Determinants of social expenditure in OECD countries

Florian Haelg, Niklas Potrafke, Jan-Egbert Sturm

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a KOF Swiss Economic Institute, ETH Zurich, Switzerland
b ifo Institute, Germany
c University of Munich, Germany
d CESifo Munich, Germany

Abstract: This study portrays 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-economic variables such as government ideology and electoral motives, demographic change and economic variables such as unemployment. Scholars have used social expenditure as dependent variable in a plethora of 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 trade globalization, fractionalisation of the party system and budget deficits decreased social expenditure. Social globalisation and coalition governments increased social expenditure.

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Keywords: social expenditure, OECD countries, extreme bounds analysis

* Corresponding author: Florian Haelg, haelg@kof.ethz.ch, KOF Swiss Economic Institute, ETH Zurich, Leonhardstrasse 21, 8092 Zurich, Switzerland.
1. Introduction

For a long time, social expenditure has increased in many industrialized countries. 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, but was somewhat decreasing in the following public debt crisis. Since the year 2009, social expenditure is decreasing in about two thirds of the OECD countries, however.\(^1\) 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.\(^2\) In social-democratic countries, 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 liberal countries, such as in the United States, social expenditure typically assumes relatively low values but increased somewhat in recent years. In many OECD countries, social expenditure assumes the lion’s share of general government expenditure (e.g. Dorn et al. 2018 and 2019). 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 phenomena which has been described as “social dominance” (e.g. Schuknecht and Zemanek 2018).

Figure 1: Evolution of social expenditure in the OECD and in selected countries, 1980-2016.

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2 Figure A. 1 in the appendix displays the evolution of social expenditure in all OECD countries, grouped along different welfare states regimes.
Scholars examine determinants of social expenditure. Theories include political-economic, demographic and economic approaches. Globalization is, for example, expected to influence social expenditure. Advocates of the dark side of globalization believe 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 believe, 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 increase social expenditure to a larger extent than right-wing governments because left-wing governments favour 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. Increases in social expenditure may also be quite mechanical. In the course of the demographic change, the working age population has to take care of a growing number of senior citizens. When less citizens work and provide contributions to social security systems, and simultaneously, more senior citizens enjoy social security benefits, social expenditure increases, ceteris paribus. In recessions, unemployment benefits increase and GDP decreases, by definition. It is quite clear that social expenditure as a share of GDP increases in recessions. The empirical evidence supporting individual theories is mixed. We return to theories and previous empirical studies in section 2.

Econometric 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 and employ extreme bounds analysis (EBA) to portray robust predictors of social expenditure. Our sample includes 31 OECD countries over the period 1980-2016. The results suggest that trade globalization, fractionalisation of the party system and budget deficits decreased social expenditure. Social globalisation and coalition governments increased social expenditure.

2. Theories and previous empirical evidence

Globalisation-Welfare state nexus

Two theories describe how globalisation influences social expenditure: the race-to-the-bottom (disciplining or efficiency theory) and the compensation theory. The race-to-the-bottom theory holds that globalisation 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. In the course of increasing competition among countries, 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 labour (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 organisations. 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 increase when economic globalisation is proceeding rapidly (Cameron 1978, Rodrik 1998).\(^4\) Citizens who are exposed to increasing income insecurity and uncertainty in the course of globalisation 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 globalisation.\(^6\)

The empirical evidence on the globalisation-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 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 globalisation 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 globalisation notwithstanding (Potrafke 2019a). In OECD countries, the effect of globalisation 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 globalisation proceeds rapidly (Leibrecht et al. 2011, Onaran and Boesch 2014, Onaran et al. 2012). The globalisation-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 globalisation to be a quite exogenous phenomenon: national governments have hardly any means to respond to globalisation 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 globalisation by encouraging trade and investment flows. By

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\(^3\) Egger et al. (2019) find that during globalisation, higher levels of public expenditures are financed by a smaller range of tax bases, such as middle class labour income.

\(^4\) Cameron (1978) hypothesised that countries that are more open are more heavily unionised which, through collective bargaining, leads to higher social spending. Rodrik (1998) showed that the correlation between openness and social spending is also found in developing countries with low levels of unionisation. He argues that social spending serves as a form of insurance against uncertainty and risks related to openness.

\(^5\) For the link between globalisation and the size of government, see also Alesina and Wacziarg (1998) and Epifani and Gancia (2009).

\(^6\) Colantone et al. (2019), for example, show how worker’ mental distress induced by import competition.
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 globalisation and its consequences are based on market-oriented policies to integrate an economy in the world’s market (de jure globalisation by reducing tariffs etc.) and the extent to which globalisation and its consequences are based on actual flows of goods and investments (de facto globalisation).

De jure globalisation is often the prerequisite for de facto globalisation: de facto globalisation 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 globalisation influence the welfare state.

**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, Alesina et al. 1997). Left-wing governments have also been described to implement more protectionist policies than right-wing governments (Dutt and Mitra 2005 and 2006). Additionally, policies of left-wing governments towards social spending may be reinforced by powerful labour 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-organised 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). There is also evidence that globalisation influenced the effect of government ideology on social expenditure (Potrafke 2009). Partisan differences on welfare policy eroded over time in OECD countries (e.g. Iversen 2011, Kittel and Obinger 2003) but more recent research shows that the global financial crisis of 2007-2008 gave rise to re-emerging partisan effects on social expenditure in OECD and European countries (Savage 2019, McManus 2019). In particular, the financial crisis deteriorated social and economic conditions and challenged social policy approaches, resulting in higher political polarisation (Funke et al. 2016, Mian et al. 2014).

**Common pool problems**

Institutions and types of government influence policy formation and affects budget composition, especially social spending. Regarding *electoral systems*, the model of Persson et al. (1998) predicts that redistributive transfers are higher in majoritarian voting systems,

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7 Additionally, Schmitt (2016) shows that partisan effects are stronger and more stable if we analyse cabinet- instead of country-year periodization.
because they are more explicitly targetable to voting districts in which narrow results are expected. On the other hand, the model of Milesi-Ferretti et al. (2002) predicts higher redistributive transfers in proportional voting systems, because proportionally elected representatives define their constituency along social lines, which are more easily targetted by redistributive transfers (for example unemployment benefits). 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 behaviour of policy makers. They show that the instability of a government is positively associated with government spending. Government instability is measured by frequent government changes (Grilli, Masciandaro, Tabellini 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 polarisation (Alesina and Tabellini 1990), the fractionalisation 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. Empirical evidence does however not suggest that fiscal policies of minority governments differed from fiscal policies of majority governments (Potrafke 2019b).

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, for example, more prominent with coalition governments (de Haan et al. 1999).

Scholars describe that budgeting procedures or fiscal rules influence the sustainability of fiscal policy (see, for example, von Hagen, 1991, 1992). Budgeting procedures and fiscal 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 somewhat mixed. Penner and Weisner (2001) found no strong evidence that fiscal rules decrease welfare spending in the US federal states. One reason might be that welfare belongs to the ‘entitlement spending’, which cannot be cut easily. 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 negative effects of fiscal rules on the ratio of social transfers to government consumption in OECD countries.

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8 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.

9 Fiscal rules are rules according to which budgets are drafted by the government, amended and passed by the parliament, and implemented by the government.
Hartwig and Sturm (2019) find evidence that ‘hard’ rules are detrimental to redistribution and increase income inequality.

*International institutions* also influence domestic welfare spending social 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 Eurozone members, for example, affect national budgets, which has consequences for domestic policies such as social spending.

**Electoral motives**

Political budget 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 level of development (Shi and Svensson 2006), the quality of the institutional environment (Shi and Svensson 2006), the age and level of democracy (Brender and Drazen 2005, Gonzales 2002), 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 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. 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 Ratto 2004). Ostry et al. (2014) find that redistribution is positively related to income inequality. Van Velthoven et al. (2018) find evidence that income inequality that is caused by finance (financial development, financial liberalisation and banking crisis) leads to more redistribution than inequality caused by other factors.

**Political participation**

Political participation affects policies if it is not randomly distributed across population. Increasing 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.

Overall, 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). On the other hand, Hodler et al. (2015) show that lower voting costs after the introduction of postal voting in Switzerland, which increase voter turnout and decrease average education of participants, lowered government welfare expenditures. Examining the increased voter turnout after the introduction of compulsory voting laws in Austria, Hoffman et al. (2017), on the other hand, found no evidence of the effect of higher turnout on government expenditures.

**Fragmentation**

Becker (1957) proposes that individuals have stronger feelings of empathy towards their own group. Alesina et al. (2003) show that ethnic fragmentation decreases social expenditure because achieving consensus necessary for redistribution to the needy is more difficult in ethnically diverse societies. The same effect applies to linguistic fragmentation. The results for religious fragmentations, however, point to a positive relationship between transfers and fragmentation, but the results are most likely caused by a third factor, which is the level of tolerance of the majority. Desmet et al. 2009 and 2012, for example, provides cross-country evidence for the negative correlation between ethnic fractionalisation and redistribution.

**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, certain public goods such as education have traits of luxury goods and are consumed more heavily with higher income.

**Demography**

Manifold hypotheses juxtapose how population aging influences the welfare state. The median voter hypothesis predicts that the size of the welfare state increases in the course of 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, Tepe and Vanhuysse 2009, Potrafke 2009). The political economic and the mechanic effect notwithstanding, aging is expected to increase the size 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 labour 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, Tepe and Vanhuysse 2009, Potrafke 2009). Razin et al. (2002) even report a negative influence of the dependency ratio on the labour tax rate and social transfers.

Business cycle: GDP growth and unemployment

Social expenditure will increase in recessions, as measured by low GDP growth and pronounced unemployment rates (e.g., Garrett and Mitchell 2001).

Public debt and budget deficit

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

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. 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 labour market programmes, unemployment and housing. Spending on old age pensions and health amount to around two thirds of overall social expenditure. Public social expenditure was more than 30% of GDP in Finland and France in 2015. It was lowest at around 15% in liberal welfare state regimes such as Switzerland, Ireland and Iceland, and in Baltic countries such as Lithuania and Latvia. On average, social expenditure was 19.0% in the OECD countries (see Figure 2).

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10 We discard Chile, Israel, Korea, Mexico, and Turkey from our analysis because of data unavailability in the explanatory variables.

11 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.

12 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.
Social expenditure increased from 14.4% in 1980 to 19% in 2015 (and 20.5% in 2016). Overall, social expenditure increased in every OECD country between 1980 and 2015, except in the Netherlands and Ireland (see Figure 3). 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”.

Source: OECD
3.2 Explanatory variables

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

We measure globalisation six different 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 globalisation and also disentangles the economic dimension of globalisation into a trade and financial subcomponent. If we assume, for example, that trade globalisation results in higher uncertainty and risks for domestic workers than financial globalisation, we would expect to find a stronger compensation effect for trade than financial globalisation. The new KOF index also helps to disentangle the effects of de jure and de facto globalisation on social expenditure. We include separate de facto and de jure indices for trade and financial globalisation, as well as the overall index for social and political globalisation in our empirical analysis.

To measure government ideology, we include variants of 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 centre, and 3 for left-wing chief executives. We compute dummy variables for right-wing and for left-wing government ideologies, respectively.

We also include the interaction terms between government ideology and the individual globalisation indices. The new distinction between de facto and de jure globalisation in the KOF Globalisation Index is especially suitable to examine the correlation between government
ideology and economic globalisation: when left-wing governments are active in protectionist policies, especially de jure economic globalisation should be less pronounced under left-wing than right-wing governments. De facto economic globalisation 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 globalisation 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 government ideology and a variable representing the Global Financial Crisis (GFC). To measure banking crisis in general and the GFC in particular, we use the dataset on systematic banking crisis from Laeven and Valencia (2018). In particular, we employ the average output loss per year in a systematic banking crisis, to account for the severity of the crisis. As suggested by Garrett (1998), we include union density and the interaction term between left-wing government ideology and union density to account for governments responding to pressure from unions. Visser (2019) compiled the union density variable.

We include different 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. We further include variables measuring frequency of government changes, the ideological gap between incoming and outgoing government, the fractionalisation of the party system and dummy variables for coalition governments, minority governments and single-party cabinets. All variables are taken from Armingeon et al. (2018). To account for budgetary procedures and fiscal rules, we employ the four different fiscal rules variables by Lledò et al. (2017). These variables account for the presence of expenditure rules, debt rules, budget balance rules, and revenue rules, respectively. To account for international institutions, we introduce dummy variables for European Union and European Economic and Monetary Union membership.

To account for 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 the respective measures put forward in the literature. Those are 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, dummies representing the electoral system and legislative structure, and the fiscal expenditure rule dummy.

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). Ethnic fragmentation is calculated as the Herfindahl index of ethnic fractionalisation of politically

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13 The electoral system and legislative structure are time-invariant for most countries. The country fixed effects thus subsume these variables. However, we are interested in the interaction effect of these variables.

14 The fractionalisation 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.
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). To account for social expenditure related to demographic changes in a society, old age and young age dependency ratios are included in our models. Finally, we introduce economic variables such as the log of GDP per capita, the level of public debt and the budget deficit.

Table 1: Descriptive statistics

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<td>4.44</td>
<td>-32.06</td>
<td>18.67</td>
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Note: For a description of the variables, please refer to Table A. 1: Explanatory variables for social expenditure suggested in the literature. in the appendix.
4. Methodology

To examine the determinants of public social expenditure in OECD countries, we apply (variants of) extreme bound analysis (EBA), suggested by Leamer (1983), and Levine and Renelt (1992). This approach has been widely used in the economic growth literature. The central difficulty in this research - which also applies to the research topic of the present paper - 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:

$$Y = \alpha M + \beta F + \gamma Z + u,$$

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 $\beta$ – the lowest value for $\beta$ minus two SDs – is negative and the upper extreme bound for $\beta$ – the highest value for $\beta$ plus two SDs – is positive, the variable $F$ is not robustly related to $Y$.

As argued by Temple (2000), it is rare in empirical research that we can say with certainty that one model dominates all other possibilities in all dimensions. In these circumstances, it makes sense to provide information about how sensitive the findings are to alternative modelling choices. EBA provides a relatively simple means of doing exactly this. Still, the approach has been criticized in the literature. Sala-i-Martin (1997) argues, for example, that the test applied poses too rigid a threshold in most cases. Assuming that the distribution of $\beta$ has at least some positive and some negative support, the estimated coefficient changes signs if enough different specifications are considered. We therefore report not just the lowest and highest coefficient estimates, the extreme bounds, but also the percentage of the regressions in which the coefficient of the variable $F$ is significantly different from zero at the 10% level. Moreover, instead of analysing just the extreme bounds of the estimates of the coefficient of a particular variable, we follow Sala-i-Martin’s (1997) suggestion to analyse the entire distribution. Following this suggestion, we not only report the unweighted average parameter estimate of $\beta$ and its standard deviation, but also the unweighted cumulative distribution function (CDF-U), that is, the fraction of the CDF lying on one side of zero.\(^{16}\)

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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).

\(^{16}\) 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 result in rather different outcomes and conclusions. We thus restrict our attention to the unweighted version. Furthermore, for technical reasons – in particular our unbalanced panel set-up – we are unable to use extensions of this approach, like Bayesian Averaging of Classical Estimates, as introduced by Sala-i-Martin et al. (2004), or Bayesian Model Averaging (BMA).
5. Results

Baseline model

In the baseline model, we regress social expenditure (socx_ipol) only on our two ‘M vector’ variables, the standard explanatory variables. Those include the old age dependency ratio (dpnd_ol) and the unemployment rate (unemp). 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, respectively. Given these standard variables, our dataset includes annual data for 31 OECD countries and 37 years. The first column of Table 2 shows the result of an OLS estimation of social expenditure on our standard explanatory variables including country and year fixed effects. Standard errors are clustered at the country level.

Table 2: OLS estimation results

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<th>(2) Extended model</th>
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<td></td>
<td>(3.933)</td>
<td>(1.021)</td>
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<td>Unemployment rate (in %)</td>
<td>0.352***</td>
<td>0.276***</td>
</tr>
<tr>
<td></td>
<td>(6.534)</td>
<td>(5.623)</td>
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<tr>
<td>KOF Trade Globalisation Index, de facto</td>
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<td>-0.0705**</td>
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<tr>
<td></td>
<td></td>
<td>(-2.567)</td>
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<td>KOF Social Globalisation Index</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>(1.773)</td>
<td></td>
</tr>
<tr>
<td>Banking crisis, yearly output loss</td>
<td>0.0752</td>
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</tr>
<tr>
<td></td>
<td>(1.571)</td>
<td></td>
</tr>
<tr>
<td>Fractionalisation of the party system</td>
<td>-7.259***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-2.955)</td>
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</tr>
<tr>
<td>Coalition governments</td>
<td>0.421*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.726)</td>
<td></td>
</tr>
<tr>
<td>Government debt (% of GDP)</td>
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</tr>
<tr>
<td></td>
<td>(1.419)</td>
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</tr>
<tr>
<td>Deficit (% of GDP)</td>
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<tr>
<td></td>
<td>(-3.296)</td>
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</tr>
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<td>Number of countries</td>
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<td>31</td>
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<tr>
<td>Number of periods</td>
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<td>37</td>
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</table>

Notes: Standard errors are clustered at the country level. *** p<0.01, ** p<0.05, * p<0.1. Country- and period-fixed effects not shown.

The results of the baseline model confirm the positive link between both the old age dependency ratio and unemployment rate on social expenditure. The coefficients of both variables are positive and statistically significant at the 1%-level. A one percentage point higher unemployment rate, for example, is associated with a 0.35 percentage points higher share of social expenditure on GDP.
Extreme Bounds Analysis

The results of the extreme bounds analysis are summarised in Table 3.\textsuperscript{17} As noted before, the standard explanatory variables that enter the $M$-vector are the old age dependency ratio and the unemployment rate. For the inclusion of additional explanatory variables, we use Sala-i-Martin’s version of extreme bounds analysis (EBA). The first two columns give the average of the estimated β-coefficients (Avg. Beta) for that particular variable and the average standard error (Avg. Std.Err.). 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) that shows the unweighted cumulative distribution function (CDF-U). We follow Sala-i-Martin (1997) and apply the criterion that CDF-U ≥ 95%: If an explanatory variable has CDF-U of at least 0.95, we regard this variable as a robust determinant of social expenditure. Furthermore, columns (5) and (6) report the lowest and highest estimated coefficients plus or minus two times their SDs, the lower and upper bound.

\textit{Table 3: EBA results}

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<td>-0.07</td>
<td>0.09</td>
<td>14.08</td>
</tr>
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</table>

\textsuperscript{17} The results depicted in the table do not include interactions of explanatory variables as described in section 3; including interaction effects is still work in progress.
elfrel  -0.04  0.09  0.01  0.72  -0.62  0.34  21.29
lgdppc  -2.15  1.81  0.12  0.85  -11.03  5.10  0.55
dpnd_yg  -0.02  0.09  0.00  0.65  -0.35  0.31  5.13
debt     0.03  0.02  0.08  0.95  -0.03  0.07  35.40
deficit  -0.20  0.04  1.00  1.00  -0.29  -0.06  4.48
frer     -0.56  0.60  0.00  0.82  -2.39  1.03  0.42
frdr     -0.30  0.62  0.00  0.68  -2.57  1.48  0.36
frbbr    -0.32  0.49  0.00  0.74  -1.91  1.33  0.46
frrr     -0.20  1.41  0.00  0.56  -3.92  3.26  0.27

Notes: For variable definitions, refer to Table A.1: Explanatory variables for social expenditure suggested in the literature. Shaded areas indicate variables for which CDF-U ≥ 0.95.

The EBA results depicted in Table 3 show that, besides our standard explanatory variables, seven explanatory variables are robustly correlated with social expenditure: (1) de facto trade globalisation (KOFTrGIdf), (2) the fractionalisation of the party system (rae_leg), and (3) budget deficits (deficit) with a negative sign; (4) social globalisation (KOFSoGI), (5) banking crisis (bc_avgyloss), coalition governments (gov_coal) and public debt (debt) with a positive sign.

We thus find mixed evidence the effect of globalisation on social expenditure: the negative coefficient for trade globalisation gives rise to the race-to-the-bottom theory. On the other hand, we find evidence that social globalisation increases the social expenditure. Furthermore, we find support for the notion that the Great Financial Crisis (GFC) has increased social expenditure in many industrialised countries. We further find robust evidence for two political-economic variables: The fractionalisation of the party system and coalition governments. While we find that higher fractionalisation of the party system, meaning that parliament seats are distributed to more parties, leads to lower social expenditure, a result that contradicts the notion that government instability is beneficial to social expenditure, coalitions governments tend to be associated with higher levels of social expenditure. Finally, public debt and budget deficit are found to be robust predictors for social expenditure. Higher debt levels are associated with higher levels of social expenditure, while budget deficits exerts pressure to cut on social spending.

Preferred Model

As a final step, we examine all variables that emerge as robust explanatory variables jointly in an overall. Column (2) in Table 2 reports the results from a regression of social expenditure on the baseline explanatory and the further explanatory variables deemed robust. We can give two different interpretations to this exercise. While the EBA tests for a large number of different combinations of variables, here we only report one combination. In this sense, we demand less from the incorporated variables. But since we include a larger number of explanatory variables than in the EBA, these regressions are in a sense also more demanding to the variables.
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 extreme bounds analysis in a sample of 31 OECD countries over the period 1980-2016, our results suggest that trade globalization, fractionalisation of the party system and budget deficits decreased social expenditure. Social globalisation and coalition governments increased social expenditure.
References


Appendix

Figure A.1: Evolution of social expenditure in individual countries, grouped along different welfare state regimes, 1980-2016.

Source: OECD
Baltic countries

Social expenditure (in % of GDP)

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

<table>
<thead>
<tr>
<th>Measure</th>
<th>Variable</th>
<th>Suggested by</th>
<th>Expected effect</th>
<th>Data Source</th>
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<td>+ World Bank WDI</td>
<td>+</td>
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<td>+/-</td>
<td>Gygli et al. (2019)</td>
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<td>Schulze, Ursprung (1999)</td>
<td>+/-</td>
<td>Gygli et al. (2019)</td>
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<td>Schulze, Ursprung (1999)</td>
<td>+/-</td>
<td>Gygli et al. (2019)</td>
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<td>KOFFiGIdj</td>
<td>Schulze, Ursprung (1999)</td>
<td>+/-</td>
<td>Gygli et al. (2019)</td>
</tr>
<tr>
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<td>KOFSoGI</td>
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<td>+/-</td>
<td>Gygli et al. (2019)</td>
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<td>KOFPoGI</td>
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<td>-</td>
<td>Cruz et al. (2018)</td>
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<td>Interaction</td>
<td>dexecl#</td>
<td>Source</td>
<td>(+/-)</td>
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<tr>
<td>Interaction of left-wing government and de facto trade globalisation</td>
<td>KOFTGldf</td>
<td>Potrafke (2009)</td>
<td>+</td>
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</tr>
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<td>Interaction of left-wing government and de facto financial globalisation</td>
<td>KOFFIGldf</td>
<td>Potrafke (2009)</td>
<td>+</td>
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<td>Interaction of left-wing government and de jure trade globalisation</td>
<td>KOFTGldj</td>
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<td>Potrafke (2009)</td>
<td>+</td>
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<td>Interaction of left-wing government and social globalisation</td>
<td>KOFSoGI</td>
<td>Potrafke (2009)</td>
<td>+</td>
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<tr>
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<td>KOFPoGI</td>
<td>Potrafke (2009)</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Systemic banking crisis (average output loss per year)</td>
<td>bc_avgvyloss</td>
<td>McManus (2019)</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Interaction of right-wing government and systemic banking crisis</td>
<td>bc_avgvyloss</td>
<td>McManus (2019)</td>
<td>-</td>
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<tr>
<td>Union density</td>
<td>ud_ipol</td>
<td>Garrett (1998)</td>
<td>+</td>
<td></td>
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<tr>
<td>Interaction of left-wing government and union density</td>
<td>ud_ipol</td>
<td>Garrett (1998)</td>
<td>+</td>
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<tr>
<td>Common pool problems</td>
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<tr>
<td>Electoral system (dummy for proportional voting)</td>
<td>prop</td>
<td>Persson et al. (1998), Milesi-Ferretti et al. (2002)</td>
<td>+/-</td>
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<tr>
<td>Legislative structure (dummy for presidential system)</td>
<td>pres</td>
<td>Persson, Tabellini (1999)</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Ideological gap between new and old cabinet</td>
<td>gov_gap</td>
<td>Alesina, Tabellini (1990)</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Fractionalisation of government</td>
<td>rae_leg</td>
<td>de Haan et al. (1999)</td>
<td>+</td>
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</tr>
</tbody>
</table>
Minority governments  gov_minor  +  Armingeon et al. (2018)
European Economic and Monetary Union (EMU) membership  emu  -  Armingeon et al. (2018)

Electoral motives
Election year#level of development  delect#lgdppc  Shi, Svensson (2006)  -  Armingeon et al. (2018); World Bank WDI
Election year#institutional quality  delect#icrg_qog  Shi, Svensson (2006)  -  Armingeon et al. (2018); Teorell et al. (2018)
Election year#level of democracy  delect#fh_polity2  Gonzales (2002)  -  Armingeon et al. (2018); Teorell et al. (2018)
Election year#fiscal rules  delect#frer  Rose (2006)  -  IMF/ Lledó et al. (2017)

Income inequality

Political participation
**Fragmentation**

Ethnic fragmentation  | elfrel  | Alesina et al. (2003)  | -  | Cederman et al. 2010 and Vogt et al. 2015

**Demography**

Age dependency ratio, young  | dpnd_yg  | +  | World Bank WDI

**Economic variables**

GDP per capita (log)  | lgpdp  | Wagner's Law  | +/-  | WDI
Budget deficit  | deficit_hist  | Herwartz, Theilen (2014)  | -  | Armingeon et al. (2018); Mauro et al. (2015)