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Abstract: We portray determinants of social expenditure in OECD countries. Many theories have been proposed to describe why social expenditure has increased in industrialized countries. Determinants include globalization, political-institutional variables such as government ideology and electoral motives, demographic change and economic variables such as unemployment. Scholars have used social expenditure as the dependent variable in many empirical studies. We employ extreme bounds analysis to examine robust predictors of social expenditure. Our sample includes 31 OECD countries over the period 1980-2016. The results suggest that budget deficits, trade globalization and fractionalization of the party system were negatively associated with social expenditure. Aging, unemployment, social globalization, coalition governments and public debt were positively associated with social expenditure. Moreover, social expenditure increased under left-wing governments when de facto trade globalization was pronounced. Results based on Bayesian model averaging corroborate the relationships found between banking crisis, de facto trade globalization, social globalization, legislative fractionalization, coalition governments, public debt and budget deficits on the one hand and social expenditure on the other. We conclude that policymakers in individual countries use domestic measures to design social policies – globalization, aging, and business cycles notwithstanding.

1.   Introduction

For a long time, social expenditure has increased in many industrialized countries. Public social expenditure relative to GDP increased from 14.4% in 1980 to 20.5% in 2016 in OECD countries (see Figure 1). In particular, social expenditure relative to GDP was rapidly increasing during the Great Recession of 2008-2009. Since the year 2009, social expenditure is decreasing in about two thirds of the OECD countries following the public debt crisis.[1] There is variance across OECD countries in social expenditure in both levels and over time: in continental countries, such as Italy, social expenditure tends to increase. In countries with a large size and scope of government, it typically assumes a relatively high share of GDP. It has fluctuated between 25% and 30% since 1980 in countries such as Finland, or even decreased, as for example in the Netherlands. In countries enjoying economic freedom like the United States, social expenditure typically assumes relatively low values but increased somewhat in recent years (see Figure 2; see also Figure A. 1 and Figure A. 2 in the appendix). In many OECD countries, social expenditure assumes the lion's share of general government expenditure. Governments need to set priorities when designing budgets. Clearly, large budget shares for social expenditure give rise to smaller budget shares for other types of expenditure such as public goods, a phenomenon that has been described as "social dominance" (e.g. Schuknecht and Zemanek 2018).

Figure 1: Social expenditure in the OECD, 1980-2016.

Source: OECD
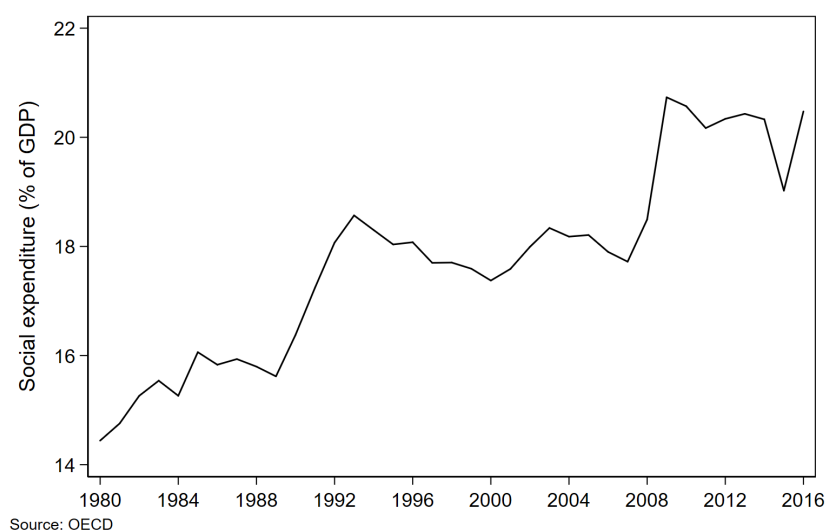
Scholars examine determinants of social expenditure. Theories include political-economic, institutional, demographic and economic approaches. Globalization is, for example, expected to influence social expenditure. Advocates of the dark side of globalization describe that globalization puts pressure on national governments that need to decrease tax rates and, in turn, have decreasing public expenditure at hand to redistribute income. Consequently, globalization may well decrease social expenditure (race-to-the-bottom hypothesis). Others maintain, by contrast, that globalization increases social expenditure because citizens demand more insurance and income redistribution (compensation hypothesis). The partisan theories suggest, for example, that left-wing governments

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[1] https://www.oecd.org/social/soc/OECD2019-Social-Expenditure-Update.pdf (accessed on 31 July 2019).

increase social expenditure to a larger extent than right-wing governments because left-wing governments favor income redistribution and tend to gratify low-income citizens. The political business cycle theories suggest that election-motivated politicians increase social expenditure before elections. Social expenditure is more visible to the voters than investment expenditure for roads and schools. Election-motivated politicians are also not likely to decrease social expenditure after elections; they rather leave it at the pre-election level. The influence of globalization on domestic governments puts the partisan theories and the political business cycle theories into question: do domestic governments have any leeway in designing social policies when globalization exerts pressure on domestic governments? We return to this issue below.

Increases in social expenditure may also be quite mechanical. During the demographic change, the working age population must take care of a growing number of senior citizens. When less citizens work and provide contributions to social security systems, and simultaneously, more citizens enjoy social security benefits, social expenditure increases, ceteris paribus. In recessions, unemployment benefits increase and GDP decreases. It is quite clear therefore that social expenditure as a share of GDP increases in recessions. Overall, however, the empirical evidence supporting individual theories is mixed. We discuss theories and previous empirical studies in section 2.

Figure 2: Social expenditure in selected countries, 1980-2016
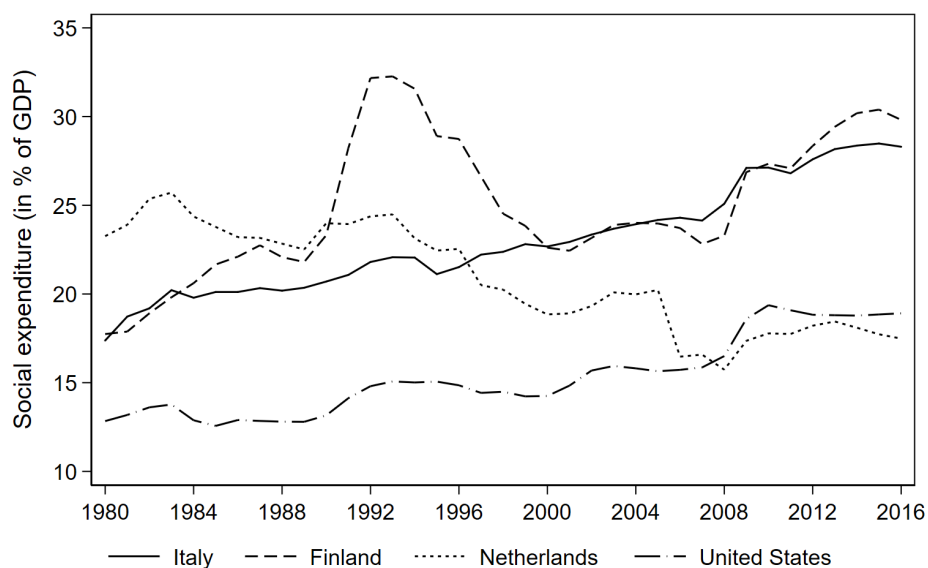
Source: OECD

Panel data models for OECD countries need to handle concerns about endogenous explanatory variables. Important sources of endogeneity are omitted variables and reverse causality between the dependent and the explanatory variable.

Explanatory variables are endogenous when omitted variable bias is present, that is there are third (observed or unobserved) variables that are both correlated with the dependent variable and the main explanatory variable. Panel data studies consider many explanatory variables at once and disentangle which explanatory variables explain changes in social expenditure conditional on other variables. Previous empirical studies on social expenditure suffer, however, from omitted variable bias when significant predictors of social expenditure are not considered. We include many explanatory variables

that have been proposed to predict social expenditure to mitigate concerns about omitted variable bias and employ extreme bounds analysis (EBA) and Bayesian model averaging (BMA) to portray robust predictors of social expenditure. Clearly, employing EBA and BMA does not rule out but it helps to mitigate omitted variable biases.

Another important reason for endogeneity is reverse causality between the dependent and the explanatory variables. For example, social policies and how social expenditure develops may well influence voting behavior. When citizens disagree with social policies, they will vote incumbent governments out of office. Government ideology changes. We handle concerns about reverse causality by considering lagged values of the explanatory variables in both EBA and BMA. We also employ 5-year averages of our variables instead of yearly observations as a robustness check.

We nevertheless realize that we can only safely say to report conditional correlations between individual explanatory variables and social expenditure and not causal effects. The term "effect" that we use in our study thus relates to conditional correlations – in our empirical analysis and often when we portray results of related studies. Our sample includes 31 OECD countries over the period 1980-2016. The results suggest that budget deficits, trade globalization and fractionalization of the party system were negatively associated with social expenditure. Aging, unemployment, social globalization, coalition governments and public debt were positively associated with social expenditure. Moreover, social expenditure increased under left-wing governments when de facto trade globalization was pronounced. Results based on Bayesian model averaging corroborate the relationships found between banking crisis, de facto trade globalization, social globalization, legislative fractionalization, budget deficits, and public debt on the one hand and social expenditure on the other. We conclude that policymakers in individual countries use domestic measures to design social policies – globalization, aging and business cycles notwithstanding.

2. Theories and previous empirical evidence

2.1 Economic and demographic determinants

Economic determinants: Social expenditure will increase in recessions, as measured by low GDP growth and pronounced unemployment rates (e.g., Garrett and Mitchell 2001). A difficulty with estimating the effect of GDP growth on social expenditure is that GDP represents the denominator of our dependent variable. An increase in GDP mechanically decreases the social expenditure to GDP ratio. To measure the business cycle effect of GDP, Schuknecht and Zemanek (2018) employ GDP growth minus the trend component as an explanatory variable.[2] Regarding unemployment, they extract the trend component from the unemployment rate as measure of the structural unemployment rate.

Demography: Manifold hypotheses juxtapose how population aging influences the welfare state. The median voter hypothesis predicts that the size of the welfare state increases during demographic changes. When the median voter becomes older, the older generation will lobby for higher social transfers. Aging induces, however, a pure mechanical effect: the larger the number of pensioners, the larger are pension expenditures (Breyer and Craig 1997, Potrafke 2009, Tepe and Vanhuysse 2009). The political economic and the mechanic effect notwithstanding, aging is expected to increase the size

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[2] Filtering is carried out using the Hodrick-Prescott-Filter (HP).

of the welfare state. An alternative hypothesis predicts that aging reduces the size of the welfare state because aging reduces the profitability of the pay-as-you-go social security systems and the younger generation refuses to pay higher pension benefits when labor supply is endogenous (Börsch-Supan 1995, Breyer and Stolte 2001, Razin et al. 2002, Galasso and Profeta 2007, Shelton 2008).

Scholars have studied empirically how aging has influenced welfare state expenditures in OECD countries. The empirical evidence shows that aging as measured for example by the dependency ratio hardly influenced overall social expenditure, public pension and health expenditures (Breyer and Craig 1997, Potrafke 2009, Tepe and Vanhuysse 2009). Razin et al. (2002) even report a negative influence of the dependency ratio on the labor tax rate and social transfers.

2.2 Globalization-Welfare state nexus

Two theories describe how globalization influences social expenditure: the race-to-the-bottom (disciplining or efficiency theory) and the compensation theory. The race-to-the-bottom theory suggests that globalization mitigates the welfare state. The most important reason is system competition between national governments (e.g. Sinn 1997 and 2003). National governments are expected to compete for foreign direct investments and try to keep national champions within their borders by offering attractive investment conditions. When competition among countries increases, national governments decrease tax rates for relatively mobile tax bases such as corporate profits and capital (see Devereux et al. 2002 and 2008) and high-income labor (see Kleven et al. 2014, Egger et al. 2019) to remain competitive. Governments reduce trade regulations and tariffs, abolish capital account restrictions and collaborate with other countries in international organizations. The more competition between national governments there is, the more tax rates are expected to decrease. With small tax rates on interest income and small corporate tax rates, public expenditures must be financed by a smaller range of tax bases. Tax revenues might decline, which, in turn mitigates public good provision and especially transfers such as social expenditure.[3]

The compensation theory, by contrast, describes that social expenditure increases when economic globalization is proceeding rapidly (Cameron 1978, Rodrik 1998).[4,5] Citizens who are exposed to increasing income insecurity and uncertainty in the course of globalization will demand more social expenditure and a larger size and scope of the government. In particular, social expenditure is likely to increase to compensate for uncertainty and risks. Important examples include generous unemployment and health insurance that may well help those citizens who do not enjoy the benefits of globalization.[6]

The empirical evidence on the globalization-welfare state nexus is mixed (see, for example, Schulze and Ursprung 1999, Ursprung 2008, Dreher et al. 2008b and Meinhard and Potrafke 2012, Onaran et

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[3] Egger et al. (2019) find that during globalization, higher levels of public expenditures are financed by a smaller range of tax bases, such as middle class labor income.
[4] Cameron (1978) hypothesized that countries that are more open are also more heavily unionized, which, through collective bargaining, increases social spending. Rodrik (1998) showed that the correlation between openness and social spending is also found in developing countries with low levels of unionization. Social spending serves as a form of insurance against uncertainty and risks related to openness.
[5] For the link between globalization and the size of government, see also Alesina and Wacziarg (1998) and Epifani and Gancia (2009).
[6] Colantone et al. (2019) show, for example, how import competition induces workers' mental distress.

al. 2012, Gaston and Rajaguru 2013a and 2013b, Onaran and Boesch 2014, Potrafke 2015, Bove et al. 2017). Studies show that citizens' demand for welfare spending depends on countries' income. In Asia, for example, citizens in high-income countries such as Japan and Singapore demand a larger welfare state when exposed to globalization than citizens in poorer economies (Lim and Burgoon 2018). Citizens in low-income Asian countries, for instance, hardly demand a large welfare state, the level of exposure to globalization notwithstanding (Potrafke 2019). In OECD countries, the effect of globalization on social spending also seems to depend on countries' income and welfare state regimes. Social expenditure tends to increase in high-income (West) European countries and to decrease in low-income (East) countries when globalization proceeds rapidly (Leibrecht et al. 2011, Onaran and Boesch 2014, Onaran et al. 2012). The globalization-induced effects also differ across welfare state regimes supporting the compensation effect in social democratic, conservative and Mediterranean welfare state regimes and the efficiency effect in liberal welfare state regimes (Yay & Aksoy, 2018).

The race-to-the-bottom hypothesis considers globalization to be a quite exogenous phenomenon: national governments have hardly any means to respond to globalization than by just implementing market-oriented policies. In fact, national governments do have a choice when implementing national policies: they decide, for example, whether they wish to decrease business tax rates or abolish tariffs on traded goods and services. Clearly, some national policies such as abolishing tariffs on traded goods and services or capital account and investment restrictions facilitate de facto globalization by encouraging trade and investment flows. By contrast, fiscal policies such as decreasing business tax rates are rather domestic, especially when markets are not integrated. Decreasing business tax rates hardly promote trade of goods and services and investment flows when the national economy is protected by tariffs and capital account restrictions. One may therefore want to disentangle the extent to which globalization and its consequences are based on market-oriented policies to integrate an economy in the world's market (de jure globalization by reducing tariffs etc.) and the extent to which globalization and its consequences are based on actual flows of goods and investments (de facto globalization).

De jure globalization is often the prerequisite for de facto globalization: de facto globalization such as trade of goods and services and attracting foreign direct investments require that national governments have implemented policies that enable trade and investment flows. It remains as an empirical question how de facto and de jure globalization influence the welfare state.

2.3 Political-institutional determinants
Government ideology: The partisan theories describe that left-wing governments implement more expansionary economic policies and are inclined towards more income redistribution from high-income to low-income citizens than right-wing governments. The purpose is to gratify the needs of the individual constituencies (e.g. Hibbs 1977, Chappell and Keech 1986, Alesina 1987). Left-wing governments have also been described to implement more protectionist policies than right-wing governments (Dutt and Mitra 2005 and 2006). Policies of left-wing governments towards social spending may be reinforced by powerful labor unions (Garrett 1998). On the other hand, welfare cuts are unpopular and both left-wing and right-wing parties see retrenchment as undesirable (see, for example, Starke 2006); welfare expansion has created well-organized interest groups such as pensioner lobbies; and welfare states create path dependencies that ensure that new measures reflect those in place.

Many empirical studies examining the determinants of social expenditure include government ideology and find evidence for ideology-induced policy-making (e.g. Kittel and Obinger 2003, Potrafke 2009, Bove et al. 2017; see Potrafke 2017 and 2018 for surveys). Ideology-induced welfare policies retired to the background in many OECD countries (e.g. Iversen 2011, Kittel and Obinger 2003). New studies show, however, that the global financial crisis of 2007-2008 gave rise to re-emerging partisan effects on social expenditure in OECD and European countries (Schmitt 2016, Herwartz and Theilen 2017, Savage 2019, McManus 2019). In particular, the financial crisis deteriorated social and economic conditions and challenged social policy approaches, resulting in higher political polarization (Mian et al. 2014).

Common pool problems: Institutions and types of government influence policy formation and budget composition, especially social spending. Redistributive transfers are likely to be higher in majoritarian voting systems, because they are more explicitly targetable to voting districts in which narrow results are expected (Persson et al. 1998). On the other hand, redistributive transfers increase in proportional voting systems, because proportionally elected representatives define their constituency along social lines, which are more easily targeted by redistributive transfers, for example unemployment benefits (Milesi-Ferretti et al. 2002). Regarding the legislative structure, the model by Persson and Tabellini (1999) predicts that the separation of power, a defining feature of presidential as opposed to parliamentary regimes, gives rise to smaller and more efficient governments and hence lower redistribution.

Other theories portray how the political system affects the behavior of policy makers. They show that government spending increases when a government is not stable. Government instability is measured by frequent government changes (Grilli et al. 1991, de Haan and Sturm 1994) or the number of elections (Saunders and Klau 1985). Sources of instability may be a high degree of political polarization (Alesina and Tabellini 1990), the fractionalization of government (de Haan et al. 1999) and minority governments. Minority governments, for example, are often believed to be less stable and durable than majority governments (Warwick 1979, Lijphart 1984, Saalfeld 2013). The parties forming minority governments do not have majorities in parliament and need to organize them for individual laws they want to pass. Compromises need to be negotiated and log-rolling between the minority government and opposition parties supporting individual laws may well give rise to a large size and scope of government. Public spending is likely to increase with minority governments because every party wants to get satisfied.[7] Empirical evidence does however not suggest that fiscal policies of minority governments differed from fiscal policies of majority governments (Potrafke 2020).

Another strand of literature focuses on *disagreement among agents in the decision-making process* (e.g., Alesina and Drazen, 1991). The deeper the conflicts among such agents, the greater the difficulties encountered when, for example, reducing budget deficits. Such policy conflicts are more prominent with coalition governments (de Haan et al. 1999). Disagreement among agents in the

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[7] On the other hand, theories describe that public expenditure are not likely to be higher under minority than majority governments because minority governments are expected to be strong and stable when it consists of one large centrally located party (Crombez 1996, Tsebelis 2002). The size of the government may even be smaller under minority governments because minority governments can choose among various potential partners and choose the least costly alternative.

decision-making process is therefore likely to increase overall budget size and, thus, also likely to increase social expenditure.

Electoral motives: Political business cycle (PBC) theories suggest that politicians' electoral motives influence public spending (Nordhaus 1975, Rogoff and Sibert 1988, Rogoff 1990, Persson and Tabellini 2002, Shi and Svensson 2006; see de Haan and Klomp 2013 and Dubois 2016 for surveys). Election-motivated politicians are expected to increase public expenditure before elections. In particular, expenditure that is visible to the voters is likely to be increased. Social expenditure is a prime example.

Empirical research on conditional political budget cycles suggests that political budget cycles depend on the electoral rules (whether voting takes place according to proportional or majoritarian rules) and the form of governmental system (parliamentary or presidential system) (Persson and Tabellini 2003), the level of development (Shi and Svensson 2006), the quality of the institutional environment (Shi and Svensson 2006), the age and level of democracy (Gonzales 2002, Brender and Drazen 2005), the transparency of the political process (Alt and Lassen 2006a, 2006b), the presence of checks and balances (Streb and Torrens 2013) and credible fiscal rules (Rose 2006, Alt and Rose 2009).

Income inequality: The median voter theorem put forward by Meltzer and Richard (1981) predicts that income inequality increases income redistribution and, in turn, social expenditure. If a linear income tax finances a lump-sum redistribution, the amount of redistribution is positively related to the ratio of mean to median income. For the median voter, who decides on the amount of redistribution, the cost of taxation is proportional to his income while the benefits are proportional to the mean income. On the other hand, high-income inequality may reduce voters' willingness to support taxation and public expenditures (e. g. Pecoraro 2017). Some models even suggest, that residents cannot agree on the composition of public goods in heterogeneous societies (Benabou, 1996 and 2000). Empirical evidence on the relationship between income inequality and the size of the welfare state is mixed (e.g. Milanovic 2000, Borge and Rattso 2004, Ostry et al. 2014, Gründler and Köllner 2017). Van Velthoven et al. (2018) show that income inequality that is caused by financial development, financial liberalization and banking crisis gives, rise to more redistribution than inequality caused by other factors. Wealth inequality also decreased income redistribution (Gründler 2019).

Political participation: Political participation affects policies if it is not randomly distributed across population. Increasing voter turnout in elections is expected to increase welfare spending. This is because with raising voter turnout, the structure of the electoral shift towards the relatively poor and less educated voters, that previously abstained from voting (Lijphart 1997). Voter turnout affects the welfare state if low educated voters have different preferences on social spending than higher educated voters.

Empirical evidence on the link between voter turnout and social expenditure is mixed. Some studies find a positive relationship between voter turnout (especially after increasing suffrage) and social expenditure consistent with the median voter theorem (e.g. Husted and Kenny 1997, Abrams and Settle 1999, Mueller and Stratmann 2003, Cascio and Washington 2014 and Fujiwara 2015; for a survey see Borck 2019). In Switzerland, lower voting costs after the introduction of postal voting, which increase voter turnout and decrease average education of participants, lowered government welfare expenditures (Hodler et al. 2015). In Austria, however, the increased voter turnout after the introduction of compulsory voting laws did not influence government expenditures (Hoffman et al.

2017). In France, increasing voter costs (that decreased voter turnout) even increased investment expenditure (Godefroy and Henry 2016).

Fragmentation: Becker (1957) proposes that citizens have stronger feelings of empathy towards their own group. Ethnic and linguistic fragmentation decreases social expenditure because achieving consensus necessary for redistribution to the needy is more difficult in ethnically diverse societies (Alesina et al. 2003). Ethnic fractionalization and redistribution are also negatively correlated (Desmet et al. 2009, 2012, Sturm and de Haan 2015 and Pleninger and Sturm 2020).

Income: Wagner's law describes that the size of the public sector relatively to the private sector rises with per capita income. There are two mechanisms at work: first, as countries become richer, their society becomes more complex, which increases the need for public regulatory and protective actions. Secondly, individual public goods such as education have traits of luxury goods and are consumed more heavily with higher income.

2.4 Political-economic determinants

Budgeting procedures or *fiscal rules* may well influence the sustainability of fiscal policy (see, for example, von Hagen 1991 and 1992).[8] Budgeting procedures and fiscal rules are introduced to enforce fiscal discipline; inquiring negative consequences for social spending (see Heinemann et al. 2018 for a survey on fiscal rules). However, the empirical evidence on fiscal rules is mixed. In the US states, fiscal rules and welfare spending were hardly correlated. Welfare belongs to the 'entitlement spending', which cannot be cut easily (Penner and Weisner 2001). On the other hand, Nerlich and Reuter (2013), for instance, report that fiscal rules have a strong negative impact on expenditures on social protection in the EU, while Dahan and Strawczynski (2013) found that fiscal rules decreased the ratio of social transfers to government consumption in OECD countries. 'Hard' rules reduce redistribution and increase income inequality (Hartwig and Sturm 2019).

International institutions also influence domestic welfare spending (e.g. Kittel and Obinger 2003, Herwartz and Theilen 2014, McManus 2019). In the EU, the Maastricht Treaty of debt and deficit requirements for euro area members, for example, affect national budgets, which has consequences for domestic policies such as social spending.

Public debt and budget deficit: The increased government indebtedness in many industrialized countries since the 1980s imposed constraints on the expansion and maintenance of social expenditure. High levels of debt especially restrain partisan effects on social expenditure. Authors have shown that social expenditure is negatively correlated with public debt (in % of GDP) (Kittel and Obinger 2003) and budget deficits (net lending, in % of GDP) (Herwartz and Theilen 2014).

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[8] Fiscal rules are rules according to which budgets are drafted by the government, amended and passed by the parliament, and implemented by the government.

3. Data

3.1 Social expenditure in OECD countries

We use data on total public social expenditure from the OECD Social Expenditure Database (SOCX) for the years 1980-2016 for 31 OECD countries.[9] The SOCX includes public benefits with a social purpose, grouped along the following areas: old age pensions, health, incapacity-related benefits, family support, survivors, active labor market programs, unemployment and housing.[10] Spending on old age pensions and health amount to around two thirds of overall social expenditure (see Figure A. 3 in the appendix).

Public social expenditure was highest in France in 2016, amounting to 32% of GDP. It was lowest at around 15% in liberal welfare state regimes such as Ireland, Iceland and Switzerland, and in Baltic countries such as Lithuania and Latvia. On average, social expenditure was 20.5% in the OECD countries in 2016 (see Figure 3).[11]

Figure 3: Public social expenditure (in % of GDP) in the year 2016
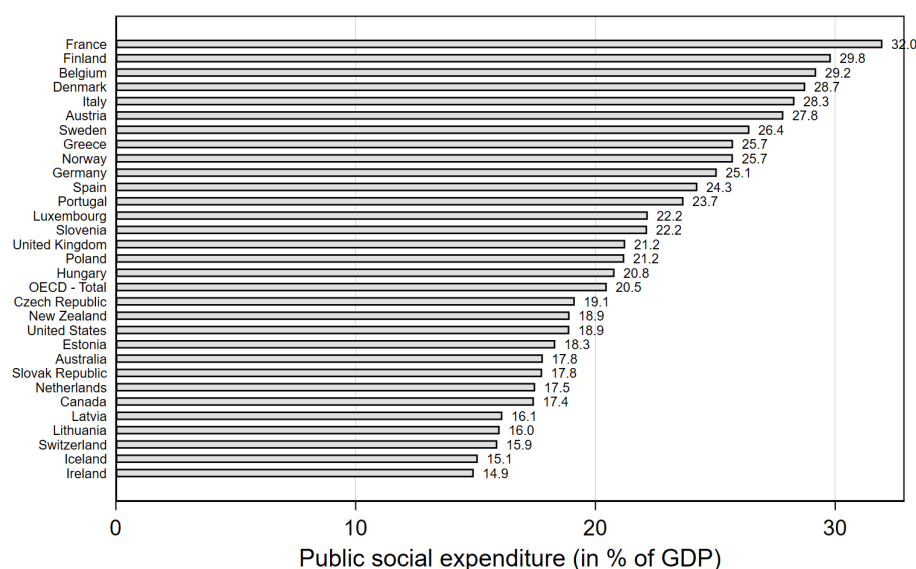
Source: OECD

Social expenditure increased from 14.4% in 1980 to 20.5% in 2016. Social expenditure increased in every OECD country between 1980 and 2016, except in the Netherlands and Ireland (Figure 4).[12] Schuknecht and Zemanek (2018) describe the trend in increasing social expenditure, which in turn, is likely to crowd out public expenditure for other services such as public goods, as "social dominance".

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[9] Of the 36 OECD countries, we exclude Chile, Israel, Korea, Mexico, and Turkey because data for some explanatory variables is not available for those countries.

[10] It includes public spending on early childhood education and care up for children under age 6, but excludes public spending on education beyond that age.

[11] The OECD average is calculated over all 36 OECD countries, which includes newly established OECD countries such as Israel, Chile, Korea, and Mexico that are characterized by relatively low levels of public expenditure.

[12] In Ireland, GDP (the denominator) increased by 25% in 2015, following the relocation of a small number of multinationals' intellectual property assets to Ireland. In the Netherlands, the health care reform of 2006 relocated basic health insurance finance to private funds, which decreased public social spending.

Figure 4: Public social expenditure (in % of GDP), in the year 1980 and 2016.
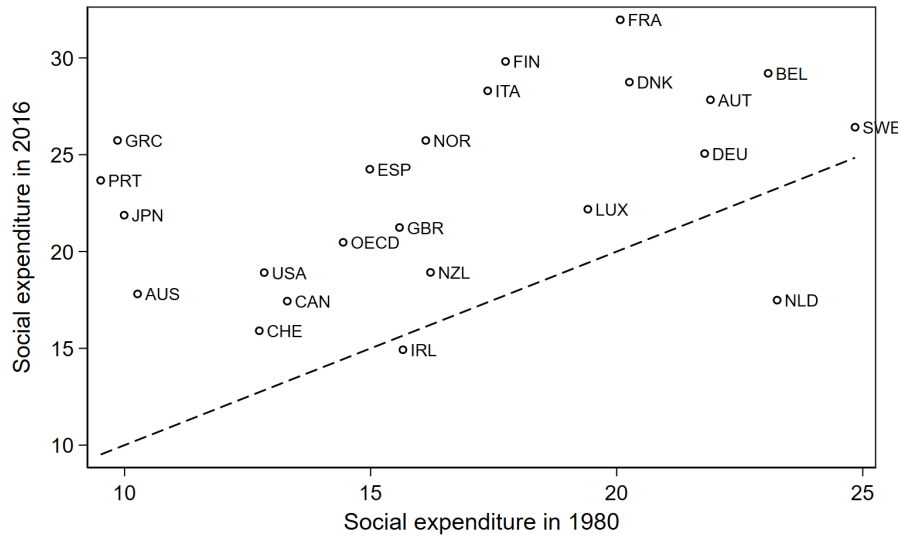
Source: OECD

3.2 Explanatory variables

Descriptive statistics of the explanatory variables are shown in Table 1. The sources of the explanatory variables and their expected effect on social expenditure are shown in Table A. 1. in the appendix.

Economic determinants include the unemployment rate measured as percentage of the labor force and GDP per capita (log). We also include a variable measuring banking crisis in general and the Global Financial Crisis (GFC) in particular. We use the dataset on systematic banking crisis from Laeven and Valencia (2018) and compute the average output loss per year to account for the severity of the crisis. *Demographic determinants* include the old age and the young age dependency ratio.

We measure *globalization* by six sub-indices of the revised KOF Globalisation Index (Dreher 2006, Dreher et al. 2008a and Gygli et al. 2019). The new KOF index distinguishes between the dimensions (economic, social and political) of globalization and disentangles the economic dimension of globalization into a trade and financial subcomponent. For example, when trade globalization results in higher uncertainty and risks for domestic workers than financial globalization, we expect a stronger compensation effect for trade than for financial globalization. The new KOF index also helps to disentangle the effects of de jure and de facto globalization on social expenditure. We include de facto and de jure indices for trade and financial globalization, as well as the overall index for social and political globalization in our empirical analysis.

We include several *political-institutional determinants* and interaction terms between individual variables. To measure government ideology, we include the government ideology indicator by Cruz et al. (2018). They provide a measure on the political ideology of the chief executive, which assumes the value 1 for right-wing, 2 for center, and 3 for left-wing chief executives. We compute a dummy variable for left-wing governments.

We also include the interaction terms between left-wing governments and the individual globalization indices. The new distinction between de facto and de jure globalization in the KOF Globalisation Index is suitable to examine the correlation between government ideology and economic globalization:

when left-wing governments are active in protectionist policies, especially de jure economic globalization should be less pronounced under left-wing than right-wing governments. De facto economic globalization is also expected to be less pronounced under left-wing than right-wing governments. Clearly, left-wing governments have less means in directly influencing de facto economic globalization but especially foreign investors may hesitate in investing in a country with a newly elected government that is expected to implement, for example, business tax increases. As suggested by McManus (2019), we also include the interaction term between left-wing governments and our variable measuring the banking crisis. As suggested by Garrett (1998), we include union density and the interaction term between left-wing governments and union density to account for governments responding to pressure from unions (Visser 2019).

We include variables related to the common pool problem that are expected to influence social spending. This includes measures of the electoral system and the legislative structure of a country. In particular, proportional voting and a presidential system are expected to be positively correlated with social expenditure. However, these effects are mostly subsumed in the country fixed effects because the electoral system and legislative structure are time-invariant for most countries. We further include variables measuring the ideological gap between incoming and outgoing government, the fractionalization of the party system and dummy variables for coalition governments, minority governments and single-party cabinets (Armingeon et al. 2018).[13]

To examine electoral cycles in social expenditure, we include a dummy variable that equals one for years in which elections for national parliament (lower house) are held. The variable is calculated based on the dataset of Armingeon et al. (2018). To account for conditional electoral cycles, we employ interaction terms between the election cycle dummy variable and measures that have been shown to mitigate electoral cycles: the electoral system and legislative structure, the level of development measured as per capita GDP, institutional quality measured using the ICRG index, the level of democracy measured using the POLITY2 database, and the fiscal expenditure rule dummy.[14]

Ethnic fragmentation is calculated as the Herfindahl index of ethnic fractionalization of politically relevant groups in a country based on data from the Ethnic Power Relations (EPR) Core Dataset (Cederman et al. 2010 and Vogt et al. 2015). We employ the market Gini coefficient from the SWIID data base (Solt 2009) as measure of inequality. To identify a potential effect of higher political participation on social expenditure, we include voter turnout in elections compiled by Armingeon et al. (2018).

Political-economic determinants are measured by four variables. To account for budgetary procedures and fiscal rules, we employ a fiscal rules indicator based on Lledó et al. (2017). This variable accounts for the presence of expenditure rules, debt rules, budget balance rules, and revenue rules. We also introduce a dummy variable for European Union membership. Finally, we include public debt as a percentage of GDP and budget deficits as measured by net lending as a percentage of GDP.

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[13] The fractionalization of the party system is measured as proposed by Rae (1968): $fract = 1 - \sum_{i=1}^{n} s_i^2$, where s is the share of seats for party i and m is the number of parties.
[14] Inferences do not change when we measure political institutions using data provided by Gründler and Krieger (2016, 2018) and Bjørnskov and Rode 2020).

Table 1: Descriptive statistics

	Obs.	Mean	Std. Dev.	Min.	Max.
Dependent variable					
Public social expenditure (% GDP)	954	20.22	4.81	9.51	34.18
Economic and demographic determinants					
Unemployment rate (% of labor force)	950	7.61	4.12	0.18	27.50
GDP per capita (log)	954	10.37	0.55	8.61	11.63
Banking crisis (average output loss per year)	954	0.92	3.24	0.00	21.54
Old age dependency ratio	954	22.52	4.21	13.21	42.65
Young age dependency ratio	954	27.49	5.17	19.67	51.57
Globalization-welfare state nexus					
KOF Trade Globalisation Index, de facto	951	53.46	19.11	18.38	89.04
KOF Financial Globalisation Index, de facto	951	71.27	18.84	18.74	99.78
KOF Trade Globalisation Index, de jure	951	83.45	10.63	39.80	97.80
KOF Financial Globalisation Index, de jure	951	76.17	12.31	31.10	98.31
KOF Social Globalisation Index	951	78.74	7.98	51.16	92.12
KOF Political Globalisation Index	951	85.03	11.43	43.15	98.71
Political-institutional determinants					
Left-wing government	954	0.34	0.47	0.00	1.00
Union density (in %)	950	36.72	21.34	4.44	98.66
Proportional voting	950	1.66	0.64	0.00	2.00
Presidential system	950	0.43	0.71	0.00	3.00
Ideological gap between cabinets	951	-0.00	0.86	-3.00	3.00
Legislative fractionalization	954	0.70	0.10	0.41	0.91
Coalition governments	954	0.57	0.50	0.00	1.00
Minority governments	954	0.22	0.42	0.00	1.00
Single party governments	954	0.19	0.39	0.00	1.00
Election year	954	0.28	0.45	0.00	1.00
Institutional quality	851	0.85	0.14	0.50	1.00
Level of democracy	893	9.82	0.30	8.50	10.00
Ethnic fractionalization	951	18.75	21.01	0.00	59.72
Gini index	940	0.46	0.04	0.36	0.54
Voter turnout (in %)	954	74.27	13.20	38.20	96.80
Political-economic determinants					
Fiscal rules	954	0.43	0.50	0.00	1.00
EU membership	954	0.43	0.50	0.00	1.00
Public debt (in % of GDP)	941	63.30	36.09	4.64	218.31
Deficit (net lending, in % of GDP)	935	-2.59	4.49	-32.06	18.67

Notes: For variable definitions and sources, refer to Table A. 1.

3.3 Methodology

To examine the determinants of public social expenditure in OECD countries, we apply extreme bounds analysis (EBA), suggested by Leamer (1985), and Levine and Renelt (1992).[15] This approach has been widely used in the economic growth literature. The central difficulty in this research - which also applies to our study - is that several different models may all seem reasonable given the data but yield different conclusions about the parameters of interest. Equations of the following forms are estimated:

$$Y = \alpha \boldsymbol{M} + \beta \boldsymbol{F} + \gamma \boldsymbol{Z} + u, \tag{1}$$

where Y is the dependent variable; M is a vector of 'standard' explanatory variables; F is the variable of interest; Z is a vector of up to three possible explanatory variables, which the literature suggests may be related to the dependent variable; and u is an error term. The extreme bounds test for variable F states that if the lower extreme bound for β – the lowest value for β minus two standard deviations – is negative and the upper extreme bound for β – the highest value for β plus two standard deviations – is positive, the variable F is not robustly related to Y.

It is rare in empirical research that one model dominates all other possibilities in all dimensions (Temple 2000). We therefore discuss how sensitive the findings are to alternative modelling choices. EBA provides a relatively simple means of portraying sensitivity to alternative modelling choices. Still, the approach has been criticized. Sala-i-Martin (1997) describes, for example, that the test applied poses too rigid a threshold in most cases. Assuming that the distribution of β has at least some positive and some negative support, the estimated coefficient changes signs if enough specifications are considered. We therefore report the smallest and largest coefficient estimates, the extreme bounds and the percentage of the regressions in which the coefficient of the variable F is significantly different from zero at the 5% level. Moreover, instead of investigating just the extreme bounds of the estimates of the coefficient of an individual variable, we follow Sala-i-Martin's (1997) suggestion to examine the entire distribution of the coefficients. Following this suggestion, we investigate the (unweighted) average parameter estimate of β and its average standard deviation, and the (unweighted) cumulative distribution function of the parameter estimate. In particular, we are interested in the fraction of the distribution function lying on one side of zero: CDF(0).[16]

Including interaction effects in EBA is not straightforward. This is because we need to make sure that we control for the individual variables additional to the interaction effect. We include the interaction effects and the individual effects in the F-vector, leaving the control variables in the Z-vector unchanged. Hence, we are using the same set of variables as before to test for the robustness of the interaction term. Furthermore, we need to test the significance of the interaction term and the individual variables simultaneously. This is done with an F-test.

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[15] Parts of this section rely upon previous works like Hartwig and Sturm (2014), Moser and Sturm (2011), Sturm and Williams (2010), and Dreher et al. (2009a and b).

[16] For simplicity, this term is used for the distribution on both sides of zero, that is for CDF(0) and 1-CDF(0). Sala-i-Martin (1997) proposes using the (integrated) likelihood to construct a weighted CDF(0). However, the varying number of observations in the regressions due to missing observations in some of the variables poses a problem. Sturm and de Haan (2001) show that this goodness-of-fit measure may not be a good indicator of the probability that a model is the true model, and the weights constructed in this way are not equivariant to linear transformations in the dependent variable. Hence, changing scales results in rather different outcomes and conclusions. We thus restrict our attention to the unweighted version.

4. Results

4.1 Baseline model

In the baseline model, we regress social expenditure only on our two 'M vector' variables, the standard explanatory variables. We include the old age dependency ratio and the unemployment rate as standard variables. The reason being the mechanical link between these variables and social expenditure: the larger the number of pensioners and unemployed workers, the larger are pension and unemployment expenditures. Given these standard variables, our dataset includes annual data for 31 OECD countries and 37 years. As a baseline model, we regress social expenditure (*socx*) on the old age dependency ratio (*dependency*), the unemployment rate (*unemp*) and country (*i*) and year (*t*) fixed effects. Standard errors are clustered at the country level.

$$socx_{it} = \alpha + 0.36(0.056) * unemp_{it} + 0.34(0.083) * dependency_{it} + \mu_i + \gamma_t + \varepsilon_{it} \qquad (1)$$

The result of the regression is shown in equation (1). It confirms the positive link between both aging and the unemployment rate, and social expenditure. The coefficients of both variables are positive and, as the standard errors in the brackets suggest, statistically significant at the 1%-level. A one-percentage point higher unemployment rate and dependency ratio, is associated with a 0.36 and 0.34 percentage point higher social expenditure ratio.

4.2 Extreme Bounds Analysis

We now turn to the extreme bounds analysis. The results of the extreme bounds analysis excluding interaction terms are shown in Table 2. For every variable of interest (*F*-variable), we estimate 3003 models including up to three additional explanatory variables (*Z*-variables). The two standard explanatory variables (*M*-variables) are included in every regression. The first two columns in Table 2 report the (unweighted) average of the estimated β-coefficients (Avg. Beta) and the average standard error (Avg. SE) over all models for the particular variable of interest. Column (3) reports the percentage of the regressions in which the coefficient on the variable of interest differs significantly from zero at the 5%-level (%Sign.). Our main attention is on column (4). It displays the fraction of the cumulative distribution function of the estimated coefficients, laying on either side of zero (CDF(0)). We follow Sala-i-Martin (1997) and apply the criterion that CDF(0) ≥ 0.95: If 95% of the density lays on one side of zero, we regard this variable as a robust determinant of social expenditure. Furthermore, columns (5) and (6) report the estimated lower (Min.) and upper bound (Max.). They are defined as the lowest and highest estimated coefficients plus or minus two times their standard deviation (SD).

Applying the rule CDF(0) ≥ 0.95 for robust determinants, we find that both the standard explanatory variables determine social expenditure. The estimated coefficient for the unemployment rate has an estimated coefficient that is positive and statistically different from zero in every estimation. The dependency ratio is statistically different from zero in 86% and the coefficient is positive in 99% of all estimations.

The EBA results in Table 2 report eight other robust explanatory variables. We find that social expenditure is positively correlated with banking crisis, social globalization, coalition governments and public debt. Social expenditure is negatively correlated with trade globalization (de facto), the ideological gap between cabinets, the legislative fractionalization and government deficits. We thus find mixed evidence regarding the effect of globalization on social expenditure: the negative coefficient for trade globalization corroborates the race-to-the-bottom theory. Trade globalization is shown to predict social expenditures in all regressions. The estimated coefficient is negative in all estimated models. On the other hand, the results show that social globalization increases social

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expenditure. It is conceivable that citizens in an individual country observe social policies in other industrialized countries (e.g., pension or family benefits) and therefore demand similar benefits in their own country. Social globalization is measured by increasing information exchange between citizens and promotes learning from other countries. Furthermore, social expenditure increased during the Great Financial Crisis (GFC) in many industrialized countries.

Table 2: Extreme Bounds Analysis: Results

	Avg.Beta	Avg.SE	%Sign.	CDF(0)	Min.	Max.
Standard explanatory variables						
Unemployment rate (% of labor force)	0.35	0.06	1.00	**1.00**	0.10	0.56
Old age dependency ratio	0.29	0.09	0.86	**0.99**	-0.20	0.61
Economic and demographic determinants						
GDP per capita (log)	-1.95	1.84	0.07	0.82	-10.75	4.14
Banking crisis (average output loss per year)	0.12	0.05	0.86	**0.99**	-0.04	0.26
Young age dependency ratio	-0.03	0.10	0.00	0.67	-0.37	0.34
Globalization-welfare state nexus						
KOF Trade Globalisation Index, de facto	-0.09	0.03	0.99	**0.99**	-0.19	0.01
KOF Financial Globalisation Index, de facto	0.03	0.03	0.03	0.85	-0.05	0.12
KOF Trade Globalisation Index, de jure	-0.03	0.05	0.00	0.72	-0.18	0.12
KOF Financial Globalisation Index, de jure	0.06	0.03	0.27	0.94	-0.03	0.16
KOF Social Globalisation Index	0.27	0.14	0.46	**0.97**	-0.08	0.71
KOF Political Globalisation Index	0.03	0.06	0.00	0.71	-0.14	0.20
Political-institutional determinants						
Left-wing government	0.15	0.25	0.00	0.72	-0.46	0.80
Union density (in %)	0.01	0.04	0.00	0.64	-0.09	0.12
Ideological gap between cabinets	-0.10	0.06	0.10	**0.95**	-0.28	0.07
Legislative fractionalization	-7.72	3.06	0.99	**0.99**	-17.25	1.02
Coalition governments	0.60	0.34	0.28	**0.95**	-1.18	2.05
Minority governments	-0.33	0.41	0.01	0.79	-2.08	1.56
Single party governments	-0.49	0.48	0.09	0.81	-2.71	1.62
Election year	-0.03	0.06	0.00	0.69	-0.20	0.17
Ethnic fractionalization	-0.06	0.09	0.01	0.74	-0.67	0.32
Gini index	-22.51	17.84	0.00	0.89	-65.85	25.27
Voter turnout (in %)	0.01	0.04	0.00	0.60	-0.10	0.11
Political-economic determinants						
Fiscal rules	-0.66	0.47	0.02	0.91	-1.92	0.65
EU membership	-0.83	0.68	0.15	0.86	-3.35	1.49
Public debt (in % of GDP)	0.03	0.02	0.63	**0.97**	-0.02	0.07
Deficit (net lending, in % of GDP)	-0.20	0.04	1.00	**1.00**	-0.30	-0.06

Notes: For variable definitions and sources, refer to Table A. 1. Bold numbers indicate variables for which CDF(0) ≥ 0.95.

The results also suggest that the more the political landscape is fragmented, the smaller is social expenditure: legislative fractionalization, meaning that the parliament seats are distributed to more

parties, and the ideological gap between cabinets are negatively associated with social expenditure. On the other hand, politically working together in the form of coalition governments is positively associated with social expenditure.

Public debt and budget deficits are found to be robust predictors for social expenditure. Higher debt levels are associated with higher levels of social expenditure, while budget deficits exert pressure to cut on social spending.

4.3 Extreme Bounds Analysis: Interaction terms

In Table 3, we present the results for the individual interaction terms. We report the results for each set of individual variables and interaction term. The first two columns in Table 3 report the (unweighted) average of the estimated β-coefficients (Avg. Beta) and the average standard error (Avg. SE) over all models for the particular variable of interest. Column (3) reports the share of the regressions in which the coefficient on the variable of interest differs significantly from zero at the 5%-level (%Sign.). The last column reports the percentage of models with an F-test for joint significance at the 5%-level (%F-Sign).

The results suggest that the combinations of left-wing governments, de facto trade globalization and the interaction, as well as the combinations of left-wing governments, banking crisis and their interaction are – each as a group – always significant and therefore robust determinants of social expenditure. This is because the percentage of models with F-tests for joint significance at the 5%-level (%F-Sign) is in both cases equal to one. The remaining groups of each three variables do not turn out to be robust predictors of social expenditure.

Table 3: Extreme Bounds Analysis: Results for interaction terms

	Avg.Beta	Avg.SE	%Sign.	CDF(0)	%F-sign
Government ideology and globalization					
Left-wing government	-1.23	0.63	0.44	0.97	**1.00**
KOF Trade Globalisation Index, de facto	-0.09	0.03	**1.00**	1.00	
Interaction term	0.03	0.01	**1.00**	1.00	
Left-wing government	-1.25	0.83	0.09	0.92	0.01
KOF Financial Globalisation Index, de facto	0.02	0.02	0.02	0.77	
Interaction term	0.02	0.01	0.34	0.96	
Left-wing government	-2.88	1.51	0.44	0.97	0.00
KOF Trade Globalisation Index, de jure	-0.05	0.05	0.01	0.81	
Interaction term	0.04	0.02	0.62	0.97	
Left-wing government	0.07	1.12	0.00	0.68	0.00
KOF Financial Globalisation Index, de jure	0.06	0.03	0.26	0.94	
Interaction term	0.00	0.01	0.00	0.67	
Left-wing government	-1.67	2.32	0.00	0.76	0.00
KOF Social Globalisation Index	0.26	0.14	0.42	0.96	
Interaction term	0.02	0.03	0.00	0.78	
Left-wing government	-0.58	2.04	0.00	0.62	0.00
KOF Political Globalisation Index	0.03	0.06	0.00	0.69	
Interaction term	0.01	0.02	0.00	0.64	

Partisan effects

Left-wing government	0.07	0.24	0.00	0.62	**1.00**
Banking crisis (average output loss per year)	0.11	0.06	0.58	0.97	
Interaction term	0.12	0.08	0.08	0.94	
Left-wing government	0.32	0.46	0.00	0.75	0.00
Union density (in %)	0.01	0.04	0.00	0.66	
Interaction term	0.00	0.01	0.00	0.64	

Political business cycles

Election year	-0.21	0.16	0.00	0.90	0.00
Proportional voting	-0.22	0.55	0.00	0.71	
Interaction term	0.11	0.09	0.00	0.88	
Election year	0.08	0.05	0.08	0.92	0.43
Presidential system	0.01	0.16	0.00	0.66	
Interaction term	-0.26	0.10	0.93	0.99	
Election year	0.10	1.21	0.00	0.66	0.00
GDP per capita (log)	-1.98	1.84	0.07	0.82	
Interaction term	-0.01	0.12	0.00	0.66	
Election year	0.13	0.32	0.00	0.72	0.00
Institutional quality	1.98	4.54	0.00	0.67	
Interaction term	-0.20	0.38	0.00	0.73	
Election year	-1.24	3.88	0.00	0.62	0.03
Level of democracy	1.48	0.78	0.40	0.96	
Interaction term	0.12	0.39	0.00	0.62	
Election year	-0.10	0.08	0.02	0.87	0.00
Fiscal rules; expenditure rules	-0.70	0.48	0.03	0.92	
Interaction term	0.16	0.13	0.00	0.89	

Notes: For variable definitions and sources, refer to Table A. 1. Bold numbers indicate variables for which the share of regressions in which the coefficient differs significantly from zero (%Sign.) or the interaction term and its individual variables are jointly significant (%F-sign.) is equal or greater than 0.95.

However, we find that the interaction term between left-wing governments and banking crisis is almost never statistically significant. Hence, the significance of the F-tests appears to be driven by the banking crisis variable itself. The interaction term between left-wing governments and de facto trade globalization, on the other hand, is positive and the coefficient for trade globalization negative. This suggests, that under center and right-wing governments, de facto trade globalization was negatively associated with social expenditure, while under left-wing governments, the negative effect is smaller.

The left panel of Figure 5 shows how government ideology is associated with social expenditure conditional on trade globalization. The level of trade globalization conditions the influence of left-wing governments on social expenditure: left-wing governments had no effect on social expenditure when de facto trade globalization was low. Social expenditure increased, however, under left-wing governments when trade liberalization was pronounced. This result suggests that left-wing governments were more active to protect domestic citizens from rapidly proceeding globalization than center and right-wing governments – an effect that is well in line with the core idea of partisan politics and previous empirical studies (Potrafke 2009).

Figure 5: Marginal effects of government ideology and trade globalization on social expenditure
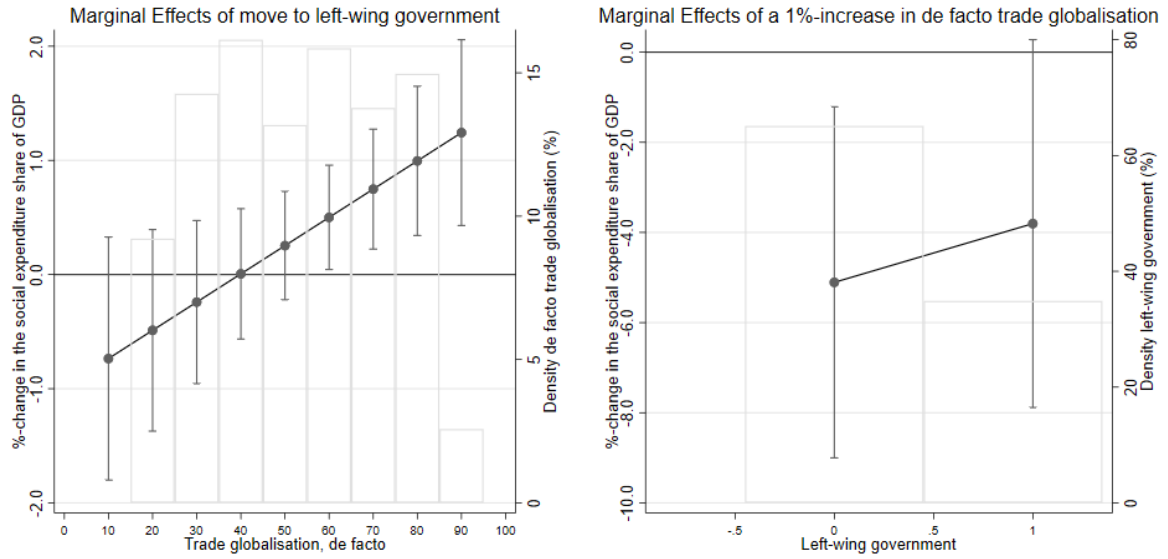
4.4 Bayesian model averaging

We also use Bayesian model averaging (BMA) of our classical linear regression estimations as described by Magnus et al. (2010), an approach that follows Sala-i-Martin et al. (2004). The statistical framework includes two sets of explanatory variables. The so-called focus regressors are included in every model. As in the EBA, we chose the unemployment rate and the old age dependency ratio as focus regressors, because of the mechanical link between these variables and social expenditure. The auxiliary regressors k contain our additional explanatory variables.

BMA addresses model uncertainty related to the choice of the auxiliary regressors by estimating models for all possible combinations and taking a weighted average over all models. It attaches prior probabilities to the different models and averages them based on derived posterior probabilities. The probability that model j, M_j, is the "true" model given the data y, i.e. the posterior model distribution given a prior model probability, is defined as

$$P(M_j/y) = \frac{P(y|M_j)P(M_j)}{\sum_{i=1}^{2^k} P(y|M_i)P(M_i)} \tag{2}$$

where $P(y|M_j)$ is the marginal likelihood of model M_j given data y, and $P(M_j)$ is the prior model probability. The weight for a given model is normalized by the sum of the weights of all models, represented in the denominator in equation (2) (given the number of auxiliary regressors k, the total number of models amounts to 2^k). We employ the Bayesian estimator by Magnus et al. (2010), which uses conventional non-informative priors on the focus regressors and the error variance, and a multivariate Gaussian prior on the auxiliary regressors.

The results of the BMA are shown in Table 4. Column 2 and 3 show the estimated coefficients and their standard error (mean and standard deviation of the posterior distribution), t-ratios are shown in column 4. Column 5 reports the posterior inclusion probability (pip). It is the sum of the posterior model probability for all models wherein a regressor was included and can be interpreted as the likelihood that a regressor is included in the true model. A one standard error band to the coefficient is reported in the last two columns.

Table 4: Bayesian Model Averaging: Results

	Avg.Beta	Avg.SE	t	pip	[1-Std. Err. Bands]	
Standard explanatory variables						
Unemployment rate (% of labor force)	0.20	0.03	**6.47**	1.00	0.14	0.27
Old age dependency ratio	0.07	0.04	**1.58**	1.00	-0.02	0.15
Economic and demographic determinants						
GDP per capita (log)	-5.65	1.05	**-5.36**	**1.00**	-7.71	-3.58
Banking crisis (average output loss per year)	0.05	0.03	**1.44**	**0.75**	-0.02	0.11
Young age dependency ratio	0.02	0.04	0.60	0.32	-0.05	0.10
Globalization-welfare state nexus						
KOF Trade Globalisation Index, de facto	-0.08	0.01	**-6.58**	**1.00**	-0.10	-0.05
KOF Financial Globalisation Index, de facto	0.04	0.01	**4.30**	**1.00**	0.02	0.06
KOF Trade Globalisation Index, de jure	-0.05	0.02	**-3.08**	**0.97**	-0.09	-0.02
KOF Financial Globalisation Index, de jure	0.08	0.01	**6.79**	**1.00**	0.05	0.10
KOF Social Globalisation Index	0.32	0.04	**8.69**	**1.00**	0.24	0.39
KOF Political Globalisation Index	0.00	0.00	-0.05	0.03	-0.01	0.01
Political-institutional determinants						
Left-wing government	0.00	0.02	0.04	0.03	-0.04	0.05
Ideological gap between cabinets	0.00	0.00	0.09	0.04	0.00	0.01
Legislative fractionalization	-0.01	0.04	-0.35	0.14	-0.10	0.07
Coalition governments	-5.03	1.33	**-3.78**	**0.99**	-7.65	-2.42
Minority governments	0.33	0.28	**1.17**	**0.65**	-0.22	0.87
Single party governments	-0.04	0.16	-0.25	0.14	-0.36	0.28
Election year	-0.18	0.32	-0.57	0.30	-0.80	0.44
Ethnic fractionalization	0.00	0.02	-0.10	0.04	-0.05	0.04
Gini index	-0.15	0.07	**-2.23**	**0.91**	-0.29	-0.02
Voter turnout (in %)	-15.71	3.94	**-3.99**	**1.00**	-23.45	-7.98
Political-economic determinants						
Fiscal rules	-0.24	0.26	-0.95	0.54	-0.75	0.26
EU membership	-0.85	0.38	**-2.24**	**0.91**	-1.60	-0.10
Public debt (in % of GDP)	-0.18	0.02	**-8.46**	**1.00**	-0.22	-0.14
Deficit (net lending, in % of GDP)	-0.24	0.26	-0.95	0.54	-0.75	0.26

Notes: For variable definitions and sources, refer to Table A. 1. Bold numbers indicate variables for which the (absolute) t-ratio greater than 1 and the posterior inclusion probability (pip) is greater than 0.5. pip equals one for the unemployment rate and old age dependency ratio by definition.

The estimation does not provide p-values of the t-ratios for testing the significance of the estimated parameters, because the Bayesian counterpart is not straightforward. A regressor is robustly correlated with the independent variable if the corresponding absolute t-ratio is greater than one, in which case the mean squared error (MSE) of the restricted OLS estimator is lower than the MSE of the restricted OLS estimator. Alternatively, as a rough guideline, a posterior inclusion probability of 0.5 corresponds approximately to a t-ratio of one in absolute value (Magnus et al. 2010).

The results in Table 4 confirm our EBA results that the unemployment rate and the old age dependency ratio are robust predictors of social expenditure, the t-ratio of both focus regressors is greater than one, while the posterior inclusion probability (pip) is one by definition.

For the auxiliary regressors, we focus on the posterior inclusion probability (pip), which is interpreted as the probability that the respective auxiliary regressor belongs to the true model. The results for the BMA confirm our previous results that the following variables are robust predictors of social expenditure: banking crisis, de facto trade globalization, social globalization, legislative fractionalization, coalition governments, public debt, and budget deficits. The BMA does not confirm the previous results for the ideological gap between cabinets. However, contrary to the EBA, we find additional robust determinants of social expenditure. In particular, we find that financial globalization (both de facto and de jure) is positively associated with social expenditure. We also find that GDP per capita, de jure trade globalization, ethnic fractionalization, inequality (Gini index) and EU membership are negatively associated with social expenditure.

Turning to the interaction terms, we employ BMA to check the robustness of our results for interaction effects based on the EBA. For each set of individual variables and interaction term, we include them in our set of focus regressors to ensure that all of the three are included in all models. We carry out the BMA using the remaining variables as auxiliary regressors. The posterior inclusions probability (pip) is thus one for each variable in the set by definition and is not reported. We consider the t-ratio to determine robust predictors of social expenditure.

Table 5: Bayesian Model Averaging: Results for interaction effects

	Avg.Beta	Avg.SE	t	[1-Std. Err. Bands]	
Left-wing government	-0.88	0.37	**-2.40**	-1.61	-0.16
KOF Trade Globalisation Index, de facto	-0.08	0.01	**-6.87**	-0.10	-0.06
Interaction term	0.02	0.01	**2.62**	0.00	0.03
Left-wing government	-0.06	0.13	-0.49	-0.31	0.18
Banking crisis (average output loss per year)	0.05	0.02	**2.16**	0.00	0.09
Interaction term	0.12	0.04	**2.85**	0.04	0.21

Notes: For variable definitions and sources, refer to Table A. 1. Bold numbers indicate variables for which (absolute) t-ratio greater than 1. Posterior inclusion probability (pip, not reported) equals one for individual variables and interaction terms by definition to ensure that the set is included in all models.

The results in Table 5 confirm the results from the robust EBA in the previous section. In particular, we confirm the positive effect of the interaction between left-wing governments and de facto trade globalization. The results for the full list of interaction terms are presented in Table A. 2 in the appendix.

5. Robustness tests

A potential source for endogeneity is reverse causality between the dependent and the explanatory variables. For example, social policies and how social expenditure develops may well influence voting behavior. When citizens disagree with social policies, they will vote incumbent governments out of office. Government ideology changes. To address potential endogeneity from reverse causality, we re-estimate EBA and BMA with lagged control variables. Lagged control variables should at least attenuate potential reverse causality. We also estimate EBA and BMA using averages over 5-year non-

overlapping periods to isolate medium- to long-term determinants of social expenditure, and 5-year periods with lagged dependent variables.

Figure 6 shows the standardized coefficients of the baseline model and the models using dependent variables lagged by one period (lag), averages of 5-year periods (5yr) and 5-year periods with lagged depended variables (5yr lag) for extreme bounds analysis (EBA) and Bayesian model averaging (BMA), respectively. The coefficients are standardized by the sample standard deviation of the individual variable to make them comparable to each other. The figure shows the coefficients for the robust determinants of social expenditure as found by the baseline model for of the extreme bounds analysis. The coefficients for all determinants are shown in Figure A.4 in the appendix.

Figure 6: Coefficient plots for robust determinants
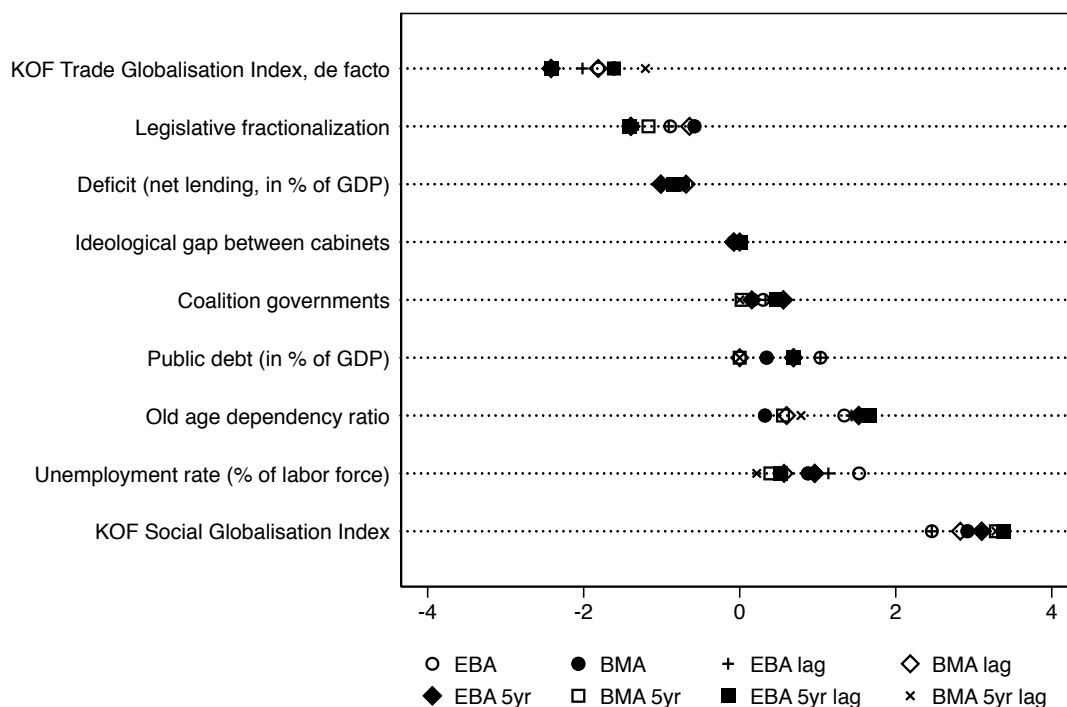
Notes: Standardized coefficients of the individual models for robust determinants of social expenditure according to EBA (see Table 2). Coefficient plots for all determinants are shown in Figure A. 4. Coefficients are rescaled by the sample standard deviation of the variable (semi-standardization). EBA: Extreme bounds analysis; BMA: Bayesian model averaging; lag: 1-year lagged control variables; 5yr: Averages over non-overlapping 5-year periods.

As Figure 6 shows that the point coefficients of the models are comparable in size. For social globalization, for example, we find that a one standard deviation increase in the KOF index of social globalization is associated with an increase in social expenditure between 2.5 and 3.4 percentage points on average. An increase in the KOF index of trade globalization by one standard deviation, on the other hand, is associated with a decrease in social expenditures between 1.2 and 2.4 percentage points. Overall, the coefficients of our baseline models for EBA and BMA are robust to using lagged dependent variables and 5-year periods with and without lagged dependent variables.

6. Conclusion

We portray robust determinants of social expenditure in OECD countries. Determinants include globalization, political-economic variables such as government ideology and electoral motives, demographic change and economic variables such as unemployment. Employing EBA in a sample of 31 OECD countries over the period 1980-2016, our results suggest that budget deficits, trade globalization and fractionalization of the party system were negatively associated with social expenditure. Aging, unemployment, social globalization, coalition governments and public debt were positively associated with social expenditure. We furthermore introduce interaction effects into an EBA framework and find that the interaction of government ideology and trade globalization is a robust determinant of social expenditures. Social expenditure increased under left-wing governments when de facto trade globalization was pronounced. We have also used Bayesian model averaging: the results corroborate the relationships found between banking crisis, de facto trade globalization, social globalization, legislative fractionalization, budget deficits, and public debt on the one hand and social expenditure on the other.

The large budget shares on social affairs often seem to be predetermined and exogenous to what policymakers influence: globalization puts pressure on domestic policies, demographic change and recessions have mechanic effects on social expenditure. Consequently, domestic policymakers have hardly any means to design spending on social affairs. Our results confirm that aging, unemployment and de facto globalization predict social expenditure. The results also suggest, however, that policymakers in individual countries still have leeway to influence social policies; and the policymakers use their leeway. Advocates of a large size of government may therefore proceed in supporting policymakers who are likely to extend the welfare state.

References

Abrams, B. A. and Settle, R. F. (1999). Women's suffrage and the growth of the welfare state. *Public Choice*, 100(3), 289-300.

Alesina, A. (1987). Macroeconomic policy in a two-party system as a repeated game. *Quarterly Journal of Economics*, 102, 651–678.

Alesina, A., Devleeschauwer, A., Easterly, W., Kurlat, S. and Wacziarg, R., (2003). Fractionalization. *Journal of Economic Growth* 8, 155–194.

Alesina, A., Drazen, A., (1991). Why are stabilizations delayed? A political economy model. *American Economic Review,* 81(5), 1170–1188.

Alesina, A. and Tabellini, G. (1990). A positive theory of fiscal deficits and government debt. *Review of Economic Studies,* 57, 403-414.

Alesina, A., Wacziarg, R. (1998). Openness, country size and government. *Journal of Public Economies* 69(3), 305-321.

Alt, J. E., & Lassen, D. (2006a). Transparency, political polarization and political budget cycles in OECD countries. *American Journal of Political Science*, 50, 530–550.

Alt, J. E., & Lassen, D. (2006b). Fiscal transparency, political parties and debt in OECD countries. *European Economic Review*, 50, 1403–1439.

Alt, J. E., & Rose, S. S. (2009). Context-conditional political budget cycles. In C. Boix & S. C. Stokes (Eds.), The Oxford handbook of comparative politics. Oxford: Oxford University Press.

Armingeon, K. (2012). The politics of fiscal responses to the crisis of 2008-2009. *Governance*, 25(4), 543–565.

Armingeon, K., Isler, C., Knöpfel, L., Weisstanner, D., & Engler, S. (2018). Comparative political data set 1960–2016. Bern, Switzerland: Institute of Political Science, University of Berne. http://www.cpds-data.org/.

Becker, G. S. (1957). The economics of discrimination. Chicago: University of Chicago Press.

Benabou, R. (1996). Heterogeneity, stratification, and growth: Macroeconomic implications of community structure and school finance. *American Economic Review,* 86, 584–609.

Benabou, R. (2000). Unequal societies: Income distribution and the social contract. *American Economic Review*, 90, 96–129.

Bjørnskov, C., and Rode, M. (2020). Regime types and regime change: A new dataset on democracy, coups, and political institutions. *Review of International Organizations*, forthcoming.

Borck, R., (2019). Political participation and the welfare state. In R.D. Congleton and B. Grofman (Eds.), The Oxford Handbook of Public Choice, Volume 2. Oxford: Oxford University Press.

Borge, L. E. and Rattso, J. (2004). Income distribution and tax structure: Empirical test of the Meltzer–Richard hypothesis. *European Economic Review,* 48, 805-826.

Bove, V., Efthyvoulou, G., and Navas, A. (2017). Political cycles in public expenditure: butter vs guns. *Journal of Comparative Economics*, 45, 582-604.

Brender, A., and Drazen, A. (2005). Political budget cycles in new versus established democracies. *Journal of Monetary Economics*, 52, 1271–1295.

Brender, A., and Drazen, A. (2007). Electoral fiscal policy in new, old, and fragile democracies. *Comparative Economic Studies*, 49, 446-466.

Breyer, F. and Craig, B. (1997). Voting on social security: Evidence from OECD countries. *European Journal of Political Economy*, 13(4), 705-724.

Breyer, F. and Stolte, K. (2001). Demographic change, endogenous labour supply and the political feasibility of pension reform. *Journal of Population Economics,* 14(3), 409-424.

Cameron, D. R. (1978). The expansion of the public economy: A comparative analysis. *American Political Science Review* 72(4), 1243–61.

Cascio, E. U. and Washington, E. (2014). Valuing the vote: The redistribution of voting rights and state funds following the voting rights act of 1965. *Quarterly Journal of Economics*, 129(1), 379-433.

Cederman, L. E., Wimmer A., and Min B. (2010). Why do ethnic groups rebel? New data and analysis. *World Politics,* 62(1), 87–119.

Chappell, H.W. and Keech, W.R. (1986). Party differences in macroeconomic policies and outcomes. *American Economic Review*, 76, 71–74.

Colantone, I., Crino, R. and Ogliari, L. (2019). Globalization and mental distress. *Journal of International Economics*, 119, 181-207.

Crombez, C. (1996). Minority governments, minimal winning coalitions and surplus majorities in parliamentary systems. *European Journal of Political Research* 29, 1-29.

Cruz, C., Keefer, P., & Scartascini, C. (2018). Database of political institutions 2017. https://publications.iadb.org/handle/11319/8806

Dahan, M. and Strawczynski, M. (2013) "Fiscal rules and the composition of government expenditures in OECD countries" *Journal of Policy Analysis and Management*, 32, 484- 504.

de Haan, J., Sturm, J.-E. and Beekhuis, G. (1999). The weak government thesis: Some new evidence. *Public Choice*, 101, 163-176.

de Haan, J., and Sturm, J.-E. (1994). Political and institutional determinants of fiscal policy in the European community. *Public Choice,* 80, 157-172.

de Haan, J., and Sturm, J.-E. (1997). Political and economic determinants of OECD budget deficits and government expenditures: A reinvestigation. *European Journal of Political Economy*, 13, 739-750.

de Haan, J. and Klomp, J. (2013). Conditional budget cycles: A review of recent evidence. *Public Choice*, 157, 387-410.

Desmet, K., Ortuño-Ortín I., and Wacziarg R. (2012). The political economy of linguistic cleavages. *Journal of Development Economics*, 97(2), 322–338.

Desmet, K., Weber, S., and Ortuño-Ortín, I. (2009). Linguistic diversity and redistribution. *Journal of the European Economic Association*, 7(6), 1291-1318.

Devereux, M. P., Griffith, R. Klemm, A., (2002). Corporate income tax reforms and international tax competition. *Economic Policy*, 17(35), 449–95.

Devereux, M. P., Lockwood, B. and Redoano, M. (2008). Do countries compete over corporate tax rates? *Journal of Public Economics*, 92, 1210-1235.

Dreher, A. (2006). Does globalization affect growth? Evidence from a new index of globalization. *Applied Economics*, 38(10):1091–1110.

Dreher, A., Gaston, N., and Martens, P. (2008a). *Measuring Globalisation - Gauging its Consequences*. New York: Springer.

Dreher, A., Sturm, J.-E. and Ursprung H.W. (2008b). The impact of globalization on the composition of government expenditures: Evidence from panel data. *Public Choice,* 134, 263-292.

Dreher, A., Sturm, J.-E. and Vreeland, J. R. (2009a). Development aid and international politics: does membership on the UN Security Council influence World Bank decisions*? Journal of Development Economics*, 88, 1–18.

Dreher, A., Sturm, J.-E. and Vreeland, J. R. (2009b) Global horse trading: IMF loans for votes in the United Nations Security Council, *European Economic Review*, 53, 742–57.

Dubois, E. (2016). Political business cycles 40 years after Nordhaus. *Public Choice,* 166, 235-259.

Dutt, P., Mitra, D. (2005). Political ideology and endogenous trade policy: an empirical investigation. *Review of Economics and Statistics,* 87(1), 59-72.

Dutt, P., Mitra, D. (2006). Labor versus capital in trade-policy: The role of ideology and inequality. *Journal of International Economics,* 69(2), 310-320.

Egger, P., Nigai, S. and Strecker, N. M. (2019). The taxing deed of globalization. *American Economic Review*, 109(2), 353-390.

Epifani, P., Gancia, G. (2009). Openness, government size and the terms of trade. *Review of Economic Studies* 76(2), 629-668.

Fujiwara, T. (2015). Voting technology, political responsiveness, and infant health: Evidence from Brazil. *Econometrica*, 83(2), 423-464.

Galasso, V. and Profeta, P. (2007). How does ageing affect the welfare state? *European Journal of Political Economy,* 23(2), 554-563.

Garrett, G. (1998). *Partisan politics in the global economy*. Cambridge: Cambridge University Press.

Garrett, G. and Mitchell, D. (2001). Globalization, government spending and taxation in the OECD. *European Journal of Political Research,* 39, 145-177.

Gaston, N. and G. Rajaguru (2013). International migration and the welfare state revisited. *European Journal of Political Economy* 29, 90-101.

Godefroy, R., and Henry, E. (2016). Voter turnout and fiscal policy*. European Economic Review*, 89, 389-406.

Gonzales, M. D. L. A. (2002). Do changes in democracy affect the political budget cycle? Evidence from Mexico. *Review of Developmental Economics*, 6, 204–224.

Grilli, V., Masciandaro, D. and Tabellini, G. (1991). Political and monetary institutions and public financial policies in the industrial countries. *Economic Policy*, 13, 341-392.

Gründler, K. (2019). Wealth inequality and public redistribution: first empirical evidence. *Working Paper.*

Gründler, K., and Krieger, T. (2016). Democracy and growth: Evidence from a machine learning indicator, *European Journal of Political Economy,* 45, 85-107.

Gründler, K., and Krieger, T. (2018). Machine learning indices, political institutions, and economic development, *CESifo Working Paper No.6930*.

Gründler, K., and Köllner, S. (2017). Determinants of governmental redistribution: Income distribution, development levels, and the role of perceptions. *Journal of Comparative Economics,* 45(4), 930-962.

Gygli, S., Haelg, F., Potrafke, N., and Sturm, J.-E. (2019). The KOF Globalisation Index - Revisited. *Review of International Organizations*, 14(3), 543-574.

Hagen, J. von (1991). A note on the empirical effectiveness of formal fiscal restraints. *Journal of Public Economics,* 44, 99-110.

Hagen, J. von (1992). Budgeting procedures and fiscal performance in the European Communities. Economic Papers, Commission of the European Communities, Nr. 96.

Hartwig, J. and Sturm, J.-E. (2014). Robust determinants of health care expenditure growth, *Applied Economics*, 46:36, 4455-4474.

Hartwig, J. and Sturm, J.-E. (2019). Do fiscal rules breed inequality? First evidence for the EU, *Economics Bulletin*, 39:2.

Heinemann, F., Moessinger, M.-D. and Yeter, M. (2018) "Do fiscal rules constrain fiscal policy? A meta-regression analysis". *European Journal of Political Economy,* 51, 69-92.

Herwartz, H. and Theilen, B. (2014). Partisan influence on social spending under market integration, fiscal pressure and institutional change. *European Journal of Political Economy*, 34, 409–424.

Herwartz, H., and Theilen, B. (2017). Ideology and redistribution through public spending. *European Journal of Political Economy* 46, 74-90.

Hibbs, D.A., (1977). Political parties and macroeconomic policy. *American Political Science Review,* 71, 1467–1487.

Hodler, R., Luechinger, S. and Stutzer, A. (2015). The effects of voting costs on the democratic process and public finances. *American Economic Journal: Economic Policy,* 7(1), 141-171.

Hoffman, M., G. León, and M. Lombardi (2017). Compulsory voting, turnout, and government spending: Evidence from Austria. *Journal of Public Economics* 145, 103-115.

Iversen, T. (2001). The dynamics of the welfare state expansion: trade openness, de-industrialization, and partisan politics. In Pierson, P. (Ed.) *The new politics of the welfare state* (pp. 45–79). Oxford: Oxford University Press.

Kenworthy, L. and Pontusson, J. (2005). Rising inequality and the politics of redistribution in affluent countries. *Perspectives on Politics,* 3(3), 449-471.

Kittel, B. and Obinger, H. (2003). Political parties, institutions and the dynamics of social expenditure in times of austerity. *Journal of European Public Policy*, 10, 20-45.

Kleven, H. J., Landais, C., Saez, E. and Schultz, E. (2014). Migration and wage effects of taxing top earners: Evidence from the foreigners' tax scheme in Denmark. *Quarterly Journal of Economics*, 129(1), 333-378.

Kwon, H.Y., Pontusson, J., (2010). Globalization, labour power and partisan politics revisited. *Socio-Economic Review*, 8, 251–281.

Laeven, L. and Valencia, F. (2018). Systematic Banking Crisis Revisited, *IMF Working Paper*, 18/206.

Leamer, E. E. (1985). Sensitivity analyses would help, *American Economic Review*, 75, 308–13.

Leibrecht, M., Klien, M., and Onaran, O. (2011). Globalization, welfare regimes and social protection expenditures in Western and Eastern European countries. *Public Choice,* 148(3-4), 569-594.

Levine, R. and Renelt, D. (1992) A sensitivity analysis of cross country growth regressions, American Economic Review, 82, 942–63.

Lijphart, A. (1984). Measures of cabinet durability: a conceptual and empirical evaluation. *Comparative Political Studies*, 17, 265–279.

Lijphart, A. (1997). Unequal participation: Democracy's unresolved dilemma. *American Political Science Review,* 91 (1), 1–14.

Lim, S., and Burgoon, B. (2018). Globalization and support for unemployment spending in Asia: do Asian citizens want to embed liberalism? *Socio-Economic Review*, forthcoming.

Lledo, V., S. Yoon, X. Fang, S. Mbaye, and Y. Kim (2017). Fiscal rules at a glance [data set]. available at: http://www.imf.org/external/datamapper/FiscalRules/map/map.htm.

Magnus, J., Powell, O., and Prüfer, P. (2010). A comparison of two model-averaging techniques with an application to growth empirics. *Journal of Econometrics*, 154, 139-153.

Mauro, P., Romeu, R., Binder, A. and Zaman, A. (2015). A modern history of fiscal prudence and profligacy. *Journal of Monetary Economics*, 76, 55-70.

McManus, I. (2019). The re-emergence of partisan effects on social spending after the global financial crisis. *Journal of Common Market Studies*, 57, 1274-1291.

Meinhard, S., and Potrafke, N. (2012). The globalization-welfare state nexus reconsidered. *Review of International Economics* 20(2), 271-87.

Meltzer, A. H., and Richard, S. F. (1981). A rational theory of the size of government. *Journal of Political Economy*, 89(5), 914–927.

Mian, A., Sufi, A. and Trebbi, F. (2014). Resovling debt overhang: Political constraints in the aftermath of financial crisis. *American Economic Journal: Macroeconomics*, 6(2), 1-28.

Milanovic, B. (2000). The median-voter hypothesis, income inequality, and income redistribution: an empirical test with the required data. *European Journal of Political Economy*, 16(3), 367-410.

Milesi-Ferretti, G.-M., Perotti, R. and Rostagno, M. (2002). Electoral systems and public spending. *Quarterly Journal of Economics*, 117(2), 609–657.

Moser, C. and Sturm, J.-E. (2011). Explaining IMF lending decisions after the Cold War, *Review of International Organizations*, 6, 307–40.

Mueller, D. C. and Stratmann, T. (2003). The economic effects of democratic participation. *Journal of Public Economics*, 87, 2129-2155.

Nerlich, C. and Reuter, W.H. (2013). The design of national fiscal frameworks and their budgetary impact. *ECB Working Paper* number 1588.

Nordhaus, W. D. (1975). The political business cycle. *Review of Economic Studies*, 42, 169–190.

Onaran, O., Boesch, V. (2014). The effect of globalisation on the distribution of taxes and social expenditures in Europe: Do welfare state regimes matter? *Environment and Planning A* 46: 373-397.

Onaran, O., Boesch, V., Leibrecht, M. (2012). How does globalisation affect the implicit tax rates on labor income, capital income, and consumption in the European Union? *Economic Inqui*ry 50(4): 880-904.

Ostry, J., A. Berg, and C. G. Tsangarides (2014). Redistribution, inequality and growth. IMF Staff Discussion Note.

Pecoraro, B. (2017). Why don't voters 'put the Gini back in the bottle'? Inequality and economic preferences for redistribution. *European Economic Review,* 93, 152-172.

Penner, R.C. and Weisner, M. (2001). Do state budget rules affect welfare spending? The Urban Institute Occasional Paper number 43.

Persson, T., Gérard, R. and Tabellini, G. (1998). Towards micropolitical foundations of public finance. *European Economic Review,* 42, 685–694.

Persson, T., and Tabellini, G. (1999). The size and scope of government: comparative government with rational politicians. *European Economic Review*, 43, 699–735.

Persson, T., and Tabellini, G. (2002). Do electoral cycles differ across political systems? (Mimeo). IIES, Stockholm University.

Persson, T., and Tabellini, G. (2003). The economic effect of constitutions. Cambridge: MIT Press.

Pleninger, R., and Sturm, J.-E. (2020). The effects of economic globalization and ethnic fractionalization on redistribution, *World Development*, forthcoming.

Potrafke, N. (2009). Did globalization restrict partisan politics? An empirical evaluation of social expenditures in a panel of OECD countries. *Public Choice* 140, 105–124.

Potrafke, N. (2015). The evidence on globalisation. *World Economy*, 38(3): 509–552.

Potrafke, N. (2017). Partisan politics: The empirical evidence from OECD panel studies. *Journal of Comparative Economics,* 45, 712–750.

Potrafke, N. (2018). Government ideology and economic policy-making in the United States – A survey. *Public Choice,* 174, 145-207.

Potrafke, N. (2019). The globalisation-welfare state nexus: Evidence from Asia. *World Economy*, 43(3), 959-974.

Potrafke, N. (2020). Fiscal performance of minority governments: new empirical evidence for OECD countries. *Party Politics*, forthcoming.

Rae, Douglas W. (1968). A note on the fractionalization of some European party systems. *Comparative Political Studies* 1: 413-418

Razin, A., Sadka, E. and Swagel, P. (2002). The aging population and the size of the welfare state. *Journal of Political Economy*, 110(4), 900-918.

Rodrik, D. (1998). Why do more open economies have bigger governments? *Journal of Political Economy* 106(5), 997-1032.

Rogoff, K., and Sibert, A. (1988). Elections and macroeconomic policy cycles. *Review of Economic Studies*, 55, 1–16.

Rogoff, K. (1990). Equilibrium political budget cycles. *American Economic Review* 80: 21-36.

Rose, S. (2006). Do fiscal rules dampen the political business cycle? *Public Choice*, 128, 407–431.

Saalfeld, T. (2013). Economic performance, political institutions and cabinet durability in 28 European parliamentary democracies, 1945-2011. in: W.C. Müller, & H.M. Narud (Ed.), *Party governance and party democracy*. New York: Springer, 51-79.

Sala-i-Martin, X. (1997) I just ran two million regressions, *American Economic Review*, 87, 178–83.

Sala-i-Martin, X., Doppelhofer, G. and Miller, R. I. (2004). Determinants of long-term growth: a Bayesian averaging of classical estimates (BACE) approach, *American Economic Review*, 94, 813–35.

Saunders, P. and F. Klau (1985). The role of the public sector: Causes and consequences of the growth of government. OECD Economic Studies (4).

Savage, L. (2019). The politics of social spending after the great recession: The re-turn of partisan policymaking. *Governance*, 32(1), 123-141.

Schmitt, C. (2016). Panel data analysis and partisan variables: How periodization does influence partisan effects. *Journal of European Public Policy*, 23(10), 1442–1459.

Schuknecht, L., Zemanek, H. (2018). Social dominance. *CESifo Working Paper* No. 6894.

Schulze, G.G. and Ursprung, H.W. (1999). Globalisation of the economy and the nation state. *World Economy* 22(3), 295–352.

Shelton, C.A. (2007). The size and composition of government. *Journal of Public Economics*, 91, 647-651.

Shelton, C.A. (2008). The aging population and the size of the welfare state: Is there a puzzle? *Journal of Public Economics*, 92(3-4), 647-651.

Shi, M. and Svensson, J. (2006). Political budget cycles: do they differ across countries and why? *Journal of Public Economics*, 90, 1367–1389.

Sinn, H.-W. (1997). The selection principle and market failure in systems competition. *Journal of Public Economics,* 66(2), 247-274.

Sinn, H.-W. (2003). *The new systems competition*. Blackwell, Oxford.

Solt, F. (2009). Standardizing the World Income Inequality Database. *Social Science Quarterly,* 90: 231–242.

Starke, P. (2006). The politics of welfare state retrenchment: A literature review. *Social Policy & Administration,* 40(1), 104–120.

Streb, J. M., and Torrens, G. (2013). Making rules credible: divided government and political budget cycles. *Public Choice*, 156, 703-722.

Sturm, J.-E. and de Haan, J. (2001) How robust is Sala-i-Martin's robustness analysis, mimeo, University of Groningen, Groningen.

Sturm, J.-E., and de Haan, J. (2015). Income inequality, capitalism and ethno-linguistic fractionalization. *American Economic Review Papers and Proceedings,* 105: 593–597.

Sturm, J.-E., and Williams, B. (2010). What determines differences in foreign bank efficiency? Australian evidence, *Journal of International Financial Markets, Institutions & Money*, 20, 284–309.

Temple, J. (2000). Growth regressions and what the textbooks don't tell you. *Bulletin of Economic Research*, 52, 181–205.

Tepe, M. and Vanhuysse, P. (2009). Are aging OECD welfare states on the path to gerontocracy? Evidence from 18 democracies, 1980-2002, *Journal of Public Policy,* 29(1), 1-28*.*

Tsebelis, G. (2002). *Veto players. How political institutions work*. Princeton University Press, Princeton.

Ursprung, H.W. (2008). Globalisation and the welfare state. in: S.N. Durlauf, & L.E. Blume (Ed.), *The New Palgrave Dictionary of Economics*, Second edition. Köln: Palgrave Macmillan.

Van Velthoven, A. de Haan, J. and Sturm, J.-E. (2019). Finance, income inequality and income redistribution, *Applied Economics Letters,* 26(14), 1202-1209.

Visser, J. (2019) ICTWSS Database. version 6.0. Amsterdam: Amsterdam Institute for Advanced Labour Studies (AIAS), University of Amsterdam. June 2019.

Vogt, M., Bormann, N. C., Rüegger, S., Cederman, L. E., Hunziker, P., and Girardin, L. (2015). Integrating data on ethnicity, geography, and conflict: The ethnic power relations data set family. *Journal of Conflict Resolution*, 59(7), 1327–1342.

Warwick, P. V. (1979). The durability of coalition governments in parliamentary democracies. *Comparative Political Studies* 11, 465–498.

Yay, G. G., and Aksoy, P. (2018). Globalization and the welfare state, *Quality and Quantity* 52(2), 1015-1040.

Appendix

*Figure A. 1: Social expenditure in different welfare state regimes, 1980-2016.*
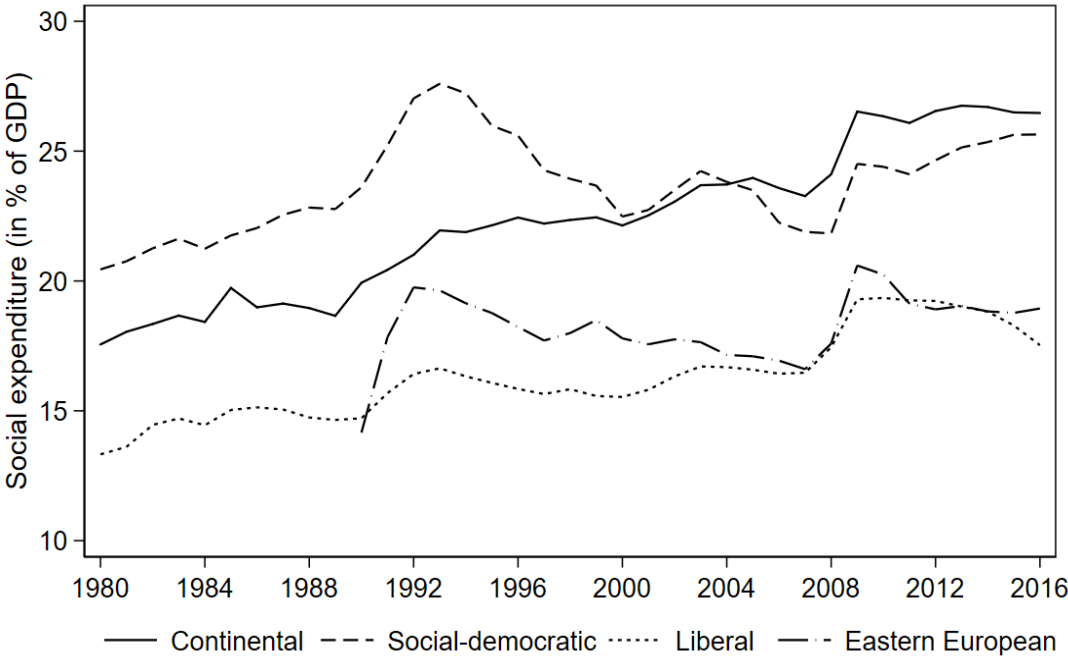
Source: OECD

Note: The classification of countries to the individual welfare state regimes follows Esping-Andersen.

Figure A. 2: Social expenditure in individual countries, grouped along different welfare state regimes, 1980-2016.
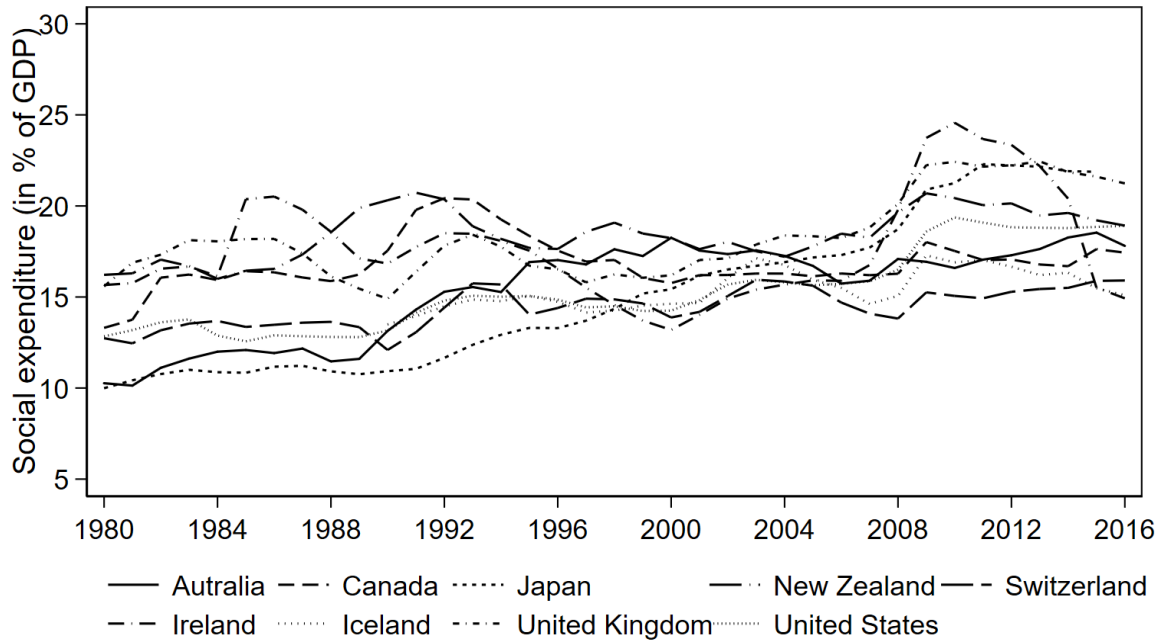
Continental countries

Source: OECD

Social-democratic countries
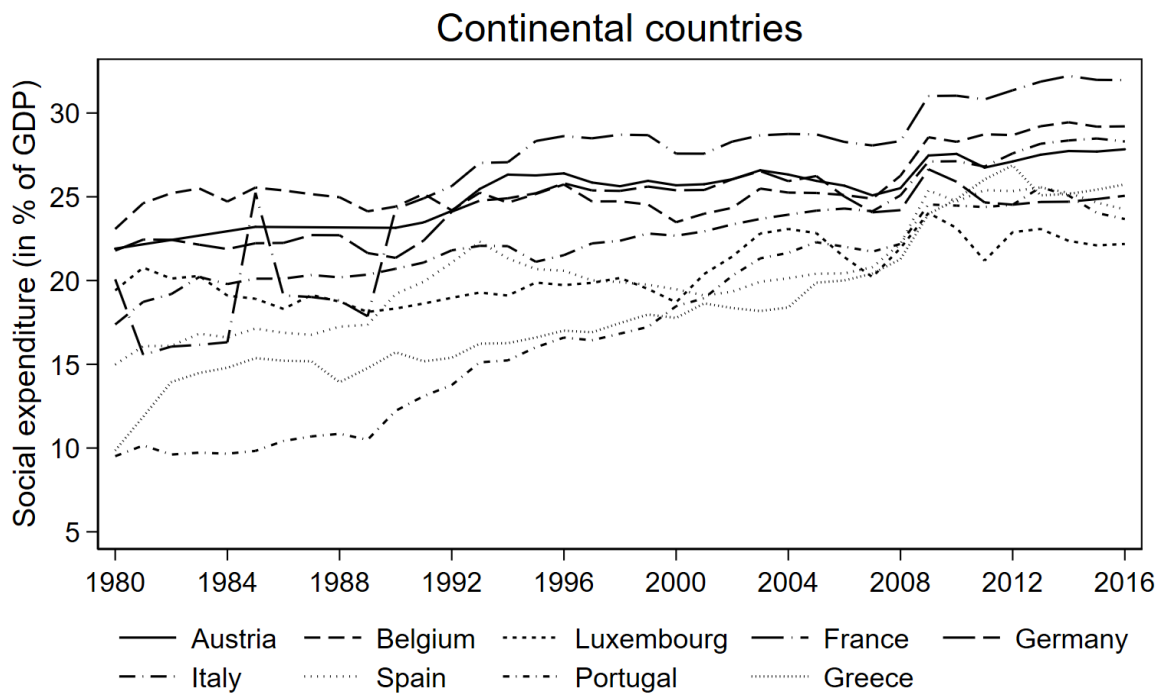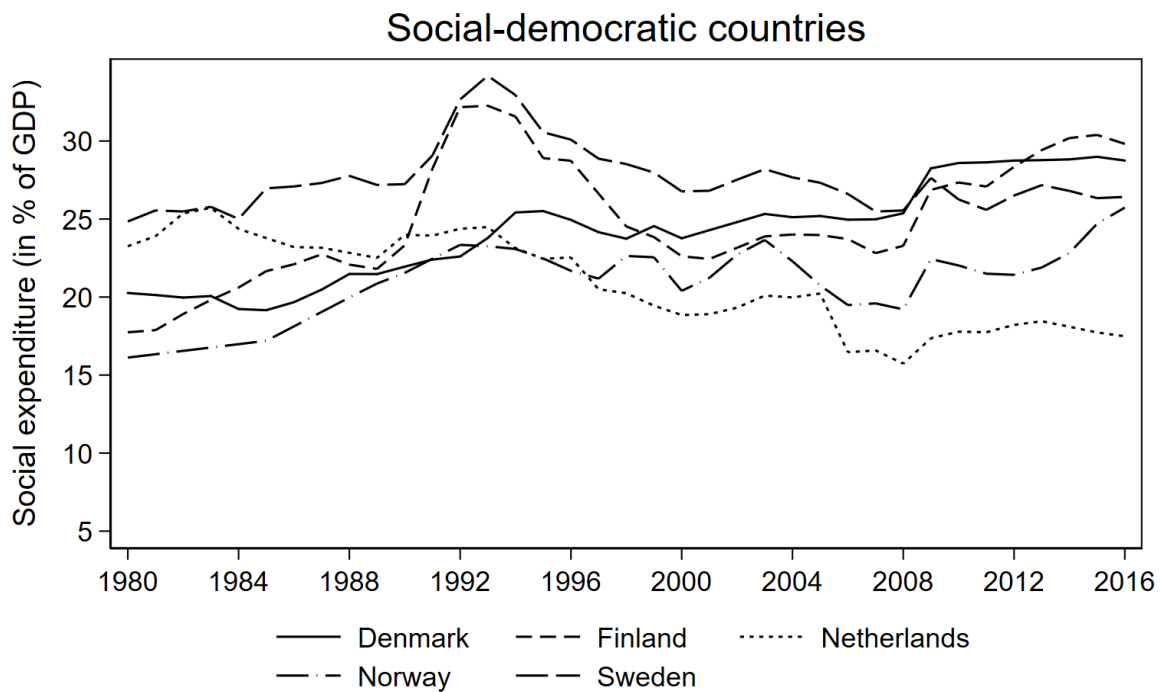
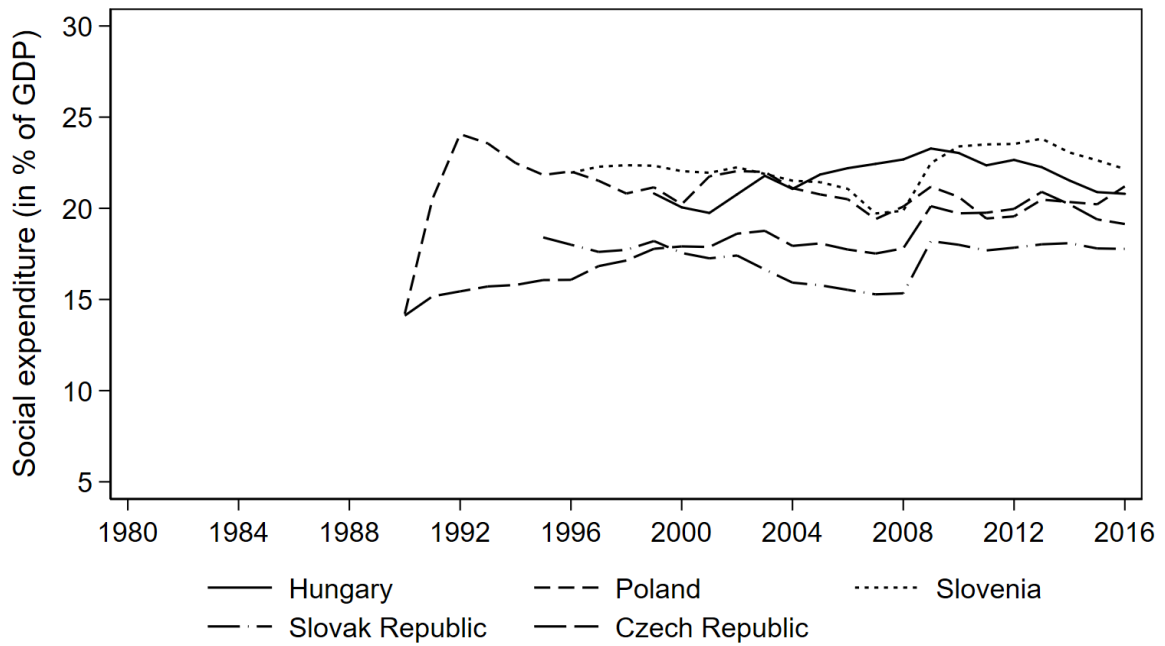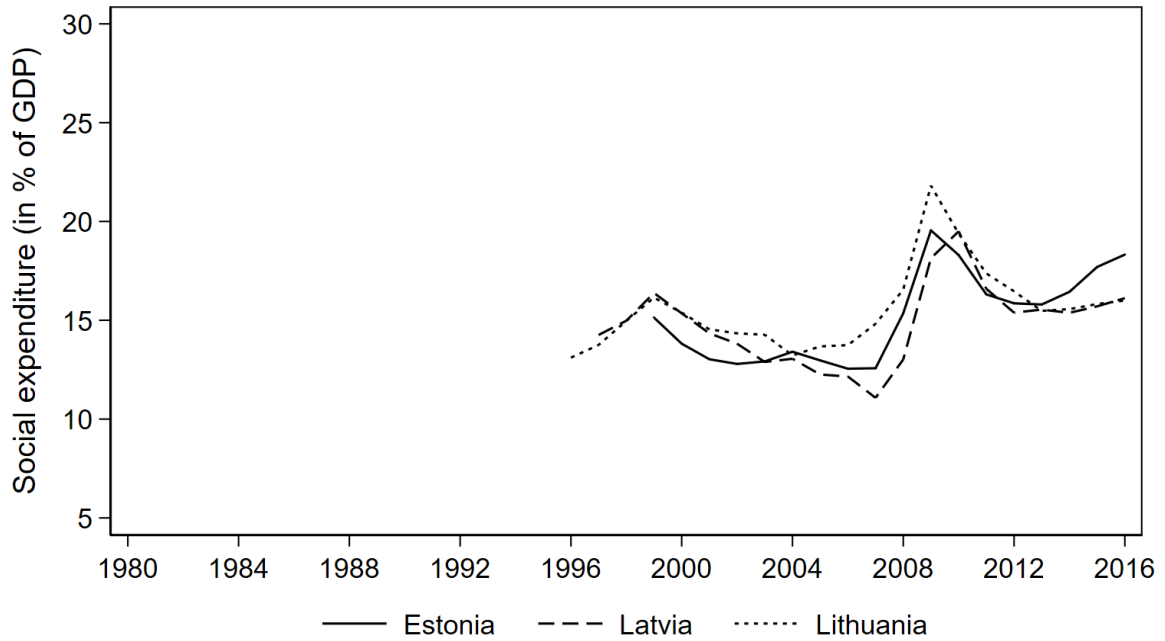Source: OECD

Liberal countries

Source: OECD

Eastern European countries

Source: OECD

Baltic countries

Source: OECD

Figure A. 3: Composition of social expenditure in OECD countries
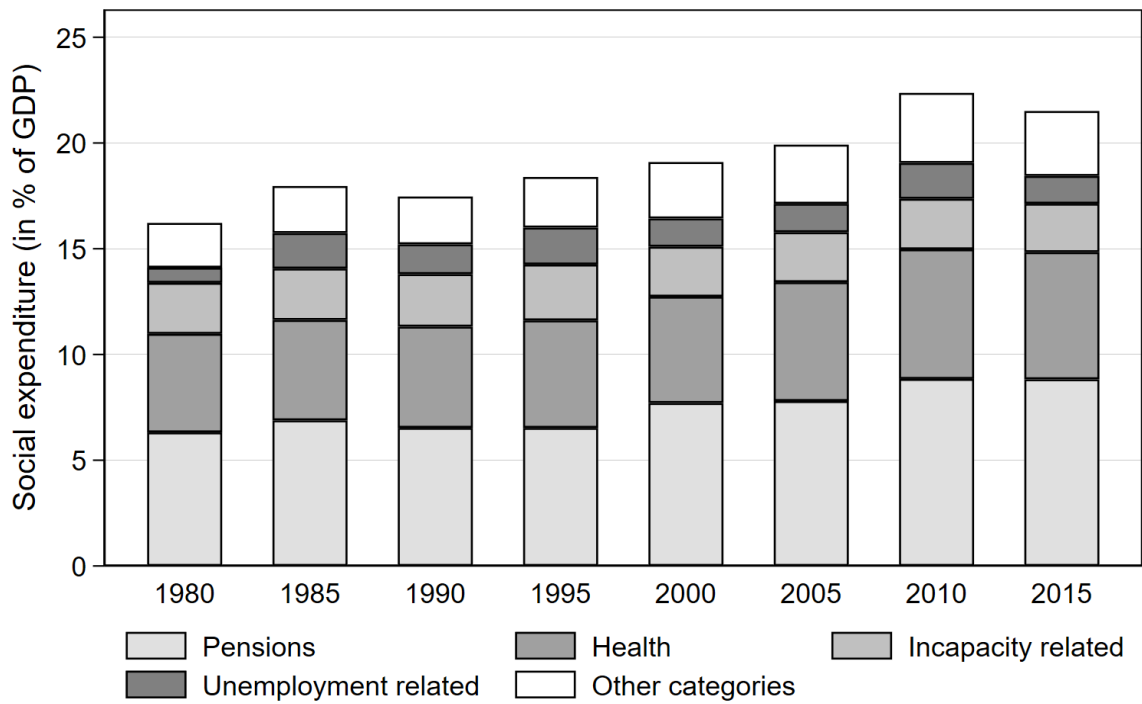
Source: OECD

Figure A. 4: Coefficients plot, all determinants
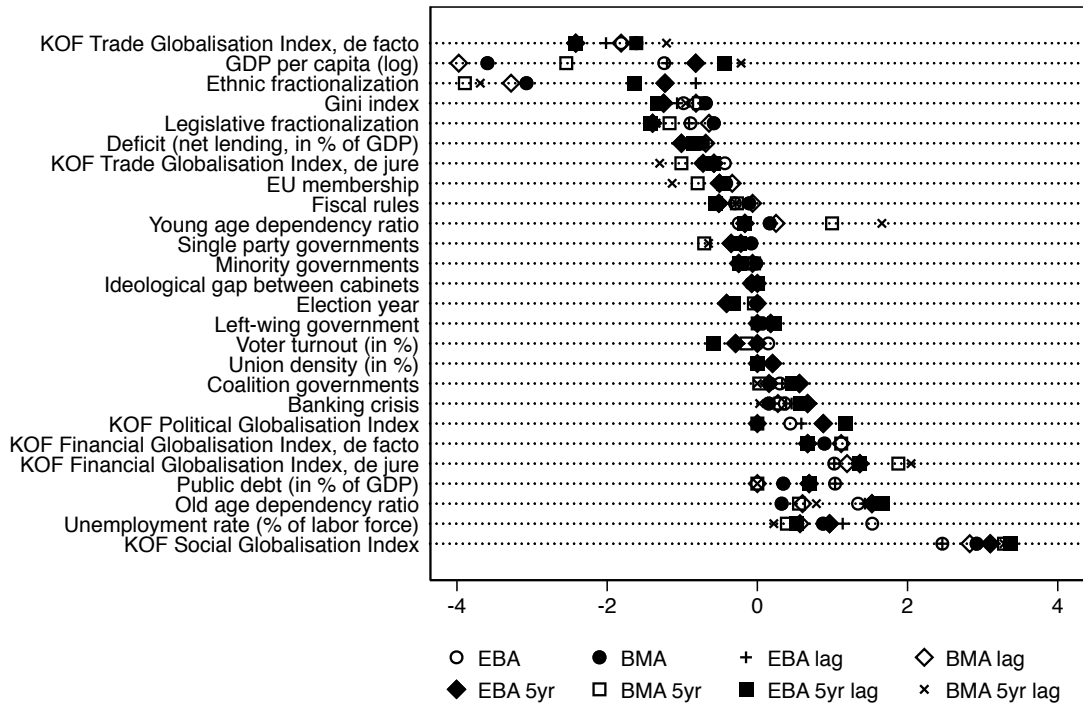
Notes: Standardized coefficients of individual models for all determinants. Coefficients are rescaled by the sample standard deviation of the variable (semi-standardization). EBA: Extreme bounds analysis; BMA: Bayesian model averaging; lag: 1-year lagged control variables; 5yr: Averages over non-overlapping 5-year periods.

Table A. 1: Explanatory variables for social expenditure suggested in the literature.

Measure	Suggested by	Effect	Data source
Dependent variable			
Public social expenditure (in % of GDP)			OECD SOCX
Explanatory variables			
Economic and demographic determinants			
Unemployment rate (% of labor force)	Garrett and Mitchell (2001)	+	Armingeon et al. (2018)
GDP per capita (log)	Wagner's Law	+/-	WDI
Banking crisis (average output loss per year)	McManus (2019)	+	Laeven and Valencia (2018)
Old age dependency ratio		+	World Bank WDI
Young age dependency ratio		+	World Bank WDI
Globalization-Welfare state nexus			
KOF Trade Globalisation Index, de facto	Schulze and Ursprung (1999)	+/-	Gygli et al. (2019)
KOF Financial Globalisation Index, de facto	Schulze and Ursprung (1999)	+/-	Gygli et al. (2019)
KOF Trade Globalisation Index, de jure	Schulze and Ursprung (1999)	+/-	Gygli et al. (2019)
KOF Financial Globalisation Index, de jure	Schulze and Ursprung (1999)	+/-	Gygli et al. (2019)
KOF Social Globalisation Index	Schulze and Ursprung (1999)	+/-	Gygli et al. (2019)
KOF Political Globalisation Index	Schulze and Ursprung (1999)	+/-	Gygli et al. (2019)
Political institutional determinants			
Left-wing government	Kittel and Obinger (2003)	+	Cruz et al. (2018)
Union density	Garrett (1998)	+	Visser (2019)
Proportional voting	Persson et al. (1998), Milesi-Ferretti et al. (2002)	+/-	Armingeon et al. (2018)
Presidential system	Persson and Tabellini (1999)	-	Armingeon et al. (2018)
Ideological gap between cabinets	Alesina and Tabellini (1990)	+	Armingeon et al. (2018)
Legislative fractionalization	de Haan et al. (1999)	+	Armingeon et al. (2018)
Coalition governments	de Haan et al. (1999)	+	Armingeon et al. (2018)
Minority governments		+	Armingeon et al. (2018)
Single-party cabinets	Armingeon (2012)	-	Armingeon et al. (2018)

Election year	Rogoff and Sibert (1988)	+	Armingeon et al. (2018)
Ethnic fragmentation	Alesina et al. (2003)	-	Cederman et al. 2010, Vogt et al. 2015
Gini index	Alesina et al. (2003)	+	Solt (2009)
Voter turnout (in %)	Lijphart (1997)	+	Armingeon et al. (2018)
Political-economic determinants			
Fiscal rules	von Hagen (1991)	-	Lledó et al. (2017)
EU membership	McManus (2019)	-	Armingeon et al. (2018)
Public debt (% of GDP)	Kittel and Obinger (2003)	-	Armingeon et al. (2018)
Budget deficit (net lending, % of GDP)	Herwartz and Theilen (2014)	-	Armingeon et al. (2018); Mauro et al. (2015)
Interaction terms			
Partisan effects			
Left-wing government and globalization	Potrafke (2009)	+	Cruz et al. (2018), Gygli et al. (2019)
Left-wing government and banking crisis	McManus (2019)	+	Cruz et al. (2018), Laeven and Valencia (2018)
Left-wing government and union density	Garrett (1998)	+	Cruz et al. (2018), Visser (2019)
Political business cycles			
Election year and proportional voting	Persson and Tabellini (2002, 2003)	+/-	Armingeon et al. (2018);
Election year and presidential system	Persson and Tabellini (2002, 2003)	-	Armingeon et al. (2018); Lijphart (2012)
Election year and GDP per capita	Shi and Svensson (2006)	-	Armingeon et al. (2018); World Bank WDI
Election year and institutional quality	Shi and Svensson (2006)	-	Armingeon et al. (2018); Teorell et al. (2018)
Election year and level of democracy	Gonzales (2002)	-	Armingeon et al. (2018); Teorell et al. (2018)
Election year and fiscal rules	Rose (2006)	-	IMF/ Lledó et al. (2017)

Table A. 2: Bayesian Model Averaging: Results for interaction effects, full list

	Avg.Beta	Avg.SE	t	[1-Std. Err. Bands]	
Government ideology and globalization					
Left-wing government	-0.88	0.37	-2.40	-1.61	-0.16
KOF Trade Globalisation Index, de facto	-0.08	0.01	-6.87	-0.10	-0.06
Interaction term	0.02	0.01	2.62	0.00	0.03
Left-wing government	-1.15	0.47	-2.44	-2.08	-0.22
KOF Financial Globalisation Index, de facto	0.04	0.01	3.52	0.02	0.06
Interaction term	0.02	0.01	2.59	0.00	0.03
Left-wing government	-1.86	0.96	-1.94	-3.75	0.02
KOF Trade Globalisation Index, de jure	-0.07	0.02	-4.24	-0.10	-0.04
Interaction term	0.02	0.01	1.99	0.00	0.04
Left-wing government	0.12	0.82	0.14	-1.50	1.73
KOF Financial Globalisation Index, de jure	0.08	0.01	6.49	0.05	0.10
Interaction term	0.00	0.01	-0.11	-0.02	0.02
Left-wing government	-2.58	1.19	-2.17	-4.90	-0.25
KOF Social Globalisation Index	0.30	0.04	8.08	0.23	0.37
Interaction term	0.03	0.02	2.21	0.00	0.06
Left-wing government	-1.53	1.15	-1.33	-3.78	0.72
KOF Political Globalisation Index	-0.01	0.02	-0.65	-0.05	0.02
Interaction term	0.02	0.01	1.37	-0.01	0.04
Partisan effects					
Left-wing government	-0.06	0.13	-0.49	-0.31	0.18
Banking crisis (average output loss per year)	0.05	0.02	2.16	0.00	0.09
Interaction term	0.12	0.04	2.85	0.04	0.21
Left-wing government	0.39	0.24	1.61	-0.09	0.87
Union density (in %)	0.01	0.01	0.97	-0.01	0.04
Interaction term	-0.01	0.01	-1.70	-0.02	0.00
Political business cycles					
Election year	-0.20	0.30	-0.65	-0.79	0.40
Proportional voting	-0.42	0.43	-0.98	-1.26	0.42
Interaction term	0.08	0.17	0.47	-0.26	0.42
Election year	0.04	0.13	0.30	-0.21	0.28
Presidential system	-0.32	0.27	-1.19	-0.85	0.21
Interaction term	-0.25	0.16	-1.57	-0.57	0.06
Election year	-0.49	2.10	-0.24	-4.61	3.62
GDP per capita (log)	-5.65	1.06	-5.34	-7.73	-3.57
Interaction term	0.04	0.20	0.21	-0.35	0.44
Election year	-0.10	0.69	-0.15	-1.45	1.24
Institutional quality	-0.22	1.32	-0.16	-2.81	2.38
Interaction term	0.05	0.80	0.06	-1.51	1.61
Election year	-2.30	3.64	-0.63	-9.45	4.85
Level of democracy	0.31	0.36	0.88	-0.39	1.02

Interaction term	0.23	0.37	0.61	-0.50	0.95
Election year	-0.19	0.15	-1.30	-0.47	0.10
Fiscal rules	-0.53	0.18	-2.94	-0.88	-0.18
Interaction term	0.28	0.21	1.29	-0.14	0.70

Notes: For variable definitions and sources, refer to Table A. 1. Bold numbers indicate variables for which (absolute) t-ratio greater than 1. Posterior inclusion probability (pip, not reported) equals one for individual variables and interaction terms by definition to ensure that the set is included in all models.

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