky, especially if they involve developing yet unproven technologies. Finally, there may be a substantial time lag between taking a stake and the higher productivity. While the fund has a long investment horizon, this still means that it loses flexibility in changing its investment portfolio.

### The wedge between benefits for fund participants and society at large

It is important to realise that the net societal benefit from a pension fund equity stake is likely to be larger than the net benefit at the fund level. For example, investments financed with a pension fund’s stake in the company may generate knowledge spillovers beyond the company itself, either through other companies in the fund’s portfolio or through turnover in the labour market. Also, the extra

profit from the firm's investment generates tax revenues. These positive spillovers will generally not be internalised when a pension fund decides on whether to take an equity stake, but they may form a basis for providing pension funds with incentives to take such long-term equity positions and get involved with the firm. An overall friendly climate towards pension funds taking on equity risk could therefore contribute to raising potential growth benefitting societies at large.

#### **What makes the fund different from other investors?**

The above discussion raises the question of whether the benefits from pension funds taking equity stakes in firms on average are not also realised by other investors taking such equity stakes. What makes pension funds different in this regard from other (institutional) investors? One distinct feature of pension funds is their long-term horizon, which allows the supply of funds, long-term commitment and engagement channels to operate simultaneously. The synergies across these channels may take time to materialise. This is often called "patient capital". Of the other investor types, life insurance companies and sovereign wealth funds would probably come closest to pension funds, because they also have long liabilities. Thorough due diligence, a pension fund may also get other investors on board.

## **4. How do the above channels concretely come into play? Case studies**

This subsection presents a number of case studies that illustrate the above channels in action.

### **Case: Stiesdal**

In May 2021, PensionDanmark – Denmark's largest labour market pension fund – became a new investor in Stiesdal, a Danish cleantech company working to mitigate climate change. Stiesdal develops floating offshore wind foundations, energy storage technology, PtX technology and pyrolysis plants for atmospheric carbon capture and storage and biofuel production.

Since its foundation in 2016, Stiesdal has made strong progress in developing innovative solutions for use in the green transition and has formed several remarkable partnerships with both Danish and international businesses. PensionDanmark's triple-digit million investment is allocated towards the company's continued product development. With four technologies, all of which offer considerable potential, there are several paths to success.

With PensionDanmark joining the group of owners, Stiesdal has been able to take corporate governance and professionalism to the next level through, for example, engagement at board level while at the same time strengthening the company's long-term development prospects.

PensionDanmark's investment is also signalling credibility and capital strength to potential customers and partners. In the cleantech sector, where large customer contracts often require significant capital



investment, having a strong financial position can be a key factor in securing business. By investing in the company, PensionDanmark is not only providing financial support, but also signalling to other potential investors and customers a belief in the company's potential for success.

PensionDanmark's long-term horizon allows for investments in illiquid, new technologies offering considerable return potential. For instance, the company's floating foundations enable the installation of offshore wind turbines irrespective of water depth, which may multiply the already huge global offshore wind potential. In addition, Stiesdal SkyClean pyrolysis plants turn organic by-products from agriculture, forestry, and industry into biochar and bioenergy. Stiesdal inaugurated a new SkyClean plant in Denmark in March 2022.

Stiesdal shows how the cleantech sector provides several advantages for large pension funds. These include portfolio diversification and ownership of new technologies. In addition, because most investments in the cleantech space are private, pension funds have access to opportunities not available in public markets, and they can also earn an illiquidity premium.

The case of Stiesdal clearly shows all the different channels in action. PensionDanmark is able to provide funding needed for Stiesdal's capital-intensive operations, thus pointing to the "supply of funds channel." Commitment by PensionDanmark is long-term, allowing for the development of new technologies that have not yet fully proven themselves, hence indicating the relevance of the "long-term commitment channel." The "engagement channel" is particularly important with PensionDanmark having a seat on the board and deploying experienced people to raise Stiesdal's professionalism further. Finally, the "signalling effect" towards the market is explicitly referred to.

#### Case: Mahi Pono

PSP Investments, one of Canada's largest pension investment managers, acquired a 41,000-acre former sugar cane plantation in central Maui, Hawaii in 2018. The goal of the acquisition was to transform the land into a hub of diversified agriculture such as citrus, coffee, macadamia, avocados, and other crops. Mahi Pono, which means "to farm or cultivate morally and properly", was established to revitalize and develop the property.

Since the early 1900s, sugar cane had been the primary crop on Maui and had a high environmental impact due to the high-water requirements and burning practices at harvest. Moreover, sugar cane was originally produced for export, limiting the local economic and social impact. Prior to this acquisition, the sugar cane operation was shut down, resulting in the layoff of approximately 600 employees and the lying fallow of Maui's central valley. The property was put up for sale and sat idle for two years before being acquired by PSP Investments.

PSP Investments believes that building lasting trust with the community and enhancing their social license to operate is essential to the project's success and will build long-term value. Since the

establishment of Mahi Pono, more than \$500 million of capital has been invested on the island, and more than 300 local jobs have been created. At maturity, the company is expected to employ upwards of 800 people. The planting plan is already about 60% complete, with around 12,000 acres planted using best-in-class sustainable farming practices to reduce irrigation needs and chemical applications. Development will continue until 2027, where more than 20,000 productive acres generating over 300 million pounds of produce are expected.

Mahi Pono strives to uphold high standards of sustainable farming and be responsible stewards of the land. PSP Investments also leveraged its existing partnerships and industry relationships to help support the project and mitigate development risk. The company has a good track record with stakeholder relations which is crucial for addressing community concerns. PSP Investments aims to bring value to the local community by creating new jobs and opportunities for economic diversification. Moreover, this project will help Hawaii decrease its reliance on food imports and increase food security, in line with the state's mandate.

The case of Mahi Pono demonstrates an important role for the “long-term commitment channel” with long-term financial commitment to ensure the full development of the farm by 2027. With the direct involvement of PSP Investments with the local management team, the “engagement channel” clearly is also operative. Finally, the signalling channel played a role in the sense PSP Investments was able to make this acquisition because of its track record on responsibility.

#### Case: Amvest / PGGM

Amvest is a Dutch real estate development company that owns and rents out part of the housing real estate it has developed. Currently (2023), it has 22,000 housing units under management, and another 24,000 units under development. All its activity takes place in The Netherlands. Amvest is equally owned by two Dutch investors with long “evergreen” horizons, including PGGM, the second largest Dutch pension investor. The owners of Amvest aim to earn sound long-term risk adjusted financial returns that can stand the competition with their other real estate investments. At the same time, they are both deeply committed to being impactful investors.

Amvest has a true long-term horizon: it commits to residential areas for 5 to 15 years as a developer, and then for 20 to 30 years as investment manager. By doing so, it combines the two distinct areas of expertise of real estate development and management. All projects it takes on are looked at by using the same impact framework. The four impact lenses are: tenant satisfaction, livability (social cohesion, safety), environmental impact and climate adaptation. The development of areas, often newly developed or to be redeveloped urban areas, complies with the four themes in the impact framework. The consistent approach to real estate investment and the firm's reliability as a partner both result in the firm having a strong reputation with key stakeholders in the Dutch market including municipalities,

construction companies and national policy makers. Amvest's reputation therefore creates a favorable position for the acquisition of new projects.

The financial returns, both as a developer, manager and in terms of the investors' portfolios, have all exceeded their respective targets over the long run.

The case of Amvest again highlights several channels through which the Amvest productivity will be enhanced. First, the supply of funds channel is at work with the two large evergreen owners. The long-term commitment channel is also in operation, as the long horizon and the explicit impact-thinking both lead to positive interactions. For example, the high quality, long-term design leads to lower maintenance costs. Happy tenants have longer tenure, which leads to high and stable occupancy rates. The third channel, the signaling channel, may help increase the interest by local governments to involve Amvest in their development plans as a reliable partner and be serious about the impact-dimensions. Lastly, when it comes to the corporate governance and engagement channel, the close relationship between the two owners and Amvest creates a smooth, high trust governance which helps to steer for the long term and stay the course on the impact dimensions.

#### Case: APG/ANET

ABP – the largest pension funds in the Netherlands – wants to help accelerate the transition to renewable energy in the Netherlands. With this in mind, ABP's asset manager APG invests in small-scale initiatives and companies focusing on innovative solutions across the entire renewable energy chain: energy generation, storage, distribution and use. These (often fast-growing) companies contribute to the energy transition with their products, data applications and digital technologies. ABP established the ABP Netherlands Energy Transition fund (ANET) in 2019, specifically for these investments. ANET reflects ABP's investment belief that it can have a direct impact on the lives of its participants with its investments in the Netherlands.

A large part of the ANET portfolio is made up of early-stage investments: companies that, for example, have validated their technology and need capital to take the next step. ANET's investment often marks the first institutional funding for these ventures. An increasing proportion of the companies in the portfolio have grown to the point where they need more funding to finance further growth, like the expansion of their product range or an international roll-out. The fund has set aside capital for potential follow-up investments to support these companies in their journey of contributing to the energy transition, which highlights the "long-term commitment channel".

Moreover, ANET is a mandate with a "network-driven" investment approach: to help find investors who may be interested in participating in a subsequent round of funding, the team often leverages its broad network of reputable peers who prioritize long-term scalable businesses too. Aligning with well-respected and credible investors is particularly important for ventures, as investors and other

stakeholders have often not yet shaped their perception of these companies. ANET's investment approach shows how the "supply of funds channel" and "signaling channel" can interact and potentially reinforce each other.

ANET not only adds value by providing these companies (access to) capital. With a seat on the supervisory board of each company in the ANET portfolio, APG is actively involved in the strategic oversight. The supervisory board goes through the financials with the company every month, and at least once every quarter strategic topics like the growth strategy are discussed.

The "engagement channel" goes further than the ANET team mobilizing its knowledge and experience to provide strategic guidance. Through the fund, portfolio companies can also draw on the expertise of other specialists within APG and tap into a broad network of contacts. For example: for one of the portfolio companies, an introduction led to the potential opportunity to roll out a pilot program. Being part of an energy-transition ecosystem is an important objective for ANET: knowledge, skills and experiences need to be shared to achieve the energy transition, together.

## 5. Implications for the broader economy

The combination of the academic findings and the presented case studies provides leads for policy improvements. Policymakers are on the one hand concerned with the level and security of the pension provision to pension fund participants and on the other hand with prosperity at the macroeconomic level, i.e. with sustainable growth. Measures that promote pension fund equity investments in and engagement with firms with productivity-enhancing potential serve the latter objective.

However, such investments are also risky and may therefore make the pension payments more uncertain. Indeed, supervisors and regulators are faced with a trade-off between the stability of pensions provided by individual pension funds and both the expected level of pension provision and macroeconomic growth. Requiring perfect certainty about the level of the pension would force pension funds to invest all their assets in safe public debt. However, this would result into pensions that are on average low, while at the macroeconomic level there would be a shortage of risk-bearing capital provision needed for investments in growth-enhancing technologies. Generally speaking, higher macroeconomic growth inevitably comes with risks.

Still, the question is whether this trade-off can be shifted towards a more favourable one. With pension funds doing a careful selection of the firms they invest in and their active engagement with those firms, they reduce investment risks, while promoting productivity increases. In fact, through this activity pension funds help other market participants in their investment selection. How can policymakers promote such activity by pension funds?

First, pension funds want a predictable supervisory framework and investment conditions. This does not need to be very expensive. However, it requires restraint from the side of politicians. Ireland provides an example of a high level of predictability, especially in relation to corporate taxes, which has served the Irish economy well.

Second, in those countries still (largely) relying on pay-as-you-go pensions or without adequate pensions, policymakers could introduce or expand funded pension schemes. Where participation is not mandatory, governments could make it mandatory. A good example are the Netherlands, where participation both by employers and employees is mandatory in most cases, resulting in a large volume of pension assets and high pensions.

Third, potential options for early withdrawal of accumulated pension assets should weigh not only the need to protect fund participants from their own myopia, but also the danger that pension funds may have to liquidate investment positions. In effect, the investment horizon of pension funds becomes shorter with the option of early withdrawal. One possibility is to forbid early withdrawal entirely or to limit it to only a fraction of accumulated pension savings. Taxation of money withdrawn from the scheme could be sufficiently high to discourage participants from taking out their pension savings prematurely.

Third, tax deductibility of pension contributions could be introduced or expanded, thus encouraging individuals to save more via their pension fund. Fourth, taxation of capital gains or dividends could be a decreasing function of the amount of time a pension fund holds on to its equity stake.

It is important to beware of bestowing new societal tasks upon pension funds. The task of pension funds is to provide an adequate and sufficiently secure pension to their participants. Requiring pension funds to promote economic growth, employment and other macroeconomic objectives could bias them into taking stakes in companies with insufficient growth promise or bad management. Pension funds should be free in their selection process. After all, selection of the companies with the best potential is in the interest of both their participants and the economy at large.

The results from the above research and cases studies may also provide leads for pension fund managers themselves. In view of the high costs of research into potential investees, pension funds might team up by setting up joint vehicles with research teams and bundle their engagement activities with investees. The volume of engagement activity can then be larger than when it is organised within each fund individually. Such bundling of engagement activity may lead to positive spillovers of best practices in engagement.

## 6. Concluding remarks

This white paper reported on the positive productivity effects of pension fund equity stakes in firms, mainly smaller and unlisted firms. Econometric analysis demonstrated such effects for Danish data. Case studies from large pension funds located in different countries supported the econometric findings.

Various potential channels behind these productivity effects were identified. These include the supply of funds channel, the long-term commitment channel, the engagement channel and the signalling channel. Different channels may operate simultaneously and therefore strengthen each other.

However, it is difficult to disentangle the roles of the different channels, in part because they may operate at the same time. While the results from the econometric work and the case studies indicate positive productivity effects of pension fund equity stakes, care must be applied in interpreting the results. First, not all cases of pension fund equity investments will be successes. Second, it may never be possible to completely rule out selection effects. Third, in assessing the net benefit from the perspective of the pension fund, it is important to take into account the costs associated with the selection of suitable investments and engagement with investees.

Research into the role of pension funds for productivity and the broader macroeconomy is still in its infancy. One reason is that the dominant system of pension provision remains the public pay-as-you-go system. However, the prospect of a rising burden of pension provision to an ageing population leads to pension reform and an increasing amount of savings via pension funds.

The need for investigation of the consequences of this trend is high. This starts with the collection of sufficient amounts of data on the assets of pension funds and on the composition and location of these assets. Unfortunately, detailed data are only available for very few countries. More available and detailed data allows for more reliable econometric analyses and will make it easier to disentangle the roles of the various channels, and their interactions, through which pension fund investments affect firm productivity.

Expanding the current analysis to other countries with a large role for funded pensions in the economy would be desirable: do we see the same results as in the case of Denmark? Also, an increase in the number of available and detailed case studies is desirable to get a better handle on the drivers of the success (or failure) of such investments. Such case studies inform us about why and how pension funds select the companies they invest in, the relationship with their investees, and the various channels affecting the success of the investment, and how these channels interact.

Finally, from the perspective of a pension fund itself it would be interesting to quantify the benefits and costs of the contribution of (direct) equity investments to the overall asset portfolio. For example, proximity of investees increases familiarity with their investment case and facilitates engagement. However, increasing domestic investments in this way may reduce the benefits from portfolio diversification.

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