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Explaining the introduction of automatic pension indexation provisions in 17 OECD countries, 1945–2000

Juan J. Fernández
University Carlos III of Madrid, Spain

Abstract
Previous quantitative research regarding the long expansionary era of public pension generosity has relied mainly on aggregate expenditure data, which capture many pension policy dimensions. Yet, the overall level of national pension generosity may differ from the generosity of each important dimension. To improve our understanding of public pension reforms that increase generosity levels, this study examines the introduction of automatic indexation clauses between 1945 and 2000. The paper tests predictions of welfare policy development and policy diffusion theories. Using event history methods, we argue that the inflation rate and the incumbency of Christian democratic parties are the main determinants of these policy reforms. Countries with higher inflation rates and more entrenched Christian democratic parties are more likely to link pensions in payment or past wages considered for initial calculation purposes to an economic index. This suggests that political parties differ in their support for each measure that improves pension generosity depending on its expected redistributive impact.

Keywords
pension, indexation, inflation, Christian democracy

Since the early 1980s, social scientists have paid close attention to the causes of cross-national variations in the expansion of public welfare protection, including old-age schemes. As a result, there is a sizable quantitative scholarship on the post-war evolution of public pension provision. Practically all of these studies have relied on expenditure data indicators (Huber and Stephens, 2001; Kangas and Palme, 2007; Palme, 1990; van Kersbergen, 1995; Williamson and Pampel, 1993) or pension generosity indices (Myles, 1989).[1] This evidence has the valuable feature of integrating multiple dimensions of public pension generosity into a single indicator. Yet these measures mask the fact that cross-national rankings of public pension generosity may vary substantively across different policy dimensions (for example, indexation procedures, pensionable ages, accrual rates and minimum or maximum pensions). As noted by Palme, 'the correlations between the different aspects of pension programmes are low, which indicates that they are

Corresponding author:
Juan J. Fernández, Wissenschaftszentrum Berlin fuer Sozialforschung, Reichpietschufer 50, Berlin 10785, Germany
Email: jjfgonza@clio.uc3m.es

multidimensional and makes a single additive index problematic' (1990: 101). As public pension systems are multidimensional, we can therefore gain a more nuanced understanding of post-war pension politics by examining the determinants of different dimensions of pension generosity. Seeking to improve our knowledge regarding one important – but understudied – event in this social policy domain, this study conducts an event history analysis of the introduction of automatic adjustments of entry pensions or pensions in payment. In terms of policy analysis, pension adjustment procedures should gain more scholarly attention because of their critical importance for the long-term value of these benefits and the poverty level among the very old, who are a particularly vulnerable and dependent group (OECD, 1988).

We define automatic pension adjustments, or pension indexation rules, as the legal provisions used to determine (a) entry pensions or (b) pensions in payment according to an economic index. In order to avoid gradual depreciation of pension benefits due to price or wage inflation, these provisions establish rules to calculate pension benefits according to a consumer price index (CPI), a wage value index or a combination of both. In earnings-related programmes, first-year or entry pensions are calculated on the basis of individual past wages. In this regard, the indexation mechanism makes it possible to revalue past wages by taking into account average price or wage increases. Moreover, once the initial pension has been established, automatic indexation of pensions in payment also prevents a gradual depreciation of the entitlement. In this regard, the CPI indexation allows benefits to retain their purchasing power, whereas wage indexation allows benefits to absorb improvements in the average standard of living.

As indexation provisions are implemented by a public agency following a predetermined economic index, and without direct legislative involvement of policymakers, they produce 'automatic' adjustments. In this sense, pension indexation depoliticizes this aspect of public retirement income provision (Weaver, 1988). Moreover, these provisions establish a baseline adjustment level, which allows for better, long-term predictions of individual

retirement income. Hence, at the time of their introduction, these provisions were widely perceived as generosity improvements (Gerig, 1960).

However, we still have a limited understanding of the factors that facilitated pension indexation reforms. Although welfare economists have already analysed its economic outcomes and functions (Liefmann-Kiel, 1959; OECD, 2011; Piggot and Sane, 2009; Vording and Goudswaard, 1997; Whitehouse, 2009), few studies have examined the introduction of pension indexation clauses. Moreover, these case studies generally only consider the partisan and economic cycle background of pension indexation reforms (Heclo, 1974; Hockerts, 1980; Jessoula, 2009; Schuyt and Taverne, 2004; van Kersbergen and Becker, 1988; Weaver, 1988). Hence, although economic modernization, population ageing, policy diffusion and institutional conditions are commonly underlined by contemporary theories of welfare reform, we still have a limited understanding of the role of these factors in the adoption of pension indexation reforms.

To fill this gap, this paper examines the introduction of pension indexation clauses in the 18 Organisation for Economic Co-operation and Development (OECD) countries with a democratic system since 1945. Of these 18 countries, Denmark passed the reform in 1933. For the remaining 17 countries, we conduct an event history analysis to determine the causes that led to the enactment of these clauses between 1945 and 2000. In particular, we test predictions drawn from the welfare state development and policy diffusion theories that have received empirical support in previous welfare policy analyses.

Our argument is that macroeconomic conditions and the partisan structure of government best explain these policy events. First, inflationary pressures raise concerns about the long-term real value of pensions, creating incentives to prevent a rapid depreciation of pension benefits. Second, Christian democratic parties should be particularly inclined to introduce pension indexation because, by depoliticizing pension adjustments, these rules meet the Christian democratic historical goal of reducing class conflict. In addition, owing to their expansionary outcomes, these rules allow Christian democratic

parties to broaden their electoral base to the working class. Consistent with these expectations, countries with higher inflation have a higher probability of introducing any form of pension indexation and pension indexation linked to CPI changes. In addition, countries with more entrenched Christian democratic parties are more likely to introduce any form of pension indexation, as well as pension indexation linked to CPI and wage changes. In contrast, the number of prior indexation reforms in other countries does not shape the likelihood of an event. This indicates that cross-national emulation or policy learning did not contribute to the spread of these provisions.

These results have theoretical implications because they complement the dominant account of pension policy change during this period. According to most analysts, organized labour and left-wing parties have historically been the main engines of expansionary pension policy measures (Huber and Stephens, 2001; Myles, 1989; Palme, 1990). However, this study shows that Christian democratic parties had a more important role than left-wing parties in the introduction of automatic indexation mechanisms. This suggests that leading collective actors differ in their support for each measure that improves pension generosity depending on its expected redistributive impact. Left-wing governments may have been more likely to increase generosity levels of the most redistributive provisions, while Christian democratic parties may have been more likely to increase generosity levels of the most insurance-based provisions.

The adoption of indexation clauses for in-payment pensions

The introduction of pension indexation clauses represents a historical milestone in the expansionary era of social rights. Before the First World War, many affluent democracies introduced mandatory public pension programmes to improve the life chances of retired workers. In the inter-war period, another milestone occurred when many countries passed discretionary and irregular adjustments of pension in payment to prevent the purchasing power of old-age

pensions from eroding (Gerig, 1960). However, irregular adjustments remained highly sensitive to political and economic cycles, and, in the long term, the real value of public pensions remained uncertain. Hence, since the 1930s, to reduce this uncertainty and continue improvements in living conditions for the elderly, affluent democracies have passed legal provisions that link pensions to changes in an explicit economic index. As noted in an OECD report, 'the introduction of a largely automatic indexation procedure and the linkage of benefits to changes in the economic situation were seen as further progress in the welfare state' (1988: 72).

According to most contemporary actors, indexation clauses represented a substantial improvement in social rights of the elderly because they ensured a baseline of regular adjustments for pensions. With these measures, the state 'insures not only the risk of income loss due to change in someone's condition [such as aging], but also the [relative] income loss due to inflation or a general rise in income levels' (Vording and Goudswaard, 1997: 33; Whitehouse, 2009). In this sense, indexation benefited the elderly because of its psychological effect. These provisions do not necessarily maximize pension income. Discretionary increases can lead to higher benefits than indexed-based ones. However, discretionary adjustments are, by definition, irregular, thus complicating predictions of future old-age pension benefits. In contrast, indexing adjustments reduce the uncertainty of entitlements for the elderly, who are highly dependent on this source of income. As the elderly have a rather limited access to other income sources, they value highly the security and predictability of pension benefits produced by pension indexation.

Beyond its psychological effect, the notion of automatic indexation also received widespread support because it bolstered the financial position of social security programmes. These clauses expanded the inter-generational contract and created additional financial obligations for younger cohorts. 'Index-related benefits involve greater sacrifices to the working population than the non-working population' (Liefmann-Kiel, 1959: 509). Thus, they made younger cohorts expect larger benefits, which

increased the confidence of the elderly that younger generations will remain committed to financing their pensions.

Although pension indexation would have clearly improved the level of social protection in OECD countries, these proposals remained controversial in many countries owing to their redistributive and potential macroeconomic impact. First, ministers of finance and the economy in countries such as Germany and Sweden shared concerns regarding the potential inflationary pressures created by pension indexation (Heclo, 1974; Hockerts, 1980). Second, these provisions are consequential for the working-age population. By improving the benefit levels of the elderly, pension indexation also boosts public pension spending, creating the need for further revenues. Additional revenue needs require higher social security contributions, necessarily reducing the short-term purchasing power of working-age cohorts. In addition, most public pension systems were also financed by state subsidies (Gordon, 1988) obtained from progressive income taxes, making high-income groups another constituency whose interests are undermined by these reforms.

Nevertheless, macroeconomic concerns and opposing short-term interests did not prevent a generalized institutionalization of pension indexation provisions. As shown in Table 1, the notion of automatic adjustments has been incorporated into the legislation of most of the 18 OECD countries considered. Despite cross-national differences in the economic, institutional and political context, indexation clauses have spread widely across affluent democracies. From the early 1930s to 2000, 16 of the 18 countries had introduced these provisions. Yet, there were also substantial differences in enactment times.

In 1933, Denmark pioneered this measure by establishing a mechanism to index the old, flat-rate benefit. After the Second World War, France was the first country to add this provision to its pension legislation. The first reform wave occurred in the 1950s, when five countries passed indexation clauses (Sweden, Belgium, Finland, the Netherlands and Germany). In the 1960s, only two countries introduced automatic indexing provisions (Austria and Italy). The second wave occurred in the 1970s, when seven countries finally adopted these measures (Canada, the United States, Japan, the United Kingdom, Australia, New Zealand and Switzerland). The fact that none of these 17 OECD countries has revoked the use of pension indexation reveals the widespread support for these measures. By 2000, only Ireland and Norway did not have automatic indexing provisions in their pension policy legislation. Both countries increased pensions regularly; however, the concrete rate was decided ad hoc by parliamentary committees. Regarding the indexation mechanism, most countries (11) introduced full price indexation. Five countries chose to introduce partial wage indexation, full wage indexation or the higher of price or wage indexation. Despite the fact that both indexation mechanisms represent an important improvement in public pension protection, wage indexation was expected to produce higher adjustments because it is sensitive to changes in the average standard of living. This is because wage indexation allows pensioners to benefit from improvements in living conditions tied to increases in productivity levels. Is it possible to identify general patterns in the economic, institutional or political conditions under which indexation clauses were introduced? To answer, the next section reviews welfare policy development and policy diffusion theories prior to conducting the event history analysis.

Theoretical background

As indexation rules have been widely perceived as expansionary measures, we can draw on dominant theories of welfare state development and policy diffusion to account for the introduction of these legal provisions. In particular, this section focuses on predictions of the functionalist-economic and power-resources approaches, which have been particularly fruitful in explaining pension policy change during this period. As alternative theories, the section also outlines predictions from the logic of industrialism and cognitive diffusion approaches.

The neofunctionalist approach

Functionalist theories have a long tradition in welfare policy analysis. Their key feature is that they

Table 1. Years of enactment of automatic pension legislation provisions in 18 Organisation for Economic Co-operation and Development countries

Country	Year of enactment	Law	Indexation mechanism	Source
Denmark	1933	National Social Insurance Act	CPI	Liefmann-Keil (1959: 488)
France	1948	Law of 23 August 1948	CPI	Bridenne et al. (2008: 248)
Sweden	1951	No. 157	CPI	Olson (1986: 10)
Belgium	1955	Law of 26 May 1955	CPI	Gerig (1960: 18)
Finland	1956	National Pension Act	CPI	Liefmann-Keil (1959)
Netherlands	1956	General Old Age Pensions Act	Wages	Roebroek and Berben (1986: 680)
Germany	1957	Pension Reform Law	Wages	Alber (1987: 256)
Austria	1965	Pension Adjustment Act	Wages	Weigel and Amann (1986: 541)
Italy	1965	No. 903	CPI	Jessoula (2009: 135)
Canada	1972	Amendment to the Old Age Security Act	CPI	Department of National Health and Welfare (1972: iv)
United States	1972	Social Security Amendment	CPI	Purcell and Whitman (2007: 36)
Japan	1973	Revision of the Welfare Law for the Elderly	CPI	Seike (1997: 307)
United Kingdom	1974	National Insurance Act	Higher of CPI and wages	Parry (1987: 363)
Australia	1976	Social Services Amendment Act (No 3) 1976	CPI	Australian Government Department of Families (2006: 37)
New Zealand	1977	Government Superannuation Fund Contributions Order 1977	CPI	Alexander McKenzie (personal communication)
Switzerland	1977	Law of 24 June 1977	Half CPI and wages	Gross and Puttner (1987: 627)
Ireland	–	–	–	Maguire (1986: 413, 421-422)
Norway	–	–	–	Espen Halland Dahl and Aksel Hatland (personal communication)

CPI, Consumer Price Index.

explain institutional change in terms of the normative and social cohesion it creates. As functionalist theories emphasize the functions of the welfare state in preserving the social order, they tend to underplay the role of political struggles in favour of socio-economic conditions. In this view, rapid economic change creates new social risks that prompt the need to modify social policies (Erikson et al., 2002; for reviews, Myles and Quadagno, 2002; Timonen, 2003).

Neo-functionalist economic principles remain common in many accounts about the adoption of pension indexation provisions. In particular, many observers suggest that conditions of high inflation spread concerns about the purchasing power of pensions, persuading policymakers to adopt automatic indexation arrangements. As Horlick and Lewis wrote in 1970, 'inflation and rapid increase in real incomes in the period since World War II have led a growing number of countries – particularly the industrialized nations – to introduce provisions for the automatic adjustment of long-term benefits in relation to rising prices or wages' (1970: 12; see also Whitehouse, 2007). Moreover, according to neo-functionalist principles, welfare policies are highly adaptive to economic changes (Erikson et al., 2002), which means that inflation peaks should have an immediate effect on support for indexation clauses. Thus, the neo-functionalist approach predicts that high inflation increases the probability of an immediate introduction of indexation clauses.

Hypothesis 1: Countries with higher inflation are more likely to introduce automatic indexation mechanisms.

The power constellation approach

In sharp contrast to neo-functionalist approaches, the power constellation approach attributes cross-national variations in welfare policy development to struggles between different socio-economic groups. It argues that the political power of the working and lower-middle classes and the generosity of welfare states are closely connected (Korpi, 1983; Stephens, 1980). Once the lower classes develop an intense political consciousness and translate their interests into effective labour movements, they can establish social and economic policies that can improve their life chances.

Among power resources theorists, Huber and Stephens (2001) have analysed the interaction between the development of political consciousness and political struggles most persuasively. Their key point is that, because welfare policy struggles are essentially ideological struggles, in the post-war period labour movement efforts for welfare policy change revolved mainly around transforming slow-moving welfare preferences of large segments of the population. Once left-wing parties manage to shift society's ideological centre of gravity, expansionary welfare policies were more likely because they had the support from the broader middle classes and other political parties. For this reason, Huber and Stephen consider that the partisan composition of government matters much less in the short term than in the long run: 'Repeated victories by a given party or coalition are likely to affect expectations of societal actors and these actors in turn are likely to adjust their "realistic" preferences accordingly' (Huber and Stephens, 2001: 32). In sum, left-wing power affects welfare policy change not simply because it allows the imposition of a predetermined political agenda, but mainly because it helps shape public opinion in favour of expansionary welfare reforms.

Hypothesis 2: Countries with more entrenched left parties are more likely to introduce automatic indexation mechanisms.

Although Huber and Stephens (2001) attribute the overall expansion of public pension generosity to the long-running incumbency of left-wing parties, there are reasons to believe that, regarding pension indexation rules, Christian democratic parties could have had a larger influence. As shown by van Kersbergen (1994, 1995), post-war Christian democratic parties drew on their religious and interclass origins to create a distinctive political ideology and strategy that contributed to the development of insurance-based welfare systems.

In a nutshell, Christian democracy developed an ideology that combines the principles of social justice, individual responsibility and social accommodation. In this view, societies have a moral obligation to provide material protection for all social groups, not only the most deprived. Following the subsidiarity principle, when family, local and market networks fail to provide sufficient income, the state must intervene to ensure the livelihood of individuals and families (Manow and van Kersbergen, 2009). However, Christian democracy believes that this

support derives from the individual's capacity to contribute to the wellbeing of society, and this protection should not be redistributive to the extent that it threatens the fragile balance between social classes (van Kersbergen, 2009). Moreover, welfare provision ultimately has the central task of promoting social harmony and integration and undermining class conflict in the political and economic arenas. This overall goal creates a predisposition for compromises and political mediation (Kalyvas and Kersbergen, 2010; van Kersbergen, 1994, 1995).

Owing to this ideological and strategic position, Christian democratic parties could be particularly likely to support and enact pension indexation provisions for three reasons. First, Christian democracy was especially inclined to develop public pension programmes. 'Because the issue of age concerns a risk of life rather than a risk of class, one can expect Christian democracy initially to be particularly active in the field of old-age provision' (van Kersbergen, 1995: 103; see also Baldwin, 1990). In other words, for Christian democracy, the fact that the risk of longevity cuts across social classes, whereas the risks of unemployment or disability are concentrated around the working class, means that age-biased welfare states benefit the working and middle classes and could help to deactivate class conflicts. Consistent with this view, Christian democratic parties' power is a better predictor of overall public pension spending than left-wing party power (Huber and Stephens, 1993, 2001; van Kersbergen, 1995).

Second, and more specifically, indexation provisions gave Christian democratic parties an additional opportunity to deactivate class conflict in the political field. As indexed pensions 'changed the political logic of development' into a mainly economic one (van Kersbergen, 1995: 115), they reduced the chances of recurrent and intense partisan and class confrontations regarding the adjustments of pensions. In this sense, pension indexation acted as a policy tool to pursue the general objective of promoting social integration. Finally, these provisions also had strategic potential because they met the interests of its traditional middle-class electoral base, as well as the interests of the working class, for whom Christian democratic parties also tried to

cater. These provisions ensured the purchasing power of public pensions for these two groups, which are very dependent on this source of retirement income. This means that pension indexation provisions gave Christian democratic parties a policy mechanism to broaden their electoral social base, which was also consistent with their foundational ideological principles.

Available analyses of key post-war pension reforms do not usually discuss Christian democratic leaders' judgements of indexation mechanisms. However, they provide consistent evidence that Dutch, German and Italian Christian democratic leaders championed or supported the introduction of these clauses. In Germany, the Christian democratic Chancellor Konrad Adenauer championed a 1955 proposal to index both entry pensions and pensions in payment. In his view, pension indexation had the two critical advantages of helping to depoliticize pension politics and undercut the conservative image of the *Christlich Demokratische Union* (Hockerts, 1980). However, his economic ministers opposed automatic indexation of pensions in payment on the grounds that it created inflationary pressures. Hence, the ultimate 1957 reform only introduced wage indexation of entry pensions (Alber, 1989). In Italy, *Democrazia Cristiana* (DC) promoted an expansionary pension policy to lock endorsement by critical constituencies (Lynch, 2006; Maestri, 1987) that was also consistent with the Vatican's social doctrine (van Kersbergen, 1995). In this context, DC backed the 1965 pension reform that indexed public pensions (Jessoula, 2009).

In the Netherlands, the post-war Catholic movement (especially that of the Church) actively pressed the middle classes and the bourgeoisie into accepting improvements in social protection as a means to reduce class cleavages and foster the unity of the Dutch nation (van Kersbergen, 2009; van Kersbergen and Becker, 1988). Substantial improvements in old-age pensions were a cornerstone in this regard, and were achieved with the 1956 reform that also introduced automatic indexation. This reform was enthusiastically supported by governing coalition member *Katholieke Volkspartij* (Schuyt and Taverne, 2004). Hence, in the three cases of Germany, Italy and the Netherlands, Christian democratic parties were

critical in the enactment of automatic indexation mechanisms.

> Hypothesis 3: Countries with more entrenched Christian democratic parties are more likely to introduce automatic indexation mechanisms.

The logic of industrialism approach

Beyond neo-functionalist and power constellation approaches, two other theories might explain cross-national differences in pension policy development. One model that has received some attention in the last three decades is the logic of industrialism approach. Authors within this framework attribute the expansion of public welfare provision to historical changes produced by socio-economic modernization. Hence, contrary to the economic-functionalist approach, which predicts immediate and short-term effects of economic conditions, the logic of industrialism approach predicts long-term effects of socio-economic development. Theorists of the logic of industrialism argue that industrialization and urbanization reduce the capacity of families to care for the elderly, at the same time that they increase life expectancy and create the need for state welfare provision (Kerr et al., 1964). Moreover, economic modernization generates the surplus to fund public pension programmes (Cutright, 1965; Wilensky, 1975). Given these propositions, the logic of industrialism approach expects that countries with higher levels of industrialization, higher shares of elderly population and higher gross domestic product (GDP) per capita are more likely to introduce pension indexation.

> Hypothesis 4: Countries that have undergone a higher degree of economic and social modernization are more likely to introduce automatic indexation mechanisms.

Policy diffusion approach

Thus far, this section has discussed only domestic economic or political factors. In this nation-centred view, waves of similar policies can be explained as independent domestic responses to similar socio-economic problems. However, policymaking occurs within a large international social system in which technocrats and politicians may scan policy developments in other countries. In this view, policies can spread as a result of hierarchically uncoordinated but inter-dependent dynamics (Elkins and Simmons, 2005). Following this principle, policy diffusion research explores how horizontal cross-national ties help explain waves of equivalent reforms.[2] It suggests two particular mechanisms by which the number of prior enactments in other countries shapes the likelihood of further reforms: policy learning and policy institutionalization (Dobbin et al., 2007).

Regarding policy learning, policy developments in 'neighbouring' countries may affect future policy events because they expand the volume of information and limit policy risks. Past reforms function as natural experiments that heavily reduce the uncertainty regarding the expected policy outcomes (Meseguer, 2003; Meseguer and Gilardi, 2008). They provide critical data in policy analysis and have the potential to assuage concerns raised by opponents to the reform. Similarly, existing policies provide ready-made solutions to intractable problems, which have the potential to skew the attention of policymakers (Weyland, 2005).

Actions by other states can also affect policymaking because the global legitimacy of a policy model depends on its ultimate prevalence. As more countries enact a reform and the policy script is increasingly common, it becomes taken for granted and culturally institutionalized. In this context, the policy model is likely to further diffuse by additional countries that seek to signal a ritualistic commitment to global cultural conventions (Meyer, 2004; Meyer et al., 1997; Strang and Meyer, 1993). Applied to pension policy, Brooks (2007) has recently argued that peer diffusion is a significant cause of pension privatizations. Hence, the policy diffusion approach predicts that the density of reforms shape the likelihood of additional ones.

> Hypothesis 5: The likelihood of a reform increases with the number of countries that have already introduced that policy.

Data and methods

Independent variables

The multivariate models presented below include 14 independent variables. Given the salience of the neo-functionalist accounts underlying the role of price changes in historical accounts of pension indexation, a critical variable is *inflation*, which measures the annual rate of change in the CPI. Annual CPI values since 1945 were obtained from Mitchell (2007a–c). Reflecting the principle of the logic of industrialism theory that socio-economic modernization is the main cause of improvements in welfare policy generosity, the models include four additional socio-economic variables: *log of GDP per capita* represents the natural logarithm of 1990 international Geary–Khamis dollars, obtained from Maddison (2003); the share of *population 65 or older* and the share of *population 55 or older*, calculated from data of the National Center for Health Statistics (several years); and *industrial employment*, the proportion of employees in industrial sectors (Mitchel, 2007 a–c; OECD, 2008). The final economic variable is *GDP growth*, which captures the role of the economic cycle. It was calculated as the annual growth rate of the GDP per capita (Maddison, 2003).

According to the discussion concerning the partisan structure of government, the incumbency of left-wing or Christian democratic governments should affect welfare generosity levels mainly in the long run. Therefore, following Huber and Stephens (2001), we constructed two variables with the overall power of these two party types since 1945. *Left party cabinet portfolios (moving average)* and *Christian democratic party cabinet portfolios (moving average)* represent the average percentage of portfolios held by left-wing (Christian democratic) politicians in year *i* and country *j* since the first postwar legislative elections. For instance, if *i* = 1970 and *j* = Sweden, the value represents the average percentage of left-wing cabinet portfolios in Sweden between 1945 and 1970.[3] Alternatively, one model considers the influence of the immediate structure of government through *left party cabinet portfolios*$_{(t-1)}$ and *Christian democratic party cabinet portfolios*$_{(t-1)}$.

The quantitative literature on policy diffusion has operationalized the role of cross-nationally interdependent policymaking through the number of reforms in all countries but the focal one. In particular, since countries can be expected to follow policy developments in neighbouring countries more closely, recent policy diffusion studies rely on spatial lags that weight policy events in other countries by their distance to the focal country (Beck et al., 2006; Cao, 2010; Simmons and Elkins, 2004). Consistent with this research, *weighted adoptions* represents the spatially weighted number of past reforms in all 17 other countries. Each weight was obtained from a standardized inverted matrix of kilometric distances between capitals (CEPII, 2010), so that proximate countries are given more weight. As results in policy diffusion studies can be sensitive to the connectivity matrix (Cao, 2010; Plümper and Neumayer, 2010), we also assess the effect of the *weighted adoptions in neighbouring countries* that passed the reform. In this case, the inverted distances matrix is limited to physically contiguous countries.

Regarding the institutional structure, countries with more legislative veto points may face greater difficulties in expanding public pension generosity. For this reason, *constitutional structure* constitutes a control variable that indexes four institutional veto points: bicameralism, federalism, judicial review and presidentialism. The index was constructed with data from Lijphart (1999).

As the logic of the public pension scheme may influence the introduction of indexation clauses, one model also includes the control variable *earnings-related tier*, which distinguishes the countries with an earnings-related tier from those with only flat-rate or means-tested programmes. Historically, earnings-related programmes only included formulae to determine entry pensions and not pensions in payment. Hence, systems with these programmes may have been more prone to introduce indexation clauses. Regarding the specification of the variables, all independent variables – except *inflation* and *GDP growth* – have been lagged by one year. Given that according to the neo-functionalist approach *inflation* and *GDP*

growth should have an immediate impact, they are the average of a zero- and one-year lag.

Analytical approach

The data set constructed for this study includes a binary dependent variable distinguishing the introduction (1) from the non-introduction (0) of an indexation clause, as well as yearly observations. Given this data structure, it is appropriate to use discrete duration methods. These models reveal the determinants of the hazard rate, or probability that a policy event takes place in a given year if it did not occur in any previous year. Of all discrete duration methods, we fit probit models with robust standard errors, clustering by country and covariates to capture duration dependence. The probit function is adequate in this setting (Box-Steffensmeier and Jones, 2004) and has been commonly employed by policy diffusion research. Two problems associated with the use of generalized linear regression models like probit for event history analysis is that they violate the regression assumptions that observations are independent in time and space. To address these violations, the models are clustered by country and include robust standard errors (Buckley and Westerland, 2004).

Another analytical problem associated with the use of probit models applied to duration analysis is the fact that without covariates to capture time dependence, the models hold the unrealistic assumption that the hazard rates are constant over time, which can bias the coefficients of theoretically relevant variables. For this reason, it is necessary to include one or more covariates that absorb time dependence. We rely on quadratic splines (with three knots) that were preferred by Box-Stefensmeier and Jones (2004), Buckley and Westerland (2004) and Beck et al. (1998). Finally, it is noteworthy that the case of Denmark is 'left censored'. Denmark introduced indexation clauses in 1933, years before data on key economic and political variables were available (1945). As this means that the failure occurred in Denmark prior to the first observation point, it was excluded from the analysis (for the same approach, see Cleves et al., 2008).

Multivariate results

Any form of automatic pension indexation

Table 2 reports the determinants of the enactment of any form of automatic pension indexation. Models 1 and 2 include all independent variables except one of the diffusion variables. Furthermore, Models 3–5 present three sensitivity analyses. Model 3 includes two additional control variables. Model 4 considers alternative indicators of the partisan structure of government. Finally, Model 5 examines the robustness of the two main significant variables.

In Model 1, *inflation* is the sole socio-economic variable that significantly increases the likelihood of an event. Supporting Hypothesis 1, higher inflation rates increase the probability of the introduction of pension indexation. This suggests that OECD governments pass indexation clauses to ease public concerns about the future real value of pension benefits. In contrast, predictions from the logic of industrialism approach do not find supportive evidence. Neither the *log of the GDP per capita,* share of *population 65 or older* nor *industrial employment* is positive and significant. This indicates that two key features of socio-economic modernization – industrialization and population ageing – do not prompt the likelihood of an event.

The non-finding that more aged populations are not more likely to introduce automatic pension indexation provisions also does not confirm an emerging literature arguing that the increased political power of the elderly translates into more generous pension benefits (Browning, 1978; Galasso, 2006; Persson and Tabellini, 2000; for a critical view, Tepe and Vanhuysse, 2009). One possible explanation is that this account may be based on an oversimplified model of political influence in which objective interests have a mechanical impact on political representation and public policy (for a similar critique, see Huber and Stephens, 1993). As noticed by Pampel (1994) and Kohli (2008), the formalization of class and religious cleavages in the inter-war period and their subsequent institutionalization in the post-war period could have crowded out the political articulation of an age cleavage. Because post-war parties mobilized their bases only

Table 2. Probit models for the introduction of indexation clauses in 17 Organisation for Economic Co-operation and Development countries, 1945–2000

	Model 1	Model 2	Model 3	Model 4	Model 5
	All indexation mechanisms				
Socio-economic variables					
Inflation	0.041** (2.186)	0.041** (2.320)	0.042** (2.095)	0.037** (2.227)	0.030** (2.063)
GDP growth	−0.032 (−0.713)	−0.034 (−0.789)	−0.018 (−0.418)	−0.020 (−0.457)	
Log of the GDP per capita	1.619 (0.872)	1.780 (0.977)	2.123 (1.182)	0.844 (0.449)	
Population 65 or older	−0.067 (−0.717)	−0.085 (-0.933)		−0.023 (−0.334)	
Population 55 or older			−0.017 (−0.227)		
Industrial employment	−0.019 (−0.549)	−0.019 (−0.599)	−0.032 (−0.890)	0.001 (0.019)	
Political variables					
Left party cabinet portfolios (moving average)	0.007 (0.750)	0.009 (0.993)	0.006 (0.711)		
Christian democratic party cabinet portfolios (moving average)	0.024*** (4.178)	0.026*** (3.853)	0.027*** (4.190)		0.016*** (3.295)
Left party cabinet portfolios$_{(t-1)}$				0.002 (0.538)	
Christian democratic party cabinet portfolios$_{(t-1)}$				0.011** (2.122)	
Constitutional structure	0.016 (0.438)	0.020 (0.551)	0.024 (0.573)	0.015 (0.466)	
Earnings related tier			−0.317 (−0.799)		
Diffusion variables					
Weighted adoptions	−0.020 (−0.228)		−0.004 (−0.048)	−0.003 (−0.037)	
Weighted proportion in neighbouring countries		−0.003 (−0.561)			
Time since last event	0.572** (2.262)	0.587** (2.240)	0.546** (2.353)	0.499** (2.146)	0.510** (2.029)
Spine 1 cubed	0.010*** (2.624)	0.010*** (2.778)	0.010*** (2.847)	0.008** (2.397)	0.009*** (2.611)
Spine 2 cubed	−0.007*** (−3.057)	−0.007*** (−3.260)	−0.007*** (−3.358)	−0.006*** (−2.657)	−0.006*** (−3.127)
Spine 3 cubed	0.002*** (3.610)	0.002*** (3.916)	0.002*** (3.875)	0.002*** (2.944)	0.002*** (3.535)
Constant	−9.593 (−1.425)	−10.266 (−1.567)	−11.299* (−1.691)	−7.106 (−1.090)	−4.132*** (−3.904)
McFadden's r^2	0.190	0.194	0.192	0.145	0.167
n	379	379	379	379	379

z-statistics in parentheses.
GDP, gross domestic product.
*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.
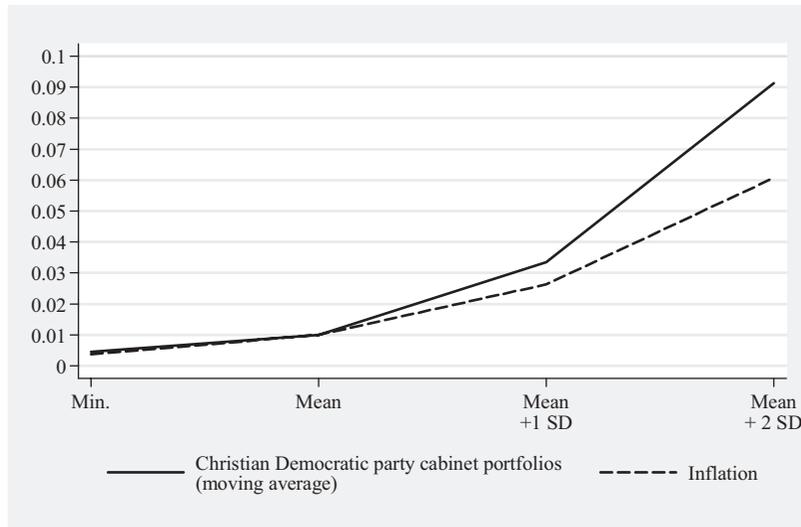
Figure 1. Estimated probabilities of introducing automatic indexation legislation at different values of inflation and Christian democratic party cabinet portfolios (moving average).

along class and religious conflicts, they prevented a group-based mobilization of the elderly. For this reason, a more aged voting population does not increase the likelihood of a pension indexation reform.

Model 1 also indicates that *left party cabinet portfolios (moving average)* is positive but insignificant, while *Christian democratic party cabinet portfolios (moving average)* is positive and significant. This evidence supports Hypothesis 3 but not Hypothesis 2. Therefore, the commitment to ease concerns about pension benefits occurs not only in response to price inflation, but also in response to a particular power constellation. Controlling for the *constitutional structure* and diverse socio-economic factors, countries with stronger Christian democratic parties are significantly more likely to introduce pension indexation clauses.

To assess the predictions from the policy diffusion approach, Models 1 and 2 include the covariates *weighted adoptions* and *weighted adoptions in neighbouring countries*.[4] However, contrary to the expectation of this line of research, *weighted adoptions* is not positive and significant. Hence, we cannot confirm Hypothesis 5 and attribute the adoption of these clauses to cross-national policymaking interdependence. Moreover, Model 2 also reveals

that the consideration of an alternative policy diffusion indicator does not affect the two main findings obtained so far. In this model, a higher level of inflation and a more entrenched Christian democratic movement increase the probability of establishing pension indexation procedures, while all other socioeconomic and political variables still remain unrelated to the event. Neither the level of economic affluence nor the entrenchments of left-wing parties reach a significant level.

How substantial are the effects of inflation and Christian democratic cabinet portfolios? To consider the substantiveness of these two factors and which one has a stronger impact on the event of interest, Figure 1 displays the predicted probabilities at different values of inflation and Christian democratic cabinet portfolios holding all other variables at their mean value. The probabilities have been estimated from Model 1 in Table 2. The figure shows that at the mean value of *Christian democratic party cabinet portfolios (moving average)* and *inflation*, the probability of an event is, respectively, 0.010 and 0.010. At one standard deviation above the mean, their probabilities are, respectively, 3.38 and 2.63 times higher. In particular, the probabilities are 0.034 and 0.026. Both the inflation rate and the power of Christian democratic parties

therefore have a statistically significant and substantive impact on the likelihood of the introduction of pension indexation clauses. Yet, the effect of the Christian democratic movement is stronger than the effect of inflation.

Models 3–5 provide three sensitivity analyses. They address three possible concerns with the findings presented so far. First, the non-significant effect of population ageing is due to the use of the share of the *population 65 or older*. Second, the power of left-wing parties does have an immediate effect. Third, the effect of inflation and Christian democratic parties may only be due to the control variables. However, contrary to these concerns, Models 3–5 confirm the findings obtained from previous equations. Using another indicator of population ageing (*population 55 or older*), the effect remains insignificant. Using an instantaneous measure of the structure of government, the power of left-wing party cabinet portfolios remains insignificant, whereas *Christian democratic party cabinet portfolios$_{(t-1)}$* is positive and significant. The effect of this variable, however, is less than half the alternative indicator of Christian democratic power. Finally, excluding all other variables (Model 5), *inflation* and *Christian democratic party cabinet portfolios (moving average)* remain positive and significant.

CPI and wage indexation

Another possible concern with the results presented so far is that the causes of the introduction of automatic indexation may differ substantially between countries that adopted CPI indexation and those that adopted some form of wage indexation. To assess this possibility, we distinguished the post-war reforms that introduced a full form of CPI indexation (10 countries) from those that introduced a mixed or full form of wage indexation (five countries) (Table 3). The results indicate that the findings are not highly sensitive to the type of indexation. Countries with more entrenched Christian democratic parties have a higher likelihood of introducing both CPI and wage indexation. Moreover, the two policy diffusion variables and *left party cabinet portfolios (moving average)* remain insignificant. The only substantial differences occur in regard to *inflation* and *industrial*

employment. Inflation is only positive and significant in relation to the most common CPI indexation. This is consistent with the neo-functionalist contention that social policy reforms respond to social need produced by short-term economic changes. Faced with the erosion of the pension value in high inflation periods, governments decided to ensure the purchasing power of pensions by linking them to CPI changes. Moreover, partially supporting Hypothesis 4, countries with a higher rate of *industrial employment* are more likely to adopt the more generous wage indexation.

Discussion

A re-examination of the long expansionary era of public pension provision has both theoretical and social policy implications. From a social policy perspective, owing to the current concern with the financial situation of these schemes, pension policy-makers commonly focus on pension indexation mechanisms only as potential cost-cutting provisions (Weaver, 1998). This makes it more necessary than ever to revisit post-war pension policy reforms to recall the reasons why these provisions were introduced. From a theoretical perspective, systematic analyses of concrete measures could help to overcome the overarching claim of the power constellation approach that the power of organized labour has been a key engine of pension reform, in order to specify which particular provisions were most supported by left parties.

Pension indexation rules provide a valuable object of analysis from which to begin this exploration, because contemporary actors perceived them as expansionary reforms. Of the 18 post-war democracies traditionally considered in quantitative welfare research, 15 of them introduced pension indexation between 1945 and 2000. Hence, by analysing these reforms, it is possible to identify the causes of an important, common milestone in post-war pension policy.

Results of the discrete event history analysis do not provide solid evidence supporting either the logic of the industrial approach or the diffusion approach. The degree of economic modernization is

Table 3. Probit models with determinants of the introduction of automatic indexation mechanisms in 17 Organisation for Economic Co-operation and Development countries, 1945–2000

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	CPI indexation			Wage indexation		
Socio-economic variables						
Inflation	0.037***	0.046***	0.046***	−0.069	0.001	0.002
	(3.096)	(2.914)	(3.223)	(−0.674)	(0.011)	(0.025)
GDP growth	−0.017	−0.033	−0.034	0.055	0.025	0.018
	(−0.440)	(−0.704)	(−0.725)	(0.909)	(0.377)	(0.389)
Log of the GDP per capita	1.206	3.003	3.202	−2.476	−3.660	−4.276
	(0.854)	(1.614)	(1.429)	(−1.245)	(−1.613)	(−1.286)
Population 65 or older	−0.028	−0.087	−0.097	0.130	−0.016	−0.047
	(−0.397)	(−0.770)	(−0.860)	(1.041)	(−0.050)	(−0.184)
Industrial employment	−0.014	−0.060	−0.063	0.091***	0.110*	0.121*
	(−0.408)	(−1.227)	(−1.357)	(2.612)	(1.726)	(1.819)
Political variables						
Left party cabinet portfolios (moving average)		0.005	0.008		0.014	0.015
		(0.458)	(0.604)		(0.982)	(1.126)
Christian democratic party cabinet portfolios (moving average)		0.022***	0.024***		0.024**	0.025***
		(3.245)	(2.661)		(2.016)	(2.642)
Veto points		−0.008	−0.008		0.096	0.109
		(−0.178)	(−0.176)		(1.311)	(1.155)
Diffusion variables						
Weighted adoptions		−0.007			0.051	
		(−0.038)			(0.190)	
Weighted proportion of neighbouring countries			−0.003			−0.001
			(−0.280)			(−0.113)
Time since last event	0.408**	0.521***	0.546***	1.226	1.749*	1.748*
	(2.104)	(2.608)	(2.878)	(1.618)	(1.960)	(1.888)
Spline 1 cubed	0.007**	0.010***	0.010***	0.017	0.022**	0.021**
	(2.217)	(3.428)	(3.488)	(1.598)	(1.961)	(2.024)
Spline 2 cubed	−0.005**	−0.007***	−0.007***	−0.010*	−0.013**	−0.012**
	(−2.241)	(−3.627)	(−3.644)	(−1.652)	(−2.083)	(−2.258)
Spline 3 cubed	0.002**	0.002***	0.002***	0.002*	0.003**	0.003***
	(2.209)	(3.530)	(3.548)	(1.717)	(2.323)	(2.955)
Constant	−7.307	−12.790**	−13.586*	−3.066	−2.880	−0.946
	(−1.553)	(−2.131)	(−1.794)	(−0.408)	(−0.336)	(−0.102)
McFadden's r^2	0.130	0.186	0.188	0.248	0.331	0.330
n	379	379	379	379	379	379

z-statistics in parentheses.
GDP, gross domestic product.
*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

only a predictor of the introduction of wage indexation, but not of any form of pension indexation or the predominant CPI indexation. Moreover, the enactment of equivalent reforms in other countries does not increase the likelihood of indexation reforms. The latter finding suggests that international links between technocrats and policymakers do not lie behind these reforms.

In contrast, short-term economic cycles and domestic political conditions do help to account for this policy event. Countries with higher inflation rates are more likely to introduce any form of automatic indexation clauses and automatic indexation based on CPI changes. A standard deviation increase in *inflation* multiplies the probability of any form of indexation by 2.63. Inflation affects pension indexation introduction because it raises awareness about the risk of a gradual depreciation in the values of these entitlements. In a high inflation context, OECD governments decide to link old-age pensions to a macroeconomic index to increase public confidence in the long-term purchasing power of these benefits.

The partisan structure of government also affects these reforms. Despite the fact that the incumbency of left-wing parties is unrelated to the event, countries with more entrenched Christian democratic parties are more likely to index their old-age pensions. A standard deviation increase in the range of *Christian democratic party cabinet portfolios (moving average)* multiplies the probability by 3.38. In comparison with left-wing parties, the general policy principles of Christian democratic parties make them particularly well equipped to pass these provisions. In general terms, Christian democracy is particularly supportive of public pension provision that, contrary to other programmes, benefits all social classes. Moreover, it specifically endorses pension indexation because it depoliticizes pension adjustments, and so it can act as a policy tool to reduce political class conflict. Finally, because these provisions benefit the working and middle classes, they give an opportunity to broaden the electoral base of Christian democratic parties from its core middle-class constituency to the working classes.

More broadly, these results have theoretical implications for the analysis of pension policy change during the post-war era. Emphasizing the *intra*generational redistributive impact of pension policy, the dominant account in welfare policy analysis attributes expansionary measures to the political power of organized labour and left-wing parties (Huber and Stephens, 2001; Myles, 1989; Palme, 1990). Yet, public pension provision also has an insurance or *inter*generational redistributive function. Hence, more affluent socio-economic groups and other political parties also have interests in non-redistributive expansionary measures (Baldwin, 1990; Iversen, 2005). Consistent with this fact, we show that Christian democratic parties were more influential in the enactment of pension indexation clauses than left-wing parties. This suggests that the expected redistributiveness of each expansionary measure determines which sociopolitical coalition drove its enactment. The improvement of the most insurance-based and least redistributive dimensions of pension policy were caused less by labour parties than by religious or centrist parties. Future research could test this hypothesis by comparing the determinants of pension policy events with highly redistributive and limited redistributive consequences. In this regard, it would be worth considering the diffusion of earnings-related and minimum pension programmes, and changes in pensionable ages or the maximum and minimum replacement rates.

Funding

Notes

1. For an exception, see Palme (1990, Chapter 5).
2. For instance, neo-liberal (Simmons and Elkins, 2004) and corporate taxation (Cao, 2010) reforms are more likely to be passed if they were previously enacted in other countries.
3. This is a better indicator than the simple cumulative percentage of left-wing (Christian democratic) cabinet portfolios because for year i it is insensitive to the overall number of previous post-war cabinets.
4. Owing to their high correlation ($r = 0.77$; $p < 0.05$), diffusion variables have been included in separate models.

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