Essays on the Political Economy of Public Finance

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Dedication

To my late uncle Dr. Charles Baah. You encouraged me to do a PhD. Thank you for the confidence you reposed in me. I am forever grateful.

Declaration

I declare that except where specific reference is made to the work of others, the contents of this dissertation are original and have not been submitted in whole or in part for consideration for any other degree or qualification in this, or any other university. This dissertation is my own work and contains nothing which is the outcome of work done in collaboration with others, except as specified in the text and Acknowledgements. This dissertation contains fewer than 65,000 words including appendices, bibliography, footnotes, tables and equations and has fewer than 150 figures.

Acknowledgements

I want to thank my supervisors Dr. Christa Brunnscheweiler and Dr. Edward Anderson whose direct advice, guidance, inspiration, and mentoring made this thesis possible. I am grateful to Dr. Oana Borcan, Prof. Peter Moffatt, Prof. Corrado Di-Maria, and Prof. Ragnar Torvik whose comments and feedback at various stages helped shape the different chapters of my thesis. I appreciate the love, sacrifices and support of my wife Mrs. Eunice Asiedua Obeng. I acknowledge and appreciate the support of my parents and family especially my aunt Miss Grace Olivia Baah throughout my PhD. Mrs. Akua Gyekyewaa Antwi thank you for all your encouragement. I am grateful to Dr. Daniel Sakyi who believed in me and stood with me at all times during my PhD. A special thank you to Dr.(Mrs) Bertha Owusu and Patricia Mawuledey Dameh.

Abstract

In this thesis, we examine the political economy of public finance. I provide a general introduction to the thesis in Chapter 1. In Chapter 2, I examine the determinants and interrelationship of different types of government expenditure using data on 73 countries for the period 1990-2016. The results show foreign aid receipts and urbanization have raised total expenditure, but external debt stocks have reduced total expenditure. Also, there is a substituting relationship between expenditures on social protection and pure public goods, and education and defence, but complementary relationship between all other categories of government expenditure.

In Chapter 3, we provide an up-to-date empirical assessment of the relationship between economic globalisation and government spending for the 'hyper-globalisation' period of the 1990s and 2000s. The results suggest that hyper-globalisation has had divergent and conflicting effects on consumption spending: while the globalisation of trade has tended to raise spending, the globalisation of finance and foreign investment has tended to reduce it. However, the size of the effects is quite small, and there is no evidence that spending has risen by more in countries which are particularly prone to terms of trade shocks.

In Chapter 4, I examine the mediating effect of democracy in explaining the relationship between decentralization and government size for the period 1970-2013. I proxy decentralization by fiscal decentralization, use total spending as our primary measure of government size, and adopt the V-Dem high-level democracy indices as measures of democracy. I use the fixed effects estimator with Driscoll-Kraay standard errors and the instrumental variable estimation technique. Our main finding is that fiscal decentralization and democracy in themselves are effective tools to 'starve the beast' as they lead to reduced government size, with the former suggesting support for the Leviathan hypothesis. I find evidence of the mediating effect of democracy in the relationship between decentralization and government size; a positive and statistically significant effect of the interaction term with the effect size largest for participatory democracy. We do not find a non-linear relationship between decentralization and government size.

In Chapter 5, we examine how local governments' political alignment with the central government affects subnational fiscal outcomes. We analyze data from Ghana, which has a decentralized political structure with substantial political and fiscal powers delegated to the district level, and high dependency on intergovernmental transfers. Using a regression discontinuity design for a new dataset for 1994-2014, we find that districts with an aligned Member of Parliament and District Chief Executive (DCE) receive more transfers and have higher expenditures. In a second step, we instrument transfers and estimate a flypaper effect

for Ghanaian districts.

Chapter 1

Introduction

Government spending is an important element of public finance. From as early as Wagner (1893), government spending has been linked with macroeconomic outcomes such as economic growth, equity and welfare. For instance, Ram (1986, 1989), Lucas (1988), Barro (1990) and Romer (1990) clearly demonstrate the extent to which government spending may improve or hinder economic growth. In addition, government spending can have positive welfare effects when it is targeted at providing public goods such as health, education, social protection, defence, and law and order. Governments may also adopt social welfare spending as a tool to redistribute wealth to ensure equity. However, given that government spending is a reflection of government policy choices and decisions, it may be driven by considerations other than economic, including political considerations. Therefore, as long as government spending remains an important tool in the hands of governments, the centrality of politics and political economy in understanding the determinants of government spending cannot be overemphasized. Moreover, in the case of developing countries, government spending often tends to exceed revenue levels. Such uncontrolled government spending in developing countries have been a source of macroeconomic volatility which have been both pro-and counter-cyclical in nature. In reality, rather than having the intended positive economic growth and welfare effects, government spending in developing countries have tended to be associated with long-term persistently increasing trends leading to high deficits and debts, and an excessive spending on debt-servicing. Rightly so, the latter effects may be explained by the political and institutional structure of many developing countries.

We approach government spending in two broad ways. First, we consider government spending at the national level. At the national level, we explore the determinants of and interrelationship of government spending types, as well as the effect of globalization on both the level and composition of government spending. Further, we determine the effect of decentralization on government size under varieties of democracy. Second, we focus on the local government level and explore how political alignment influences fiscal outcomes in local governments. A detailed description of the contents of each chapter is provided below.

In Chapter 2, I examine the determinants and interrelationship of different types of government expenditure. In theory, different components of government expenditure may have different effects on macro- and micro-economic outcomes such as economic growth and production and the differing effects can have implications for resource allocation and redis-

tribution within an economy. I use data on 73 countries for the period 1990-2016, broken down by both economic and functional classifications of expenditure, significantly extending the scope of previous contributions. I use a two-way fixed effect estimator with lagged independent variables, and seemingly unrelated regression (SUR) to examine complementarity and substitutability among components of government expenditure. The results show foreign aid receipts and urbanization have raised total expenditure, but external debt stocks have reduced total expenditure. There is a substituting relationship between expenditures on social protection and pure public goods, and education and defence, but complementary relationship between all other categories of government expenditure. Hence, disaggregating expenditure data by category and examining expenditure types within a unified framework enables a more nuanced test of many theories of government expenditure.

In Chapter 3, we provide an up-to-date empirical assessment of the relationship between economic globalisation and government spending for the 'hyper-globalisation' period of the 1990s and 2000s. We use data on government consumption spending as well as more disaggregated spending components (e.g. social welfare). We also use a range of globalisation measures, including the most recent version of the KOF globalisation index, and a combination of econometric methods, including fixed effects, Generalised Methods of Moments (GMM) and dynamic ordinary least squares (DOLS) estimation. The results suggest that hyper-globalisation has had divergent and conflicting effects on consumption spending: while the globalisation of trade has tended to raise spending, the globalisation of finance and foreign investment has tended to reduce it. However, the size of the effects is quite small, and there is no evidence that spending has risen by more in countries which are particularly prone to terms of trade shocks.

In Chapter 4, we examine the mediating effect of democracy in explaining the relationship between decentralization and government size for the period 1970-2013. We proxy decentralization by fiscal decentralization, use total spending as our primary measure of government size, and adopt the V-Dem high-level democracy indices as measures of democracy. We use the fixed effects estimator with Driscoll-Kraay standard errors and the instrumental variable estimation technique. Our main finding is that fiscal decentralization and democracy in themselves are effective tools to 'starve the beast' as they lead to reduced government size, with the former suggesting support for the Leviathan hypothesis. We find evidence of the mediating effect of democracy in the relationship between decentralization and government size; a positive and statistically significant effect of the interaction term with the effect size largest for participatory democracy. We do not find a non-linear relationship between decentralization and government size.

In Chapter 5, we examine how local governments' political alignment with the central government affects subnational fiscal outcomes. In theory, alignment could be rewarded with more intergovernmental transfers, or swing voters in unaligned constituencies could be targeted instead. We analyze data from Ghana, which has a decentralized political structure with substantial political and fiscal powers delegated to the district level, and high dependency on intergovernmental transfers. Using a regression discontinuity design for a new dataset for 1994-2014, we find that districts with an aligned Member of Parliament and Dis-

trict Chief Executive (DCE) receive more transfers and have higher expenditures. Ghana's changeable voting patterns may hinder identification of swing voters, and/or DCEs who fail to pull their districts towards the central government may be punished. Marginally aligned districts also raise more own revenues. In a second step, we instrument transfers and estimate a flypaper effect for Ghanaian districts.

Chapter 2

The Determinants and Interrelationship of Government Spending Types

In this paper, I examine the determinants and interrelationship of different types of government expenditure. In theory, different components of government expenditure may have different effects on macro- and micro-economic outcomes such as economic growth and production and the differing effects can have implications for resource allocation and redistribution within an economy. I use data on 73 countries for the period 1990-2016, broken down by both economic and functional classifications of expenditure, significantly extending the scope of previous contributions. I use a two-way fixed effect estimator with lagged independent variables, and seemingly unrelated regression (SUR) to examine complementarity and substitutability among components of government expenditure. The results show foreign aid receipts and urbanization have raised total expenditure, but external debt stocks have reduced total expenditure. There is a substituting relationship between expenditures on social protection and pure public goods, and education and defence, but complementary relationship between all other categories of government expenditure. Hence, disaggregating expenditure data by category and examining expenditure types within a unified framework enables a more nuanced test of many theories of government expenditure.

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2.1 Introduction

In examining the determinants of government expenditure, it is important to consider both aggregated (total) and components of government expenditure. Different components of government expenditure may have different effects on macro- and micro-economic outcomes such as economic growth and production. The differing effects can have implications for resource allocation and redistribution within an economy [1]. Further, the differences in the effects of components of government expenditure on politico-socio-economic variables may be attributed to the differences in their unit of measurement: (a) as shares of GDP or (b) as shares of total expenditure, and the interrelationship between components of government expenditure. For instance, for a fixed level of total expenditure, changes in one government expenditure type are likely to occur at the expense of or complementary to a corresponding change in another expenditure type.

In this paper, I examine the determinants of government expenditure and its components and the nature of the interrelationship between components of government expenditure. I contribute to the existing literature on the determinants of government expenditure in four main ways. First, we use recent data on government spending and its components for a sample of countries including developed and developing countries. Our sample size covers 73 countries over the period 1990-2016, significantly extending the scope of previous contributions. Second, we measure components of government expenditure both as shares of GDP and as shares of total expenditure to unify the differing approaches in the existing literature and ensure robustness of our results. Third, in terms of the econometric methods, I use a two-way fixed effect estimator with lagged independent variables, and seemingly unrelated regression (SUR) to examine complementarity and substitutability among components of government expenditure. These approaches have not been applied together before to provide a more comprehensive overview of government expenditure. Fourth, I use the IMF GFS database broken down by both economic and functional classifications of expenditure to gain a better understanding of the drivers of different types of government expenditure. I further sub-categorise the functional classification of expenditure into pure public goods, economic services, merit goods, and social protection in addition to expenditure types such as education, defence and health spending.

I find that an increase in foreign aid receipts and urbanization is associated with an increase in total spending; an increase in foreign aid receipts however leads to a reduction in consumption spending. An increase in external debt stock however leads to a reduction in total expenditure. For components of spending, trade openness has a positive effect on government spending on subsidies, merit goods, and education following year; inward FDI stock has a positive effect(negative effect) on government spending on pure(merit) goods;

[1] See Aschauer (1989), Barro (1990), Devarajan et al. (1996) Tanzi and Zee (1997), as well as Bose et al. (2007) on the effects of government expenditure on economic growth; Fan and Saurkar (2008) on the effects of government expenditure on production, resource allocation and redistribution, and economic growth; as well as Salameh (2000), Fan et al. (2000), Fan and Rao (2008), and Fan et al. (2004) on the effects of government expenditure on poverty. Other earlier studies include Peacock and Wiseman (1961), Borcherding (1985), and Scartascini and Crain (2002).

outward FDI stock has a positive(negative) effect on government spending on merit goods and education (social benefits); and the KOF overall index of globalisation has a negative effect on subsidies, merit goods, and education spending. There may be economies of scale associated with government spending on services, merit goods, defence, health, as well as education, as I find a negative effect of an increase in total population on the components of government spending. The results for components of government expenditure as shares of GDP and as shares of total expenditure are qualitatively similar. In the results for the interrelationships, I find substituting relationships between pure public goods and social protection, and education and defence. I find complementary relationships between current and investment expenditures, consumption and subsidies expenditures, social benefits and subsidies expenditures, as well as consumption and social benefits expenditures. There are also complementary relationships between pure public good and merit good expenditures, services and pure public good expenditures, services and merit good expenditures, social protection and merit goods expenditures, as well as social protection and services expenditures. Finally, there are complementary relationships between health and defence expenditures, and education and health expenditures.

The rest of the paper is structured as follows. A literature review of theoretical and empirical evidence on the determinants of government expenditure is done in Section 2. Methodology is examined in Section 3. Section 4 is devoted to data description. Estimation results are presented and discussed in Section 5, while conclusions are given in Section 6.

2.2 Literature Review

Much of the early literature on the determinants of government spending cite national income as a major explanatory variable [2]. The effect of national income on government expenditure is explained by the so-called Wagner's Law - increases in the levels of national income are expected to lead to increases in government expenditure as a share of national income (Wagner 1893). Another important determinant of aggregate government expenditure and its components is overall and specific components of the population. For instance, health, social welfare, and other forms of transfer expenditures are likely to increase as the share of old population in the overall population increases, while education expenditure increases with increasing share of the young population, changes in total population can affect aggregated and components of government expenditure. There may be economies of scale associated with increasing population as the marginal cost of providing public goods may reduce with increasing total population (Alesina and Wacziarg, 1998). The latter notwithstanding, overcrowding and congestion due to increasing urbanization may be associated with increasing social costs and reduced individual welfare, requiring an increase in government expenditure to restore efficiency.

Two important characteristics have been found to provide good explanations for the sizes

[2]Early literature on the subject matter include Baumol (1967), Musgrave (1969), Borcherding and Deacon (1972), Bergstrom and Goodman (1973), Musgrave and Musgrave (1984), and Henrekson (1993). See Facchini (2014) for a detailed list of literature on the subject matter.

of aggregated and components of government expenditure recently; democracy and globalization. For instance, the desire to satisfy the tastes, preferences and needs of voters may lead to larger government expenditure (both aggregated and components; see Isham et al., 1997; and Boix, 2001, 2003). Further, the biggest share of government size in any established nation are social transfers (or welfare expenditure; see Hicks and Swank, 1992; and Stasavage, 2005). In addition, relative to other governance types such as autocracies and anocracies, democracies may be associated with higher consumption expenditure (Shelton, 2007). It is worth noting that inefficiencies and imprudent use of government resources in autocracies may create bigger government expenditure levels. In the case of globalization, the compensation hypothesis suggests a positive effect of globalization on government expenditure while efficiency hypothesis suggests a negative effect (Gemmell et al., 2008). Compensation hypothesis argues that globalization increases exposure to external shocks, leading to uncertainties in the streams of incomes of individual and households, which requires increased government expenditure (particularly welfare spending) to compensate for such shocks (Rodrik 1998, Garrett 1998). The arguments of efficiency hypothesis are in twofold: first, purely for efficiency reasons, smaller government size is preferred over bigger government size as a country becomes more open. Second, reduced revenues from trade tax due to a "race-to-the-bottom" approach to trade taxation may lead to lower total revenue, which reduces the ability of governments to spend (Garrett 1998; and Gemmell et al., 2008; Benarroch and Pandey 2012).

Given that our sample size includes developing countries, two additional factors remain important determinants of government expenditure (aggregated and components) in such countries; foreign and external debts. Foreign aid affects the levels, the evolution, as well as the composition of government expenditure as it adds to government total revenues to fund government expenditure (Remmer, 2004; Morrissey, 2015). Foreign aid receipts in general increases government expenditure (Hudson and Mosley, 2008). However, aid fungibility suggests that an increase in foreign aid receipts for a specific use may(may not) be additional to spending for that use (e.g. health) although it does not necessarily imply that total spending does not increase in proportion to aid. This is possible when aid receipts: (i) daunt domestic revenue generation efforts; (ii) are diverted from their intended use for example in the presence of corruption, rent-seeking, wastage, weak state and political institutions (Burnside and Dollar, 2000). Similarly, external debts may serve as additional funds inflow to augment shortfalls in domestic revenues to finance domestic expenditure in developing countries, and this may explain variations in total and components of government expenditure (see Mahdavi, 2004; and Obeng and Sakyi, 2017).

A closely related contribution is Shelton (2007), who examines the size and composition of government expenditure. The paper is similar as it uses data disaggregated by category of expenditure and tests different hypothesis of government expenditure within a unified specification. The paper finds a positive effect of total population on health expenditure, a positive effect of the fraction of young population on defense and consumption expenditure, a positive of the fraction of old population on total and consumption expenditure, and a positive effect of income on defense expenditure. The paper also finds trade openness has

a positive effect on total expenditure, health and transport expenditure, as well as wages and salaries. The current paper adds to this by introducing other categories such as pure public goods, merit goods, services and social protection. Also, I consider components of government expenditure both as shares of GDP and as shares of total expenditure, and introduce complementarity and substitutability.

2.3 Methodology

2.3.1 Panel Fixed Effect Model Specification

I examine the determinants of government expenditure using a two-way fixed effects estimator. I use one year lagged values of the time varying independent variables to help tackle some endogeneity problems due to two-way causal relationships between the regressors and the regressands. The specification here is similar to that of earlier median voter model specifications such as Borcherding and Deacon (1972), Bergstorm and Goodman (1973) and Shelton (2007) [3]. These specifications are the most popular and relied on in the literature. The estimation model is therefore given as:

$$Expenditure_{it} = \alpha + \beta X_{it-1} + \phi Y_{it-1} + \gamma Year_t + \mu_i + \epsilon_{it} \tag{2.1}$$

where i and t refer to the country and year respectively. $Expenditure_{it}$ is a vector of expenditure variables including both total and components of government expenditure. All expenditure variables are given either as shares of GDP or as shares of total expenditure. The base variables (X) are real GDP per capita, foreign aid, total population, trade openness, and external debt stock. Y is a vector of control variables including shares of young and old population, urbanization, Foreign Direct Investment (FDI), overall globalization, as well as dummies for democracy and autocracy. These covariates are added successively to the baseline model, and finally all together [4]. Year dummies ($Year$) are used to capture time period effects on government expenditure. Country dummy is given by μ_i while ϵ_{it} refers to the error term. All variables (except the dummy variables) are used in the natural logarithm form [5].

2.3.2 Seemingly Unrelated Regression (SUR) Estimation

As stated earlier, we examine the correlations of the residuals of the expenditure categories to determine the effect of a change in one category of expenditure on other categories of expenditure using the SUR model.

[3] I omit tax revenue as I do not find consistent data for most countries.

[4] For want of space, I only present the results for the full model. All other results are available in an online appendix.

[5] I include a dummy which is equal to 1 for OECD countries. However, it is statistically insignificant in all cases. In addition, the results for the model with an OECD dummy is not significantly different from those for the model without an OECD dummy. I therefore report the results for the more parsimonious model without the OECD dummy.

A seemingly unrelated regression (SUR) estimation combines several individual relationships connected by correlated disturbances, providing simultaneous regression coefficients in all equations (Moon and Perron, 2006). The estimation procedure adopts the estimates of the variances and covariances of the disturbance terms based on the residuals obtained from an equation-by-equation application of least squares (Zellner, 1962). Two main advantages of using the SUR estimator are that; (i) SUR provides efficiency in estimation by combining information on different estimations, (ii) SUR allows the imposition and/or the test of restrictions involving parameters within different equations (Zellner, 1962; Moon and Perron, 2006). The coefficients of SUR estimations are at least asymptotically more efficient than those of single equation least-squares estimators. The efficiency gains can be quite substantial if there are no high levels of correlations between independent variables in different equations and if there exists high correlations between disturbance terms of in different equations (Zellner, 1962). In some special cases, the efficiency gains may disappear (see Kruskal, 1968; Davidson and Mackinnon, 1993; Greene, 2003; Moon and Perron, 2006). The procedure can be appropriately applied to regression equations where each equation refers to a given classification category and the observations refer to different points in space (Zellner, 1962 pp. 349). Hence, it is quite appropriate to adopt a SUR estimation in this case since the use of different components of an overall measure of government expenditure may imply some level of correlation among the equations' disturbances, even though the independent variables may not be highly correlated.

We provide a baseline SUR model as follows. Assume a dependent variable y_i and a vector of K_i independent variables given as $x_i = (1, x_{it,1}, x_{it,2}, \ldots, x_{it,K_{i-1}})'$ for each observable unit i, and an unobserved error term, μ_{it}. The index it represents the t^{th} observation of the i^{th} equation in the system. Where t could represent time dimension or may refer to a location in space (Moon and Perron, 2006). Hence a typical linear SUR model can be represented by a system of linear regression equations given as[6]

$$\begin{aligned} y_{1t} &= \beta_1' \mathbf{x}_{it} + \mu_{it} \\ &\vdots \\ y_{Nt} &= \beta_N' \mathbf{x}_{Nt} + \mu_{Nt} \end{aligned}$$

where $i = 1, \ldots, N$ and $t = 1, \ldots, T$, and $L = K_1 + +K_N$. This can be further simplified by stacking the observations either in the t dimension or for each i to obtain:

$$Y_t = \tilde{X}_t' \beta + U_t \tag{2.2}$$

where $Y_t = [y_{1t}, \ldots, y_{Nt}]'$, a block-diagonal matrix of the explanatory variables $x_{1t}, \ldots, x_{NT}$ given as $\tilde{X}_t = diag(x_{1t}, x_{2t}, \ldots, x_{NT})$ on its diagonal, the vector of the coefficients of the explanatory variables given as $\beta = [\beta_1', \ldots \beta_N']'$, and the variance matrix of the error vector defined as $Var(U_t) = \Sigma$.

[6]Adopted from Moon and Perron (2006). For proofs and further reading, see Zellner and Huang (1962), Zellner (1963,1972), Kakwani (1967), Kmenta and Gilbert (1968), Phillips (1977), Srivastava and Giles (1987), Kmenta (1971),Srivastava and Maekawa (1995), and Fiebig (2001)

The classical linear SUR model stated assumes a full rank K_i for $x_i = [x_{i1}, \ldots, x_{iT}]'$ for each $i = 1, \ldots, N$. It also assumes that the errors are iid over time with zero mean and constant variance, conditional on all the explanatory variables. The matrix is also assumed as positive definite. A SUR model can also be represented as a multivariate regression with parameter restrictions (see Moon and Perron, 2006). The classical SUR model can be estimated using the Ordinary least Squares (OLS) estimator, the Generalized least squares (GLS) and feasible (FGLS) estimator, the Gaussian quasi-maximum likelihood estimator (QMLE), the Minimum distance (MD) estimator, the Bayes estimator, empirical Bayes estimator, or shrinkage estimators (cf. Moon and Perron, 2016). Extensions can be made to the classical linear SUR model if the assumptions on the disturbance terms stated earlier are not satisfied. Such extensions may be to accommodate autocorrelations and heteroscedasticity, endogenous regressors, vector autoregressions, seemingly unrelated cointegration regressions, and nonlinear SUR (NSUR) (see Moon and Perron, 2006).

Given that the equations in our system have identical explanatory variables, I adopt the two-stage least squares approach to the SURE as the results from this approach are similar to those from a three-stage least squares estimations [7]. I determine complementarity/substitutability between government expenditure types from the correlation matrix of the residuals from the estimates of the SURE model.

2.4 Data description

2.4.1 Dependent variables

Total expenditure

Total expenditure is defined as the sum of all 'current' and 'capital' (or investment) government spending. In the IMF GFS data, it is given as the sum of 'total expense' and 'net investment in non-financial assets'. There are two different measures of total expenditure from the IMF dataset, (i) the Classification of the Functions of Government (COFOG) total expenditure measure (g_eco1), and (ii) the Economic Classification of Government (ECOG) total expenditure measure (g_cofog). These measures are however highly correlated (r=0.99), hence it does not matter which one is used although (g_eco1) has more observations. I adopt g_eco1 as proxy for total expenditure given that it has more observations. Our measure of total expenditure is given as shares of GDP.

Components of expenditure measures

We describe our components of expenditure measures with two figures. Figure 2.1 shows a range of components of spending measures using the economic classification (ECOG). I adopt six of these measures starting with total expenditure, then current and capital expenditure, followed by three components of current spending (subsidies, social benefits, and

[7] As Gemmell et al. (2008), I find similar results (available upon request) with 3SLS.

consumption spending) [8]. In the figure below, these six measures with their specific individual components are the shaded ones. All components of expenditure measures are given as shares of GDP.

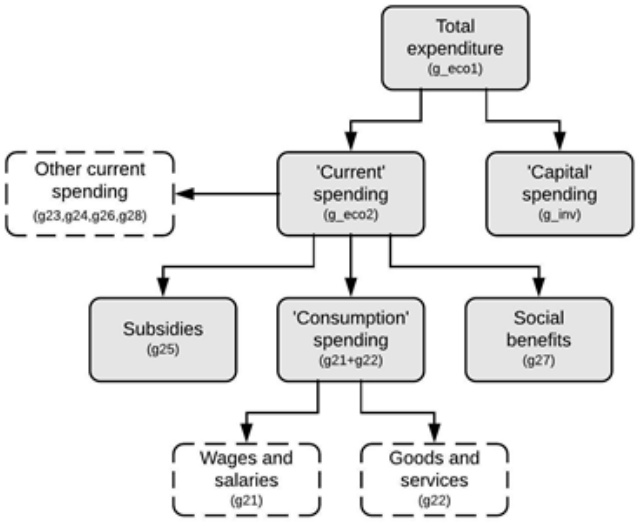


Figure 2.1: Components of spending measures: economic classification. Shaded measures are included in the analysis.

Figure 2.2 shows a range of components of spending measures using the functional classification (COFOG). Here also, a selection of measures are used starting with total expenditure, the Oxley and Martin (1991) disaggregation (i.e. pure public goods, economic services, merit goods, and social protection), and a selection of individual components (i.e. defence, health, and education) [9]. Here also, the categories of expenditure included in the analysis and their individual components are shown by shaded boxes.

[8] Current spending is referred to more specifically in the IMF GFS dataset as 'total expense'; capital spending is referred to as 'net investment in non-financial assets'. Consumption spending is not directly available in the GFS dataset; in this paper, it is approximated by the sum of spending on wages and salaries (g21) and spending on use of goods and services (g22).

[9] The individual components are selected based on their frequency of use in the literature and their significance in terms of size and data availability.

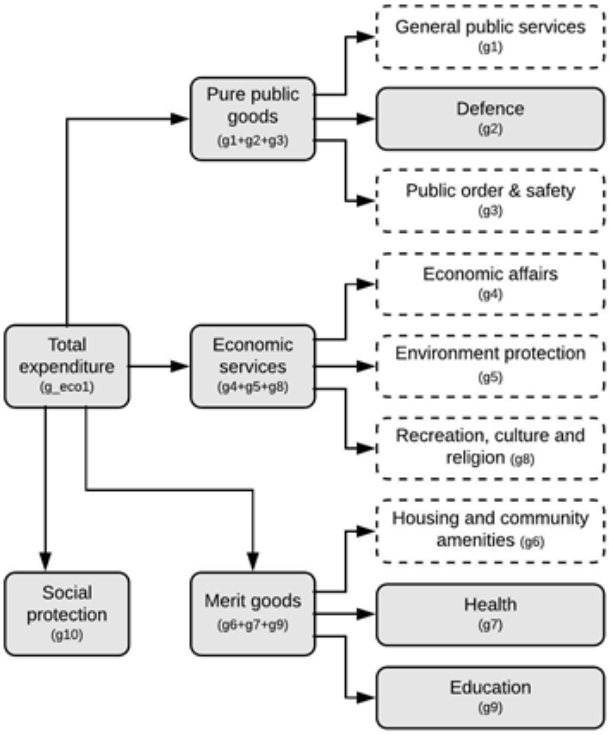


Figure 2.2: Components of spending measures: functional classification. Shaded measures are included in the analysis.

I note that, the ECOG and COFOG expenditure data used refer to both general and central government expenditure. This is significant as most other researchers use data on general government only; I included data on other levels of government in order to increase the number of observations [10].

2.4.2 Controls

Income is proxied by real GDP per capita. Foreign aid is measured as net Official Development Assistance (ODA) receipts as a percentage of gross national income (GNI)[11]. External debt stock is proxied by the total external debt stock to gross national income (GNI). In the case of the demography variables, young population is measured as the population between the ages 0-14 years as a percentage of the total population, old population is measured as population aged 65 years and above as a percentage of the total population, while urbanization is measured as the urban population as a percentage of the total population. Total population is based on the de facto definition of total population. Data on real GDP per capita, foreign aid, total population, young population, old population, urbanization, and external debt stock are sourced from the World Bank, World Development Indicators dataset, WDI (2017).

I proxy globalization by trade openness, inward and outward foreign direct investment stock, and the KOF overall index of globalization. Trade openness is measured as the sum of

[10]That is, some observations refer to general government, some refer to central government, and some refer to 'budgetary central government'.

[11]It must be noted that the indicator used here does not separate categories of aid which are likely to have varying impact on government expenditure decisions.

exports and imports of goods and services as a percentage of GDP. Data on trade openness is sourced from the World Bank, World Development Indicators dataset, WDI (2017). Inward and outward foreign direct investment (FDI) stocks are measured as a percentage of GDP and represent direct investment positions. Data on inward and outward FDI stock is sourced from the UNCTAD dataset. The overall globalization index used here is the KOF Index of Overall Globalization (see Dreher, 2006; Dreher et al., 2008)[12].

Data on democracy and autocracy are derived from dummy variables constructed out of the Polity2 variable sourced from the PolityIV project (see Marshall and Jaggers, 2014). The dummies for democracy and autocracy are constructed as follows: polity scales of -10 to -6 are considered autocracies, while polity scales of +6 to +10 are considered democracies. Polity scales of -5 and +5 are considered anocracies[13]. Summary statistics of all variables are provided in Appendix Table A2.1.

2.5 Estimation Results

I discuss the estimation results for the economic classification of government expenditure followed by the results for the functional classification of government expenditure, all as shares of GDP. As robustness check however, I present and discuss results for economic and functional classifications of expenditure as share of total expenditure. I then discuss the results from the SUR estimations.

2.5.1 Fixed effect estimates

Economic classification-ECOG

From the results in column 2 of Table 2.1, there is a positive and statistically significant relationship between foreign aid receipts and total government expenditure. The size of the coefficient indicates that one percent increase in foreign aid receipts is associated with a 0.032 per cent increase in total government expenditure. Urbanization shows a positive and statistically significant relationship with total expenditure. One percent increase in urbanization in the previous year is associated with a 0.406 per cent increase in total government expenditure. However, there is a negative relationship between external debt stock and total government expenditure. One percent increase in external debt stock is associated with a 0.049 per cent decrease in total expenditure.

From column 3 of Table 2.1, government current expenditure reduces by 0.378 and 0.720 per cent respectively with one percent increase in the proportion of old population and the proportion of young population. The results for old and young population is puzzling as it

[12]The overall globalization index aggregates three main dimensions (other sub-indices of the measure exist too) of globalization measures: economic integration, social integration, and political integration. The index however differs from the Maastricht Globalization index (see Figge and Martens, 2014) as it excludes environmental factors.

[13]Shonchoy (2016) makes use of similar measures of autocracy and democracy. Anocracies feature inherent qualities of political instability and ineffectiveness in addition to *"incoherent mix of democratic and autocratic traits and practices"* (Marshall and Cole, 2011; pp. 9).

may be difficult to explain the findings using the arguments of economies of scale for non-rival public goods stated earlier. One percent increase in urbanization is however associated with a 0.454 per cent increase in government current expenditure.

Interestingly, the results in column 4 of Table 2.1 shows government investment expenditure reduces with one percent increase in total population (by -1.053 per cent). It seems fit to expect that government expenditure on investment will increase with an increase in total population. However, such a positive relationship may not occur if the increase in total population leads to increase in congestion. This is because an increase in congestion may lead to a reduction social welfare and an increase in social costs as explained earlier. Hence, governments may reduce investment expenditure to finance the increased social costs. I find a negative relationship between an increase in external debt stock and government investment expenditure. There is a positive relationship between an increase in foreign aid receipts and government investment expenditure (a 0.076 per cent increase). There is a negative relationship between government investment expenditure and inward FDI stock in the previous year, showing evidence of efficiency hypothesis. That is, one percent increase in inward FDI stock is associated with a 0.249 per cent reduction in investment expenditure. The results show a positive relationship between the KOF overall index of globalization and investment expenditure (0.026 per cent increase), confirming evidence of compensation hypothesis.

I find a positive relationship between an increase in trade openness and government expenditure on subsidies (a 1.649 per cent increase), which suggests evidence of compensation hypothesis. Interestingly, the coefficient of the lag of the KOF index of overall globalization is negative for government spending on subsidies, suggesting evidence of efficiency hypothesis, albeit small. Given that, subsidies are considered a form of welfare/transfer expenditure the mixed results from the globalization measures confirm that evidence for both compensation and efficiency of hypothesis may exist concurrently although which dominates may be unclear (Schulze and Ursprung, 1999). Government expenditure on subsidies however reduces with increases in foreign aid receipts (a 0.140 per cent reduction). There is also a negative relationship between urbanization and government expenditure on subsides (a 2.133 per cent reduction), but this may not be worrying where increased urbanization is associated with increased incomes and a reduction in the gap between the rich and poor. The results for subsidies are given in column 5 of Table 2.1.

Table 2.1: Estimated results for economic classification (ECOG)-fixed effects

VARIABLES	Total	Current	Invest	Subsidy	Consume	Benefits
	2	3	4	5	6	7
$GDPpc$	-0.013	-0.011	0.004	0.137	-0.009	0.027
	(0.020)	(0.021)	(0.048)	(0.089)	(0.020)	(0.053)
Aid	0.032**	0.020	0.076**	-0.140**	0.012	0.015
	(0.014)	(0.015)	(0.034)	(0.066)	(0.018)	(0.062)
$Population$	-0.355	-0.250	-1.053***	2.538*	0.140	0.067
	(0.221)	(0.292)	(0.343)	(1.503)	(0.273)	(0.553)
Old	-0.145	-0.378**	0.615*	-1.348	-0.248	-1.117
	(0.162)	(0.186)	(0.341)	(1.134)	(0.170)	(0.674)
$Young$	-0.118	-0.720**	0.927	-0.264	-0.777**	-0.763
	(0.273)	(0.310)	(0.559)	(1.857)	(0.322)	(0.888)
$Urban$	0.406**	0.454**	0.255	-2.133*	0.461**	3.416***
	(0.181)	(0.195)	(0.464)	(1.257)	(0.224)	(1.109)
$Debt$	-0.049***	0.012	-0.162***	0.061	-0.044**	0.155*
	(0.018)	(0.028)	(0.059)	(0.458)	(0.021)	(0.0912)
$Openness$	-0.015	-0.024	-0.093	1.649***	-0.002	-0.035
	(0.044)	(0.064)	(0.080)	(0.543)	(0.061)	(0.0848)
FDI_i	0.002	0.032	-0.249***	0.104	-0.017	0.102
	(0.036)	(0.038)	(0.071)	(0.250)	(0.031)	(0.197)
FDI_o	-0.008	-0.001	-0.020	-0.037	-0.011	-0.064***
	(0.006)	(0.008)	(0.018)	(0.038)	(0.009)	(0.0239)
KOF	0.008	0.002	0.026**	-0.058*	0.001	0.011
	(0.006)	(0.007)	(0.010)	(0.034)	(0.006)	(0.0194)
$Democracy$	0.046	-0.018	-0.044	-0.360	0.026	0.273*
	(0.048)	(0.060)	(0.092)	(0.292)	(0.038)	(0.138)
$Autocracy$	-0.013	-0.044	0.354	-0.096	0.016	0.276**
	(0.034)	(0.070)	(0.318)	(0.283)	(0.051)	(0.137)
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes
Observations	696	715	688	513	686	513
$R-squared$	0.271	0.281	0.206	0.353	0.166	0.296
Number of countries	73	73	73	63	70	61

Note: Fixed effects models are used. Estimations are done using robust standard errors. Standard errors in parenthesis below estimates. All regressions include a constant term. ***,**,*, refer to statistical significance at 1, 5, and 10 per cent levels respectively. "Total", "Current", "Invest", "Subsidy", "Consume", and "Benefits" refer to total expenditure, current expenditure, investment expenditure, expenditure on subsidies, consumption expenditure and, expenditure on social benefits respectively.

The results in column 6 of Table 2.1 indicate a negative relationship between an increase in the proportion of young population in the previous year and government consumption expenditure (a 0.777 per cent reduction).There is a negative relationship between an increase

in external debt stock and government consumption expenditure (a 0.0438 per cent reduction). As expected, government expenditure on social benefits increases with one percent increase in urbanization (by 3.416 per cent). I find a positive relationship between one percent increase in external debt stock and government expenditure on social benefits. I find that democracies have relatively higher levels of expenditure on social benefits compared with anocracies. Also, autocracies have higher expenditure on social benefits relative to anocracies.

Overall therefore, the results in this section may be summarized as follows. Foreign aid receipts is positively and significantly associated with total and investment expenditures but negatively and significantly related with government expenditure on subsidies. The relationship between demographic characteristics and ECOG measures of expenditure is spending-type specific. In particular, total population is positively and significantly related with government expenditure on subsidies but negatively and significantly related with expenditure om investment. An increasing share of old population reduces current expenditure but increases investment expenditure. An increasing share of young population is however associated with reduced current and consumption expenditure. Urbanization is associated with increased expenditure on total, current, consumption, and social benefits but reduced expenditure on subsidies. External debt stock is detrimental to both aggregate and most components of expenditure, except government expenditure on social benefits. The effects of globalization variables on government expenditure is however both globalization-variable and expenditure-type-specific. Both democracies and autocracies are associated with increased government expenditure on social benefits.

Functional classification-COFOG

The results for functional classificaion of expenditure are given in Table 2.2. The results show a negative relationship between an increase in the proportion of old population and government expenditure on pure public goods (a 0.58 per cent reduction). There is a positive relationship between an increase in urbanization and government expenditure on pure public goods (a 0.446 per cent increase). There is a positive relationship between one percent increase in inward FDI stock and government expenditure on pure public goods (0.0622 per cent increase), although the coefficient is statistically significant at 10 per cent level.

Government expenditure on economic services reduces with an increase in total population (a 1.525 per cent reduction). The results show that one percent increase in external debt is associated with a 0.241 per cent reduction in government expenditure on economic services.

Table 2.2: Estimated results for functional classification(COFOG)-fixed effects

VARIABLES	Total	Pure	Serve	Merit	Protect	Defence	Health	Educ
	2	3	4	5	6	7	8	9
GDP_{pc}	-0.013	0.002	0.017	0.048	0.100	-0.075	0.075	0.050
	(0.020)	(0.039)	(0.057)	(0.040)	(0.070)	(0.046)	(0.049)	(0.038)
Aid	0.032**	-0.001	0.037	0.012	-0.027	0.010	0.014	-0.004
	(0.014)	(0.019)	(0.031)	(0.021)	(0.060)	(0.051)	(0.027)	(0.018)
$Population$	-0.355	-0.366	-1.525**	-0.945**	0.153	-1.037***	-1.013*	-1.109***
	(0.221)	(0.243)	(0.639)	(0.377)	(0.693)	(0.204)	(0.596)	(0.240)
Old	-0.145	-0.581*	-0.643	0.509	0.402	-0.830**	-0.337	0.296
	(0.162)	(0.318)	(0.547)	(0.471)	(0.827)	(0.327)	(0.581)	(0.370)
$Young$	-0.118	-0.109	-0.945	0.271	0.967	0.539	-0.129	0.429
	(0.273)	(0.477)	(0.938)	(0.392)	(0.607)	(0.536)	(0.554)	(0.434)
$Urban$	0.406**	0.446*	0.592	-0.173	1.676	1.439***	-0.525	0.714***
	(0.181)	(0.266)	(0.573)	(0.461)	(1.041)	(0.411)	(0.316)	(0.250)
$Debt$	-0.049***	0.026	-0.241*	0.020	-0.292*	-0.043	-0.034	-0.072*
	(0.018)	(0.038)	(0.125)	(0.055)	(0.167)	(0.105)	(0.077)	(0.043)
$Openness$	-0.015	0.039	0.110	0.100*	0.087	-0.021	0.104	0.063**
	(0.044)	(0.032)	(0.080)	(0.053)	(0.081)	(0.037)	(0.087)	(0.030)
FDI_i	0.002	0.062*	-0.081	-0.150*	0.242	0.054	-0.012	-0.033
	(0.036)	(0.037)	(0.074)	(0.086)	(0.184)	(0.071)	(0.067)	(0.028)
FDI_o	-0.008	-0.018	-0.024	0.044**	0.124	-0.004	0.010	0.032**
	(0.006)	(0.017)	(0.024)	(0.022)	(0.077)	(0.019)	(0.019)	(0.013)
KOF	0.008	-0.004	-0.011	-0.021**	-0.014	-0.006	-0.032	-0.016**
	(0.006)	(0.005)	(0.023)	(0.009)	(0.014)	(0.010)	(0.019)	(0.006)
$Democracy$	0.046	-0.060	0.114	0.047	0.0851	-0.007	0.045	0.018
	(0.048)	(0.048)	(0.089)	(0.058)	(0.098)	(0.076)	(0.075)	(0.060)
$Autocracy$	-0.013	-0.001	0.038	0.057	-0.162	0.198*	0.130	0.100
	(0.034)	(0.053)	(0.282)	(0.067)	(0.179)	(0.105)	(0.105)	(0.065)
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	696	460	322	460	438	441	460	455
$R-squared$	0.271	0.218	0.325	0.351	0.343	0.213	0.287	0.355
Number of countries	73	57	48	57	55	56	57	57

Note: Fixed effects models are used. Estimations are done using robust standard errors. Standard errors in parenthesis below estimates. All regressions include a constant term. ***,**,*, refer to statistical significance at 1, 5, and 10 per cent levels respectively. "Serve" "Protect", and "Educ" refer to economic services, social protection and education respectively.

There is a negative relationship between an increase in total population and government expenditure on merit goods (a 0.945 per cent reduction). I find a negative relationship between an increase in inward FDI stock (-0.150 per cent), and the level of overall globalization (-0.0207 units) and government expenditure on merit goods, suggesting evidence of

efficiency hypothesis.

Government expenditure on social protection reduces by 0.292 per cent with one percent increase in external debt stock.

Rather puzzling, there is a negative relationship between increases in total population and the proportion of old population and defence expenditure. Government defence expenditure increases with an increase in urbanization. As expected, autocracies spend more on defence relative to anocracies.

One percent increase in total population is associated with a 1.013 per cent reduction in health expenditure. The results show a positive relationship between urbanization, trade openness, and outward FDI stock and government education expenditure. There is a negative relationship between total population and government education expenditure. The coefficient of the first period lag of external debt stock is negative for education expenditure. I find a negative relationship between an increase in the level of overall globalization and government expenditure on education.

Overall therefore, the results for COFOG expenditure measures can be summarised as follows. There is evidence of economies of scale, in that total population is negatively and significantly associated with government expenditures on services, merit goods, defence, health, and education. I also see some evidence of economies of scale for the share old population, in that the share of old population is negatively and significantly associated with government spending on pure public goods and defence. This confirms that additional spending on non-rival public goods decrease with increases in total and the share of old population. However, urbanization is positively and significantly associated with government expenditure on pure public goods, defence and education. That is, urbanization may be associated with increased congestion which leads to reduced efficiency and social welfare, and this may require increased government expenditure to restore equilibrium. External debt stock is negatively and significantly associated with government expenditure on economic services, social protection, and education. I see some evidence of compensation hypothesis for trade openness, inward FDI stock, and outward FDI stock in that: (i) trade openness is positively and significantly associated with merit goods and education expenditure; (ii) inward FDI stock is positively and significantly associated with pure public goods; and (iii) outward FDI stock has a positive relationship merit goods and education expenditure. I see evidence in support of the efficiency hypothesis: (i) there is a negative relationship between inward FDI stock and government spending on merit goods, and (ii) the KOF overall globalization index is negatively and significantly associated with government spending on merit goods and education. I see that autocracies are associated with relatively higher levels of defence expenditure.

2.5.2 Robustness check: components of expenditure as share of total expenditure

I move away from the 'traditional' measure of components of government expenditure (i.e. as share of GDP) and consider components of government expenditure as share of total

expenditure. I determine whether the explanatory power of the control variables for components of government expenditure remain the same with the change in the unit of measurement. Similar conclusion can be gleaned from other literature (see Mahdavi 2004; Lora and Olivera, 2007). In particular, Gemmell et al. (2008) indicates that measuring components of expenditure as shares of total expenditure maximizes the chances of finding statistically significant effects of the explanatory variables. I expect the results to be qualitatively similar with more statistically significant explanatory variables. The results for the ECOG and COFOG measures as share of total expenditure are given in Tables 1.3 and 1.4 respectively.

First, I confirm an increase in the number of statistically significant coefficients of the explanatory variables for ECOG (see Table 2.3). The results are however largely qualitatively similar, although there are some differences for current expenditure as share of total expenditure (old population and KOF index) and government consumption expenditure as share of total expenditure (foreign aid and external debt stock). Hence, it may not matter whether components of government expenditure are measured as shares of GDP or as shares of total expenditure.

Contrarily, relatively fewer explanatory variables show statistically significant results in the case of the functional classification of expenditure measured as shares of total expenditure. Here also, the results are qualitatively similar, with a few exceptions for government expenditure on pure public goods and government expenditure on defence.

Table 2.3: Estimated results for economic classification (ECOG) as share of total expenditure-fixed effects

VARIABLES	$Current_{sh}$	$Invest_{sh}$	$Subsidy_{sh}$	$Consume_{sh}$	$Benefits_{sh}$
	2	3	4	5	6
GDP_{pc}	-0.003	0.016	0.149*	0.006	0.049
	(0.010)	(0.051)	(0.081)	(0.017)	(0.048)
Aid	-0.014**	0.044	-0.126*	-0.025**	0.024
	(0.006)	(0.029)	(0.066)	(0.012)	(0.057)
$Population$	0.243*	-0.699**	2.405*	0.663***	0.492
	(0.124)	(0.325)	(1.430)	(0.235)	(0.565)
Old	-0.207***	0.756**	-1.281	0.007	-0.649
	(0.067)	(0.307)	(1.167)	(0.175)	(0.659)
$Young$	-0.478**	1.041**	-0.026	-0.684**	-0.375
	(0.201)	(0.479)	(1.871)	(0.330)	(0.883)
$Urban$	0.150	-0.146	-2.676**	0.111	2.937**
	(0.113)	(0.360)	(1.283)	(0.216)	(1.150)
$Debt$	0.056***	-0.113*	0.109	0.005	0.193**
	(0.021)	(0.057)	(0.460)	(0.018)	(0.0908)
$Openness$	-0.006	-0.079	1.640***	-0.003	-0.071
	(0.026)	(0.058)	(0.549)	(0.041)	(0.085)
FDI_i	0.031*	-0.252***	0.027	-0.015	0.087
	(0.017)	(0.053)	(0.238)	(0.029)	(0.219)
FDI_o	0.005	-0.012	-0.023	-0.005	-0.057**
	(0.004)	(0.016)	(0.036)	(0.009)	(0.025)
KOF	-0.004**	0.018**	-0.071**	-0.003	0.010
	(0.002)	(0.009)	(0.033)	(0.005)	(0.019)
$Democracy$	-0.010	-0.088	-0.468*	0.009	0.219
	(0.013)	(0.119)	(0.255)	(0.069)	(0.142)
$Autocracy$	-0.029	0.368	-0.139	0.034	0.280**
	(0.042)	(0.339)	(0.299)	(0.038)	(0.133)
Year dummy	Yes	Yes	Yes	Yes	Yes
Observations	696	688	507	669	507
$R-squared$	0.287	0.233	0.357	0.292	0.250
Number of countries	73	73	63	70	61

Note: Fixed effects models are used. Estimations are done using robust standard errors. Standard errors in parenthesis below estimates. All regressions include a constant term. ***,**,*, refer to statistical significance at 1, 5, and 10 per cent levels respectively. "$Current_{sh}$", "$Invest_{sh}$", "$Subsidy_{sh}$", "$Consume_{sh}$", and "$Benefits_{sh}$" refer current expenditure, investment expenditure, expenditure on subsidies, consumption expenditure and, expenditure on social benefits as share of total expenditure respectively.

Table 2.4: Estimated results for functional classification (COFOG) as share of total expenditure-fixed effects

VARIABLES	$Pure_{sh}$	$Merit_{sh}$	$Serve_{sh}$	$Protect_{sh}$	$Defence_{sh}$	$Health_{sh}$	$Educ_{sh}$
	2	3	4	5	6	7	8
GDP_{pc}	-0.040	0.028	0.016	0.100	-0.004	0.066**	0.032
	(0.032)	(0.044)	(0.051)	(0.061)	(0.038)	(0.031)	(0.028)
Aid	-0.007	-0.014	0.010	-0.027	-0.044	-0.018	0.004
	(0.015)	(0.013)	(0.027)	(0.049)	(0.062)	(0.027)	(0.013)
$Population$	0.430	-0.900*	-1.009	2.806***	-1.032	-1.134*	0.154
	(0.314)	(0.523)	(0.917)	(0.898)	(0.656)	(0.590)	(0.159)
Old	-0.562*	1.364**	-0.464	0.557	-0.145	1.216*	0.582*
	(0.325)	(0.583)	(0.568)	(0.784)	(0.561)	(0.666)	(0.314)
$Young$	-0.309	0.731*	-1.223	1.305	1.079	0.553	0.676**
	(0.427)	(0.431)	(0.857)	(0.788)	(0.677)	(0.464)	(0.272)
$Urban$	0.171	-0.277	0.331	1.171*	1.151**	-0.340	0.175
	(0.219)	(0.353)	(0.635)	(0.685)	(0.464)	(0.246)	(0.179)
$Debt$	0.074	0.041	-0.186*	-0.153	-0.063	-0.077	-0.002
	(0.047)	(0.053)	(0.096)	(0.127)	(0.128)	(0.074)	(0.041)
$Openness$	-0.047**	0.023	0.038	0.048*	-0.050*	-0.019	0.004
	(0.021)	(0.028)	(0.050)	(0.024)	(0.027)	(0.021)	(0.013)
FDI_i	0.091***	-0.149	-0.060	0.454**	0.107	0.060	0.032
	(0.027)	(0.106)	(0.069)	(0.212)	(0.067)	(0.063)	(0.031)
FDI_o	-0.026	0.072***	-0.020	-0.0002	0.032	0.0602**	0.0302**
	(0.018)	(0.025)	(0.025)	(0.041)	(0.024)	(0.025)	(0.013)
KOF	0.003	-0.012**	-0.007	0.001	-0.020	-0.018	-0.008
	(0.011)	(0.005)	(0.019)	(0.015)	(0.017)	(0.011)	(0.005)
$Democracy$	-0.055	0.073	0.040	-0.014	-0.097	0.111	0.057
	(0.049)	(0.063)	(0.071)	(0.082)	(0.112)	(0.078)	(0.038)
$Autocracy$	0.050	0.056	0.020	-0.162	0.235*	0.182***	0.123*
	(0.042)	(0.064)	(0.257)	(0.177)	(0.124)	(0.058)	(0.062)
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	325	325	267	308	315	325	320
$R-squared$	0.304	0.425	0.244	0.441	0.302	0.322	0.254
Number of countries	46	46	42	45	45	46	46

Note: Fixed effects models are used. Estimations are done using robust standard errors. Standard errors in parenthesis below estimates. All regressions include a constant term. ***,**,*, refer to statistical significance at 1, 5, and 10 per cent levels respectively. "$Serve_{sh}$", "$Protect_{sh}$", and "$Educ_{sh}$" refer to economic services, social protection and education as share of total expenditure respectively.

2.5.3 Complementary or substituting?-SURE estimates

I obtain results for four sets of components of expenditure measures based on the tiers of expenditures shown for the ECOG and COFOG classifications in Figures 2.1 and 2.2. These are: (i) current and investment; (ii) subsidies, consumption, and social benefits; (iii) pure public goods, merit goods, economic services, and social protection; as well as (iv) defence, health and education expenditures all as shares of GDP [14]. Our choice of independent variables in the SURE model is similar to those in equation (2.1), namely shares of young and old population, urbanization, Foreign Direct Investment (FDI), overall globalization, as well as dummies for democracy and autocracy. It is important to state that the matrices reported and discussed here are the estimates of the error variance matrix Σ defined in Section 2.3.2. In all cases, the Breusch and Pagan (1980) LM statistic confirm the validity of the correlation estimates obtained, that is the coefficients obtained are indeed independent.

The results in Table 2.5 show a complementary relationship between current and investment expenditure. I find a positive (0.1812) correlation between consumption and investment expenditures. This suggests increases in current expenditure is associated with corresponding increases in investment expenditure as share of GDP.

Table 2.5: Correlation matrix of SUR estimates for current and investment expenditure, as share of GDP

	Current	Investment
Current	1.0000	
Investment	0.1812	1.0000

Note: Breusch-Pagan test of independence 22.581 (0.0000)

The results in Table 2.6 confirms complementary relationship between expenditure on subsidies and consumption, expenditure on social benefits and subsidies, as well as expenditure on social benefits and consumption.

Table 2.6: Correlation matrix of SUR estimates for subsidies, consumption and social benefits, as share of GDP

	Subsidies	Consumption	Benefits
Subsidies	1.0000		
Consumption	0.1188	1.0000	
Benefits	0.0359	0.3922	1.0000

Note: Breusch-Pagan test of independence 75.642(0.0000)

In Table 2.7 I find complementary relationships between expenditure on merit and pure public goods, complementary relationship between expenditure on pure public goods and

[14] I find substituting relationships between expenditure types measured as shares of total expenditure in most cases. This however may seem more of a mechanical relationship and may be inevitable. For example, if spending on health goes up, and all other areas of spending remain unchanged, then the share of health will rise while the other shares will fall. Hence, I do not discuss the results as they do not provide much information about government spending choices.

economic services, as well as a complementary relationship between expenditure on merit goods and economic services. There is also a complementary relationship between expenditure on social protection and merit goods and a complementary relationship between expenditure on social protection and economic services. The correlation coefficients in the above cases are all positive. I however find a substituting relationship between expenditure on social protection and pure public goods as the correlation coefficient in this case is negative.

Table 2.7: Correlation matrix of SUR estimates for pure goods, merit goods, economic services, and social protection, as share of GDP

	Pure	Merit	Services	Protect
Pure	1.0000			
Merit	0.181	1.0000		
Services	0.2281	0.3076	1.0000	
Protect	-0.19	0.2462	0.1566	1

Note: Breusch-Pagan test of independence 93.513(0.0000)

The results for the correlation matrix for defence, health, and education expenditure are given in Table 2.8. There are complementary relationships between health and defence expenditures, and education and health expenditures as shown by the positive coefficient of the correlation matrix. The correlation coefficient for education and defence expenditures is however negative, implying a substituting relationship.

Table 2.8: Correlation matrix of SUR estimates for defence, health and education, as share of GDP

	Defence	Health	Education
Defence	1.0000		
Health	0.0282	1.0000	
Education	-0.1073	0.501	1.0000

Note: Breusch-Pagan test of independence 114.800(0.0000)

In sum, the correlation matrix provides positive correlation coefficients for most pairs of components of government expenditure suggesting evidence of complementary relationships. There is however a substituting relationship between expenditures on social protection and pure public goods, and education and defence since the correlation coefficient from the correlation matrix is negative. Evidence of complementary relationship for the respective pairs of expenditure type implies increases(decreases) in either of them may be associated with simultaneous increases(decreases) in the corresponding pair. Substituting however suggests for each pair of spending, a change in an expenditure type occurs at the expense of the corresponding pair of expenditure type.

2.6 Conclusion

In this paper, I examine the determinants of aggregate and components of expenditure, and the interrelationship between components of government expenditure. I measure components of government expenditure both as shares of GDP and as shares of total expenditure. The empirical evidence for aggregate expenditure shows foreign aid receipts and urbanization are positively and significantly associated with total government expenditure, but increases in external debt stock reduces total government expenditure. I find that demographic characteristics such as total population, share of young population, share of old population, and urbanization, which increase the heterogeneity of preferences are negatively associated with components of government expenditure (except government spending on subsidies), perhaps suggesting economies of scale effects on both aggregate and components of government size. There is simultaneous evidence of compensation and efficiency hypothesis; trade openness shows evidence of compensation hypothesis, the KOF overall index of globalisation shows evidence of efficiency hypothesis, but for the FDI variables, evidence for either of the two hypothesis varies according to the expenditure category. Government spending on social benefits is higher for both democracies and autocracies relative to anocracies. Not surprisingly, autocracies are associated with higher defence spending relative to anocracies. The effect of external debt stock however depends on the type of expenditure component in question. Significantly, the results obtained largely remains robust to measuring components of expenditure as share of total expenditure. Hence, in examining the determinants of components of government expenditure, it may not matter if components of government expenditure are measured as shares of GDP or as shares of total expenditure.

Turning to the interrelationship between components of government expenditure, the correlation matrix provides positive correlation coefficients for most pairs of components of government expenditure suggesting evidence of complementary relationships. There is however a substituting relationship between expenditures on social protection and pure public goods, and education and defence since the correlation coefficient from the correlation matrix is negative.

Notwithstanding the above, I acknowledge that there may be limitations in the use of annual observations in a pooled fixed effects estimations with some variables following a trend and some relatively time invariant. Further, it may be limiting to combine OECD and developing countries in a single regression framework as separating them may be ideal.

2.7 Appendix

Table A2.1: Summary statistics-expenditures

Variable	Obs	Mean	Std. Dev.	Min	Max
Total	2193	33.54826	11.8492	5.61727	65.18385
Current	2226	30.07577	12.80393	3.426025	63.844
Investment	2193	4.319748	3.590323	-7.03722	35.67666
Consumption	2408	14.34883	5.533754	2.203775	37.41827
Pure	1684	10.43029	6.480978	1.925588	190.5868
Merit	1684	9.099387	3.887769	0.3523194	17.74093
Economic services	1355	5.902248	2.954602	0.4357183	27.11101
Social Protection	1684	8.546338	7.085642	0	25.58009
Defence	1684	2.071825	4.192692	0	144.593
Health	1684	3.706636	2.3696	0	9.23027
Education	1684	4.42401	1.782599	0	10.75027
Wages and salaries	2422	8.752944	3.514294	0.4560935	18.54611
Goods and services	2415	5.614718	3.242625	0.649056	25.87346
Subsidies	2007	1.408237	1.409929	0	9.180821
Social benefits	1989	8.378565	7.361857	0	26.01253
Real GDP per capita	6243	13149.81	19618.06	4.397576	275265.7
Foreign aid	4499	56.13903	77.80095	-210.3844	816.6744
Population	6485	3.44e+07	1.26e+08	54670	1.39e+09
Population <15	6412	32.22467	10.87201	11.06062	51.88591
Population 65+	6412	7.02884	4.808392	0.75047	27.04858
Urbanization	6488	54.03892	23.48938	4.339	100
Debt stock	3637	67.96761	80.80172	0.2385863	1380.766
Trade openness	5711	83.3097	54.00852	0.0209992	619
Inward FDI	5680	39.64183	102.7301	2.56e-07	1810.289
Outward FDI	3957	39.64183	102.7301	1.19e-07	889.84
Overall globalization	5803	52.93795	16.34103	18.26765	90.6673
Polity2	5524	2.316618	7.085919	-10	10

Table A2.2: List of countries

Albania	Czech Republic	Jamaica	Peru
Argentina	**Germany**	Jordan	**Poland**
Armenia	**Denmark**	**Japan**	**Portugal**
Australia	Dominican Republic	Kazakhstan	Paraguay
Austria	**Spain**	**Korea, Rep.**	Russian Federation
Azerbaijan	Estonia	Lesotho	El Salvador
Belgium	**Finland**	Lithuania	Serbia
Bulgaria	**France**	**Luxembourg**	Slovak Republic
Bosnia and Herzegovina	**United Kingdom**	Latvia	Slovenia
Belarus	Georgia	Morocco	**Sweden**
Bolivia	**Greece**	Moldova	Thailand
Brazil	Honduras	**Mexico**	Tunisia
Canada	Croatia	Macedonia, FYR	**Turkey**
Switzerland	**Hungary**	Malta	Ukraine
Chile	India	Mongolia	**United States**
Congo Rep.	**Ireland**	Mauritius	South Africa
Colombia	Iran, Islamic Rep.	Malaysia	
Cabo Verde	**Iceland**	**Netherlands**	
Costa Rica	**Israel**	**Norway**	
Cyprus	**Italy**	**New Zealand**	

Note: OECD countries are in bold.

Chapter 3

Globalisation and Government Spending: Evidence for the 'Hyper-Globalisation' of the 1990s and 2000s

In this paper, we provide an up-to-date empirical assessment of the relationship between economic globalisation and government spending for the 'hyper-globalisation' period of the 1990s and 2000s. We use data on government consumption spending as well as more disaggregated spending components (e.g. social welfare). We also use a range of globalisation measures, including the most recent version of the KOF globalisation index, and a combination of econometric methods, including fixed effects, Generalised Methods of Moments (GMM) and dynamic ordinary least squares (DOLS) estimation. The results suggest that hyper-globalisation has had divergent and conflicting effects on consumption spending: while the globalisation of trade has tended to raise spending, the globalisation of finance and foreign investment has tended to reduce it. However, the size of the effects is quite small, and there is no evidence that spending has risen by more in countries which are particularly prone to terms of trade shocks.

*This paper is co-authored with Edward Anderson. I would like to thank participants of the internal seminar at the University of East Anglia in general and Christa Brunnschweiler in specific for useful comments. All remaining errors are my own.

3.1 Introduction

The 1990s and 2000s were a period of 'hyper-globalisation' (Subramanian and Kessler 2013), marked by particularly rapid rises in international trade and capital flows.[1]. According to many observers, this had a number of benefits, not least much faster rates of convergence across the developing world, particularly from the late 1990s onward (ibid; see also Abiad et al 2015, Bourguignon 2015). Nonetheless, the failure to manage some of the downsides of globalisation has, it is argued, contributed to a growing political backlash against globalisation since the early 2000s (e.g. Rodrik 2018, Stiglitz 2018). This has in turn threatened to undermine the benefits of globalisation, through a return to trade protectionism and economic nationalism.

Changes in the level and composition of government spending are one key way in which governments can manage the process of globalisation. According to the 'compensation hypothesis' (Rodrik 1998, Garrett 1998), governments respond to globalisation by increasing spending, either as a way of compensating the adversely affected (e.g. workers in import-competing sectors), or, more generally, as a means of offsetting the volatility and insecurity resulting from greater exposure to global markets. According to the 'efficiency hypothesis' however, globalisation also puts pressure on governments to reduce spending, due for example to a reduction in tax revenues resulting from global competition to attract and retain mobile capital (Garrett 1998, Gemmell et al 2008). These pressures, which arguably became particularly acute during the 1990s and 2000s, due to higher levels of international capital mobility, may have prevented governments from providing the compensation required to make 'hyper-globalisation' politically sustainable. It is worth noting that this Chapter is an extension of Chapter 2. Our choice of data source for consumption spending provides us with both an increased number of countries and two additional years of data in our sample.

Some prima facie evidence in support of this view can be found in the fact that the rapid rise in international trade and capital mobility during the 1990s and 2000s coincided with an aggregate decline in government spending as a share of GDP (Garett 1998; see also Section 5 below). However, simple comparisons of aggregate trends should be treated with caution. In this paper therefore we provide a detailed empirical assessment of the relationship between globalisation and government spending for the 1990s and 2000s. Two main questions motivate our analysis, namely (i) whether there is any robust evidence of a negative relationship between measures of economic globalisation and government spending during the 1990s and 2000s, which could help explain the emerging political backlash against globalisation since the early 2000s; and (ii) whether any evidence of a negative relationships is stronger for measures of 'financial globalisation', reflecting the growing international mobility of capital and finance, as opposed to measures of 'trade globalisation', reflecting the international mobility of goods and services. We also explore the extent to which the size or direction of this relationship varies across countries, e.g. between countries more or less

[1]The 1990s and 2000s have also been referred to as the period of 'high globalisation' (Milanovic 2016), and 'New Globalisation' (Baldwin 2016: 79): roughly speaking, the period beginning with the fall of the Berlin Wall and ending with the start of the global financial crisis. Further details on trends in trade and capital flows in this period are provided in Section 5 below.

exposed to external volatility, as implied by the compensation hypothesis. Although there is now a substantial empirical literature on the globalisation-spending relationship, reviewed further below, we are not aware of any studies focusing specifically on the 1990s and 2000s that use a wide range of government spending and globalisation measures.

We use data on government final consumption expenditure for 1990-2014 from the latest edition of the Penn World Tables (version 9.0), and data for a range of globalisation measures, including the most recent version of the KOF globalisation index (Gygli et al 2018), as well as more commonly-used measures (e.g. trade openness, FDI stocks, capital account liberalisation index). We also use the IMF Government Financial Statistics (GFS) database to assemble a new dataset on government spending for 169 OECD and non-OECD countries over the period 1990-2016, disaggregated by both economic and functional classifications of expenditure. [2] This makes our study the first of which we are aware to study the relationship between globalisation and detailed sub-categories of spending (e.g. social welfare) in the 2000s. In terms of econometric methods, we use a combination of fixed effects, Generalised Method of Moments (GMM), and dynamic ordinary least squares (DOLS).

To give a flavour of the results, we find that the 'hyper-globalisation' of the 1990s and 2000s has had divergent and conflicting effects on government spending. While trade globalisation has tended to raise consumption spending, consistent with the compensation hypothesis, financial globalisation has tended to reduce it, consistent with the efficiency hypothesis. Nevertheless, the size of these effects is quite small; furthermore, there is no evidence that consumption spending has risen by more in countries which are particularly prone to external trade risk (as measured by the product concentration of exports) and which for that reason need compensation most.

The remainder of the paper is structured as follows. The next section is devoted to reviewing the most recent evidence on the relationship between globalisation and government spending. We discuss methodology and data in sections 3 and 4 respectively. We then provide some initial exploratory analysis in section 5, before turning to the main results in section 6. Finally, we present some additional results and robustness tests in section 7, before turning to conclusions and policy recommendations in section 8.

3.2 Literature Review

In a seminal contribution on the topic, Rodrik (1998) found strong evidence of a robust positive relationship between openness to trade and government spending, which applied to almost all categories of spending (the one exception being interest payments), and was evident among both developed and developing countries. Other studies have found a mixed picture however. Gemmell et al (2008) reviewed 19 studies published between 1995 and 2006, and found that the number finding a positive relationship between openness to trade or capital flows and government spending was broadly balanced by a similar number of

[2] Our dataset is freely available for other researchers to use, and is available on request from the authors. We have data for slightly more countries for the economic as opposed to functional classification of expenditure (164 compared to 139; we have data for both classifications for 138 countries).

studies finding a negative relationship (ibid: 156).[3] In this section, we update the results of Gemmell et al (2008), by briefly reviewing the results of 13 empirical studies published since 2006.

Basic details about each study are contained in Table 3.1. In terms of the results, we find a relatively mixed picture, similar to the findings of Gemmell et al (2008). Turning first to consumption spending, three studies find a consistently positive and statistically significant relationship with trade openness: Epifani and Gancia (2009), Ram (2009) and Shonchoy (2016). However, Benarroch and Pandey (2008, 2012) find no evidence of a statistically significant relationship, while Jetter and Parmeter (2015) find that the results vary depending on the data used: strong evidence of a positive relationship when using PWT 6.1 data, but much less evidence when using PWT 7.1, and no evidence when using PWT 8.0 (if anything, a negative relationship). In terms of the other globalisation measures, Kimakova (2009) finds a positive relationship between consumption spending and private capital flows, while Ashraf et al (2017) find a similar relationship with inward 'greenfield' FDI. However, Meinhard and Potrafke (2012) find no evidence of a significant relationship between consumption spending and the KOF index of economic globalisation (which includes openness to trade and capital flows), although they do find a positive and statistically significant relationship for both social and political globalisation.

The results for other spending measures are also mixed. For total spending, Shelton (2007) finds evidence of a positive relationship with trade openness, but Gemmell et al (2008) and Benarroch and Pandey (2012) find no evidence of a relationship, while Liberati (2007) finds a negative relationship with openness to trade and capital flows. Kim et al (2018) find evidence of a positive relationship with the KOF 'trade globalisation' sub-index, but a negative relationship with the financial, social and political sub-indices. When disaggregating spending, Epifani and Gancia (2009) find no consistent evidence of a relationship between trade openness and social security and welfare spending. Benarroch and Pandey (2012) find evidence of a positive relationship between trade openness and education, defence and housing spending among LICs, while Shelton (2007) finds some evidence of a positive relationship between trade openness and education, defence and transport spending. For all other categories of spending however, these studies find no evidence of a significant relationship with trade openness [4]. Gemmell et al (2008) also find very little evidence of a relationship between trade openness and disaggregated government spending. However, they do find evidence that the stock of inward FDI significantly increases social welfare, health and general public spending, while it significantly reduces spending on transport, housing, education and economic services.

Finally, there are again mixed results as to whether the positive relationship between trade openness and government spending is stronger among countries which are more exposed to external risk, as implied by the compensation hypothesis. Rodrik (1998) found positive and statistically significant interaction terms between trade openness and two mea-

[3] All of the studies reviewed by Gemmell et al (2008) use data up to the late 1990s at the latest.

[4] Shelton (2007) also disaggregates spending according to the IMF economic classification, and finds some evidence that trade openness increases spending on social transfers, most strongly for OECD countries.

sures of external risk: the terms of trade volatility and the product concentration of exports. Benarroch and Pandey (2008) also found a positive and significant interaction term between trade openness and terms of trade volatility. However, Epifani and Gancia (2009) find that interaction terms between trade openness and measures of external risk are typically insignificant or negative, contrary to the compensation hypothesis [5].

To summarise, there remains a wide range of empirical results in the literature, with as yet no apparent consensus. Similar to Gemmell et al (2008), we find that the number of studies finding a positive relationship between measures of globalisation and government spending is roughly balanced by the number of studies not finding a relationship. It is worth noting, however, that there is very little evidence specifically examining the hyperglobalisation period of the 1990s and 2000s, when international trade and capital flows grew particularly rapidly (see below). The one exception is Meinhard and Potrafke (2012), who test whether the relationship between KOF globalisation indices and consumption spending differs between the periods 1970-89 and 1990-2004. However, these authors do not distinguish between the trade and financial components of the KOF economic globalisation index, which were found by Kim et al (2018) to have quite different effects. This paper therefore adds to the existing evidence by focusing specifically on the 1990s and 2000s, while at the same time disaggregating between the trade and financial components of economic globalisation.

Table 3.1 Literature review: cross-country econometric published since 2006.

Study	Country sample	Time period	Econometric method	Spending measure (source)	Globalisation measure (source)	Main results*
Liberati (2007)	20 OECD countries	1970-2003	OLS, fixed effects, random effects, dynamic panel (Arrelano-Bond)	Total spending; total spending excl. interest and defence spending; health, education and social protection spending	Trade openness, FDI, portfolio capital flows (IMF)	-
Shelton (2007)	100 countries	1970-2000 (5-year periods)	Random effects	Total spending, spending by economic classification and by function (IMF).	Trade openness (PWT 6.1).	+
Benarroch and Pandey (2008)	96 countries	1970-2000 (5-year periods)	Fixed effects	Consumption spending (PWT 6.1).	Trade openness (PWT 6.1).	0
Gemmell et al (2008)	25 OECD countries	1980-1997 (annual)	OLS, fixed effects (two-way), error correction model	Total spending, spending by function (OECD, IMF)	Trade openness, FDI stocks (UNCTAD)	Total spending: 0 (trade openness); +/0 (FDI)
Epifani and Gancia (2009)	143 countries	1950-2000 (5-year periods)	OLS, fixed effects	Consumption spending (PWT 6.1); social welfare spending	Trade openness (PWT 6.1)	+ (consumption spending) 0 (social welfare spending)
Kimakova (2009)	87 countries	1980-1999 (4-year periods)	Random effects, fixed effects, dynamic panel (Arrelano-Bond)	Consumption spending (PWT 6.1).	Trade openness (PWT 6.1); gross private capital flows	+ (trade openness) + (capital flows)
Ram (2009)	154 countries	1960-2000 (annual, 5 and 10-year periods)	OLS, fixed effects (two-way)	Consumption spending (PWT 6.1).	Trade openness (PWT 6.1).	+
Benarroch and Pandey (2012)	119 countries	1972-2000 (5-year periods)	Fixed effects (two-way)	Consumption spending (PWT 6.3). Total spending, spending by function (Easterly 2001).	Trade openness (PWT 6.3); financial openness (gross stocks of external liabilities)	0
Meinhard and Potrafke (2012)	186 countries	1970-2004 (5-year periods)	Fixed effects (two-way)	Consumption spending (PWT 6.2)	KOF Globalisation index, aggregate and by component	+ (aggregate, social and political globalisation) 0 (economic globalisation)
Jetter and Parmeter (2015)	Varies, but generally over 100	1960-2010 (annual, 5 and 10-year periods)	Fixed effects (two-way)	Consumption spending (PWT 6.1,7.1,8.0)	Trade openness (PWT 6.1,7.1,8.0)	+ (PWT 6.1) +/0 (PWT 7.1) 0/- (PWT 8.0)
Shonchoy (2016)	97 developing countries	1984-2004 (annual, 3-year periods)	Random effects, FGLS	Consumption spending (WDI).	Trade openness (WDI).	+
Ashraf et al (2017)	130 countries, developed and developing	2003-2011 (annual)	Fixed effects (two-way)	Consumption spending (WDI)	FDI flows, total and disaggregated (UNCTAD)	+ (Greenfield FDI) 0 (M&A FDI)
Kim et al (2018)	53 OECD and non-OECD countries	1980-2011 (annual)	Fixed effects, DOLS, FMOLS	Total spending (WDI,OECD,IMF)	KOF Globalisation index, aggregate and by component	+ (trade globalisation), - (financial globalisation)

Notes: All spending and globalisation measures are expressed as a share of GDP; we do not include studies looking at the composition of government spending (e.g. Dreher et al 2008). * + indicates a positive and statistically significant relationship, - a negative and statistically significant relationship; 0 indicates no statistically significant relationship; / implies that results vary.

[5] Epifani and Gancia (2009) instead find that the relationship is stronger among countries which export relatively more differentiated goods, which, they argue, reduces the domestic cost of taxation.

3.3 Methodology

3.3.1 Panel Fixed Effect Model Specification

We examine the relationship between globalisation and government spending using the following basic equation as a starting point:

$$Expenditure_{it} = \alpha + \beta Glob_{it} + \rho X_{it} + \gamma Year_t + \mu_i + \epsilon_{it} \tag{3.1}$$

where $Expenditure$ is a vector of government spending variables, i and t represent country and year respectively. We estimate this model using annual data, although we also repeat the estimations using 5-year averages as a robustness test. $Glob$ refers to a vector of globalization variables, and X represents control variables. Year dummy, country dummy and the error term are given as $Year$, μ and ϵ respectively. A positive and statistically significant coefficient on the globalization indices implies evidence of the compensation hypothesis while a negative and statistically significant coefficient suggests evidence of the efficiency hypothesis. For the main results, all variables are measured in the natural logarithm form, with the exception of the KOF globalisation indices (see below).

We make use of three empirical methods: two-way fixed effects, panel dynamic ordinary least squares (DOLS), and Generalized Method of Moments (GMM). The two-way fixed effects model helps account for possible biases due to omitted country-specific and time-invariant factors. There are however three main challenges with the typical two-way fixed effects estimator in our case, namely: (i) cross-sectional dependence, (ii) persistence in the dependent variable, and (iii) contemporaneous endogeneity. Cross-sectional dependence is possible in any panel data as panel groups (countries in our case) are independent, heterogeneous, and susceptible to shocks from each other. We account for cross-sectional dependence by using two-way fixed effects estimator with Driscoll-Kraay standard errors (DK-SE, see Driscoll and Kraay, 1998) [6]. DK-SEs are heteroscedasticity consistent and robust to general forms of temporal and cross-sectional dependence, and especially relevant in our case with smaller time dimension. Further, government spending is likely to be persistent: (a) current levels of spending are likely to be dependent on previous levels of spending, (b) a government spending item (e.g. spending on infrastructure) may be spread over more than one period. To account for such persistence in the dependent variables, we make use of dynamic estimation methods that include the lag of the dependent variable as an explanatory term, namely the panel dynamic ordinary least squares (DOLS) and the system-GMM estimation approaches. [7] Lastly, equation (1) assumes that globalisation is

[6] Using the typical two-way fixed effect estimator, we find evidence of cross-sectional dependence using the Pesaran LM tests (Pesaran, 2004).

[7] We use the Kao and Chiang (2000) Dynamic Ordinary Least Squares (DOLS) for cointegrated panel data with homogeneous long-run covariance structure across cross-sectional units (STATA command xtdolshm). It is appropriate for panels with cointegrated I(1) variables. We note that the popular Pedroni (2001) estimator is not appropriate in our case as our explanatory variables exceed 7. The linear dynamic panel-data estimation using maximum likelihood and structural equation modelling approach is inappropriate in our case as $T > 10$ (see Williams et al., 2018). In particular, we note that the coefficient of the lagged dependent variable is

exogenous. However, we are aware of the possible existence of contemporaneous endogeneity for globalization and address this using a GMM estimator with the lags of the variables as instruments (see also Liberati, 2007; and Kimakova, 2009).

We note the following about our econometric approaches. First, we examine the stationarity properties of our panel dataset in order to avoid obtaining spurious regressions. We use the Fisher ADF and the Fisher PP unit root tests. The Fisher-type tests are appropriate in our case as they do not require strongly balanced data and allow the individual series to have gaps. The unit root test results (Table A3.5) suggest that all variables are integrated of order one. Second, we test for cointegration using the Kao (1999) cointegration test technique, which assumes a homogenous cointegrating vector across all panels. There is evidence of a valid cointegration relationship in all cases as shown by the test statistics (see Table A3.4). Third, for the system-GMM, we adopt three specification tests to determine the validity of the instruments used, as invalid instruments render the system-GMM estimator inconsistent. In particular, we test for over-identification using the Hansen test and the difference-in-Hansen test, which determine whether the full set of instruments used, and the additional instruments used in the levels equations are valid. For both over-identification tests, we do not reject the null hypothesis of no over-identification. The third test of validity is the Arellano-Bond AR(2) test for serial correlation which examines second-order serial correlation in the first-differenced error term, with a null of the absence of second-order serial correlation. Here also, the results for the three specification tests considered fail to reject the null hypothesis in all cases, implying the instruments used are appropriate and valid, the model is correctly specified, the errors do not follow a moving average process, and the regression results obtained are consistent, reliable and valid. Finally, to avoid instruments proliferation in the system-GMM estimation, we limit our lags to one (1), ensuring that our instruments are less than the number of countries in our panel (see Roodman, 2009a; Roodman 2009b; and Benarroch and Pandey, 2012).

3.4 Data

In this section, we describe the variables used in the analysis and sources of data. A full list of all variables and definitions, together with the descriptive statistics for each variable, and the correlation matrix, is provided in the Appendix (Tables A3.1-A3.3). In particular, Table A3.2 provides detailed description of how the variables are measured and the data sources.

3.4.1 Government spending

The compensation hypothesis suggests that the relationship between globalisation and government spending should be strongest for spending in two areas: consumption spending and (particularly in OECD countries) social welfare spending.[8] We concentrate on consumption

statistically significant in all cases across different estimations, confirming our argument of persistence in the dependent variable.

[8]That is,"If government spending played a risk-mitigating role, we would expect to see this primarily reflected in income transfer programs and in social security and welfare spending. In most developing countries,

spending in our main results (Section 5); we then consider social welfare spending, alongside other disaggregated measures of spending in our additional results (Section 6). We proxy consumption spending by the Penn World Table (PWT) government final consumption expenditure measure given its advantage over other measures (see Rodrik, 1998; pp. 1001). With regard to the social welfare spending data, we use and report the results for the IMF ECOG classification ('social benefits')[9]. All spending variables are measured as share of GDP. The PWT data is available for a larger number of countries compared with the IMF and World Bank data. The PWT has reduced biases with respect to cross-country differences in the relative price of government purchases. A weakness with the PWT dataset however seems to be that same variables may differ significantly across versions of the Penn World Tables with changes in the benchmarked prices (see Breton 2012; Johnson et al., 2013; and Jetter and Parmeter, 2015). Moreover, while PWT only includes data for consumption spending, the IMF and World Bank datasets provide us with more disaggregated measures of government spending.

Moreover, given that globalisation may generate pressures for governments to spend more in certain areas, (e.g."productive investment": infrastructure etc. to attract mobile capital; see Gemmell, et al. 2008), we consider other categories of spending. We follow Oxley and Martin (1991) and categorise spending into pure public goods (general public services plus defence plus public order and safety spending), merit goods (housing and community amenities plus health plus education spending), as well as economic services (economic affairs plus environment protection plus recreation, culture and religion spending).

3.4.2 Globalisation

We use a range of measures to capture the different aspects of a country's openness that may affect government spending. The first is the KOF Globalisation Index.[10] This is a composite index, which spans three different dimensions of globalisation (economic, social, and political). We focus on the sub-indices for 'trade globalisation' and 'financial globalisation' (subcategories of the economic dimension), which are designed to measure countries' openness to international trade and capital flows respectively. According to the compensation hypothesis, greater exposure to international trade implies higher external exposure to external risk and volatility, which in turn generates demands for higher spending. By contrast, greater exposure to international capital flows implies greater pressure on governments to reduce spending, due to lower tax revenues (as suggested by the efficiency hypothesis). Since theory suggests that they may have different effects on spending, we include them separately

income transfer schemes tend to be rudimentary for reasons of administrative capacity. Consequently, their governments tend to rely on public employment, in-kind transfers, and public-works programs— all of which show up in government consumption—in order to broaden safety nets. But in advanced countries with social welfare programs in place, it should be primarily spending on social security and welfare that is correlated with exposure to external risk, not government consumption." (Rodrik 1998: 1019).

[9]This measure of social welfare spending is highly correlated with the alternative IMF COFOG classification ('social protection'); the correlation coefficient is 0.957 in the full sample. Hence, their regression estimates tend to show qualitatively similar results; we report in the text any substantive differences.

[10]The original KOF index was produced by Dreher (2006). The latest version is Gygli et al (2018); this includes data for over 200 countries between 1970 and 2015.

in our regressions. They are also not that highly correlated: the correlation coefficient is approximately 0.68 in the full sample.

There are fewer grounds in theory for expecting that the other dimensions of globalisation included in the KOF index will affect spending; nonetheless, we still include these as control variables (see Section 4.3 below). We also test separately for the effects of the 'de-facto' trade and financial globalisation indices, which reflect actual flows of goods and services or capital that cross national borders, and 'de-jure' indices, which reflect the extent of government policies that, in principle, either restrict or enable these flows. These are again not that highly correlated: the correlation coefficient is just 0.29 between the de facto and de-jure trade globalisation indices, and 0.44 between the de facto and de jure financial globalisation indices (Appendix Table A3.3). We also use three separate indicators of economic globalisation widely used in the literature, namely the ratio of trade to GDP ('trade openness'), from the PWT, the ratio of inward and outward stocks of FDI to GDP (from UNCTAD), and the Chinn-Ito index of capital account liberalisation (Chinn & Ito 2006).

3.4.3 Controls

Baseline controls

We refer to the control variables in our main results as our baseline controls. These are real GDP per capita, dependency ratio, urbanization, total population, as well as price ratio.

The Penn World Tables (PWT 9.0) provides data on expenditure-side real GDP at chained PPPs and price ratio. We therefore obtain real GDP per capita by dividing the PWT real GDP measure by total population from PWT (for consistency), as in Gemmell et al. (2008) and Benarroch and Pandey (2012). Following Musgrave's (1969) interpretation of Wagner's Law (Wagner, 1893), increases in the levels of GDP per capita are expected to lead to increases in government expenditure as a share of GDP, hence, we expect a positive relationship between real GDP per capita and government consumption spending as a share of GDP. Price ratio from PWT is the ratio of the price level of government consumption to the price level of household consumption. It is a measure of the relative public sector and private sector prices, and an appropriate control for changes in relative prices over time (Gemmell et al. 1999). However, its effect on spending may be positive or negative.

Data on dependency, urbanization, and total population are obtained from the World Bank, World Development Indicators dataset (WDI, 2018). We follow similar studies and use these variables as controls [11]. We measure dependency as the sum of the population in the ages 0-14 years and the population in the ages 65+ as a percentage of the total population. An increase in dependency ratio will likely be associated with an increase in demand for higher government consumption spending (since dependents are usually economically inactive and are likely to be reliant on government consumption spending). Hence, we expect a positive relationship between consumption spending and dependency ratio. We measure urbanization as the urban population as a percentage of total population. We expect

[11] Dependency- Rodrik (1998) and Benarroch and Pandey (2008); urbanisation- Rodrik (1998) and Benarroch and Pandey (2012); and total population- Shelton (2007).

government spending on consumption to increase with an increase in urbanization. The argument here is simple: an increase in urbanization may create congestion, which is likely to lead to a reduction in the welfare of the citizenry. Such welfare loss may need to be compensated for by increased government spending. Notwithstanding, additional spending on non-rival public goods such as roads and street lighting may decrease with increasing urbanization due to economies of scale. With regard to total population, Alesina and Wacziarg (1998) indicate that countries with large population are associated with small government consumption spending as a share of GDP for varying reasons. First, the per capita cost of providing non-rival goods is lower for larger populations (larger economies of scale,see Rodrik, 1998; and Jetter and Parmeter, 2015). In addition, preferences over the provision of public goods are more heterogeneous in larger populations. The net effect therefore depends on the trade-off between the costs associated with greater heterogeneity in preferences and the benefits due to lower per capita cost in public goods provision, although the latter may outweigh the former (see Shelton, 2007). Hence, total population may have a positive or negative effect on spending (Alesina and Wacziarg, 1998; and Rodrik, 1998).

Additional controls

Our robustness test includes introducing additional controls in equation (1) to check if the estimates of the globalisation variables remain consistent in the sign and direction of their effects. These additional controls are in two forms: (a) two measures of potential sources of additional revenue for governments (i.e. external debt stock and foreign aid), and (ii) a measure of institutional quality (polity2).

We obtain data on external debt stock and foreign aid receipts from WDI (2018). External debt stock is external debt stock as a percentage of gross national income, and foreign aid is the net official development assistance (ODA) receipts as a percentage of gross national income (GNI).The idea is that, in the face of limited resources, governments may find external debt (true for both developed and developing countries) and foreign aid (especially true for developing countries) appropriate sources of external inflows to augment domestic revenue shortfalls to finance government activities. Hence, government consumption spending may increase with increases in both external debt stock and foreign aid inflows. However, in the case of foreign aid, while flypaper effects argue that increases in foreign aid receipts lead to more than proportionate increases in consumption spending, aid fungibility arguments suggest increases in foreign aid receipts will be associated with less that proportionate increases in spending, or rather a redistribution of spending. Rodrik (1998) controls for external debt stock while Shonchoy (2016) controls for foreign aid receipts.

We adopt the Polity2 index from the PolityIV project (Marshall and Jaggers, 2014) as a measure of political regime strength. Although other studies generate democracy and autocracy measures from this index (see Shonchoy, 2016), we consider the distinction between democracy and autocracy less relevant in our case since most of the countries in our sample were democratic in the period of our study. We examine the influence of the existing political regime strength on government spending. The argument here is that, government spending is likely to vary over a spectrum of political regime strength. Polity2 provides

a political regime strength spectrum that ranges from hereditary monarchy to consolidated democracy.

Interaction terms

To examine whether there is any evidence that the size or direction of the relationship between globalization and spending varies between advanced countries (OECD countries here) and developing countries (non-OECD countries here), we introduce an interaction term between the globalization variables and a dummy variable for OECD. We consider OECD countries that existed at the start of the period (i.e. OECD countries in 1990). Our interaction term is similar to Shelton (2007).

We test whether the size or direction of the effect of globalization varies between countries more exposed to external risks. We measure a country's external risk by an interaction between the globalization variable and the export concentration index. The export concentration (or diversification) index is from the WITS Trade Data. For the missing years, we complement the data by its related measure from the UNCTAD, the concentration index or Hirschman (H) index. It is a measure of the extent to which a country's exports are concentrated (based on a single or few goods) or diversified (based on a lot more goods). It gives an indication as to whether a large share of a country's exports is accounted for by a small number of commodities or vice versa. The index ranges between zero for a country with no exports to 1 for a country with a single export commodity. Therefore, the lower the index, the less concentrated (hence more diversified) are a country's exports. Countries that export only a few commodities are more exposed to external risk – in particular, to changes in the prices of those commodities on world markets – than countries which export a wide range of commodities. Hence, countries with lower export concentration index face lower external risk while countries with high concentration index face higher levels of external risk.

3.4.4 Sample sizes

Due to missing observations for some of our control variables, the sample used for main estimations is between 101 and 169 countries, covering the period 1990-2017. There are up to 25 OECD countries and 144 non-OECD countries. We consider OECD countries at the start of 1990. The sample therefore includes both developed and developing countries. Our estimations exclude observations for which population is less than 500,000 people, trade openness values exceeding 500 percent of GDP, negative trade openness values, FDI stocks exceeding 1000 percent of GDP, as well as observations with negative government expenditure values. The advantage of such exclusions is to ensure outliers do not drive our results.

3.5 Exploratory analysis

Prior to the formal econometric analysis we carry out some exploratory analysis of the data. We first discuss aggregate trends in globalisation and government spending over time;

we then look at trends at the country level, using simple bivariate correlations to establish whether there is any prima facie evidence of the compensation or efficiency hypothesis during the 1990s and 2000s.

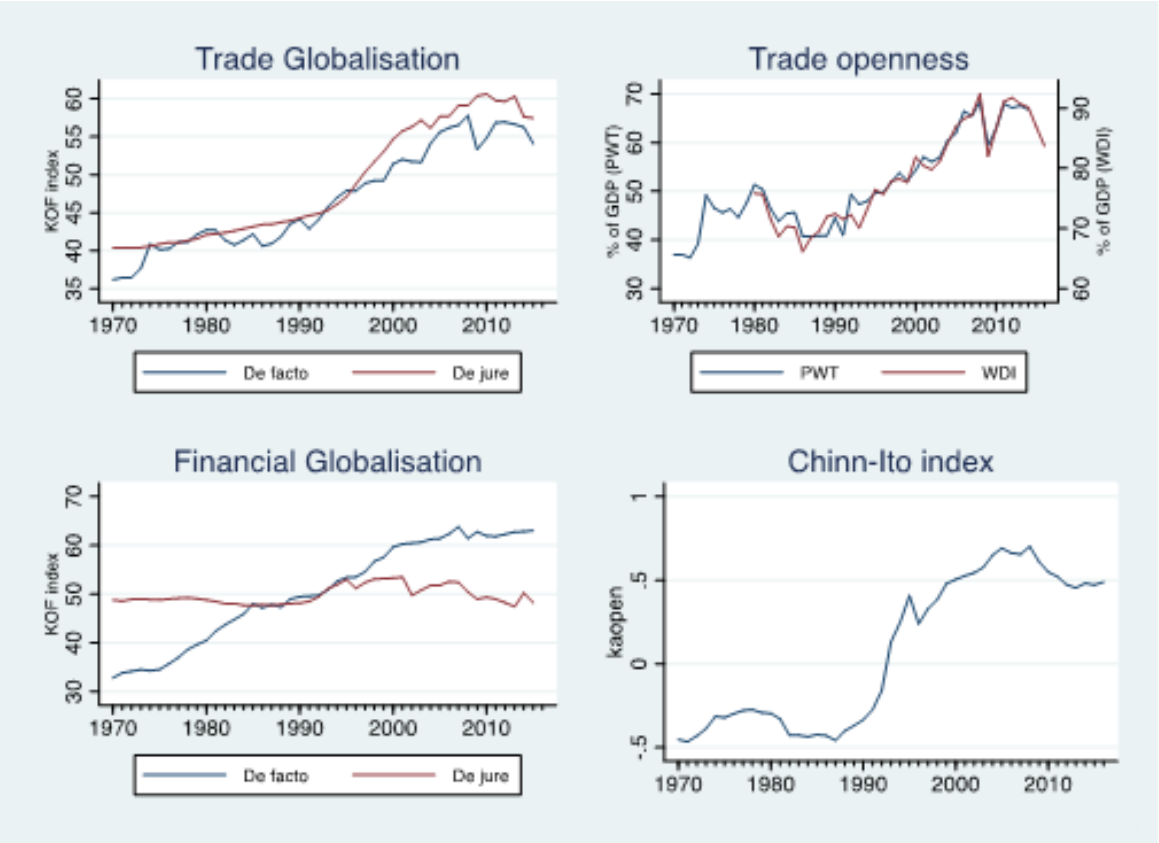
Figure 3.1 shows trends in a range of measures of economic globalisation since 1970. We plot the (unweighted) mean value of each measure over time, for a constant sample of countries. The evidence confirms that the 1990s and 2000s were indeed marked by particularly rapid rises in international trade and capital mobility. The KOF trade globalisation indices (both *de facto* and *de jure*) rose gradually during the 1970s and 1980s and then accelerated in the early to mid-1990s, reaching a peak around the time of the global financial crisis in 2008. Similar patterns are observed in the trade openness measure, and in the Chinn-Ito index of capital mobility, which both rose rapidly during the 1990s, again reaching a peak in the late 2000s. The one exception is the KOF indices of financial globalisation, which show either a relatively constant increase until the early 2000s before slowing down in the mid-2000s (*de facto*), or no trend at all (*de jure*). However, if we disaggregate these indices between OECD and non-OECD countries, we do see a clear acceleration of financial globalisation in the 1990s for non-OECD countries; among OECD countries, the acceleration began slightly earlier, in the 1980s, and reached a peak by the mid-1990s [12].

Figure 3.2 shows trends in government spending since 1970. Here we plot the annual (unweighted) mean value of government consumption spending as a share of GDP, taken from two different sources (the PWT and the WDI), for a constant sample of countries in each case. Here, the overall pattern is almost the reverse of Figure 3.1: spending rises as a share of GDP during the 1970s and early 1980s, before falling substantially during the late 1980s and 1990s, and then stabilising and recovering slightly during the 2000s. Note that the WDI measure of spending appears to start rising slightly earlier than the PWT measure, although the magnitude of changes over the period is smaller than for the PWT measure. If we disaggregate between OECD and non-OECD countries, the trends are very similar in the 1970s and 1980s, but spending stabilised and began rising again from the late 1990s among OECD countries, as opposed to the mid to late 2000s among non-OECD countries [13].

[12] For the KOF trade globalisation indices and trade openness, the acceleration in the 1990s also mainly reflects trends in non-OECD countries; among OECD countries, the rise is more constant over time, with some evidence of an acceleration only in the 2000s.

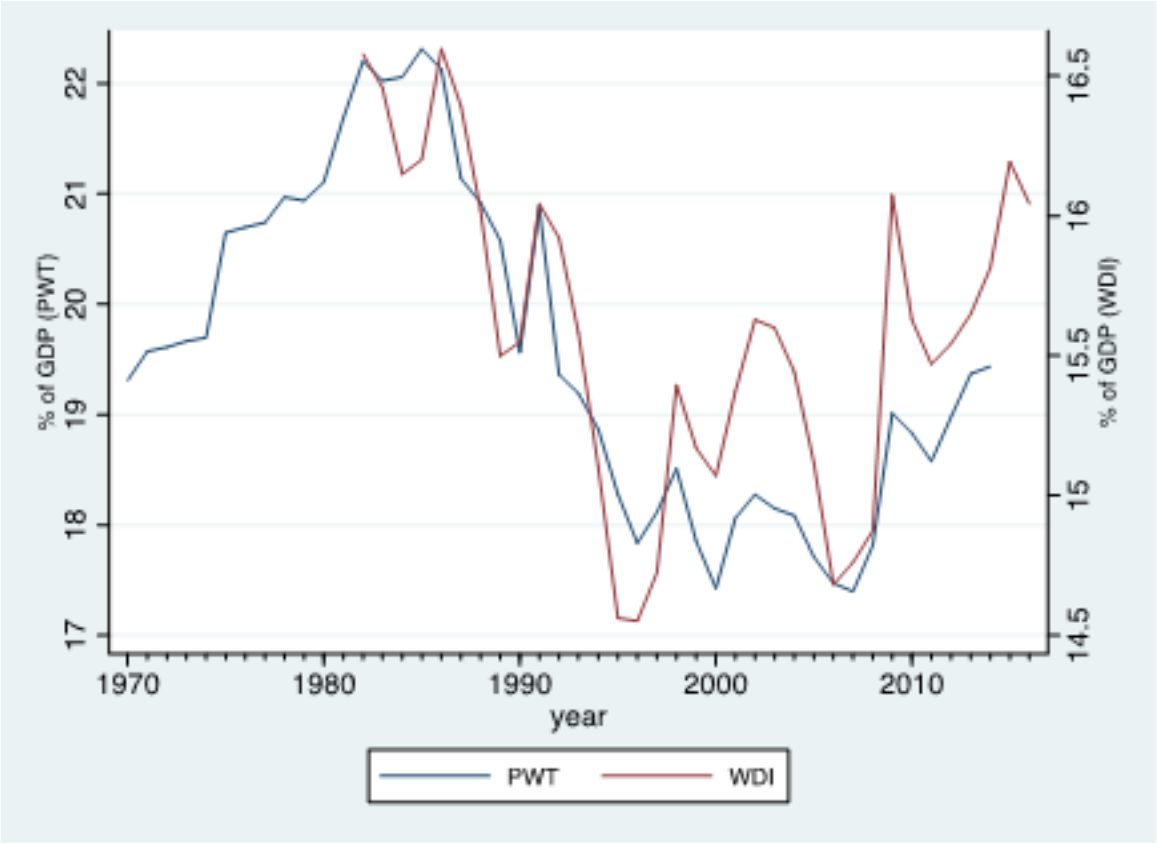
[13] Note that we were unable to produce a similar graph using the IMF spending data, since these data are more patchy: there are relatively few countries which provide a complete set of observations over the whole period.

Figure 3.1: Trends in economic globalisation, 1970-2016



Source: PWT, KOF, WDI. The sample of countries in each graph is constant over time: 24 OECD and 127 non-OECD countries for the PWT, 24 OECD countries and 97 non-OECD countries for the KOF indices, 21 OECD countries and 71 non-OECD countries for the Chinn-Ito index, and 24 OECD and 93 non-OECD countries for the WDI data.

Figure 3.2: Trends in government consumption spending, 1970-2016



Source: PWT, WDI. The sample of countries in each case is constant over time: 24 OECD and 127 non-OECD countries for the PWT, and 24 OECD countries and 83 non-OECD countries for the WDI. WDI data for the 1970s are only available for a much smaller number of countries.

Overall therefore, the evidence in Figures 3.1 and 3.2 might be considered to support the 'efficiency hypothesis', in that the rapid rise in international trade and capital mobility during the 1990s and 2000s coincided with an aggregate decline in government consumption spending as a share of GDP [14]. Of course, various other factors might account for the trends shown in Figure 3.2. Furthermore, there is substantial variation across countries. For example, while the mean rise in the PWT trade openness measure between 1990 and 2008 was 27 percentage points, it rose by less than 10 percentage points in one quarter of countries, and in fact fell in 10 percent of countries. The interesting question therefore is whether countries experiencing larger increases in trade or financial openness during the period experienced different trends in government spending.

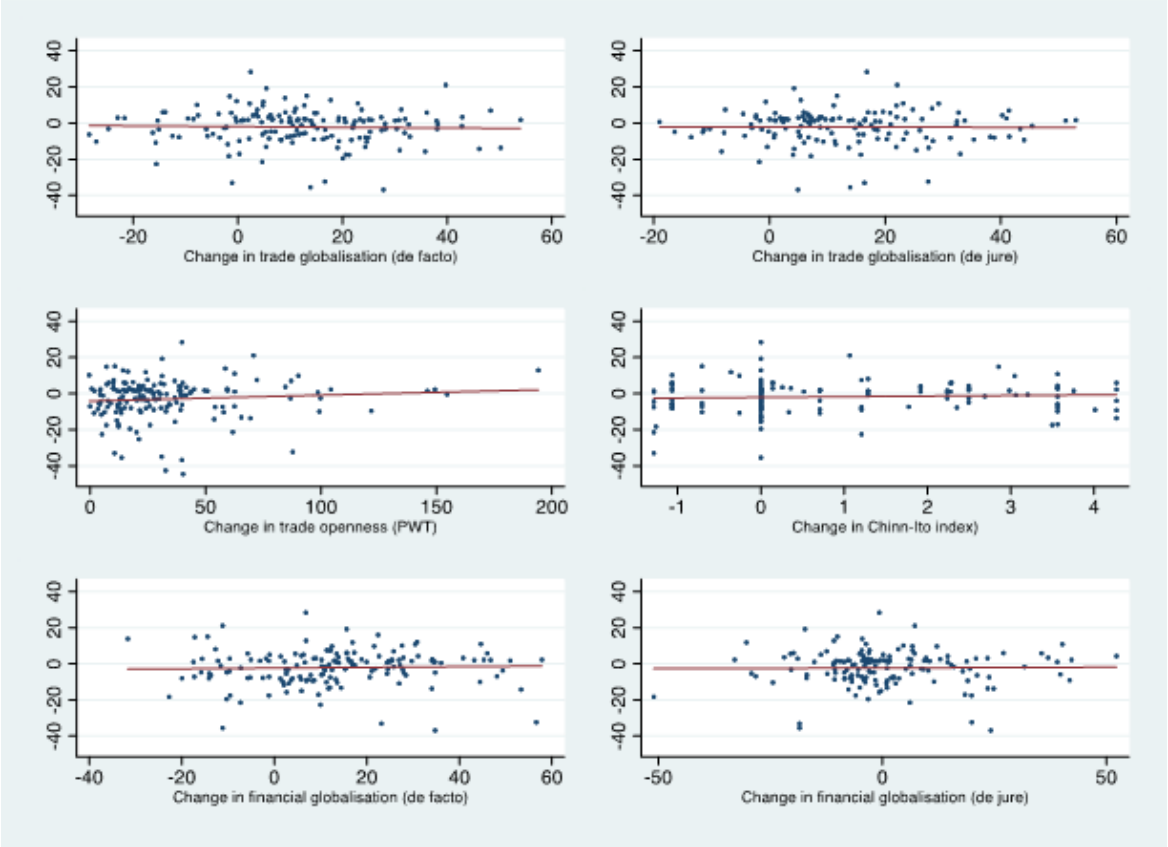
Some initial evidence on this question is shown in Figure 3.3. Here we plot, for as many countries as possible, the change in each measure of economic globalisation between 1990 and 2008 against the change in government consumption spending as a share of GDP over the same period (from the PWT). The results show no evidence of a significant correlation between changes in government spending and changes in either trade or financial openness, positive or negative [15]. We also tried re-running the scatter plots shown in Figure 3.3 using

[14] Garett (1998:18) makes a similar point, comparing trends in international trade, capital mobility and government spending in the decade before and after 1985: "spending growth slowed down at precisely the point when market integration took off".

[15] We acknowledge that the estimation results in Table 3.2 however show statistically significant effects of

other measures of spending: consumption spending from the WDI, and social spending from the IMF. We also tried plotting the change in globalisation between 1990 and 1999 against the subsequent change in government spending between 2000 and 2008, thereby allowing for possible lag effects. In each case however, there were again no significant correlations. Overall, the results could therefore be taken to suggest that neither the efficiency nor the compensation hypothesis was significant over this period; trends in government spending were instead driven by other factors. However, these results must be treated with caution, since they fail to control for other possible influences on spending. In the next section therefore we extend the analysis to more powerful multivariate analysis.

Figure 3.3: Simple correlations between changes in globalisation and changes in government consumption spending, 1990-2008



Source: PWT, KOF, Chinn-Ito. The vertical axis in each plot shows the change in government consumption spending as a share of GDP, taken from the PWT database. The number of countries included in each plot varies from 134 to 158. None of the correlations are statistically significant at conventional levels.

3.6 Main Results

In this section we look at the effect of globalization on government consumption spending, using the PWT dataset (version 9.0). The results are shown in Table 3.2. We sub-categorize the results for the *de facto* globalization measures, the *de jure* globalization measures, and the other indicators of economic globalization referred to earlier.

Turning first to the economic globalisation variables, the *de jure* trade globalisation in-

trade and financial openness on government spending in some cases.

dex has a positive and statistically significant effect on consumption spending according to all three estimation methods (columns 2, 5 and 8). The *de facto* trade globalisation index also has a positive and statistically significant effect for the DOLS estimates (column 4), although not for FE or GMM (columns 1 and 7). By contrast, both the *de facto* and *de jure* financial globalisation indices have a negative and statistically significant effect on spending for the DOLS and GMM estimates (columns 4-5, 7-8), although not for the FE estimates, where the relationships are not significant (columns 1-2). The other measures of economic globalisation support these results to some extent, in that the Chinn-Ito index and inward stocks of FDI both have a negative and statistically significant effect on spending, at least according to the DOLS and GMM estimates (columns 6 and 9) [16]. However, trade openness does not have a statistically significant effect on consumption spending, according to all three sets of estimates (columns 3, 6 and 9).

Thus, despite some differences across econometric methods and across measures of economic globalisation, the results in Table 3.2 provide evidence that increased openness to trade during the 1990s and 2000s increased government consumption spending, while increased openness to capital and financial flows reduced it. This supports the results of Kim et al (2018), who found a similar pattern for their sample of 53 countries between 1980 and 2011. Table 3.2 also shows that the evidence is stronger when using DOLS and GMM rather than standard FE; for trade, the evidence is also stronger for the 'policy' measures of openness (i.e., the *de jure* KOF index) as opposed to the 'outcome' measures (i.e., the *de facto* KOF index, and the trade-GDP ratio) [17].

How large are the effects? For trade globalisation, the results suggest that a one standard deviation increase in the *de jure* KOF index would increase spending by between 2.5 and 10 per cent (the DOLS estimates show the largest effect, followed by the FE and GMM). For financial globalisation, a one standard deviation increase in the *de jure* KOF index would reduce spending by between 2.5 and 15 per cent; a one standard deviation increase in inward FDI or the Chinn-Ito index would reduce spending by between 1.7 and 8.6 per cent (the DOLS estimates again showing a larger effect than GMM). It is worth stating the marginal effects of the globalization indices on government spending. On the average a 10-point increase in the *de jure* trade globalization index is associated with between 5 and 22 per cent increase in government spending. On the other hand, on the average a 10-point increase in *de jure* KOF financial globalization index is associated with between 4 and 28 per cent increase in government spending. In the case of the Chinn-Ito index, its marginal effect is that a 10-point increase in the index is associated with between 1 and 2 per cent reduction in government spending. These amounts are clearly not trivial, although they might easily be swamped by other influences on spending, especially in non-OECD countries where the median absolute deviation in government consumption spending is just under 6 per cent per

[16] Note that FDI stocks are one component of the KOF *de facto* KOF financial globalisation index, while the Chinn-Ito index is one component of the *de jure* index.

[17] It is perhaps surprising that trade openness measure has no statistically significant impact on spending, given that it is a component of the *de facto* trade globalisation index, which does have a statistically significant impact (at least, according to the DOLS estimates). One possible explanation is differences in samples. However, when we re-estimate the regression in column 6, this time excluding the financial globalisation variables (as a way of increasing sample size), trade openness is again not statistically significant.

year.

The results for the control variables in Table 3.2 are somewhat mixed, depending mainly on the estimation method. GDP per capita has a negative effect and statistically significant effect on consumption spending according to the FE and GMM results, which directly refutes Wagner's Law, but is not significant according to the DOLS results. As expected, dependency ratios and urbanisation rates both have a positive and statistically significant effect on spending according to the FE results, but the results are not significant for the GMM results nor for DOLS in the case of urbanisation. Similarly, population has a negative effect on spending for the FE results, supporting the results of Alesina and Wacziarg (1998), but the effect is not statistically significant for the DOLS or GMM results. Only two control variables are consistently statistically significant across all regressions: first, the price ratio of government consumption to household consumption, which has a negative effect, and the KOF social globalisation index, which has a positive effect. The former result is consistent with Gemmell et al (2008), while the latter is consistent with Meinhard and Potrafke (2012).

We now turn to the results for the interaction terms, designed to test for possible differences across countries in the relationship between economic globalisation and spending. We re-estimated each of the regressions in Table 3.1, including interaction terms for each measure of economic globalisation, first with a dummy variable for OECD countries, and then with a measure of export concentration, an indicator of exposure to external shocks. The results are summarised in Table 3.3. Turning first to the results for the OECD interaction term, there is some evidence from the FE results that the *de jure* trade globalisation index and trade openness have a stronger (more positive) effect on consumption spending in OECD as opposed to non-OECD countries, while the *de jure* financial globalisation index more negative effect. However, the DOLS and GMM results show no significant differences in the effect of either trade or financial globalisation between OECD and non-OECD countries, which casts doubt on the robustness of the FE results. For export concentration, the DOLS and GMM results show that the effects of the *de jure* trade index and the trade openness measure have in fact been more negative in countries with higher export concentration, which directly contradicts the compensation hypothesis (since export concentration is a proxy for external risk).

In summary therefore, the results in this section suggest that the 'hyper-globalisation' of the 1990s and 2000s has had divergent and conflicting effects on government spending. While there is evidence that trade globalisation has raised spending, consistent with the compensation hypothesis, financial globalisation appears to have reduced it, consistent with the efficiency hypothesis. Nevertheless, the results also suggest that the size of these effects is quite small, with one standard deviation changes in the globalisation measures being associated with changes in consumption spending of up to 10 percent, which is not a large amount given the relatively large amount of variation in levels of spending over time, particularly in non-OECD countries. In addition, there is no evidence that consumption spending has risen by more in countries which are particularly prone to external trade risk (as measured by the product concentration of exports) and which for that reason might be considered to need compensation most.

Table 3.1: Government consumption spending as share of GDP

	Driscoll and Kraay FE			DOLS			GMM		
VARIABLES	1	2	3	4	5	6	7	8	9
$Expend_{t-1}$							0.875***	0.827***	0.809***
							(0.027)	(0.038)	(0.041)
$KOFTrGI$	3.29e-05	0.002***		0.003***	0.004***		9.90e-05	0.001***	
	(0.001)	(0.001)		(0.001)	(0.001)		(0.0003)	(0.0004)	
$KOFFiGI$	3.71e-05	-0.001		-0.002*	-0.006***		-0.001*	-0.001***	
	(0.001)	(0.001)		(0.001)	(0.001)		(0.0003)	(0.0003)	
$Tradeopen$			-0.0162			-0.024			0.007
			(0.0255)			(0.033)			(0.013)
$InwardFDI$			0.0174*			-0.028**			-0.018***
			(0.00917)			(0.012)			(0.006)
$OutwardFDI$			0.00297			-0.010			0.004
			(0.00692)			(0.009)			(0.003)
$Chinn-Ito$			0.00887			-0.054***			-0.011**
			(0.00668)			(0.012)			(0.004)
GDP_pc	-0.107***	-0.106***	-0.144***	0.048	0.0189	0.003	-0.036**	-0.042***	-0.068***
	(0.026)	(0.027)	(0.024)	(0.033)	(0.034)	(0.049)	(0.016)	(0.014)	(0.019)
$Dependency$	0.601***	0.579***	0.588***	0.823***	0.874***	0.768***	0.039	0.067	0.005
	(0.074)	(0.087)	(0.094)	(0.198)	(0.199)	(0.254)	(0.044)	(0.043)	(0.051)
$Urbanization$	0.139***	0.170***	0.436***	0.070	0.053	0.021	0.021	0.018	0.024
	(0.047)	(0.059)	(0.086)	(0.139)	(0.141)	(0.226)	(0.014)	(0.015)	(0.018)
$Population$	-0.173**	-0.184***	-0.208***	-0.022	-0.039	-0.066	0.006	-0.001	-0.005
	(0.064)	(0.043)	(0.053)	(0.104)	(0.106)	(0.149)	(0.005)	(0.005)	(0.007)
$Price-ratio$	-0.556***	-0.550***	-0.569***	-0.609***	-0.598***	-0.582***	-0.050***	-0.082***	-0.107***
	(0.029)	(0.030)	(0.043)	(0.022)	(0.022)	(0.032)	(0.016)	(0.022)	(0.031)
$KOFSoGI$	0.013***	0.013***	0.014***	0.005**	0.008***	0.013***	0.003***	0.004***	0.005***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.001)	(0.001)	(0.001)
$KOFPoGI$	-0.003***	-0.003***	-0.001	-0.001	0.001	0.003	-0.001	0.0001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.005)	(0.001)	(0.001)
Year/Period dummies	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes
Observations	3,772	3,559	2,876	2,751	2,667	1,575	3,624	3,418	2,721
R-squared	0.4915	0.4884	0.4879	0.454	0.486	0.457			
Number of countries	156	146	135	131	127	75	156	146	135

Note: Each set of three columns represents estimations with de facto globalisation measures, de jure globalisation measures and the traditional measures of globalisation respectively. The Driscoll and Kraay FE results are in columns 1-3, the DOLS results are in columns 4-6, and the GMM results are in columns 7-9. The AR(2) test statistic with its corresponding p-value are 0.58(0.564), 0.59(0.559), and -0.29(0.773) for Columns 7-9 respectively. The Hansen overidentification test statistic for Columns 7-9 are 139.49(1.000), 124.46(1.000), and 105.96(1.000) respectively. The Diff-in-Hansen test statistic are 0.02(1.000), -2.95(1.000), and -3.36(1.000) for Columns 7-9 respectively. Robust standard errors in parentheses. ***(**)(*) represent statistical significance at 1, 5 and 10 per cent levels of significance respectively. All regressions include a constant term. DOLS includes the lagged dependent variable in the model estimations but the coefficient and corresponding standard error and p-values are not shown in the STATA results output.

Table 3.2: Summary of results for interaction terms: Consumption spending

	Driscoll-Kraay FE		DOLS		GMM	
	1	2	1	2	1	2
A. Interaction variable: OECD dummy (pre-1990)						
$KOFTrdf$	No	No	+	No	No	No
$KOFFidf$	No	+	-	No	-	No
$KOFTrdj$	+	+	+	No	+	No
$KOFFidj$	No	-	-	No	-	No
TO	No	+	No	No	No	No
$FDIi$	+	No	-	No	-	No
$FDIo$	No	+	-	No	No	No
$Chinn - Ito$	No	No	-	No	-	No
B. Interaction variable: Export concentration index						
$KOFTrdf$	+	-	+	-	+	-
$KOFFidf$	-	No	No	No	No	No
$KOFTrdj$	+	No	+	No	+	No
$KOFFidj$	No	No	-	No	-	No
TO	No	+	No	No	+	No
$FDIi$	+	-	No	No	No	No
$FDIo$	No	No	No	No	No	+
$Chinn - Ito$	No	No	No	No	No	No

Note: Summary of results for the globalization variables. Here, + (-) (No) refer to positive effect, negative effect, and no effect respectively. Columns 1 and 2 in each case refers to the results with the globalisation variables and the interaction term respectively.

3.7 Additional Results

This section contains the results for our robustness tests (Section 6.1), and the other expenditure measures (Section 6.2). We present the summary of results for our robustness tests in Table 3.4 and the summary of results for the other measures of spending in Table 3.5. The 'main' column in each case refers to the corresponding fixed effects, DOLS, and GMM results in Table 3.1.

3.7.1 Robustness tests

Turning to our robustness tests, we estimate results for 5-year averages, additional controls and for a sub-sample of OECD countries, and non-OECD countries. We estimate robustness results with two-way fixed effect with DK-SE, panel DOLS, and GMM (except 5-year averages) and compare them with their corresponding main results in Table 3.1.

We begin with the fixed effects results in Part A of Table 3.4. The results for the two-way fixed effect with DK-SEs are robust to varying specifications and across different country groupings. However, unlike the main annual results however, we find a positive relationship between outward FDI stock and consumption spending in OECD countries, and a positive and statistically significant effect of the Chinn-Ito index on consumption spending in non-OECD countries.

We turn to the DOLS results in Part B of Table 3.4. Relative to the 'main' results, we find a positive and statistically significant relationship between the *de facto* financial globalisation and consumption spending in the results for Controls 2. There is a positive (in all cases) and statistically significant relationship (except for Controls 2) between the *de jure* trade globalisation and consumption spending. Trade openness is negatively and significantly associated with consumption spending in the Controls 2 results. Contrary to the main DOLS results, we find a positive and statistically significant relationship between outward FDI stock and consumption spending for OECD countries, and a negative and statistically significant relationship between outward FDI stock and consumption spending in non-OECD countries. The OECD results show a positive relationship between the Chinn-Ito index and consumption spending. In sum, the DOLS results is generally robust and consistent in most cases, to the introduction of additional controls and to sub-sampling into country groupings.

The GMM results are in Part C of Table 3.4. The GMM results are robust and consistent for non-OECD countries and to additional controls but differs for OECD countries. In particular, there is a negative and statistically significant relationship between the *de facto* trade globalisation index and consumption spending in OECD countries. The *de facto* financial globalisation index, the *de jure* financial globalisation index, and the Chinn-Ito index are positively and significantly associated with consumption spending in OECD countries. We find no statistically significant relationship between all other measures of globalisation and consumption spending in OECD countries.

Table 3.3: Summary of results for robustness tests

Globalisation variable	Main (annual)	5-year averages	Controls 1	OECD	Non-OECD	Controls 2
A. Fixed effects						
$KOFTrGIdf$	No	No	No	No	No	No
$KOFFiGIdf$	No	No	No	No	No	No
$KOFTrGIdj$	+	+	+	+	+	+
$KOFFiGIdj$	No	No	No	No	No	No
TO	No	No	No	No	No	No
$FDIi$	+	No	+	No	+	+
$FDIo$	No	No	No	+	No	No
$Chinn-Ito$	No	No	No	No	+	No
B. DOLS						
$KOFTrGIdf$	+		No	No	+	No
$KOFFiGIdf$	-		No	No	-	+
$KOFTrGIdj$	+		+	+	+	No
$KOFFiGIdj$	-		-	-	-	-
TO	No		No	No	No	-
$FDIi$	-		No	No	No	No
$FDIo$	No		No	+	-	No
$Chinn-Ito$	-		-	+	-	-
C. GMM						
$KOFTrGIdf$	No		No	-	No	No
$KOFFiGIdf$	-		No	+	-	No
$KOFTrGIdj$	+		+	No	+	+
$KOFFiGIdj$	-		-	+	-	-
TO	No		No	No	No	No
$FDIi$	-		No	No	-	No
$FDIo$	No		No	No	No	No
$Chinn-Ito$	-		-	+	-	-

Note: Summary of results for the globalization variables. Here, + (-) (No) refer to positive effect, negative effect, and no effect respectively. Controls 1 refers to estimations with Polity2 only as additional control while Controls 2 refer to estimations with Polity2, foreign aid and external debt stock as additional controls. Distinguishing between Controls 1 and 2 is necessary as including foreign aid and external debt stock leaves us with estimations for non-OECD countries only in Control 2 (OECD countries do not have observations for external debt and foreign aid).

3.7.2 Other expenditure measures

We show the summary of results for other expenditure measures in Table 3.5. As noted earlier, in addition to our social welfare measures (i.e. IMF COFOG social protection and IMF ECOG social benefits spending measures, SW COFOG and SW ECOG respectively), we follow Oxley and Martin (1991) and Saunders (1993) to categorise IMF functional classification of spending into pure public goods, merit goods, and economic services. We estimate the results using fixed effects with DK-SEs [18].

We begin with the results for pure public goods. We find that the *de facto* trade globalisation index, the *de facto* financial globalisation index, the *de jure* trade globalisation index, and inward FDI stock are positively and significantly associated with government spending on pure public goods. There is a negative and statistically significant relationship between the *de jure* financial globalisation index and government spending on pure public goods. There is however no statistically significant relationship between trade openness, outward FDI stock and the Chinn-Ito index, and pure public goods.

Turning to merit goods, the *de facto* trade globalisation index and FDI stocks have a negative and statistically significant link with government spending on merit goods. Trade openness has a positive and statistically significant relation with government spending on merit goods. There is no statistically significant relationship between all other measures of globalisation and government spending on merit goods.

Table 3.4: Summary of results for other expenditure measures-fixed effects with DK-SEs

Globalisation variable	Pure	Merit	Services	SW COFOG	SW ECOG
$KOFTrGIdf$	+	-	No	No	No
$KOFFiGIdf$	+	No	-	+	No
$KOFTrGIdj$	+	No	+	-	No
$KOFFiGIdj$	-	No	-	+	No
TO	No	+	No	-	-
$FDIi$	+	-	-	No	-
$FDIo$	No	-	-	No	No
$Chinn - Ito$	No	No	No	+	+

Note: Summary of results for the globalization variables. Here, + (-) (No) refer to positive effect, negative effect, and no effect respectively. In the SW COFOG estimation, the functional form used (which gives the best results) has the dependent variable measured as share of GDP, dependency ratio as share of total population, urbanization as share of total population, trade openness as share of GDP, while all other variables are in natural logarithm form except the indices.

Turning to economic services, there is a negative and statistically significant relationship between the *de facto* financial globalisation index, the *de jure* financial globalisation index, inward FDI stock, and outward FDI stock and government spending on economic services. The *de jure* trade globalisation index is however positively and significantly associated with

[18] In the DOLS results, the number of countries reduces significantly. The GMM estimation results fail the AR(2) test in most cases.

government spending on social services. There is no statistically significant relationship between the de facto trade globalisation index, trade openness, and Chinn-Ito index and government spending on economic services.

From column 5 of Table 3.4, there is no statistically significant relationship between the *de facto* trade globalisation index, inward FDI stock, and outward FDI stock and COFOG social welfare spending. The *de facto* financial globalisation index, the *de jure* financial globalisation index, and the Chinn-Ito index are positively and significantly associated with COFOG social welfare spending. The *de jure* trade globalisation index and trade openness are however negatively and significantly associated with COFOG social welfare spending.

Finally, we turn to ECOG social welfare spending. There is a negative and statistically significant relationship between trade openness and ECOG social welfare spending. The Chinn-Ito index is positively and significantly associated with ECOG social welfare spending. No statistically significant relationship exists between other measures of globalisation and ECOG social welfare spending.

In sum, the effects of the globalisation variables here largely depend on the type of government spending under consideration. What is obvious is that there is more evidence for compensation for pure public goods and social welfare spending, while evidence of efficiency occurs more for economic services spending. For government spending on merit goods however, governments may either opt to compensate for increases in outcomes of trade (trade openness) by increasing spending on merit goods, or reduce spending on merit goods with increases in the policy measures of trade (*de jure* trade globalisation index). With respect to similar literature, our findings for inward FDI stock are qualitatively similar to those of Gemmell et al. (2008) in all cases except that for SW COFOG.

3.8 Conclusion

In this paper we provide an up-to-date empirical assessment of the relationship between economic globalisation and government spending for the 'hyper-globalisation' period of the 1990s and 2000s. We use the most recent available data on government consumption spending from the Penn World Tables, and more disaggregated spending measures from the IMF Government Financial Statistics. We also use the most recent version of the KOF globalisation index (Gygli et al, 2018), alongside a range of more commonly-used globalisation measures. Our study is to our knowledge the first to focus specifically on the hyper-globalisation period, while at the same time testing for effects of globalisation on disaggregated as well as aggregate government spending, and disaggregating between the trade and financial components of economic globalisation.

Our main finding is that the 'hyper-globalisation' of the 1990s and 2000s has had divergent and conflicting effects on government spending. While trade globalisation has tended to raise consumption spending, financial globalisation has tended to reduce it. The former is consistent with the 'compensation hypothesis', according to which governments respond to globalisation by increasing spending, as a means of offsetting the volatility and insecurity resulting from greater exposure to global markets. The latter, by contrast, is consistent with

the 'efficiency hypothesis', whereby globalisation also puts pressure on governments to reduce spending, due for example to pressures on tax revenues resulting from the increasing mobility of capital. Thus, rather than choosing between these two hypotheses, our results provide support for both – once we disaggregate between the trade and financial dimensions of economic globalisation.

A number of caveats and qualifications must be noted. First, the size of these effects is quite small, with one standard deviation changes in the globalisation measures being associated with changes in consumption spending of up to 10 percent, which is not a large amount given the large variation in levels of spending over time, particularly in non-OECD countries. This suggests the extent of any 'compensation' provided by increased government consumption spending in response to trade globalisation in the 1990s and 2000s has been limited in size, and quite easily undermined by other influences on spending. In addition, there is no evidence that consumption spending has risen by more in countries which are particularly prone to external trade risk and which for that reason need compensation most. This suggests that the positive relationship between trade globalisation and consumption spending may be driven by forces other than compensation (see for example Jetter and Parmeter 2015).

Second, although we have used a range of estimation methods, and a range of globalisation measures, some of our results differ according to the precise method used. For consumption spending for example, the evidence is stronger when using DOLS and GMM rather than standard FE, and (at least for trade) when using the 'policy' measures of openness (i.e., the *de jure* KOF index) as opposed to the 'outcome' measures (i.e., the *de facto* KOF index, and the trade-GDP ratio). Finally, it is interesting to note that the KOF index of social globalisation in fact has a larger effect on consumption spending than either trade or financial globalisation, across almost all of our estimations. This result is unexpected, and merits further investigation in future work (for similar findings on the effect of social globalisation, see Meinhard and Potrafke 2012). In addition, we acknowledge that panel unit root and cointegration tests have lower power, hence the equilibrium relationship may vary in significance across countries. Given the heterogeneity in the sample and apparent sensitivity to data and specification, the power of GMM may be overstated. Finally it may be insufficient to apply an OECD interaction to a limited number of variables.

Notwithstanding these qualifications, our results provide some implications for policy. Our paper was motivated by the evidence of a growing political 'backlash' against globalisation since the early 2000s, which has threatened to undermine the benefits of globalisation, through a return to trade protectionism and economic nationalism. Our results suggest that the combination of rapid trade and financial globalisation, which characterised the hyperglobalisation of the 1990s and 2000s, may have been at least partly to blame. While financial globalisation is unlikely to have been the main driving force behind the declining levels of government spending as a share of GDP shown in Section 5, higher levels of international capital mobility do appear to have offset the ability of governments to provide the compensation required to make the globalisation of trade politically sustainable. To avoid this outcome in future, governments should either proceed more cautiously with financial

globalisation, or instead seek to manage the damaging effects of capital mobility through greater steps toward international tax co-operation and co-ordination.

3.9 Appendix

Table A3.1: Descriptive statistics

Variable	Observations	Mean	Std. Dev.	Minimum	Maximum
Spending variables					
Consumption spending	4,516	0.206	0.181	0.017	7.675
Baseline controls					
Real GDP per capita	4,520	14702.26	17103.32	142.3924	159825.7
Dependency	5,426	38.507	7.104	14.128	54.367
Urbanization	6,014	56.61354	24.548	5.416	100
Total population (WDI)	4,644	3.84e+07	1.35e+08	501566	1.39E+09
Total Population (PWT)	3,851	40.199	138.448	0.501	1369.436
Price ratio	4,520	0.925	0.721	0.011	27.346
Globalization variables					
KOFTrGIdf	4,922	54.518	19.729	3.597	98.611
KOFFiGIdf	4,755	57.941	20.223	3.199	99.988
KOFSoGI	5,130	53.19443	20.087	8.111	90.730
KOFPoGI	5,130	55.177	25.404	2.187	99.544
KOFTrGIdj	4,044	55.330	23.057	7.783	98.939
KOFFiGIdj	4,392	47.5349	25.149	1	96.059
Trade openness	4,501	0.608	0.561	0.0001	4.791
Inward FDI stock	5,005	39.277	68.802	2.56E-07	998.4862
Outward FDI stock	4,009	22.280	120.698	1.19E-07	3416.549
Chinn-Ito index	4,615	0.216	1.566	-1.910	2.360
Additional controls					
Debt stock	3,126	66.546	84.721	0.239	1380.767
Foreign aid	3,664	7.7656	11.560	-2.629	192.026
Polity2	4,493	3.202	6.595	-10	10
Export concentration	4,744	0.354	0.219	0.045	0.983
Other expenditure measures					
Pure public goods	1,777	11.747	23.549	1.923	524.783
Merit goods	1,777	9.236	4.136	0.352	31.379
Economic services	1,472	6.175	3.302	0.436	27.111
Social benefits	1,916	8.898	7.188	0.002	26.013
Social protection	1,721	8.549	7.022	0.006	25.580

Table A3.2: Variables and definitions

Variable	Definition	Data source
Consumption spending	Government final consumption	Penn World Table version 9.0
Social benefits	IMF ECOG social benefits. Includes government spending on social security benefits, social assistance benefits, as well as employment-related social benefits, all in cash and in kind.	IMF Government Finance Statistics (GFS, 2018)
Social protection (SW COFOG)	IMF COFOG social protection. This refers to government spending on sicknesses and disability, old age, survivors, family and children, unemployment, housing, other social exclusion, R&D social protection, as well as other forms of social protection.	IMF Government Finance Statistics (GFS, 2018)
Social benefits (SW ECOG)	IMF ECOG social benefits. This refers to government spending on social security benefits (in case and in kind), social assistance benefits (in cash and in kind), and employment-related social benefits (in cash and in kind).	IMF Government Finance Statistics (GFS, 2018)
Pure public goods	General public services plus defence plus public order and safety spending from IMF COFOG spending.	IMF Government Finance Statistics (GFS, 2018)
Merit goods	Housing and community amenities plus health plus education spending from IMF COFOG spending.	IMF Government Finance Statistics (GFS, 2018)
Economic services	Economic affairs plus environment protection plus recreation spending from IMF COFOG spending.	IMF Government Finance Statistics (GFS, 2018)
Real GDP per capita	Expenditure-side real GDP at chained PPPs divided by total population.	Penn World Tables version 9.0
Dependency	Sum of the proportion of the population in the ages 0-14 years and the proportion of the population in the ages 65+ as percentage of total population.	World Bank World Development Indicators (WDI, 2018)
Urbanization	Urban population as a percentage of total population.	World Bank World Development Indicators (WDI, 2018).
Total population	Total population	World Bank World Development Indicators (WDI, 2018)
Price ratio	Ratio of price level of government consumption to the price level of household consumption.	Penn World Table version 9.0
KOFTrGIdf	KOF trade globalization index, de facto	Gygli et al. (2018)
KOFFiGIdf	KOF financial globalization index, de facto	Gygli et al. (2018)
KOFSoGI	KOF social globalization index	Gygli et al. (2018)
KOFPoGI	KOF political globalization index	Gygli et al. (2018)
KOFTrGIdj	KOF trade globalization index, de jure	Gygli et al. (2018)
KOFFiGIdj	KOF financial globalization index, de jure	Gygli et al. (2018)
Trade openness	Sum of imports and exports as percentage of GDP	World Bank World Development Indicators (WDI, 2018)
Inward FDI stock	Inward FDI stock as percentage of GDP	UNCTADSTAT
Outward FDI stock	Outward FDI stock as percentage of GDP	UNCTADSTAT
Chinn-Ito index	Chinn-Ito index of capital account liberalisation	Chinn and Ito (2006)
Debt stock	External debt stock as a percentage of gross national income (GNI)	World Bank World Development Indicators (WDI, 2018)
Foreign aid	Net official development assistance (ODA) receipts as a percentage of gross national income (GNI)	World Bank World Development Indicators (WDI, 2018)
Polity2	Polity2 index	Polity4 project, Marshall and Jaggers (2014)
Export diversification (or concentration index)	Measure of the extent to which a country's exports are concentrated (based on a single or few goods) or diversified (based on a lot more goods).	WITS Trade Data and UNCTAD Trade Statistics

Table A3.3: Correlation matrix of some variables

Variable	KOFTrGf	KOFFiGf	KOFTrGj	KOFFiGj	KOFSoGI	KOFPoGI
KOFTrGIdf	1.0000					
KOFFiGIdf	0.5464	1.0000				
KOFTrGIdj	0.2947	0.5584	1.0000			
KOFFiGIdj	0.1178	0.441	0.6117	1.0000		
KOFSoGI	0.382	0.6326	0.799	0.5284	1.0000	
KOFPoGI	-0.1975	0.1371	0.3786	0.3763	0.2283	1.0000

Variable	Chinn-Ito	Inward FDI	Outward FDI	Trade openness
Chinn-Ito index	1.0000			
Inward FDI stock	0.1685	1.0000		
Outward FDI stock	0.2325	0.9896	1.0000	
Trade openness	0.3376	0.1642	0.1572	1.0000

Variable	Social benefits	Social protection	Consumption
Social benefits	1		
Social protection	0.9572	1	
Consumption	0.1363	0.1621	1

Table A3.4: Kao test for cointegration

Test statistic (t)	Main			OECD dummy			Export con dummy			Controls 1		
	1	2	3	1	2	3	1	2	3	1	2	3
Modified Dickey-Fuller	-9.063	-8.730	-1.625	-9.026	-8.695	-1.596	-2.841	-3.182	0.098	-8.029	-7.308	-1.749
	(0.000)	(0.000)	(0.052)	(0.000)	(0.000)	(0.055)	(0.002)	(0.001)	(0.461)	(0.000)	(0.000)	(0.040)
Dickey-Fuller	-8.648	-8.201	-2.391	-8.629	-5.639	-2.354	-3.141	-3.068	0.114	-6.822	-6.218	-1.319
	(0.000)	(0.000)	(0.008)	(0.000)	(0.000)	(0.009)	(0.008)	(0.001)	(0.455)	(0.000)	(0.000)	(0.094)
Augmented Dickey-Fuller	-5.609	-5.664	0.157	-5.620	-5.639	0.190	-3.538	-4.100	0.328	-5.363	-5.306	-0.877
	(0.000)	(0.000)	(0.438)	(0.000)	(0.000)	(0.425)	(0.002)	(0.000)	(0.371)	(0.000)	(0.000)	(0.190)
Unadjusted MDF	-11.660	-10.400	-4.493	-11.629	-10.392	-4.481	-4.930	-3.663	-1.542	-9.736	-8.695	-3.136
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.0001)	(0.062)	(0.000)	(0.000)	(0.001)
Unadjusted DF	-9.718	-8.389	-4.140	-9.703	-8.887	-4.116	-4.352	-3.345	-1.048	-7.571	-6.843	-2.187
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.147)	(0.000)	(0.000)	(0.014)
	OECD-countries			Non-OECD countries			Controls 2					
	1	2	3	1	2	3	1	2	3			
Modified Dickey-Fuller	-1.170	-1.744	-2.744	-8.486	-8.172	-1.280		-4.823	-1.698			
	(0.121)	(0.041)	(0.003)	(0.000)	(0.000)	(0.100)		(0.000)	(0.243)			
Dickey-Fuller	-2.418	-2.824	-2.910	-8.036	-7.592	-1.964		-4.045	-0.040			
	(0.008)	(0.002)	(0.002)	(0.000)	(0.000)	(0.025)		(0.000)	(0.484)			
Augmented Dickey-Fuller	-2.217	-3.130	-3.588	-5.173	-5.213	0.432		-3.808	0.21			
	(0.013)	(0.009)	(0.000)	(0.000)	(0.000)	(0.333)		(0.000)	(0.417)			
Unadjusted MDF	-3.527	-3.814	-2.999	-10.815	-9.627	-3.610		-5.691	-1.134			
	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)		(0.000)	(0.128)			
Unadjusted DF	-3.697	-3.865	-3.025	-8.990	-8.190	-3.413		-4.466	-0.337			
	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)		(0.000)	(0.368)			

Note: Kao (1999) cointegration test results. Probabilities in parenthesis.

Table A3.5: Fisher-type unit root tests

Variable	Fisher ADF	Fisher PP
PWT	-39.8549***	-81.9247***
Real GDP per capita	-32.8904***	-53.3827***
Dependency	-3.2912***	-0.4982
Urbanization	-6.2920***	-12.5111***
Population	-91.0266***	-4.4558***
Price ratio	-27.8966***	-61.9901***
Concentration	-51.9374***	-105.6647***
KOFSoGI	-37.3248***	-84.1419***
KOFPoGI	-51.6171***	-105.0641***
KOFTrGIdf	-47.7547***	-90.7497***
KOFFiGIdf	-38.2648***	-80.2690***
KOFTrGIdj	-29.4017***	-71.6534***
KOFFiGIdj	-41.4996***	-86.3921***
Trade Openness	-57.5928***	-114.7427***
Inward FDI stock	-43.3828***	-84.0061***
Outward FDI stock	-37.6419***	-74.3931***
Chinn-Ito index	-35.1330***	-78.2329***
Debt stock	-26.2668***	-59.3730***
Foreign Aid	-47.3997***	-101.7954***
Polity2	-46.0207***	-73.7882***
Pure	-10.7816***	-9.1090***
Merit	-6.0324***	-5.7881***
Services	-7.9674***	-7.5385***
SW COFOG	-3.2477***	-4.0537***
SW ECOG	-4.4627***	-8.6957***

Note: Fisher ADF and PP unit root tests for the differences of the variables. *** represent statistical significance at 1 per cent level of significance. Inverse chi-squared (433.0710, p-value 0.0567) and modified inverse chi-squared (1.6180, 0.0528) statistics for Fisher PP show evidence of unit root for dependency at lag 4.

Table A3.6: List of countries

Afghanistan	**Denmark**	Lao PDR	Russian Federation
Albania	Djibouti	Latvia	Rwanda
Algeria	Dominica	Lebanon	Samoa
Angola	Dominican Republic	Lesotho	Sao Tome and Principe
Antigua and Barbuda	Ecuador	Liberia	Saudi Arabia
Argentina	Egypt, Arab Rep.	Libya	Senegal
Armenia	El Salvador	Lithuania	Serbia
Australia	Equatorial Guinea	**Luxembourg**	Seychelles
Austria	Eritrea	Macao, China	Sierra Leone
Azerbaijan	Estonia	Macedonia, FYR	Singapore
Bahamas, The	Ethiopia	Madagascar	Slovak Republic
Bahrain	Fiji	Malawi	Slovenia
Bangladesh	**Finland**	Malaysia	Solomon Islands
Barbados	**France**	Maldives	Somalia
Belarus	Gabon	Mali	South Africa
Belgium	Gambia, The	Malta	**Spain**
Belize	Georgia	Mauritania	Sri Lanka
Benin	**Germany**	Mauritius	St. Kitts and Nevis
Bermuda	Ghana	**Mexico**	St. Lucia
Bhutan	**Greece**	Micronesia, Fed. Sts.	St. Vincent and the Grenadines
Bolivia	Grenada	Moldova	Sudan
Bosnia and Herzegovina	Guatemala	Mongolia	Suriname
Botswana	Guinea	Morocco	Swaziland
Brazil	Guinea-Bissau	Mozambique	**Sweden**
Brunei Darussalam	Guyana	Namibia	**Switzerland**
Bulgaria	Haiti	Nepal	Syrian Arab Republic
Burkina Faso	Honduras	**Netherlands**	Tajikistan
Burundi	**Hungary**	Netherlands Antilles	Tanzania
Cambodia	**Iceland**	**New Zealand**	Thailand
Cameroon	India	Nicaragua	Togo
Canada	Indonesia	Niger	Tonga
Cape Verde	Iran, Islamic Rep.	Nigeria	Trinidad and Tobago
Central African Republic	Iraq	**Norway**	Tunisia
Chad	**Ireland**	Oman	**Turkey**
Chile	**Israel**	Pakistan	Turkmenistan
China	**Italy**	Palau	Uganda
Colombia	Jamaica	Panama	Ukraine
Comoros	**Japan**	Papua New Guinea	United Arab Emirates
Congo, Dem. Rep	Jordan	Paraguay	**United Kingdom**
Congo, Rep	Kazakhstan	Peru	**United States**
Costa Rica	Kenya	Philippines	Uruguay
Cote d'Ivoire	Kiribati	**Poland**	Uzbekistan
Croatia	Korea, Dem. Rep.	**Portugal**	Vanuatu
Cuba	**Korea, Rep.**	Puerto Rico	Venezuela, RB
Cyprus	Kuwait	Qatar	Vietnam
Czech Republic	Kyrgyz Republic	Romania	Yemen, Rep.
Zambia			
Zimbabwe			

Note: OECD countries are in bold.

Chapter 4

Fiscal Decentralization, Democracy and Government Size: Disentangling the Complexities

In this paper, we examine the mediating effect of democracy in explaining the relationship between decentralization and government size for the period 1970-2013. We proxy decentralization by fiscal decentralization, use total spending as our primary measure of government size, and adopt the V-Dem high-level democracy indices as measures of democracy. We use the fixed effects estimator with Driscoll-Kraay standard errors and the instrumental variable estimation technique. Our main finding is that fiscal decentralization and democracy in themselves are effective tools to "starve the beast" as they lead to reduced government size, with the former suggesting support for the Leviathan hypothesis. We find evidence of the mediating effect of democracy in the relationship between decentralization and government size; a positive and statistically significant effect of the interaction term with the effect size largest for participatory democracy. We do not find a non-linear relationship between decentralization and government size.

*I would like to thank Christa Brunnschweiler and Edward Anderson for useful comments. All remaining errors are my own.

4.1 Introduction

Fiscal decentralization has become an increasingly common feature of both developed and developing countries in recent decades (Garman, et al., 2001; Hooghe et al., 2010). Decentralization may be welfare-improving and enhance government accountability (Tiebout, 1956). Sub-national governments are seen to be efficient and effective at resource allocation given that they are closer to the citizenry and are likely to better determine and anticipate the needs and preferences of their residents. Hence, in a heterogeneous context, decentralization enables sub-national governments to better match the needs and preferences of the population with the available bundle of goods and services (Golem, 2010). Further, fiscal decentralization assumes that sub-national governments possess the needed autonomy both to raise revenues and fund their expenditures with little or no central government interference.

Changes in the levels of government size (spending) is one key way in which governments can manage the effect of decentralization. Hence, I acknowledge that this Chapter related to Chapters 2 and 3, although the sample differs. However, the effect of decentralization on government size depends on whether the government is a 'benevolent agent' or a monolithic 'Leviathan'. As a benevolent agent, government is assumed to act in the interest of the citizenry (Tiebout, 1956; Oates, 1972; Weingast, 2009). The improved efficiency and accountability due to fiscal decentralization therefore encourages the citizenry to demand more public goods, leading to larger government size (Golem, 2010). The Leviathan hypothesis assumes that greater decentralization leads to smaller government size. Governments (both central and local governments) are assumed to be monolithic Leviathans with public servants driven by their self-interest to maximize revenues. Fiscal decentralization provides constraints in the form of mobile tax bases and tax competition among sub-national governments, with a possible "race to the bottom" which reduces total government intrusion into the economy, hence the 'beast' is starved, and government size is reduced (Brennan and Buchanan, 1980).[1]

Does democracy play any role in the relationship between decentralization and government size? First, it may be easier for decentralization to be a political decision under a democracy as it involves reducing the concentration of power with the central government. One of the most valued assets of non-democracies or authoritarian governments is the concentration of power at the center (Beyani, 2000), which is at variance with the motivations for decentralisation. Therefore, there is likely to be a minimal preference for decentralisation in non-democracies (see Karlström, 2015 and Qiao et al., 2019). Second, the assumptions of both the benevolent and Leviathan hypotheses seem plausible under a democracy. For instance, the incentive of a government to be benevolent may be borne out of a desire to meet the tastes, preferences and needs of voters in order to retain power in a democracy (see Hicks and Swank, 1992; Isham, et al., 1997; Boix, 2001). It is important to note that the differences between benevolent and Leviathan cases may be understood when we clearly

[1]Note that residents are also assumed to possess information advantages in addition to being mobile (see Qiao et al., 2019).

distinguish central from total (central plus local) government size. Such distinction gives room to appreciate the role of voter preferences for public goods in explaining the effect of democracy on government size. An example of how this works is a comparison between Scandinavia with greater voter preference for public goods relative to the USA. Furthermore, information advantages, demand for efficient provision of public goods and services, and 'voting with the feet', may require conditions such as free elections, freedom of speech, fundamental human rights, public demand for accountability, effective institutions among others, which are essential characteristics of a democracy (Karlström, 2015). Also, democracy in itself may be an effective tool to "starve the beast" under a Leviathan. Therefore, assuming the earlier arguments are valid, examining the intermediating role of democracy in the decentralization-government-size relationship may provide an explanation for the divergent and conflicting empirical evidence on the effect of decentralization on government size.[2]

Crucially, any attempt to consider the role of democracy in explaining the relationship between fiscal decentralization and government size must note the importance of the different conceptions of representative democracy. In that case, measures of democracy in its broad since (such as a simple binary 0,1 indicator of democracy and autocracy), a simple measure of a country's political regime, or using institutional quality to gauge the level of democracy may not be enough as the relationship may be more nuanced than direct. Various conceptions of democracy may have varying implications given the differences in the characteristic principles of democracy they measure; electoral, liberal, participatory, deliberative and or egalitarian democracy. While the electoral principle of democracy is an essential component of any other conception of representative democracy, such conceptions retain their unique characteristics in principle which likely have implications for the relationship being considered here. For instance, one bedrock of the electoral principle of democracy is the delegation of authority to representatives which is not exactly the same as a preference for, where practicable, a direct involvement of the citizens in decision making under a participatory democracy. Added to this, a more liberal democracy may provide limits on central government power, allowing devolution of power to local governments. The egalitarian principle of democracy expects that resources are distributed equally among all social groups. These and other characteristics are essential not only for decentralization but to demonstrate voter preferences for public goods and its consequent effect on government size.

This paper looks beyond just the broad concept of democracy and uses varieties of democracy indices for 76 developed and developing countries for the years 1970-2013. We adopt the V-Dem high-level of democracy indices (see Coppedge et al., 2020) in measuring democracy; electoral, liberal, participatory, deliberative and egalitarian democracy indices. We introduce an interaction term of fiscal decentralization and the varieties of democracy indices to capture the mediating effect of democracy. This is a unique approach compared to

[2]Note that, variations in the extent of both decentralization and democracy can affect the decentralization-government-size relationship. Such variations may be in the form of transitions within or between political regime types which create changes in political constraints (e.g. fiscal rules, independent central banks) and in the behavior of public servants (Marlow, 1988)

a similar study on the mediating effect of democracy in the relationship between decentralization and government size discussed later in the literature review. Our primary measure of government size is real per capital total (central plus local) government expenditure to GDP from the World Bank World Development Indicators. We proxy decentralization by fiscal decentralization-expenditure decentralization measured as the ratio of state and local government spending to general government spending from the World Bank's Decentralization indicator database. We make use of the fixed effects estimation technique with Driscoll-Kraay standard errors to account for cross-sectional and time dependence. Our robustness analysis includes an estimation with a sub-sample of developed and developing countries, an estimation with the log of public sector employment as an alternative measure of government size, an estimation in first differences with regime change lag as an alternative measure of democracy, and an instrumental variable estimation to take care of any endogeneity concerns.

Finally, in another unique contribution, we examine non-linearity to determine if the extent (intensity) of decentralization matters for the effect of decentralization on government size. Conceptually, if intensity matters, then both the direct and indirect effects of decentralization on government size may differ at both higher and lower levels of either decentralization or democracy. For instance, if indeed decentralization "starves the beast", then at the peak of decentralization, government size should be smaller. However, given that government welfare spending increases as a country becomes more democratic, there is likely to be a higher demand for bigger government size in advanced democracies. These two scenarios although contradictory suggest that, if the rate of change in the degree of decentralization differs from the rate of change in the size of government, then the relationship between decentralization and government size may be non-linear or non-monotonic and may have peaks or troughs.

To summarize our results, our baseline results clearly establishes effects of fiscal decentralization and democracy on government size; negative for both variables and for all measures of democracy, and this is confirmed by our main results. However, the magnitude of the effect of fiscal decentralization is largest in the regression with electoral democracy index as control while participatory democracy has a more negative effect on government size compared to other concepts of democracy. The findings for fiscal decentralization and democracy is consistent across the sub-sample of developed and developing countries. The results is also consistent for the robustness check; (i) with employment as a measure of government size, (ii) with regime change as a measure of democracy, and (iii) when we control for endogeniety. We find similar results for the interaction term in the estimation to determine non-linearity. Most importantly, we find evidence of a mediating effect of democracy in all cases; a positive and statistically significant effect of the interaction term with the effect size largest for the participatory principle of democracy. The positive effect of the interaction term in the main results is consistent for all estimations except the sub-sample of developing countries, although only statistically significant for egalitarian democracy in the IV estimation, but statistically insignificant for employment and regime change. However, an increase in fiscal decentralization in a developing country under a liberal democracy is

associated with a reduction in government size. We do not find a non-linear relationship between decentralization and government size.

The remainder of the paper is structured as follows. The next section is devoted to reviewing evidence of the relationship between decentralization and government size, and evidence of the mediating role of democracy in that relationship. We discuss methodology and estimation results in sections 3 and 4, before turning to conclusions and policy recommendations in section 5.

4.2 Literature review

Empirical evidence on the relationship between government size and fiscal decentralization is mixed, although the balance seems to tilt in favor of the Leviathan hypothesis (Stegarescu, 2005; and Golem, 2010). Oates (1985) in a seminal contribution to the Leviathan hypothesis does not find support for the Leviathan hypothesis for 48 US states and 43 countries. Nelson (1986) and Forbes and Zampelli (1989) fail to find evidence for the Leviathan hypothesis for US states. However, these early studies have some deficiencies. First, their definition of decentralization does not consider 'total government intrusion', as it omits central government activity.[3] Second, they measure the relative size of government in terms of tax receipts as against total expenditure. Total expenditure is however a more complete measure of government size as it accurately measures total government resource absorption (see Marlow, 1988; Golem, 2010).[4] Other studies that find evidence for the Leviathan hypothesis using total government expenditure as a measure of government size include Grossman (1989), Joulfaian and Marlow (1990), Joulfaian and Marlow (1991), Ehdaie (1994), Grossman and West (1994), Shadbegian (1999). However, Stein (1999) finds evidence for benevolent agent hypothesis, i.e. that decentralization is associated with larger government size.

In terms of recent literature, Wu and Lin (2012) and Jia et al. (2014) find evidence of a positive relationship between fiscal decentralization and government size for China at the provincial-and national-level respectively. Casette and Paty (2010) find a negative effect of tax decentralization on central government expenditure, a positive effect of tax decentralization on sub-national government expenditure, and a positive effect of tax decentralization on aggregate public expenditure.[5] Martinez-Vazquez and Yao (2009) examine the decentralization-government-size hypothesis using the number of public sector employees as proxy for government size and find that the number of public sector employees increases with the country's level of fiscal decentralization.

More closely related to the current paper, Qiao et al. (2019) provides empirical evidence for the mediating role of democracy in the decentralization-government-size relationship.

[3]They define decentralization as the ratio of local government activity over the sum of state and local government activity, thereby omitting central government activity (see Marlow, 1988).

[4]Recent empirical studies that use revenue as a measure of government size include Prohl and Schneider (2009) and Feld et al. (2010). Jin and Zou (2002), Rodden (2003) and Fiva (2006) find support for Leviathan hypothesis, specifically revenue decentralization using sub-national own-source revenue as a measure of decentralization and total government expenditure as share of GDP as a measure of government size.

[5]Liberati and Sacchi (2013) indicates it may be easier to reduce government size with tax restrictions as against tax decentralization.

The paper finds a positive effect of the interaction term, implying that at higher levels of democracy, fiscal decentralization is associated with bigger government size. The results are robust across alternative measures of government size, decentralization, and democracy, alternative data frames, alternative specifications, and accounting for endogeneity issues.[6] The paper however uses an average of political right index and civil liberties index as a primary measure of democracy and the Polity2 index of political democracy and autocracy as secondary measure of democracy; these indices do not capture the nuances of the concept of democracy described earlier. The paper does not also take into consideration the possible effects of cross-sectional and time dependence in the panel data estimation. The current paper is therefore superior in both measures of democracy and in the fixed effects estimation approach, and also differs in the examination of non-linearity.

4.3 Empirical strategy and data

4.3.1 Model specification

We examine the fiscal-decentralization-government-size relationship considering the mediating role of democracy as follows:

$$Govsize_{it} = \alpha + \sigma FD_{it} + \upsilon DEM_{it} + \rho(FD * DEM)_{it} + \tau X_{it} + \mu_i + \eta_t + \epsilon_{it} \quad (4.1)$$

where $Govsize$ refers to to government size: our primary measure of government size is total government expenditure as a percentage of GDP; used in natural logarithm form. Later, we introduce the log of total public sector employment as an alternative measure of government size. Country and year are represented as i and t respectively. The fiscal decentralization indicator is given as FD and is measured in natural logarithm, DEM refers to the democracy measure, while $FD * DEM$ represents the interaction term between decentralization and democracy. The coefficients of interest are σ, υ and ρ. In the respective cases, we expect negative effects of fiscal decentralization and democracy on government size, but a positive effect of the interaction term on government size a priori. The latter suggests that as the level of democracy increases, fiscal decentralization will be associated with an increase in government size. X represents control variables; real GDP per capita, urbanization, the share of young population, and the share of old population given in natural logarithms; others are the KOF globalization index, central bank independence, monetary union, as well as fiscal rules. Year dummy, country dummy and the error term are given as μ_i, η_t, and ϵ_{it} respectively. We adopt the two-way fixed effects estimator with Driscoll-Kraay standard errors to account for general forms of temporal and cross-sectional dependence since panel

[6] Baskaran (2011) examines whether the relationship between decentralization and government size is mediated by the ideology of the central government. The study finds that decentralization increases government size irrespective of the ideology of the government, although the magnitude of the effect is larger for left- as against right-wing governments. The interest of the current paper is however in examining whether the decentralization-government-size relationship is mediated by the broad concept of democracy.

datasets are prone to incidents of cross-sectional dependence (Driscoll and Kraay, 1998). This makes the fixed effects estimation results more robust.

4.3.2 Data

Summary statistics of all variables are provided in the Appendix (Table A1). We show the correlation between the varieties of democracy variables in Appendix Table A2. Clearly, the varieties of democracy variables are highly correlated which lends support to individual estimations with each of them as proxy for democracy in their respective cases.

Dependent variable

The primary measure of government size is total expenditure measured as the share of total government expenditure to GDP, which is sourced from the World Bank World Development Indicators (WDI) database. The spending measure used here is comprehensive as it captures all local and central government spending, making it an appropriate measure of government size in this case. As an alternative measure, we use the log of total public sector employment from the International Labour Organization (ILO) as proxy for government size (See Martinez-Vazquez and Yao, 2009 and Qiao et al., 2019)

Fiscal decentralization

Fiscal decentralization is proxied by expenditure decentralization measured as the ratio of sub-national (state and local) government spending to general government spending. It is the measure commonly used in the literature as it adequately accounts for total government intrusion (see Marlow, 1988; Oates, 1985; Davoodi and Zou, 1998; and Golem, 2010). Data on expenditure decentralization is from the World Bank's Decentralization Indicator database.

Democracy

As noted earlier, similar studies fail to capture the various conceptions of democracy. Hence, we adopt an approach which encompasses the varieties of democracy. We account for electoral democracy, liberal democracy, participatory democracy, deliberative democracy, as well as egalitarian democracy. Data on our democracy indices are sourced from the V-Dem dataset (see Coppedge et al., 2020; and Pemstein et al., 2020).

The electoral principle of democracy captures the principle that democracy creates an enabling atmosphere for rulers to be responsive to citizens, which can be achieved through competition for citizenry vote of approval in an election, a process that must allow an extensive level of usual suffrage. The electoral democracy index is constructed with an interval of low to high, represented as 0-1 respectively. [7]

[7] It takes the average of, or the weighted average of indices measuring freedom of association thick, clean elections, freedom of expression, elected officials, and suffrage, and on the other, the five-way multiplicative interaction between those indices (see Coppedge et al., 2020).

The concept of liberal democracy considers the extent to which democracy successfully limits the power of governments, providing room for the protection of individual and minority rights against the 'tyranny' of the majority. At the core of the liberal principle of democracy are constitutionally protected civil liberties, strong rule of law, an independent judiciary, and effective checks and balances which must succeed in limiting the excessive use of executive power. The index is calculated taking the level of electoral democracy into consideration. It is an index with an interval 0-1 representing low to high respectively.

The participatory principle of democracy has at its core value, an active citizenry participation in all political processes which may be electoral or non-electoral. Here, delegating authority to elected representatives may not be enough as it is expected that where possible, other platforms are created for citizenry direct involvement. This could be ensured through engagement with civil society organisations, direct democracy, and elected bodies at the sub-national level. The index is on an interval of 0-1 representing low to high participatory democracy respectively, and takes electoral democracy into account.

The deliberative democracy index is an index of the process of decision making in a polity. The expectation is that political decision making is driven by public reasoning aimed at ensuring common good as against emotional appeals, solidary attachments, parochial interests or coercion. Hence, democracy must involve respectful dialogue at all levels of the decision making process; from conceptualization to implementation rather than a summation of known preferences. The deliberative democracy index is given on an interval of 0-1 representing low to high respectively and considers the level of electoral democracy.

Finally, the egalitarian democracy index measures the extent to which the ideal of egalitarian democracy is achieved. The egalitarian principle of democracy considers the potential of material and immaterial inequalities to limit the enjoyment of formal rights and liberties, placing limits on the ability of citizens from diverse social groups to participate in the democratic process. To ensure egalitarian democracy, the rights and freedoms of all individuals must be protected regardless of their social group, there must be equal distribution of resources across all such groups, as well as equal access to power for all individuals and groups. It is given on an interval of low to high (0-1) and considers electoral democracy.

Control variables

The control variables are; real GDP per capita (GDPpc), urbanization (Urban), the share of young population (Young), and the share of old population (Old) given in natural logarithms; the KOF index of globalization (KOFGI), an index for central bank independence (CBI), a dummy for monetary union (EMU), as well as a dummy for fiscal rules (Fiscal rule). According to Wagner's law (Wagner, 1893), government spending as share of GDP increases with increases in national income, hence we use real GDP per capita as proxy for national income. Urbanization is introduced to capture government consumption and investment (Alesina and Wacziarg, 1998) and is measured as urban population as share of total population. The share of the young and old population in the total population of any country represents the size of its dependant non-working population. The size of the dependant population matters; young population demands higher spending on education while old pop-

ulation demands higher spending on health care. Hence, countries with larger share of the dependant population are likely to have bigger government size. The current paper captures the share of young population as the population in the ages 0-14 as share of total population, and old population as the population 65+ as share of total population. Where there is central bank independence (CBI), there is limited central bank financing of government budgets either directly or indirectly, and government size is likely to be smaller (Fischer, 1995). The dummy variable for a monetary union is equal to 1 if a country participated in an Economic and Monetary Union in years t and afterwards, or 0 otherwise. The strict requirements of a monetary union implies members are less likely to have huge deficits and this helps restrain government expansion (Qiao et al., 2019). Fiscal rules are likely to improve fiscal outcomes especially when it succeeds in coordinating an effective fiscal decentralization (Alesina and Bayoumi, 1996; Neyapti,2013). Fiscal rules is therefore given as a dummy variable equal to 1 if a country has at least one fiscal rule (e.g. expenditure rule, revenue rule, budget balance rule, or debt rule) in place, and 0 otherwise. Globalization may lead to governments increasing spending to compensate for trade-related risks or to offset volatility and insecurity ('compensation hypothesis, Rodrik, 1998), or governments reducing spending due for example to a reduction in tax revenues which may be caused by a 'race to the bottom' resulting from global competition to attract and retain capital ('efficiency hypothesis' Garrett 1998). We proxy globalization by the KOF overall globalization index.

Data on real GDP per capita, urbanization, the share of young population, and the share of old population is obtained from the World Bank World Development Indicators (WDI, 2018). Data for monetary union and central bank independence are sourced from the European Union and Garriga (2006) respectively. The fiscal rules dummy is sourced from the IMF Fiscal Rules Database (2016). Finally, data for the KOF overall globalization index is sourced from Gygli et al. (2018).

4.4 Estimation results

4.4.1 Baseline results

The baseline results sets-out to determine the individual effects of both fiscal decentralization and democracy on government size (as measured by government spending). Hence, the results are without the interaction term. The results are given in Table 1.

From Table 1, fiscal decentralization has a negative and statistically significant effect on government size when we control for all forms of democracy. Thus, increased fiscal decentralization is associated with increased government size irrespective of the variety of democracy controlled for. In terms of magnitude, increased fiscal decentralization is associated with between 4.8 and 5.0 per cent reduction in government size. The amounts are clearly not trivial, although they might be easily be swayed by other influences on government size, especially in developed countries. We therefore find evidence for the Leviathan hypothesis similar to Grossman (1989), Joulfaian and Marlow (1990), Joulfaian and Marlow (1991), Ehdaie(1994), Grossman and West (1994), and Shadbegian (1999).

The results also show negative and statistically significant effects of electoral and participatory democracies on government size. Hence, electoral and participatory democracies are associated with reduced government size, with an effect size of 10 and 21 per cent respectively.

For the control variables, we find no evidence of Wagner's Law, rather real GDP per capita has a negative and statistically significant effect on government size when we control for electoral and participatory democracies. An increased share of old population is associated with reduced government size in all cases; the share of old population has a negative and statistically significant effect on government size. The KOF overall globalization index and the share of young population however have a positive and statistically significant effect on government size.

Hence, the baseline results provides a hint of the possible effects of both fiscal decentralization and democracy on government size; generally negative for the former and negative for the latter for electoral and participatory democracy.

Table 4.1: Baseline results: Fiscal decentralization and government size

VARIABLES	Electoral	Liberal	Participatory	Deliberative	Egalitarian
FD	-0.0491***	-0.0491***	-0.0500***	-0.0480***	-0.0478***
	(0.0125)	(0.0125)	(0.0126)	(0.0126)	(0.0125)
DEM	-0.0955*	-0.0770	-0.205**	-0.0385	0.00563
	(0.0527)	(0.0554)	(0.0900)	(0.0603)	(0.0630)
$GDPpc$	-0.163*	-0.156*	-0.171*	-0.151	-0.142
	(0.0909)	(0.0896)	(0.0953)	(0.0918)	(0.0885)
$KOFGI$	0.0140***	0.0137***	0.0140***	0.0135***	0.0133***
	(0.00420)	(0.00412)	(0.00420)	(0.00416)	(0.00406)
$Urban$	0.0442	0.0469	0.0248	0.0514	0.0581
	(0.126)	(0.127)	(0.124)	(0.127)	(0.128)
$Young$	0.357**	0.371***	0.339**	0.376***	0.388***
	(0.135)	(0.134)	(0.134)	(0.137)	(0.131)
Old	-0.467***	-0.446***	-0.481***	-0.432***	-0.412***
	(0.148)	(0.145)	(0.153)	(0.145)	(0.135)
CBI	-0.0511	-0.0508	-0.0535	-0.0498	-0.0463
	(0.0513)	(0.0521)	(0.0519)	(0.0509)	(0.0519)
EMU	0.00729	0.00574	0.00681	0.00377	0.00182
	(0.0396)	(0.0389)	(0.0390)	(0.0391)	(0.0384)
$Fiscalrule$	-0.0107	-0.0118	-0.00917	-0.0125	-0.0133
	(0.0228)	(0.0227)	(0.0231)	(0.0226)	(0.0221)
Year dummy	Yes	Yes	Yes	Yes	Yes
Observations	1,176	1,176	1,176	1,176	1,176
Countries	67	67	67	67	67

Fixed effects estimations with Driscoll-Kraay standard errors. All regressions include a constant term. ***(**)(*) represent statistical significance at 1, 5, and 10 per cent levels respectively.

4.4.2 Main results

For our main results, we re-estimated each of the regressions in Table 1, including interaction terms for each measure of democracy with fiscal decentralization to determine the mediating effect of democracy in the relationship between decentralization and government size. The results are given in Table 2.

Similar to the baseline results, we find a negative and statistically significant effect of fiscal decentralization on government size, irrespective of the variety of democracy. The negative effect of fiscal decentralization suggests that fiscal decentralization on its own may be an effective tool to "starve the beast". [8] Electoral, liberal, as well as participatory democracies have a negative and statistically significant effect on government size, but the effects of deliberative and egalitarian democracies are not statistically significant.

[8] In the sense of reducing the amount of resources available to the central government to finance its spending; some taxes may be localised and there may be central government grants to local governments. The term as used here may not strictly define - 'starving the beast" - the concept or political strategy of deliberating cutting taxes to reduce central government revenues and limit its ability to spend. See for instance Buchanan and Wagner, (1977), Buchanan, (1984), Niskanen (2006) and Romer and Romer (2007).

Table 4.2: Main results: The mediating effect of varieties of democracy

VARIABLES	Electoral	Liberal	Participatory	Deliberative	Egalitarian
FD	-0.113***	-0.0873***	-0.103***	-0.0980***	-0.101***
	(0.0319)	(0.0272)	(0.0267)	(0.0280)	(0.0316)
DEM	-0.236**	-0.215*	-0.410**	-0.204	-0.171
	(0.0996)	(0.120)	(0.160)	(0.125)	(0.127)
$FD * DEM$	0.00674**	0.00643*	0.00881**	0.00723**	0.00735*
	(0.00285)	(0.00372)	(0.00371)	(0.00331)	(0.00374)
$GDPpc$	-0.138	-0.131	-0.149*	-0.123	-0.124
	(0.0832)	(0.0822)	(0.0868)	(0.0830)	(0.0819)
$KOFGI$	0.0151***	0.0144***	0.0151***	0.0146***	0.0140***
	(0.00413)	(0.00410)	(0.00420)	(0.00413)	(0.00391)
$Urban$	-0.0287	0.00193	-0.0497	-0.000147	0.0123
	(0.133)	(0.130)	(0.128)	(0.130)	(0.129)
$Young$	0.444***	0.440***	0.419***	0.461***	0.445***
	(0.116)	(0.116)	(0.116)	(0.116)	(0.114)
Old	-0.448***	-0.436***	-0.480***	-0.428***	-0.406***
	(0.141)	(0.139)	(0.151)	(0.138)	(0.132)
CBI	-0.0397	-0.0440	-0.0414	-0.0400	-0.0379
	(0.0533)	(0.0534)	(0.0548)	(0.0528)	(0.0530)
EMU	0.00902	0.00639	0.0123	0.00693	0.00400
	(0.0379)	(0.0379)	(0.0385)	(0.0380)	(0.0373)
$Fiscalrule$	-0.00323	-0.00516	0.000821	-0.00311	-0.00610
	(0.0242)	(0.0245)	(0.0251)	(0.0243)	(0.0237)
Year dummy	Yes	Yes	Yes	Yes	Yes
Observations	1,176	1,176	1,176	1,176	1,176
Countries	67	67	67	67	67

Fixed effects estimations with Driscoll-Kraay standard errors. All regressions include a constant term. ***(**)(*) represent statistical significance at 1, 5, and 10 per cent levels respectively.

We now turn to the results for the interaction term designed to test for the mediating effect of democracy. The interaction term is positive and statistically significant in all cases, showing that increasing fiscal decentralization under the varieties of democracy is associated with increasing government size. There is however evidence that the interaction term has a stronger (more positive) effect on government size in participatory democracies compared to other varieties of democracy. This is quite significant as the target of every decentralization effort is to among others increase the direct participation of citizens and civil society in the democratic decision making process. The results suggests that such increased participation may be associated with increasing government spending. Nevertheless, the results also suggest that the size of the effects is quite small, with a percentage increase in fiscal decentralization under a participatory democracy being associated with a 0.88 per cent increase in government size as proxy by government spending. Our results here contradict those of

Qiao et al. (2019) who find a positive effect of the interaction term, albeit with a different measure of democracy.

4.4.3 Additional Results

This section contains the summary results for our sub-sample of developed vrs. developing countries, the results for our alternative measure of government size, and the results for our alternative measure of democracy (regime change). We represent the summary results for the sub-sample of countries in Table 3, the full results for our alternative measure of government size in Table 4, and the full results for our alternative measure of democracy in Table 5.

Sub-sample: Developed vs. Developing countries

Turning to our results for the sub-sample of countries, Panel A represents results for developed countries, and Panel B the results for developing countries.

The results for the developed countries are qualitatively similar to those for the main results; negative and statistically significant effects of fiscal decentralization and the varieties of democracy on government size, and a positive effect of the interaction term on government size. The effect size of fiscal decentralization is largest for deliberative democracy while the effect sizes of both democracy and the interaction term is largest for participatory democracy. The results for the interaction term suggests that increasing fiscal decentralization is associated with increasing government size in developed countries irrespective of the variety of democracy. The results for the interaction term may not be surprising as developed countries have high fiscal decentralization. The positive effect of the interaction term suggests that if the process of decision making in a developed country is driven by a desire to meet the common good as against a mere attempt to aggregate observable preferences, then fiscal decentralization could be associated with even bigger government size; suggesting a willingness of governments to provide more public goods - perhaps, benevolent governments.

However, for developing countries, there is a negative and statistically significant effect of participatory democracy on government size and a negative and statistically significant effect of the interaction term on government size for liberal democracies. Therefore in the presence of constitutionally protected civil liberties, strong rule of law, an independent judiciary, and effective checks and balances, fiscal decentralization could be an effective tool to reduce government size in developing countries. This is significant as developing countries are noted to struggle with unnecessarily large government sizes.

Table 4.3: Sub-sample: Developed versus Developing countries

	Electoral	Liberal	Participatory	Deliberative	Egalitarian
Panel A: Developed					
FD	-	-	-	-	-
DEM	-	-	-	-	-
$FD * DEM$	+	+	+	+	+
Panel B: Developing					
FD	No	No	No	No	No
DEM	No	No	-	No	No
$FD * DEM$	No	-	No	No	No

Summary of results for the sub-sample of developed and developing countries. Here, +(-)(No) refer to positive effect, negative effect, and no effect respectively.

Employment: An alternative measure of government size

As noted earlier, we follow Martinez-Vazquez and Yao (2009) and Qiao et al. (2019) and use the log of total public sector employment (simply referred to as employment) as an alternative measure of government size. The pairwise correlation between employment is however low (0.05) which may suggest that the former may not be an appropriate proxy for the latter. However, we argue that, we use employment not necessarily as an alternative measure of spending but as an alternative measure of government size. Employment provides a measure of government size in terms of numbers; the number of people in public sector employment. Further, it may be suggestive of the extent of government spending on public sector wages and salaries (a part of total spending), which may explain the low correlation coefficient. Hence in principle, it is an appropriate measure of government size and perhaps suggestive of the cost to government spending in terms of wages and salaries paid to public sector employees.

Turning to the results in Table 4, there is no statistically significant effect of fiscal decentralization and the interaction term on public employment. However, there is a negative and statistically significant effect of all varieties of democracy on public employment. The findings here may be explained as follows; electoral, liberal, participatory, deliberative, and egalitarian democracies provide opportunities for private sector involvement in the economy, increasing private sector employment and perhaps reducing public sector employment, hence, government size. Here also, the effect size is largest for participatory democracy and least for deliberative democracy.

Table 4.4: Employment as an alternative measure of government size

VARIABLES	Electoral	Liberal	Participatory	Deliberative	Egalitarian
FD	-0.00173	-0.00371	-0.0143	-0.0113	-0.00889
	(0.0184)	(0.0132)	(0.0201)	(0.0195)	(0.0160)
DEM	-0.295**	-0.308**	-0.543***	-0.189*	-0.342*
	(0.108)	(0.110)	(0.133)	(0.0955)	(0.183)
$FD * DEM$	-0.000394	-0.000994	0.000405	0.000292	0.000149
	(0.00101)	(0.000943)	(0.00154)	(0.00140)	(0.00122)
$GDPpc$	-0.00607	-0.00635	0.00155	-0.0257	-0.0125
	(0.126)	(0.125)	(0.128)	(0.135)	(0.127)
$KOFGI$	6.17e-06	-0.000372	-0.000598	-0.000928	-0.000405
	(0.00258)	(0.00246)	(0.00247)	(0.00256)	(0.00265)
$Urban$	1.044***	1.067***	1.030***	1.136***	1.104***
	(0.160)	(0.155)	(0.154)	(0.155)	(0.151)
$Young$	0.312	0.322	0.297	0.212	0.275
	(0.470)	(0.464)	(0.491)	(0.510)	(0.464)
Old	-0.105	-0.0861	-0.0854	-0.100	-0.0619
	(0.207)	(0.196)	(0.200)	(0.208)	(0.188)
CBI	-0.000501	0.00190	-0.00636	0.000619	-0.00448
	(0.0380)	(0.0406)	(0.0375)	(0.0376)	(0.0392)
EMU	0.0276**	0.0268**	0.0306**	0.0274**	0.0293**
	(0.0125)	(0.0121)	(0.0124)	(0.0123)	(0.0132)
$Fiscalrule$	-0.0301*	-0.0284	-0.0262	-0.0319*	-0.0318*
	(0.0163)	(0.0171)	(0.0177)	(0.0172)	(0.0173)
Year dummy	Yes	Yes	Yes	Yes	Yes
Observations	546	545	545	546	546
Countries	49	48	48	49	49

Fixed effects estimations with Driscoll-Kraay standard errors. All regressions include a constant term. ***(**)(*) represent statistical significance at 1, 5, and 10 per cent levels respectively.

Regime change: An alternative measure of democracy

As an alternative, we adopt a regime change measure of democracy to capture changes in regime. This is important as transitions within or between political regime types may create changes in political constraints (such as fiscal rules, central government independence) and in the behaviour of bureaucrats and public servants (Marlow, 1988). Such changes may have implications for both decentralization and government size, and hence, the relationship between them. Marlow (1988) argues that where political constraints remain invariant over time, government policies and the behaviour of bureaucrats and public servants do not also change; policy decisions of governments, and bureaucrats or public servants are in part restricted by political constraints. Therefore, changes in the behavior of public servants and governments are likely to be linked to the changes in the political constraints they face or

even changes in the political regime.

We account for regime change by introducing a measure of regime change (regime change lag) and estimating equation (1) in first differences.[9] The advantage of using the regime change lag indicator is that it proceeds from a less restrictive definition of institutional democracy as a concept, maximizing observations on regime transition phases (Bjornskov and Rode, 2019). A first difference estimation therefore rightly captures the switch from 0 to 1 between any regimes and its direct effect on government size, in addition to its indirect effect on government size through fiscal decentralization.

Turning to the results in Table 5, changes in fiscal decentralization is associated with a reduction in government spending. The coefficient of the fiscal decentralization variable is negative and statistically significant. There is however no direct effect of changes in regime on government spending. Also, changes in fiscal decentralisation between any regime change has no statistically significant effect on government size; the coefficient of the interaction term is statistically insignificant.

[9]The regime change variable in Bjornskov and Rode (2019) differs from that of Cheibub et al. (2010) by applying a different timing rule; it *"count all regime changes before July 1 of year x as pertaining to year x, and all regime transitions after that date as pertaining to year $x+1$". pp. 4 Bjornskov and Rode, 2019*Hence, relative to the original data in Cheibub et al. (2010), the regime change data in Bjornskov and Rode (2019) are lagged by half a year. What we adopt here-*Regime change lag*-is a regime change indicator of whether a regime transition occurred in the second half of the year, as it easily enables us to restore the original timing rule in Cheibub et al. (2010).

Table 4.5: Regime change as an alternative measure of democracy

VARIABLES	Spending
$D.FD$	-0.0601*
	(0.0316)
$D.FD * Regimechange$	-0.00187
	(0.00292)
$D.Regimechange$	0.0780
	(0.100)
$D.GDPpc$	0.0530
	(0.205)
$D.KOFGI$	0.00472
	(0.00608)
$D.Urban$	1.389
	(0.925)
$D.Young$	0.207
	(0.484)
$D.Old$	-0.345
	(0.465)
$D.CBI$	-0.148
	(0.0919)
$D.EMU$	-0.0413**
	(0.0183)
$D.Fiscalrule$	0.0102
	(0.0277)
Year dummy	Yes
Observations	563
R-squared	0.209

Fixed effects estimations with Driscoll-Kraay standard errors. All regressions include a constant term. ***(**)(*) represent statistical significance at 1, 5, and 10 per cent levels respectively.

Endogeneity concern

It is possible to contemplate issues of endogeneity from equation (1) and this may be due to reverse causal relationship between decentralization and spending, omitted variable bias, and or measurement error. Such endogeneity concerns have been raised in the literature (see Xhang and Zou, 1998; Jin et al., 2005; and Qiao et al., 2008) although they do not explicitly control for it. We follow Qiao et al. (2019) and adopt an instrument which is given as the "weighted average of fiscal decentralisation from the neighbouring countries(weighted by the contiguity matrix) as instrument for fiscal decentralization in an instrumental variable estimation framework. The instrument is valid as fiscal decentralization policies may be similar between neighboring countries and their design may be influenced by the experiences of neighboring countries. However, the size of government in any country is not expected

to significantly influence the fiscal decentralization policy of its neighbors (see Qiao et al., 2019). The test statistics for the validity of the instruments used and the reliability of the results do not reject that our instrument is valid and reliable. Our estimations pass the tests of under-identification and weak identification in all cases. The F-statistic from the first-stage regression is slightly below the rule-of-thumb threshold of 10 in all cases, but there seems no glaring problem of weak instruments (Staiger and Stock, 1997).

Table 4.6: Robustness check: Instrumental variable estimations

VARIABLES	Electoral	Liberal	Participatory	Deliberative	Egalitarian
FD	-0.338***	-0.323***	-0.307***	-0.325***	-0.360***
	(0.123)	(0.0994)	(0.104)	(0.100)	(0.115)
DEM	-0.491**	-0.516**	-0.564**	-0.507**	-0.737***
	(0.214)	(0.209)	(0.270)	(0.213)	(0.269)
$FD * DEM$	0.0114	0.0119	0.0136	0.0129	0.0174*
	(0.00869)	(0.00794)	(0.0107)	(0.00833)	(0.0101)
$GDPpc$	-0.0611	-0.0555	-0.0498	-0.0648	-0.0770*
	(0.0464)	(0.0435)	(0.0439)	(0.0457)	(0.0464)
$KOFGI$	0.0170***	0.0164***	0.0163***	0.0174***	0.0170***
	(0.00338)	(0.00325)	(0.00328)	(0.00336)	(0.00330)
$Urban$	0.0110	-0.00176	-0.000857	-0.00533	0.0279
	(0.0946)	(0.0903)	(0.0912)	(0.0894)	(0.0952)
$Young$	0.107	0.136	0.133	0.101	0.157
	(0.153)	(0.154)	(0.154)	(0.152)	(0.154)
Old	0.348***	0.370***	0.358***	0.345***	0.387***
	(0.108)	(0.110)	(0.109)	(0.108)	(0.110)
CBI	-0.570***	-0.557***	-0.540***	-0.573***	-0.547***
	(0.113)	(0.111)	(0.109)	(0.114)	(0.112)
EMU	0.408***	0.404***	0.393***	0.406***	0.408***
	(0.0579)	(0.0567)	(0.0567)	(0.0567)	(0.0562)
$Fiscalrule$	-0.140***	-0.141***	-0.156***	-0.148***	-0.126***
	(0.0460)	(0.0457)	(0.0448)	(0.0454)	(0.0462)
R-squared	0.306	0.306	0.307	0.306	0.306
F-statistic	8.13	8.05	7.97	7.97	8.09
Anderson(under)	91.746	112.655	108.493	118.391	94.23
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
C-D(weak)	96.179	121.101	116.04	128.161	99.075
Year dummy	Yes	Yes	Yes	Yes	Yes
Observations	935	935	935	935	935

Note: The dependent variable is government spending. The instrument used is the weighted average of fiscal decentralization from the neighbouring countries (weighted by the contiguity matrix, see Qiao et al., 2019). All regressions include a constant term. ***(**)(*) represent statistical significant at 1, 5 and 10 per cent levels respectively.

Turning to the estimation results in Table 6, we find similar effects of our variables of interest on spending; negative and statistically significant effect of fiscal decentralization and democracy on spending in all case, and positive effect of the interaction term on government spending but only statistically significant for egalitarian democracy.

4.4.4 Non-monotonic relationship

The argument for the existence of a non-monotonic relationship between decentralization and government spending may be explained as follows. A linear relationship implies the variables involved increase(decrease) in the same direction and at the same rate. In addition, a monotonic relationship suggests that decentralization and government size increase(decrease) in the same direction, although not always at the same rate.[10] On the other hand, a non-monotonic relationship implies that the rate of increase(decrease) in the variables may change with a change in one variable. This produces a 'curved patter' within the data, requiring a non-linear modelling. Thus, while a monotonic relationship suggests the relation between the variables considered is positive or negative at all levels of the variables, this is not so for a non-monotonic relationship.

The argument above suggests that, whether or not the relationship between decentralization and government size via democracy is positive or negative, it may not stay positive or negative over time if it is non-linear. There are likely to be some points in time where it will be positive and others where it will be negative. For instance, the relationship at the beginning of a democracy may not be the same as that for an advanced democracy. As government size varies with the level of democracy, so is the expected effect of decentralization via democracy on government size. The relationship is likely to be U-shaped; start high, hit a trough and rise again. That is, at initial levels of democracy, decentralization may be associated with reduced government size; democracy is expected to lead to efficient spending, which implies initially lower levels of spending compared to say autocracy. It may then reach a minimum over time. However, given that increased democracy comes with it an increase in heterogenous preferences among the citizens and an improved ability of citizens to demand higher government spending, the welfare state is required to meet such preferences with increased spending. Hence, advanced democracies are often associated with bigger government size and high fiscal decentralization.

[10] A monotonic inverse relationship is equivalent to a negative correlation, while monotonic direct relationship is equivalent to a positive correlation. Note that while all linear relationships are monotonic, not all monotonic relationships are linear (cf. Yitzhaki and Schechtman, 2012).

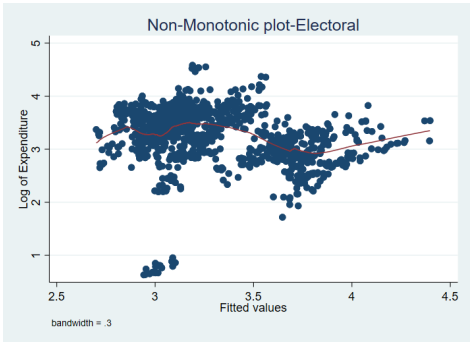
Table 4.7: Non-monotonic relationship

VARIABLES	Electoral	Liberal	Participatory	Deliberative	Egalitarian
FD	-0.125**	-0.111**	-0.115**	-0.111**	-0.107**
	(0.0515)	(0.0465)	(0.0440)	(0.0464)	(0.0511)
DEM	-0.407**	-0.397*	-0.619**	-0.354*	-0.356
	(0.198)	(0.226)	(0.285)	(0.207)	(0.251)
$FD * DEM$	0.0167*	0.0175*	0.0214*	0.0166*	0.0175
	(0.00913)	(0.0103)	(0.0120)	(0.00894)	(0.0117)
FD^2	-1.66e-05	4.97e-06	-7.26e-06	-3.44e-06	-1.80e-05
	(2.65e-05)	(2.48e-05)	(2.14e-05)	(2.44e-05)	(2.52e-05)
$FD^2 * DEM$	-7.78e-05	-0.000115	-0.000114	-8.94e-05	-6.96e-05
	(7.55e-05)	(8.14e-05)	(9.99e-05)	(7.41e-05)	(8.68e-05)
$GDPpc$	-0.101	-0.104	-0.120	-0.0923	-0.0930
	(0.0765)	(0.0706)	(0.0774)	(0.0739)	(0.0747)
$KOFGI$	0.0154***	0.0146***	0.0154***	0.0149***	0.0141***
	(0.00421)	(0.00412)	(0.00427)	(0.00418)	(0.00394)
$Urban$	-0.0210	-0.00596	-0.0496	0.0143	0.0322
	(0.125)	(0.122)	(0.122)	(0.120)	(0.117)
$Young$	0.473***	0.466***	0.439***	0.483***	0.462***
	(0.117)	(0.114)	(0.116)	(0.115)	(0.115)
Old	-0.464***	-0.440***	-0.497***	-0.437***	-0.427***
	(0.144)	(0.147)	(0.156)	(0.142)	(0.139)
CBI	-0.0462	-0.0499	-0.0470	-0.0452	-0.0436
	(0.0520)	(0.0509)	(0.0524)	(0.0511)	(0.0524)
EMU	0.00601	0.00505	0.0122	0.00526	0.00260
	(0.0369)	(0.0377)	(0.0389)	(0.0377)	(0.0370)
$Fiscalrule$	-0.00107	-0.00277	0.00415	-0.000662	-0.00325
	(0.0256)	(0.0262)	(0.0270)	(0.0259)	(0.0258)
Constant	3.604***	3.533***	4.088***	3.227***	3.248***
	(1.114)	(1.076)	(1.237)	(1.019)	(1.052)
Year dummy	Yes	Yes	Yes	Yes	Yes
Observations	1,176	1,176	1,176	1,176	1,176
Countries	67	67	67	67	67

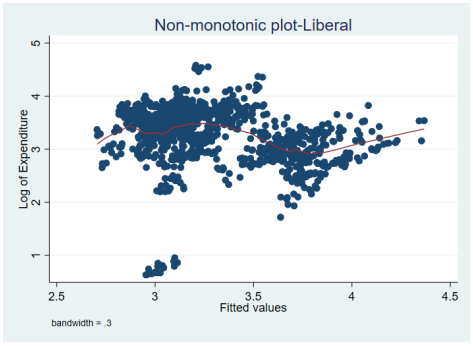
Fixed effects estimations with Driscoll-Kraay standard errors. All regressions include a constant term. ***(**)(*) represent statistical significance at 1, 5, and 10 per cent levels respectively.

The estimation results for the non-monotonic relationship in Table 7 shows similar effects of fiscal decentralization, democracy and the interaction term on government size; negative and statistically significant for fiscal decentralization and democracy on government size (except for egalitarian democracy) and a positive effect of the interaction term on government size (except for egalitarian democracy). However, the coefficients of the squared-term of fiscal decentralization (FD^2) and the interaction of the squared of FD and

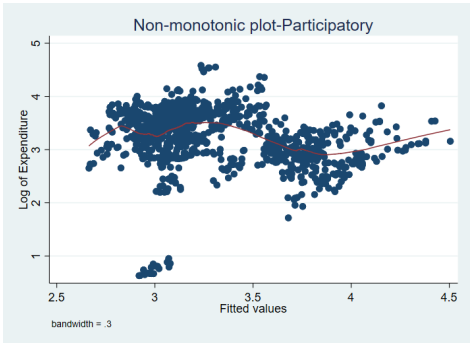
h



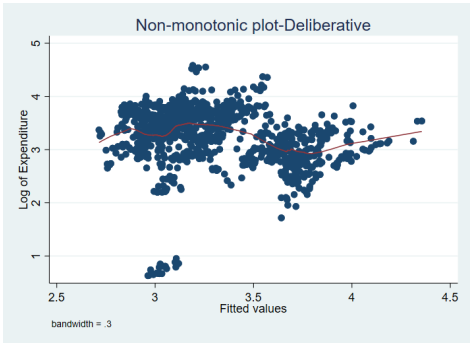
(a) Electoral



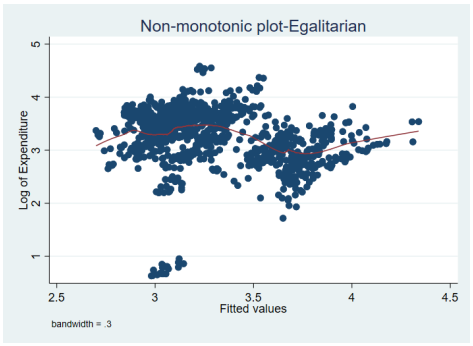
(b) Liberal



(c) Participatory



(d) Deliberative



(e) Egalitarian

Figure 4.1: Non-monotonic plot of varieties of spending under varieties of democracies

democracy ($FD^2 * DEM$) are statistically insignificant.

We provide a plot of the non-monotonic relationship in Figure 1.[11] Figure 1 seems to show non-linear relationship between decentralization, democracy and government size under varieties of democracies. The plot of spending suggests a non-linear relationship, generally of the inverted-U-shape type. This is however by no means conclusive as the coefficients of the relevant variables - decentralization squared and the interaction term of the square of decentralization and democracy - in Table 6 are statistically insignificant. Therefore, there is no conclusive evidence of a non-monotonic relationship in this case; the mediating effect of democracy in the relationship between decentralization and government size is likely to be more linear. Any non-linearity would not be captured by a squared term, as found. It may

[11]To examine non-monotonicity, I make use of the "lowess" command in STATA. As noted earlier, if the graphs show a non-monotonic effect, then I need to include fiscal decentralization squared and the interaction term of fiscal decentralization squared and democracy in equation (1). I explicitly specify a bandwidth of 0.3, meaning 30 per cent of the data is used in smoothing each point. I use smaller bandwidth in order to follow the original data more closely. Lowess is desired due to its locality, as it tends to follow the data. Hence, it gives locally weighted scatterplot smoothing. Polynomial smoothing methods are global; i.e. what happens on the extreme left of a scatterplot can affect the fitted value in the extreme right.

be the case that the non-linearity is addressed when conditioning on controls, but it suggests heterogeneity, which for instance including say an OECD interaction would not account for.

4.5 Conclusion

In this paper, we examine the mediating effect of democracy in explaining the relationship between decentralization and government size for the period 1970-2013. We proxy decentralization by fiscal decentralization, use total spending as our primary measure of government size, and adopt the V-Dem high-level democracy indices as measures of democracy. Our study is to our knowledge unique as it considers the mediating effect of varieties of democracy as against the use of an institutional proxy for democracy or a binary variable as measure of democracy. Our indices provide an interval of between 0-1 which measures high and low democracies for specific concepts of democracies such as electoral, liberal, participatory, deliberative, and egalitarian democracy. The current paper also accounts for the influence of regime change and examines the effect of non-linearity. Our robustness tests are; (i) using sub-sample of developed and developing countries, (ii) an estimation with employment as an alternative measure of government size, (iii) an estimation with regime change as an alternative measure of democracy, and (iv) an instrumental variable estimation to take care of endogeneity.

Our main finding is that fiscal decentralization in itself is an effective tool to "starve the beast" as it leads to reduced government size suggesting support for the Leviathan hypothesis. Fiscal decentralization seems to have more negative effect when we control for electoral democracy. The negative effect of decentralization on government size is consistent across all estimations. Democracy is associated with a reduction in government size, and the largest effect seems to be participatory democracy. We find evidence of the mediating effect of democracy in the relationship between decentralization and government size; a positive and statistically significant effect of the interaction term with the effect size largest for the participatory principle of democracy. The positive effect of the interaction term in the main results is consistent for all estimations except the sub-sample of developing countries, although only statistically significant for egalitarian democracy in the IV estimation, but statistically insignificant for employment and regime change. However, an increase in fiscal decentralization in a developing country under a liberal democracy is associated with a reduction in government size. We do not find a non-linear relationship between decentralization and government size.

A number of caveats and qualifications must be noted. First, while the effect size of fiscal decentralization and democracy are by no means small, with a percentage in fiscal decentralization being associated with changes in spending up to 36 per cent, the interaction term has a magnitude of effect of a maximum of 1.7 per cent. The joint effect of fiscal decentralization and democracy on government size is therefore lower than the individual effects of these variables.

Notwithstanding, our results provide important implications for policy. Fiscal decentralization may be an effective tool for citizens to bargain for increased public goods provision in

a democracy in general, more so where the core characteristic of the democracy is participatory. For a developed country, all concepts of democracy could be important as government size is likely to increase in all cases. Given the struggles of developing countries to control large government sizes, the beast could be starved if decentralization comes with it a more liberal democracy.

Appendix

Table A3.1: Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Spending	3,419	25.72921	12.57706	1.877688	210.2051
Employ	1,132	1845.236	4226.855	1.4	38063
FD	1,615	25.30753	17.90808	0.018681	98.75611
GDPpc	7,893	8.2243	1.509572	4.751814	11.87928
KOFGI	7,696	48.93902	16.55902	14.2923	90.39829
Urban	10,166	51.21273	25.17438	2.845001	100
Young	9,242	34.4939	10.32543	11.13134	51.88591
Old	9,242	6.302605	4.23739	0.75047	24.62983
CBI	5,832	0.491597	0.202769	0.016667	0.979
EMU	10,296	0.019911	0.1397	0	1
Fiscal rule	10,296	0.129274	0.335519	0	1
Electoral	7,358	0.425893	0.289686	0.009	0.924
Liberal	7,295	0.329997	0.276637	0.003	0.891
Participatory	7,326	0.263908	0.215059	0.005	0.808
Deliberative	7,358	0.332631	0.272712	0.003	0.899
Egalitarian	7,358	0.336598	0.246317	0.015	0.887
Regime change lag	3,344	0.010467	0.101784	0	1

Table A3.2: Pairwise correlation for varieties of democracy

VARIABLES	Electoral	Liberal	Participatory	Deliberative	Egalitarian
Electoral	1.0000				
Liberal	0.9748	1.0000			
Participatory	0.9682	0.9683	1.0000		
Deliberative	0.9713	0.9798	0.9640	1.0000	
Egalitarian	0.9481	0.9733	0.9466	0.9595	1.0000

Table A3.3: List of countries

Albania	Czech Republic	Jamaica	Peru
Argentina	**Germany**	Jordan	**Poland**
Armenia	**Denmark**	**Japan**	**Portugal**
Australia	Dominican Republic	Kazakhstan	Paraguay
Austria	**Spain**	**Korea, Rep.**	Russian Federation
Azerbaijan	Estonia	Lesotho	El Salvador
Belgium	**Finland**	Lithuania	Serbia
Bulgaria	**France**	**Luxembourg**	Slovak Republic
Bosnia and Herzegovina	**United Kingdom**	Latvia	Slovenia
Belarus	Georgia	Morocco	**Sweden**
Bolivia	Greece	Moldova	Thailand
Brazil	Honduras	Mexico	Tunisia
Canada	Croatia	Macedonia, FYR	**Turkey**
Switzerland	Hungary	Malta	Ukraine
Chile	India	Mongolia	**United States**
Congo Rep.	**Ireland**	Mauritius	South Africa
Colombia	Iran, Islamic Rep.	Malaysia	
Cabo Verde	**Iceland**	**Netherlands**	
Costa Rica	**Israel**	**Norway**	
Cyprus	**Italy**	**New Zealand**	

Note: OECD countries are in bold.

Chapter 5

Rewarding Allegiance: Political Alignment and Fiscal Outcomes in Local Government

In this paper, we examine how local governments' political alignment with central government affects subnational fiscal outcomes. In theory, alignment could be rewarded with more intergovernmental transfers, or swing voters in unaligned constituencies could be targeted instead. We analyze data from Ghana, which has a complex decentralized system: District Chief Executives (DCEs) are centrally-appointed local administrators loyal to the ruling party, while district MPs may belong to another party. A formula for transfer distribution aims to limit the influence of party politics. Using a new dataset for 1994-2014 and a regression discontinuity design, we find that despite this system, districts with aligned MP and DCE receive more transfers, have higher district expenditure, and more internally generated funds. Results are strongest for a subsample of constant districts over the period, suggesting that municipal fragmentation has weakened political alignment effects. We also show strong electoral cycle effects, and find a crowd-in effect for Ghanaian districts.

5.1 Introduction

Fiscal policy outcomes in decentralized systems are often influenced by political factors such as political alignment between the central and local governments, and electoral cycle pressures. Given politicians' primary aim of securing re-election, Lindbeck and Weibull (1987) proposed that intergovernmental transfers (i.e. fiscal transfers from the central to the local government level) would be targeted primarily at swing voters in order to convince them to cast their vote for the incumbent party candidate in the next election. Cox and McCubbins (1986) instead contended that transfers would aim at rewarding core supporters

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in constituencies that chose the incumbent party with a larger vote share. A sizeable empirical literature now exists on the political motivations behind intergovernmental transfers. The evidence generally, but not exclusively, supports the core-voter-targeting explanation for politically-motivated intergovernmental transfers.[1]

The present paper provides the first comprehensive analysis of how political factors affect a range of fiscal outcomes in a complex, developing-country context. Specifically, we look at Ghana and answer three related questions: how does political alignment influence subnational fiscal outcomes, including intergovernmental transfers, and local expenditure and internally generated funds? Second, are there electoral cycle effects in local fiscal outcomes? And finally, is there a crowding-in effect (often called a flypaper effect), i.e. do intergovernmental transfers lead to disproportionate increases in local expenditure compared to similar-sized internally generated revenues?

Ghana is a stable multi-party democracy with regular elections that are deemed free and fair. It has seen six national-level elections and three peaceful changes in power between ruling parties since the return to democracy in 1992. The country has a decentralized system of government, with substantial powers delegated to the Metropolitan, Municipal and District Assemblies – what we call District Assemblies (DAs) for simplicity (see section 5.3 for more details). Crucially, Ghana's system adds a layer of complexity to the conventional political alignment setup, where one key local figure (e.g. a mayor of a municipality or a state governor) is either aligned or unaligned with the central government. Ghana's DA membership is made up of both locally-elected and centrally-appointed officials, in addition to the Member(s) of Parliament (MP) representing the local constituency.[2] The most powerful political appointee is the District Chief Executive (DCE), the head of the DA directly appointed by the President. DCEs are viewed as party cronies and owe their allegiance to the central government, whose policies they are expected to promote and for whom they should garner support among the district electorate (Ahwoi 2010; Ayee and Dickovick 2010; Mohammed 2015). This means that in principle, *all* districts are aligned with the central government to the same degree. Nevertheless, political differences can and do arise from the fact that MPs instead may be of an opposition party, and that DCEs and MPs are often at odds with each other.[3] Political alignment of a district in the Ghanaian system is therefore determined in practice by the political affiliation of the local MP(s).

All districts are heavily reliant on central government transfers to carry out their duties, and both the DCE – as the head of the DA – and the MP(s) are viewed by the general public as responsible for district-level policies. In a context where showing that one can 'get things done' is very important, MPs however have limited (public) financial means at their disposal

[1] The empirical evidence spans countries across the world, from the United States (Larcinese et al. 2006), to India (Rodden and Wilkinson 2004), Brazil (Brollo and Nannicini 2012), and Italy (Bracco et al. 2015), to name a few recent contributions.

[2] Each district has at least one constituency. The more populous Municipal and Metropolitan districts have more than one constituency and MP.

[3] Ghana has a multi-party system, but politics are dominated by the two largest parties, the New Patriotic Party (NPP) and the National Democratic Congress (NDC). All Presidents so far have been members of either of these two parties. The two parties are generally characterized as center-right and center-left, respectively, with only loose ethnic group identifications (see e.g. Boylan 2016).

to directly target their constituency, giving DCEs the upper hand when it comes to exploiting the possibilities of politically-motivated transfers. The Ghanaian system seeks to prevent such patronage by making the allocation of the main central transfer – the District Assembly Common Fund (DACF) – subject to a mathematical formula, approved annually by Parliament, that considers a district's population size and comparative development factors.[4] Yet, Banful (2011) finds evidence of political motivation in the relative size of transfers of DACF moneys, and of the weights given to the criteria in the formula: transfers tend to be targeted at swing districts, and the formula appears to be amended with this aim prior to national elections.

This paper looks beyond just the DACF and uses a unique, broad set of measures of district-level fiscal outcomes for the years 1994-2014, covering five national-level elections. We apply a careful causal identification approach to analyze whether Ghana's complex system shows any evidence of political influences, despite the built-in hurdles to party favouritism in intergovernmental transfers. The peculiar political pressures and rivalries at the local constituency level would lead us to expect that, if anything, there is targeting of swing voters through increased transfers to (marginally) non-aligned districts. We first examine variations in district fiscal outcomes over the entire electoral cycle and show that there is a marked increase on average across districts and fiscal measures in (pre-) election years, but no clear evidence for political alignment effects.

We then apply a regression discontinuity design (RDD) – which has been frequently employed in the recent empirical literature on political alignment effects – and instead find clear evidence of political targeting of core supporters, particularly in intergovernmental transfers and district expenditure, and to a lesser degree also in internally generated funds (IGF). Our treatment variable is an alignment dummy that takes the value of one if the district is aligned with the central government, and 0 otherwise. Our assignment variable is the difference between the percentage of vote share of the parliamentary candidate of the party that wins the national elections, and the percentage of vote share of the parliamentary candidate of the main opposition party that loses the national elections.[5] Hence, a positive margin denotes an aligned, while a negative margin implies an unaligned district. Results from an extension using time-differences-in-differences point in the same direction. A plausible explanation is that it is difficult to successfully identify and target 'swing' voters and districts in a context where district-level voting patterns in national elections seldom persist for more than two electoral cycles. In addition, the flip-side of core supporter reward implies that DCEs who fail to bring their district close to the governing party line might be 'punished' with relatively lower transfers.[6]

Finally, we demonstrate that transfers crowd-in both local government expenditure and

[4]There is an ongoing debate on whether the small share of the DACF transfers devoted to MPs' district development projects is unconstitutional. There are numerous calls for revising the current policy and having MPs focus on their core job of legislating at the national level, though it is recognized that this will necessitate a change in people's perceptions of MPs' responsibilities and the extent of their power (see Ahwoi 2010).

[5]We use the vote shares of NPP and NDC in determining vote margin. We assign winner or loser according to which of these two parties win the national presidential elections.

[6]Robinson and Torvik (2009) focus on the possibility that swing voters are severely punished, potentially to the point of disenfranchisement. There is no evidence of the use of such 'sticks' in Ghana.

own revenues, using the instrumental variables (IV) approach proposed by Bracco et al. (2015), with our alignment dummy as the exogenous instrument for transfers.

Our main sample includes a balanced panel of the 39 districts that have been present throughout the period under analysis (what we term "constant" districts). There has been a remarkable process of municipal fragmentation in Ghana since the current Constitution was passed in 1992, which has led to a stepwise increase in the number of districts from 110 in 1994, to 216 at the end of our sample period. Our results are broadly consistent when we vary the sample size, including all districts in the sample, or districts with only one MP, where political alignment is most clear-cut. However, results are strongest for our main sample, suggesting that municipal fragmentation in Ghana has in effect weakened any attempts at political targeting of transfers to date, in spite of recent criticism of gerrymandering in the setting of new district boundaries (see Riedl and Dickovick 2014; Mohammed 2015). Our results suggest that it is in fact this continued fragmentation, rather than the complex political system, that has played the biggest role in curtailing the influence of political favouritism in subnational fiscal outcomes in Ghana.

The rest of the paper is structured as follows: Section 2 provides a brief literature review; Section 3 gives more details on the Ghanaian context; Section 4 presents the methodology and data; Section 5 discusses the political alignment results and Section 6 the flypaper effect results; and Section 7 draws conclusions.

5.2 Literature review

The modern debate on the decentralization of government goes back to Buchanan (1950), Musgrave (1959), and Oates (1972, 1977), who argued that decentralization leads to greater political participation, accountability, and administrative and fiscal efficiency. Critics of decentralization instead point out that it leads to soft budget constraints, macroeconomic instability, clientelism, and greater government size (e.g. Rodden 2006).

A vast literature has since developed on the merits and demerits of a decentralized system. One aspect that has received particular attention is the importance of intergovernmental transfers for the provision of public goods and for political competition at the local level. In theory, these transfers could be used to increase politicians' re-election chances, either by convincing swing voters (e.g. Lindbeck and Weibull 1987), or by rewarding core supporters (e.g. Cox and McCubbins 1986; and Dixit and Londregan 1996). *Political alignment* – i.e. whether the local politician is of the same party or coalition as the central government – is a central concept in this strand of the literature.

Our study contributes to the large body of evidence that seeks to estimate the impact of political alignment on central transfers. Empirically, most studies have found a positive effect of political alignment with the center on the size of intergovernmental transfers – especially discretionary grants – in line with the hypothesis of rewarding core supporters. Examples include Levitt and Snyder (1995) and Larcinese et al. (2006) for the U.S.; Arulampalam et al. (2009) and Rodden and Wilkinson (2004) for India; Brollo and Nannicini

(2012) for Brazil; and Bracco et al. (2015) for Italy.[7] There is also evidence of electoral cycle effects in fiscal outcomes, with an increase in the expenditure and the budget deficit in election years which can differ across countries (.e.g, Shi and Svensson 2006), or which may be driven by party politics (e.g., Sakurai and Menezes-Filho 2011). The present paper examines a decentralized system in Africa over a period of twenty years and five election cycles, and finds evidence of electoral cycle effects, and of core-supporter reward not only in the size of central government transfers, but also in district expenditures and internally generated funds, which have not received much attention so far.

Another common finding in the decentralization literature is that of a crowding-in or so-called flypaper effect: central government transfers increase the level of local government spending more than an equivalent amount of extra locally-generated revenues.[8] We follow the strategy in Bracco et al. (2015), who isolated this effect in Italy by instrumenting central government grants with political alignment, and we find some evidence for a crowding-in effect in Ghana.

Although few contributions examine the effects of decentralization in Africa, we are not the first to do so. Mbate (2017) reviews the literature that shows how decentralization has spread throughout the continent and how it has affected governance.[9] Appiah-Agyekum et al. (2013) present a qualitative analysis of how the Ghanaian decentralized political system influences the use of local government finance. More closely related to our paper, Miguel and Zaidi (2003) find evidence of 'patronage targeting' at the district level in Ghana's education spending between 1996 and 2000, applying a regression discontinuity design to a random sample of schools. Mogues and Benin (2012) use a panel dataset for Ghana from 1994-2004 and show that central government transfers crowd out locally-generated revenues, in spite of incentives for raising own funds that are built into the criteria for allocation of the DACF. Banful (2011) extends the same dataset to 1994-2005 to examine whether the formula for the allocation of DACF moneys eliminates politically-motivated targeting of transfers. In fixed-effect estimations, she finds that transfers follow the swing-voter hypothesis: districts with lower vote margins in the previous election receive relatively more transfers, and the criteria for funding allocation change in line with this prediction. Using a longer time period of official data than all previous contributions and applying an RD design, we instead find evidence for the core-supporter hypothesis in Ghana.

5.3 The local governance structure of Ghana

5.3.1 The institutional framework

Our focus is on Ghana, so it is worth describing the country's decentralized political and fiscal system in some detail before turning to the empirical analysis. Ghana has been a

[7] In a related paper, Borcan (2020) looks at the links between political alignment and electoral fraud in Romania.

[8] See Inman (2008) for a review of the literature on the flypaper effect.

[9] Riedl and Dickovick (2014) instead look at how political party systems have affected decentralization in Africa, and include Ghana in their case studies.

stable, multi-party presidential democracy since the new Constitution of 1992 signalled the end of the last military government. The new Constitution included a decentralized structure of government, with substantial powers delegated to sub-national entities; fiscal decentralization was added in 1994 to formalize central government transfers to local authorities.[10] In practice, the current decentralized governance system has four tiers below the center, operating – starting at the top of the hierarchy – at the regional, district, zonal, and Unit Committee levels. In this article, we concentrate on the District Assemblies (DAs), which act as the crucial links between regional and central governments above, and Zonal Councils, Unit Committees and the general population below.[11]

The Constitution of Ghana specifies that the DAs are the highest political, legislating, budgeting, and planning authorities at the local level.[12] In order to carry out its plans, a District authority has three sources of revenue: central grants directed to the District Assemblies Common Fund (DACF); ceded revenue;[13] and internally generated funds (IGF) raised through local taxation, fees, fines, and charges. The DACF and ceded revenue are both central government transfers, but the DACF constitutes the main source of funding of district authorities. It has a constitutionally stipulated minimum share of central government revenue of at least 5%; it is distributed between DAs according to a formula approved annually by Parliament, and in turn its allocation by DAs must be approved by the central government.[14]

The DACF allocation formula is calculated as a weighted linear combination of four criteria, which adds up to 100%. The most important is the 'Equality' criterion, which ensures that each district benefits from a substantial amount of the DACF by providing an equal base sum to every district. The 'Need' criterion is targeted at bridging the gap between rich and poor districts. It considers factors such as income or wealth, population, health facilities, doctor-to-population and nurse-to-population ratios, education facilities, pupils-to-teacher ratio, water coverage, tarred roads mileage, and number of dilapidated schools. The 'Responsiveness' criterion serves as an incentive for districts to raise their own revenues, although the indicators used to measure own revenue generation have greatly varied

[10]Decentralization was further strengthened in 2010 under the Decentralization Policy Framework.

[11]The Regional Coordinating Councils (RCCs) have little real power beyond coordinating activities and strategies, while the two lowest levels are mainly responsible for carrying out at the local level the policies decided above, and for conveying concerns from the population to the higher government levels.

[12]Among their most important tasks are the preparation of annual district Development Plans, which should be subjected to public hearings to ensure alignment with local needs; and of annual budget estimates. Both require approval by a majority of District Assembly members. Development is prescribed to be pro-poor and cover basic infrastructure, the provision of municipal works and services, the management of human settlements and of the natural environment in the district (FES 2016). In particular, DAs are responsible for fire protection; the civil status register; the maintenance of a statistical office; education services including pre-school, primary, and junior secondary education; social welfare services including family welfare services and welfare homes; public health services including primary care and health protection; water and sanitation; refuse collection and disposal; self-help projects; cemeteries and crematoria; slaughterhouses; and parks and open spaces, sports and leisure facilities.

[13]Ceded revenue is redistributed to DAs by the Internal Revenue Service via the Ministry of Local Government and Rural Development. It includes some specialized funding sources (e.g. natural resource royalties).

[14]Since 1997, a small share of each district's DACF funds – around 4-5% – is allocated to the DA's MP(s). See the "Guidelines for Utilisation of 50% of the District Assemblies' Common Fund Contingency Factor Allocation to be Shared on Constituency Basis", Ministry of Local Government and Rural Development Ref. No. SCR/ADM.250/VOL.3, 18th November 1997.

over the years (Banful 2011). Finally, a measure of the intensity of use of public facilities in a district — 'Service Pressure' – is included in the formula to account for the implications of population density for public facilities. We control for district population and the number of private schools in our regression estimations to take some of the main DACF allocation criteria into account. Note that the weight assigned to these criteria frequently varies, although the 'Equality' criterion has always maintained the largest weight. Banful (2011) argues that formula changes are politically motivated; on the flipside, the frequent changes in the DACF formula imply that districts cannot easily influence future grant allocations, especially since allocation formula details are only communicated with a two-year delay (see also Mogues and Benin 2012).

Although DAs can set local tax rates, the potential for fiscal revenue from local taxation is limited, as the most lucrative sources of taxation – income tax, sales tax, and import and export duties – go to the central Internal Revenue Service. Moreover, local tax collection is ineffective (Dickovick and Riedl 2010).[15] Instead, district authorities overwhelmingly rely on central government transfers for their revenue, with grants and DACF funds combined making up on average over 80% of DAs' revenue sources. Figure 5.1 clearly confirms the huge reliance of districts on central government transfers.

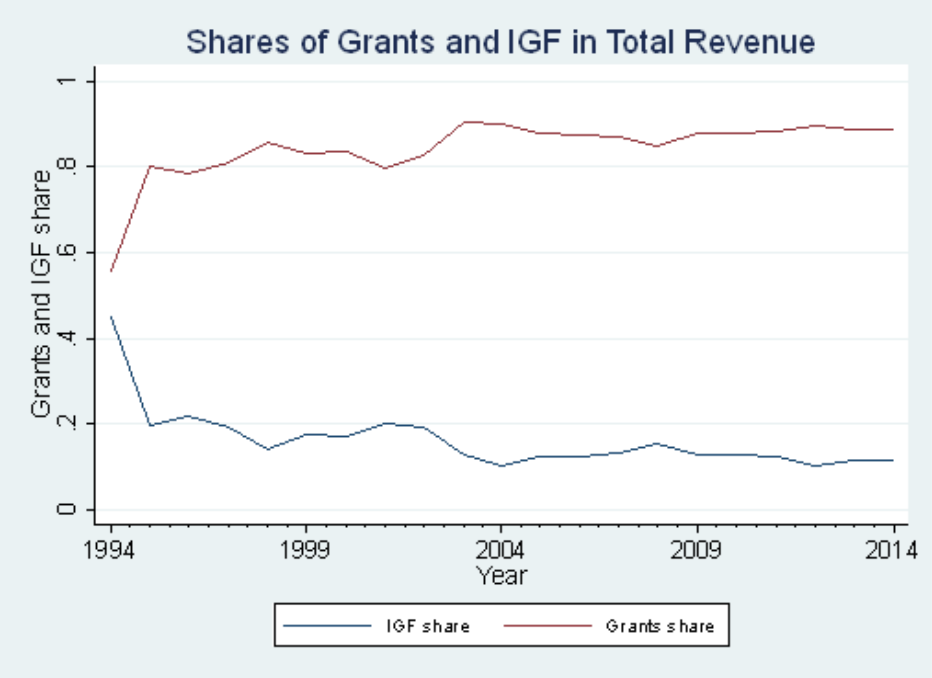

Figure 5.1: Mean shares of grants and IGF in districts' total revenue in Ghana, 1994-2014

Since the Constitution of 1992, Ghana has gone through four rounds of district government fragmentation, which have successively increased the number of districts from 110 to 138 (after the creation of new districts in 2004), to 173 (2008), 216 (2012), to currently 254 (2018). In the early phases, fragmentation gave due consideration to the idea of economic

[15]There is one other potential source of revenue, which however has uneven usage across districts and time: revenue may come from outside the national framework, for example from the IMF/ World Bank's Heavily Indebted Poor Countries (HIPC) Initiative debt relief programme (FES 2016). Note that District Assemblies are not allowed to set deficit budgets, and any loans require prior approval by the Ministry of Finance. The Auditor General audits the annual accounts of DAs and presents a report to parliament.

viability of the new districts and the creation of effective local institutions; however, critics argue that since the 2000's, fragmentation has actually worsened central public spending inefficiencies and weakened local fiscal accountability (e.g., Mohammed 2015).[16] In order to avoid bias driven by politically-motivated district boundaries as much as possible, our main results rely on a restricted sample of 39 districts that remain unaltered in our sample from 1994-2014.[17]

The DAs' huge reliance on central government moneys to carry out their duties potentially opens up avenues for politically motivated transfers. To better assess this possibility, we next describe Ghana's local government politics in more detail.

5.3.2 Local government politics

A unique feature of local governance in Ghana is that membership of the District Assemblies is determined though a combination of centrally-made appointments and locally elected representatives. 70% of Assembly Members are elected; these elected members are also members of the Unit Committee in their local electoral area. The DA further includes the member(s) of parliament (MPs) representing the constituency(-ies) within the district; MPs are *ex officio* members with no voting right in general assembly meetings of DAs. Elections for DA members – but not MPs – are on a non-partisan basis; the elections are state-sponsored and conducted by the electoral commission. Finally, 30% of the DA members are directly appointed by the president, (theoretically) in consultation with chiefs and interest groups in the district.

Crucially, the appointed members include the District Chief Executive (DCE), who is the political-administrative head of the DA with the power to initiate, design and implement policies, and tasked with managing the district's resources (FES 2016; Debrah 2016). The approval of the government's DCE nominee depends on a two-thirds majority of the vote in the general DA. Those in favor of the system argue that it is necessary for the President to be given the opportunity to mobilize so-called competent and experienced individuals to complement elected assembly members, who may not always have technical knowledge of the issues (Debrah 2016). However, appointees tend to be seen as party cronies rather than technicians (Afrobarometer 2008; Ayee and Dickovick 2010; Mohammed 2015). In fact, DCEs are subject to "centripetal forces of central control" that pull their districts towards the central government (Ahwoi 2010: 7), and they are highly aware of being accountable to the President, who can "sack [them] at any time" (Ahwoi 2010: 15). The outcome of this mixed model of political appointees (heavily linked to the central government) and elected members (who may be aligned with the opposition) is 'administrative politicking': DCEs are

[16]The motives behind the creation of new districts have also come under scrutiny, as the increase in constituencies and MPs that accompanies fragmentation has raised accusations of 'gerrymandering', i.e. the manipulation of constituency boundaries to favor one party (Riedl and Dickovick 2014; Mohammed 2015). While this strategy works sometimes in Ghana, our data show that newly created districts are no more loyal to one party over time than districts that have existed since 1992. Few districts in Ghana can truly be regarded as 'safe' for any political party for more than two electoral cycles.

[17]We cannot exclude that the reasons why these districts remain 'constant' introduce their own bias into our estimations. They are mainly rural districts with no large urban center. However, in robustness tests using different sample variations (discussed below), we find similar results.

often accused of breaking administrative rules, interfering with MPs' local political roles, distrusting civil servants, and generally contributing to chaotic local government (Debrah 2016).

DCEs and MPs frequently clash due to a peculiarity in the system mentioned above: MPs receive a share of a district's DACF for own projects and 'monitoring', and the allocation and disbursement of this share must be approved by the DCE.[18] Tensions between the two sides also arise from extreme partisanship and the desire to score political points; from personality conflicts; and from low transparency and trust – all of which are likely exacerbated by the appointee's often being the unsuccessful candidate in the last parliamentary race, especially in districts won by the opposition.[19] In fact, though influential, the DCE's position is precarious because it depends on presidential favor, and it is subject to a two-term limit. If the DCE has ambitions for a more secure and prominent political career, they will typically run for MP (Ahwoi 2010). Competition is always likely to be high in districts where there is differing party allegiance between DCE and MP(s), but if DCEs show an interest in the parliamentary seat, tensions arise even when both sides are in the same party (Boylan 2016; Debrah 2016).

In sum, no matter the outcome of the district-level parliamentary and presidential elections, the local DCE is always likely to owe allegiance to the party in power in the central government, and may have their own political career at heart during their agenda-setting and decision-making process. A district MP, on the other hand, may be aligned or unaligned with the ruling party. The decentralized system in Ghana therefore offers an interesting case study of politically motivated intergovernmental transfers and local government expenditure patterns.

5.4 Data and Methodology

5.4.1 Effects of political alignment on fiscal outcomes

Electoral cycles

We first examine the effects of political alignment on fiscal outcomes in Ghana. We focus on central government grants as the main fiscal outcome, but also discuss results for district expenditure and internally generated funds (IGFs) in the extensions and robustness analysis below. To begin with, we look at systematic variation over time in local fiscal outcomes and explore the existence of electoral cycles using a panel fixed-effects estimator as follows:

[18]There are numerous reports of delays in approval and disbursement, or even appropriation by the DCE to undertake projects without the knowledge of the MP (see Boylan 2016; Debrah 2016). The Minister of Local Government and Rural Development and DACF Administrator are regularly called upon to intervene in cases of conflicts over disbursements of MPs' shares. In cases of "actual sabotage", the DACF Administrator can directly disburse the small part of an MP's DACF share that is allocated to 'monitoring and evaluation'. This advance is then deducted from the next quarterly DACF tranche (personal interview with a former DACF Administrator, Accra, May 2019).

[19]On the tensions and clashes within DAs, see Ayee (1999); Daddieh and Bob-Milliar (2012); Boylan (2016); Debrah (2016).

$$lnGrants_{it} = \alpha + \sigma EY_{it} + \beta X_{it} + \mu_i + \epsilon_{it}, \tag{5.1}$$

where $lnGrants_{it}$ refers to the natural logarithm of real per capita central government grants to district i in year t; EY refers to the election year dummy; and X_{it} represents a vector of control variables, including the total number of private schools in the DA – a proxy for district income – and the total population in the DA, which are given in natural logarithms. The district fixed effects and the error terms are shown as μ_i and ϵ_{it}, respectively.

In an extension, we introduce dummy variables for one and two years before the election year, with the latter dummy variable coinciding with the second year after the previous election in the four-year term. We also include an interaction term between the election year and a dummy for political alignment between DAs and central governments (described below), to determine whether the effect of elections differs between aligned and unaligned districts. We expect σ to be positive for the election year and a year before the election year, but negative for two years before the election year, signalling an electoral cycle effect.

Regression Discontinuity Design (RDD)

We next examine the average causal effect of political alignment on central government grant allocations to local governments. We measure district alignment by considering the political alignment between local government political agents and the center, with the DCE and MP as our local political agents. Given that DCEs are appointed by the central government, if the elected MP in the district and the central government belong to the same party, then the DCE and MP are automatically aligned with the central government. Hence, alignment is a dummy variable equal to 1 if the DCE and MP are from the same party as the central government, and 0 otherwise. We consider parliamentary election results, because parliamentary and presidential election results in Ghana are to a large extent identical. With the unit of observation for election results at the constituency level, we aggregate the parliamentary election results to the district level as constituencies are units within districts [20]. Ghana has a first-past-the-post electoral system, so a party is considered to have won a district if it captures a relative majority of the parliamentary vote share. For districts with more than one MP, alignment is determined using the difference between the average of the sum of votes for the parliamentary candidates of the winner of the national election and the average of the sum of votes of the parliamentary candidates of the loser of the national elections [21]. The RDD approach has been adopted in similar contexts by recent studies such as Brollo and Nannicini (2012), Bracco et al. (2015), Bonilla-Mejía and Higuera-Mendieta

[20] Banful (2011) adopts a similar approach to aggregating constituency-level election results to district-level results. She also notes that presidential and parliamentary results in Ghana are virtually the same, as candidates of the two major parties win in both the presidential and parliamentary elections held in any given district.

[21] Since Ghana is effectively a two-party state, assume two parties in an election, Party A and Party B. Assume further that there are 3 constituencies in district i at time t. Both parties field candidates for each constituency. Hence, we aggregate the percentage of votes obtained by all candidates of Party A and divide by 3 and do same for Party B. If Party A's presidential candidate wins the national elections, then we assign Party A as the winner and Party B as the loser, and construct $Margin$ and $Align$ as described later.

(2017), and Borcan (2020). These studies use close elections or 'marginal winners/losers' for identification in examining concepts such as alignment and transfers, alignments and electoral advantages, and alignment and electoral outcomes. In addition to this, the RDD technique is largely popular in examining causality in Economics and related fields in social science and business and in other scientific fields such as epidemiology among others.

We adopt the *continuity-based* Regression Discontinuity design as our identification strategy to determine the causal effect of political alignment on central government grants to local governments in Ghana. Our estimation is based on testable continuity assumptions (Cattaneo et al. 2018). We estimate the Average Treatment Effect (ATE) of political alignment based on the discontinuity in observed outcomes at the cut-off. Stated differently, the continuity approach assumes that in the absence of treatment, potential outcomes are changing smoothly across the threshold; treatment alone then produces a discontinuity. An RD design is particularly suitable in our case given that local governments in Ghana are relatively homogeneous in nature, having a similar administrative, budgetary, fiscal, political, and institutional structure. The estimated model is stated as follows:

$$lnGrants_{it} = \rho_0 Align_{it} + f(Align_{it} * Margin_{it}) + \beta_i X_{it} + \varsigma_t + \mu_i + \epsilon_{it} \tag{5.2}$$

where $lnGrants_{it}$ refers to the natural logarithm of real per capita central government grants to district i in year t. Our treatment and assignment variables are $Align_{it}$ and $Margin_{it}$, respectively. Our control function, $Align_{it} * Margin_{it}$, is a *p*th-order polynomial in $Margin_{it}$ interacted with our treatment variable $Align_{it}$. X_{it} represents a vector of time variant control variables (i.e. total population and number of private schools) which are given in natural logarithm, ς_t refers to the year dummy, μ_i represents the district fixed effect, and the error term is given as ϵ_{it}. Our coefficient of interest is ρ_0 which measures our alignment effect at the zero threshold; a positive coefficient would indicate core-supporter targeting. We assume triangular kernel weights with bandwidth selected using the Mean Square Error (MSE)-optimal bandwidth choice. Standard errors are clustered at the district level (see Cattaneo et al. 2018).

5.4.2 Crowd-in or crowd-out: The effect of transfers

In a second step, we examine the effect of transfers on local government expenditures and own revenues (IGFs), following the approach of Knight (2002) and Bracco et al. (2015). The expectation for local expenditure is that there is a flypaper effect when a dollar of central government grants is associated with relatively higher levels of public spending compared with an equivalent dollar of citizen income (Inman 2008). What about IGFs or own-tax revenues? The basic median-voter model argues that central government grants will be associated with lower local taxes, since local governments will now be able to optimally mix revenue sources to fund spending. In effect, it is expected that central government grant receipts will crowd-out local government own-tax revenue generation, resulting in reduced local tax revenues (Scott 1952; Bradford and Oates 1971 a,b; and Dahlberg et al. 2008).

Arguments on crowd-out and crowd-in effects of grants on local government spending and local government internally generated funds assume an exogenous distribution of grants (Knight, 2002). However, grant allocations are determined through a political process and are the outcome of a bargaining game at the central government level. Grant allocations are therefore likely to reflect underlying constituent preferences expressed through their elected representatives (Besley and Case 2000). Hence, ignoring the link between preferences and grant receipts may reduce any possibility of finding evidence for a crowd-in or crowd-out effect of grants on spending or local government own-revenues (Knight 2002). For instance, local government spending could increase simply because of a political decision to increase grant allocations to a local government. This makes it difficult to solely attribute any evidence of a crowd-in effect to increased grants without considering the political decision to increase such grants. Knight (2002) suggests such endogeneity could be corrected by using measures based on the political power obtained from having a legislative or parliamentary representation such as partisan affiliation (political alignment in our case), committee representation and tenure. Therefore, we follow Knight (2002) and Bracco et al. (2015) and examine the effect of central government grants by instrumenting central government grants in the following specification:

$$Y_{it} = \alpha_1 Grants_{it} + \beta_i X_{it} + \vartheta_t + \mu_i + \epsilon_{it} \tag{5.3}$$

where Y_{it} is a vector measuring the natural logarithm of real per capita local government expenditure and internally generated funds (i.e. own-tax revenue). We use similar control variables X_{it} as in equation (1), which are given in natural logarithms. $Grants_{it}$ represents the natural logarithm of real per capita central government transfers to local government. We instrument grants by (i) the alignment dummy only, and (ii) the alignment dummy and the fourth order polynomial function in the alignment-margin interaction term, given that grants are endogenous and grants and alignment are correlated [22]. The a priori expectation is that $\alpha > 0$ for local government expenditure shows evidence of a crowd-in or flypaper effect, and $\alpha < 0$ for local government own-tax-revenue shows evidence of a crowd-out effect. The estimations include district fixed effects and robust standard errors clustered at the district level.

5.4.3 Data description

We make use of data for up to 216 districts in Ghana over the period 1994-2014 covering five elections in our full sample. Since the number of districts varies over the period of the study due to district fragmentation, our main results refer to the 39 districts that remained throughout our sample period (*constant districts*). As robustness checks, we consider the (unbalanced) full sample of districts and districts with only one MP, where alignment is easiest to assign.

[22] See Knight (2002) and Bracco et al. (2015) for theoretical proofs.

Our dependent variable(s) in each case remain as described earlier. Data on all our dependent variables is sourced from the various issues of the districts' budget. Data for the period 1994-2004 is from Mogues and Benin (2012), data for 2005-2010 is from the Ministry of Local Government and Rural Development (MLGRD) in Ghana, and 2011-2014 is compiled by the authors from the various issues of the individual district assemblies' composite budget for the years 2011-2015 by the Ministry of Finance and Economic Planning, Ghana.

As noted earlier, our treatment and assignment variables are the alignment dummy $Align_{it}$ and $Margin_{it}$, respectively.

Our control variables are the total population of the residents in the district and the total number of private schools in the district. Total population is constructed from the census data and population projections for the districts by the Ghana Statistical Service (GSS). We use the total number of private schools as a measure of district-level income/wealth, due to the lack of consistent local income data. [23] Data on total number of private schools in the district is sourced from the various rounds of the Ghana Annual Schools Census (Basic Schools Information) by the Ministry of Education (MOE), Ghana.

We present our descriptive statistics in Table 5.1. From the table, districts have relatively higher levels of expenditure than revenue, suggesting they are likely to incur budget deficits on average. The mean central government grant received by the districts is relatively higher than the mean internally generated funds of the districts. The latter is confirmed by the descriptive statistics of central government grant as share of total revenue and IGF as share to total revenue (Grant_share and IGF_share respectively). In particular, central government grants constitute 83.78% of local government total revenues on average, while local government IGFs make up approximately 16.60% of local government total revenues. The bigger share of central government grants to local government total revenue suggests local governments in Ghana have low levels of fiscal autonomy, and are largely dependent on central governments (see also Figure 5.1).

[23] Banful (2011) uses the total number of schools in the district (both private and public) as a proxy for district income/wealth. We argue that the total number of private schools is a better measure of district wealth, as they are closely linked to local demand and hence local wealth.

Table 5.1: Descriptive statistics: Full sample

Variable	Obs	Mean	Std. Dev.	Min	Max
Expenditure	2296	35558.04	79807.03	0.5254759	2078311
Revenue	2727	29799.09	61383.56	0.2290661	773438.4
Grants	2714	25320.48	55758.13	0	765464.8
IGF	2727	4574.653	10354.1	0.0540525	190906.7
Grants_share	747	83.780	13.746	4.783	100
IGF_share	751	16.596	14.967	0.594	100
Margin	695	4.848	32.001	-86.1	90.26
Align	2943	0.894	0.307	0	1
Unalign	2943	0.091	0.287	0	1
Number of MPs	2929	1.473	1.642	1	13
Private schools	1665	97.040	166.556	0	1571
Population	2929	146375.5	186606.9	21346	1900000

Note: Descriptive statistics for all variables using the full sample of districts.

5.5 Results on the effects of political alignment on fiscal outcomes

5.5.1 Electoral cycles

The results for the electoral cycle effect of central government grant allocations to DAs are given in Table 5.2. Columns 1-3 of Table 5.2 show results for the constant districts; columns 4-6 results for the full sample of districts; and columns 7-9 the results for the one-MP districts.

The coefficient of the election year dummy (EY) is positive in all cases and statistically significant for the constant DAs and for the full sample of DAs. The estimated coefficients are however larger for the constant districts. Central government grants to local governments in Ghana therefore increase in election years. Moreover, central government grant allocations to DAs increase in the year immediately preceding the election year (see the coefficient of EY_1), as well as in the election year. As the coefficient magnitudes of EY and EY_1 suggest, the effect is bigger in the election year itself than the year before (note that parliamentary and presidential elections in Ghana are held in November or December). Hence, it may be said that the predilection of central governments of all political ideologies to increase grant allocations to DAs is enhanced in election years relative to non-election years. Instead, results show that there is a slight dip in grant allocations two years prior to elections (EY_2), though the effect is not significant. In sum, grant allocations to DAs by central governments follow an electoral or a political business cycle: (i) grant allocations are lower in the mid-term of the government's four-year mandate; (ii) grant allocations increase in the year preceding the next national election year; and (iii) grant allocations are highest in election years.

Table 5.2: Electoral cycle effect of central government grants

VARIABLES	Constant districts			Full Sample			One MP districts		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Baseline	Cycle	Mediate	Baseline	Cycle	Mediate	Baseline	Cycle	Mediate
EY	1.993***	2.226***	2.958***	1.484***	1.579***	1.988***	0.667	1.115	0.777
	(0.227)	(0.299)	(0.680)	(0.149)	(0.178)	(0.348)	(0.637)	(0.693)	(0.946)
$Population$	1.043	0.994	1.048	2.374*	2.355*	2.379*	1.205	1.318	1.206
	(2.374)	(2.365)	(2.376)	(1.281)	(1.279)	(1.282)	(1.042)	(1.062)	(1.046)
$Private$	-4.897***	-5.010***	-4.893***	-2.420***	-2.485***	-2.430***	-3.192***	-3.505***	-3.182***
	(0.528)	(0.553)	(0.536)	(0.334)	(0.345)	(0.331)	(0.726)	(0.721)	(0.759)
EY_1		0.732***			0.362***			0.970***	
		(0.227)			(0.131)			(0.277)	
EY_2		-0.158			-0.147			0.0755	
		(0.211)			(0.104)			(0.263)	
$EY * Align$			-1.528			-0.849			-0.246
			(1.029)			(0.521)			(1.452)
Observations	414	414	414	1,479	1,479	1,479	202	202	202
R-squared	0.297	0.304	0.305	0.146	0.150	0.150	0.218	0.248	0.219

Note: Fixed effect estimations. All regressions include a constant term. Robust standard errors are in parenthesis. The dependent variable is measured in real per capita terms. ***, **, * represent statistical significance at 1, 5 and 10 per cent levels, respectively.

The large coefficients suggest that grant allocations are delayed until election years, with DAs receiving almost three times as much in that year as they receive in other years. This is plausible in a developing country context, and echoes the results of Shi and Svensson (2006) for a large sample of countries, and of Sakurai and Menezes-Filho (2011) for Brazil.

Finally, in columns 3, 6 and 9 we examine whether the election year effect on grants differs between aligned and unaligned DAs, by introducing an interaction term between election year and political alignment ($EY * Align$). The coefficient of $EY * Align$ is consistently negative but statistically insignificant for central government grants, which suggests that political alignment does not play a salient role in central government grant allocations during the electoral cycle. However, we cannot rule out more systematic differences in fiscal outcomes between aligned and unaligned districts. To examine this issue in more detail, we next turn to the RDD approach.

5.5.2 Regression Discontinuity Design (RDD)

Design validity

We first show evidence on the design validity of our RDD approach, and then discuss the estimation results. Our design validity is in two forms; (a) a graphical analysis and (b) a series of regression design validity tests.

Graphical analysis We carry out a graphical analysis to examine the density and distribution of our assignment variable and show evidence of discontinuity. We discuss a histogram and a density plot of *Margin* showing its distribution along the zero cut-off (Figures 5.2 and 5.3). We then plot the margin of alignment, $Margin_{it}$, on the horizontal axis and the per capita central government grants of each district on the vertical axis in Figure 5.4. Recall that the results derive from the continuity-based RD design proposed by Cattaneo et al. (2018), with MSE-optimal bandwidth choice. For easier interpretation of the plots, the margin of vote is restricted to the range [-40, 40], and estimates include the 95% confidence intervals. We make use of 40 bins in all our plots. The plots shown are those for the main sample of constant districts.

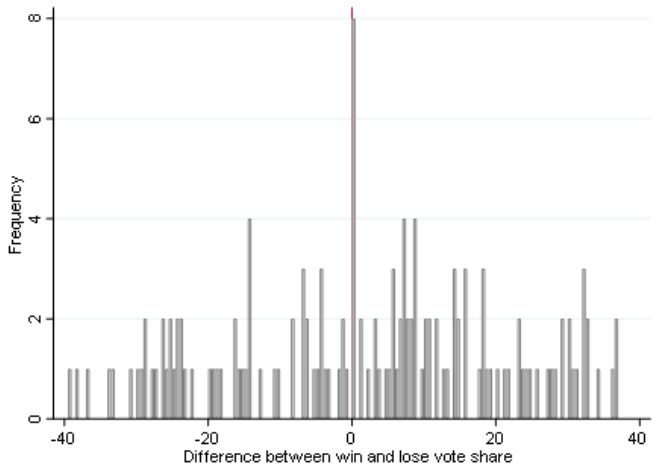

Figure 5.2: Histogram: Distribution of margin around zero for constant districts

Note: A histogram of margin of alignment for 39 constant districts for the period 1994-2014. The histogram is constructed for margin in the range [-40, 40]. The central line splits the distribution at the cut-off point of zero(0).

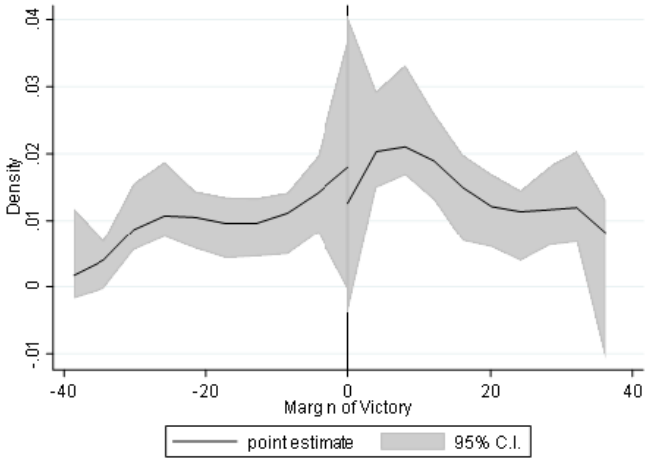

Figure 5.3: RD density plot of margin for constant districts

Note: A density plot of margin of alignment for 39 constant districts for the period 1994-2014. The central line splits the margin of alignment in the range [-40, 40] at the cut-off point of zero(0). The shaded lines are the 95% confidence interval.

Figure 5.2 clearly shows that the margin of alignment, which is measured as the difference between win and lose vote share (i.e. margin of victory), is distributed around zero(0), with some districts *barely* aligned, other districts *barely* unaligned and more districts clearly won or lost. Figure 5.3 illustrates the discontinuity in margin of alignment with the density distribution along the cut-off of zero (0), clearly shown with a 95% confidence interval. This justifies our use of margin as the assignment variable.

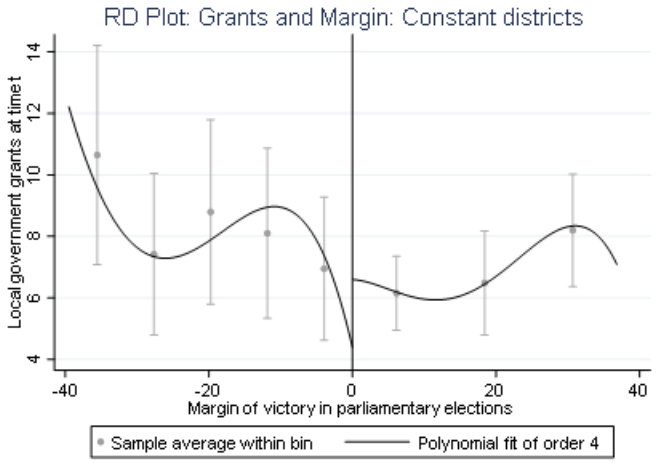

Figure 5.4: Grants and Margin

Figure 5.4 shows the RD plot of central government grants to DAs in real per capita terms. There is clear discontinuity in grants at the margin of alignment, with the distribution of grants along the cut-off of zero (0) shown with a 95% confidence interval. Also evident is that – as we move away from the cut-off – unaligned districts (on the left side of the cut-off) tend to have higher grants compared to aligned districts (on the right side). However, the estimation fit – denoted by the length of the vertical lines or 'whiskers' extending from the sample average points – is less precise among unaligned districts, and decreases the further we move from the cut-off. Instead, on the right side of the cut-off we clearly see that central government grants tend to increase the larger the positive margin of alignment, which gives some preliminary evidence of core supporter reward. The strength of any alignment effect is tested below.

Regression-based design validity analysis For our other design validity test, we examine whether alignment exhibits discontinuity. We have already included pretreatment covariates in our specifications above, and the results are qualitatively similar. Another way of testing if political alignment exhibits discontinuity is to run a regression akin to our RDD model with each covariate as dependent variable and alignment and the control function as explanatory variables and examine whether the coefficients are significantly different from zero. The regression results are shown in Table A1 of the Appendix. None of the coefficients of the covariates is individually statistically significant. The individual F-statistics are statistically insignificant, as is the joint F -statistic (0.54 with a p-value of 0.46). We also test for discontinuity in the pretreatment characteristics, given the expectation that the pretreatment covariates are similar to the left and right of the cut-off. The results are given in Table A2 of the Appendix; they clearly show no discontinuity in the pretreatment characteristics, since the RD estimates for both total population and our income proxy are statistically insignificant [24].

As a third regression validity test, we follow Lee and Lemieux (2010) and Bracco et al. (2015) and simultaneously test the null of discontinuities in all covariates, by estimating

[24]The difference between the results in Tables A1 and A2 is that the former is a fixed effect estimation while the latter is a continuity-based RD estimation.

regressions with each covariate as dependent variable and alignment and the control function as explanatory variables and using higher order polynomials. The test is performed using a single system of equations within a Seemingly Unrelated Regression (SUR) framework. Using SUR provides efficiency in estimation by combining information on different estimations. We then perform a Chi-square test for the joint hypothesis that alignment is statistically insignificant in all regressions, implying zero discontinuity. The results in Table A3 in the Appendix show that we fail to reject the null hypothesis of zero discontinuity in all covariates in all polynomial orders of the margin of alignment. Hence, there is no evidence of discontinuity in our covariates.

In sum, our three additional specification tests have shown that political alignment exhibits discontinuity, since alignment has no effect on the pretreatment characteristics; the pretreatment characteristics do not have any influence at the discontinuity; and the pretreatment characteristics are similar to the left and to the right of the cut-off (i.e. there are no discontinuities in the covariates).

RDD estimation results

We present the RDD results in Table 5.3 for the constant districts (columns 1-2), full sample (columns 3-4) and one MP districts (columns 5-6). We show results for two variations of the RDD specifications, namely the RDD with year dummies only, and RDD with year dummies and controls [25]. Including additional covariates should however not have any significant effect on the estimation of the alignment effect, as such covariates only help to determine if alignment exhibits discontinuity (Pettersson-Lidbom 2008).

The RDD estimate shows a positive effect of alignment on grants for the constant districts in both the estimations with year dummies only and the estimations with year dummies and controls. That is, constant districts that are aligned receive between 4.9 and 6.3 times more central government grants. We therefore find clear evidence of political targeting of core supporters using intergovernmental transfers[26]. The result is consistent and robust with or without the additional covariates, which proves that the addition of covariates becomes redundant when a control function is present. Our large RD estimates are not unusual, at least in the context of less-developed countries, as Brollo and Nannicini (2012) estimate similar coefficients for the effect of alignment on federal government transfers to municipalities in Brazil. Migueis (2013) and Bracco et al. (2015) find positive effects of alignment on central government transfers for Portuguese and Italian municipalities respectively, but

[25] We do not report the results with neither year dummy nor controls as they are qualitatively similar to those with year dummies.

[26] To confirm these results, we estimate an RD for 'swing' districts - districts in the full sample with $0 < margin \leq 10$. The results in Appendix Table A4 show a negative but statistically insignificant effect on grants for districts that are just aligned (swing districts). This is consistent with the argument advanced earlier that 'swing voters' are difficult to identify in a system with regular large shifts in voting patterns like Ghana. Accordingly, choosing districts that are aligned with a wide margin of votes is likely the safer bet for a government in power that is considering political targeting of transfers. Further, we try some sensitivity analysis at lower margins. That is given an optimal bandwidth of 40%, we determine the point between 10-40% margins at which the results turn positive. We use h(15), h(20), h(25), h(30), and h(35), and find the results remain positive at all these bandwidths except when controls are introduced for h(35). The results are given in Appendix Table A4.

their coefficients are smaller.

Table 5.3: RDD estimations for central government grants

	Constant districts		Full sample		One MP districts	
	(1)	(2)	(3)	(4)	(5)	(6)
$RDEstimate$	4.887**	6.335*	0.539	0.034	1.152	-0.461
	(2.143)	(3.454)	(1.127)	(1.720)	(1.280)	(1.695)
Observations	175	101	622	373	505	324
Year dummies	yes	yes	yes	yes	yes	yes
Other controls	no	yes	no	yes	no	yes

Note: Estimations are done using the fourth order polynomial. All regressions include a constant term. Robust standard errors are in parenthesis. The dependent variable is measured in real per capita terms. ***(**)(*) represent statistical significant at 1, 5 and 10 per cent levels respectively.

Using our full, unbalanced sample of districts over the whole period of study, there is no statistically significant effect of political alignment on central government grants to DAs, although the signs are consistent. The lack of statistically significant results in this larger sample is probably due to the presence of 'noise' in the data. Given that the number of districts increased over the period of study due to the creation of new districts, our estimations are being affected by the addition of new districts and the dropout and/or split of existing districts. Any political alignment effect that existed in the full sample is likely cancelled out by these major changes in district size and number (recall that the number of districts nearly doubled from 110 at the start of our period to 216 at the end in a multi-step fragmentation process).

The RDD result for the districts with one MP shows no statistically significant effect of alignment on central government grant allocations to such DAs, although the sign of the RD estimate in the estimation with year dummy only is similar to the corresponding results for the constant districts. However, the result proves not to be robust to the addition of further covariates and even changes sign. Note that districts with one MP are typically more rural districts; the lack of causal evidence for political targeting of transfers may speak in favor of the efforts of successive governments to foster development across the country.

In general, the lack of robustness across sample sizes in the causal effects of political alignment on intergovernmental grant allocation suggests that concerns over politically-motivated district fragmentation and gerrymandering (see Riedl and Dickovick 2014; Mohammed 2015) have not (yet) translated into systematic targeting of funding along political alignment lines.

5.5.3 Robustness analysis

Other fiscal outcomes

We have found evidence of electoral cycles and political targeting in intergovernmental grant allocations, but what about other district fiscal outcomes such as total expenditure and internally generated funds (IGFs)?

The electoral cycle effect for local government total expenditures is similar to that found for grants (see Table A5 of the Appendix): there is an increase in national election years and in the year preceding the national election year, but a reduction in the mid-term of the four-year mandate of the central government. However, the coefficient of $EY * Align$ is now negative and statistically significant for district total expenditure, suggesting that aligned DAs have relatively lower levels of total expenditures in election years, perhaps because of targeting of swing districts in the crucial lead-up to elections. Sakurai and Menezes-Filho (2011) find similar results for total expenditures for local governments in Brazil. The electoral-cycle result does not seem to capture a systematic causal relation however: the RDD estimates for total expenditure are also consistent with those for grants, and the coefficient is statistically highly significant for the constant districts. Hence, aligned districts not only receive more grants, but also spend more on average compared with unaligned districts (see Table A7, Panel A).

Looking at local government IGFs, we also find confirmation for our main results for grants. IGFs increase in national election years and in the year preceding the national election year, but reduce in the mid-term of the four-year mandate of the central government (see Table A6). Similar to the case of grants, there is no significant difference between IGFs in election years for aligned and unaligned DAs. Again, the RDD estimates for IGFs are also consistent with those for grants and total expenditure, though results are not significant for our main sample once we add further controls, and for the full and one-MP samples (see Table A7, Panel B).

In sum, our main results for intergovernmental grants are consistent across local fiscal outcomes, showing a significant impact of electoral cycles and political alignment.

Time-differences-in-differences

As a robustness check to the RDD procedure, we follow Solé-Ollé and Sorribas-Navarro (2008) and adopt a *time-differences-in-differences* procedure. We again focus on central government grants and make use of data for successive terms of office to determine the effect of variations in political alignment on changes in the amount of central government grants received by the local government. We do this in two ways: (i) with the average of central government grants across successive terms of office; and (ii) with central government grants added up for the last two years of each central government's term of office divided by the population of the DA at the beginning of these two-year periods. The use of the latter set of data is justified by the fact that the incumbent central government's vested interest in the last two years of its term is likely to be to win the coming elections (see Solé-Ollé and Sorribas-Navarro 2008).[27] The procedure simply involves estimating a fixed-effect equation with the variables in differences.

There are three advantages to the use of the *time-differences-in-differences* procedure. First, they adequately account for omitted-variable biases in the case of the control variables and other fixed individual characteristics of the DAs. Second, in the case of Ghana, we

[27]Evidence of this is shown by the positive and statistically significant coefficient of the dummies for the election year and the year preceding the election year in our estimation results.

are less likely to suffer from changes in political alignment at the DA level during a term, e.g. through by-elections. These are extremely rare occurrences. Third, the homogeneous nature of DAs and Ghana's national elections across DAs provides relatively stable electoral features from one term of office to another, hence reducing the possibility of a correlation between changes in electoral features and changes in alignment status. On the downside, we can only consider time-differences-in-differences across successive terms for the constant districts sample, as new districts may only enter the full sample for one or two terms. This severely limits the statistical power of the estimations.

Using data for both the average and end-two-year real per capita grant for the constant districts, the coefficient of the alignment dummy is statistically insignificant (see Table A8 of the Appendix). This implies that there is no clear effect of changes in alignment on central government grants over successive terms of office and between the end periods of any two successive terms of office. However, it is worth noting that the direction of the effect determined here is similar to that found in the RDD estimation, i.e. positive.

5.6 Results on crowd-in or crowd-out effects

How do grants affect local government expenditure and IGFs? We now turn to the results for the crowd-in effect in Tables 5.4 and 5.5. In each table of results, Column 1 represents the results for the OLS estimation when grants are not instrumented; columns 2 and 3 represent the 2SLS results with the alignment dummy only as instruments; and columns 4 and 5 refer to the 2SLS results with the alignment dummy as well as the fourth-order polynomial function in Margin as instruments. The test statistics for the validity of the instruments used and the reliability of the results do not reject that our instruments are valid and reliable. Our estimations pass the tests of under-identification and weak identification, and the Hansen test for instrument validity in all cases. The F-statistic from the first-stage regression is below the rule-of-thumb threshold of 10 in three out of four cases, but there seems no glaring problem of weak instruments (Staiger and Stock 1997).

5.6.1 Expenditure per capita

The results for total expenditure are given in Table 5.4. In the OLS estimations, we find evidence of a crowd-in effect, with an increase in central government transfers linked to more local government spending. The estimated magnitude shows each *cedi* of grants is associated with up to 1.16 *cedis* (column 3) in per capita expenditure. This suggests grants are associated with approximately one-for-one increases in spending per capita. The estimated effect is statistically significant at the 1% level. The results are confirmed in both 2SLS estimations. When we instrument grants with the alignment dummy only, we find that local government expenditures increase by more than the proportionate increase in central government grants. In sum, there is consistent evidence of a crowd-in effect of central government grants on local government total expenditure per capita; this is the 'flypaper effect' suggested within the literature. Our finding is consistent with most of the empirical literature

(e.g., Dahlberg et al. 2008), but contradicts Knight (2002) and Bracco et al. (2015). [28]

Table 5.4: Crowd-in effect: Expenditure per capita

	OLS	2SLS Baseline Model		2SLS Polynomial function	
		1st stage Grants	2nd stage Expenditure	1st stage Grants	2nd stage Expenditure
	(1)	(2)	(3)	(4)	(5)
Grants	0.988***		1.158***		0.930***
	(0.004)		(0.087)		(0.0417)
Population	0.167***	2.078***	-0.175	1.665***	0.273**
	(0.049)	(0.425)	(0.196)	(0.375)	(0.109)
Private	0.023	-0.896***	0.169**	-0.784***	0.006
	(0.020)	(0.127)	(0.083)	(0.175)	(0.045)
Align		-1.077***		-0.459	
		(0.345)		(0.509)	
Margin (4th poly)				Yes	
Margin (1st poly)				No	
Observations	1,099	1,099	1,099	366	366
R-squared	0.976	0.949		0.961	
F-statistic		9.73		7.69	
K-P(under)		9.73	9.733	24.10	24.098
		(0.002)	(0.0018)	(0.0001)	(0.0001)
C-D (weak)	9.73	9.58	5.33	5.335	
K-P(weak)	9.58	9.731	7.69	7.688	
Hansen					3.582(0.310)

Note: All regressions include a constant term. Standard errors are in parentheses. Robust standard errors clustered at the district level. K-P(under), C-D(weak), K-P(weak), and Hansen represent Kleibergen-Paap rk LM statistic (underidentification), Cragg-Donald Wald F-statistic for weak identification, Kleibergen-Paap rk Wald D statistic for weak identification, and Hansen J statistic respectively. All fiscal variables are measured in real per capita terms. ***(**)(*) statistically significant at 1, 5 and 10 per cent levels respectively.

5.6.2 IGF per capita

We find in Table 5.5 that central government grants crowd-in locally-generated revenues on average. The evidence for crowding-in is consistent whether or not grants are instrumented, and whether or not the instruments include a polynomial function. In terms of the magnitude of the effect, each *cedi* of grants is associated with up to approximately 1.02 *cedi* per capita IGF (column 1). The OLS results show the largest effect, implying the coefficient of grants is biased upwards when we do not instrument central government grants. Hence, there is

[28] As a robustness check, we make use of a second measure of expenditure, i.e. real per capita local government expenditure less central government grants *Expenditure2*. *Expenditure2* in effect shows local government expenditure out of own revenues. The effect of grants on real per capita local government expenditure out of own revenues is qualitatively similar to the one here, confirming evidence of a crowd-in or flypaper effect. The results are available upon request.

strong evidence that an increase in central government grants is associated with an increase in locally-generated revenues, which contradicts the reduction in locally-generated revenues predicted by the median-voter model. We therefore find evidence of a crowd-in effect similar to Dahlberg et al. (2008).

Our results differ from the findings of Mogues and Benin (2012), who showed that central government grants crowd-out locally-generated revenues in Ghana. We argue that our results are more robust as we consider longer periods of study and address endogeneity concerns. The finding here is quite important, as the biggest part of central government transfers, the DACF, has in its criteria for allocation built-in incentives for raising own funds. [29] The implication is that where central government unconditional grants have built-in incentives to increase locally-generated revenues, an increase in central government grants can indeed be associated with an increase in locally-generated revenues.

[29]This is a small incentive to improve on IGF in the form of a very small criteria weight (has been 5% for most years) for the so-called 'responsiveness factor' known as 'percentage increase in IGF' and is set to zero for DAs that do not have an increase (see Banful 2011; Mogues and Benin 2012).

Table 5.5: Crowd-in effect: IGF per capita

	OLS	2SLS Baseline Model		2SLS Polynomial function	
		1st stage	2nd stage	1st stage	2nd stage
		Grants	IGF	Grants	IGF
	(1)	(2)	(3)	(4)	(5)
Grants	1.015***		0.836***		0.998***
	(0.00655)		(0.0636)		(0.0460)
Population	0.421***	1.665***	0.713***	1.656***	0.274**
	(0.0774)	(0.307)	(0.151)	(0.372)	(0.117)
Private	0.404***	0.712***	0.281***	-0.773***	0.605***
	(0.0319)	(0.110)	(0.0571)	(0.172)	(0.0561)
Align		-1.262***		-0.441	
		(0.324)		(0.498)	
Margin (4th poly)				Yes	
Margin (1st poly)				No	
Observations	1,478	1478	1,478	373	373
R-squared	0.949	0.922		0.950	
F-statistic		15.17		7.93	
K-P(under)		14.79	14.789	24.97	24.970
		(0.0001)	(0.0001)	(0.0001)	(0.0001)
C-D (weak)		17.7	17.704	5.58	5.582
K-P(weak)		15.17	15.169	7.93	7.932
Hansen					6.609(0.0855)

Note: All regressions include a constant term. Standard errors are in parentheses. Robust standard errors clustered at the district level. K-P(under), C-D(weak), K-P(weak), and Hansen represent Kleibergen-Paap rk LM statistic (underidentification), Cragg-Donald Wald F-statistic for weak identification, Kleibergen-Paap rk Wald D statistic for weak identification, and Hansen J statistic respectively. All fiscal variables are measured in real per capita terms. ***(**)(*) represent statistical significant at 1, 5 and 10 per cent levels respectively.

5.7 Conclusions

The present paper examines the effect of political alignment on subnational fiscal outcomes in Ghana, which has a complex system prone to peculiar political pressures at the local district level. The paper also examines the crowd-in or flypaper effect. We use a new dataset for Ghana on central government grants to local governments, district budgets, and election outcomes spanning the years 1994-2014 and five national elections.

We find evidence of electoral cycle effects: grant allocations, district expenditure and IGFs are lower in the mid-term of the government's four-year mandate; increase in the year preceding the next national election year; and peak in election years. However, these electoral cycles manifest across districts, with no evidence of political alignment effects. We then apply a regression discontinuity design (RDD) by exploiting the discontinuity in parliamentary vote margins of winning and losing parties at the threshold of zero (0), which al-

lows alignment to be as good as randomly assigned. In our main RDD results for a balanced sample of constant districts for the whole period, we find evidence of political targeting of core supporters not only in intergovernmental transfers, but also in districts' expenditure patterns.

Finally, we show that there is a crowd-in effect of grants for both expenditure (a fly-paper effect) and own revenues, using the instrumental variables (IV) approach proposed by Bracco et al. (2015) to identify causality. The evidence of a crowd-in effect for local governments' own revenues suggests that built-in incentives to increase IGF that are found in the main intergovernmental transfers, the District Assembly Common Fund, can in fact have the intended effect.

There has been an ongoing process of municipal fragmentation in Ghana since the current Constitution was adopted in 1992, which has led to an increase in the number of districts from 110 in 1994, to 216 at the end of our sample period. While our results are consistent when we vary the sample size - including all districts in the sample and districts with only one MP where it is easier to assign alignment - they are much weaker. This suggests that despite worries of politically-motivated municipal fragmentation and gerrymandering in Ghana, the process has in fact (probably inadvertently) watered-down any attempts at targeted intergovernmental transfers – and moreover done so more successfully than the obstacles to party favoritism that are built in to the decentralized system. Whether this persists in the future remains to be seen.

Appendix

Table A4.1: Specification test of whether alignment exhibits discontinuity

	Population	Private
	(1)	(2)
$Align$	0.0475	-0.00649
	(0.0883)	(0.245)
Observations	190	113
F-statistic	1.81(0.0884)	1.56(0.1567)

Note: OLS regressions with align and the control function as independent variables. Standard errors are in parenthesis. Robust standard errors clustered at the district level. Regressions include constant term. The joint F-statistic is 0.54 wit a p-value of 0.46.

Table A4.2: Specification test of whether covariates have an effect at the discontinuity

	Population	Private
	(1)	(2)
$RDEstimate$	0.0754	0.063
	(0.1040)	(0.3980)
Observations	190	113

Note: RDD estimations. Standard errors are in parenthesis. Robust Standard errors clustered at the district level. Regressions include a linear control function.

Table A4.3: Testing for the continuity of the covariates

Polynomial grade	Chi2(2)	Prob>Chi2
	(1)	(2)
0	5.46	0.0651
1	2.15	3.413
2	0.62	0.7334
3	1.54	0.4621
4	1.27	0.5306
5	0.15	0.9271
6	0.07	0.9656

Note: Chi-square tests results from a test of discontinuity in the covariates for the constant districts. A Seemingly Unrelated Regression (SUR) procedure is used similar to by Lee and Lemieux (2010) and implemented by Bracco et al. (2015).

Table A4.4: Sensitivity analysis for 'swing' districts and various bandwidth(h)

Sensitivity	RD Estimate	
	(1)	(2)
$Swing$	-4.034	-3.603
	(2.502)	(4.446)
$h(15)$	1.181	1.306
	(2.479)	(2.882)
$h(20)$	1.625	0.271
	(1.802)	(2.214)
$h(25)$	1.208	-0.173
	(1.467)	(1.933)
$h(30)$	1.03	0.039
	(1.272)	(1.753)
$h(35)$	0.843	-0.151
	(1.195)	(1.649)
Observations	622	373

Note: RDD estimations for districts with $0 < margin \leq 10$; swing districts-bandwidth h(10), and sensitivity analysis for bandwidth h(15), h(20), h(25), h(30), and h(35). Standard errors are in parenthesis. Robust standard errors clustered at the district level. ** represent statistical significant at 5 per cent levels respectively. Columns 1 and 2 represent results for RDD with year dummy and RDD with year dummy and controls respectively.

Table A4.5: Electoral cycle effect of Expenditure

	Constant districts			Full Sample			One MP districts		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Baseline	Cycle	Mediate	Baseline	Cycle	Mediate	Baseline	Cycle	Mediate
EY	2.420***	2.457***	3.125***	2.420***	2.457***	3.125***	1.807**	2.400**	1.710
	(0.228)	(0.328)	(0.391)	(0.228)	(0.328)	(0.391)	(0.874)	(0.995)	(1.206)
$Population$	2.695*	2.672*	2.714*	2.695*	2.672*	2.714*	3.587*	3.969**	3.570*
	(1.462)	(1.462)	(1.465)	(1.462)	(1.462)	(1.465)	(1.918)	(1.866)	(1.931)
$Private$	-3.550***	-3.660***	-3.565***	-3.550***	-3.660***	-3.565***	-4.730***	-5.274***	-4.752***
	(0.542)	(0.574)	(0.538)	(0.542)	(0.574)	(0.538)	(0.695)	(0.629)	(0.753)
EY_1		0.376*			0.376*			1.160**	
		(0.226)			(0.226)			(0.440)	
EY_2		-0.398**			-0.398**			-0.0185	
		(0.183)			(0.183)			(0.344)	
$EY * Align$			-1.174*			-1.174*			0.237
			(0.597)			(0.597)			(1.512)
Observations	1,109	1,109	1,109	1,109	1,109	1,109	162	162	162
R-squared	0.199	0.205	0.205	0.199	0.205	0.205	0.334	0.371	0.335

Note: Fixed effect estimations. All regressions include a constant term. Robust standard errors are in parenthesis. The dependent variable is measured in real per capita terms. ***(**)(*) represent statistical significant at 1, 5 and 10 per cent levels respectively.

Table A4.6: Electoral cycle effect of IGFs

	Constant districts			Full Sample			One MP districts		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Baseline	Cycle	Mediate	Baseline	Cycle	Mediate	Baseline	Cycle	Mediate
EY	1.260***	1.196***	1.726***	1.260***	1.196***	1.726***	0.652	0.880	0.642
	(0.146)	(0.177)	(0.329)	(0.146)	(0.177)	(0.329)	(0.589)	(0.633)	(0.906)
$Population$	2.704**	2.685**	2.708**	2.704**	2.685**	2.708**	1.475	1.536	1.475
	(1.323)	(1.320)	(1.323)	(1.323)	(1.320)	(1.323)	(1.072)	(1.080)	(1.073)
$Private$	-2.386***	-2.417***	-2.394***	-2.386***	-2.417***	-2.394***	-3.413***	-3.599***	-3.414***
	(0.370)	(0.378)	(0.367)	(0.370)	(0.378)	(0.367)	(0.689)	(0.694)	(0.720)
EY_1		0.0701			0.0701			0.552**	
		(0.124)			(0.124)			(0.239)	
EY_2		-0.270**			-0.270**			-0.0365	
		(0.110)			(0.110)			(0.247)	
$EY * Align$			-0.785			-0.785			0.0232
			(0.492)			(0.492)			(1.383)
Observations	1,485	1,485	1,485	1,485	1,485	1,485	202	202	202
R-squared	0.143	0.144	0.146	0.143	0.144	0.146	0.257	0.269	0.257

Note: Fixed effect estimations. All regressions include a constant term. Robust standard errors are in parenthesis. The dependent variable is measured in real per capita terms. ***(**)(*) represent statistical significant at 1, 5 and 10 per cent levels respectively.

Table A4.7: RDD estimations for expenditure and IGFs

	Constant districts		Full sample		One MP districts	
	(1)	(2)	(1)	(2)	(1)	(2)
			Panel A: Expenditure			
$RDEstimate$	5.052***	6.510*	0.897	0.247	1.564	-0.0651
	(2.184)	(3.725)	(1.163)	(1.714)	(1.298)	(1.693)
$Observations$	175	101	615	369	499	321
			Panel B: IGF			
$RDEstimate$	5.452***	6.297	1.228	(0.0157)	1.912	-0.902
	(2.106)	(4.026)	(1.235)	(1.658)	(1.344)	(1.607)
$Observations$	175	101	624	373	507	324

Note: Estimations are done using the fourth order polynomial. All regressions include a constant term. Robust standard errors are in parenthesis. The dependent variable is measured in real per capita terms. ***(**)(*) represent statistical significant at 1, 5 and 10 per cent levels respectively. Columns numbered 1 and 2 represent results for two variations of the RDD specifications namely, RDD with year dummies and RDD with year dummies and controls.

Table A4.8: Time-differences-in-differences estimation

	Constant	Constant_in_Term
	(1)	(2)
$Align$	1.720	0.147
	(1.983)	(1.098)
$Population$	-0.930	0.0709
	(1.836)	(1.577)
$Private$	-1.559	-1.289
	(1.299)	(1.669)
F-test (zero slopes)	0.75	0.21
F-test	0.83	0.02
Observations	150	75
R-squared	0.023	0.008

Note: Estimations done with all variables in first-difference. All regressions include a constant term. Robust standard errors are in parenthesis. The dependent variable is measured in real per capita terms. ***(**)(*) represent statistical significant at 1, 5 and 10 per cent levels respectively. 'Constant' refers to estimations using average real per capita grants across successive terms of office for the constant districts and 'Constant_in_Term' refers to estimations for constant districts using real per capita grants for the last two years of a government's term of office.

Chapter 6

Conclusion

The thesis examines the political economy of public finance at both the national and local government levels. There are four chapters of empirical essays with the first three empirical essays closely related. The first empirical essay examines the determinants and interrelationship of different types of government expenditure. The results show foreign aid receipts and urbanization have raised total expenditure, but external debt stocks have reduced total expenditure. There is a substituting relationship between expenditures on social protection and pure public goods, and education and defence, but complementary relationship between all other categories of government expenditure. The second empirical essay examines the relationship between economic globalisation and government spending for the 'hyper-globalisation' period of the 1990s and 2000s. The results suggest that hyper-globalisation has had divergent and conflicting effects on consumption spending: while the globalisation of trade has tended to raise spending, the globalisation of finance and foreign investment has tended to reduce it. However, the size of the effects is quite small, and there is no evidence that spending has risen by more in countries which are particularly prone to terms of trade shocks. In the third empirical essay, I examine the mediating effect of democracy in explaining the relationship between decentralization and government size for the period 1970-2013. The main finding is that fiscal decentralization and democracy in themselves are effective tools to 'starve the beast' as they lead to reduced government size, with the former suggesting support for the Leviathan hypothesis. There is evidence of the mediating effect of democracy in the relationship between decentralization and government size; a positive and statistically significant effect of the interaction term with the effect size largest for participatory democracy. There is no non-linear relationship between decentralization and government size. The final empirical essay explores how local governments' political alignment with the central government affects subnational fiscal outcomes. The results show that districts with an aligned Member of Parliament and District Chief Executive (DCE) receive more transfers and have higher expenditures. Ghana's changeable voting patterns may hinder identification of swing voters, and/or DCEs who fail to pull their districts towards the central government may be punished. Marginally aligned districts also raise more own revenues. In a second step, we instrument transfers and estimate a flypaper effect for Ghanaian districts.

Notwithstanding the strengths of thesis, there are limitations worth noting. In the first

empirical essay, I omit tax revenue due to data availability issues which could be included in future research. The use of annual observations in a pooled FE estimation with both time variant and time invariant variables may in itself be limiting. Further, future research may consider going beyond applying an OECD interaction term in Chapters 2, 3 and 4 to using more detailed country groupings for not only the variables of interest but all other variables where necessary. Moreover, I believe examining the growth effect of globalization may also be relevant for future research. Finally, future research may consider examining political alignment and local government outcomes using a panel or cross-section of countries and with straight forward definitions of alignment and with particular emphasis on African countries.

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