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**VOTING IN THE AFTERMATH OF A PENSION REFORM: THE  
ROLE OF ECONOMIC-FINANCIAL LITERACY**

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# Voting in the aftermath of a pension reform: the role of economic-financial literacy

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## Abstract

Economic reforms affecting people's lives are generally quite unpopular and may imply an electoral cost. This can derive, among other things, from lack of understanding of the basic elements of reforms. Our paper shows that the electoral cost of a pension reform is significantly lower in countries where the level of economic-financial literacy is higher. The evidence from data on legislative elections held between 1990 and 2010 in 21 advanced countries is robust when we control for macro-economic conditions, demographic factors, and characteristics of the political system. Interestingly, these findings are not robust when we use less specific indicators of human capital – such as general schooling - supporting the view that economic-financial knowledge has distinctive features that may help reduce the electoral cost of reforms having a relevant impact on the life cycle of individuals.

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## 1. Introduction

Reforms are meant not only to change laws but also, and more importantly, to change people's behavior, and their effectiveness crucially depends on the ability of citizens, i.e. public opinion, to recognize the necessity of reforms, their general design and their "sense of direction". Without this basic understanding, reforms wither (Fornero, 2013 and 2015). The electorate's ability to understand essential economic concepts may also be a relevant element for the evaluation of the "electoral costs" of economic reforms that typically require sacrifices today in expectation of benefits tomorrow. Reforms are often viewed as difficult to implement because the burden they impose on citizens may make the government unpopular, independently on the merits of its goals. Jean-Claude Juncker, the present President of the European Commission, expressed the concern in a much quoted aphorism: "We all know what to do, but we don't know how to get re-elected once we have done it" (The Economist, March 15, 2007).

In this paper, we focus on major restructuring of pension systems that took place in advanced countries in the past decades, and study whether the probability of a government to be confirmed into office is associated with the signing into law of a pension reform in the previous legislature, and to indicators of the degree of basic economic and financial knowledge among the population. Research on the association, in advanced countries, between economic reforms and electoral outcomes does not decisively support the view that a "political toll" exists. For instance, Alesina *et al.* (2013) find no evidence of a clear relation between large fiscal adjustments and the probability of a government to be re-elected in OECD countries. Buti *et al.* (2010), who analyze the impact of deregulation in five policy areas using the database on reforms developed by Duval (2008), show that re-election of the incumbent government is not affected by reforms, when using a synthetic index of reformist attitude in all policy areas, and find mixed results when they consider different types of reforms: the association is mildly positive for tax wedge and unemployment benefits cuts, and mildly negative for reforms of employment protection and retirement schemes.

Related works study the reasons why it is difficult for a government to carry out economic reforms and analyze the conditions under which policy changes are most likely to occur. Alesina *et al.* (2006) use a "war of attrition" model - whereby the political conflict between two generic groups in the society delays fiscal stabilization after a negative permanent shock to the economy - to show that reforms whose target is the stabilization of large budgetary deficits or inflation are more likely to occur in times of economic crisis, after the appointment of a new government, and when the government is stronger. Prati *et al.* (2013) study reforms of real and financial markets

and show that there is a positive, albeit very heterogeneous across countries, association between reforms and growth. Bonfiglioli and Gancia (2016) study the association between deregulation of financial and real markets and economic uncertainty and show a positive correlation between stock market volatility and structural reforms.

In this work, we focus on the electoral cost of reforms that introduce structural modifications in people's economic life cycle and that are likely to receive prolonged front page media attention, as it is arguably the case for major changes to the pension system or to the labor market. We concentrate specifically on a set of policy changes that represent a key public policy issue in advanced countries, and considers "major" reforms to the pension system, collecting information on those laws that are universalistic in their scope and that, according to international organizations such as the Organisation for Economic Co-operation and Development (OECD), the International Monetary Fund (IMF), and the World Bank (WB), are targeted at improving financial sustainability by reducing future pension spending without putting at risk the adequacy of retirement incomes.

We find no evidence, as in Alesina *et al.* (2013), of a clear relationship between reforms and re-elections *per se*. Things change, however, when we take into account the population's level of basic economic and financial knowledge: the electoral cost of a pension system reform appears indeed to be significantly lower in countries where the level of economic and financial knowledge among the population is higher. We also consider other indicators of human capital, and test their role as explanatory variables, showing that economic and financial knowledge has distinctive features that more general dimensions of education, such as school attainment, do not capture.

Our argument that the electoral cost of reforms requiring specific skills in order to be correctly understood and assessed (even if only at a very basic level) depends on the general understanding of their economic content thus finds support in the data. We contribute to the growing literature on the importance of economic and financial knowledge to people's decision-making. Recent studies by, e.g., Bucher-Koenen and Lusardi (2011), Lusardi and Mitchell (2007, 2014), Fornero and Monticone (2011), Van Rooij *et al.* (2011), show that economic and financial literacy helps explain people's ability to accumulate and manage wealth and build retirement plans. Poor financial literacy is also associated to a lack of portfolio diversification in country studies (Guiso and Jappelli, 2008) as well as across countries (Jappelli, 2000; Giofré 2017). And people's ability to take advantage of new investment opportunities, measured by economic literacy, may help reduce inequality across countries and over time (Lo Prete, 2013).

Of course, economic-financial literacy is not the only ingredient necessary to enact successful reforms, but it appears to be a relevant one in our empirical models, where we control for macroeconomic conditions, characteristics of the political system, political and demographic factors.

The contribution of our work is thus twofold. We contribute both to the studies on the association between reforms and re-election in advanced countries, and to the studies that emphasize the role of economic and financial knowledge to people understanding of economic issues that affect their daily decisions. In addition, we propose a qualitative taxonomy of pension reforms that allows for cross-country comparisons.

The paper is organized as follows. We define the variables we use in the empirical analysis in Section 2. We provide some descriptive evidence and present the empirical strategy in Section 3. The main results and a set of robustness checks are discussed in Section 4. Concluding remarks are to be found in Section 5.

## **2. Data**

Our dataset includes information on parliamentary elections held between 1990 and 2010. We collected data on electoral outcomes, pension reforms, education, macroeconomic, demographic, and political factors in 21 OECD countries, namely: Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Japan, Netherlands, Norway, Poland, Portugal, Slovak Republic, Spain, Sweden, and United Kingdom.

*Re-election.* We use two definitions of re-elections. According to the first one, a government is re-elected if the incumbent head of government is still leading the country's government after the elections. The second one considers whether the newly appointed head of the government belongs to the same party as her predecessor, to account for the possibility that the same party is still in a position to appoint the head of government in the current legislature. Both these variables take value one if the government is re-elected, and zero if it is not.

*Pension reforms.* We build our pension reform variable following an *ex ante* approach. We consider whether a “fundamental” (structural) pension reform was introduced by the incumbent government. More specifically, we define “major” a pension reform that satisfies both the following criteria:

- (a) introduces a structural change that - according to valuations of the international institutions (such as the OECD, the WB, or the IMF) – has an impact in terms of financial sustainability and/or income adequacy; and

(b) has a broad scope, that is, it affects the generality of workers and not only specific categories, including reforms which aim at greater integration of public and private pillars of retirement systems.

The resulting reform variable takes value one if a major change in the pension system occurred during the previous legislature, and zero otherwise (a full list and description of reform events is available in the Online Appendix to this paper).

Our definition has the advantage of ruling out minor changes to formulae and other technical features characterizing the pension rules (the *so-called* “parametric” reforms<sup>1</sup>) that are not central to the pension system and that, as it is reasonable to expect, are less likely to receive widespread media coverage and voters’ attention. A similar attempt to distinguish between “marginal” and “structural” pension reforms was made by Fondazione Rodolfo De Benedetti and IZA on the basis of a scope criterion – namely they considered changes in the generosity of public pension systems that modify the monetary amount of pensions or eligibility criteria for the generality of workers. We construct upon their effort by taking into account also the sustainability and adequacy content of the reforms under analysis, and by enlarging both the country and the period samples.

An alternative approach to the definition of the reform variable would be to consider *ex post* measures of the impact of a policy change on the economy. It is, however, difficult to find statistics on changes such as the reduction in households’ pension wealth (i.e. implicit public debt, for a pay-as-you-go system) resulting from a reform. For instance, in Duvall (2008)’s study on the role of macroeconomic policy in fostering structural reforms in labour and product markets, the author built an index of major reforms in old-age pension schemes by considering one of the few data series available for cross-country comparisons. He used an average of OECD measures of implicit tax rates on continuing work, and defined as “major” a change in the resulting indicator that was greater than two standard deviations of its annual change over all the observations considered in the study. This methodology allowed to identify as “major” a very limited number of reform events, and, when used in Buti *et al.* (2010) to assess the association between reforms and re-elections, constrained the pension reform to have an electoral cost only

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<sup>1</sup> Our taxonomy does not entirely correspond to the usual distinction between “structural” and “parametric” reforms, as some parametric reforms have a profound impact on sustainability/adequacy and may thus be considered as “major”.

after it became effective - which could be many years after its enactment depending on the length of the phasing in.<sup>2</sup>

We overlook such admittedly difficult, albeit important, assessments because of the extreme complexity in arriving at clear cut definitions, and focus on whether voting behavior is directly affected by the occurrence of a pension reform. In doing so we concentrate mainly on people's perceptions of the net costs (benefits) of a reform instead of relying on effective changes, due to the reform, in money's worth measures of pension programs (such as the replacement ratios, the internal rate of returns and the net worth).

*Education.* There are several dimensions of human capital accumulation which may affect people's understanding of public policies. The ability to understand basic economic concepts about individual financial decisions and the functioning of a modern economy is generally referred to as financial literacy (FL) or, more comprehensively, as economic-financial literacy (EFL). In our case, we refer to the latter, although not directly measured, because we cannot rely on the more recent direct measures, through surveys, of the level of financial literacy among the population. As a measure of EFL we use an indicator that allows for cross-country comparisons, the measure of "economic literacy among the population" compiled by the IMD World Competitiveness Yearbook. This indicator is built on the basis of interviews to senior representatives of the national business community who are asked to evaluate the level of EFL among the population on a 1-10 scale. Of course, an indicator obtained from indirect survey of interviews may convey subjective biases. This measure has, however, the notable advantage to be available for a large number of countries; moreover, our confidence in its information content is fostered by the observation that, as discussed in Section 4, the measure is correlated at significant levels with other indicators of people's educational achievements.

Unfortunately, we cannot exploit information on financial literacy collected by the Programme on International Student Assessment (PISA) of the OECD, because its data collection covers only recent years that are out of our reference period. Instead, we use PISA data on the level of "mathematical literacy", which are based on the assessment of mathematical performance of 15 years old scholars. This score aims to measure the level of skills that should enable people to make well-founded decisions in daily issues involving mathematics, as it could be the case for the evaluation of a pension reform. Finally, we consider more generic indicators of human

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<sup>2</sup> Duvall (2008) classifies only eight changes as major reforms to retirement schemes in the 21 OECD countries over the 1985-2003 period he considers. Besides the restrictive criterion applied, the timing of such changes is related to the enactment of specific measures that might have been enforced several years after the reform package they belong to was voted into law and placed before the people in polling stations.

capital: secondary and tertiary school attainment, as measured by Barro and Lee (2013), which account for the percentage of people who achieved a secondary or a tertiary school degree, respectively.

*Control variables.* The probability of a government to be re-elected may depend on many factors that are not directly related to the reform process or to economic-financial literacy.

First, we control for macroeconomic conditions and for demographic factors. One may expect people living in countries that experience periods of higher economic growth, expansionary fiscal policies, and lower inflation, to be keener of re-electing the incumbent government. To control for the spurious effects that may derive from the presence of these confounding factors, we include a measure of the level of economic activity in the years before the elections, the output gap to GDP ratio, and we account for changes in fiscal policy and price level dynamics by controlling for the change in the primary cyclically adjusted balance and for yearly changes in inflation, respectively. The age structure of the voting population may also be relevant to electoral outcomes in the aftermath of a pension reform. Since major changes to the pension system are likely to affect different cohorts differently, we include as a proxy for the age of the median voter the “median age” of the total population.<sup>3</sup>

We include information of the main aspects of the political system and electoral rules, using data drawn from the Database of Political Institutions (DPI) by the World Bank (see Beck *et al.*, 2001, and Cruz *et al.*, 2016). Following previous studies on the determinants of re-election (Brender and Drazen, 2008; Buti *et al.*, 2010), we consider some characteristics of the political system as the presence of a parliamentary *versus* presidential system of government, proportional *versus* majoritarian voting rules, and the constitutional term of office of the elected chambers.

Next, we consider information on the political juncture in which the incumbent government was operating. To measure the power of the incumbent government to enact policies, we consider the “margin of majority” it enjoys over the opposition parties, that is, the ratio of the number of seats held by the government to total seats. The political orientation of the government may also be important to test if the electoral cost of a reform differs across parties due to their ideological connotation. For instance, one may expect a left-wing government to lose more support if it got involved in reforms that impose a burden on all citizens irrespectively of their income level. To include information on the political orientation of the incumbent government, we use the

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<sup>3</sup> In regressions not reported, we control also for changes in real GDP, inequality, young and old dependency ratios. Our main findings are robust to the use of these alternative controls for macroeconomic and demographic conditions.



definition by the DPI and define “left-wing” a government whose head is from a Communist, Socialist, or Social-democratic party. We also consider if the current elections took place after the former parliament dissolved earlier with respect to the expiration of the constitutionally specified term of office, and if in the same year of the current election citizens were also called to vote for presidential and/or European elections.

As robustness checks, we consider other dimensions potentially relevant to our analysis. We investigate whether the electoral cost of a reform depends on how many years the incumbent head of the government has been in office, and on how early in the legislature the reform was introduced. To gather information on the nature, content, and intensity of policy-related discussions, qualitative analyses of media debates would be helpful which require a data collection effort far beyond the scope of the present project. Still, we can try to control for dimensions that are related to the ones that we cannot measure. For instance, we have no data on the political support of opposition parties, but we have information on the political distance between the main parties elected at the national level, the “polarization” variable by the DPI, which takes value zero if the party of the head of the government has an absolute majority, and otherwise measures the maximum distance in political orientation between the party of the head of the government and the largest opposition party. As regards the popularity of the government and the intensity of policy-related discussions, we include the projections of old-age dependency ratios (30 years ahead), to account for the possibility that people’s perception of a higher cost of ageing may create more sympathy for a reform and reduce its electoral costs, and we consider the number of civil unrests that took the form of political expression events such as strikes and mass demonstrations at the national level.

### **3. Descriptive evidence and empirical strategy**

We collected data on 118 parliamentary (general) elections that took place between 1990 and 2010 in the sample of advanced countries listed in Table A.1. The sample is unbalanced due to the (across-countries) staggered nature of the election calls, the different constitutionally defined length of tenure, which in our sample ranges between 4 and 5 years, and potential early dissolutions of the legislature, an event which occurred 46 times and at least once in every country of the sample with the exceptions of Finland, Hungary, and Norway.

We relate electoral outcomes to the introduction of major changes to the pension system. We classified as “major” the 28 pension reforms that are listed in Table A.2. It is possible that the same government enacted more than a pension reform act in the same legislature, as did the Schussel government in Austria, or that a change in the pension system was implemented by a

series of legislative acts dealing with different aspects of the pension system, as it was the case of Finland in 2005, Hungary in 1997, and the Slovak Republic in 2003-04. We do not distinguish between contractionary or expansionary reforms – in this respect, it is important to mention that in the country and period sample we consider there has been no reversal, - nor we have information on whether the pension reform was part of a broader reform package which included innovations in other economic sectors. We included in our list also the privatization of the Dutch public pension fund ABP and the reform of the Finnish ITP occupational pension plan in 2007, to acknowledge the relevance of occupational plans in the countries considered – a choice which does not affect our findings, which are robust to the exclusion of these two reform events from the sample. As the footnote to Table A.2. remarks, we record no major pension reforms over the period under analysis in three countries, namely: Denmark, Greece, and Ireland.

Concerning re-elections, the head of the government was elected for a second term of office in 44 election rounds out of 118. The countries where the head of the government was confirmed in office more frequently are Austria, Denmark, and Germany, where re-election occurred four times in the period under analysis. In contrast, in Italy, France, Hungary, and Poland the head of the government has never been re-elected over the period under analysis.

Figure 1 provides some descriptive evidence by plotting the frequency of pension reforms against the frequency of re-election. In our sample, there is a slightly negative association between the percentage of elections that result in the re-election of the incumbent government and the percentage of elections that took place after a major change in the pension system occurred. Interestingly, the countries that have reformed more are also those in which the governments have paid the higher electoral costs, with the notable exception of Germany, where reforms are associated to a high probability of the incumbent government to be re-elected.<sup>4</sup>

This descriptive is useful to depict a figure that summarizes some characteristics of the variables under analysis, but has of course to be qualified. In what follow, we develop empirical models to analyze the relationship between re-election and pension reforms and to show that the introduction of education, measured by indicators of economic-specific competences, uncovers interesting insights about the association between reform events and their political toll.

Econometrically, we test if the slope of the relationship between reforms (*REF*) and re-election (*REEL*) differs across countries in ways that depend on the level of economic and financial

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<sup>4</sup> The results in Section 4 are robust to the exclusion of Germany from the sample.

knowledge that the population displays on average (*EFL*) by including an interaction term between our pension reform variable and the EFL indicator. In empirical models that read

$$REEL_{jt} = REF_{jt'} \times EFL_{jt} + X_{jt} + \varepsilon_{jt} ,$$

we expect the coefficient of the interaction term to be not significantly different from zero, if the association between re-election and pension reforms does not differ across countries when we allow them to differ on the basis of the level of economic and financial knowledge of their population; significantly different from zero, otherwise.

We study the outcome of a parliamentary election in country  $j$  at time  $t$ , and consider if a major pension reform was enacted in a year  $t'$  of the previous legislature, where  $t - n \leq t' \leq t$ , and  $n$  represents the constitutionally specified term of office of the legislature. If the legislature is interrupted  $s$  years before its constitutionally defined conclusion, the inequality becomes  $t + s - n \leq t' \leq t$ , as we consider reforms that occurred within the present legislature, whatever its length. We control for the possibility that an early dissolution of the legislature occurred, and for other potentially relevant determinants of re-election that may or may not vary across countries  $j = 1, \dots, J$  and over time  $t = 1, \dots, T$ . The  $X_{jt}$  set of control variables in the empirical model above includes country-specific characteristics of the political system, indicators of the power and the political orientation of the incumbent government, and macroeconomic indicators that, to account for the fact that people are more likely to consider recent events when casting a ballot in national elections (Fair, 1978; Brender and Drazen, 2008; Buti *et al.*, 2010), are averaged over the current and the previous year. To measure people's understanding of the economic content of reforms that may have been signed into law up to four years before the call of the election scheduled at time  $t$ , and to reduce potential measurement errors, we consider the four year moving average of the indicators of education (see the Data Appendix for details).

We estimate the empirical models above by using linear probability models. Results would be qualitatively similar if we use Probit estimators. Ordinary Least Squares (OLS) and Least Square Dummy Variable (LSDV) estimators, that in general can be preferable to non-linear estimators when running regressions on panel data and when using instrumental variables (see the discussion in Angrist and Pischke, 2009), will allow us to compare straightforwardly results from specifications that control or not for unobserved heterogeneity across countries and common year effects.

#### 4. Results

Results in first column of Table 1 from OLS estimation of the bi-variate association between the probability of a government to be re-elected and the introduction of major changes to the pension system which occurred in a year during the previous legislature confirm, in the context of our study on pension reforms, previous results by Alesina *et al.* (2013): the probability of the incumbent government to win the elections is not significantly related to the enactment of a reform during the previous legislature.<sup>5</sup>

In the second column of Table 1, we present results from OLS estimation of the main specification of interest, that is, of the empirical model that allows the relation between reforms and electoral outcomes to differ across countries on the basis of the level of EFL among the population. The introduction of an interaction term between EFL and the pension reform variable provides interesting insights. EFL is significantly associated to the probability of confirming the head of the government for a second term of office not *per se* - its main effect being not significantly estimated - but because of its interaction with the pension reform variable. As in Buti *et al.* (2010), who consider a very narrow set of changes in the pension system, pension reforms are negatively associated to re-election, but interestingly in our data this effect is mediated by the ability of people to understand basic economic concepts.

The positive sign of the coefficient of the reform-EFL interaction term indicates that in countries where the population on average has more economic-specific competences the electoral cost of a pension reform is lower. To give a sense of magnitude of the associations under analysis, we can use the results from this linear probability model, which are easier to interpret than marginal effects from a Probit model, even if they have to be considered with caution. The total effect of a pension reform net of the dampening effect of EFL, estimated by the interacted slope coefficient, falls in the unit interval. Since the value of EFL ranges between 2.84 and 7.96, the total effect of the pension reform variable on the re-election of the head of the government spans both sides of the point estimate: it is two fifths lower in the country with the lower level of EFL (i.e. Hungary in 2010), and one fifth higher in the country with the higher level of EFL (i.e. Finland in 2003).

This result is robust to the inclusion of variables that control for macroeconomic conditions, demographics, characteristics of the political system and the political conditions in which the incumbent government was operating. In column (2) of Table 1 the level of the output gap is positively and significantly associated to re-election probabilities, indicating that the incumbent government has more chances to win the elections in times when the economy is working above

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<sup>5</sup> This finding is robust also in specifications where we include more restricted sets of control variables and to alternative estimators (results not reported).

its potential, that is in good times, in line with the results in Brender and Drazen (2008) and Buti et al. (2010). The negative and significant association between re-election and the median age of the population suggests that, as it would be reasonable to expect, the older the population, the higher the electoral costs of reforms which redistribute resources across generations, from the old to the young. The political control variables have the expected sign, although they are often not significant at conventional levels.

The empirical specification in columns (3) and (4) of Table 1 check for potential multicollinearity issues, and consider two sets of control variables separately, while in columns (5) and (6) we present estimates from models which include country, and country and time effects, respectively. Again, the result of a negative association between pension reforms and the probability to elect the incumbent head of the government for another term in office, and of a positive interaction between reforms and EFL holds. Finally, in the last column of Table 1, we present Probit average marginal effects, to show that the results from this non-linear probability model confirm findings from OLS estimations.

In the first two columns of Table 2 we add information on the years in office of the incumbent government and on whether the reform was enacted early in the legislature. In columns (3) and (4) demographics projections account for the possibility that a future expected change in the age structure of the population may be related to the probability of the head of the government to be re-elected, and for the polarization of political positions among the main parties elected in the previous legislature. In columns (5) and (6) we consider if at least one civil unrest was recorded in the year of the elections or in the year before that had a nation-wide scope and that took the form of a mass demonstration that could be classified as political expression. This latter variable is available only for the years before 2005 - thus, we consider a smaller period sample that does not include the years of the 2007-2008 financial crises. In all specifications, we include all the macroeconomic, demographic, and political controls considered in Table 1, running for each specification first a LPM and then a model that includes country and time effects (LSDV). The association between re-election, pension reforms and EFL holds also in these specifications where the additional control variables we just described are not significantly associated to re-election.

In Table 3 we present estimates from a model where we use a different definition of re-election. We consider a government re-elected if the party the incumbent head of the government belongs to is still able to appoint her successor, independently on her identity. Interestingly, our findings hold when this definition of re-election accounts for the possibility that the incumbent head of

the government was not confirmed in office for reasons other than the enactment of a reform (e.g. retirement or death). Next, in the last columns of Table 3, we enlarge the sample to include information on the electoral outcome of presidential elections, too - available for the countries where the electoral system is not parliamentary. The results are very similar to the ones in Table 1, although the main effect of the pension reform variable is slightly not significant when we do not control for country and period effects.

In Table 4 we relax the implicit assumption we made so far that reforms are exogenous to re-election probabilities, and address potential endogeneity issues. It may be the case, indeed, that changes in policy are driven by electoral considerations. Given the very nature of pension reforms, such concerns should be minor. It is difficult to argue that a major reform of the pension system may be expected to have lower electoral losses than reforms in other policy areas. Anyway, to rule out this possibility, we follow Buti *et al.* (2010) and run our regressions on a sub-sample of countries that belong to the European Union, and on the years that followed the signature of the 1992 Maastricht Treaty. The argument for this estimation strategy is that Maastricht criteria and the limitations to discretionary national policies imposed to EU member countries may help considering the subsequent reforms as exogenously spurred by common developments rather than as the result of nationally-driven interests. The result in columns (1) and (2) of Table 4 show that our main findings are robust in specifications where country and time dummies capture cross-country unobserved heterogeneity and common year effects.

We also try to find variables that are related to reforms and not to re-election probabilities, and move to an instrumental variable approach to the estimation of our main empirical models. Finding good instruments for our reform variable is not an easy task. To isolate the exogenous component of major policy changes to the pension system, we consider cross-country differences between welfare systems, and common forces driving pension systems' changes over time. As country-specific characteristics, we group countries according to their welfare state typology, and identify five groups: Conservative, Social Democratic, Southern European, Liberal-Anglo Saxon, Scandinavian, and East European (see Esping-Andersen, 1990, Bonoli, 1997, Ferrera, 1996, and the discussion in Gordon *et al.*, 2006). As exogenous force driving pension systems' change and pre-retirement financial accumulation decisions over time, we use the OECD average number of births to the total population ratio lagged by 30 years. Finally, we include in the set of instruments also the interactions between the welfare state typology and past birth rates. IV estimates in columns (3) and (4) of Table 4, despite the low explanatory power of the

instruments, suggest that the associations between the probability of re-election, pension reforms, and EFL, are still holding when country and period effects are included.

The above analysis indicates that EFL plays a role in explaining the association between electoral outcomes and pension reforms. As we discuss in the introduction, this measure of specific human capital can arguably be related to people's understanding of reforms to the pension system, because the economic content of such policy changes requires some specific concepts in order to be correctly understood and assessed. In Table 5, we consider other indicators of human capital that capture people achievement in other dimensions of education: PISA scores on mathematical performance, secondary and tertiary school attainment. Table A.4 shows correlations between the pension reform variables and the other indicators of education. For all the education measures considered, the bivariate association with the pension reform variable is low and never significant at conventional levels. The bi-variate correlations between EFL, PISA scores in mathematical performance, and tertiary schooling are high. Thus, countries with a higher percentage of highly educated people seem to have also higher levels of EFL. Secondary schooling, instead, is less positively associated to the other measures of human capital. In Table 5 we present estimates from empirical models where we use in the place of EFL the indicators of human capital accumulation we have just presented, one by one not to incur in multicollinearity issues. Interestingly, only one of the indicators is significantly associated to re-elections and to pension reforms in regressions that consider country and time effects: students' performance in Mathematics.

## **5. Concluding remarks**

Our analysis of legislative elections held between 1990 and 2010 in advanced countries provides evidence in favor of a role of economic and financial-specific competences in explaining the association between economic reforms and their electoral cost. Where EFL is higher, economic reforms that impose current sacrifices in exchange of future benefits are better understood by citizens who are thus less likely to "punish" the governments/political parties that introduced them. The "electoral cost" of reforms is therefore lower.

Our results for the specific case of pension reforms are robust with respect to the inclusion of indicators that account for characteristics of the political system and for political, demographic and macro-economic conditions. Interestingly, they do not hold when more general indicators of school attainment are used.

Of course, EFL is not, *per se*, a sufficient condition for the success of reforms; illiteracy can, conversely, thwart their effectiveness by calling for an excessively long phase-in period or backwards changes to previously approved reforms.

Future research might successfully extend the analysis, for instance, by collecting information on other reforms belonging to the same policy package of the pension reforms, or approved during the same legislature, such as changes in labour market regulation. And possibly use more direct indicators of economic and financial knowledge, like the PISA and other surveys providing cross-country analyses, as soon as they become available.

Our analysis has clear policy implications. As implied by Mr. Juncker's aphorism quoted in the introduction, the *awareness* of what is involved in a reform could be an important determinant of its electoral cost and future viability. In this respect, EFL could become a new, more transparent alternative to concealing from citizens the unpleasant consequences of reforms, a potentially key element in the relationship between citizens and politicians. Since such literacy is primarily a result of education, government policy could thus indirectly induce long-run support for virtuous reforms and more effective citizenship.



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## Data Appendix

The dataset includes information for the 21 OECD countries listed in Table A.1. We collected data on parliamentary elections held between 1990 and 2010 - ruling out presidential elections in countries where they take place, - and on major pension reforms that were enacted in the years before the parliamentary elections took place.

The list of the reform events is available in Table A.2, while details on the pension reform variable are available in the Online Appendix to this paper.

The indicator of economic and financial knowledge (EFL) is compiled by the IMD World Competitiveness Yearbook. PISA scores refer to the OECD mean values of PISA scores in mathematical performance for boys and girls (we include the simple average over gender). Measures of secondary and tertiary general school attainment are from the Barro-Lee Educational Attainment Dataset (version 2.0, June 2014 release; see Barro and Lee, 2013). These indicators are available for a limited number of years: EFL is measured on a yearly basis between 1995 and 2008; PISA scores on mathematical performance are available for 2003, 2006, 2009, 2012; Barro and Lee's measures of school attainment are recorded every five years from 1950 to 2010. The data are interpolated, the missing observations are filled by keeping the last value constant in the years of no records, and we include in the empirical models the four year moving average of the indicators of education. The results are robust to limiting the period of analysis to the available first and last value, and to the use of the current year or of current and previous year average value of the indicators.

Data on the characteristics of the political system and on political conditions are from the Database of Political Institutions 2015 described by Cruz *et al.* (2016), which is an updated version of the original Beck *et al.* (2001)'s database. Macroeconomic variables are drawn from the OECD and the IMF World Economic Outlook databases. Data on "civil unrest" refer to political expression events which took the form of strikes and mass demonstrations at the national level; they are available until 2005 and are drawn from the "Social, Political, Economic Event Database" (SPEED Project – Civil Unrest Event Data) by the Cline Center for Democracy (University of Illinois).

Data on the median age of the total population (years) are drawn from the UN World Population Prospects (2015 revision). Demographic projections refer to old dependency ratios, that is to the ratio of people older than 64 to the working-age population, from the online database "Health Nutrition and Population Statistics: Population estimates and projections" by the World Bank.

Data on birth rates are from the World Bank online database and are expressed in terms of annual births per 1000 population.

**Table A.1**

Elections and pension reforms in 1990-2010, by country

<i>Country</i>	<i>Nr. of legislative elections in the sample</i>	<i>Nr. of major pension reforms in the previous legislature</i>
Austria	7	1
Belgium	6	1
Canada	6	1
Czech Republic	6	1
Denmark	6	0
Finland	5	2
France	4	2
Germany	6	3
Greece	7	0
Hungary	5	1
Ireland	4	0
Italy	6	3
Japan	7	2
Netherlands	6	2
Norway	5	1
Poland	5	1
Portugal	6	2
Slovak Republic	5	1
Spain	5	1
Sweden	6	2
United Kingdom	5	1

**Table A.2**

1990-2010 elections and major pension reforms during the previous legislature, by country

<i>Country</i>	<i>Year of election</i>	<i>Major pension reforms signed into law before the election day</i>
Austria	2006	Austrian Pension Reform (2003), Harmonization of Austrian Pension Systems Act (2004)
Belgium	1999	Framework Act (1996)
Canada	2000	Canada Pension Plan reform (1998)
Czech Republic	1996	Pension Reform (1995)
Finland	1999	Pension reform law (HE 189/1996)
Finland	2007	Pension reform laws on earnings-related pensions (HE 118/2005) and on national pensions (HE 119/1995)
France	1993	Balladur reform (1993)
France	2007	Pension Reform Act (2003)
Germany	1994	Pension Reform Act (1992)
Germany	2002	Riester reform (2001)
Germany	2009	Retirement Age Adjustment Act (2007)
Hungary	1998	Pension Reform Acts LXXX on Eligibilities and finances of social insurance and private pension (1997), LXXXI on Social security pensions (1997), LXXXII on Private pensions and private pension funds (1997)
Italy	1994	Amato reform (1992)
Italy	1996	Dini reform (1995)
Italy	2006	Maroni reform (2004)
Japan	2000	Pension system reform (2000)
Japan	2004	Pension system reform (2004)
Netherlands	1998	Privatization of the public pension fund ABP (1996)
Netherlands	2006	Life Course Savings Scheme (2006)
Norway	2009	Flexible Retirement Act (2009)
Poland	2001	Pension reform (1999), Act No. 887 on the Social Insurance System (1998), Act No. 162 on Old-Age and Disability Pensions from the Social Insurance Fund (1998)
Portugal	1995	Law 329/93 (1993)
Portugal	2005	Law 60-B/2005 (2005)
Slovak Republic	2006	Social Insurance Act (2003), Old-Age Pension Savings Act (2004), Supplementary Old-Age Pension Savings Act (2004)
Spain	2000	Royal Decree 6/1997 (1997)
Sweden	1998	Pension reform (1998)
Sweden	2010	Reform of the ITP occupational pension plan (2007)
United Kingdom	2010	Pensions Act (2007)

*Note:* according to our coding, three countries recorded no major pension reforms over the period under analysis, namely: Denmark, Greece and Ireland.

**Table A.3**  
Summary statistics

<i>Variable</i>	<i>Obs.</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>Min</i>	<i>Max</i>
Pension reform	118	0.24	0.43	0	1
Re-election of the head of the government	118	0.37	0.48	0	1
Re-election, the head of the gov. from the same party	118	0.48	0.50	0	1
Output gap, level	110	-0.01	2.90	-7.58	8.94
Government balance	108	2.57	5.22	-7.27	47.73
Inflation	115	3.80	5.07	-0.57	41.1
Median age of the population	118	38.06	2.56	29.02	44.52
Presidential form of government	118	0.36	0.48	0	1
Proportional system	118	0.87	0.33	0	1
Constitutional tenure	118	4.26	0.44	4	5
Margin of majority	118	0.55	0.09	0.25	0.86
Left-wing	118	0.47	0.50	0	1
Early election	118	0.39	0.49	0	1
Concurrent election	118	0.16	0.37	0	1
Year of office	118	4.66	2.88	1	16
Newly appointed government	118	0.16	0.37	0	1
Demographic projections	118	40.1	7.64	24.36	62.44
Polarization	114	1.2	0.93	0	2
Civil unrest	87	0.29	0.45	0	1
EFL	118	5.33	1.26	2.84	7.96
PISA scores on mathematical performance	118	502.8	24.9	445.5	546.83
Secondary schooling	118	54.41	12.9	21.23	88
Tertiary schooling	118	17.5	6.86	4.86	41.22

Notes: This table shows descriptive statistics for the variables used in the analysis.

**Table A.4**

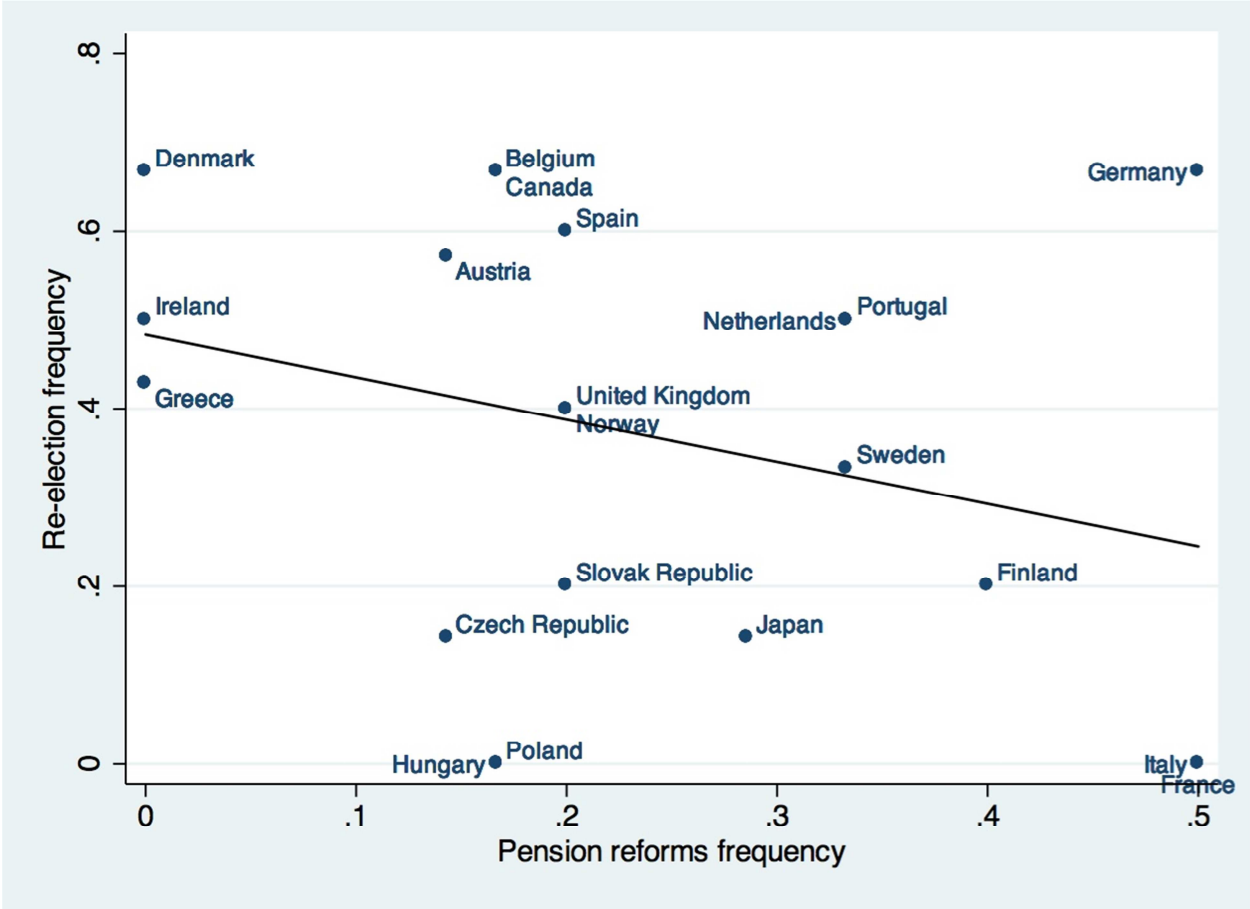
Correlations between pension reforms and indicators of competence

	Pension reform	EFL	PISA scores	Secondary schooling	Tertiary schooling
Pension reform	1				
EFL	-0.06	1			
PISA scores	0.03	0.72***	1		
Secondary schooling	0.03	0.16*	0.26***	1	
Tertiary schooling	0.00	0.58***	0.5 ***	0.09	1

Notes: (\*) (\*\*) (\*\*\*) denote significance at the (10) (5) (1) percent level.



**Figure 1**  
Pension reforms and re-elections, frequencies.



**Table 1**  
Reforms, EFL, and re-election.

Dependent variable: Re-election of the head of the government							
Estimator:	LPM	LPM	LPM	LPM	LSDV	LSDV	PROBIT
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Pension reform	0.141 (0.106)	-1.015** (0.434)	-1.008** (0.409)	-0.877** (0.393)	-1.231** (0.457)	-1.662*** (0.551)	-1.219** (0.484)
Reform*EFL		0.218** (0.087)	0.211** (0.083)	0.182** (0.080)	0.257*** (0.079)	0.350*** (0.096)	0.245*** (0.088)
EFL		-0.033 (0.046)	-0.005 (0.042)	0.011 (0.041)	-0.016 (0.086)	0.013 (0.111)	-0.033 (0.041)
Output gap	0.049*** (0.017)	0.047*** (0.017)	0.037** (0.015)		0.021 (0.019)	0.009 (0.023)	0.043*** (0.015)
Gov. balance	-0.002 (0.007)	0.006 (0.007)	0.001 (0.004)		0.013* (0.007)	0.013 (0.008)	0.006 (0.008)
Inflation	-0.036** (0.016)	-0.025 (0.018)	-0.011 (0.015)		0.004 (0.021)	-0.000 (0.015)	-0.024 (0.018)
Median age	-0.054** (0.023)	-0.057** (0.024)	-0.023 (0.018)		-0.000 (0.031)	-0.084 (0.100)	-0.054** (0.022)
Presidential	-0.257** (0.113)	-0.246** (0.117)		-0.134 (0.095)			-0.240** (0.105)
Proportional	-0.072 (0.174)	-0.100 (0.170)		-0.065 (0.168)			-0.101 (0.163)
Consitut. tenure	-0.193 (0.144)	-0.192 (0.140)		-0.044 (0.130)			-0.176 (0.138)
Margin of majority	0.764 (0.594)	0.736 (0.598)		0.311 (0.510)	0.970 (0.736)	1.449 (0.931)	0.683 (0.504)
Left wing	0.027 (0.103)	-0.006 (0.103)		0.020 (0.090)	-0.004 (0.092)	-0.033 (0.091)	-0.001 (0.090)
Early election	-0.008 (0.102)	-0.004 (0.101)		-0.062 (0.093)	-0.115 (0.128)	-0.181 (0.109)	-0.003 (0.095)
Concurrent elect.	-0.087 (0.145)	-0.121 (0.138)		-0.066 (0.117)	-0.263 (0.204)	-0.392** (0.167)	-0.092 (0.122)
Country effects					X	X	
Time effects						X	
Observations	108	108	108	118	108	108	108

Notes: Robust standard errors in parenthesis. (\*) (\*\*) (\*\*\*) denote significance at the (10) (5) (1) percent level. LPM estimates in columns from (1) to (4), LSDV estimates in columns (6) and (7), Probit average marginal effects in column (7).

**Table 2**

Robustness checks - political variables and government's popularity.

Dependent variable:	Re-election of the head of the government					
	(1)	(2)	(3)	(4)	(5)	(6)
Pension reform	-0.951** (0.452)	-1.705*** (0.537)	-0.898** (0.415)	-1.554** (0.620)	-1.200** (0.532)	-1.667** (0.766)
Reform*EFL	0.216** (0.088)	0.356*** (0.091)	0.200** (0.082)	0.328*** (0.105)	0.251** (0.107)	0.373** (0.144)
EFL	-0.026 (0.046)	-0.006 (0.102)	-0.052 (0.047)	-0.004 (0.112)	-0.059 (0.060)	0.314 (0.267)
Years of office	0.019 (0.017)	-0.020 (0.018)				
Newly appointed gov.	-0.097 (0.144)	-0.011 (0.174)				
Demo. projections			0.003 (0.014)	-0.021 (0.036)		
Polarization			0.080 (0.059)	-0.016 (0.100)		
Civil unrest					-0.180 (0.190)	-0.269 (0.249)
Country effects		X		X		X
Period Effects		X		X		X
Observations	108	108	105	105	77	77

Notes: Robust standard errors in parenthesis. LPM and LSDV estimates. (\*) (\*\*) (\*\*\*) denote significance at the (10) (5) (1) percent level. All specifications include controls for political, macroeconomic, and demographic conditions.

**Table 3**

Robustness checks - same party and presidential elections.

Dependent variable:	Same party	Same party	Head of the government	Head of the government
	(1)	(2)	(3)	(4)
Pension reform	-1.216*** (0.439)	-1.520*** (0.587)	-0.652 (0.456)	-0.885** (0.363)
Reform*EFL	0.282*** (0.080)	0.347*** (0.099)	0.159* (0.085)	0.212*** (0.065)
EFL	-0.019 (0.055)	-0.047 (0.116)	-0.044 (0.045)	-0.088 (0.082)
Country effects		X		X
Period Effects		X		X
Observations	108	108	129	129

Notes: Robust standard errors in parenthesis. LPM and LSDV estimates. (\*) (\*\*) (\*\*\*) denote significance at the (10) (5) (1) percent level. All specifications include controls for political, macroeconomic, and demographic conditions.

**Table 4**  
Endogeneity issues.

Dependent variable:	Re-election of the head of the government			
	LPM	LSDV	IV-LPM	IV-LSDV
Estimator:	(1)	(2)	(3)	(4)
Pension reform	-0.521 (0.509)	-2.728*** (0.528)	1.391 (2.861)	-3.949* (2.340)
Reform*EFL	0.126 (0.104)	0.533*** (0.100)	0.080 (0.507)	0.631* (0.348)
EFL	0.008 (0.063)	-0.185 (0.184)	0.030 (0.109)	-0.040 (0.146)
Country effects		X		X
Period Effects		X		X
Observations	75	75	108	108

Notes: Robust standard errors in parenthesis. (\*) (\*\*) (\*\*\*) denote significance at the (10) (5) (1) percent level. All specifications include controls for political, macroeconomic, and demographic conditions.

**Table 5**

Other measures of education.

Dependent variable:	Re-election of the head of the government					
Indicator of education:	PISA score	PISA score	Secondary schooling	Secondary schooling	Tertiary schooling	Tertiary schooling
	(1)	(2)	(3)	(4)	(5)	(6)
Pension reform	-3.530 (2.364)	-8.784*** (2.960)	-0.528 (0.476)	-1.242 (0.832)	-0.425 (0.269)	-0.569 (0.511)
Reform*EFL	0.007 (0.005)	0.018*** (0.006)	0.012 (0.008)	0.027* (0.015)	0.031** (0.015)	0.041 (0.026)
EFL	-0.001 (0.003)	-0.022 (0.016)	-0.006 (0.004)	-0.052*** (0.013)	0.001 (0.009)	0.015 (0.020)
Country effects		X		X		X
Period Effects		X		X		X
Observations	108	108	108	108	108	108

Notes: Robust standard errors in parenthesis. LPM and LSDV estimates. (\*) (\*\*) (\*\*\*) denote significance at the (10) (5) (1) percent level. All specifications include controls for political, macroeconomic, and demographic conditions.

## Appendix

This appendix describes the pension reform variable used in the paper.

**Table 1**

1990-2010 elections and major pension reforms during the previous legislature (if any), by country

<i>Country</i>	<i>Year of parliamentary election</i>	<i>Major pension reforms signed into law before the election day</i>
Austria	2006	Austrian Pension Reform (2003), Harmonization of Austrian Pension Systems Act (2004)
Belgium	1999	Framework Act (1996)
Canada	2000	Canada Pension Plan reform (1998)
Czech Republic	1996	Pension Reform (1995)
Finland	1999	Pension reform law (HE 189/1996)
Finland	2007	Pension reform laws on earnings-related pensions (HE 118/2005) and on national pensions (HE 119/2005)
France	1993	Balladur reform (1993)
France	2007	Pension Reform Act (2003)
Germany	1994	Pension Reform Act (1992)
Germany	2002	Riester reform (2001)
Germany	2009	Retirement Age Adjustment Act (2007)
Hungary	1998	Pension Reform Acts LXXX on Eligibilities and finances of social insurance and private pension (1997), LXXXI on Social security pensions (1997), LXXXII on Private pensions and private pension funds (1997)
Italy	1994	Amato reform (1992)
Italy	1996	Dini reform (1995)
Italy	2006	Maroni reform (2004)
Japan	2000	Pension system reform (2000)
Japan	2004	Pension system reform (2004)
Netherlands	1998	Privatization of the public pension fund ABP (1996)
Netherlands	2006	Life Course Savings Scheme (2006)
Norway	2009	Flexible Retirement Act (2009)
Poland	2001	Pension reform (1999), Act No. 887 on the Social Insurance System (1998), Act No. 162 on Old-Age and Disability Pensions from the Social Insurance Fund (1998)
Portugal	1995	Law 329/93 (1993)
Portugal	2005	Law 60-B/2005 (2005)
Slovak Republic	2006	Social Insurance Act (2003), Old-Age Pension Savings Act (2004), Supplementary Old-Age Pension Savings Act (2004)
Spain	2000	Royal Decree 6/1997 (1997)
Sweden	1998	Pension reform (1998)
Sweden	2010	Reform of the ITP occupational pension plan (2007)
United Kingdom	2010	Pensions Act (2007)

*Note:* according to our coding, three countries recorded no major pension reforms over the period under analysis, namely: Denmark, Greece and Ireland.



**Table 2**

## Major pension reforms, brief description by country

Country	Description of the reform	Comments by international organizations
AUSTRIA	<p>The <i>2003 Austrian Pension Reform</i> (BGBl. I no. 71/2003):</p> <ul style="list-style-type: none"> <li>• increased statutory early retirement age;</li> <li>• increased the base of average earnings from 15 to 40 years;</li> <li>• reduced the annual accrual rate from 2 to 1.78 percent;</li> <li>• abolished early retirement on account of unemployment, and increased the discount rate for each year of early retirement.</li> </ul> <p>The <i>2005 Act on the Harmonisation of Austrian Pension Systems</i>:</p> <ul style="list-style-type: none"> <li>• extended the assessment period to lifetime earnings;</li> <li>• reintroduced the possibility of early retirement that was a few years later tightened again;</li> <li>• indexed existing pensions to consumer price inflation (not much different from before but now official);</li> <li>• harmonized contribution rates to 22.8% of the gross wage;</li> <li>• introduced a sustainability factor which triggers an adjustment process in case central demographic factors deviate from their projections (that was not operational and never triggered).</li> </ul>	<p>“Concrete steps so far include [...] a major pension reform in 2003 and harmonization of the main pension systems effective 2005” (<i>Austria: 2005 article IV consultation</i>, IMF country report no. 05/248, July 2005, p.4).</p>
BELGIUM	<p>The <i>1996 Framework Act (Document législatif no. 1-387/2)</i>:</p> <ul style="list-style-type: none"> <li>• equalized the pension age for women and men, by gradually rising the pension age for women from 60 to 65 years by 2009;</li> <li>• increased gradually the minimum working period for early retirement from 24 to 35 years by 2005;</li> <li>• gradually reduced to zero the valorization coefficient within 9 years (up to 2005) at a rate of 0.004 per cent per year, for the 1955-74 cohorts;</li> <li>• indexed calculation made every two years on the basis of the actual wage increase margin.</li> </ul>	<p>"The most visible parametrical reform of the first pillar was the introduction of gradually increasing pensionable age[...] in 1996." (<i>The 2015 Pension Adequacy Report: current and future income adequacy in old age in the EU Country Profiles – Volume II</i>, European Commission Directorate-General for Employment, Social Affairs and Inclusion Social Protection Committee).</p>
CANADA	<p>The <i>1998 Reform of the Canada Pension Plan (CPP)</i>:</p> <ul style="list-style-type: none"> <li>• increased the contribution rate from 5.6 per cent to the steady state rate of 9.9 per cent in 2003 and beyond;</li> <li>• introduced (modest) reductions in benefits by using a five rather than three-year average of the maximum pensionable earnings (and the earnings-related</li> </ul>	<p>“The reform was motivated by the need to correct several deficiencies of the previous framework and to accommodate shifting demographics, life-expectancy and economic conditions.” (<i>OECD Economic Surveys: Canada 1998</i>, OECD 1998, pp. 87 and 89).</p>

	<ul style="list-style-type: none"> <li>portion of disability and survivors' benefits);</li> <li>froze the maximum death benefit at \$2,500;</li> <li>projected a gradual increase of the account/expenditure ratio of the CPP from 2 to 5 by 2020;</li> <li>created an investment board to invest the CCP in a diversified investment portfolio.</li> </ul>	<p>"Concerns over the financial sustainability of the Canada Pension Plan (CPP) led to the passage of new legislation in 1998 to put the system on a firmer footing [...]" (<i>OECD Economic Surveys: Canada 2000</i>, OECD 2000, p.106).</p>
CZECH REPUBLIC	<p><i>The 1995 Pension Insurance Act No. 155/1995</i>, which came into force in 1996:</p> <ul style="list-style-type: none"> <li>reformed the public PAYG pension scheme (from the former socialist social protection scheme);</li> <li>set the retirement age to increase gradually from 60 to 62 years for men and from 53-57 to 57-61 years for women (depending on the number of children raised);</li> <li>increased the period required for pension entitlement to 35 years;</li> <li>increased to 30 years the period required to calculate the pensionable earning (in 2016).</li> </ul>	<p>"[...] the reforms created a role for private pension funds, which will eventually supplement the basic state pension. To ensure the financial viability of the system an increase in the retirement age by two years for men and by four years for women has been introduced. These changes are estimated to be sufficient to bring the system into balance or surplus over the medium term, at existing contribution rates." (<i>OECD Economic Surveys: The Czech Republic 1996</i>, OECD 1996, p.108)</p>
FINLAND	<p><i>The 1996 Reform (HE 189/1996)</i>:</p> <ul style="list-style-type: none"> <li>extended the period required to calculate the pensionable earnings from the last 4 years' earnings to the last 10;</li> <li>cut pensions expenditures by defining pensionable wages as net of employees' pension contributions;</li> <li>reduced the weight of wage increases in the pension indexing formula from 50 to 20 per cent, and increased the weight of the CPI to 80 per cent;</li> <li>diminished the accrual rate for disability pensions;</li> <li>extended means-testing for eligibility to the national pensions (eliminating gradually the basic amount of national pension paid to all).</li> </ul> <p><i>The 2005 Reform (HE 118/2005 on earnings-related pensions, HE 119/1995 on national pensions)</i>:</p> <ul style="list-style-type: none"> <li>aimed at making the earnings-related scheme more sustainable by increasing the extent of prefunding, and linking benefits to life-expectancy;</li> <li>aimed at increasing labor force participation among older workers by introducing a flexible retirement age between 63 and 68, including an early retirement option at age 62, but with a sharp rise in the accrual rate of pension rights after reaching the age of 63 to 4.5% (compared to 2.5% for those aged over 60 under the previous system);</li> <li>abolished the ceiling of the maximum pension because for somebody it was</li> </ul>	<p>"Furthermore, in 1996, one of the most important reforms of the 1990s in terms of savings was to reduce the accrual of pension rights during the years in early retirement till the official retirement age of 65." (<i>OECD Economic Surveys: Finland 2000</i>, OECD 2000, p.94)</p> <p>"Major pension reform was introduced in Finland in 2005." (<i>Pensions at a Glance 2007</i>, OECD 2007, p.118)</p>

	<p>likely to mean that the pension did not increase by working beyond the early 60s;</p> <ul style="list-style-type: none"> <li>aimed at making the system more equitable by basing benefits on all life-time earnings, equalizing the minimum age for benefit computation and contribution requirement, and redefining accrual rates for certain non-working episodes.</li> </ul>	
FRANCE	<p><i>The 1993 Balladur reform:</i></p> <ul style="list-style-type: none"> <li>modified the main parameters used to calculate the pension level;</li> <li>indexed pensions to prices <i>de jure</i> instead of wages;</li> <li>extended the period for the calculation of the pensionable earnings: it computed the reference wage, which before the reform was based on the average best 10 years weighted by earnings growth, on the best 25 years weighted by price levels.</li> </ul> <p><i>The 2003 Pension Reform Act (Law 2003-77, 21 August 2003):</i></p> <ul style="list-style-type: none"> <li>applied the 1993 reform to public sector employees; and further increased the duration length for a full pension to 41.5 year;</li> <li>introduced a system of bonuses and deductions according to the duration of contribution with actuarial neutrality.</li> </ul>	<p>“Several changes recommended in this report were introduced by the 1993 Balladur reform of the basic regime in the private sector.” (<i>OECD Economic Surveys: France 2001</i>. OECD 2001, p.60)</p> <p>“A key pension reform was adopted in mid-2003. [...] Executive Directors welcomed the forward-looking policies recently being pursued by the French authorities, and, in particular, commended their adoption of the milestone pension reform, which will appreciably strengthen France's long-run fiscal outlook and make a key contribution toward addressing the major challenges for future GDP growth and fiscal sustainability arising from the impending demographic shock.” (<i>Public Information Notice: IMF Concludes 2003 Article IV Consultation with France</i>, 29 October 2003)</p>
GERMANY	<p><i>The 1992 German Pension Reform Act:</i></p> <ul style="list-style-type: none"> <li>increased gradually the statutory retirement age for regular pensions to 65 years for men and women;</li> <li>linked pensions benefits to net rather than gross wages;</li> <li>introduced a flexible early retirement age with a reduction of benefits of 3.6 per cent per year of early retirement.</li> </ul> <p><i>The 2001 Riester reform:</i></p> <ul style="list-style-type: none"> <li>introduced contribution rate ceilings (20% until 2020 and 22% until 2030);</li> <li>modified the pension indexation formula by linking annual changes in pension levels to annual changes in wage levels;</li> <li>introduced a multipillar pension system with a pre-funded pillar;</li> <li>partially substituted the pay-as-you-go financed pensions with funded</li> </ul>	<p>“As the most recent occurrence of substantial piecemeal pension reforms in Germany, the 1992 Pension Reform Act introduced: [...]” (<i>Germany: Selected Issues - IMF Staff Country Report No. 92/101</i>, IMF 1997, p.151)</p> <p>“Germany also experienced an important increase in coverage, especially for low earners, thanks to the introduction of Riester pensions in 2001 as part of a major pension reform”. (<i>Reviews of Pension Systems: Ireland</i>, OECD 2014, p.128)</p>

	<p>pensions.</p> <p><i>The 2007 Retirement Age Adjustment Act:</i></p> <ul style="list-style-type: none"> <li>• increased the statutory retirement age from 65 to 67 years</li> <li>• strengthened the employment of older people.</li> </ul>	<p>“The 2001 reform is a major change in the system”. (<i>Pension Reform Issues and Prospects for Non-Financial Defined contribution (NCD) Schemes</i>, World Bank 2006, p.589)</p> <p>“In 2007, a major reform step was the legislated gradual increase of the pensionable age from age 65 to age 67 by the year 2029.” (<i>Pension Adequacy in the European Union 2010-2050</i>, Directorate-General for Employment, Social Affairs and Inclusion of the European Commission and the Social Protection Committee, May 2012, p.259)</p>
HUNGARY	<p><i>The 1997 Pension Reform Acts LXXX, LXXXI, and LXXXII:</i></p> <ul style="list-style-type: none"> <li>• introduced a new three-pillar pension system that began operating in January 1998;</li> <li>• increased the pensionable age (55 years for women and 60 years for men till 1998) to 62 years for both sexes, but smoothly by 2009;</li> <li>• replaced wage indexation of continuing pensions with a combined wage-price indexation by 2001;</li> <li>• established the same worth for each year of service and the accrual rates referred to gross rather than net earnings from 2013.</li> </ul>	<p>“Structural reform continued in 1997. The import surcharge, after having been progressively reduced, was eliminated on schedule in July, and a major pension reform was passed.” (OECD Economic Outlook, volume 62, OECD 1997, p.110)</p> <p>“The two most important reform measures, the increase in the retirement age and the shift toward mixed indexation, have a major impact” (<i>The Hungarian Pension System in Transition</i>, Social Protection Unit - Human Development Network - The World Bank, April 1998, p.28)</p>
ITALY	<p><i>The 1992 Amato reform:</i></p> <ul style="list-style-type: none"> <li>• increased the retirement age from 60 to 65 for men and from 55 to 60 for women, by 2002;</li> <li>• increased the years of contribution to become eligible for old age pensions, and for seniority pensions in the public sector;</li> <li>• changed the calculation of old age pensions: earning-based, with the assessment of the reference wage based on the earnings the entire career, adjusted for inflation and real growth;</li> <li>• harmonized the accrual coefficients across most schemes.</li> </ul> <p><i>The 1995 Dini reform (law 335/95):</i></p> <ul style="list-style-type: none"> <li>• introduced a defined contribution system instead of a defined contribution system;</li> </ul>	<p>“In response to the financial crisis of 1992, the Amato government succeeded in adopting a far-reaching package of adjustments to the parameters of the pension system” (<i>The Political Economy of Reform. Lessons from Pensions, Product Markets and Labour Markets in Ten OECD Countries</i>, OECD 2009, p.107)</p> <p>“The pension reform represents a milestone in the direction of a more uniform and viable system” (<i>OECD Economic Surveys: Italy 1996</i>, OECD 1996, p. 54)</p>

	<ul style="list-style-type: none"> <li>introduced an age threshold for seniority pensions (57 years) for all workers;</li> <li>standardized the rules for public and private employees;</li> <li>introduced stricter rules on the cumulability of disability benefits and income from work, as well as tighter controls on beneficiaries.</li> </ul> <p><i>The 2004 Maroni reform (law 243/04):</i></p> <ul style="list-style-type: none"> <li>modified the minimum age to obtain a pension, moving it from 57 years to 60 years from 2008, to 61 from 2010 and to 62 from 2014, while keeping constant the contribution period requirement to 35 years,;</li> <li>introduced a “bonus” for those who decide to keep working even though they satisfy all the requirements to obtain a pension.</li> </ul>	<p>“The reform is a major step in the right direction” (OECD Economic Surveys: Italy, OECD 2005, p.67)</p>
JAPAN	<p><i>The 2000 Pension system reform:</i></p> <ul style="list-style-type: none"> <li>increased gradually the retirement age in the second pillar from 60 to 65 years;</li> <li>reduced income-related benefits by 5 per cent;</li> <li>indexed lump-sum and income-related benefits only to an inflation rate;</li> <li>imposed to the working elderly aged 65 to 70 to pay contributions, and partially cut their benefits according to their earned incomes.</li> </ul> <p><i>The 2004 reform:</i></p> <ul style="list-style-type: none"> <li>introduced an automatic adjustment of benefit levels to changes in demographic structures—the so-called “macro indexing”;</li> <li>increased the ratio of the government subsidy to the basic pension benefit from <math>\frac{1}{3}</math> to <math>\frac{1}{2}</math>;</li> <li>adapted the social security pension schemes to the changing life style of people (e.g. increase in part-time workers and in female workers);</li> </ul> <p>improved the organizational structure of the investing and managing the reserve fund of the social security pension schemes.</p>	<p>“An important step was taken in pension reform in March 2000 with the passage of a bill which, once fully effective, is designed to cut benefits payments by some 20 per cent.” (OECD Economic Surveys: Japan 2000, OECD 2000, p.18).</p> <p>“The system was reformed substantially in 2004.” (Kenichiro Kashiwase, Masahiro Nozaki and Kiichi Tokuoka, <i>Pension reforms in Japan</i>, IMF working paper 12/285, December 2012, p. 6)</p>
NETHERLANDS	<p><i>The 1996 privatization of the public pension fund ABP (Algemeen Burgerlijk Pensioenfond).</i></p> <p><i>The 2006 Life Course Savings Scheme (Levensloopregeling; LCSS):</i></p> <ul style="list-style-type: none"> <li>offered employees the opportunity to save tax free to finance periods of unpaid leave;</li> <li>abolished tax deductions for early retirement schemes for people who were younger than 57 years on 1st January 2005: these people could participate in the LCSS and save up to 12% of the gross salary per annum, and the</li> </ul>	<p>“Although participation (still) is low, the LCSS has a potential to contribute to promote freedom of choice for employees, to balancing the work-life balance over the life cycle, and may also contribute to the objectives of transitional labour markets.” (Working Party on Social Policy, <i>Seminar on the life risks, life course and social policy ins and outs of the Dutch life course</i></p>

	contributions to the savings fund were tax free, as well as the returns on the fund.	<i>savings scheme</i> , Directorate for employment, labour and social affairs, OECD, May 2007).
NORWAY	<p><i>2006 Stoltenberg White Paper (Report No. 5 to the Storting: "Earning and drawing old age pension from the National Insurance Scheme, 2006–2007") and new legislation in the Spring of 2009:</i></p> <ul style="list-style-type: none"> <li>introduced a flexible retirement from age 62 to 75 on actuarially neutral terms;</li> <li>changed the calculation of old-age benefits to be based on the worker's average lifetime contributions (from ages 13 to 75) plus credits for missing periods that are due to unemployment or caregiving;</li> <li>replaced the current flat-rate contributory public pension with the income-tested pension;</li> <li>reformed the Contractual Early Retirement Schemes (AFP).</li> </ul>	<p>"A major pension reform was implemented from 2011" (Statement by Mr. Audun Gronn, Alternate Executive Director for Norway, January, 27, 2012, in "Norway: 2011 Article IV Consultation—Staff Report; Public Information Notice on the Executive Board Discussion; and Statement by the Executive Director for Norway", IMF Country Report No. 12/25, p.69[2])</p>
POLAND	<p><i>The Pension reform (1999), and the Acts No. 162 (1998) and No. 887 (1998):</i></p> <ul style="list-style-type: none"> <li>established a defined-contribution, multi-pillar system involving: a pay-as-you-go (PAYG) pillar based on notional defined contributions (NDC), a mandatory funded pillar in which private pension funds manage individuals' contributions, and a voluntary third pillar consisting of company pension plans and other savings vehicles;</li> <li>established that special public pension schemes for uniformed services should be extended to judges and public prosecutors.</li> </ul>	<p>"The 1999 pension reform stands out for having been designed and adopted under two successive governments of very different political orientations – perhaps the most important reform since 1989 to so transcend the partisan divide." (<i>The Political Economy of Reform. Lessons from pensions, product markets and labour markets in ten OECD countries</i>, OECD, 2009, p.139)</p> <p>"The 1999 pension reform—which phased out the old pay-as-you-go (PAYG) system and created a new mixed private-public pension system—was a major effort to restore the solvency of the public pension system." (<i>Republic of Poland: Selected Issues— IMF Country Report No. 05/264</i>, IMF 2005, p.55)</p>
PORTUGAL	<p><i>The 1993 Reform of the Social Security general regime (Decree-Law 329/93 of 25 September):</i></p> <ul style="list-style-type: none"> <li>increased the legal retirement age for women to 65 years (the same as for men);</li> <li>increased the minimum entitlement contributory period from 10 to 15 years.</li> </ul> <p><i>The 2005 reform (Law 60-B/2005):</i></p>	<p>"The Portuguese pension system has undergone a number of substantial reforms in recent times, most notably in 1993" (<i>Portugal: Selected Issues— IMF Country Report No. 04/80</i>, IMF 2004, p.43)</p>

	<ul style="list-style-type: none"> <li>raised the minimum age for retirement and the number of necessary years of service to receive a full pension;</li> <li>closed the public sector employee pension system to new entrants, to generate convergence to the conditions prevailing in the private sector social security system.</li> </ul>	<p>“A courageous reform of the generous public sector employee pension system was approved in 2005. [...] Not only should this reform help reducing spending pressure, but it should also facilitate the mobility of public employees to the private sector.” (OECD Economic Surveys: Portugal, OECD 2006, p.54)</p>
SLOVAK REPUBLIC	<p><i>The 2003 Social Insurance Act (No. 461/2003 Coll.):</i></p> <ul style="list-style-type: none"> <li>increased gradually the statutory retirement age for both men and women to 62 (by 2014) and decide that legal retirement age will gradually increase depending on growth and life expectancy from 2017;</li> <li>reformed the public pension system, reforming pension insurance, which includes: a mandatory old-age DC insurance financed by redistribution managed by the Social Insurance Agency; a mandatory pension savings system with DC finances by capitalization managed by private companies.</li> </ul> <p><i>Old-Age Pension Savings Act (No. 43/2004 Coll.):</i></p> <ul style="list-style-type: none"> <li>regulated the mandatory pension tier.</li> </ul> <p><i>Supplementary Old-Age Pension Savings Act (No. 650/2004 Coll.):</i></p> <ul style="list-style-type: none"> <li>regulated the voluntary pension system.</li> </ul>	<p>“Recognizing the problem, the government implemented a major reform of the pension system, first removing the public defined-benefit (DB) pay-as-you-go (PAYG) pillar and then introducing a fully-funded defined-contribution (DC) pillar.” (OECD Economic Surveys: Slovak Republic 2009, p.72, OECD 2009).</p>
SPAIN	<p><i>The 1997 reform (Royal Decree 6/1997):</i></p> <ul style="list-style-type: none"> <li>established that the number of contributive years over which the benefit base is computed would have progressively increased from 8 to 15 between 1997 and 2001;</li> <li>made the formula for the computation of the replacement rate less generous;</li> <li>reduced the 8% per-year penalty to early retirees between the ages of 60 and 65 to 7% for those individuals with 40 or more contributive years at the time of retirement.</li> </ul>	<p>“The 1997 legislation is the most important pension legislations of recent years” (The Spanish Pension System: Issues of Introducing NDCs, Carlos Vidal-Meliá and Inmaculada Domínguez-Fabián, World Bank 2006, p.617)</p>
SWEDEN	<p><i>The 1998 reform:</i></p> <ul style="list-style-type: none"> <li>replaced the pay-as-you-go defined benefit (DB) system with a pay-as-you-go notional defined contribution (NDC) system;</li> <li>was implemented in 1999 and applied to people aged 45 or under at the time of the reform.</li> </ul>	<p>“From the perspective of longer-term fiscal sustainability, the long-awaited reform of old-age pensions entered into force in 1999. [...] fiscal consolidation and pension reform have brought public finances back on a sustainable footing [...]”. (OECD Economic Surveys: Sweden 1999, OECD 1999, pp.12-13)</p>

	<p><i>2007 reform of the Sweden's white collar industry-wide pension scheme (ITP):</i></p> <ul style="list-style-type: none"> <li>• new entrants to the ITP scheme will change from a DB scheme that provides 65% of final salary integrated with the social security system, to a DC scheme.</li> </ul>	<p>“The ITP occupational pension plan was extensively upgraded in 2007 after a decade of negotiations between the employers and white-collar unions.”  <i>(OECD Private Pensions Outlook 2008, OECD 2009, p.280)</i></p>
<p>UNITED KINGDOM</p>	<p><i>The 2007 Pensions Act:</i></p> <ul style="list-style-type: none"> <li>• linked cost of living increases to wages rather than prices;</li> <li>• raised the pension age for women to 65 by 2020;</li> <li>• raised the pension age for both women and men from 65 to 68 between 2024 and 2046.</li> </ul>	<p>“The current Government is committed to continue largely upon the trajectory laid down by the previous government in its major pension reforms of 2007 and 2008, which themselves were based on the Recommendations of the Turner Commission which had sought cross party consensus on its proposals.”  <i>(Pension Adequacy in the European Union 2010-2050, Directorate-General for Employment, Social Affairs and Inclusion of the European Commission and the Social Protection Committee, May 2012, p.381)</i></p>



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