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On the spread of social protection systems

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Abstract: This paper undertakes an empirical analysis of the adoption of various components of social security systems as well as contribution rates. Apart from economic determinants of the adoption, the empirical analysis features determinants relating to countries' political systems and contagion. We analyse to which extent a country's integration into the international network of economic and political cooperation, the similarity of political systems, and economic interdependence facilitate the adoption of social security system components between economies. We study the heterogeneous responses of high and middle to low income economies to country-specific as well as foreign countries' fundamentals.

Keywords: social security systems, taxation, international comparisons, panel data analysis, principal component analysis
JEL classification: H55, H2, C22, F42

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1 Introduction

Social security is a major aspect of economic development. Modern states protect their citizens by means of different social security programmes against potential life adversities and risks. Social security has an outstanding role in promoting growth, political as well as human development (Collier and Messick 1975). Given its tantamount importance for securing minimum living standards and its relevance as a policy strategy against poverty and low levels of wellbeing, especially, in developing countries, a systematic analysis of the fundamentals determining the adoption of aspects of social security systems appears important. Such fundamentals may be domestic, accruing to a potentially adopting economy itself, and they may be foreign, pertaining to foreign adopters through contagion. The responsiveness is likely heterogeneous across types of countries (developing, transition, and developed) as well as across types of components of social security systems (the range of aforementioned provisions covered and the scale and scope of protection). With this research interest, the present paper is concerned with understanding the cross-country progression and clustering of the adoption of social security standards. In particular, the research agenda is interested in isolating economic and political fundamentals whose change might have specifically large impacts on the cross-country pattern of the adoption of such systems and the expansion of welfare programmes around the world.

Despite its accredited importance, very little is known to date about the drivers of and impediments to the adoption of welfare (social security) programmes and their components. Extant work on the pathway towards social insurance has focused on particular countries or sub-national regions and the determinants of the evolution of policies within them. Only few contributions have an international as well as a time dimension. Collier and Messick (1975) explore the timing of the first adoption of social security systems among a number of independent states. They consider domestic 'prerequisites' as well as (hierarchically and spatially) contagious channels of influence. Their findings suggest that domestic factors as well as contagion are responsible for the *timing* of adoption, and contagion is particularly important for the *nature and scope* of the programmes instituted, e.g. through imitation. Their results suggest a hierarchical diffusion pattern with (politically and economically) advanced countries adopting first and less advanced, and developing ones adopting later.

Consistent with Collier and Messick's (1975) findings, Caucutt et al. (2013) identify urbanization and industrialization as key factors of the adoption of social security standards across countries. Structural change induces a migration of individuals from rural areas to cities. While farmers have to rely on land (ownership) and self-sufficiency for old age support, urban dwellers endorse social security systems to smooth consumption over the life cycle. Schmitt (2015) uses a sample of 91 British, French, and Spanish colonies, and, consistent with the hierarchical diffusion argument in Collier and Messick (1975), finds that colonial heritage is an important driver of the adoption, scope, and type of social protection programmes. She shows that the increased heterogeneity of social security programmes across British colonies compared to their French counterparts is largely attributed to the decentralized strategy followed by the British Empire. In addition, the United Kingdom expected their overseas colonies to self-finance these welfare programmes, which explains the correlation between the level of economic development and social security adoption by these British colonies. Whereas the above mention theoretical studies[1] focus, the urbanization process, or

[1] Schmitt (2015) is the only empirical paper and only uses GDP and colonial heritage as explanatory factors.

GDP as explanatory factors for the spread of social security, we provide an empirical analysis of the drivers of this diffusion process accounting both for domestic economic factors and distinguishing between contagion in terms of economic, geographic, or cultural proximity.

In comparison to work on social security systems, the literature on the diffusion of economic policies at large is vast (see Gilardi 2016, for a review), with one of the first contributions being that of Cooper (1968). According to Gilardi (2016), the literature distinguishes between three categories of diffusion mechanisms, namely learning, competition, and emulation. The first channel assumes that countries are influenced by the repercussions of similar policies in other countries.[2] The second mechanism attributes diffusion to the mutual reaction between states in order to attract scarce and mobile resources. Third, emulation, in contrast to learning, does not require that decision makers objectively assess the consequences of policy but posits that states conform to normative perceptions. Hence, whereas some reforms do not receive support even though they might have positive effects, others benefit from strong endorsement, independent of their success probability (Gilardi 2016).

Simmons and Elkins (2004) reveal an additional channel of policy diffusion through globalization and the liberalization of cross-border transactions, leading to the spatial or temporal clustering of the adoption of policies. The reason for contagion in space and time is that the adoption of economic policy changes the economic environment in an adopting country as well as in 'economically connected' ones, and it changes the information set in future potential adopters about the policy. Other reasons for contagion are yardstick competition and standard competition for mobile agents (individuals, firms, etc.) as,for example, is the focus in the literature on tax competition (see Besley and Case 1995; Wilson 1999, for an overview). Beyond tax competition, there is evidence also on the adoption of environmental standards and policies along those lines. For example, Beron et al. (2003) examine the correlation between the decisions of different sovereign states to ratify the Montreal Protocol, and Lovely and Popp (2011) and Perkins and Neumeyer (2012) study the determinants of environmental regulation diffusion, such as economic integration among countries, political economy factors, or international market power.

Given that welfare systems foster social as well as economic development, the lack of effective coverage may represent a major barrier to economic development. The present paper is geared towards identifying the major domestic (idiosyncratic) and foreign (network or contagion) factors which stimulate the adoption of social security systems worldwide. The paper is structured as follows. The next section provides a brief overview of the history of social security systems at large and their major components. Section 3 presents the data employed, the construction of variables used in the empirical analysis, and the estimation strategy. Section 4 reports on the main empirical results, and the last section concludes.

[2] Gilardi (2010) highlights the importance of differentiating between the policy and political repercussions of policy change. His findings reveal a heterogeneity in the effect of new information on policy makers. This different sensitivity can be attributed to different ideological positions and prior beliefs. Furthermore, he shows that policy makers react to both the political as well as the policy consequences of reforms.

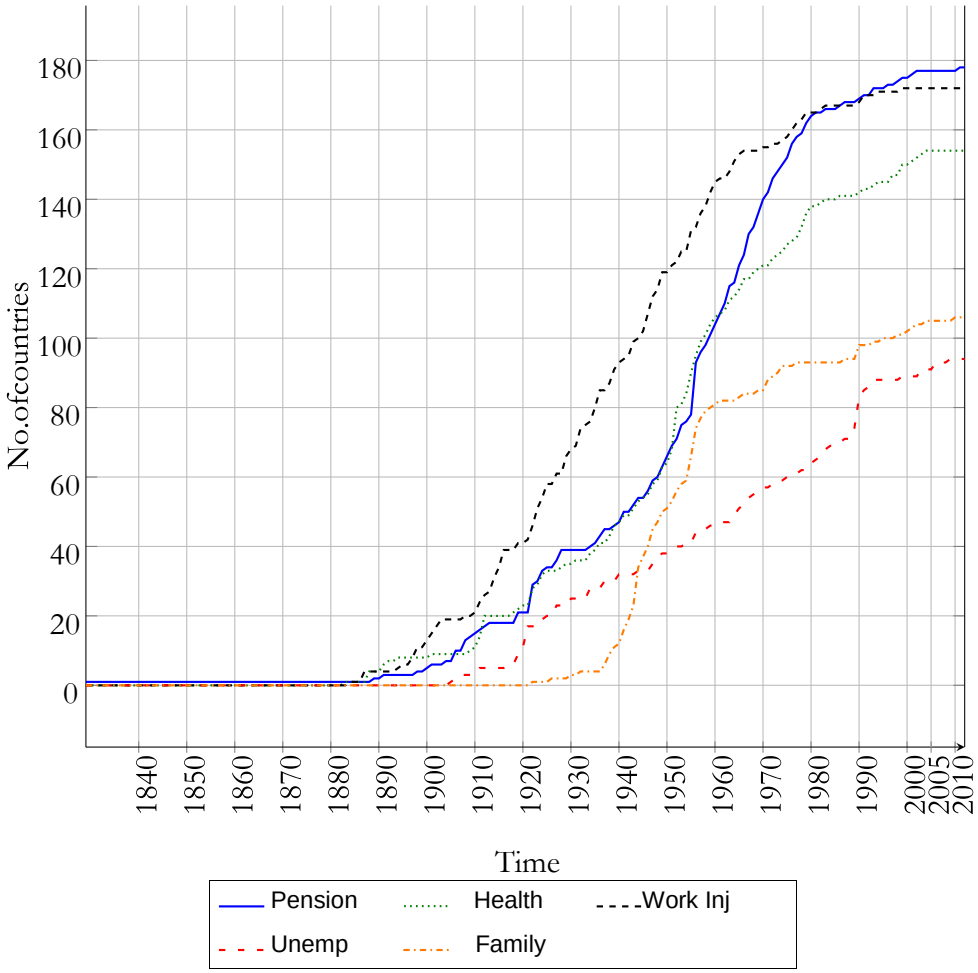
2 The history and nature of social security systems

From a historical perspective, the political concept of modern social insurance can be traced back as far as 1883–89 to the German government at the time of Chancellor Bismarck.[3] The first type of insurance was sickness insurance, followed by work injury insurance, and, later on, by invalidity and old age insurance. It was financed by contributions and was compulsory for all wage earners. Following Germany's lead, several countries started introducing such systems. By the 1930s, the United States, Canada, and Latin American countries had implemented different types of social insurance schemes (ILO 1984). The second wave in social security adoption occurred after the Second World War. Many countries achieved independence from their former colonizers at that time, and social security programmes spread to Asia and Africa. Hence, between the end of the 1940s and the beginning of the 1980s, the number of countries that had introduced social security programmes more than doubled from 58 to 139 (US-SSA 1981; ILO 1984). This increase should partly be attributed to the spreading of adoption as such but also to the growth in the number of independent countries.

It is useful to distinguish among five broad social insurance categories or components, namely: (i) coverage for old age, disability, and survivors; (ii) sickness and maternity; (iii) work injury; (iv) unemployment; and (v) family allowances. The evolution of the adoption of these different social security programme components by area is depicted in Figure 1. By now, the majority of countries have introduced work injury coverage and provisions for old age and invalidity. Whereas around 50 per cent have also implemented programmes for sickness and maternity, only 25 per cent provide for unemployment insurance. At present, 177 and 172 countries have implemented pension and work injury schemes, respectively, whereas only around one-half, i.e. 93 economies, provide for unemployment relief. 154 and 105 economies run health and family allowance programmes, respectively.

[3] Mutual-aid-type societies have existed since ancient-Greek times (Collier and Messick 1975).

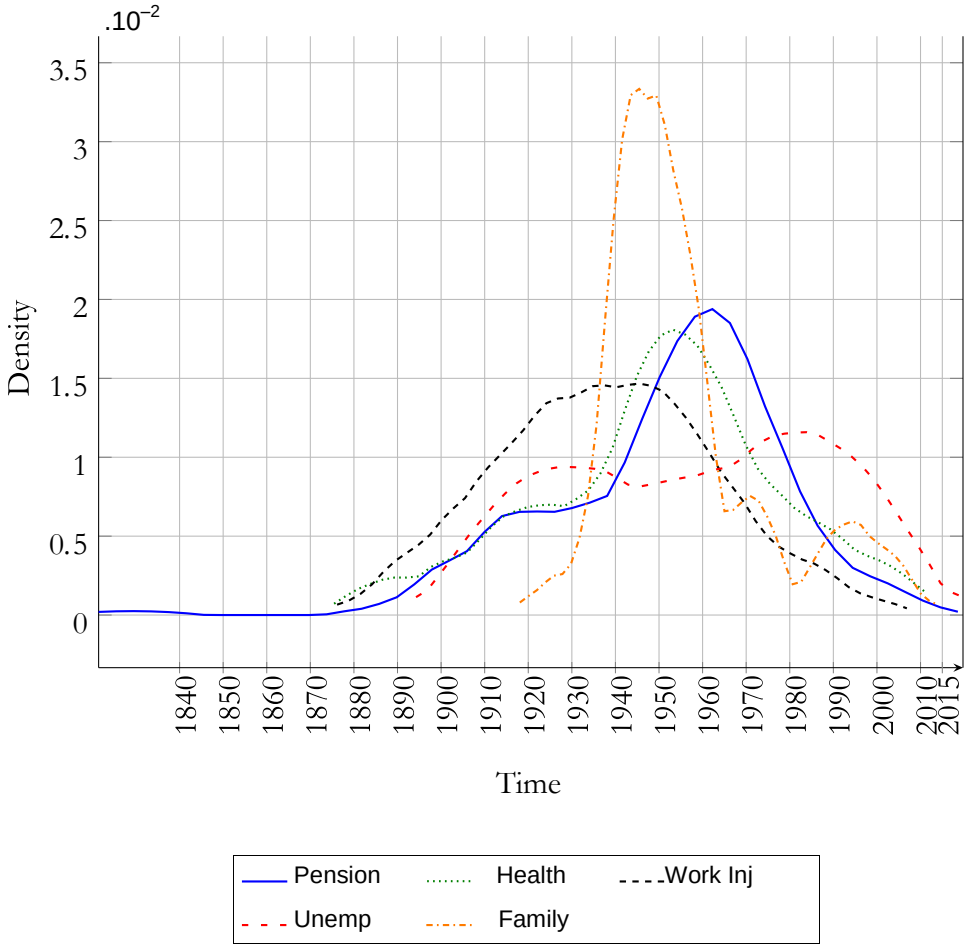
Figure 1: Adoption of social security programmes by type (pre-1900 to 2012)



Source: Authors' illustration based on data from ILO (2015) and the US-SSA, various years.

Figure 2 alludes to the rate of adoption of the different types of social security programmes over time. A number of features are apparent from Figure 2. First, family allowance programmes display a sharp rise, with most countries implementing such programmes between the end of the 1930s and the beginning of the 1970s. The density of health and pension programmes is left-skewed, as in the beginning only a small fraction of countries implemented such programmes, and the followers introduced them only much later on. Finally, the introduction of unemployment programmes shows two local maxima, namely in the 1920s and in the 1990s, respectively.

Figure 2: Development of social security programmes by type (Pre-1900 to 2012)



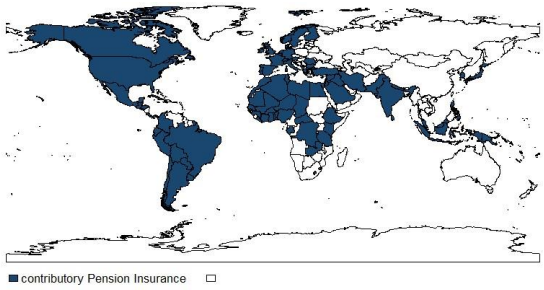
Source: Authors' illustration based on data from ILO (2015) and the US-SSA, various years.

The maps in Figures 3–7 depict the spatial distribution of each particular contributory welfare programme for the time span considered in our empirical analysis, namely 1980 to 2010. During the 1980s and 1990s, contributory pension programmes were present in Europe, North and South America, and in some African countries. During the first ten years of the new millennium, these programmes then spread to Eastern Europe, Russia, the Middle East, and Asia. The maps show a decreasing worldwide coverage of the other types of contributory programmes. Accordingly, during the 1980s, only some European and Central and South American countries had implemented contributory health programmes. During the 1990s Australia, India, and China followed, with North America, Russia, Eastern European economies, and countries in North Western Africa introducing these programmes only since the beginning of the 2000s. Many African countries still lack any form of contributory health programme. A different picture emerges when it comes to compulsory contributory work injury programmes. Here, a larger number of African countries implemented such programmes; however, this was not so for the United States and former member countries of the

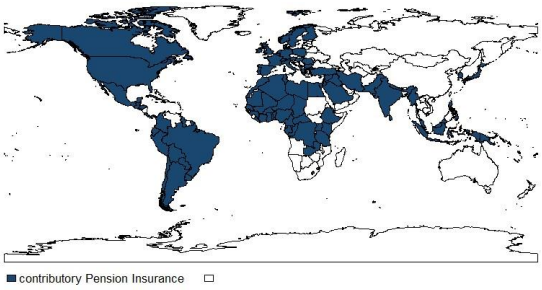
Soviet Union.[4] A scant geographic coverage is encountered for compulsory contributory family allowance programmes, including child allowances and maternity benefits confirming the pattern we saw in the adoption of such programmes in the course of time. Hence, at the moment, only a small number of countries worldwide implemented such mandatory contributory family programmes.

Figure 3: Geographical spread of contributory pension programmes

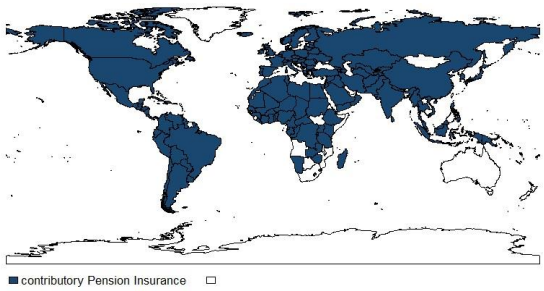
A. 1980



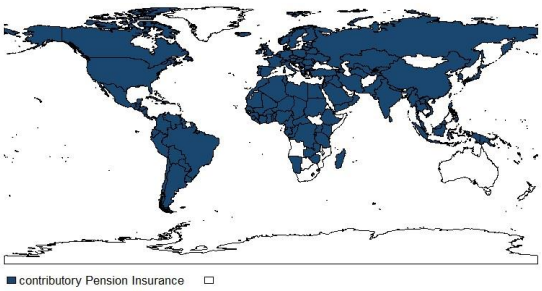
B. 1990



C. 2000



D. 2010

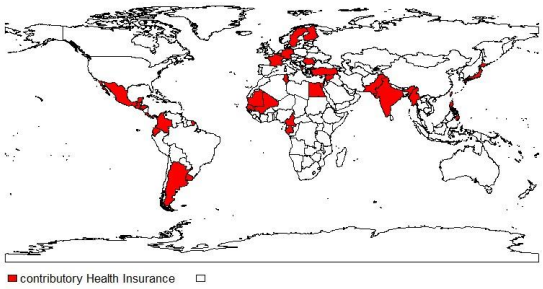


Source: Authors' illustration based on data from US-SSA, various years.

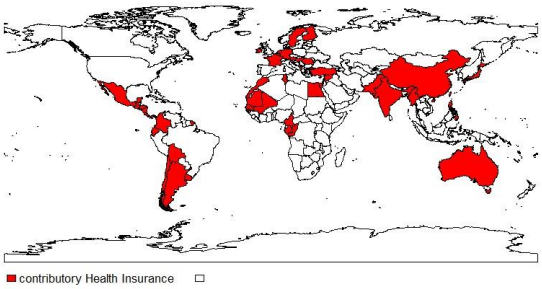
[4] We should note here, that, at the beginning of the 2000s the former members of the Soviet Union implemented separate work injury, unemployment, and family programmes, but then mostly aggregated these contributions into one, by 2010.

Figure 4: Geographical spread of contributory health programmes

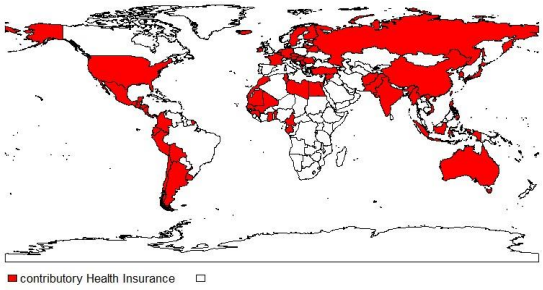
A. 1980



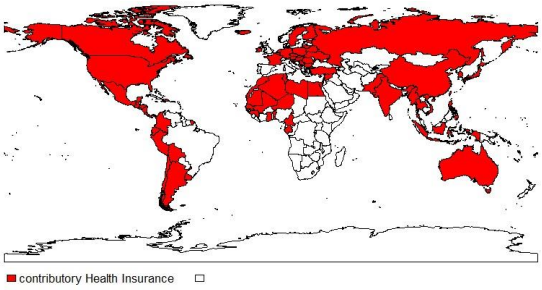
B. 1990



C. 2000



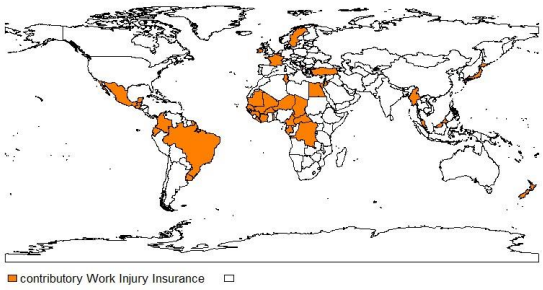
D. 2010



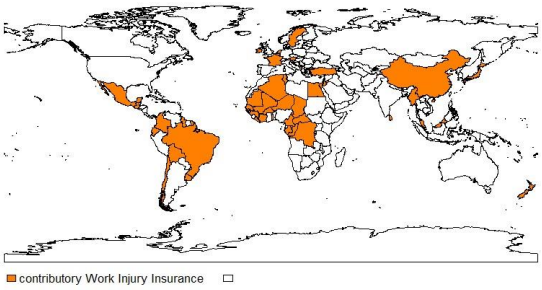
Source: Authors' illustration based on data US-SSA, various years.

Figure 5: Geographical spread of work injury programmes

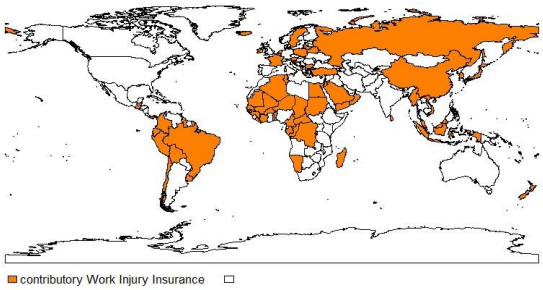
A. 1980



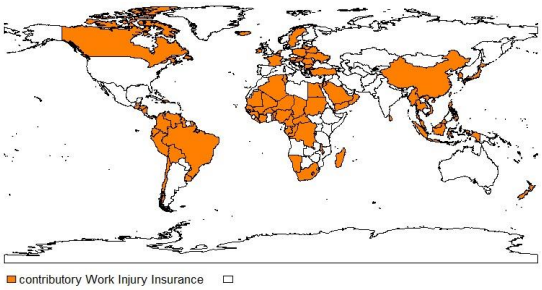
B. 1990



C. 2000



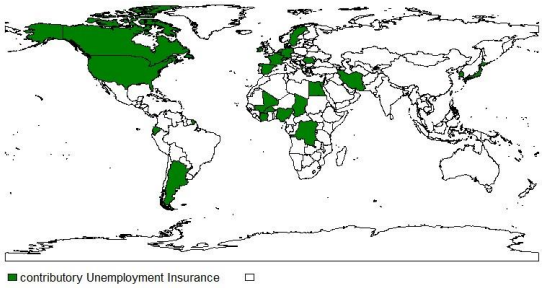
D. 2010



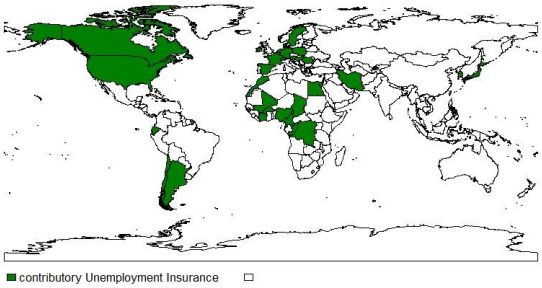
Source: Authors' illustration based on data US-SSA, various years

Figure 6: Geographical spread of unemployment programmes

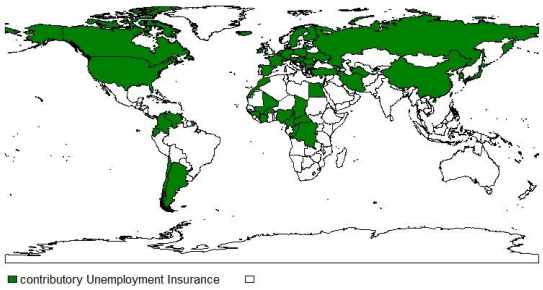
A. 1980



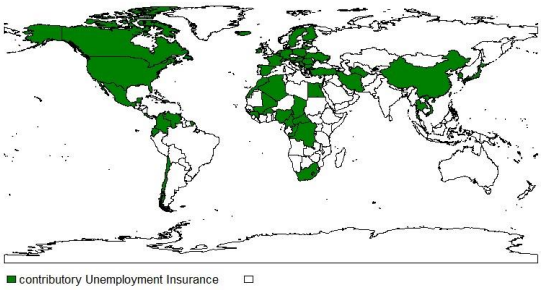
B. 1990



C. 2000



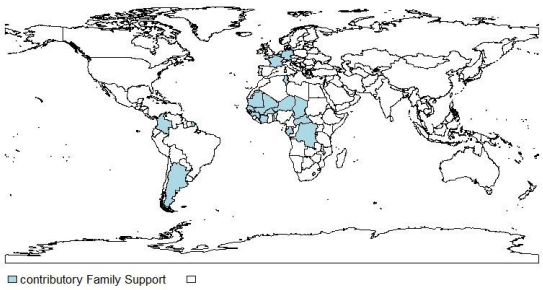
D. 2010



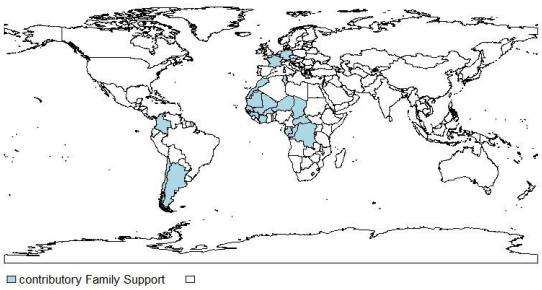
Source: Authors' illustration based on data from US-SSA, various years

Figure 7: Geographical spread of family allowance programmes

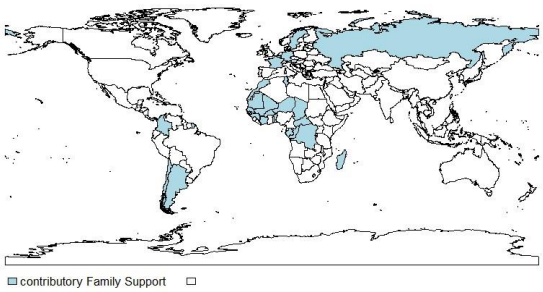
A. 1980



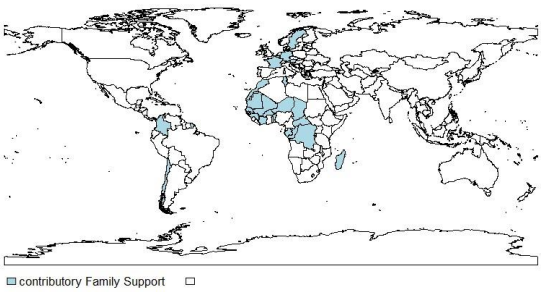
B. 1990



C. 2000



D. 2010



Source: Authors' illustration based on data from US-SSA, various years

3 Data and variable construction

3.1 Data sources and fundamental drivers of social security systems

All information on social protection systems we employ are derived from US-SSA '*Social Security Observatory's Social Security Programmes Throughout the World*'. This webpage provides information on the year of introduction of each programme in each country as well as the employee and employer contribution rates for the specific programmes. We hand collected all this information for 129 countries[5] and the years 1980–2012 so that we have an unbalanced panel as the number of countries on which we have data both on social security programmes as well as on economic and political variables increases steadily over the years. In addition, we collect information on the start of each type of programme in the 129 countries considered, where the starting year may go as far back as to the beginning of the 19th century. For the computation of our three metrics of proximity we use information on bilateral trade and investment agreements, bilateral tax treaties, or currency union membership from the World Trade Organization, CEPII, and other sources. Data on bilateral distance, and other geographical indicators between countries is derived from the CEPII database (CEPII n.d.) which also provides information on official languages, law system, or colonial relationships.

The adoption of social security systems and their components also depends on a number of domestic factors, besides contagion. In particular, economic and political fundamentals affect the likelihood that social security systems are adopted and their scale and scope. We expect the following country-specific variables to explain the prevalence of social protection: per capita income (*Ln GDPPC*); population (*Ln POP*); the average national wage (*Ln WAGE*); the labour participation rate in the economy (*LABPART*); the unemployment rate (*UNEMP*); the savings rate measured as percentage of GDP (*SAV ING*); the government consumption rate (*GOV CONS*); the dependency rate (*DEPENDENCY*); and the share of the population with primary, secondary, and tertiary education (*PRIMEDR*, *SECEDR*, *TERTEDR*). All variables besides the wage and the proxies for education are derived from the World Development Indicators. Education variables come from Barro and Lee (2010), whereby missing observations are linearly imputed. Wage data is obtained from the ILO's Laborsta and ILOstat Databases. Moreover, we employ three covariates reflecting characteristics of the political system: *POLITY* , the Polity IV Project's indicator which is an integer value bounded between -10 and 10 and reflects the freedom of a political system (with lower values indicating less and higher values indicating more freedom); *FEDERAL*, a binary indicator variable reflecting whether a country is organized as a federal system (1) or not (0); and *FINITETERM*, an indicator variable suggesting whether the ruling president or prime minister in a system is in power

[5] The following countries are included in our analysis: Albania, Algeria, Argentina, Armenia, Australia, Austria, Bahrain, Bangladesh, Belgium, Benin, Bolivia, Botswana, Brazil, Bulgaria, Burundi, Cambodia, Cameroon, Canada, Central African Republic, Chile, China, Colombia, Congo, Costa Rica, Croatia, Cuba, Cyprus, Czech Republic, Cote d'Ivoire, Denmark, Dominican Republic, Ecuador, Egypt, El Salvador, Estonia, Fiji, Finland, France, Gabon, Gambia, Germany, Ghana, Greece, Guatemala, Guyana, Haiti, Honduras, Hong Kong, Hungary ,India, Indonesia, Iran, Iraq, Ireland, Israel, Italy, Jamaica, Japan, Jordan, Kazakhstan, Kenya, South Korea, , Kuwait, Kyrgyzstan, Laos, Latvia, Lesotho, Liberia, Libya, Lithuania, Luxembourg, Malawi, Malaysia, Mali, Mauritania, Mauritius, Mexico, Moldova, Mongolia, Morocco, Mozambique, Namibia, Nepal, Netherlands, New Zealand, Nicaragua, Niger, Norway, Pakistan, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Poland, Portugal, Qatar, Romania, Russia, Rwanda, Saudi Arabia, Senegal, Serbia, Sierra Leone, Singapore, Slovakia, Slovenia, South Africa, Spain, Sri Lanka, Sudan, Swaziland, Sweden, Switzerland, Syria, Tajikistan, Tanzania, Thailand, Togo, Trinidad and Tobago, Tunisia, Turkey, Uganda, Ukraine, United Arab Emirates, United , Kingdom, United States, Uruguay, Venezuela, Viet Nam, Yemen, Zambia, and Zimbabwe.

for a finite term (1) or not (0). Information on *FEDERAL* and *FINITETERM* is collected from the University of Gothenburg's Quality of Governance Dataset. The role of these economic factors may be rationalized as follows.

Richer economies, in terms of higher per capita income, are more likely to implement social security systems, as economic modernization and wealth is one of the main drivers behind the emergence of welfare states (Schmitt 2015).[6] Larger economies in terms of population are also expected to have a higher propensity of introducing a social security system. As opposed to this, the larger the labour force participation or the dependency ratio, the lower the probability of implementing a social security system. Furthermore, a higher share of more educated individuals implies higher per capita income and accordingly social security contributions are expected to be lower to counter the possible emigration of high-skilled citizens.

For the historical analysis, we take population from the POPULSTAT (2010) dataset, which tracked population statistics back to 1950. In order to analyse the adoption of any or either of the five categories of social security, we impute data on *Ln POP*, *Ln GDPPC*, *Ln WAGE*, *PRIMEDR*, *SECEDR*, *TERTEDR*, *UNEMP*, *DEPENDENCY* , *SAV ING*, and *GOV CONS* as well as for the proximity variables back to 1829, by applying the average growth rate over the observed years to impute the values for earlier years. We should note here, that due to missing information also for more recent years after 1950, we do not include the information on countries' political systems in our logistic regressions which use historical data.

3.2 Empirical specification

Let us use Y_{it}^{k} to denote the social security system measure (binary or continuous) of type k for country i and year t. Moreover denote a measure of link, connectedness, or adjacency of type h between countries i and j in year t by w_{ijt}^{h} which is zero whenever $i = j$, $w_{iit}^{h} = 0$. Then, an aggregate measure of social security standards of type k of countries which are similar to i in terms of metric h is

$$\overline{Y}_{it}^{hk} \equiv \sum_{j=1}^{N} w_{ijt}^{h} Y_{jt}^{k} \quad . \tag{1}$$

In the regression analysis of this paper, we are interested in the diffusion of various components of countries' social security systems. In order to extract information on this issue from the data, it is useful to postulate the following diffusion process:

$$Y_{it}^{k} = f\left(\sum_{h \in \mathfrak{H}} \alpha^{hk} \overline{Y}_{it-1}^{hk} + X_{it}^{k} \beta^{k} + u_{it}^{k} \right), \tag{2}$$

where $f(\cdot)$ is some functional form (e.g. panel logit for binary variables, dependent variables, or panel linear regression for continuous dependent variables), α^{hk} is a parameter which measures the response of Y_{it}^{k} to the adoption of Y_{it}^{k} in h-type neighbouring economies in year $t - 1$, X_{it}^{k} is a

[6] Even though the focus of the current paper is on the adoption of social security systems and their components (i.e. the scope of systems), we should note that the size (scale) of social security expenditure as a fraction of GDP is larger, the higher per capita income is. This relationship is known as 'Wagner's law' (Mulligan and Sala-i-Martin 1999).

column vector of economic and political regressors which may have an influence on $Y_{it}^{k}\beta^{k}$ is a corresponding parameter vector, and u_{it}^{k} is a disturbance term.

3.3 Measuring proximity and determining country-pair weights w_{ijt}^{h}

In this study, we use three metrics of proximity $h \in \{policy; geography; culture\}$. These three ingredients include the following variables:

- **Proximity through policy—**We employ binary indicator variables on the existence of a bilateral trade agreement, a bilateral investment agreement, a bilateral tax treaty, and a currency union between countries *i* and *j* in year *t* to determine preferential economic policy proximity. We do a principal components analysis (PCA) to determine the first principal component in bilateral policy space. For all country pairs and years, we then obtain PCA_{ijt}^{p} and construct $w_{ijt}^{p} = \frac{PCA_{ijt}^{p}}{\sum_{j=0}^{N} PCA_{ijt}^{p}}$ for all countries $j \neq i$ as a compact metric of preferential policy proximity.

- **Proximity through geography—**We employ minus log bilateral distance, a common border bilateral indicator, and other geographical indicators between countries *i* and *j* to determine the time-invariant geographical proximity between countries. As with policy proximity, we conduct a principal component analysis, determine PCA_{ij}^{g} and associated weights $w_{ij}^{g} = \frac{PCA_{ij}^{g}}{\sum_{j=0}^{N} PCA_{ij}^{g}}$ for all countries $j \neq i$ as a compact metric of geographical proximity.

- **Proximity through common culture, history, and institutions—**We employ time-invariant binary indicators on common official language, common law system, colonial relationship, and common colonizer between countries *i* and *j* to determine the time-invariant cultural proximity between countries, and from a principal components analysis obtain PCA_{ij}^{c} and associated weights $w_{ij}^{c} = \frac{PCA_{ij}^{c}}{\sum_{j=0}^{N} PCA_{ij}^{c}}$ for all countries $j \neq i$ as a compact metric of cultural proximity.

The three metrics of proximity allow us to define $\{\overline{Y}_{it-1}^{pk}, \overline{Y}_{it-1}^{gk}, \overline{Y}_{it-1}^{ck}\}$ as measures of the existence of the *k*th aspect of social security systems in countries which are similar in terms of proximity $h \in \{p,g,c\}$. The parameters on these variables measure the relative importance of spillovers from adopting aspect *k* from neighbourly countries in dimension *h*.

4 Empirical results

4.1 Descriptive statistics

Our first category of dependent variables is a binary variable which takes the value one in the year the respective country adopted one of the five social security schemes (*Pension*, *Unemployment*, *Health*, *Work Injury* or *Family*) and zero otherwise. The variable *SocSec* takes the value one in the year a country implemented for the first time any type of social security. We summarize the features of the dependent variables used in this paper in Table 1 and those of the explanatory variables in Table 2. Table 1 lists statistics for the following variables:

- **Effective rates—**a fractional variable indicating the effective average and marginal rate payable towards social security by employees and employers, respectively. These rates are based on the contributions of a single male worker earning the average country wage, 50 per cent or five times the average wage respectively.

- **Employer—**fractional variables indicating the rate employers have to pay to finance their share of the social security payments for single male employees earning the country-wide average wage, half or five times the average wage respectively. According to the table, average rates range from 0 to 83 per cent and are about 12 per cent on average. Marginal rates are higher with a maximum of 533 per cent[7] and an average of 14 per cent.

- **Employee—**a fractional variable indicating how high a rate employees have to pay to finance the social security payments for employees earning the country-wide average wage half or five times the average wage respectively. These rates are considerably lower than their employer-based counterparts. According to the table, the average rates range from 0 to 38.5 per cent and are about 6 per cent on average. The marginal rates reach a maximum of 44.72 per cent with mean values of around 6.7 per cent.

Table 1: Summary statistics—dependent variables (%)

	Mean	Stddev	Median	Min	Max	Obs
Employer						
EATR_50	11.78	8.46	10.67	0.00	59.63	3,342
EMTR_50	13.69	12.32	11.00	0.00	233.00	3,342
EATR_100	12.03	8.44	10.92	0.00	74.91	3,342
EMTR_100	14.17	14.88	11.15	0.00	533.00	3,342
EATR_500	9.97	8.57	8.18	0.00	82.94	3,342
EMTR_500	10.41	14.88	6.40	0.00	533.00	3,342
Employee						
EATR_50	5.99	5.88	4.74	0.00	38.49	3,342
EMTR_50	6.59	6.92	5.00	0.00	43.40	3,342
EATR_100	6.15	5.60	4.95	0.00	35.41	3,342
EMTR_100	6.69	6.55	5.00	0.00	44.72	3,342
EATR_500	4.65	4.54	3.70	0.00	28.80	3,342
EMTR_500	3.89	5.12	1.68	0.00	30.00	3,342

Note: Measures greater than 100 per cent are possible due to flat rate contributions, which may exceed the average wage per country.

Source: Authors' calculations based on data from the 'Social Security Observatory's Social Security Programmes throughout the World' website.

Table 2 lists summary statistics on the main determinants of social security (or protection) systems including the geography-, culture-, history-, and the trade-relationship-related weighting schemes—Y_{it}^{pk}, Y_{it}^{gk} and Y_{it}^{ck} respectively. We leave the inspection of this table to the reader and suppress a discussion for the sake of brevity.

[7] Measures greater than 100 per cent are possible due to flat rate contributions, which may exceed the average wage per country.

Table 2: Summary statistics—independent variables

	Mean	Stddev	Median	Min	Max	Obs
Ln GDPPC	8.08	1.57	8.03	4.15	11.64	3,342
Ln POP	16.11	1.67	16.10	11.46	21.02	3,342
LABPART	66.51	10.60	67.20	11.47	91.50	3,342
Ln WAGE	8.44	1.37	8.43	-2.86	11.44	3,342
UNEMP	8.65	5.95	7.30	0.00	39.30	3,342
DEPENDENCY	0.64	0.18	0.59	0.16	1.18	3,342
SAVING	20.43	11.95	20.14	-236.43	78.02	3,342
GOVCONS	15.79	5.86	15.31	0.00	76.22	3,342
PRIMED	28.63	15.81	27.45	0.00	82.22	3,342
SECED	35.26	20.89	33.66	0.87	91.95	3,342
TERTED	9.83	8.36	7.74	0.00	48.03	3,342
POLITY	4.33	6.43	7.00	-10.00	10.00	3,342
FEDERAL	0.16	0.37	0.00	0.00	1.00	3,342
FINITETERM	0.90	0.30	1.00	0.00	1.00	3,342
$\overline{Y}_{it}^{pk}$	3.51	0.74	3.49	1.58	7.30	3,342
$\overline{Y}_{it}^{gk}$	3.74	1.92	3.29	0.71	15.54	3,342
$\overline{Y}_{it}^{ck}$	3.27	1.23	3.04	0.00	9.96	3,342

Source: Authors' calculations based on data from the World Development Indicators (World Bank 2014), ILO Laborsta (2008) and ILOStat (2014) Databases, University of Gothenburg's Quality of Governance Dataset (Dahlberg et al. 2015), and Barro and Lee (2010).

4.2 Regression results

Tables 3–8 present the regression results. Tables 3, 5, and 6 report the results for all countries in the sample whereas Tables 4, 7, and 8 present the results for high-, middle-, and low-income economies. We thereby follow the World Bank classification.

In Tables 3 and 4 we report the results of logistic regressions. Regarding the drivers, a few results stand out. First, on the one hand, having a social security system at all is more likely in countries with higher per capita GDP and larger countries in terms of population. On the other hand, the larger the tertiary education rates, the dependency or labour force participation rates, the lower the probability that a country adopts any type of social security scheme.

As to the contagion or spillover variables, we arrive at the following insights. Spillovers in the adoption of social security system characteristics mainly happen through geographical neighbourhood when it comes to the adoption of the system per se. The result is basically driven by high-income economies (see left block of results in Table 4).

Tables 5–8 report the results of random effects estimations using as dependent variables the employer or employee-based contribution rates for the economy-wide respective average wage, 50 per cent of or five times the average wage. All regressions are clustered at the country level. In countries with a higher dependency ratio or more political freedom employer-based rates are lower, whereas countries with a higher per capita GDP or larger countries in terms of population tend to display lower employee-based social contribution rates (see Tables 5 and 6). Furthermore, richer middle and low income economies in terms of higher per capita GDP are associated with lower employer-based rates and high-income economies with higher government consumptions exhibit higher employer-borne effective average and marginal social security contribution rates. In terms of

the neighbourhood variables, whereas trade and economic proximity has a negative effect on employer-based rates, it has a slightly positive effect on the average effective social security burden on employee-based rates. These effects are even more pronounced when we distinguish between different income country groups. As shown in Tables 7 and 8 economic proximity in terms of trade-relationship-related weighting schemes is negatively correlated with effective employer contribution rates in middle and low income economies and positively correlated with employee-borne rates. In addition, within the overall group of countries, there is a positive correspondence between employer- and especially employee-based rates and geographic neighbourhood. Cultural proximity is positively correlated with employer-based contributions and this is the case in particular within middle and low income economies. We have also performed fixed effects regressions using the same dependent variables as in Tables 5–8. In this case, the negative coefficients of economic proximity continue to pertain, whereas geographic and cultural proximity loses its significance as these effects are captured already by the time-invariant fixed country effects.[8]

[8] The results of these regressions are available from the authors upon request.

Table 3: Random effects logistic regressions—binary system indicators

	Pension	Health	Work inj.	Unemp	Family	SocSec
Ln GDPPC	0.336***	0.224***	0.185***	0.258***	0.345***	0.170***
	(0.054)	(0.052)	(0.046)	(0.075)	(0.075)	(0.044)
Ln POP	0.126**	0.169***	0.096*	0.227***	0.069	0.086
	(0.057)	(0.062)	(0.057)	(0.085)	(0.079)	(0.056)
LABPART	-0.007	-0.012**	-0.008*	-0.021***	-0.013*	-0.007***
	(0.005)	(0.005)	(0.004)	(0.008)	(0.007)	(0.004)
Ln WAGE	0.012	0.014	0.011	0.031	0.035	0.007
	(0.018)	(0.018)	(0.015)	(0.034)	(0.034)	(0.014)
UNEMP	-0.006	0.000	-0.001	-0.014	0.000	-0.001
	(0.008)	(0.002)	(0.002)	(0.02)	(0.003)	(0.002)
DEPENDENCY	-0.006*	-0.008**	-0.005**	-0.011*	-0.013**	-0.005**
	(0.003)	(0.004)	(0.003)	(0.007)	(0.006)	(0.002)
SAVING	0.000	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
GOVCONS	-0.008	-0.004	-0.007	-0.012	-0.025	-0.005
	(0.007)	(0.007)	(0.007)	(0.017)	(0.017)	(0.006)
PRIMED	-0.003	-0.002	-0.002	0.007	0.003	-0.002
	(0.004)	(0.004)	(0.003)	(0.005)	(0.005)	(0.003)
SECED	-0.012	-0.002	-0.026	0.019	-0.002	-0.017
	(0.011)	(0.01)	(0.016)	(0.009)	(0.011)	(0.014)
TERTED	-0.29***	-0.22***	-0.262***	-0.147***	-0.191***	-0.258***
	(0.068)	(0.059)	(0.092)	(0.046)	(0.058)	(0.084)
$\overline{Y}_{it}^{pk}$	0.432	4.005	0.076	0.712	-4.103	-1.922
	(3.77)	(3.461)	(3.122)	(6.341)	(3.698)	(3.665)
$\overline{Y}_{it}^{gk}$	0.287	-1.654	5.191***	-1.903	4.138*	4.170**
	(2.248)	(2.669)	(1.833)	(4.652)	(2.174)	(2.000)
$\overline{Y}_{it}^{ck}$	0.819	0.060	-4.431	1.783	3.318	-1.346
	(2.537)	(2.775)	(3.063)	(3.504)	(1.63)	(3.338)
Constant	-6.851***	-7.016***	-5.803***	-8.663***	-6.187***	-5.69***
	(1.023)	(1.086)	(0.946)	(1.613)	(1.432)	(0.921)
R^2	0.08	0.06	0.06	0.1	0.1	0.05
Obs	20,429	20,429	20,429	20,429	20,429	20,429
Countries	125	125	125	125	125	125

Notes: Standard errors in parentheses. *** p<0.01; ** p<0.05; * p<0.1

Source: Authors' computations.

Table 4: Random effects logistic regressions by income class—binary system indicators

	High Income						Middle & Low Income					
	Pension	Health	Work inj.	Unemp	Family	SocSec	Pension	Health	Work inj.	Unemp	Family	SocSec
Ln GDPPC	0.240***	0.169*	0.149*	0.293***	0.482***	0.090	0.417***	0.264***	0.247***	0.349**	0.318***	0.222***
	(0.093)	(0.090)	(0.086)	(0.105)	(0.127)	(0.081)	(0.083)	(0.077)	(0.07)	(0.155)	(0.123)	(0.065)
Ln POP	0.107	0.173	0.076	0.232	0.283*	0.034	0.122*	0.162**	0.111	0.26**	−0.015	0.109
	(0.123)	(0.145)	(0.123)	(0.149)	(0.164)	(0.118)	(0.073)	(0.074)	(0.071)	(0.115)	(0.106)	(0.069)
LABPART	0.007	−0.007	−0.003	−0.015	−0.02	0.008	−0.008	−0.014**	−0.008	−0.023*	−0.015	−0.009*
	(0.014)	(0.014)	(0.013)	(0.014)	(0.016)	(0.013)	(0.006)	(0.007)	(0.005)	(0.012)	(0.009)	(0.005)
Ln WAGE	−0.001	0.004	0.007	0.043	0.043	−0.003	0.028	0.009	0.014	0.004	0.049	0.01
	(0.02)	(0.029)	(0.022)	(0.057)	(0.053)	(0.019)	(0.036)	(0.026)	(0.025)	(0.044)	(0.066)	(0.023)
UNEMP	−0.06	−0.047	−0.029	−0.152*	−0.107	−0.038	−0.005	0.000	0.000	−0.008	0.000	−0.001
	(0.067)	(0.067)	(0.065)	(0.08)	(0.075	(0.065)	(0.008)	(0.002)	(0.002)	(0.02)	(0.001)	(0.002)
DEPENDENCY	−0.006	−0.007	−0.006	−0.008	−0.003	−0.005	−0.006	−0.012**	−0.005	−0.014	−0.022**	−0.005
	(0.006)	(0.007)	(0.005)	(0.009)	(0.008)	(0.005)	(0.005)	(0.006)	(0.004)	(0.013)	(0.01)	(0.003)
SAVING	0.000	−0.011	0.000	−0.013	−0.018	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.009)	(0.000)	(0.011)	(0.014)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
GOVCONS	−0.025	−0.014	−0.014	−0.022	−0.04	−0.013	−0.009	−0.005	−0.007	−0.008	−0.024	−0.006
	(0.025)	(0.021)	(0.021)	(0.026)	(0.037)	(0.018)	(0.009)	(0.008)	(0.007)	(0.021)	(0.02)	(0.007)
PRIMED	−0.001	0.002	−0.001	0.003	0.006	−0.001	0.000	0.001	0.003	0.007	0.008	−0.001
	(0.006)	(0.006)	(0.006)	(0.007)	(0.008)	(0.006)	(0.009)	(0.009)	(0.008)	(0.013)	(0.012)	(0.008)
SECED	−0.007	−0.006	−0.001	0.000	−0.003	−0.009	−0.021	−0.003	−0.118***	0.02	−0.006	−0.034
	(0.015)	(0.016)	(0.014)	(0.015)	(0.017)	(0.016)	(0.016)	(0.013)	(0.044)	(0.013)	(0.015)	(0.026)
TERTED	−0.209**	−0.155*	−0.272**	−0.125*	−0.227**	−0.167*	−0.344***	−0.234***	−0.138	−0.120*	−0.134*	−0.426**
	(0.088)	(0.084)	(0.112)	(0.067)	(0.091)	(0.092)	(0.110)	(0.085)	(0.151)	(0.063)	(0.076)	(0.179)
$\overline{Y}_{it}^{pk}$	−27.139	−8.425	−3.647	−83.055	−7.098	−10.673	5.226	7.788*	3.309	9.767	−8.624	4.241
	(22.176)	(8.708)	(4.595)	(63.896)	(5.101)	(6.801)	(5.071)	(4.664)	(6.888)	(13.604)	(8.9)	(6.855)
$\overline{Y}_{it}^{gk}$	8.099**	6.409	12.931***	7.332	5.342*	9.657***	−0.294	−4.152	1.253	−12.994	5.037*	2.365
	(3.567)	(4.388)	(2.755)	(5.686)	(3.238)	(2.989)	(2.881)	(4.410)	(3.043)	(15.538)	(2.576)	(2.819)
$\overline{Y}_{it}^{ck}$	0.200	−3.237	−17.212	−2.243	2.785	−2.276	−0.988	−0.240	−2.579	6.637	8.933	−4.678
	(3.286)	(6.664)	(11.747)	(9.266)	(2.041)	(5.041)	(4.94)	(4.725)	(6.674)	(9.523)	(5.763)	(6.969)
Constant	−6.465***	−6.824***	−5.566***	−7.991***	−9.907***	−5.127***	−7.205***	−6.63***	−6.228***	−9.383***	−4.114**	−6.035**
	(2.097)	(2.408)	(2.054)	(2.547)	(2.777)	(1.952)	(1.357)	(1.349)	(1.152)	(2.623)	(1.919)	(1.123)
R^2	0.7	0.69	0.71	0.55	0.63	0.7	0.4	0.39	0.38	0.57	0.5	0.36
Obs	6,747	6,747	6,747	6,747	6,747	6,747	13,499	13,499	13,499	13,499	13,499	13,499
Countries	44	44	44	44	44	44	80	80	80	80	80	80

Notes: Standard errors in parentheses. *** p<0.01; ** p<0.05; * p<0.1

Source: Authors' computations.

Table 5: Random effects regressions—employer-borne contribution rates

	EATR_50	EMTR_50	EATR_100	EMTR_100	EATR_500	EMTR_500
Ln GDPPC	-4.411	-5.928	-5.173	-7.161	-8.739**	-10.58
	(4.078)	(5.773)	(3.694)	(5.646)	(4.443)	(7.55)
Ln POP	-1.339	-1.502	-1.733	-2.21	-3.288	-3.413
	(2.133)	(2.979)	(1.977)	(2.981)	(2.333)	(3.902)
Ln POPx Ln GDPPC	0.26	0.358	0.313	0.402	0.513*	0.531
	(0.25)	(0.352)	(0.231)	(0.355)	(0.278)	(0.471)
LABPART	-0.015	-0.009	0.007	0.031	0.029	0.061
	(0.031)	(0.044)	(0.032)	(0.053)	(0.036)	(0.068)
Ln WAGE	0.307	0.552	0.196	0.305	-0.227	-0.413
	(0.352)	(0.49)	(0.288)	(0.444)	(0.335)	(0.605)
UNEMP	-0.025	-0.001	-0.041	-0.009	-0.017	-0.007
	(0.054)	(0.077)	(0.053)	(0.076)	(0.05)	(0.074)
DEPENDENCY	-5.7	-5.811	-6.575*	-6.521	-6.849*	-13.492**
	(4.351)	(5.664)	(3.756)	(5.274)	(4.125)	(6.622)
SAVING	-0.002	0	0	0.004	-0.003	0.015
	(0.015)	(0.022)	(0.013)	(0.021)	(0.014)	(0.022)
GOVCONS	0.053	0.06	0.042	0.074	0.063	0.123*
	(0.049)	(0.06)	(0.043)	(0.06)	(0.042)	(0.071)
PRIMED	0.051	0.115***	0.049	0.101**	0.052	0.114*
	(0.031)	(0.044)	(0.033)	(0.049)	(0.039)	(0.06)
SECED	-0.024	-0.021	-0.018	0.002	0	-0.023
	(0.037)	(0.049)	(0.038)	(0.051)	(0.042)	(0.061)
TERTED	0.014	0.062	0.006	0.107	0.033	0.165
	(0.083)	(0.109)	(0.08)	(0.106)	(0.102)	(0.145)
POLITY	-0.057	-0.122**	-0.062	-0.119*	-0.093**	-0.133*
	(0.046)	(0.058)	(0.047)	(0.065)	(0.043)	(0.07)
FEDERAL	0.383	-0.124	-0.099	0.615	0.128	-0.948
	(0.929)	(1.05)	(0.904)	(1.021)	(0.927)	(1.264)
FINITETERM	0.143	0.42	0.405	0.549	0.356	-0.4
	0.656	0.951	0.56	0.82	0.561	0.822
$\overline{Y}_{it}^{pk}$	-0.072	-0.259*	-0.204	-0.272*	-0.266	-0.338
	(0.146)	(0.156)	(0.136)	(0.144)	(0.18)	(0.286)
$\overline{Y}_{it}^{gk}$	0.165	0.149	0.276*	0.336**	0.152	0.278*
	(0.132)	(0.142)	(0.149)	(0.131)	(0.183)	(0.168)
$\overline{Y}_{it}^{ck}$	0.418**	0.407**	0.331*	0.067	0.359*	0.233
	(0.164)	(0.16)	(0.173)	(0.133)	(0.196)	(0.142)
Constant	30.406	31.055	37.271	47.407	66.399*	82.683
	(36.059)	(50.059)	(32.504)	(48.447)	(38.093)	(64.452)
R^2	0.355	0.296	0.395	0.267	0.249	0.152
Obs	3,342	3,342	3,342	3,342	3,342	3,342
Countries	140	140	140	140	140	140

Notes: Standard errors in parentheses. *** p<0.01; ** p<0.05; * p<0.1

Source: Authors' computations.

Table 6: Random effects regressions—employee-borne contribution rates

	EATR_50	EMTR_50	EATR_100	EMTR_100	EATR_500	EMTR_500
Ln GDPPC	-0.159	-1.251	-3.154*	-3.068	-2.804*	-2.164
	(1.837)	(2.275)	(1.685)	(2.374)	(1.701)	(2.25)
Ln POP	-0.366	-0.701	-1.854*	-1.722	-1.755*	-1.112
	(1.018)	(1.238)	(0.972)	(1.301)	(1.049)	(1.272)
Ln POP x Ln GDPPC	0.051	0.124	0.241**	0.247*	0.218**	0.137
	(0.115)	(0.143)	(0.106)	(0.15)	(0.106)	(0.139)
LABPART	-0.024	-0.02	-0.015	-0.025	-0.01	-0.008
	(0.018)	(0.018)	(0.016)	(0.02)	(0.015)	(0.025)
Ln WAGE	-0.116	0.009	-0.137	-0.224	-0.4**	-0.316
	(0.181)	(0.192)	(0.167)	(0.314)	(0.174)	(0.232)
UNEMP	0.057	0.057	0.043	0.045	0.045	0.045
	(0.037)	(0.043)	(0.035)	(0.04)	(0.036)	(0.043)
DEPENDENCY	-0.62	-0.695	-0.652	-2.294	-3.392	-7.759**
	(2.473)	(2.85)	(2.269)	(2.794)	(2.817)	(3.763)
SAVING	0.001	-0.005	0.004	-0.002	0.001	0.006
	(0.007)	(0.008)	(0.007)	(0.01)	(0.007)	(0.01)
GOVCONS	-0.037	-0.047*	-0.035	-0.034	-0.027	0.004
	(0.024)	(0.026)	(0.024)	(0.035)	(0.026)	(0.029)
PRIMED	-0.017	-0.006	-0.018	-0.017	-0.033	-0.042
	(0.022)	(0.026)	(0.022)	(0.026)	(0.025)	(0.034)
SECED	-0.026	-0.018	-0.017	-0.015	-0.041	-0.068**
	(0.023)	(0.027)	(0.023)	(0.027)	(0.028)	(0.033)
TERTED	-0.05	-0.068	-0.091*	-0.115**	-0.095	-0.035
	(0.052)	(0.061)	(0.048)	(0.054)	(0.086)	(0.105)
POLITY	0.02	0.003	0.013	0.005	0.031	0.012
	(0.03)	(0.035)	(0.031)	(0.042)	(0.031)	(0.039)
FEDERAL	0.879	1.073	0.484	1.009	0.974	1.448
	(1.022)	(1.299)	(1.064)	(1.217)	(0.901)	(1.038)
FINITETERM	-0.053	-0.041	-0.086	-0.063	-0.24	-0.171
	(0.323)	(0.362)	(0.303)	(0.345)	(0.269)	(0.32)
$\overline{Y}_{it}^{pk}$	0.305*	0.232	0.37**	0.226	0.365*	0.029
	(0.167)	(0.157)	(0.153)	(0.164)	(0.21)	(0.294)
$\overline{Y}_{it}^{gk}$	0.385***	0.409***	0.336**	0.446***	0.428**	0.347
	(0.144)	(0.136)	(0.161)	(0.133)	(0.202)	(0.234)
$\overline{Y}_{it}^{ck}$	0.121	-0.069	0.1	-0.008	-0.008	0.07
	(0.196)	(0.229)	(0.198)	(0.206)	(0.113)	(0.168)
Constant	6.866	11.616	30.228*	30.105	33.354*	31.415
	(17.424)	(21.091)	(16.506)	(21.592)	(19.394)	(24.703)
R^2	0.213	0.265	0.256	0.318	0.184	0.035
Obs	3,342	3,342	3,342	3,342	3,342	3,342
Countries	140	140	140	140	140	140

Notes: Standard errors in parentheses. *** p<0.01; ** p<0.05; * p<0.1

Source: Authors' computations.

Table 7: Random effects regressions by income groups—employer-borne contribution rates

	High Income						Middle & Low Income					
	EATR_50	EMTR_50	EATR_100	EMTR_100	EATR_500	EMTR_500	EATR_50	EMTR_50	EATR_100	EMTR_100	EATR_500	EMTR_500
Ln GDPPC	-0.982	1.37	-2.582	-0.099	-3.638	6.661	-8.567*	-13.926*	-9.104**	-15.397**	-13.975***	-23.904***
	(4.902)	(6.491)	(4.771)	(6.202)	(7.17)	(10.976)	(5.012)	(7.653)	(4.182)	(7.044)	(4.355)	(6.998)
Ln POP	2.119	4.401	1.663	3.661	0.963	8.183	-3.355	-5.01	-3.705*	-5.744*	-5.479**	-9.444***
	(2.952)	(4.1)	(2.921)	(4.098)	(4.274)	(6.93)	(2.316)	(3.462)	(1.992)	(3.272)	(2.131)	(3.164)
Ln POPx Ln	-0.083	-0.246	-0.01	-0.201	0.105	-0.654	0.544*	0.867**	0.594**	0.933**	0.846***	1.376***
GDPPC	(0.305)	(0.403)	(0.296)	(0.396)	(0.439)	(0.697)	(0.289)	(0.442)	(0.253)	(0.432)	(0.271)	(0.432)
LABPART	0.029	0.042	0.037	0.059	0.067	0.111	-0.023	-0.02	0.01	0.035	0.019	0.075
	(0.058)	(0.093)	(0.056)	(0.087)	(0.075)	(0.136)	(0.032)	(0.037)	(0.036)	(0.067)	(0.036)	(0.061)
Ln WAGE	0.873	1.267	1.156	1.126	0.124	-0.648	0.212	0.497	0.024	0.148	-0.191	-0.132
	(1.307)	(1.792)	(1.316)	(1.765)	(1.716)	(3.391)	(0.355)	(0.48)	(0.261)	(0.42)	(0.292)	(0.436)
UNEMP	-0.097	-0.106	-0.131**	-0.123	-0.049	-0.007	-0.022	0.023	-0.032	0.023	-0.021	-0.033
	(0.069)	(0.103)	(0.067)	(0.088)	(0.059)	(0.102)	(0.076)	(0.112)	(0.077)	(0.119)	(0.078)	(0.119)
DEPENDENCY	-12.166	-9.918	-15.21*	-13.768	0.759	4.165	-5.146	-6.453	-5.211	-5.553	-9.691**	-16.923**
	(7.667)	(10.359)	(8.046)	(10.592)	(10.184)	(16.684)	(5.382)	(7.028)	(4.266)	(6.301)	(4.424)	(6.709)
SAVING	0.055*	0.041	0.065**	0.066*	0.047	0.063	-0.021	-0.015	-0.017	-0.021	-0.021	-0.021
	(0.032)	(0.043)	(0.03)	(0.037)	(0.029)	(0.05)	(0.018)	(0.03)	(0.017)	(0.029)	(0.017)	(0.024)
GOVCONS	0.238*	0.209	0.281**	0.286**	0.231**	0.231	0.02	0.023	-0.009	0.023	0.014	0.082
	(0.143)	(0.162)	(0.136)	(0.145)	(0.108)	(0.166)	(0.049)	(0.062)	(0.036)	(0.066)	(0.045)	(0.078)
PRIMED	0.064	0.171*	0.057	0.118	0.068	0.154	0.023	0.067	0.02	0.06	0.036	0.045
	(0.07)	(0.093)	(0.076)	(0.101)	(0.1)	(0.132)	(0.035)	(0.053)	(0.037)	(0.059)	(0.041)	(0.063)
SECED	-0.006	0.043	-0.011	0.017	0.039	0.053	-0.041	-0.052	-0.026	-0.001	-0.036	-0.102
	(0.081)	(0.097)	(0.084)	(0.099)	(0.116)	(0.141)	(0.038)	(0.057)	(0.039)	(0.057)	(0.042)	(0.062)
TERTED	0.133	0.211	0.11	0.242	0.063	0.301	-0.112	-0.04	-0.126	-0.028	0.038	0.211
	(0.117)	(0.162)	(0.117)	(0.164)	(0.184)	(0.248)	(0.112)	(0.14)	(0.12)	(0.154)	(0.11)	(0.148)
POLITY	-0.126	-0.167	-0.146	-0.213	-0.094	-0.107	-0.026	-0.087	-0.016	-0.077	-0.078*	-0.122*
	(0.134)	(0.159)	(0.129)	(0.165)	(0.143)	(0.238)	(0.044)	(0.06)	(0.043)	(0.07)	(0.044)	(0.067)
FEDERAL	-3.163*	-3.945*	-3.38**	-1.651	-1.702	-2.538	1.894*	1.346	1.406	1.244	0.878	0.126
	(1.65)	(2.362)	(1.563)	(2.338)	(2.267)	(3.035)	(0.992)	(1.198)	(0.887)	(0.994)	(1.167)	(1.743)
FINITETERM	5.842	5.705	4.751	5.164	1.427	2.831	-0.159	0.263	0.211	0.518	0.33	-0.393
	(4.292)	(4.366)	(3.972)	(4.465)	(3.374)	(4.019)	(0.654)	(0.956)	(0.574)	(0.867)	(0.6)	(0.855)
$\overline{Y}_{it}^{pk}$	0.066	-0.145	0.042	-0.076	0.063	0.003	-0.212	-0.389**	-0.395**	-0.449***	-0.521**	-0.641**
	(0.208)	(0.231)	(0.213)	(0.212)	(0.312)	(0.507)	(0.195)	(0.195)	(0.166)	(0.17)	(0.209)	(0.299)
$\overline{Y}_{it}^{gk}$	0.287	0.326	0.401*	0.356*	0.136	0.293	0.073	-0.009	0.078	0.255	0.072	0.177
	(0.222)	(0.237)	(0.239)	(0.193)	(0.358)	(0.247)	(0.177)	(0.202)	(0.175)	(0.185)	(0.179)	(0.237)
$\overline{Y}_{it}^{ck}$	-0.082	-0.014	-0.065	-0.146	0.224	0.072	0.884***	0.735***	0.806***	0.269*	0.479**	0.414***
	(0.205)	(0.218)	(0.239)	(0.2)	(0.348)	(0.22)	(0.206)	(0.199)	(0.226)	(0.145)	(0.228)	(0.138)
Constant	-17.638	-58.754	-8.182	-36.284	-4.952	-108.717	60.415	89.301	66.198*	104.397*	106.837***	183.567***
	(46.801)	(65.841)	(46.488)	(66.031)	(67.724)	(110.893)	(43.741)	(62.721)	(34.323)	(54.659)	(35.086)	(54.593)
R^2	0.25	0.279	0.293	0.179	0.281	0.178	0.287	0.221	0.299	0.253	0.2	0.125
Obs	1,344	1,344	1,344	1,344	1,344	1,344	1,977	1,977	1,977	1,977	1,977	1,977
Countries	50	50	50	50	50	50	89	89	89	89	89	89

Notes: Standard errors in parentheses. *** p<0.01; ** p<0.05; * p<0.1

Source: Authors' computations.

Table 8: Random effects regressions by income groups—employee-borne contribution rates

	High Income						Middle & Low Income					
	EATR_50	EMTR_50	EATR_100	EMTR_100	EATR_500	EMTR_500	EATR_50	EMTR_50	EATR_100	EMTR_100	EATR_500	EMTR_500
Ln GDPPC	-2.883	-3.958	-3.458	-2.516	-3.073	-3.844	0.624	-1.018	-4.331**	-4.88	-2.629	-0.929
	(3.23)	(3.926)	(3.132)	(3.707)	(3.065)	(4.055)	(2.004)	(2.849)	(2.022)	(3.325)	(1.859)	(2.559)
Ln POP	-1.928	-2.341	-2.181	-2.342	-2.735	-2.404	-0.024	-0.445	-2.358**	-2.299	-1.5	-0.455
	(2.269)	(2.656)	(2.225)	(2.484)	(2.096)	(2.838)	(1.008)	(1.363)	(1.071)	(1.631)	(0.968)	(1.12)
Ln POPx Ln	0.221	0.265	0.258	0.288	0.298	0.218	-0.004	0.1	0.309**	0.348*	0.198**	0.08
GDPPC	(0.221)	(0.256)	(0.216)	(0.243)	(0.203)	(0.277)	(0.121)	(0.174)	(0.126)	(0.208)	(0.117)	(0.155)
LABPART	-0.011	0.005	-0.006	-0.046	-0.023	-0.017	-0.026	-0.025	-0.013	-0.011	-0.006	0.014
	(0.035)	(0.035)	(0.032)	(0.034)	(0.027)	(0.047)	(0.019)	(0.02)	(0.017)	(0.029)	(0.016)	(0.021)
Ln WAGE	-0.051	0.605	-0.274	-1.688	-1.427**	-0.163	-0.107	-0.055	-0.15	-0.047	-0.205	-0.263
	(0.693)	(0.873)	(0.67)	(2.195)	(0.685)	(1.049)	(0.196)	(0.192)	(0.171)	(0.2)	(0.175)	(0.185)
UNEMP	0.146**	0.147**	0.133**	0.159***	0.142**	0.141*	-0.011	-0.011	-0.03	-0.023	-0.012	-0.011
	(0.057)	(0.059)	(0.055)	(0.061)	(0.061)	(0.076)	(0.043)	(0.056)	(0.04)	(0.054)	(0.041)	(0.056)
DEPENDENCY	0.093	-0.873	-3.573	-8.077	-6.514	-11.471	-2.032	-1.443	-0.442	0.236	-2.502	-6.003*
	(5.653)	(5.543)	(5.604)	(5.915)	(6.803)	(8.648)	(3.317)	(3.939)	(3.165)	(3.691)	(2.896)	(3.397)
SAVING	0.011	-0.006	0.012	-0.017	0	0.02	-0.006	-0.011	-0.005	-0.009	-0.004	0
	(0.018)	(0.019)	(0.018)	(0.032)	(0.021)	(0.024)	(0.009)	(0.011)	(0.008)	(0.014)	(0.009)	(0.01)
GOVCONS	-0.017	-0.09	-0.016	-0.077	-0.024	0.025	-0.038*	-0.031	-0.03	-0.007	-0.022	-0.004
	(0.078)	(0.075)	(0.086)	(0.116)	(0.097)	(0.084)	(0.02)	(0.024)	(0.02)	(0.034)	(0.025)	(0.034)
PRIMED	0.007	0.027	0.007	-0.009	-0.055	-0.114	-0.015	-0.008	-0.023	-0.017	-0.016	-0.015
	(0.042)	(0.045)	(0.039)	(0.053)	(0.064)	(0.11)	(0.027)	(0.032)	(0.026)	(0.032)	(0.026)	(0.029)
SECED	0.016	0.03	0.025	0.01	-0.054	-0.116	-0.042	-0.033	-0.033	-0.034	-0.048*	-0.081**
	(0.712)	(0.496)	(0.529)	(0.847)	(0.478)	(0.315)	(0.117)	(0.307)	(0.205)	(0.329)	(0.093)	(0.019)
TERTED	-0.044	-0.065	-0.044	-0.076	-0.111	-0.09	-0.067	-0.069	-0.138*	-0.102	-0.048	0.033
	(0.08)	(0.092)	(0.075)	(0.083)	(0.146)	(0.195)	(0.07)	(0.087)	(0.071)	(0.09)	(0.067)	(0.082)
POLITY	0.003	0	-0.025	-0.03	0.068	-0.016	0.024	0.005	0.025	0.005	0.017	0.015
	(0.074)	(0.076)	(0.064)	(0.08)	(0.068)	(0.071)	(0.031)	(0.038)	(0.034)	(0.05)	(0.033)	(0.039)
FEDERAL	-0.74	-0.633	-1.165	-1.19	0.16	1.695	1.821	2.312	1.392	2.096	1.649	2.206
	(1.1)	(1.282)	(0.983)	(1.58)	(1.575)	(2.459)	(1.571)	(1.963)	(1.734)	(2.113)	(1.4)	(1.423)
FINITETERM	0.95	0.774	0.818	2.574	0.007	3.075	0.025	0.043	-0.003	-0.065	-0.104	-0.306
	(1.589)	(1.637)	(1.474)	(2.573)	(2.681)	(2.751)	(0.327)	(0.362)	(0.298)	(0.353)	(0.263)	(0.324)
$\overline{Y}_{it}^{pk}$	0.359	0.185	0.301	0.051	0.184	-0.047	0.296	0.309	0.477**	0.461**	0.599**	0.102
	(0.257)	(0.213)	(0.239)	(0.246)	(0.338)	(0.484)	(0.232)	(0.25)	(0.194)	(0.216)	(0.278)	(0.312)
$\overline{Y}_{it}^{gk}$	0.126	0.202	0.214	0.593***	0.625*	0.435	0.447***	0.45***	0.374**	0.339*	0.327	0.21
	(0.317)	(0.273)	(0.322)	(0.222)	(0.37)	(0.411)	(0.157)	(0.15)	(0.173)	(0.184)	(0.213)	(0.192)
$\overline{Y}_{it}^{ck}$	0.145	0.026	0.099	-0.036	-0.055	-0.002	0.063	-0.11	0.163	0.171	-0.241	-0.103
	(0.217)	(0.291)	(0.225)	(0.25)	(0.126)	(0.217)	(0.504)	(0.435)	(0.457)	(0.376)	(0.423)	(0.337)
Constant	28.303	34.416	35.709	45.119	52.382	57.68	3.625	9.536	38.434**	34.852	27.687	16.13
	(36.808)	(43.277)	(36.408)	(41.528)	(39.063)	(54.778)	(18.824)	(25.255)	(18.338)	(27.398)	(17.011)	(21.433)
R^2	0.196	0.233	0.276	0.349	0.264	0.026	0.094	0.154	0.113	0.181	0.13	0.039
Obs	1,344	1,344	1,344	1,344	1,344	1,344	1,977	1,977	1,977	1,977	1,977	1,977
Countries	50	50	50	50	50	50	89	89	89	89	89	89

Notes: Standard errors in parentheses. *** p<0.01; ** p<0.05; * p<0.1

Source: Authors' computations.

5 Conclusions

Social security promotes economic and social development by ensuring income security, access to health care, and the provision of additional services which safeguard the population from life risks. Still, even if the legal coverage of social protection systems is established in most countries worldwide, the effective coverage still lags behind. Given the relevance of social security for poverty alleviation and guarantee of minimum living standards, a systematic analysis of the fundamentals determining the adoption of such systems appears important. In this paper we have attempted to fill this gap and to undertake an empirical analysis of the legal adoption of social security systems worldwide. We focus on the spread of social security systems and determinants of social security rates. The empirical analysis features both domestic and political factors as well as contagion as an explanatory factor for the implementation of such systems. Our findings reveal that proximity through geography mainly is important for the adoption of any type of social security scheme and is positively correlated with employer- and especially employee-based rates. In addition, proximity through economic policy implies lower employer based contributions, which could be interpreted as a possible sign of competition between countries, similar to tax competition. As opposed to this, cultural proximity is positively associated with employer-based rates. These latter results are more pronounced within the group of middle-low income economies.

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