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GLOBALIZATION, REDISTRIBUTION, AND THE SIZE OF GOVERNMENT

Raphael Espinoza, Jonathan D. Ostry and Xiaoxiao Zhang

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Globalization, Redistribution, and the Size of Government

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This paper investigates how trade and financial globalization affect government decisions to redistribute via spending and taxation, using a large panel covering around 100 democratic countries over the period 1970-2015. We use a time-varying external instrument in regressions with fixed and time effects in order to overcome endogeneity concerns that have plagued the earlier literature. Our findings support the view that more open economies have bigger governments. The paper also examines the impact of globalization on different types of social spending and taxes. We find that trade openness increases the tax burden on labor income and reduces the tax burden on capital income and that financial openness reduces corporate income tax rates. In addition, exposure to trade pushes governments to spend more on labor programs and family benefits. Finally, the paper does not find that political institutions affect the sensitivity of public spending to globalization.

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I. INTRODUCTION

For the last four decades, income inequality has been on the rise in many advanced economies. Economists have attributed this trend to a number of factors, including technological change, trade integration, financial globalization, widening gaps in educational achievements, the weakening of labor unions, the reduction in progressive taxation, and the historical and political forces that have made these changes possible (e.g. Acemoglu, 2002; Autor et al. 2008; Autor et al. 2016; Acemoglu et al. 2016; Goldin and Katz 2010; Machin and van Reenen 2007).

Because inequality tends to worsen when market forces are left unchecked (Piketty 2014), finding solutions involves government intervention. Well-designed redistribution policies can ensure that growth dividends are broadly shared and need not be costly in terms of growth (Ostry et al. 2014; Antràs et al. 2016). Taxation can be made more progressive, and governments can spend more to protect vulnerable populations through welfare (healthcare, pension) systems, and expenditures on education and infrastructure that favor the disadvantaged.[1] For governments that reflect the interests of their citizens, exposure to globalization should increase the size of government spending, especially for social programs, as well as the size of redistributive taxes and transfers (Rodrik 1998).

However, globalization can also reduce fiscal revenues, because factors of production that are mobile are difficult to tax. Devereux et al. (2008) find that, because of competition between countries to attract investments, a 10-percentage point reduction in the corporate tax rate in an OECD country pushes other countries to cut their tax rates by 7 percentage points; similar results have been found for non-OECD countries (Crivelli et al. 2016).

The objective of this paper is to assess the effect of globalization on government spending and taxes. Over the past 45 years, trade openness has doubled and financial openness has quadrupled for the typical OECD economy (Figure 1). Over that period, government consumption increased from around 13 percent to around 21 percent of GDP. As taxes on capital income remained roughly constant, higher public spending was financed by labor taxes, indirect taxes and public debt. The scatter plots in Figure 2 also lend support to the view that countries more exposed to globalization have bigger governments and spend more on social expenditure, in particular for labor and family programs. These charts also suggest that, the more open is an economy, the heavier is the burden of financing government spending on labor income and the lighter is the taxation of capital.

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[1] Policies to regulate private markets (such as setting a minimum wage) are outside the scope of this paper.

This paper digs deeper into these correlations. We assess the effect of both trade and financial globalization on government spending and taxes using a large panel of data from 100 democratic countries, covering the period 1970-2015. We test the robustness of our findings to different datasets and to different specifications, including models with fixed effects, with time effects, and with a time-varying instrument for globalization.

Measurement error, omitted variables, and reverse causality are all possible causes of bias in the literature that investigates the determinants of government size. Alesina and Warciazk (1998) highlighted that country size may lie behind the positive correlation between trade openness and government size found by Rodrik (1998). Since there are fixed costs to operating a government, small countries, that are also more open to trade, are likely to have larger governments. In addition, reverse causality is a potential source of endogeneity since it is likely that openness is a function of tax and spending policies. Finally, measurement error is a source of downward bias. Adam et al. (2013) find, in their meta-analysis of the literature on the effect of globalization on capital taxation, that the specific measure of globalization used explains why less than half of the 23 papers they review obtain negative effects of openness on capital taxation.

We use an instrument for globalization proposed by Feyrer (2009, 2019), which relies on the rising importance of air freight to construct a *time-varying* "effective distance" in a gravity model of international trade. As a first contribution, our paper extends this instrumental variable using more recent data and replicates Feyrer (2019)'s findings that globalization contributes positively to growth. We then show that, even when controlling for country size, for fixed effects, for time effects, and using IV, more open economies tend to have larger governments. We also examine the robustness of our findings to using different datasets and to an alternative measure of globalization that accounts for financial openness.

The second objective of the paper is to look at how the different fiscal policy instruments are affected by globalization. In the OECD, redistribution is achieved mostly using social spending (on active labor market policies, family policies, pensions and health) and progressive taxation. The paper assesses whether the different types of spending and taxes are affected by globalization. We find that globalization tends to increase spending on active labor market policies and on family benefits, which supports Rodrik (1998)'s argument that governments use spending to protect the population affected by globalization. However, we also find that globalization tends to increase the burden of taxation on labor income and to reduce the burden on capital income.

Figure 1. Evolution of trade and financial openess and government revenues and expenditure, democratic countries.
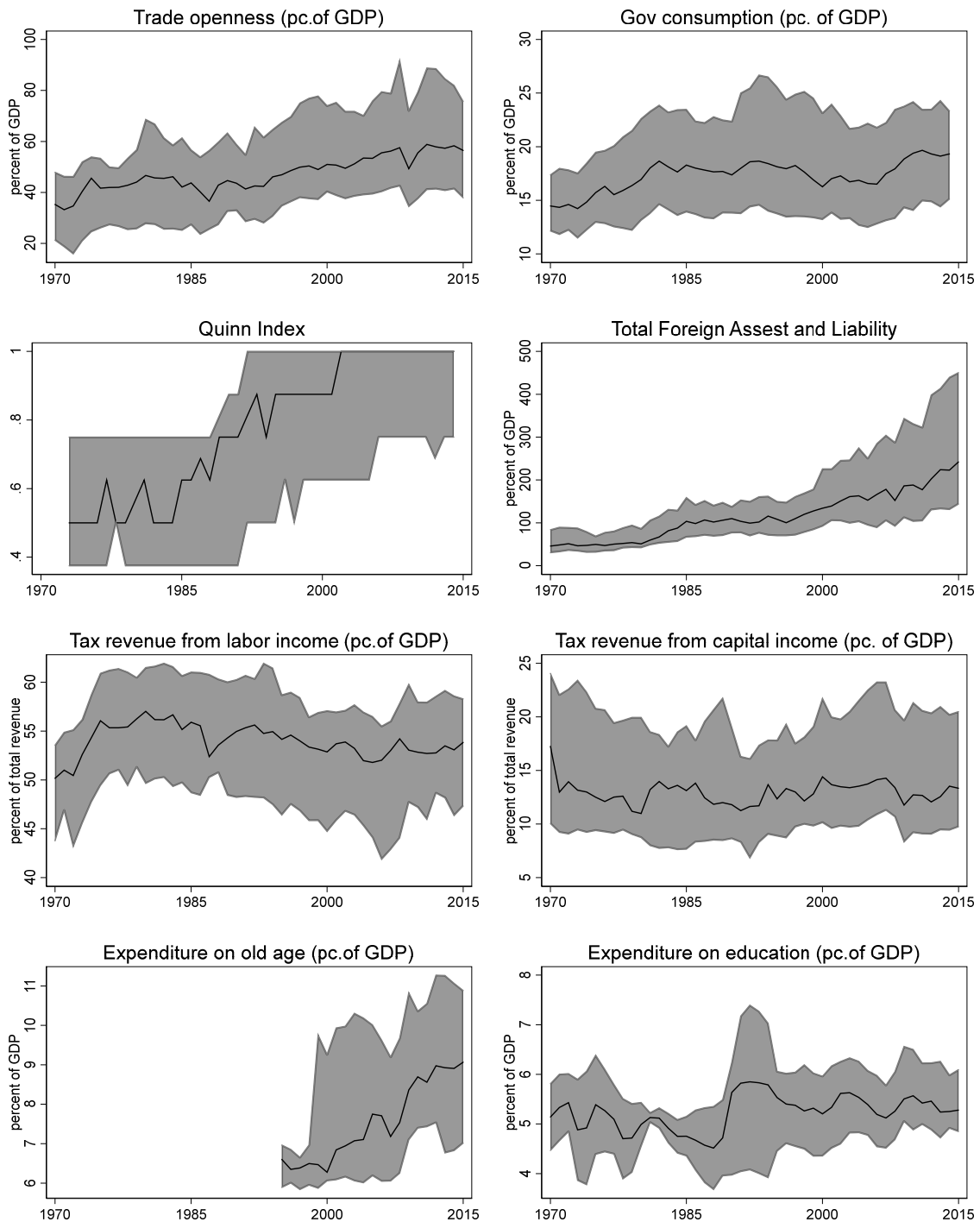
Sources: WEO, OECD Social Expenditure Database, Penn World Tables 9.0
Notes: The dark line is the median democratic country. The shaded area is for the 25th -75th percentile band.
Charts on government revenues and expenditure are for OECD countries only due to data limitation.

Figure 2. Cross sectional relationships between trade and financial openess and budget items, democratic countries
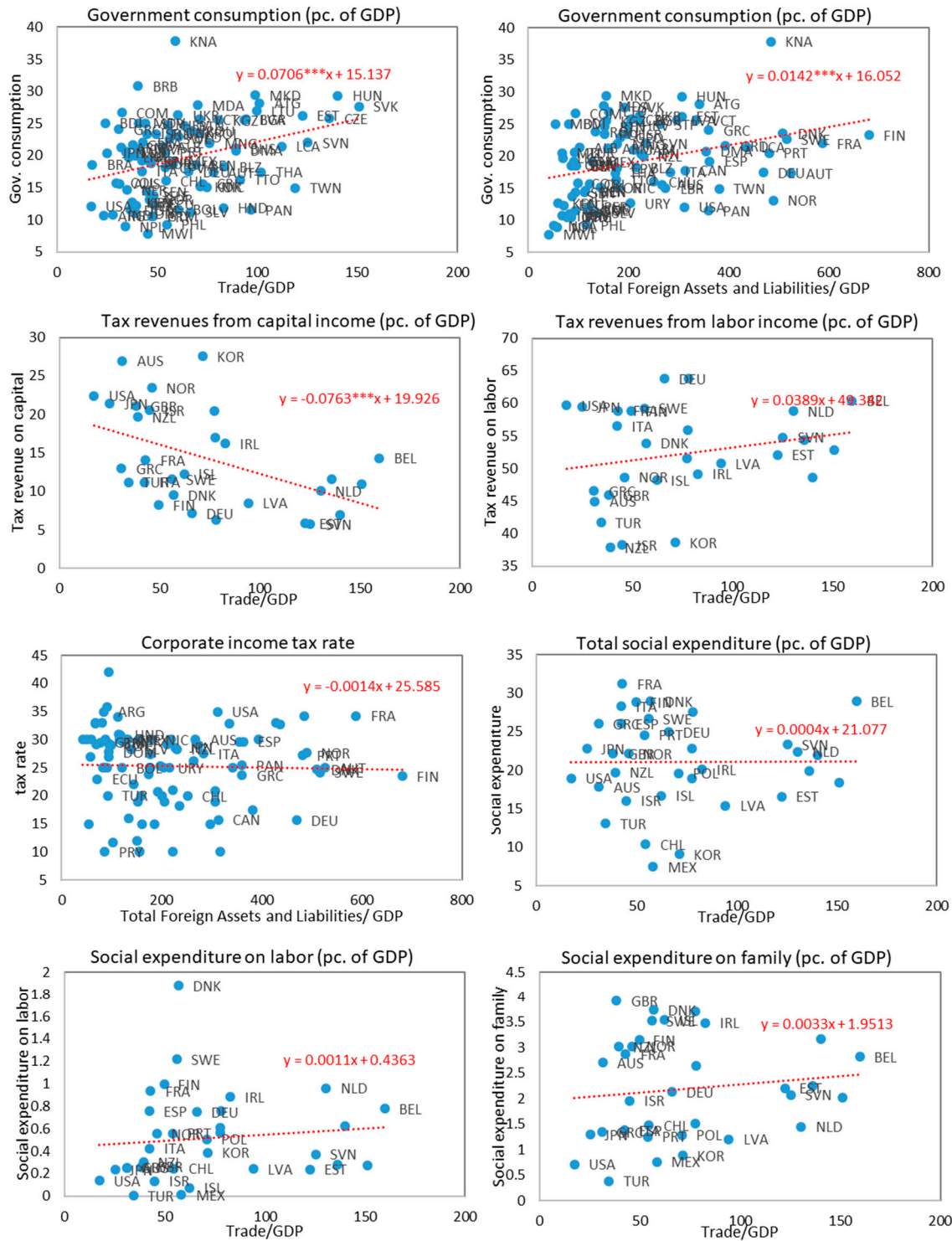
Note: Averages over the period 2010-2015. Charts on government revenues and expenditure are for OECD countries only due to data limitation.
Source: WEO, OECD Social Expenditure Database, Penn World Tables 9.0

The paper also checks whether the link between globalization and the size of government depends on political institutions. There is an extensive literature that shows why political institutions, in particular democratic accountability, the parliamentary system, the extent of electoral competition, affect the size and type of government spending (e.g. Besley and Kudamasu, 2006; Persson and Tabellini, 2004). To the extent that protection from globalization is a type of general welfare program, as opposed to a narrowly targeted program, political-economy theory would predict that countries with more democratic accountability and with a parliamentary system with larger district magnitude would increase the sensitivity of such spending to exposure to globalization (Persson and Tabellini, 2000). [2] Although we find that countries with these characteristics spend more on welfare and family programs, we do not find that political institutions affect the *sensitivity* of government spending to globalization. This could be because, in many cases, the risk posed by opening to trade is concentrated in certain segments of the population, and thus protection against globalization is not a general welfare program.

The paper proceeds as follows. Section II reviews the literature on the effect of globalization on the size and composition of government operations. Section III extends Feyrer's (2019) instrumental variable using more recent data and confirms his finding that trade openness contributes to growth, before estimating the effect of globalization on the size of government using fixed effects regressions, instrumental variable with fixed effects, and alternative datasets. Section IV notes the importance of taxes and social spending policies in reducing inequality, before estimating how different fiscal instruments are affected by globalization. This section also assesses whether political institutions affect the sensitivity of government spending to globalization. Finally, Section V extends the model to see whether financial globalization has an additional effect, in particular on tax revenues. Section VI concludes.

II. LITERATURE

Globalization and the size of government

Cameron (1978) was the first to note, using data on 18 advanced economies, that government size is an increasing function of trade openness, attributing the relationship to unionization and collective bargaining. Rodrik (1998) argued that since the relationship held for developing countries as well, it was most likely explained by government spending acting as

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[2] Electoral district magnitude is the average number of representatives sent by each district. It is a crucial determinant of the capacity of the electoral system to represent the population's views, because district magnitude affects both the strength of the link between voters and elected members as well as the overall proportionality of election results. For instance, the extreme case of a *proportional* system is one where there is only one single district covering the entire country, with all parliamentarians elected in proportion of the votes obtained for their single list of candidates. In such a system, general welfare programs are more likely to be supplied, but electoral competition may be low. The opposite extreme of a *majoritarian* system is when each district only sends as elected representative the local candidate who received the most votes in the district.

a risk-reducing instrument. He confirmed the positive correlation using a cross-section of around 100 countries, and controlling for income per capita, demographics, and urbanization.[3] Rodrik (1998) also highlighted that the causal links for this explanation held well: (i) there is a clear relationship between exposure to external shocks and income risk; (ii) government size does stabilize income; and (iii) advanced economies use transfers rather than public consumption for risk mitigation, but setting efficient transfer systems is difficult in many developing economies.

Alesina and Wacziarg (1998) however suggested that the link between trade openness and government consumption was explained by an omitted variable: the size of a country. Because there are fixed costs in the provision of public services, smaller countries tend to have larger governments. And because small countries have smaller domestic markets, they also tend to be more open to trade. Using a sample of 137 countries, they found that trade openness seemed to matter less than country size to explain government consumption, although because the two variables are closely related, it is difficult to disentangle the two effects. Nonetheless, they confirmed the importance of trade openness for government transfers.

Shelton (2007) extended this line of research by looking at several theories of the size of government.[4] He found that openness is related to higher government expenditure, especially on education and infrastructure and, for advanced economies, social spending.[5] These results suggest that governments exposed to globalization attempt to reduce market income inequality by increasing transfers and the progressivity of taxes.[6] Adam and Kammas (2007) showed that government spending was higher in more open economies and that, as expected from efficient taxation theory, the increased spending was financed by larger taxes on labor rather than capital. Adam et al. (2013) undertook a meta-analysis of 23 papers studying the relationship between capital taxation and globalization and found that the specific measure of globalization used affected substantially the coefficient obtained. While studies using the

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[3] The findings held for a range of government spending items, including education, health, and public investment.

[4] The nine factors he highlighted are: (i) trade openness (Rodrik, 1998); (ii) country size (Alesina and Wacziarg, 1998); (iii) fragmentation (Easterly and Levine, 1997); (iv) income, as per Wagner's Law (see e.g. Easterly and Rebelo, 1993); (v) income inequality (Meltzer and Richard, 1981); (vi) political rights (Benabou, 1996); (vii) presidential vs. parliamentary systems (Persson and Tabellini, 1999) ; (viii) majoritarian vs propositional electoral systems (Milesi-Ferretti et al., 2002) and (ix) the role of fiscal federalism (Oates, 1999).

[5] Martinez-Vazquez and Yao (2009) find that public employment increases with trade openness. Benarroch and Pandey (2012) also find, using GMM internal instruments, that education expenditure is the only outlay increasing with trade openness, and the result is only valid for low income countries.

[6] Shelton (2007)'s findings support the view that central government spending is smaller in larger countries. However, local government spending appears to compensate (by 10 to 60 percent, depending on the category) for the reduction in central government spending in smaller countries.

trade-to-GDP ratio or Quinn (1997)'s index of regulation of international financial transactions tended to find that globalization reduces capital taxation, studies using Dreher (2006)'s KOF index globalization tended to yield a positive relationship, possibly because the KOF index also captures social and political globalization, which has no reason to be associated with lower taxation of capital.

Ram (2009) used panel data and thus time variation and found that country size was not related to either government size or trade openness. Ram (2009) thus concluded that country size was not the omitted variable that explained the correlation between trade openness and government size. Jetter and Parmeter (2015) noted however that Ram (2009)'s support for Rodrik (1998)'s argument depended on the vintage of the Penn World Tables (PWT) used. With the newer PWT 8.0, Jetter and Parmeter (2015) find that smaller countries indeed have larger governments and that government consumption is not related to openness. Finally, Egger et al. (2019) estimate the effect of globalization on the tax burden for different wage percentiles and find that the tax burden of the middle-class increased because of globalization while the top 1 percent of workers benefited from a reduction in tax pressure.

An instrumental variable for globalization

Rodrik (1998) acknowledged that, in addition to omitted variable bias, trade openness could also be a function of government policies, raising the risk that reverse causality explained his results. Jetter and Parmeter (2015)'s findings also suggest that measurement errors could be important, leading to an additional justification for using an instrument variable model. Rodrik (1998) had already used Frankel and Romer (1999)'s geographical instrument for trade, which was developed to assess the effect of globalization on growth. However, the literature noted several limitations to instrumenting trade with such a time-invariant variable. In particular, Rodriguez and Rodrik (2000) showed that Frankel and Romer (1999)'s results on growth and globalization were not robust to including other time-invariant omitted variables such as institutions or the distance to the equator.

Using time-varying instruments is thus crucial in such cross-country analyses. The literature on the growth benefits of trade has searched for exogenous factors that affect trade openness, across time and countries. Felbermayr and Gröschl (2013) instrumented trade by trade-partner natural disasters, and Feyrer (2019) used time variation in air transport to generate time-varying measures of air trade distances in a fixed-effects panel, thus controlling for any time invariant omitted variable. Both studies obtain effects of trade on growth that are significant and higher than in OLS estimations. Egger et al. (2019) also use instrumental variables for trade openness based on measures of trade costs. Their second instrument, built on the interaction between transportation sea distance and fuel costs, bears some similarity to Feyrer (2019)'s, the instrument we decide to use because its variance at low-frequency is appropriate for our analysis.

Financial openness and government size

While there is a vast literature on trade globalization and inequality, the impact of financial globalization has received less attention. Larrain (2015) argues that opening the capital account increases the relative demand for skilled workers and leads to higher sectoral wage inequality. Furceri, Loungani, and Ostry (2019) also find salient effects of external financial liberalization on inequality, particularly in countries with lower levels of financial depth or in cases where a crisis follows liberalization. A natural question to ask is whether financial globalization may play a similar role in increasing the size of government. Kimakova (2009) finds a positive relationship between exposure to international capital flows and government size for a range of countries. However, financial openness could also reduce the ability of the government to tax capital and thus to support a larger public sector (Bretschger and Hettich, 2002; Devereux et al. 2008). This may explain why the literature is inconclusive about the effect of financial globalization on the size of government (Liberati 2007; Garrett and Mitchell 2001; Benarroch and Pandey 2012).

Which measure of financial globalization is used matters, however, as has been noted in earlier research on financial globalization. Measures of financial globalization can be grouped into three broad categories: de jure, de facto, and hybrid indicators, with the latter a combination of the former two. The IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER), a detailed description of the regulations that countries use to govern current and capital transactions, is the primary source for most de jure indicators of financial openness, which include in particular Quinn (1997); Schindler (2009) and a recent update (Furceri, Ostry and Papageorgiou, 2019), which we use in this paper.[7]

III. THE SIZE OF GOVERNMENT

Fixed effects models

We start by running estimates similar to Rodrik (1998), Ram (2009) and Jetter and Parmeter (2015), explaining the size of government by trade openness. We check the robustness of our results to the choice of different vintages of the PWT and IMF data for trade openness (measured as (exports+imports)/GDP), GDP per capita in PPP, population, and the size of government expenditure (Mauro et al. 2013). Appendix III shows the source and definition of each variable and clarifies coverage of the datasets used for each regression.

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[7] Some de jure indicators are binary (Epstein and Schor 1992; Grilli and Milesi-Ferretti 1995; Klein 2003) or cumulative totals of the binary scores (Brune and Guisinger 2006; Chinn and Ito 2002, 2006, 2008) based on the AREAER categorical table of restrictions; other de jure measures (Quinn 1992, 1997; Schindler 2009) contain elements of the intensity and magnitude of financial controls based on coding of the AREAER text.

We note at the outset that there are substantial differences in the measure of government size across datasets (Table 1). Some of the differences originate in the definition of government spending. Within the Penn World Tables vintages, PWT 7.1 stands out for having lower estimates of government consumption because in that vintage, government spending on health and education is attributed to households, under the view that such spending represents consumption done by the government on behalf of households. Government spending in the IMF database (Mauro et al. 2013) refers to total primary expenditure, and is a broad measure of government size that we use as a cross-check to the PWT. Table 2 also shows that the different measures of government spending are not that strongly correlated, although the correlation between IMF data on primary expenditure and PWT data on government consumption is higher in the more recent vintages of the PWT.

We first estimate the determinants of government size using standard OLS regressions. All models are estimated using 5-year non-overlapping averages, using time effects, and we check how fixed effects affect our results. Table 3 shows that for democratic economies, the relationship between trade openness and the size of government consumption is unstable, a result in line with Jetter and Parmeter (2015)'s finding.[8] We thus turn to IV models, which require first the construction of an external instrument.

A time-varying effective distance as IV

Frankel and Romer (1999) first proposed using geographical distance between countries as an instrumental variable in the regression of trade openness on growth. They estimated a bilateral trade gravity equation to construct the value of (bilateral) trade predicted by distance across two trade partners, and then used the sum of trade across partners as an instrumental variable for trade openness in a growth regression. They found that the effect of trade on growth was larger using the IV than using the OLS regression. Rodriguez and Rodrik (2000) however argued that such a geographic instrument may be correlated with other determinants of growth (exposure to diseases, the quality of institutions, the historical experience of wars, etc.) and could bias upwards the effect of trade on growth.

Feyrer (2019) thus proposes to control for these fixed effects and to construct an effective distance that is time-varying between countries. The idea is to account for the growing importance of air freight in international trade. A gravity model is estimated on a panel of trade flows (imports + exports) between countries i,j, at time t:

$$\text{Log}(\text{trade}_{i,j,t}) = \alpha + \gamma_i + \gamma_j + \gamma_t + \beta_{sea,t}\, \text{Log}(\text{sea distance}_{i,j}) + \beta_{air,t}\, \text{Log}(\text{air distance}_{i,j}) + \varepsilon_{i,t,t} \quad (1)$$

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[8] Because the argument that governments would protect workers from risks due to globalization is mostly valid for democracies, we focus on this set of countries for which our findings are more robust.

where γ_i, γ_j, and γ_t are fixed effects for the source country, the destination country, and the time period.[9] The originality of the method is to regress bilateral trade on measures of "air distance" and "sea distance" separately, with time-varying coefficients $\beta_{sea,t}$ and $\beta_{air,t}$. The predicted values can be summed across trade partners j to yield a predicted value of trade openness for country i, that will be time-varying due to the time variation of $\beta_{sea,t}$ and $\beta_{air,t}$. The instrument is exogenous because it is (global) technological change in the transportation industry that is driving changes in the relative role of sea and air transport.[10]

We replicate this method using IMF DOTS data (see Appendix III for data sources) covering 211 countries over the period 1950-2016. The difficult part in this exercise is to construct a measure of sea distance, taking into account the coasts and sea currents. Appendix I provides details of the map, sea current data, and algorithm used to obtain a measure of the time a boat, traveling 20 mph faster than sea currents, would take to travel from the main harbor of each country to the main harbor of the trade partner. We have used a world map with higher resolution than the one used by Feyrer (2019), and we ensure that boats can take the Panama Canal and the Suez Canal if needed (but the Bering Strait and Cape Horn are assumed to be closed).[11] Figure 3 shows for instance that our algorithm allows the sea route from Thailand to Turkey to pass by the Suez Canal.

Although we use slightly different datasets and estimate the model on updated data ending in 2015, our results replicate Feyrer's findings. We confirm in Figure 4 that since 1950, air distance has been increasingly important in explaining trade flows ($\beta_{air,t}$ becomes more negative in the later part of the sample), whereas sea distance has become less crucial. Our analysis shows that the partial reversal of this secular trend in the period 1995-2005 was only temporary as the coefficient of air distance increases again in the period 2006-2015.

Both the cross-sectional regression of predicted trade on growth (Figure 5) and the IV models linking trade openness to growth (Table 4) closely replicate Feyrer's findings. In addition, predicted trade is a good instrument for trade. Controlling for time effects and year effects, the slope of the first-stage regression is around 1.4 in the growth regression, where trade is expressed in log-levels (see Table 4). The strength of the first stage also holds when expressing trade in ratio of GDP, as in done in the IV models linking trade openness and government size (the slope coefficient of the first stage is then around 0.4, see next section).

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[9] Bilateral variables used in the existing literature, indicating whether two countries are contiguous, share their official language, share another language, were in a colonial relationship, share or have shared a colonizer, or share a currency, are also included.

[10] In addition, all our results are robust to removing the US, Japan, Germany, the UK, and France from the sample. For these countries, one could argue that technological change in the transport industry is endogenous.

[11] Only a small proportion of Pacific-Atlantic routes travel through Cape Horn.

Figure 3. Example of trade route via sea (Thailand to Turkey).

Source: authors' calculations. See also Appendix I.

Figure 4. Coefficients $\beta_{sea,t}$ and $\beta_{air,t}$ in the gravity equation
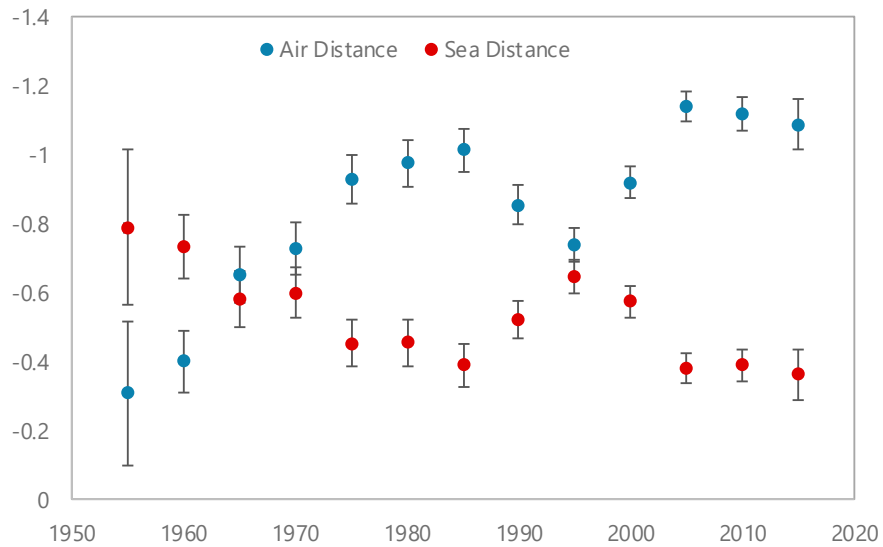
Source: authors' calculations. See also Appendix I
Note: The whiskers represent error bands for 2 standard deviations.

Figure 5. Cross-sectional relationship between growth and predicted trade openness, 1960-95
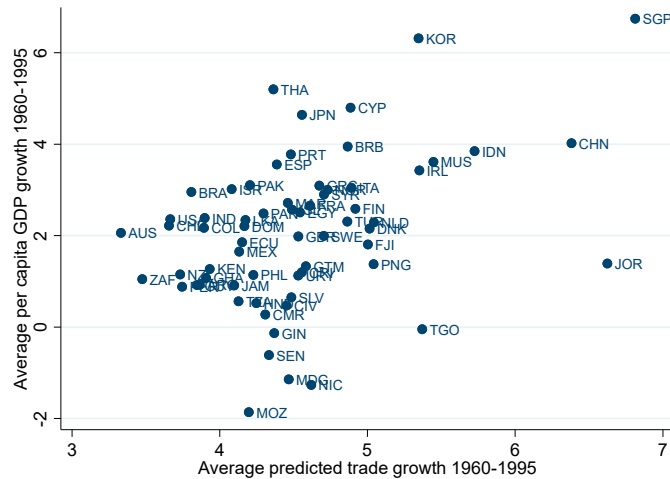
Source: authors' calculations.

Trade openness and government consumption using IV

We return to estimating the effect of trade openness on the size of government, using predicted trade from the gravity model of equation (1) as an instrument. Table 5 is similar to Table 3, except that trade openness is instrumented by predicted trade openness (i.e. predicted trade divided by GDP). In the majority of the models, trade openness does increase the size of government, even when controlling for time effects and fixed effects, and when taking into account that smaller countries also have larger governments. The only caveat to our findings is that when controlling for fixed effects, the result disappears if PWT 9.0 is used and trade openness is only significant at the 15th percentile cutoff when using the IMF data on primary expenditure.

IV. REDISTRIBUTION AND GOVERNMENT POLICIES

Instruments of redistribution

We now turn to the question of how specific instruments of redistribution are affected by globalization. We document the relative importance of each instrument before assessing the extent to which trade openness has affected the use of each instrument, using regressions similar to those presented in the previous section.

Most countries, especially in the OECD, reduce income inequality to levels significantly lower than what would be implied by market forces. Figure 6 shows that almost all OECD countries manage to reduce Gini coefficients by more than 10 percentage points (the

exceptions are Chile, Korea, Mexico, Turkey and New Zealand) using taxes and transfers, even before taking into account in-kind transfers and indirect taxation.

What is the relative importance of the different instruments of redistribution? Microeconomic studies have found that social spending, which represents around 18 percent of GDP in the OECD, is crucial (Figure 7 shows the different components of government expenditure). For instance, Immervoll and Richardson (2011), using the Luxembourg Income Study datasets, found that social benefits can reduce Gini coefficients by up to 5 percentage points (pp), whereas the strongest effect coming from direct taxation is to reduce the Gini coefficient by only 2 pp.

Figure 6. Market Gini and Net Gini coefficients in OECD countries
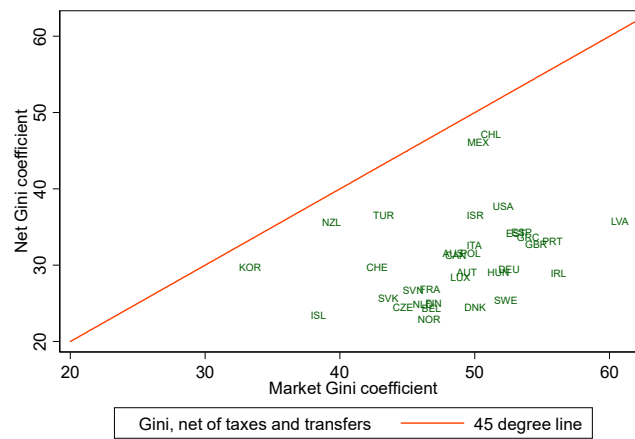
Source: SWIID, data for 2013

Figure 7. Government expenditure in the OECD
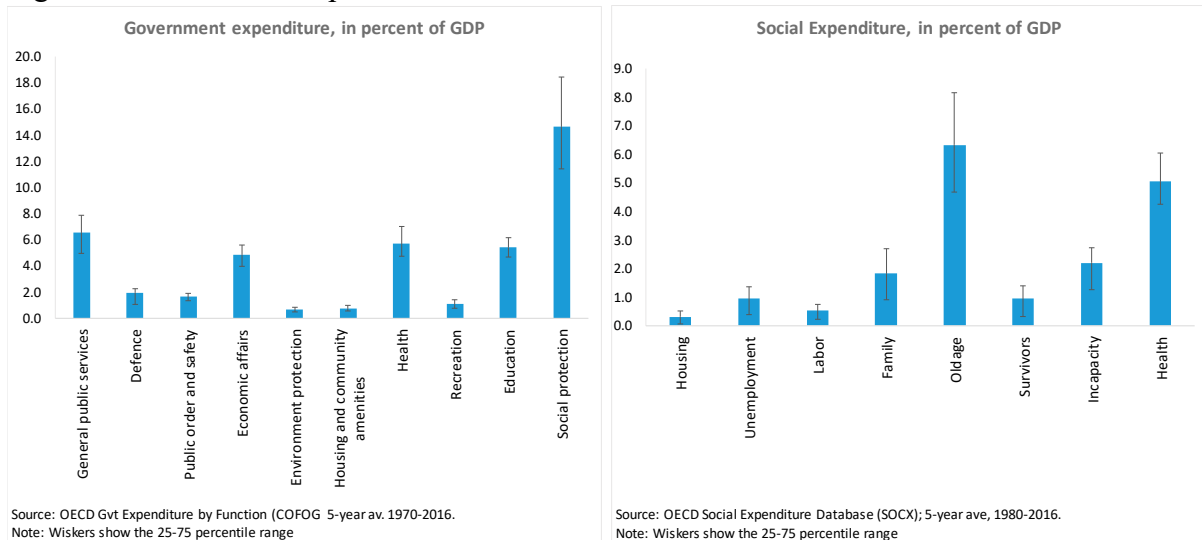
Source: OECD Gvt Expenditure by Function (COFOG 5-year av. 1970-2016.
Note: Wiskers show the 25-75 percentile range

Source: OECD Social Expenditure Database (SOCX); 5-year ave, 1980-2016.
Note: Wiskers show the 25-75 percentile range

Some simple correlations using macroeconomic-level data confirm the importance of social spending. Table 6 shows the determinants of the Gini coefficient based on disposable income using a panel data for the OECD countries over the period 1990-2015. Increases in government spending on social expenditure by 10 percent of GDP are consistently found to reduce the Gini coefficient by around 3 pp, with the strongest benefits coming from social policies on labor markets and on family benefits. By contrast, the share of government revenues due to either labor or capital income taxation is not always significant. Income tax progressivity (measured either using the ratio of marginal to average tax rate or using the IMF (2017) index of progressivity) does not significantly predict lower Gini coefficients.

Redistribution and globalization

We now turn to the question of how globalization affects the different budget lines. Looking first at revenues, we find, in line with Adam et al. (2013), that trade openness is negatively related to the taxation of capital, either measured as a ratio to GDP (Table 7, column 2) or as share of government revenues (column 5). However, the effect is not statistically significant using the instrumental variable model (column 8). In addition, labor taxes are increased with globalization, with the coefficient being significant in all specifications (columns 1, 4 and 7). These findings corroborate the view that globalization increases the burden of taxation on labor income, whereas capital income is spared. However, we did not find that taxation progressivity was related to globalization in any specification (these regressions are not reported). Finally, although the taxation of goods and services seems to be increasing with globalization (column 3), this result was not robust to different specifications.

When looking at how different categories of government expenditure are affected by globalization, we find that few specific spending items are increased when countries are more exposed to globalization (Table 8).[12] Spending on education is increasing with trade (a result reported in Shelton, 2007) but it seems that the positive coefficient is driven by global trends in education spending: when controlling for time effects, the coefficient is not statistically significant (see columns 9 and 10 in Table 8). Looking specifically at social spending (Table 9), spending on active labor market programs and family benefits appear to increase with globalization, but these programs are small in percent of GDP, and as a result the quantitative effect of globalization is small (a 10 percent increase in trade openness increases spending on family benefits by only 0.05 percent of GDP). In addition, it could be that such increases in spending come at the expense of other social programs, in particular incapacity-related benefits (e.g. disability pensions, residential care and home help support) and public spending on health care.

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[12] We do not show IV regressions for these models, as the results are not sensitive to instrumentation. In addition, we note that the risk of reverse causality is mitigated when specific budget lines are used as dependent variables.

Finally, we check whether political factors affect the sensitivity of government spending to globalization (Table 10). To the extent that protection from the risks posed by globalization is a general welfare program (as opposed to a specific program accruing to a narrower constituency), theory would predict that political systems that are more democratic, with more electoral competition, and with more proportionality in representation would lead to more sensitivity of government spending to globalization (Tabellini, 2000). Using the Quality of Government database (see Appendix III), we investigate whether this sensitivity is a function of: (i) the quality of democratic institutions (Freedom House /Polity Index); (ii) the government's number of years in office; (iii) the years in current term; (iv) the share votes obtained by the Opposition; (v) the Executive Index of Political Competitiveness; (vi) the percentage of women in parliament; (vii) the electoral district magnitude; (viii) turnout in elections; (ix) whether the legislature approves budgets; (x) the Corruption Perceptions Index (xi) a Voice and Accountability index.

Overall, we do not find that political factors affect the sensitivity of spending to globalization. The only statistically-significant effect we find is that countries with more democratic institutions and with a higher share of women in parliament do spend more on social programs (these are the two cases shown in Table 10; the other regressions are not shown). These results are in line with the view that representativity and accountability are important for spending decisions. However, the interaction terms between exposure to globalization and the different measures of political institutions are not significant. One possible explanation is that protection from globalization is in fact not a general welfare program – the risks disproportionately affect workers in export and import-competing industries, and, because of regional agglomeration effects, these workers tend to be concentrated geographically.

V. THE CASE OF FINANCIAL OPENNESS

We extend our models to assess whether financial globalization has an impact on spending and taxation. We use the *de jure* indicator of capital account openness proposed by Furceri, Papageorgiou and Ostry (forthcoming) as well as a *de facto* indicator (total foreign assets and liabilities over GDP). Compared to the *de facto* measures, *de jure* measures have the advantage of being less sensitive to reverse causality in panel regressions (Collins 2007; Quinn, Schindler and Toyoda 2011), but a drawback of this indicator is that it exhibits limited variation among OECD countries.

We start by estimating the same OLS regressions as in Table 3, adding financial openness as a control variable. Table 11 shows that for democratic economies, the positive correlation between financial openness and the size of government consumption only holds when using PWT 8.0 and the de facto measure of financial openness, and the coefficients for trade are unstable as before. We conduct similar analysis on different types of government social

expenditures but do not obtain a meaningful impact of financial openness on spending (Appendix II).

We also investigate whether greater capital mobility has any impact on the corporate income tax rate. Since earlier studies have noted that findings are sensitive to using alternative measures of the tax burden (Adam et al. 2011), we use both the simple statutory corporate income tax rate as well as the effective tax rates constructed following the methodology of Mendoza et al. (1994).[13] Figure 8 does not suggest that a bivariate relationship holds, but when controlling for fixed effects, time effects and country size, Table 12 shows that there is a statistically-significant negative relationship between both financial and trade openness and the statutory tax rate as well as the effective tax rate. These results confirm the prior that openness makes it harder for governments to raise tax revenues from corporates.

We finally examine the impact of financial openness on the structure of personal income taxes. We use the Kakwani index of tax progressive capacity proposed by Gerber et al. (2017). This measure has the advantage of focusing on the redistributive potential of the tax system alone and is insensitive to changes in the pre-tax income distribution. Our analysis shows a statistically-significant negative relation between tax progressivity and the *de jure* measure of financial globalization (Table 12)

Figure 8. Cross sectional relationships between financial openess and effective corporate income tax rate and taxprogressivity, democratic countries
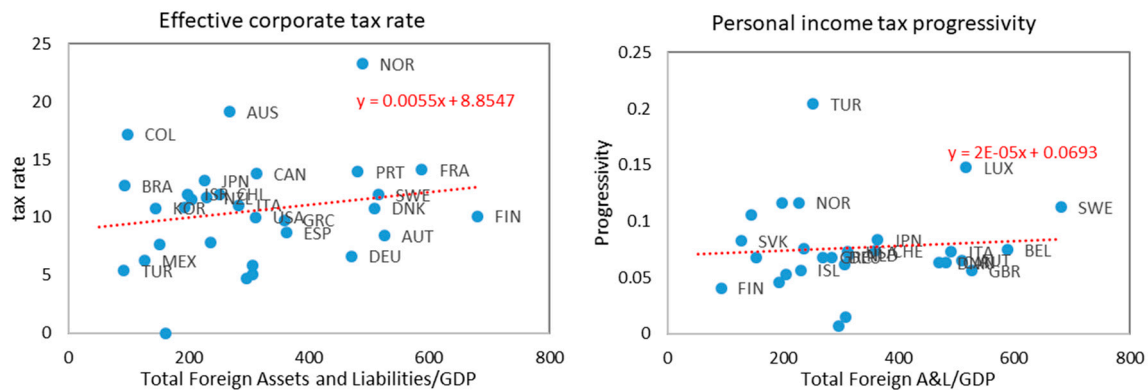
Note: Averages over the period 2010-2015.
Source: IMF, OECD Database

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[13] The effective tax rates is defined as actual corporate tax revenue divided by the corresponding pre-tax corporate income. Data are from OECD national account and tax revenue databases.

VI. CONCLUSION

Do democratic governments attempt to protect their workers from the risks posed by globalization by increasing public spending? To the best of our knowledge, this paper is the first that answers this question taking seriously endogeneity concerns by using a time-varying instrument for globalization. Our answer is yes: governments do seem to increase public spending in response to rising globalization. The IV model is also found to be more robust to the choice of dataset used, an important issue raised by earlier research.

A puzzling result that we share with the literature is that it is unclear which specific spending items are boosted when countries face higher exposure to international trade. Previous analyses had suggested that education spending was often increased by countries opening up to trade. But this result may be spurious: in the last 30 years, education spending has indeed increased, but this could also be explained by global factors, such as higher returns to skills explained by skill-biased technological change. When controlling for time effects, we do not find that education spending is sensitive to trade openness. Social spending on labor policies and family benefits do appear to increase with exposure to globalization. These tools are particularly useful to governments seeking to reduce income inequality, since they are powerful tools for redistribution. But the sensitivity of social spending to trade openness seems small, and it cannot explain alone the finding obtained at the aggregate level. An explanation for this puzzle is that, although the need for a larger government is present in most countries confronted with increased openness, the specific demands made by the affected populations may vary country-by-country. For instance, education spending could take the priority in countries with initially low provision of public education, whereas active or passive labor market policies could become central in countries with higher levels of unemployment. Further research could thus attempt to shed further light on this puzzle by looking in more detail at initial conditions for public provision.

The political-economy literature has found that spending on programs that benefit the general population is larger in countries with good democratic accountability and with proportional parliamentary systems. But we do not find that these factors affect the sensitivity of spending to globalization. One possible interpretation is that demand for protection from globalization could be more often addressed when local interest groups have more power.

We finally show that globalization constrains governments in their capacity to tax. More exposure to international trade increases the tax burden placed on labor income and decreases the burden on capital income, a potentially regressive mix. Financial liberalization also puts downward pressure on corporate tax rates and on the progressive strength on personal income taxes, presumably because of tax competition. These findings highlight the challenges to governments willing to protect their population from the economic risks globalization can create, but also constrained in their ability to do so by the mobility of tax bases.

Table 1. Government spending, summary statistics

	Obs.	Mean	Mean for OECD countries	Std. Dev. (all countries)	p25	p75
PWT 6.1	5,847	19.0	13.2	12.1	10.6	23.8
PWT 7.1	8,901	12.0	7.6	9.2	6.5	14.3
PWT 8.0	8,274	20.0	17.0	12.3	12.4	24.5
PWT 9.0	9,439	19.9	16.9	15.3	12.5	24.6
IMF (primary exp)	2,770	25.9	31.5	12.8	15.0	35.5

Table 2. Government spending, correlation across datasets.

	PWT 6.1	PWT 7.1	PWT 8.0	PWT 9.0	IMF (primary
PWT 6.1	1.00				
PWT 7.1	0.45	1.00			
PWT 8.0	0.41	0.36	1.00		
PWT 9.0	0.43	0.35	0.97	1.00	
IMF (primary exp)	-0.02	0.07	0.44	0.41	1.00

Table 3. Determinants of government consumption, OLS and Fixed Effects (democratic countries)

VARIABLES	Without fixed effects					With fixed effects				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	PWT 6.1	PWT 7.1	PWT 8.0	PWT 9.0	IMF	PWT 6.1	PWT 7.1	PWT 8.0	PWT 9.0	IMF
Trade/GDP	0.212***	0.00641	-0.0655*	-0.0323	0.105**	0.139**	0.0131	-0.0993**	-0.0873**	0.130**
	(0.0537)	(0.0291)	(0.0383)	(0.0358)	(0.0472)	(0.0617)	(0.0317)	(0.0449)	(0.0432)	(0.0567)
Log GDP per capita	-0.300***	-0.185***	-0.0211	-0.0402*	0.230***	-0.350***	-0.239***	-0.178***	-0.262***	-0.114*
	(0.0389)	(0.0270)	(0.0254)	(0.0229)	(0.0371)	(0.0880)	(0.0486)	(0.0556)	(0.0518)	(0.0618)
Log population	-0.0717***	-0.135***	-0.0923***	-0.0765***	-0.0257	0.736***	0.0807	-0.00438	-0.190**	-0.213**
	(0.0229)	(0.0186)	(0.0177)	(0.0150)	(0.0258)	(0.134)	(0.0728)	(0.0984)	(0.0902)	(0.0990)
Constant	5.318***	5.063***	3.548***	3.569***	0.877**	-1.167	3.683***	4.969***	6.148***	4.833***
	(0.453)	(0.314)	(0.271)	(0.250)	(0.435)	(1.576)	(0.862)	(0.616)	(0.577)	(0.737)
Observations	449	701	655	661	374	449	701	655	661	374
Number of countries	99	114	105	106	47	99	114	105	106	47
Fixed effects	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Standard errors in parentheses

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 4. Trade openness and growth using predicted trade as an Instrumental Variable

VARIABLES	(1)	(2)	(3)	(4)
	IV Results: ln (Real GDP per Capita)			
Second stage: ln(Real GDP per capita)				
ln (trade)	0.468***	0.382***	0.460***	0.376***
	(0.0437)	(0.0421)	(0.0419)	(0.0415)
First Stage: ln (trade)				
ln (predicted trade)	1.380***	1.346***	1.520***	1.389***
	(0.146)	(0.130)	(0.153)	(0.132)
Observations	553	604	553	604
Country dummies	Yes	Yes	Yes	Yes
Time dummies	Yes	Yes	Yes	Yes
Bilateral Controls	Yes	Yes	No	No
Balanced Panel	Yes	No	Yes	No

Standard errors in parentheses

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 5. Instrumental variable model (democratic countries)

	Without fixed effects					With fixed effects				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VARIABLES	PWT 6.1	PWT 7.1	PWT 8.0	PWT 9.0	IMF	PWT 6.1	PWT 7.1	PWT 8.0	PWT 9.0	IMF
First stage										
Predicted trade/GDP	0.383***	0.424***	0.401***	0.399***	0.360***	0.531***	0.504***	0.437***	0.438***	0.469***
	(0.0239)	(0.0207)	(0.0207)	(0.0206)	(0.0233)	(0.0449)	(0.0417)	(0.0453)	(0.0455)	(0.0472)
Log GDP per capita	-0.0226	-0.0445***	-0.0366**	-0.0324*	-0.0383	0.725***	0.738***	0.512***	0.502***	0.527***
	(0.0213)	(0.0157)	(0.0161)	(0.0166)	(0.0236)	(0.0839)	(0.0727)	(0.0667)	(0.0654)	(0.0718)
Log population	-0.149***	-0.126***	-0.125***	-0.125***	-0.156***	0.756***	0.695***	0.770***	0.662***	0.864***
	(0.00908)	(0.00745)	(0.00769)	(0.00766)	(0.0122)	(0.101)	(0.0921)	(0.0964)	(0.0903)	(0.0908)
Second stage										
trade/GDP	-0.00518	-0.0104	0.217***	0.210***	0.269***	0.482***	0.189***	0.273**	-0.00710	0.131
	(0.0830)	(0.0604)	(0.0578)	(0.0509)	(0.0574)	(0.118)	(0.0734)	(0.121)	(0.111)	(0.111)
Log GDP per capita	-0.283***	-0.128***	0.0125	-0.000335	0.407***	-0.407***	-0.292***	-0.204***	-0.279***	-0.0962
	(0.0280)	(0.0188)	(0.0175)	(0.0160)	(0.0207)	(0.0968)	(0.0566)	(0.0618)	(0.0551)	(0.0632)
Log population	-0.0797***	-0.123***	-0.0283**	-0.0218**	0.0458***	0.504***	-0.0565	-0.244**	-0.239**	-0.234**
	(0.0196)	(0.0133)	(0.0126)	(0.0111)	(0.0161)	(0.159)	(0.0871)	(0.122)	(0.105)	(0.116)
Observations	378	576	535	541	335	368	572	531	537	335
Fixed effects	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 6. Redistribution: effect of taxes, progressivity, and social spending on Net Gini coefficient (disposable income)

VARIABLES	(1) Gini coefficient, net	(2) Gini coefficient, net	(5) Gini coefficient, net	(4) Gini coefficient, net	(3) Gini coefficient, net
Pre-tax gini, avg. of 100 estimates, from SWIID	0.421***	0.423***	0.522***	0.422***	0.412***
	(0.0405)	(0.0618)	(0.0554)	(0.0397)	(0.0461)
Social Expenditure - Total, share of GDP	-0.351***	-0.345***	-0.375***		
	(0.0642)	(0.0648)	(0.0846)		
Gvt rev. from taxes on labor income/ Total gvt. ev.	-6.023				
	(4.151)				
Gvt rev. from taxes on capital income/ Total gvt. rev.	-7.130				
	(4.407)				
Gvt rev. from taxes on labor & capital income/ Total gvt. rev.		-6.534	-6.287	-6.582**	-12.14***
		(6.134)	(3.962)	(3.326)	(3.673)
Progressivity of the personal income tax			2.515		
			(2.554)		
Total social expenditure, excluding old age, share of GDP				-0.339***	
				(0.0784)	
Social Expenditure on Old age, share of GDP				-0.368***	-0.282***
				(0.100)	(0.105)
Social Expenditure on Housing, share of GDP					1.297*
					(0.675)
Social Expenditure on Unemployment, share of GDP					-0.465
					(0.314)
Social Expenditure on Labor, share of GDP					-1.065**
					(0.527)
Social Expenditure on Family, share of GDP					-0.668**
					(0.288)
Social Expenditure on Survivors, share of GDP					-0.198
					(0.308)
Social Expenditure on Incapacity, share of GDP					0.00516
					(0.251)
Social Expenditure on Health, share of GDP					-0.390**
					(0.195)
Constant	20.23***	20.27***	16.37***	20.40***	23.03***
	(2.629)	(4.453)	(3.381)	(2.621)	(3.266)
Observations	181	181	105	180	154
R-squared	0.601	0.601	0.690	0.604	0.701
Number of countries	30	30	26	30	29
Fixed effects	Y	Y	Y	Y	Y
Time effects	Y	Y	Y	Y	Y
Time-averaging	5 yr	5 yr	5 yr	5 yr	5 yr

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 7. Globalization and taxation (OECD countries)

VARIABLES	Ratio of GDP			Ratio of total gvt revenues					
	Fixed effects			Fixed effects			IV with fixed effects		
	labor tax revenues	Capital income tax revenues	Revenues from taxes on goods and services	labor tax revenues	Capital income tax revenues	Revenues from taxes on goods and services	labor tax revenues	Capital income tax revenues	Revenues from taxes on goods and services
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Trade to GDP	0.197***	-0.244**	0.173***	0.0907**	-0.349***	0.0553	0.312**	-0.123	-0.136
	(0.0689)	(0.110)	(0.0618)	(0.0447)	(0.102)	(0.0471)	(0.132)	(0.297)	(0.240)
Real GDP per cap	0.503***	0.289***	-0.122*	0.461***	0.248***	-0.213***	0.525***	0.281**	-0.254***
	(0.0644)	(0.103)	(0.0622)	(0.0418)	(0.0951)	(0.0474)	(0.0510)	(0.115)	(0.0585)
Population	0.613***	0.446*	-0.0506	0.226**	0.0591	-0.313***	0.00565	-0.156	-0.201
	(0.157)	(0.250)	(0.150)	(0.102)	(0.231)	(0.114)	(0.162)	(0.365)	(0.235)
Constant	-4.911***	-1.783	3.046***	-1.910***	1.218	6.314***	-2.832***	0.621	7.228***
	(0.834)	(1.328)	(0.827)	(0.541)	(1.231)	(0.630)	(0.709)	(1.593)	(0.939)
Observations	227	227	270	227	227	270	190	190	233
R-squared	0.639	0.344	0.172	0.532	0.258	0.358			
Number of countries	29	29	34	29	29	34	23	23	28
Fixed effects	Y	Y	Y	Y	Y	Y	Y	Y	Y
Time effects	y	y	y	y	y	y	y	y	y
Time-averaging	5 yr	5 yr	5 yr	5 yr	5 yr	5 yr	5 yr	5 yr	5 yr

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 8. Government operations, by outlay, and globalization (OECD countries)

VARIABLES	(1) General public services	(2) Defence	(3) Public order and safety	(4) Economic affairs	(5) Environment protection	(6) Housing and community amenities	(7) Health	(8) Recreation culture and religion	(9) Education	(10) Education (with FE)	(11) Old age	(12) Social protection excl old age
Trade to GDP	-0.00473	0.00140	-0.00209	-0.00213	-0.00259**	-0.00357**	-0.00334	0.000683	0.00525**	0.00501	-0.00321	0.000946
	(0.00865)	(0.00435)	(0.00218)	(0.0101)	(0.00111)	(0.00133)	(0.00614)	(0.00102)	(0.00239)	(0.00296)	(0.00665)	(0.00332)
Log(population)	-0.589	-3.351***	2.360***	1.700	-0.148	-0.0485	7.443***	-0.0863	1.508*	-0.680	5.917**	2.263
	(2.169)	(1.115)	(0.599)	(2.243)	(0.449)	(0.440)	(1.763)	(0.303)	(0.797)	(1.339)	(2.449)	(2.695)
Log(GDP per capita)	-2.124	-0.605	-0.148	0.212	0.138	0.0342	0.472	0.185	-0.686	-1.509**	-0.675	0.948
	(1.315)	(0.504)	(0.311)	(1.403)	(0.277)	(0.218)	(0.668)	(0.206)	(0.679)	(0.569)	(1.084)	(0.886)
Cabinet Composition(max=left)	0.0980	0.0275	-0.0286	-0.0842	-0.00512	0.0586**	-0.0207	0.00735	0.0509*	0.0687*	0.00250	0.257***
	(0.106)	(0.0298)	(0.0208)	(0.0915)	(0.0156)	(0.0236)	(0.0469)	(0.0182)	(0.0290)	(0.0372)	(0.0982)	(0.0912)
Population 65+	0.0834	0.0500	0.0555	0.168	0.0403	-0.0271	0.240***	0.0218	0.0225	-0.0611	0.838***	0.211**
	(0.177)	(0.0368)	(0.0373)	(0.155)	(0.0306)	(0.0275)	(0.0784)	(0.0236)	(0.0421)	(0.103)	(0.208)	(0.0926)
Population <15	0.0259	0.0426	0.0441	0.295	-0.000458	-0.000969	-0.0631	0.0246	-0.0223	-0.0666	0.347*	0.241
	(0.205)	(0.0294)	(0.0515)	(0.218)	(0.0351)	(0.0371)	(0.0649)	(0.0327)	(0.0607)	(0.0481)	(0.190)	(0.177)
Constant	32.60**	37.70***	-20.36***	-20.64	0.286	1.460	-71.22***	-0.831	-2.280	27.84*	-57.83**	-30.36
	(15.53)	(13.22)	(7.065)	(27.02)	(4.117)	(4.403)	(19.06)	(3.110)	(11.54)	(16.14)	(21.46)	(27.75)
Observations	117	117	117	117	117	117	117	117	117	117	92	92
R-squared	0.252	0.460	0.400	0.108	0.132	0.251	0.715	0.088	0.165	0.337	0.457	0.267
Number of countries	29	29	29	29	29	29	29	29	29	29	27	27
Fixed effects	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Time effects	N	N	N	N	N	N	N	N	N	Y	N	N
Time-averaging	5 yr	5 yr	5 yr	5 yr	5 yr	5 yr	5 yr	5 yr	5 yr	5 yr	5 yr	5 yr

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 9. Social Expenditure and globalization (OECD countries)

VARIABLES	(1) Housing	(2) Unemployment	(3) Labor	(4) Family	(5) Old age	(6) Survivors	(7) Incapacity	(8) Health
Trade/GDP	-0.000723	0.00303	0.00239**	0.00545***	-0.00740	0.000383	-0.00673**	-0.0148***
	(0.00107)	(0.00213)	(0.00111)	(0.00202)	(0.00560)	(0.00206)	(0.00259)	(0.00344)
Total tax revenue	0.00948	0.0888***	0.0221***	0.0265**	0.163***	0.0533***	0.0626***	0.0503**
	(0.00650)	(0.0130)	(0.00751)	(0.0123)	(0.0340)	(0.0126)	(0.0157)	(0.0213)
Pre-tax Gini	0.00510	0.0372***	0.00643	0.0375***	0.00161	0.00108	0.0659***	-0.0229
	(0.00515)	(0.0104)	(0.00603)	(0.00952)	(0.0264)	(0.00974)	(0.0122)	(0.0164)
Population 65+ (in % ot total)	0.00397	-0.0152	0.0179	0.000365	0.365***	0.0608**	-0.0617*	0.00101
	(0.0142)	(0.0290)	(0.0186)	(0.0269)	(0.0746)	(0.0275)	(0.0345)	(0.0468)
Log of population	0.318	-0.391	-0.292	1.876***	-3.853**	0.365	2.232***	0.747
	(0.309)	(0.645)	(0.369)	(0.582)	(1.614)	(0.595)	(0.747)	(1.027)
Constant	-1.076	-2.434	-0.220	-5.963***	6.206	-2.333	-6.942***	2.537
	(0.923)	(1.857)	(1.081)	(1.726)	(4.788)	(1.766)	(2.215)	(3.037)
Observations	201	201	194	210	210	210	210	214
R-squared	0.142	0.387	0.186	0.466	0.573	0.175	0.264	0.662
Number of countries	34	34	35	35	35	35	35	35
Fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Time effects	Y	Y	Y	Y	Y	Y	Y	Y
Time-averaging	5 yr	5 yr	5 yr	5 yr	5 yr	5 yr	5 yr	5 yr

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 10. Political factors and the sensitivity of spending to globalization (OECD countries)

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	Democracy			Women in Parliament		
	Social Expenc	Housing	Health	Housing	Labor	Family
Trade/GDP	0.0796	-0.00273	0.0417	0.00182	0.00500*	0.0104**
	(0.0879)	(0.00993)	(0.0335)	(0.00214)	(0.00267)	(0.00475)
Democracy index	1.247***	0.114**	0.230			
	(0.467)	(0.0518)	(0.179)			
Democracy index * Trade/GDP	-0.0130	-0.000236	-0.00746**			
	(0.00897)	(0.00101)	(0.00344)			
Total tax revenue	0.410***	0.00452	0.0204	0.0213**	0.0254**	0.0329*
	(0.0675)	(0.00760)	(0.0256)	(0.00825)	(0.0106)	(0.0190)
Pre-tax Gini	0.0941**	0.00346	-0.0381**	0.00567	0.0118	0.0167
	(0.0460)	(0.00526)	(0.0176)	(0.00649)	(0.00854)	(0.0146)
Population aged 65+ (% of total)	0.336**	0.00759	0.00156	0.0326*	0.0251	0.0251
	(0.133)	(0.0147)	(0.0510)	(0.0186)	(0.0256)	(0.0435)
Log of population	-3.895	-0.298	0.229	0.416	0.0613	2.025*
	(3.677)	(0.416)	(1.408)	(0.446)	(0.616)	(1.059)
Women in Parliament (%)				0.0121	0.0161	0.0446**
				(0.00735)	(0.01000)	(0.0171)
Women in Parliament (%) * Trade/GDP				-1.91e-05	-0.000116	-0.000199
				(6.70e-05)	(8.08e-05)	(0.000140)
Constant	23.65	1.984	2.431	-5.215	-2.125	-20.51**
	(34.62)	(3.925)	(13.26)	(4.266)	(5.904)	(10.16)
Observations	167	159	168	125	131	131
R-squared	0.682	0.197	0.662	0.209	0.214	0.339
Number of countries	33	32	33	34	35	35
Fixed effects	Y	Y	Y	Y	Y	Y
Time effects	Y	Y	Y	Y	Y	Y
Time-averaging	5 yr	5 yr	5 yr	5 yr	5 yr	5 yr

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 11. Government size and financial globalization (democratic countries)

VARIABLES	Quinn Index					Total foreign assets and liabilities				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	PWT 6.1	PWT 7.1	PWT 8.0	PWT 9.0	IMF	PWT 6.1	PWT 7.1	PWT 8.0	PWT 9.0	IMF
Financial Globalization	-0.0182	-0.115	-0.0917	-0.127	-0.146	-0.0257	0.0385	0.107**	0.0614	-0.0263
	(0.151)	(0.0700)	(0.103)	(0.0959)	(0.0967)	(0.0571)	(0.0295)	(0.0434)	(0.0398)	(0.0481)
Trade/GDP	0.195**	0.0537	-0.0704	-0.0179	0.130**	0.146*	0.0146	-0.152***	-0.0589	0.129*
	(0.0975)	(0.0464)	(0.0650)	(0.0618)	(0.0645)	(0.0793)	(0.0409)	(0.0584)	(0.0553)	(0.0681)
Log GDP per capita	-0.393**	-0.234***	-0.269***	-0.394***	0.00915	0.146	-0.129*	-0.241***	-0.269***	0.0544
	(0.157)	(0.0690)	(0.0913)	(0.0761)	(0.0852)	(0.138)	(0.0667)	(0.0846)	(0.0709)	(0.0950)
Log population	1.072***	0.0580	-0.175	-0.310**	0.00969	1.011***	0.151	0.226	-0.0567	-0.0909
	(0.239)	(0.0978)	(0.146)	(0.130)	(0.142)	(0.230)	(0.111)	(0.162)	(0.146)	(0.181)
Constant	-4.924	3.556***	7.446***	9.938***	2.984*	-7.981***	1.831	3.143*	5.864***	3.520
	(2.999)	(1.256)	(1.891)	(1.604)	(1.736)	(2.689)	(1.334)	(1.853)	(1.654)	(2.290)
Observations	275	397	391	397	306	328	539	501	506	278
Number of ifscode	61	63	62	63	44	86	100	93	94	41
Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 12. Taxation and financial globalization (democratic countries)

VARIABLES	Corporate income tax rate					Effective corporate income tax rate (OECD)	Personal Income Tax progressivity
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Quinn Index			-6.843***		-7.754***	-7.731**	-0.0413**
			(2.341)		(2.497)	(3.574)	(0.0193)
Total Foreign Assets and Liabilities		0.626		1.198			
		(0.849)		(0.895)			
Trade to GDP	-0.389			-2.997**	-3.785**	3.047	0.000307
	(1.300)			(1.327)	(1.709)	(2.506)	(0.0156)
Log GDP per capita	0.731	1.999	1.001	1.596	-0.145	7.159***	-0.0136
	(1.668)	(1.550)	(1.779)	(1.689)	(2.093)	(2.157)	(0.0171)
Log population	5.079	8.303**	10.68***	10.86***	15.17***	21.75***	-0.0197
	(3.367)	(3.509)	(3.832)	(3.766)	(4.282)	(5.895)	(0.0417)
Constant	-25.48	-72.18*	-84.68*	-82.03*	-101.6**	-282.5***	0.455
	(36.76)	(40.57)	(45.74)	(42.49)	(49.58)	(75.52)	(0.487)
Observations	497	450	360	433	339	134	162
Number of ifscode	103	96	66	93	63	34	30
Fixed effects	Y	Y	Y	Y	Y	Y	Y
Time effects	Y	Y	Y	Y	Y	y	y
Time-averaging	5 yr	5 yr	5 yr	5 yr	5 yr	5 yr	5 yr

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix I. Ocean travel distance

The raw world land mass map is extracted from "Gridded Population of the World" data set[14], and the "OSCAR third degree resolution ocean surface currents" dataset is used for ocean current velocity.[15] The resolution (each pixel represents 1/3 degree of latitude and longitude) of ocean current data is used as the final resolution, which implies that the higher-resolution world land mass data is resampled to match ocean current data.

The land mass data is edited to add the Suez Canal, the Panama Canal, and the Gibraltar straits and Turkish Straits. Both the Northern route (above Canada and Russia) and the Southern routes (Cape Horn) aree closed to match actual trade routes.[16]

The longitude and latitude of each country's major ports are collected in order to map harbors to the grid (shifted to the nearest sea pixel).
1. A graph is generated for calculating the shortest travel distance. Each sea pixel is a vertex in the graph, each vertex can have at most 4 edges to adjacent pixels if they are also sea pixels. The weight of the edge is the travel time calculated as the distance between the two pixels generated using the Haversine formula, then divided by the composite boat speed (20 knot plus ocean current velocity).
2. Dijkstra's algorithm is used to calculate the shortest route between each pair of ports, using the C++ Boost library.

The outcome of this algorithm is the list of all effective travel routes and travel distances between each pair of ports. Following Feyrer (2019), two special cases are made for the US and for Canada, for which sea distance is computed as a weighted average of the distance from the East Coast and the West Cost (the weight of 0.8 on the East Coast, and 0.2 for the West Coast are in proportion to the distribution of the population).

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[14] http://sedac.ciesin.columbia.edu/data/set/gpw-v3-land-geographic-unit-area/data-download

[15] https://podaac.jpl.nasa.gov/dataset/OSCAR_L4_OC_third-deg

[16] Although boats can pass the Cape Horn, its usage for trade is very limited.

Appendix II – Government expenditure and financial globalization

VARIABLES	(1) General public services	(2) Defence	(3) Public order and safety	(4) Economic affairs	(5) Environment protection	(6) Housing and community amenities	(7) Health	(8) Recreation culture and religion	(9) Education (with time effects)	(10) Old age	(11) Social protection excl old age
Total Foreign Assets and Liabilities	-0.00312	0.000307	-0.000263	-0.00191	-4.12e-06	-0.000657	-0.00106	-9.39e-05	-0.00176*	0.00499	-0.00179
	(0.00202)	(0.00101)	(0.000359)	(0.00237)	(0.000363)	(0.000570)	(0.000793)	(0.000461)	(0.000935)	(0.00350)	(0.00154)
Log(population)	-0.350	-4.694***	3.107***	-0.159	0.315	0.244	8.984***	-0.319	-1.078	-5.382	3.045
	(2.544)	(1.281)	(0.700)	(2.465)	(0.471)	(0.702)	(1.968)	(0.329)	(1.503)	(4.813)	(3.514)
Log(GDP per capita)	-0.718	-0.729	-0.248	0.164	-0.131	0.189	0.668	0.166	-1.483**	-1.404	1.648*
	(1.246)	(0.705)	(0.300)	(1.235)	(0.285)	(0.211)	(0.630)	(0.240)	(0.560)	(1.577)	(0.800)
Cabinet Composition(max=left)	0.106	0.0376	-0.0460*	-0.108	-0.0164	0.0603**	-0.0215	0.00639	0.0479	0.100	0.251**
	(0.110)	(0.0363)	(0.0236)	(0.114)	(0.0157)	(0.0213)	(0.0509)	(0.0197)	(0.0351)	(0.120)	(0.0885)
Population 65+	0.198	0.0689	0.0556	0.231	0.0452	0.0141	0.204**	0.0282	0.00139	0.834***	0.274**
	(0.242)	(0.0419)	(0.0412)	(0.168)	(0.0297)	(0.0386)	(0.0854)	(0.0372)	(0.0715)	(0.208)	(0.114)
Population <15	0.125	0.0335	0.0508	0.245	0.0138	0.0504	-0.0536	0.0115	-0.0311	0.509**	0.333**
	(0.205)	(0.0602)	(0.0596)	(0.218)	(0.0349)	(0.0368)	(0.0635)	(0.0373)	(0.0666)	(0.223)	(0.150)
Constant	15.31	85.18***	-48.77***	-1.158	-4.163	-6.291	-151.5***	4.059	37.78	86.73	-67.92
	(36.16)	(27.18)	(13.05)	(41.42)	(7.752)	(11.06)	(34.49)	(5.552)	(26.26)	(87.71)	(61.34)
Observations	88	88	88	88	88	88	88	88	88	65	65
R-squared	0.241	0.542	0.484	0.133	0.100	0.274	0.785	0.084	0.438	0.542	0.377
Number of ifscode	21	21	21	21	21	21	21	21	21	19	19
Fixed effects	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Time effects	N	N	N	N	N	N	N	N	Y	N	N
Time-averaging	5 yr	5 yr	5 yr	5 yr	5 yr	5 yr	5 yr	5 yr	5 yr	5 yr	5 yr

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

VARIABLES	(1) Housing	(2) Unemployment	(3) Labor	(4) Family	(5) Old_age	(6) Survivors	(7) Incapacity	(8) Health
Total Foreign Assets and Liabilities	-0.000231	0.000189	-0.000504	-0.000539	0.00134	-0.000652	-5.74e-05	-0.000677
	(0.000254)	(0.000566)	(0.000312)	(0.000518)	(0.00163)	(0.000573)	(0.000682)	(0.00101)
Total tax revenue	0.00651	0.0691***	0.0227**	0.00931	0.174***	0.0412**	0.0251	0.0644**
	(0.00714)	(0.0153)	(0.00936)	(0.0145)	(0.0454)	(0.0160)	(0.0190)	(0.0273)
Pre-tax gini	-0.00312	0.0205*	0.00645	0.0122	-0.0154	0.00691	0.0411***	-0.0103
	(0.00531)	(0.0117)	(0.00746)	(0.0109)	(0.0343)	(0.0121)	(0.0144)	(0.0212)
Population 65+	0.0125	-0.0316	-0.00213	0.0483*	0.387***	0.000630	-0.0267	0.0284
	(0.0131)	(0.0290)	(0.0200)	(0.0270)	(0.0848)	(0.0298)	(0.0355)	(0.0529)
Population	0.170	-1.630**	-1.091**	0.902	-2.311	-0.825	2.280**	1.796
	(0.325)	(0.720)	(0.447)	(0.671)	(2.108)	(0.742)	(0.884)	(1.285)
Constant	-2.797	25.01**	17.59**	-14.86	34.65	12.97	-38.02**	-27.76
	(5.525)	(12.14)	(7.561)	(11.42)	(35.87)	(12.63)	(15.04)	(21.80)
Observations	163	160	152	168	168	168	168	169
R-squared	0.153	0.381	0.220	0.370	0.592	0.164	0.169	0.654
Number of ifscode	27	27	28	28	28	28	28	28
Fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Time effects	Y	Y	Y	Y	Y	Y	Y	Y
Time-averaging	5 yr	5 yr	5 yr	5 yr	5 yr	5 yr	5 yr	5 yr

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: dropped outliers for total foreign assets and liabilities include United Kingdom, Belgium, Luxembourg, Netherlands, Switzerland, Iceland, Ireland, Malta, Cyprus, and Mauritius

Appendix III – Data Sources and definitions

Gravity Model

Timeline	1950-2016		
Country	All countries		
Average	5-year period		
Codes	Variable Name	Source	Time
Export_ DOTS	Goods, Value of Exports, Free on board (FOB), millions of USD	IMF DOTS	1950-2017
Import_ DOTS	Goods, Value of Imports, Cost, Insurance, Freight (CIF), millions of $	IMF DOTS	1950-2017
colony	1 for pairs ever in colonial relationship	CEPII	
comlang_off	1 for common official of primary language	CEPII	
contig	1 for contiguity	CEPII	
distw	Weighted distance (pop-wt, km)	CEPII	
seatime_in_day	Bilateral sea distance, time for a round trip (in days)	IMF staff calculation	
rgdpch_61_o	Real GDP per capita	PWT 6.1	1950-2000

Determinants of government consumption

Timeline	1950-2017		
Country	Democratic countries		
Average	5-year period		
Codes	Variable Name	Source	Time
Lcg_61	Log, government consumption share of real GDP per capita, %	Penn World Table 6.1	1950-2000
Lcg_71	Log, government consumption share of real GDP per capita, %	Penn World Table 7.1	1950-2010
Lcsh_g_80	Log, Share of government consumption at current PPPs, %	Penn World Table 8.0	1950-2011
Lcsh_g_90	Log, Share of government consumption at current PPPs, %	Penn World Table 9.0	1950-2014
Lprim_exp	Log, government primary expenditure share of GDP, %	Mauro et al. (2013)	1800-2011
Ltrade_DOTS_gdp	Log, trade to GDP, %	IMF DOTS	1950-2017
LRY_90	Log, real GDP per capita, USD	Penn World Table 9.0	1950-2014
Lpop_90	Log, population, millions	Penn World Table 9.0	1950-2014
chga_demo	Dummy: democracy	QOG	1950-2017

Determinants of government consumption, IV model

Timeline	1950-2017		
Country	Democratic countries		
Average	5-year period		
Codes	Variable Name	Source	Time
Lcg_61	Log, government consumption share of real GDP per capita, %	Penn World Table 6.1	1950-2000
Lcg_71	Log, government consumption share of real GDP per capita, %	Penn World Table 7.1	1950-2010
Lcsh_g_80	Log, Share of government consumption at current PPPs, %	Penn World Table 8.0	1950-2011
Lcsh_g_90	Log, Share of government consumption at current PPPs, %	Penn World Table 9.0	1950-2014
Lprim_exp	Log, government primary expenditure share of GDP, %	Mauro et al. (2013)	1800-2011
Lpredicted_trade_gdp	Log, predicted trade to GDP, %	Authors' calculation	1950-2017
Ltrade_DOTS_gdp	Log, trade to GDP, %	IMF DOTS	1950-2017
LRY_90	Log, real GDP per capita, USD	Penn World Table 9.0	1950-2014
Lpop_90	Log, population, millions	Penn World Table 9.0	1950-2014
chga_demo	Dummy: democracy	QOG	1950-2017

Redistribution: effect of taxes, progressivity, and social spending on Net Gini coefficient (disposable income)

Timeline	1950-2017		
Country	OECD countries		
Average	5-year period		
Codes	Variable Name	Source	Time
gini_net	Post-tax gini	SWIID 5.1	1960-2015
gini_market	Pre-tax gini	SWIID 5.1	1960-2015
socexp2	Social Expenditure - Total, GDP share %	OECD Social Expenditure Database (SOCX)	1980-2016
share_labor	Gvt rev from taxes on labor income/ Total gvt rev. (without %)	OECD Revenue Statistics	1965-2016
share_capital	Gvt rev from taxes on capital income/ Total gvt rev. (without %)	OECD Revenue Statistics	1965-2016
share_labcapital	Gvt rev from taxes on labor & capital income/ Total gvt rev. (without %)	OECD Revenue Statistics	1965-2016

Codes	Variable Name	Source	Time
progressivity_OECD	Progressivity of the personal income tax	OECD	1982-2004
socexp3	Total social expenditure, excluding old age, share of GDP %	OECD Social Expenditure Database (SOCX)	1980-2016
Old_age	OECD Social Expenditure - Old_age, GDP share %	OECD Social Expenditure Database (SOCX)	1980-2016
Housing	OECD Social Expenditure - Housing, GDP share %	OECD Social Expenditure Database (SOCX)	1980-2016
Unemployment	OECD Social Expenditure - Unemployment, GDP share %	OECD Social Expenditure Database (SOCX)	1980-2016
Labor	OECD Social Expenditure - Labor, GDP share %	OECD Social Expenditure Database (SOCX)	1980-2016
Family	OECD Social Expenditure - Family, GDP share %	OECD Social Expenditure Database (SOCX)	1980-2016
Survivors	OECD Social Expenditure - Survivors, GDP share %	OECD Social Expenditure Database (SOCX)	1980-2016
Incapacity	OECD Social Expenditure - Incapacity, GDP share %	OECD Social Expenditure Database (SOCX)	1980-2016
Health	OECD Social Expenditure - Health, GDP share %	OECD Social Expenditure Database (SOCX)	1980-2016

Globalization and taxation

Timeline	1950-2017		
Country	OECD countries		
Average	5-year period		
Codes	Variable Name	Source	Time
rev_capital2	Log, Gvt rev from taxes on labor income/ Total gvt rev. %	OECD Revenue Statistics	1965-2016
rev_labor2	Log, Gvt rev from taxes on capital income/ Total gvt rev. %	OECD Revenue Statistics	1965-2016
rev_goodserv2	Log, Gvt rev from taxes on goods and services income/ Total gvt rev. %	OECD Revenue Statistics	1965-2016
rev_capital	Log, Gvt rev from taxes on labor income GDP share %	OECD Revenue Statistics	1965-2016
rev_labor	Log, Gvt rev from taxes on capital income GDP share %	OECD Revenue Statistics	1965-2016
rev_goodserv	Log, Gvt rev from taxes on goods and services income GDP share %	OECD Revenue Statistics	1965-2016
Ltrade_DOTS_gdp	Log, predicted trade to GDP, %	Authors' calculations	1950-2017
Lpredicted_trade_gdp	Log, trade to GDP, %	IMF DOTS	1950-2017
LRY_90	Log, real GDP per capita, USD	Penn World Table 9.0	1950-2014

| Lpop_90 | Log, population, millions | Penn World Table 9.0 | 1950-2014 |

Government operations, by outlay, and globalization

Timeline	1950-2017		
Country	OECD countries		
Average	5-year period		
<u>Codes</u>	<u>Variable Name</u>	<u>Source</u>	<u>Time</u>
trade_GDP	Trade to GDP %	IMF Word Economic Outlook	1950-2017
l_pop	Log, population in thousand	Penn World Table 9.0	1950-2014
LRY_90	Log, real GDP per capita, USD	Penn World Table 9.0	1950-2014
gov_party	Cabinet Composition (max=left)	CPDS	1960-2014
sp_pop_65up_to_zs	Population ages 65 and above (% of total)	World Bank World Development Indicators	1960-2017
sp_pop_0014_to_zs	Population ages 0-14 (% of total)	World Bank World Development Indicators	1960-2017
G010	Gov Expenditure: General public services GDP share %	OECD Classif. of the Funct. of Government	1970-2016
G020	Gov Expenditure: Defence GDP share %	OECD Classif. of the Funct. of Government	1970-2016
G030	Gov Expenditure: Public order and safety GDP share %	OECD Classif. of the Funct. of Government	1970-2016
G040	Gov Expenditure: Economic affairs GDP share %	OECD Classif. of the Funct. of Government	1970-2016
G050	Gov Expenditure: Environment protection GDP share %	OECD Classif. of the Funct. of Government	1970-2016
G060	Gov Expenditure: Housing and community amenities GDP share %	OECD Classif. of the Funct. of Government	1970-2016
G070	Gov Expenditure: Health GDP share %	OECD Classif. of the Funct. of Government	1970-2016
G080	Gov Expenditure: Recreation, culture and religion GDP share %	OECD Classif. of the Funct. of Government	1970-2016
G090	Gov Expenditure: Education GDP share %	OECD Classif. of the Funct. of Government	1970-2016
G100	Gov Expenditure: Social protection GDP share %	OECD Classif. of the Funct. of Government	1970-2016

Social Expenditure and globalization

Timeline	1950-2017		
Country	OECD countries		
Average	5-year period		
<u>Codes</u>	<u>Variable Name</u>	<u>Source</u>	<u>Time</u>

		OCED Social Expenditure Database	
Housing	OECD Social Expenditure - Housing, GDP share %	(SOCX)	1980-2016
Unemployment	OECD Social Expenditure - Unemployment, GDP share %	OECD Social Expenditure Database (SOCX)	1980-2016
Labor	OECD Social Expenditure - Labor, GDP share %	OECD Social Expenditure Database (SOCX)	1980-2016
Family	OECD Social Expenditure - Family, GDP share %	OECD Social Expenditure Database (SOCX)	1980-2016
Survivors	OECD Social Expenditure - Survivors, GDP share %	OECD Social Expenditure Database (SOCX)	1980-2016
Incapacity	OECD Social Expenditure - Incapacity, GDP share %	OECD Social Expenditure Database (SOCX)	1980-2016
Health	OECD Social Expenditure - Health, GDP share %	OECD Social Expenditure Database (SOCX)	1980-2016
trade_GDP	Trade to GDP %	IMF Word Economic Outlook	1950-2017
rev_total	Total tax revenue GDP share %	OECD Revenue Statistics	1965-2016
gini_market	Pre-tax gini	SWIID 5.1	1960-2015
pop65	Population ages 65 and above (% of total)	World Bank World Development Indicators	1960-2017
lpop	Log, population in millions	Penn World Table 9.0	1950-2014

Political factors and the sensitivity of spending to globalization

Timeline	1950-2017		
Country	OECD countries		
Average	5-year period		
<u>Codes</u>	<u>Variable Name</u>	<u>Source</u>	<u>Time</u>
total_socl_exp	Total social expenditure, excluding old age, share of GDP %	OECD Social Expenditure Database (SOCX)	1980-2016
Housing	OECD Social Expenditure - Housing, GDP share %	OECD Social Expenditure Database (SOCX)	1980-2016
Health	OECD Social Expenditure - Health, GDP share %	OECD Social Expenditure Database (SOCX)	1980-2016
trade_GDP	Trade to GDP %	IMF Word Economic Outlook	1950-2017
rev_total	Total tax revenue GDP share %	OECD Revenue Statistics	1965-2016
gini_market	Pre-tax gini	SWIID 5.1	1960-2015

pop65	Population ages 65 and above (% of total)	World Bank World Development Indicators	1960-2017
lpop	Log, population in thousand	Penn World Table 9.0	1950-2014
WDI_wip	Proportion of seats held by women in national parliaments (%)	World Bank World Development Indicators	1990-2009
fh_polity2	Democracy index: level of democracy (Freedom House/Polity)	Freedom in the World	1972-2008

Government size and financial globalization

Timeline	1950-2017
Country	Democratic countries
Average	5-year period

codes	Variable Name	Source	Time
Lcg_61	Log, government consumption share of real GDP per capita, %	Penn World Table 6.1	1950-2000
Lcg_71	Log, government consumption share of real GDP per capita, %	Penn World Table 7.1	1950-2010
Lcsh_g_80	Log, Share of government consumption at current PPPs, %	Penn World Table 8.0	1950-2011
Lcsh_g_90	Log, Share of government consumption at current PPPs, %	Penn World Table 9.0	1950-2014
Lprim_exp	Log, government primary expenditure share of GDP, %	Mauro et al.	1800-2011
CAP	Indicator of capital account openness	Furceri, Papageorgiou & Ostry (forthcoming)	1973-2014
Ltrade_DOTS_gdp	Log, trade to GDP, %	IMF DOTS	1950-2017
Lrgdpch	Log, real GDP per capita, USD	Penn World Table	1950-2000
Lpop	Log, population, millions	Penn World Table	1950-2014

Taxation and financial globalization

Timeline	1980-2017
Country	Democratic countries
Average	5-year period

codes	Variable Name	Source	Time
tax_rate	Corporate income tax rate, statutory top central	IMF FAD Revenue Indicators	1980-2015
AETR	Effective corporate income tax rate	Authors' calculation	1990-2016

progressivity	Personal income tax progressivity	IMF	1980-2016
CAP	Indicator of capital account openness	Furceri, Papageorgiou & Ostry (forthcoming)	1973-2014
Lfin_globalization	Total foreign assets and liabilities over GDP, %	IMF	1970-2017
Ltrade_DOTS_gdp	Log, trade to GDP, %	IMF DOTS	1950-2017
LRY	Log, real GDP per capita, USD	Penn World Table	1950-2014
Lpop	Log, population, millions	Penn World Table	1950-2014

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