Public Pension Reforms and Fiscal Foresight: Narrative Evidence and Aggregate Implications*

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Abstract

We explore the evolution of pension policy across countries and investigate the macroeconomic impact of pension structural reforms in recent decades, in particular those with implementation delays. For these purposes, we document chronological changes in pension policy for 10 OECD countries between 1962 and 2017. The new data set reveals that changes in pension policy come in waves, with a rapid expansion of pension systems between 1960s and 80s followed by a wave of retrenchments since 1990s. Structural pension reforms, which are motivated by long-run fiscal sustainability concerns, often come with implementation delays. We find that in response to pension retrenchments without delays, people close to retirement stay in the workforce longer to compensate for the decline in their pensions, leading to a decline in old-age pension spending. In response to news about pension retrenchment in the future, however, the marginal group of population are more likely to exit the labor market prior to the reform being implemented. As a result, government spending on old age pensions increases, rather than decreases, over the medium term. In addition, we find that both immediate and delayed pension retrenchments lead to higher aggregate savings rate and a contraction in household consumption in the short run. The impact on GDP and investment, on the other hand, seems to hinge on the credibility of the pension reforms.

Keywords: Fiscal foresight, pension reform, narrative approach

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1 Introduction

Spending on public pensions for OECD countries has been increasing over the last half century, and is likely to continue to rise in the future. Figure 1 highlights that public spending on old-age pensions has been rising across countries, even though the pace varies. In response, policymakers have increasingly focused on pension retrenchment reforms in recent years to keep their pension systems solvent. In this paper, we focus on two questions. Firstly, what kind of role have government policies played in the change of pension spending over time? Secondly and more importantly, what impact do pension structural reforms have on the economy?

To address these two questions, we construct a new data set and document chronological changes in public pension policy for 10 OECD countries between 1962-2017. By mainly relying on annual/biannual OECD Economic Survey for each country and supplementing with legislative documents from country-specific sources, we collect information on four aspects: 1) the type of pension changes, whether they made pension programs more or less generous; 2) policy tools associated with changes in pension policy, whether through changes in payments, coverage, indexation policy, or retirement age; 3) motivations behind those policy changes, whether they were driven by cyclical, purchasing power, or structural considerations; and 4) implementation lags, which is the time elapsed between when a policy change is initially enacted and when it is fully phased in.

The new data set uncovers that other than aging society, the expansion in pension programs between 1960s and 80s played an important role in the rapid increase in pension spending across countries. Over this period, pension programs offered more generous payments to elderly population and also extended to a broader segment of population. Part of the expansion was motivated by cyclical reasons. For instance, many European countries adopted early retirement programs between 1970s and 80s in response to high unemployment rates during recessions. And part of the expansion was carried out to raise the living standard for elderly population to keep up with economic growth, for instance Japan saw rapid increases in their basic old-age pension payments in the 1970s. The expansion, however, significantly increased pension liabilities, leading to a wave of pension retrenchments since the 1980s.

Next we study the effects of pension structural reforms on the aggregate economy. The new data set allows us to identify structural policy changes, which are motivated by long-run fiscal
sustainability concerns in contrast to short-run cyclical concerns. Those reforms usually involve prolonged phase-in periods or implementation delays. These phase-in periods ease the effects of pension reforms by providing retirees time to adjust their retirement plans, while they also reflect political challenges in enacting and implementing those reforms. The literature, for instance Ramey (2011), Mertens and Ravn (2012) and Leeper, Walker, and Yang (2013), has highlighted the importance of fiscal foresight channel, as households respond to fiscal news ahead of its implementation.

In a similar spirit, we distinguish between structural reforms that are implemented immediately following announcements and ones that are implemented with a delay to account for fiscal foresight channel. We apply the local projection methodology of Jorda (2005) on the period from 1980 to 2017 to focus primarily on pension retrenchments.

We find that structural pension reforms, depending on whether they come with phase-in periods or not, can have distinctly different impact on people who are close to retirement and also on the government budget. In response to pension retrenchments being implemented immediately, people close to retirement stay in the work force longer to compensate for the decline in their pensions, as labor force participation rates (LFPR) for groups between 55 and 64 years old rise. Less generous pension benefits, in combination with a higher LFPR for the elderly population, leads to a decline in the cumulative old-age pension spending. In response to news about pension retrenchment in the future, however, this marginal group of population are more likely to exit the labor market prior to the reform being implemented in order to take advantage of more generous pre-reform pensions. Therefore, government spending on old age pensions increases, rather than decreases, over the medium run.

Turning to other macroeconomic aggregate variables, we find that both immediate and delayed pension retrenchments lead to higher aggregate savings rate and a contraction of household consumption in the short run. The impact on GDP and investment, on the other hand, seems to hinge on the credibility of pension reforms. When we exclude Italy from the sample, investment and GDP falls on impact, and the cumulative change in these variables turns insignificant over time. By including Italy, however, investment turns negative over the medium term in the case of delayed pension retrenchments, leading to a contraction in GDP. The distinctly different responses in investment are probably associated with repeated and sometimes failed structural reforms in Italy, which raises credibility concerns.
Our contribution to the literature is twofold. First, we create a new data series on changes in pension policy that goes back to the early 1960s, while the existing literature has largely focused on pension reforms since 1990s. The longer data set uncovers that pension changes have come in waves, with a rapid expansion of pension systems between 1960s and 80s followed by contractions since 1990s. Second, we highlight that implementation delays associated with structural reforms can have unintended consequence on pension spending and labor market. Even though some phase-in periods may be needed to provide retirees time to adjust their retirement plans, it is important for policy makers to understand the tradeoffs in a society with aging populations.

The paper is structured as follows. Section 3 explains how we compile the data set by largely relying on country-specific OECD Economic Surveys. In section 4, we explore the evolution of pension reforms, showing that pension retrenchment reforms in recent decades often come with significant phase-in periods. Section 5 explains the empirical approach, and sections 6 and 7 highlight that the impact of pension retrenchments on the aggregate economy depending on whether reforms come with implementation delays or not.

2 Literature Review

Our paper contributes to a growing literature that employs narrative methods to identify significant variations in policy variables of interest and motivations behind them to isolate exogenous events. Notable examples include Romer and Romer (1989) and Romer and Romer (2004) for constructing monetary policy shocks based on FOMC minutes, Ramey (2011) for compiling defense news shocks based on articles from Business Week, and Romer and Romer (2010) for constructing narrative tax shocks based on tax legislative documents.

We rely on OECD publications as a primary source for identifying narrative shocks across a panel of countries, and therefore this paper is also related to previous studies which used similar publications. For instance, Romer and Romer (2017) construct a semi-annual measure of financial distress for 24 OECD countries based on country specific OECD Economic Outlooks. Duval and Furceri (2018) employ the OECD Economic Surveys, for 26 individual advanced economies, in order to build a data set of labor and product market reforms and consider their effects on output, employment and productivity.
Given our focus on pension spending, our paper also ties to other work related to social spending programs. Romer and Romer (2010) consider the effects of Social Security benefit payment increases on consumption in the U.S. Their narrative work helps them identify changes in these transfer payments that were not motivated by countercyclical concerns, and they distinguish between permanent and temporary changes. They find a significant but short-lived positive response of consumption to a permanent benefit change, and no significant effects of temporary changes. In more closely related work, Beetsma, Romp, and van Maurik (2017) construct a database of pension reforms employing narrative methods for several OECD countries, using OECD publications and other sources for the period 1970-2017. Those authors, however, address a different question by focusing on the state of the economy when the reform is enacted. In departure from our analysis, where we focus on the motivation and implementation lags of these reforms, their focus is primarily on the nature of the reforms, i.e. whether they are expansionary or contractionary and what category they fall in. Their main finding is that business indicators are important for the timing of the reforms with contractionary measures more likely during bad times and expansionary measures less likely. On the other hand, demographic developments dictate the trend of pension reforms but do not affect dynamics in the short-run.

Finally, our paper connects to the literature on fiscal foresight. Ramey (2011) shows the importance of timing for government spending shocks, since news about changes in defense spending might be available to the public in advance of an actual change in spending. Leeper, Walker, and Yang (2013) formally show the problems associated with fiscal foresight, where agents know about a fiscal policy change that is not yet realized and thus is not in the information set of the econometrician, and how it can bias results. In most closely related work to ours, Mertens and Ravn (2012) distinguish between tax shocks in the U.S. based on implementation lags, and show that while unanticipated tax cuts lead to a rise in GDP, pre-announced tax cuts that are implemented with a delay, lead to a short run fall in GDP.

3 NEW MEASURE ON PENSION POLICY CHANGES

We document changes in pension policy for 10 OECD countries - Australia, Belgium, Denmark, Finland, France, Italy, Japan, New Zealand, Spain and the United Kingdom - from 1962 to 2017.
This list includes both countries that have successfully implemented far-reaching pension reforms (such as Belgium) and countries that still face challenges in reducing their pension spending despite repeated efforts with multiple pension reforms (such as Italy).

3.1 Data Source In compiling the data set, we mainly rely on country-specific OECD Economic Surveys (the Surveys thereafter) published at an annual or bi-annual frequency. The Surveys discuss key economic challenges, policy changes that address these challenges, and, more recently, policy recommendations from the OECD to the targeted country.\footnote{For some countries, like Australia and New Zealand, the OECD Surveys were less informative and we relied more heavily on legislative documents as a resource.}

Discussions related to pension policy have been gaining prominence in the Surveys over the years. Figure 2 shows that the average length of the Surveys across countries increased markedly from 80 pages in 1970 to 136 pages in 1991, and plateau at 144 pages in 2010. Importantly, discussions on pension policy have increased at an even faster pace. In 2010 Surveys, the word of ‘pension(s)’ was mentioned over 70 times on average across countries, compared to only 3 times in 1970 and 32 times in 1990.

The format of the Surveys has changed over time. Before 1973, the Surveys provided only general discussions on fiscal policy. Figure 3 shows that a change in pension payments in Belgium was discussed in the context of general economic policy in its 1970 Survey report. From 1973 to 2002, for most countries the Surveys provided chronologies of major economic policy events, including changes in pension policy. Figure 4 illustrates that a major change in early retirement age was passed in Belgium in December 1994 and reported in the economic event calendar in the Survey of 1995. Since 2003, the Surveys have provided in-depth discussions on economic challenges and policy recommendations. Figure 5 displays a policy discussion box in the Survey for Belgium in 2017, which highlighted the key policy measures taken in 2015.

In addition to the Surveys, we use numerous supplemental country-specific documents. For European countries, this includes cross-checking our data set with the NBER series on social security programs and retirement around the world, for instance Fraikin, Jousten, and Lefebvre (2018) for Belgium, Bingley, Gupta, Jorgensen, and Pedersen (2014) for Denmark, Lassila and Valkonen (2002) for Finland, Blanchet, Bozio, Rabate, and Roger (2019) for France, Franco (2002) and Brugiavini and Peracchi (2014) for Italy, Vegas Sánchez, Argimón, Botella, and González (2013)

3.2 Approach We take a narrative approach similar to that of Romer and Romer (2010) and Romer and Romer (2016) for tax and transfer policy changes, and Ramey and Shapiro (1998) and Ramey (2011) for defense spending changes. We extract changes in pension policy by reading through discussions related to subjects such as pensions, retirement, and Social Security in the Surveys for 10 countries between 1962 and 2017. Information along four aspects is collected: 1) policy tools associated with changes in pension policy, whether through changes in payments, coverage, indexation policy, or retirement age; 2) the type of pension changes, whether they made pension programs more or less generous; 3) motivations behind those policy changes, whether they were driven by cyclical, purchasing power, or structural considerations; and 4) implementation lags, which is the time elapsed between when a policy change is initially enacted and when it is fully phased in.

We first document policy tools associated with changes in pension policy. Although the specific tools vary, they can largely be categorized into one of the following four types. 1) Changes in pension coverage, which include changes in the number of service years required for retirement or changes in regulations related to means or assets test. For instance, in 2006, Belgium announced a plan to increase the number of service years required to qualify for early retirement from 25 to 30 years by 2008 and from 30 to 35 years by 2012. And in 1975, Australia abolished its means test for retirees age 70 to 74. 2) Changes in benefit formulas, which include direct changes to pension payments or changes in number of years that form the calculation basis for pension payments. For example, in 1972, pension benefits in Japan were increased from 2,300 to 3,300 Yen per month. 3) Changes in pension payment indexation, which involve moving away from indexing benefits to wages or earnings and toward indexing benefits to prices. For instance, in 1992, the Italian government announced to switch the indexation of pensions from wages to prices. 4) Finally, changes in pension
eligibility age at which workers can retire. For example, in 2005, Finland decided to phase out the individual early retirement pension for workers age 60 to 64 and raise the minimum retirement age for part-time workers. And in 2015, the Denmark government decided to limit the average time of individuals spending in retirement to 14.5 years, and therefore it would adjust the retirement age in response to changes in life expectancy every five years.

We document the type of pension changes, whether they made pension programs more or less generous. In general, it is straightforward to decide on the type of pension changes. For instance, expanding the coverage of old-age pension or lowering the statutory retirement age makes pension program more generous. On that other hand, scaling back the early retirement program makes pension system less generous. However, it is much more challenging to determine the budget impact of pension policy change as the literature typically does for changes in taxes and government spending [see Romer and Romer (2010) and Ramey (2011)]. The Surveys don’t provide consistent estimates on budget impact related to changes in pension policy. More importantly, pension changes can significantly alter people’s behaviors in the medium and even long term, in particular for those who are close to retirement ages, as we will further explore below. The dynamic and endogenous reactions distinguish changes in pension policy from changes in defense spending and, to a less degree, changes in tax policy. Therefore, we follow the early work in the literature [see Ramey and Shapiro (1998)], and construct a pension measure with reform intensity. Take the 2015 Belgium pension reform as an example. As shown in Figure 5, the Belgium government passed a major pension reform including three policy changes: the statutory retirement age will be increased from 65 to 66 years in 2025 and 67 years in 2030; early retirement conditions were made more stringent by increasing the minimum age and number of career years required to qualify; and the complementary pension that was used to retire earlier and to bridge the income gap until being eligible to a full pension was abolished. In our data set, we classify the 2015 Belgium reform as “-3”, as it included three policy changes that made pension system less generous.

Importantly, we identify motivations behind the changes in pension policy. As argued in Romer and Romer (2010) and other papers, it is crucial to identify the motivation behind policy changes when estimating their impact on economy. We classify the motivation behind the pension policy changes under three broad categories. 1) Changes related to purchasing power, which involve policy changes to maintain or improve the purchasing power of retirees, or intended to ensure
living standards of the beneficiaries. For instance, in 1974 the Belgium government decided to link social welfare benefits to changes in the general standard of living in addition to their linkage to price index. In 2000, the rate of pension was increased in Australia as part of a package of measures to compensate for the impact of the introduction of the goods and services tax. 2) Changes driven by cyclical reasons, which are undertaken to stimulate the economy in a recession or in response to the near-term economic conditions. For instance, the Belgium government created three early retirement programs from 1975 to 1978 and expanded these programs in the early 1980s to stimulate economic growth in a recession.³ In 1978, pension payments were postponed in Finland because of increasing government spending. 3) Finally structural reforms, which are undertaken to address long-run issues like fiscal sustainability. For instance, the Belgian government shrank early retirement programs gradually through a sequence of reforms by increasing the minimum age for early retirement from 55 to 63 years old between 1996 and 2019.

Finally, we track implementation delays, which is the time elapsed between when a policy change is initially enacted and when it is fully phased in. Mertens and Ravn (2011) and Mertens and Ravn (2012) highlight the importance of differentiating surprise and anticipated tax changes, as preannounced but not yet implemented tax cuts give rise to contractions in output. Implementation delays in pension policy changes are significantly longer than those documented in tax changes, which can be important for interpreting estimation results.

4  Overview on Pension Policy Changes

This new data set uncovers that changes in pension policy have come in waves: many countries that expanded their pension systems between 1960s and 1980s have scaled them back since the 1990s. Figure 6 shows that the period between 1960s and 1970s was entirely dominated by pension expansions, as countries in our data set passed close to 90 policy changes to expand pension systems by lowering retirement ages, broadening pension coverage, providing more favorable indexation, or raising benefit payments. The turning point arrived in the 1980s, with some countries continuing

³In 1975, the Conventional Early Retirement Pension was introduced, allowing laid-off workers over age 60 to receive an allowance in addition to unemployment benefits. In 1976, the Statutory Early Retirement Pension was enacted and applied to male workers age 60 and female workers age 55 if they were replaced by persons under age 30. Finally, the Special Early Retirement Pension was introduced in 1978 to enable elderly persons out of work for more than a year to take early retirement.
to expand their pension systems while others starting to dial back their pension expansions. The pace of pension retrenchments peaked in the 1990s: together, the countries in our data set adopted 58 policy retrenchment changes from 1990 to 1999, partly driven by European countries forced to meet certain fiscal conditions to join the European Union. More recently, the pace of pension retrenchments has slowed but remains steady.

Focusing on motivations behind those changes in pension policy, we find that pension expansions in early decades were driven by cyclical and purchasing power considerations, while retrenchments since the 1990s have been dominated by structural reforms. As shown in Figure 7, about one third of pension expansions between 1960s and 1980s were motivated by cyclical reasons, as many European countries created and expanded early retirement programs to combat economic recessions and high unemployment during this period. In addition, considerations related to purchasing power and living standards of retirees were also an important motivation behind pension expansions. Japan was a prominent example, as the government increased the old-age pension from 3% of average earnings of workers in 1972 to 10% in 1975. Since the 1990s, pension retrenchments have been almost entirely driven by long-run fiscal sustainability concerns.

Importantly, we find that pension retrenchments often come with significant phase-in periods. In our data set, we have identified 64 pension changes with implementation delays since 1962, out of which over 70 percent are pension retrenchments. Figure 8 shows the length of implementation delays for those policy changes, where each dot represents the delay associated with one change. The delays have a lower bound of one year and an upper bound of 39 years with an average of 10 years. In particular, pension retrenchments, as shown in green dots, are associated with prolonged implementation delays. Pension policy changes in Italy can shed light on the very gradual implementation of reforms. In 1995, the Italian government introduced a major reform that was envisaged to shift from a defined benefit to a defined contribution system. Specifically, old-age pensions would be related to the contributions paid over the whole working life and to retirement age. However, Franco (2002) documents that the change only applied to the contributions paid after 1995 and, therefore, the reform will only be completely phased in by 2032 with an implementation delay of 37 years.

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4 The old-age pension payment was 2,300 yen per month in 1972 and increased to 10,000 yen in 1975, compared to average earnings of workers of 100,000 yen per month at the time (see the OECD Economic Survey of Japan (1972 and 1973)).
We also provide additional details on the incidence of various types of policy types across states of the economy, and Euro Area and non-Euro Area countries in the Appendix. Overall, we find that reforms associated with purchasing power are more likely to occur in slower growth periods. Similarly and intuitively, cyclical reforms, motivated by short-term stabilization concerns, also tend to take place when economic growth slows down. On the other hand, structural reforms, motivated by long-term concerns, are slightly more likely to occur in periods with faster economic growth.

5 Empirical Approach

5.1 Major Structural Pension Reforms

The key to the estimation of the impact of policy shocks on the economy is the identification strategy. We focus on structural pension reforms that are motivated by long-term concerns, rather than cyclical considerations, following the tradition in the narrative literature [see Romer and Romer (2010)]. In addition, we categorize all structural changes to pension policy into two bins: major or marginal reforms. For instance, the Italian government adopted temporary measures to freeze out inflation adjustments for the highest pensions in 1997, which we count as a marginal change to pension policy. In the same package, the government also passed new legislation to speed up the increase in early retirement age, which had a broad impact on old-age pension system and therefore we categorize as a major policy change.

We focus on major structural pension reforms in the baseline empirical analysis and extend to all structural reforms when conducting robustness checks. Figure 9 and 10 show the time series of major structural pension changes without and with implementation lags respectively. For instance, the Japanese government passed four structural policy changes on its pension system: 1) a 5 percent reduction of Employees Pension Insurance (EPI) benefits is implemented; 2) the once-every-5-year wage-indexing of benefits is being eliminated; 3) a new earnings test for EPI pensioners is being introduced for those aged 65 to 69; 4) finally, the minimum age to receive a full EPI benefit will be raised from 60 to 65 over a 12-year period starting in 2013 (2018 for women) and fully phased in by 2025 (2030 for women). Three retrenchment changes that were implemented right after announcements are captured by the “-3” dot in Figure 9 in 2000, while the retrenchment related to retirement age is reflected by the “-1” dot in Figure 10 in 2000 as it will be gradually phased in over time.
In order to test the exogeneity of structural reforms to short-run economic concerns, Table 1 shows the Granger causality test results for structural reforms without and with implementation delays. The regressions include one lag of the pension policy change and the aggregate variable, along with country and year fixed effects. Structural reforms, regardless without or with implementation delays, cannot be predicted by lagged aggregate variables, including labor force participation rate for the age group between 55 and 64, pension spending as share of GDP, unemployment rate, growth rate of real GDP, share of elderly population, CPI inflation, and government deficit as share of GDP.

5.2 Econometric methodology

In order to consider the channel of fiscal foresight, we distinguish structural reforms that are implemented immediately following announcements from those with phase-in periods. The second kind of reforms can be thought of as news shock about reforms to be implemented in the future. The existing literature has highlighted the importance of fiscal foresight channel in the presence of fiscal news, as households respond to news ahead of policy implementation, see Ramey (2011), Mertens and Ravn (2012) and Leeper, Walker, and Yang (2013). As shown earlier, implementation delays associated with structural pension reforms are on average 9 to 10 years in our data set.

We apply the local projection technique proposed in Jorda (2005) to estimate the effects of structural pension reforms on variables of interest. The Jorda method simply requires estimation of a series of regressions for each horizon, \( h \), and for each variable. We consider the following model to capture potential differential effects on macroeconomic variables from reforms implemented without delay and news of reform:

\[
    z_{i,t+h} = \alpha_{i,h} + \gamma_{t,h} + \beta_{n,h} R_{i,t}^{\text{nodelay}} + \beta_{d,h} R_{i,t}^{\text{delay}} + \sum_{j=1}^{J} \delta_{n,h}^{k} R_{i,t-j}^{\text{nodelay}} + \\
    \sum_{j=1}^{J} \delta_{d,h}^{k} R_{i,t-j}^{\text{delay}} + \sum_{j=1}^{J} \theta_{h}^{k} z_{i,t-j} + \varepsilon_{i,t+h}, \text{ for } h = 0, 1, 2, \ldots
\]

where \( i = 1, \ldots N \) denotes the countries under consideration. Here \( z \) is the variable of interest. \( R \) is the pension reform measure that we have created using the narrative approach, with \( R^{\text{nodelay}} \) for reforms without implementation delays and \( R^{\text{delay}} \) for those with delays. Notice that \( \alpha \) is a...
country fixed effect and $\gamma$ is a time fixed effect to control for economic developments that affect all countries in a given year. The coefficient $\beta_h$ gives the response of the variable $z$ at time $t + h$ to the pension reform at time $t$. Thus, one constructs the impulse responses as a sequence of the $\beta_h$'s estimated in a series of separate regressions for each horizon. We also include lags of the pension reform dummy and the variable of interest on the right hand side, where we consider $J = 2$ in our baseline specification. Here $\varepsilon_{i,t+h}$ is an idiosyncratic error term.

6 Impact on Pension Spending and Labor Markets

In this section, we focus on the empirical effects of the pension reforms on public spending on old-age related pensions and on the LFPR of the marginal group between the age of 55 and 64, as structural pension reforms are likely to directly affect the government budget and also people who are close to retirement. We run our regressions from 1980 onwards, given the availability of data on the LFPRs by age group.\footnote{The data source is the OECD Database.} We start the analysis by excluding Italy and Japan, and then extend to include all countries in the alternative cases.

As highlighted in Figure 11, structural reforms, depending on whether they come with phase-in periods or not, can have distinctly different impact on people who are close to retirement. In response to pension retrenchments being implemented immediately (red dashed lines), people close to retirement stay in the work force longer to compensate for the decline in their pensions, as LFPRs for groups between the age of 55 and 59 and also between 55 and 64 rises. On the other hand, in response to news about pension retrenchment in the future (blue solid lines), the marginal group of population close to retirement are more likely to exit the labor market prior to the reform being implemented in order to take advantage of more generous pre-reform pensions. The LFPRs for these groups decline over time, reaching its trough close to 7 years after news of the reform. Notably, the two types of structural reforms have similar impact on young and mid-aged population between age 20 and 49 years old. The significant decline in the LFPR of the elderly population transmits to the aggregate LFPR, which is insignificant in the short run and turns negative after year 6.

Through this fiscal foresight channel, structural reforms with implementation delays can have
unintended consequences for government budget. When pension retrenchments are implemented immediately, less generous pension benefits in combination with a higher LFPR for the elderly population, leads to a decline in the cumulative old-age pension spending. On the other hand, as part of the marginal group exit from the labor market in response to pension retrenchments that come with phase-in periods, government spending on old age pensions increases, rather than decreases, over the medium run in response to pension reforms with implementation delays.

In the following sections, we explore the robustness of the distinct impact of structural reforms with and without implementation delays on the relevant labor market variables and government pension spending.

6.1 Alternative set of countries

6.1.1 Including Italy and Japan: We first show that our key results are robust when including Italy in the regressions. In the baseline case we excluded Italy, as the country has had repeated and sometimes failed structural reforms since the 1990s, which raises credibility issues. For instance, the 2011 structural reform was enacted at the height of the debt crisis and constituted of major policy changes such as updating the calculation of benefits, raising the retirement age, and linking the age adjustment to increase in life expectancy. Many of those changes, however, were rolled back by the newly elected populist government in 2019, a major setback in pension retrenchments in Italy. The top panel of Figure 12, however, shows that our empirical results are robust to the inclusion of Italy in the dataset. Notably, the LFPR of the marginal group between age 55 and 64 rises in responses to reforms enacted without delay and falls when there are implementation delays. The fall is more dramatic close to 7-8 years after the reform is announced.

Next, we also show that the key results remain unchanged when including Japan. In the baseline case, we exclude Japan because it is an outlier in our sample in many different ways. For instance while the average LFPR for ages between 55 and 64 lies within [31.1, 62.7] for our baseline sample, it is 65.8 percent in Japan given the aging population. In addition, Japan has a very large share of...
elderly population and has very high average saving rate relative to other countries in the sample. Once we include Japan to our panel of countries, as shown in the second panel of Figure 12, we broadly get the same results. The responses of the LFPRs for ages between 55 and 64 are, however, statistically significantly different for only a few years. Given the overall higher participation rates of older workers, population between 55-64 in Japan are less likely to be affected by policy changes. Note also that with the addition of Japan, the response of pension spending, particularly in the case of no delays (red dashed) becomes not statistically significant.

6.1.2 Considering European countries only: Our sample also considers Australia and New Zealand which do not share the same fiscal stainability concerns related to aging populations as most other countries in the sample. Thus, we also conduct the analysis with European countries only, which means including Italy in the sample and excluding Australia and New Zealand in addition to Japan. The bottom panel of Figure 12 shows that the distinct responses of LFPRs for the marginal groups are even more pronounced, in particularly during the short and medium term. The response of pension spending for reforms enacted without delay, however, becomes statistically insignificant across most horizons.

6.2 Alternative specification with additional control variables In this section, we consider alternative specifications with additional control variables. The model looks as follows:

\[ z_{i,t+h} = \alpha_{i,h} + \gamma_{t,h} + \beta_{n,h} R_{i,t}^{\text{model delay}} + \beta_{d,h} R_{i,t}^{\text{delay}} + \sum_{j=1}^{J} \delta_{n,h}^{k} R_{i,t-j}^{\text{model delay}} + \sum_{j=1}^{J} \delta_{d,h}^{k} R_{i,t-j}^{\text{delay}} \]

\[ + \sum_{j=1}^{J} \theta_{k}^{h} z_{i,t-j} + y_{i,t-1} + \varepsilon_{i,t+h}, \text{ for } h = 0, 1, 2, ... \]

(6.1)

where \( y \) is a vector of control variables.

6.2.1 Accounting for changing demographics In order to account for the fact that many of these economies are facing aging population, we first consider an alternative specification with demographic control variables such as life expectancy and the share of elderly population in the total population. The top panel of Figure 13 shows that our results for the LFPR of marginal group between the age of 55 and 64 are robust to the inclusion of these demographic controls. Notably, the
differences in the LFPR of ages between 55 and 64 across reforms implemented with and without delays are now statistically significantly different across more horizons, and the differences are much starker.7

6.2.2 Accounting for coincidence of other fiscal consolidation measures  One concern could be that the responses to our pension reform measures are confounded by other fiscal austerity measures undertaken during the same period. We document that 1980s onwards has witnessed a large share of pension retrenchments actions. During these years, many countries have also conducted other fiscal austerity measures, motivated by concerns over sustained budget deficits. Guajardo, Leigh, and Pescatori (2014) present the budgetary impact of fiscal consolidations, in terms of both changes in expenditures and revenues, which are not motivated by short-term or cyclical concerns. Since their dataset considers all of the countries in our analysis, with the exception of New Zealand, we first check whether pension reforms are always accompanied by other fiscal consolidation measures. A raw analysis suggests that there is a great deal of heterogeneity across countries. For the most part, the correlation between structural pension reforms and fiscal consolidations plans is low. Some countries have no overlap, such as Denmark and France. However, for some countries, like Belgium and Italy the correlation is relatively high, as high as 0.5.8

As a robustness check, we now include the fiscal consolidation shock from Guajardo, Leigh, and Pescatori (2014) as a control variable in our analysis.9 The second panel of Figure 13 shows that our baseline results for LFPR of our marginal workers and pension spending to pension reforms implemented with and without delays are preserved. In fact, the responses are now statistical significantly different across more horizons.

The last panel of Figure 13 shows that our results are robust to the inclusion of both sets of controls, demographic and fiscal consolidation, simultaneously.

6.3 Alternative Specification of the Pension Reform Shock  As mentioned above, in order to have improved identification and thus inference of our pension reforms, we make two basic

7When we consider these additional controls and all countries, including Italy and Japan, we see similar effects that the results are robust and overall statistical significance of our results are improved.
8This is true for structural reforms all grouped together and also if we separately consider ones with and without lags. Note that in our baseline analysis, we are already excluding Italy.
9We consider the lag of the fiscal consolidation shock, but results are unaffected if we put in the contemporaneous value or additional lags of this variable as controls.
assumptions. Firstly, as discussed in Section 3.2, we scale or assign intensity to structural reforms in order to account for the fact that some reforms are more comprehensive, with multiple policy changes. Secondly, as discussed in Section 5.1, we only consider major structural reforms, ignoring marginal ones. In this section, we relax them to see how these assumptions, driven partially by our judgement, affect our results.

Firstly, we assign all reforms as being in the following set \{-1, +1\}, so that we no longer assign intensity and treat all years with major reforms similarly, regardless of whether there were multi-dimensional policy reforms or one policy change by itself. The top panel of Figure 14 shows that overall our results are robust. The responses of pension spending and the LFPR of 55-64 years old have slightly larger confidence bands in case of reforms implemented with delay (blue solid lines).

Secondly, we consider all reforms that are motivated by long-term concerns, both major and marginal ones. The responses of the labor market variables and pension spending to these reforms are shown in the bottom panel of Figure 14. Note that while the broad results look the same, confidence bands are much larger, since minor policy changes are given equal weight as major ones. Notably, it is more difficult to say something conclusively about the statistical significance of LFPR of marginal groups across implementation lags.

6.4 Case Studies In this section, we provide case studies to further explore the qualitative and quantitative impact of structural pension reform. In particular, the waves of expansion and contraction in early retirement programs in the Continental Europe since the 1970s have provided a good lab for us to investigate the impact of structural changes in pension policy. In the late 1970s and early 1980s, many European countries created and expanded early retirement programs to combat economic recessions and high unemployment, which significantly increased pension liabilities. Despite tremendous political challenges, those programs have been rolled back over the years and, in some countries like Finland, have been completely phased out. We will focus on three related cases below.

6.4.1 Finland: Budget Impact of Fiscal Foresight The comparison of two pension reforms in 1994 and 2000 illustrates that fiscal foresight plays a crucial role in determining the impact of pension retrenchments on government budgets. The Finnish government decided to raise the minimum age for full-time early retirement from 55 to 58 years old in 1994, and from 58 to 60 years
old in 2000. The reform in 1994 was implemented immediately, while the 2000 reform only started to bite in 2003. Figure 15 compares the accumulative changes in early retirement spending following the two legislative actions. We denote the year when pension reform bills were passed as year $T$, which is year 1994 and year 2000 respectively for the two reforms, and normalize the spending on early retirement programs as a share of GDP to zero in that year. The blue line shows that in the 1994 reform without implementation delay, the early retirement spending (as a share of GDP) declined in the following two years. In the case of the 2000 reform (the green line), however, the early retirement spending initially increased and only started to decline after the pension retrenchment was implemented in 2003. The contrast is consistent with our empirical finding: pension retrenchment reforms that come with significant delays can raise government spending on pensions prior to implementation.

6.4.2 Denmark and France: Quantitative Impact on LFPR

The early transitional retirement scheme in Denmark, which was active only for a short period, highlights the sizeable impact of pension reforms on the LFPR of workers close to retirement. The program, which applied to long-term unemployed (12 months or more) aged between 50 and 59 years old, was introduced in 1992 and expanded in 1994. Entrance to the scheme, however, was closed in early 1996. Figure 16 shows that the early retirement spending increased from 0.6 percent of GDP in 1992 to more than 1 percent in 1996. The rise was particularly sharp following the expansion in 1994. The LFPR for the population between 50 and 59 years old, on the other hand, declined from 81 percent in 1992 to 72 percent in 1996. The early retirement spending accounted for 9 percent of total pension spending in 1992, and the share increased to 15 percent in 1996. Therefore, the elasticity between the change in LFPR of elderly workers and the change in pension spending is 1.5, implying that a 1 percentage point accumulative change of pension spending is associated with a 1.5 percent change in LFPR of the marginal group. The large responsiveness points to the effectiveness of targeted fiscal policy.

The estimate from early retirement program in France leads to an elasticity of similar magnitude. In 1981, the French government extended the income guarantee for early retirement, and also provided incentive for firms to introduce early retirement through solidarity contracts. Figure 17 shows that the government spending on “incentive to withdraw from labor market” increased from
0.4 percent of GDP to 1.3 percent between 1981 and 1985, which was equivalent to a change of 5 percentage points in terms of pension spending for this period. The LFPR for the group between 55 and 59 years old declined by 8 percentage points from 62.8 to 54.8 percent during the same period, suggesting an elasticity of 1.6 between the change in LFPR for elderly workers and the change in pension spending.

7 IMPACT ON MACROECONOMIC AGGREGATE VARIABLES

Turning to other macroeconomic aggregate variables, we find that both immediate and delayed pension retrenchments lead to higher aggregate savings rate and a contraction in household consumption in the short run. The impact on GDP and investment, on the other hand, seems to hinge on the credibility of pension reforms.

We start with the baseline case by excluding Italy and Japan. Figure 18 shows the responses of GDP, consumption, investment, and savings rate, in addition to the variables considered in section 6. Savings rates rise in response to a pension retrenchment, regardless of whether it is implemented immediately or with a phase-in period. This is likely due to negative wealth effects, as pension benefits becomes less generous. Consistent with that, on impact and at shorter horizons, cumulative consumption is crowded out and falls in both cases. Investment has a statistically insignificant response across most horizons for both cases, besides an initial decline to a negative pension shock without delay (red dashed line). GDP falls on impact, and the cumulative change turns insignificant over time and even mildly expansionary in the very long horizon.

When expanding the baseline case to include Italy and Japan, the estimates on savings rate and consumption remain largely unchanged, while the responses from GDP and investment shift somewhat, as shown in Figure 19. Regardless of whether it is implemented immediately or with a phase-in period, savings rate rise in response to a pension retrenchment, while consumption declines on impact before turning insignificant. Investment, on the other hand, turns negative over the medium term in the case of delayed pension retrenchment, leading to a mild contraction in GDP on impact and a statistically insignificant cumulative change over time.

\[ z_{it+h} = x_{it+h} - x_{it}, \]

where \( x \) is the logged variable, and therefore we consider the cumulative effect on the growth of GDP, consumption, and pension spending. The lagged log levels of these variables enter the LHS of our model as controls.
GDP. Compared to Figure 18, the distinctly different response in investment is probably associated with repeated and sometimes failed structural reforms in Italy, which raises credibility concerns.

8 Conclusion

By tracking pension policy for 10 OECD countries over the past several decades, we document that changes in pension policy come in waves, with a rapid expansion of pension systems between 1960s and 80s followed by a wave of retrenchments since 1990s. Structural pension reforms, which are motivated by long-run fiscal sustainability concerns, often come with implementation delays. We find that people close to retirement have distinctly different responses to pension retrenchments without delays from those with implementation delays. This channel of fiscal foresight gives rise to unintended consequences on pension spending.
REFERENCES


Table 1: Granger causality tests. This table shows the p-values associated with the Granger causality tests where a high p-value implies that it is not possible to reject the hypothesis that the aggregate variable does not predict the pension reform measure. Each entry shows the result of regressing our pension reform measure (of a given type) on one lag of the reform measure and the aggregate variable, along with country and year fixed effects. The aggregate variables are the labor force participation rate for the age group between 55 and 64, pension spending as share of GDP, unemployment rate, growth rate of real GDP, share of elderly population, CPI inflation, and government deficit as share of GDP. Note, also that while real GDP and CPI data spans our full sample of 1960-2017, the regressions for the rest macro variables are run on an unbalanced panel based on earliest data availability for each country.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Reform without lag</th>
<th>Reform with lag</th>
</tr>
</thead>
<tbody>
<tr>
<td>LFPR (55-64)</td>
<td>0.92</td>
<td>0.76</td>
</tr>
<tr>
<td>Pension spending/GDP</td>
<td>0.48</td>
<td>0.29</td>
</tr>
<tr>
<td>GDP growth</td>
<td>0.55</td>
<td>0.80</td>
</tr>
<tr>
<td>Unemployment</td>
<td>0.70</td>
<td>0.56</td>
</tr>
<tr>
<td>Elderly population</td>
<td>0.77</td>
<td>0.27</td>
</tr>
<tr>
<td>Inflation</td>
<td>0.46</td>
<td>0.35</td>
</tr>
<tr>
<td>Deficit/GDP</td>
<td>0.38</td>
<td>0.22</td>
</tr>
</tbody>
</table>
Figure 1: Public spending on pensions has been rising across countries, even though the pace varies.

Figure 2: Discussion related to pension policy has been gaining prominence in the OECD Economic Surveys, as the occurrence of “Pension” has increased at a faster pace than the number of total pages over time.
Economic policies seem to have had some stabilizing effect on demand during the phase of recovery of economic expansion in 1968, and perhaps during last year’s boom. In the former year, there had been a certain conflict between internal and external aims, with the expansionary policies adopted to support domestic demand contributing to the heavy, largely speculative, capital outflows. The conflict was removed last year, when internal as well as external considerations called for a shift to more restrictive policies. It is not possible to know precisely the role played by policy action, as distinct from autonomous factors, in strengthening demand during 1968 and containing last year’s boom, and the stabilizing effect of individual policies is difficult to judge. The policy mix relied on monetary and budgetary instruments in both periods, but with the adjustments in response to the changing circumstances affected more promptly in the monetary field than in that of the budget.

The expansionary policy phase had started with an active easing of monetary conditions from early in 1967 on. Early in 1968, then this had not yet succeeded in coping with the slack in fixed investment, and external influences made it technically difficult to pursue a policy of active monetary easing, expansionary fiscal action was taken. For this, the authorities relied on measures, such as public works, aid for dwellings and increased pension payments, which could be expected to involve a relatively small import leakage and quite strong employment and income effects. Combined with the continued easy posture of monetary policy, this was followed later in the year by the beginning of a revival of fixed investment. It is true, of course, that the revival was importantly influenced by autonomous factors as well, in particular, the continued buoyancy of exports, rising capacity utilization in industry and a marked improvement of business profit.
Figure 4: The Surveys provided chronologies of major economic policy events between 1973 and 2002. Example: the Survey report for Belgium (1995)

Annex

Calendar of main economic events

BELGIUM

1994

January

The standard VAT rate is increased from 19.5 per cent to 20.5 per cent.
The National Bank of Belgium cuts its central rate in three stages to 6.85 per cent.
Financial intermediaries approved by one EU country are allowed to become members of the Belgian Futures and Options Exchange.

February

The National Bank of Belgium cuts its central rate in three stages to 6.4 per cent.

March

The social partners in the Central Economic Council fail to reach unanimous conclusions about Belgium’s competitiveness. The trade unions conclude that the statistical information is insufficient to assess the competitive position, while employers’ organisations argue that competitiveness has only been stabilised by the measures in the global plan and ask for further measures.

The National Bank of Belgium cuts its central rate three times to 6.05 per cent.

April

Employers’ contributions on low salaries have been reduced, resulting in a 10 per cent reduction in labour costs for low-skilled workers.
The National Bank of Belgium cuts its central rate in four stages to 5.6 per cent.

May

The National Bank of Belgium cuts its central rate in four stages to 5.25 per cent.

June

The Finance Minister announces the introduction of a new clearing system enabling private retail investors to hold, in a special account, government Treasury bills and linear bonds (OLOs), a facility previously available only to banks and institutional investors.
The National Bank of Belgium cuts its central rate in five stages to 4.95 per cent.

July

The Government presents the 1995 Budget. Federal government spending is projected to decline by 1.6 per cent in real terms. The Budget aims to reduce the general government deficit to 4.3 per cent of GDP, in accordance with the Convergence Plan.
The federal government reaches agreement with the governments of communities and regions on the targets in the convergence plan.
The National Bank of Belgium cuts its central rate twice to 4.85 per cent.

September

The Government suggests an additional budgetary norm, requiring the primary surplus to remain above 6 per cent of GDP in the period beyond 1996.

December

An interprofessional agreement (accord interprofessionnel) is concluded for the period 1995-96. Social charges are reduced for enterprises which create additional jobs by reducing working hours and for the recruitment of long-term unemployed or measures of minimum benefit. The age limit for early retirement is lowered to 55, subject to special conditions, for two years.
Figure 5: The Surveys have been providing in-depth discussions on economic challenges and policy recommendations since 2002. Example: the Survey for Belgium (2017)

Box 3. Main elements of the 2015 pension reform

A number of measures were taken in 2015 to increase the effective average age of retirement from the labour market, thereby improving the sustainability of the pension system.

- The statutory retirement age will be increased from 65 to 66 years in 2025 and to 67 years in 2030.
- Early retirement conditions will be made more stringent.

- The minimum age and number of career years required to qualify for early retirement will progressively increase: starting from 62 years and 40 years respectively in 2016, they will increase to 62.5 and 41 years in 2017, then to 63 and 41 years in 2018 and finally to 63 and 42 years in 2019.

- Exceptions for long careers will also be tightened. The required career length to retire at 60 (61) will increase from 42 (41) years in 2016 to 43 (42) years in 2017 and 44 (43) years in 2019.

- In the civil servants scheme, the years of studies taken into account in the aforementioned career condition for early retirement will be progressively phased out as from 2016 (by steps of 4 to 6 months/year).

The terms for pre-pension benefits (unemployment benefits with employer top-up) have been made more stringent:

- The minimum age has been increased from 60 years to 62 years in 2015, subject to transitional arrangements.
- The age limit for pre-pension benefits for loss-making and restructuring companies is to increase from 55 years in 2015 to arrive at 60 years in 2020.
- The minimum age for pre-pension benefits after very long careers (40 years) has been increased from 56 years to 58 years in 2015.
- The minimum age for pre-pension benefits in case of night and shift work or incapacity to work in the building sector has been increased from 56 years to 58 years in 2015 and will be raised to 60 years on a date to be set by the National Labour Council.
- The minimum age for pre-pension benefits in case of arduous jobs will be raised to 60 years on a date to be set by the National Labour Council.
Figure 6: Changes in pension policy have come in waves with expansions to pension systems between 1960s-80s following by retrenchments since the 1990s. Each bar shows the number of policy changes for each decade. Blue bars represent policy changes that made pension scheme more generous, while green bars show pension retrenchments that were adopted to scale back pension schemes.
Figure 7: Motivations associated with pension policy changes. Expansions between 1960s and 1970s were largely driven by cyclical and purchasing power considerations, while recent retrenchments since the 1990s have been dominated by structural reforms.

Figure 8: Pension implementation delays (measured in years). Each dot represents the implementation delay associated with one policy change. Green dots are associated with pension retrenchments, while blue dots are for pension expansions.
Figure 9: Measure on major structural pension reforms without implementation delays. Each dot represents one observation.

Figure 10: Measure on major structural pension reforms with implementation delays. Each dot represents one observation.
Figure 11: Responses of labor market and pension spending to structural pension retrenchments: exclude Japan and Italy and use data between 1980 and 2017. The blue solid lines show the responses to reforms implemented with delays and red dashed lines correspond to reforms implemented without delays. The grey bands show one standard deviation confidence bands.
Figure 12: Robustness to set of countries: the blue solid lines show the responses to reforms implemented with delays and red dashed lines correspond to reforms implemented without delays. The grey bands show one standard deviation confidence bands

(a) Include Italy

(b) Include Italy and Japan

(c) Only Euro area countries
Figure 13: Robustness to alternative specifications with additional control variables: the blue solid lines show the responses to reforms implemented with delays and red dashed lines correspond to reforms implemented without delays. The grey bands show one standard deviation confidence bands

(a) Demographic control variables

(b) Fiscal consolidation control variables

(c) Both sets of control variables
Figure 14: Robustness to alternative definitions of the pension reform measure: the blue solid lines show the responses to reforms implemented with delays and red dashed lines correspond to reforms implemented without delays. The grey bands show one standard deviation confidence bands.

(a) Excluding intensity

(b) Considering major and minor pension policy changes
Figure 15: Comparison of changes in early retirement spending during two Finnish pension reforms in 1994 and 2000 respectively. We denote year when pension reform bills were passed as year $T$ and normalize the spending on early retirement programs to zero in that year. The blue line shows the cumulative changes in early retirement spending (as a share of GDP) following the 1994 reform, while the green line shows the same changes during the 2000 reform. The 1994 reform was implemented immediately while the 2000 reform was delayed until 2003 (labelled as dashed line).

Figure 16: Impact of early transitional retirement scheme on the LFPR for elderly population in Denmark. The early program was introduced in 1992 and expanded in 1994, with entrance to the scheme shutting off in 1996. The blue line shows the LFPR for population between age 50 and 59 years, and the green line shows the early retirement spending as share of GDP.
Figure 17: Impact of early retirement program on the LFPR for elderly population in France. Incentives to encourage early retirement were provided in 1981. The blue line shows the LFPR for population between age 55 and 59 years, and the green line shows the early retirement spending as share of GDP.

Figure 18: Responses of macroeconomic aggregate variables to structural pension retrenchments: exclude Japan and Italy and use data between 1980 and 2017. The blue solid lines show the responses to reforms implemented with delays and red dashed lines correspond to reforms implemented without delays. The grey bands show one standard deviation confidence bands.
Figure 19: Responses of macroeconomic aggregate variables to structural pension retrenchments: robustness checks. The blue solid lines show the responses to reforms implemented with delays and red dashed lines correspond to reforms implemented without delays. The grey bands show one standard deviation confidence bands.

(a) Include Italy

(b) Include both Italy and Japan
### A Distribution of Various Types of Reforms

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<thead>
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<th></th>
<th>Faster growth</th>
<th>Slower growth</th>
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<td>45.6</td>
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Table 2: Distribution of pension reforms across faster vs. slower growth periods (in percent of each type of reform). Faster (Slower) growth periods are periods where real GDP growth exceeded (was below) the sample average growth rate.

<table>
<thead>
<tr>
<th></th>
<th>Euro Area countries</th>
<th>non-Euro Area countries</th>
<th>Average reforms per EA country</th>
<th>Average reforms per non-EA country</th>
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</thead>
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<tr>
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<td>22.5</td>
<td>9.7</td>
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<tr>
<td>Cyclical</td>
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<td>15.3</td>
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<td>5.1</td>
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<td>17.5</td>
<td>10.3</td>
<td>5.8</td>
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<tr>
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<td>68.7</td>
<td>31.3</td>
<td>8.6</td>
<td>10.4</td>
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<td>11.2</td>
<td>3.3</td>
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Table 3: Distribution of number of pension reforms across EA and non-EA countries (in percent of each type of reform). EA countries include Belgium, Denmark, Finland, France, Italy, Spain and UK, and non-EA countries include Australia, Japan and New Zealand.
Figure 20: Pension spending to GDP ratio across time for countries in our sample.
Figure 21: Various country characteristics for our sample. Note that the averages are over the sample period 1980-2017.