

Fiscal Decentralisation and the Distributive Incidence of the Great Recession

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Abstract

We argue that fiscal decentralisation is one important explanation for variation in distributive outcomes following the Great Recession. Using a difference in differences approach, we examine how fiscal decentralisation mediated the link between spatial distribution, redistributive effort, and interpersonal inequality in 21 OECD countries in the years following the Great Recession. We find that fiscally decentralised nations saw increased interpersonal inequality and lower redistribution, but lower interregional inequality. We attribute these results to the weaker redistributive mechanisms in fiscally decentralised nations, which increased interpersonal inequality while preserving market-driven declines in high productivity areas that temporary increased regional convergence.

Keywords: Fiscal Decentralisation, Interregional Inequality, Interpersonal Inequality, Redistribution, Great Recession

JEL Codes: H71, H72, H77, I38

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1 Introduction

The Great Recession has had profound effects on the economic position of citizens around the world. In some countries, redistributive policies hastened the economic downfall of many citizens. In other cases, government stabilizers were not so strong, resulting in rising interpersonal inequality. The world's democracies confronted the crisis from very different political and institutional settings. One relevant institutional setting is the (de)centralisation of fiscal policy-making—the extent to which local governments have autonomy to tax and spend. Fiscal policy is an essential tool for automatic stabilization in times of crises. Accordingly, the extent to which polities allow for these instruments to vary within their territories is likely to have important distributional implications. The nature of these implications is the focus of this paper. In a country with strong automatic income stabilizers, the impact of economic crisis on interpersonal income inequality should be minimal. With well-developed welfare states to manage personal economic hardship, crisis should weigh heavily on government coffers, and increase economic indicators such as unemployment rates, but it should not translate into significantly rising inequality. If the system of redistribution is weak, or is substantially decentralised, however, we may see crisis alter spatial distribution within the nation.

We present a systematic analysis of how fiscal decentralisation has moderated the distributive consequences of the Great Recession. The multidimensional nature of both decentralisation and inequality makes the task particularly challenging. We focus on the relationship between fiscal decentralisation and three interrelated aspects of distributive politics and inequality: interregional inequality, capturing the relative distance in economic fortunes between sub-national territories; redistribution, the capacity of the state to reduce the gap between market and disposable income inequalities; and, finally, the scope of post-tax, post-transfer disposable income inequality. These three aspects of inequality are related to fiscal

decentralisation in distinct yet deeply interconnected ways.

footnote Third, we adopt a methodological strategy designed to circumvent pervasive identification challenges of studying the impact of political institutions on economic outcomes (Przeworski 2007). As mentioned above, the correlation between inequality and decentralisation has been the object of previous scholarly efforts. Taken together, these studies suggest that causality works both ways (Obinger, Leibfried and Castles 2005; Qian and Roland 1998; Beramendi 2012). In a field that relies mostly on observational data driven by historical selection, the Great Recession offers a promising opportunity to examine the link between fiscal decentralisation, redistribution, and inequality. We treat the Great Recession as a “natural quasi-experiment” that changed the distributive environment of nations for reasons that were exogenous to existing decentralisation structures. Using a difference in differences empirical strategy, we analyse how decentralisation impacted changes in inter-regional inequality, redistribution, and interpersonal inequality across countries after 2008.

Our results suggest a heterogeneous impact of fiscal decentralisation on different aspects of inequality. To preview of our main findings, after the Great Recession, fiscally decentralised nations saw reduced redistributive effort to equilibrate income and disproportionate increases in interpersonal inequality. On the other hand, fiscal decentralisation was associated with lower levels of interregional inequality after the Great Recession. The Great Recession had its biggest productivity effects on relatively productive, higher income regions. Thus, interregional inequality in economic productivity in fact declined in this period as growth rates in higher productivity regions fell to meet growth rates in lower productivity regions. High levels of fiscal decentralisation appear to have preserved this market-driven reduction in interregional inequalities because of the weaker redistributive mechanisms that would have done more to bolster those individuals struggling in high productivity areas. Analysing interregional inequality then provides a specific mechanism (weaker risk pooling) whereby fiscal decentralisation affects overall inequality. In most studies, we cannot

discern whether this relationship between fiscal decentralisation and distributive outcomes is due to endogenous adoption of fiscal decentralisation. In this analysis, we are able to examine what these institutions actually do, separable from the conditions of their original adoption. We find that fiscal decentralisation on both the expenditure and revenue sides is associated with lower redistributive effort and higher interpersonal inequality once we can isolate their effects.

The rest of the paper is organised as follows. We begin by developing our theoretical argument about the differential relationship between fiscal decentralisation and, respectively, interregional and interpersonal inequality. A section discussing our empirical strategy as well as our measurement and estimation choices follows. Thereafter, we discuss our core findings and point to future lines of work.

2 The Logic: Fiscal decentralisation and multidimensional inequality

2.1 Premises

The premises underpinning our theoretical approach follow directly from previous work in the political economy of decentralisation and economic geography. Our analysis of the distributional impact of the Great Recession builds on and expands these contributions.

First, it is important to start with a brief reminder from the subfield of inequality decomposition. Interregional and interpersonal inequalities are not independent, separable phenomena. Rather, they are both part of the same overall distribution of resources (Cowell 1985; Silber 2012). The former concerns distances between groups' (in this case, regions) averages. The latter concerns distances among individuals around these averages. Overall inequality combines both sets of distances (Atkinson 1983). A central tenet in our argument is that the nature of the relationship between each dimension of inequality and fiscal decentralisation is distinct.

Second, there is significant heterogeneity in the way fiscally decentralised regimes are actually designed (Brennan and Buchanan 1980; Oates 1993; Treisman 2007). Political unions can have a high degree of expenditure decentralisation but a low degree of revenue decentralisation (such as Spain), or can have a relatively higher degree of both (such as the USA). These differences matter for both efficiency and distributional reasons. In terms of efficiency, fiscal systems in which regions spend what they do not tax may generate poorer macro-economic outcomes as local units engage in fiscal irresponsibility for electoral gain (Rodden 2006; Wibbels 2005*b*; Rodden and Wibbels 2002). In terms of distribution, fiscal systems in which both revenues and expenditures are decentralised and where the scope of interregional fiscal transfers is more limited, regional economic differences and larger levels of interpersonal inequality tend to correlate more tightly.¹

Third, and critical to our logic, a growing body of literature suggests that the scope and type of decentralisation are themselves endogenous to patterns of territorial inequality (Bolton and Roland 1997; Rodríguez-Pose and Ezcurra 2009; Lee and Rogers 2019*a*). It is precisely where interregional inequalities are larger that we are likely to see higher levels of both expenditure and revenue decentralisation. The implications following from this result are important. In equilibrium, before any crisis hits a country, fiscally decentralised systems face potential external shocks from fundamentally different positions:

1. Territorial inequality associated with economic geography is typically higher in decentralised systems.
2. The fiscal state in decentralised nations, in equilibrium, is as concerned with redistribution between territories as it is with redistribution between people. Political conflict revolves as much around instruments and policies that reallocate resources between territories (e.g., *Finanzausgleich* in Germany, or *Financiación Autonómica* in Spain) as around the progressivity of taxes and benefits (Beramendi 2012; Rogers 2015).

This contrast between centralised and decentralised regimes, we argue, provides the basis for the differential channels through which exogenous shocks shape distributive outcomes. We argue that they provide the key to a better understanding of the distributional impact of the Great Recession on both interregional and interpersonal inequality. Given the joint endogeneity between specific fiscal designs, economic geography, and inequality in its various dimensions, any analysis of the distributive implications of external shocks must consider how the shock affects both ends of the relationship. We provide such an analysis in turn.

3 The theoretical link between decentralisation and inequality

Our next step is to analyse how the system of redistribution in place moderates the economic consequences of the shock, and how that in turn shapes different types of inequality, in particular the contrast between interpersonal and interregional inequalities. Fiscally decentralised systems, by the very political process that brings them about, have two central features. The first one is that they are weaker at pooling risks across individuals located in different jurisdictions; the second one is that part of their fiscal effort is devoted to equalise the level of fiscal capacity among its constituent parts. Risk-pooling is critical to the fiscal and political foundations of redistribution (Rehm 2016). In times of crisis, this aspect of the fiscal system becomes the object of intense political competition. In the event of an exogenous shock, the combination of these two features shape the distributional implications of crises in decentralised contexts.

We argue that in the event of an exogenous shock, decentralisation weakens risk pooling at the individual level, leading to lower levels of overall redistribution, and higher levels of interpersonal inequalities even if the economic fundamentals across regions have converged due to the asymmetric nature of the crisis (hitting areas where more advanced sectors were concentrated). Importantly, we expect to find this effect across the two main types of fiscal

decentralisation, expenditure and revenue decentralisation, despite existing research that suggests these types have broadly different effects.

3.1 How do shocks affect different dimensions of inequality?

A financial shock that leads to a current account crisis and ultimately to a sudden halt of the real economy has clear distributional consequences for individual economic actors. These consequences operate through different channels depending on what section of the distribution of income one analyses. At the top end, individuals derive their income from a combination of labour earnings and returns to financial capital investments. At the low end, wages are the primary source of income. Economic fortunes at the top suffer in the short run reflecting the depth in the downturn of the stock market. Economic fortunes at the bottom, in turn, reflect the depth of the downturn in the labour market.²

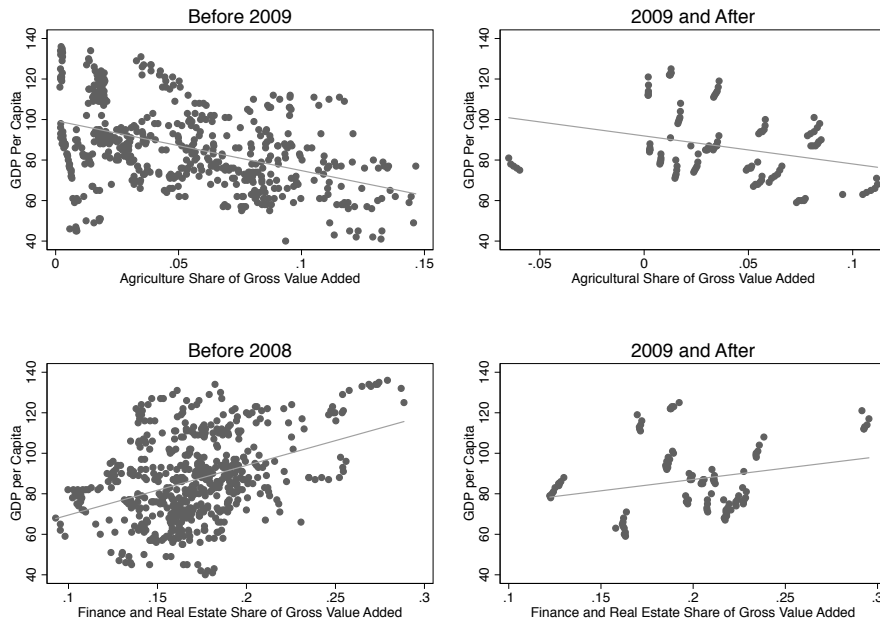
Any given individual's risk profile reflects her position within a particular labour market sector, and more importantly, how exposed her sector is to the downturn. These two factors account for implications of economic crises at the individual level. An unskilled worker in an industry particularly affected by the downturn, such as construction or real estate management, is more likely to suffer a severe shock in the form of a protracted unemployment spell. A financial manager in the city will face different fortunes depending on her portfolio of assets. If the portfolio rests primarily on real estate assets, she will face similar consequences to the real estate agent or the construction worker. If the portfolio is more diversified, she will suffer a temporary reduction of income, but the intensity of the economic consequences of the shock will be far less severe.

In the absence of spatial concentration of economic activities, the interplay between skill, occupations, and sectors will be sufficient to predict the consequences of crises for the distribution of income. Yet there is no gainsaying that sectors and economic activities are not neutral in space (Krugman 1991). To the extent that sectors, and with them specific clusters

of occupations, tend to be concentrated in space, so are the distributional implications of economic shocks. The key distinction here is whether the crisis brings regions/areas closer in terms of resources and risk profiles or, by contrast, generates asymmetric effects that exacerbate pre-existing differences within the polity. We assume all economies in our study feature economic asymmetries due to some degree of economic concentration across regions (Krugman 1991; Groot et al. 2011; Crescenzi, Luca and Milio 2016; Martin 2011). As a result, we reason from the premise that the economic influence of a common external shock may be stronger in some areas than in others. These shocks may increase interregional inequalities, should the shock disproportionately impact poorer areas. Alternatively, should the shock hit the most productive areas, interregional inequalities may decline even as economic conditions fall.

The broad scholarly consensus suggests that the impact of the Great Recession fell heavily on the more productive regions within a nation, at least in the short run (Groot et al. 2011; Bardhan and Walker 2011; Martin 2011). The crisis disproportionately hit certain sectors: financial services, housing and property, and manufacturing, that tend to cluster in more economically productive regions. Inequality increased the most in urban, high productivity areas (Groot et al. 2011; Martin 2011). Job loss and economic distress (e.g., housing loss) were most pronounced in high productivity regions (Edmiston and Zalneraitis 2007; Henderson and Akers 2009; Commission 2013). The general result of these factors was that territorial inequality in most cases fell after the Great Recession, especially in disparities in productivity and unemployment rates (Crescenzi, Luca and Milio 2016; Capello, Caragliu and Fratesi 2015). In the US case, for instance, evidence from welfare programs shows that the increases in food assistance programs following the Great Recession were not from high poverty, low productivity areas, but from relatively productive regions with large financial service and housing sectors such as California, Arizona, Florida, and New Jersey (Slack and Myers 2014).

Figure 1: Sector Trends and GDP Growth in Spain, Pre and Post Great Recession



Notes. Correlations with GDPPC (Pre-2009, Post 2009): Agriculture (-.44, -.28), Finance (.40, .24).

For Spain, to take another example, we see a decoupling of economic fundamentals that typically drive GDP per capita trends in the Pre- and Post-Great Recession era. Figure 1 shows that in the post Great Recession period in Spain, higher agricultural share of the economy is associated with higher levels of GDP per capita growth in comparison to the Pre-Recession period. Higher share of finance sector in the economy is associated with lower levels of GDP per capita growth than previous periods. The regions that were “thriving” during the boom were also the ones that contracted faster, thus leading to a reduction of inequality between subnational units in the short run. These two experiences help illustrate a potential logic by which exogenous crises lead to a reduction in differences in average incomes between territories. But this logic, as argued above, need not be general, but rather a function of the pre-existing composition of economic activities and their relative exposure to the shock.

To summarize, a common financial shock triggers, in the absence of state interventions, three effects: (1) an increase in wage inequality between workers able to preserve their employment in unaffected sectors and workers in more exposed sectors; (2) an increase in market income inequality as a result of the increase in unemployment; and (3) a change in market income regional disparities as a consequence of the interaction between the shock and pre-existing differences in regional labour markets' skill composition, productivity, and exposure to the shock.

3.2 Decentralisation and response to shocks: Expenditure vs. revenue

Existing research on fiscal decentralisation paints expenditure and revenue decentralisation in different lights. Expenditure decentralisation, the most common form of decentralisation across the globe, entails sub-national spending typically funded by transfers from the central government. In affluent nations expenditure decentralisation is often viewed in positive terms because it allows localities to tailor the administration of policy to the local levels. In other contexts, most often in middle and lower income countries, expenditure decentralisation is viewed as providing incentives for sub-national governments to engage in profligate spending (Rodden and Wibbels 2002; Jin and Zou 2002). The key feature promoting poor fiscal management in expenditure decentralised systems is whether those resources are collected locally, or transferred from the central government (Wibbels 2005*b*).

Revenue decentralisation, on the other hand, is most often praised for encouraging fiscal solvency at the local level (Ebel and Yilmaz 2002) and for allowing jurisdictions to provide their preferred level of services (Oates 1993). However, revenue decentralisation allows more affluent jurisdictions to keep their money within their borders, which may exacerbate interregional and interpersonal inequality (Beramendi 2012).

Crucially, both expenditure and revenue decentralisation limit risk pooling across the national territory, which may increase inequality (Wibbels 2005*a*). In the case of expenditure

decentralisation, revenue transferred to and spent by sub-national regions may be employed to shore up political support rather than cushion the effects of economic shocks on citizens (Beramendi, Rogers and Díaz-Cayeros 2017; Beramendi, Oh and Rogers 2019). Decentralisation in Europe, for example, appears to be associated with more social policy provision in some cases, as local politicians seek to shore up support (Ferwerda 2015). Yet the concerns with risk pooling remain. When nations experience a shock, the tax bases of revenue decentralised nations are more isolated, which may create a mismatch between the needs of people and the location of the distribution of resources.

We argue that shock of the Great Recession reveals that these decentralisation types have broadly similar effects on inequality. Decentralisation takes away from central resources that may equilibrate resources across places and reduces resources that are commonly used to address inequality. What may be obscured in the endogenous relationship between decentralisation and inequality is that both types have the effect of increasing inequality through their limitations on risk pooling, specifically to use centralised resources to compensate those harmed by economic downturns.

3.3 The Great Recession and Decentralisation: Hypotheses and empirical strategy

The previous two sections have elaborated the two pillars guiding the analysis of the impact of decentralisation on the distributive implications of the Great Recession. Economic shocks are bound to generate different distributive implications in decentralised contexts because: (1) economic geography is more skewed to begin with and; (2) the nature of redistributive conflicts and the way the fiscal system prioritises individuals versus territories are also different. In decentralised systems, risk pooling is weaker and, as a result, so is the redistributive incidence among individuals. In addition, wealthier territories are in a stronger position to demand more resources for themselves (should they need them) or to block additional transfers to others (Giuranno 2009).³

Accordingly, our analysis suggests the following empirical implications:

Premise: Given that fiscally decentralised countries begin with more polarised economic geography, we anticipate an exogenous crisis to lead to:

A: A reduction in interregional inequalities, if the shock disproportionately affects wealthier areas; or,

B: An increase in interregional inequalities, if the shock disproportionately affects poorer areas.

Hypothesis 1: Fiscally decentralised countries will provide lower levels of redistribution than centralised ones in response to an exogenous crisis.

Hypothesis 2: As a result, overall (interpersonal) inequality will grow more as a result of an exogenous shock in fiscally decentralised countries.

To test our premise and our hypotheses, we adopt a coherent empirical strategy. Decentralisation and decentralised fiscal structures are likely endogenous to the concerns about economic inequality and redistribution. Accordingly, it is not useful to conduct a standard regression analysis linking types of decentralisation to inequality and redistribution. The common shock of the Great Recession offers a “natural quasi-experiment” to evaluate the impact of endogenous institutions on redistributive outcomes. We use a difference in differences approach to see the divergent effects of fiscal decentralisation after the Great Recession.

We present results in three sections to match our empirical implications. First, we show data establishing our premise: the relationship between decentralisation, the Great Recession, and interregional inequality. We examine interregional inequality as a mechanism to reveal how redistribution and interpersonal inequality are likely affected by crises in decentralised nations. We expect the Great Recession to have an uneven effect across the nations’

geography. In particular, because the Great Recession had its biggest impact on metropolitan areas (particularly on urban employment and housing prices in suburbs), we expect its effect to be to reduce the productivity gap between more affluent metropolitan areas and less productive regions (Midrigan and Philippon 2011; Mian, Rao and Sufi 2013). Thus interregional inequality, the uneven spatial distribution of economic productivity, would in fact decline due to the crisis. We expect no general effect of fiscal decentralisation on interregional inequalities, which we assume to be intimately tied to the adoption of fiscal decentralisation in the first place (Beramendi 2012). After the Great Recession, we expect fiscally decentralised nations to preserve the market-driven equilibration in interregional income, resulting in lower interregional inequalities. If redistributive policies absorbed the entire inequality shock of the Great Recession, we would see no effect on interregional inequality, as regions would maintain status quo productivity differences. We argue the rise in interregional inequality reflects the subsequent findings for redistribution and interpersonal inequality showing that fiscal decentralisation reduces the redistributive role of government and preserves market distribution.

Second, we show the relationship between decentralisation, the Great Recession, and economic redistribution. Government redistribution is the true political mechanism linking the Great Recession to distributive outcomes in the population. We expect the results for redistribution to mirror those of interpersonal inequality. While efforts by governments to stabilize incomes were certainly activated during the Great Recession, government's ability to equilibrate income with rising market inequality could not keep up. Thus, redistribution, measured as governments' ability to narrow the gap between market and net inequality, fell in this period.⁴ We expect decentralised expenditure to be associated with lower redistribution (Obinger, Leibfried and Castles 2005) and local tax revenue to be associated with higher redistribution (Sokoloff and Zolt 2007). Moreover, we expect redistribution to be lower in the Post Recession period in fiscally decentralised states.

Third, we show the ultimate outcome of interest: the relationship between decentralisation, the Great Recession, and interpersonal inequality. Consistent with other research on the financial impact of the Great Recession, we expect interpersonal inequality to rise in the period after 2008. We expect decentralisation to be endogenously related to inequality, and thus the results to reveal more about conditions under which those institutions are adopted than their actual effects. Most importantly, we anticipate decentralisation will exacerbate rising interpersonal inequality in the Post-Recession period. Ultimately, lower redistribution and relatively weak efforts to limit inequality in decentralised states, including in the relatively affluent parts of decentralised nations, increased economic inequality in those nations.

4 Data

4.1 Dependent Variables

We organise our analysis around our dependent variables: interregional inequality (premise), redistributive effort (H1), and interpersonal inequality (H2). Summary statistics are shown in Online Appendix (OA) Table 1. Figures plotting our data by year (OA Figure 1) and by country (OA Figure 2) are shown in OA Section 1.

Interregional Inequality

We measure interregional inequality to capture the distributive dynamics relating the Great Recession to redistribution and interpersonal inequality. Our primary measure of interregional inequality is the coefficient of variation in regional GDP per capita (Lessmann 2009). This measure captures the dispersion of productivity across sub-national regions within countries. COV is calculated as follows:

$$\text{COV} = \frac{1}{\bar{y}} \left(\frac{1}{n} \sum_{i=1}^n (\bar{y} - y_i)^2 \right)^{1/2} \quad (1)$$

where \bar{y} denotes the country's average GDP per capita, y_i is per capita GDP of region i , and n is the number of regional units. Our base data (GDP and population) come from Eurostat, Cambridge Econometrics, and country national accounts. COV is a widely used measure in the literature on regional economic growth and convergence (Barro and Sala-i Martin 1992; Sala-i Martin 1996). In OA Section 2, we show our results are robust using alternative measures of interregional inequality, including the population-weighted coefficient of variation in sub-national GDP per capita, the gini coefficient of sub-national GDP per capita, and a scale and scope-independent measure of interregional inequality.

Regional GDP per capita is not directly equivalent to household income, as used in our measures of redistribution and interpersonal inequality. We employ regional GDP for several reasons. Most importantly, regional economic productivity is the best indicator of sectoral changes to capture the variation across regions that result from economic crisis. Second, regional GDP is a reasonable proxy for market income data, which is not available by region for a large number of nations for multiple periods of time. For the sub-sample of countries with region-level data available in Luxembourg Income Study data, the share of a region's GDP and the share of a region's market income correlate at $r=0.82$. Similarly, the share of regional GDP and the share of net household income per capita for a larger set of countries available from the OECD correlate at $r=0.91$.

We utilize the first-level administrative region as our sub-national unit of focus for our sample. This variable refers to the Nomenclature of Territorial Units for Statistics (NUTS2) level 2 designation in European Union countries, which is equivalent to the state or province level. We use this level for important theoretical and empirical reasons. Most critically for our research question, the first level administrative region is typically the most important administrative and political unit for fiscal decentralisation. The first level is also typically the crucial political sub-unit in most nations, serving as the relevant geography for upper houses in bicameral legislatures, and often as boundaries for lower house electoral districts.

Moreover, these units are generally consistent over time, and are the only units upon which data are regularly collected for population and economic censuses. Our results are also consistent when we use our interregional inequality measures at the NUTS3 level (the EU second administrative level), shown in OA Table 2 and in the SSGINI measure (shown in OA Table 3), which is stable across data measured at the NUTS2 and NUTS3 levels (Lee and Rogers 2019b).

Redistribution (Difference between Market and Disposable Gini Coefficients)

We measure redistribution as the relative change in the gini coefficient of income inequality before (gini coefficient of market income) and after (gini coefficient of disposable income) government tax and transfer policies (Solt 2009). Solt’s dataset is widely used in research in economic inequality because of its consistent coverage, methodology, and clear sourcing, relying on the preferred Luxembourg Income Study (LIS) whenever possible. In the case of our OECD sample, Solt’s data is primarily composed of LIS data.

$$\frac{Gini\ Net - Gini\ Disposable}{Gini\ Disposable} \quad (2)$$

This measure captures the redistributive effort, on both the taxation and expenditure sides, to reduce the market income inequality. In OA Table 4, we also show our findings are robust to two alternative measures of redistribution, social expenditure at the central level, available from Eurostat, and state and local level social spending, from the IMF Government Finance Statistics.

Interpersonal Inequality (Net Gini)

We measure interpersonal inequality as the gini coefficient of disposable income from Solt (2009). This indicator captures the level of interpersonal inequality after government tax and transfer policies and thus more accurately captures the “real” inequality felt by citizens than market inequality.

In OA 5 we also show our results with alternative measures of interpersonal inequality, including market inequality from Solt (2009), and the 90/10 income ratio, with data from Lupu and Pontusson (2011).

4.2 Independent Variables

Our primary results focus on interaction terms between two measures of fiscal decentralisation and a dummy variable representing the years after the Great Recession. We code the Post-Recession variable as 0 if the year is prior to 2009 and 1 if the year is 2009 or after.

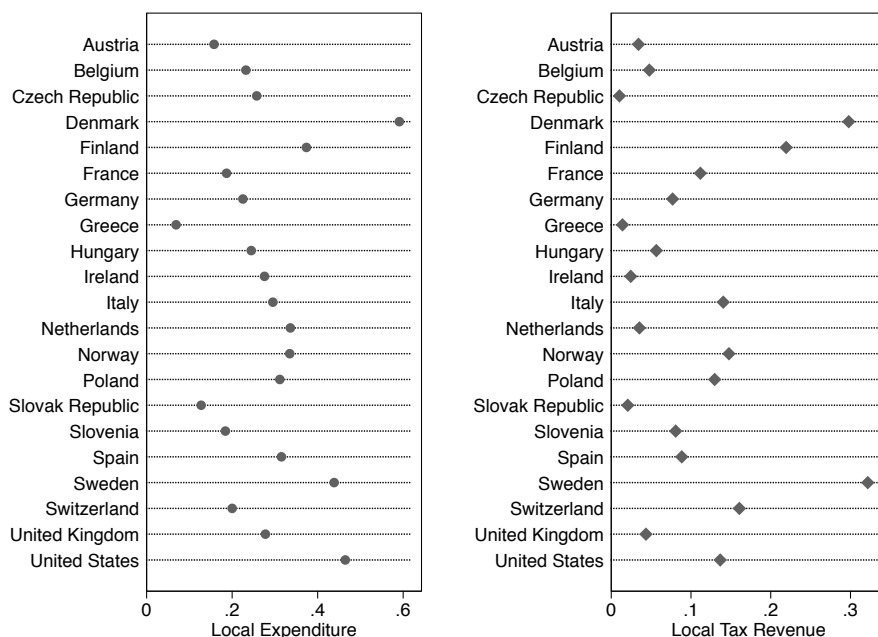
Our measures of fiscal decentralisation are observable outcomes of sub-national expenditure and taxation, taken from the World Bank. Specifically, these include local expenditure (% of total general government expenditure) and local tax revenue (% of total sub-national revenue and grants). As discussed in Section 3.2, these different decentralisation measures may capture quite distinct fiscal structures, including whether sub-national governments administer policies (expenditure), or are fiscally autonomous or more dependent on the central state to fund policies (local tax revenue). Figure 2 provides average country values for our sample. Within our sample of OECD nations we see considerable heterogeneity in expenditure and tax revenue decentralisation. Countries such as Denmark are highly decentralised on both the expenditure and revenue side, countries such as Greece are substantially centralised in both categories, in comparative perspective.

In OA Table 6, we show similar results for an alternative measure of fiscal decentralisation, local revenue (% of total general government revenue).

4.3 Control Variables

We include common control variables for economic redistribution that are consistent across our models. The level of economic development is a strong predictor of government actions to reduce economic inequality. We include in our models the logged value of per capita

Figure 2: Descriptive Statistics, Fiscal Decentralisation



Notes. Local expenditure is measured as a % of total general government expenditure and local tax revenue as a % of total sub-national revenue and grants. All values are country averages.

GDP from Penn World Tables (Feenstra, Inklaar and Timmer 2015). Governments provide more resources and services for dependent populations—both children and the elderly. We include a measure of the working age population (% population above 15 or under 65) from the World Development Indicators. Trade may impact inequality, redistribution, and the spatial distribution of income (Garrett and Rodden 2003). We include the sum of imports plus exports divided by gross domestic product (GDP) from the World Development Indicators. Proportional representation is associated with more generous redistributive policies, and lower net inequality (Iversen and Soskice 2006). We include a measure of proportional representation from Armingeon et al. (2013). We add a measure of left government control (% of seats in the legislature) from Armingeon et al. (2013). Left governments are expected to press for increased redistribution, and thus reduced inequality. We control for levels of market inequality with the Gini Market variable from Solt (2009). In all of our main models,

we also include the lagged dependent variable, as well as year and country fixed effects, to capture unobserved heterogeneity not accounted for in our set of control variables.

In OA Section 4 we also include models that control for additional political variables that may influence inequality, including federalism (Armingeon et al. 2013), parliamentary systems (Armingeon et al. 2013), centrifugal political institutions (Gerring, Thacker and Moreno 2005), party system nationalisation (Bochsler 2010), and legislative malapportionment (Samuels and Snyder 2001). Our results are not meaningfully changed when including these variables.

4.4 Model

We structure our empirical analysis as follows:

$$C_{i,t} = \alpha + \beta S_{i,t} + \beta K_{i,t} + \beta S_{i,t} * K_{i,t} + \gamma' \mathbf{X}_{i,t} + \mu_i + \lambda_t + \epsilon_{i,t}, \quad (3)$$

where i indexes each country and t indexes each year. $C_{i,t}$ is one of three distributive outcomes measures, Interregional Inequality, Government Redistribution, or Interpersonal Inequality as described in Section 4.1. $S_{i,t}$ is one of the two fiscal decentralisation measures described in Section 4.2. $K_{i,t}$ is the dummy variable for the Post-Recession period. $S_{i,t} * K_{i,t}$ is an interaction term between the fiscal decentralisation measure and the Post-Recession variable. $\mathbf{X}_{i,t}$ is a vector of controls for time-varying observable characteristics (GDP per Capita, Dependent Population, Trade, Left Government, Political Institutions, Market Inequality, Lagged Dependent Variable). μ_i and λ_t are country and year fixed effects, respectively. $\epsilon_{i,t}$ is a random error term. We maintain consistent samples across all models. All models are estimated using OLS with panel-corrected standard errors to manage panel heteroskedasticity and spatial correlation (Beck and Katz 1995). We also show results in OA Section 5 with varying specifications, including the base model (no controls, Table 10), the base model with the lagged dependent variable (Table 11), and results with AR1 correlated errors (Table 12).

5 Data Analysis

Our empirical setup includes multiple dependent and independent variables to establish an overarching comparative pattern. To aid the interpretation of the results, we plot the coefficients of the main independent variables and graph the conditional effects to examine the interactive relationship between fiscal decentralisation and the Great Recession. These figures enable easy comparisons across the indicators. The full regression results for each model are shown below in Table 1.

5.1 Premise Results: Interregional Inequality

Figures 3 and 4 show our results for our interregional inequality dependent variable. Beside each (a) plot of coefficient estimates, we also include the conditional effects of (b) the marginal effect of fiscal decentralisation in the Pre- and Post-Recession periods, and (c) the marginal effect of the Great Recession at different levels of fiscal decentralisation.

Figure 3 plots our results for the impact of expenditure decentralisation. The first coefficient estimate in Figure 3(a), for the Post-Recession period, reveals that the period after 2008 was associated with lower levels of interregional inequality than previous periods, on average. The impact of the Great Recession on the interregional inequality in our sample was substantial, reflecting a drop of approximately 28% of the sample mean, but only 58% of one standard deviation. The large value range for the interregional inequality variable in the sample accounts for this measurement.

The general relationship between expenditure decentralisation and interregional inequality in our sample is positive. This implies that expenditure decentralisation is linked to higher productivity differentials across regions. Local expenditure may be funded by local tax revenues (tested below), or more commonly, central expenditure transfers to local governments. We would see this relationship between expenditure decentralisation and in-

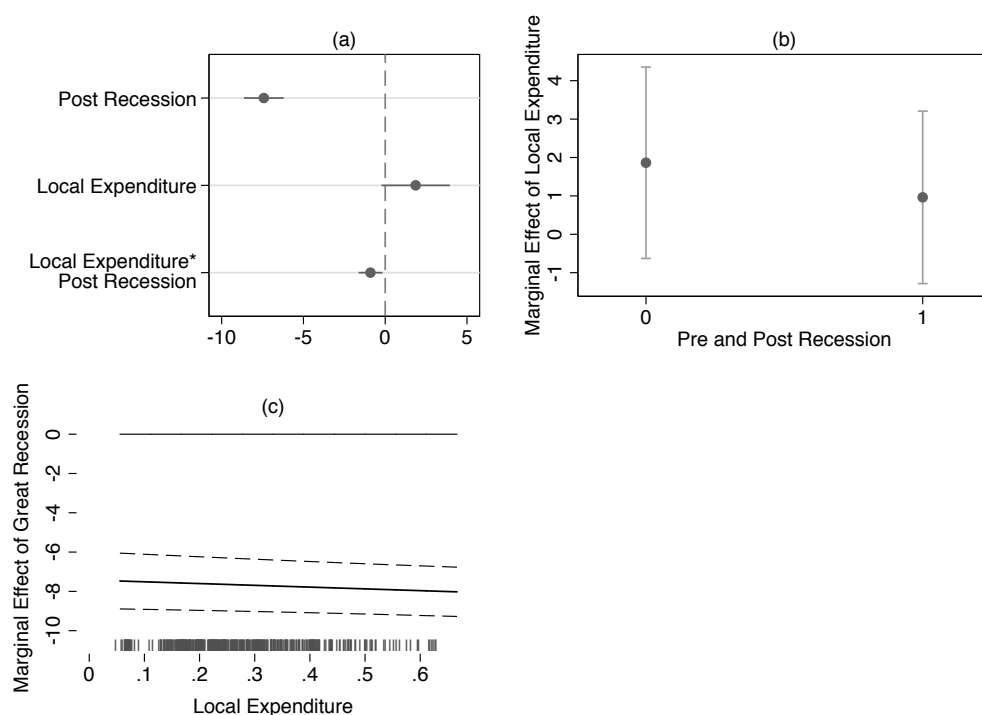
terregional inequality if, for example, higher productivity regions subsidised the spending of lower productivity regions via interregional transfers.

We expect expenditure decentralisation to be endogenously linked to interregional inequality. Thus, the more informative result indicating the relationship between expenditure decentralisation and interregional inequality is in the interaction between the Great Recession and local expenditure. With this “shock” to distribution, we may see the “true” effect of expenditure decentralisation on interregional inequality. In this case, we see that fiscal decentralisation is associated with a statistically significant decrease in interregional inequality. The effect in this case is modest. The mean value of our coefficient of variation of interregional inequality is 25 in our full sample. The average effect is a decrease in redistribution of close to 1 point, or a 4% reduction in interregional inequality in expenditure-decentralised nations.

The conditional effects plots in Figure 4 show in greater detail how interregional inequality was impacted by the Great Recession and expenditure decentralisation. In Figure 2(b) we see that prior to the Great Recession, the average value of local expenditure was associated with higher levels of interregional inequality. After the Great Recession, expenditure decentralised nations saw a decline in interregional inequality of approximately 18% (from 2.2 points higher to 1.8 points higher). Importantly, the conditional relationship still suggests expenditure is associated with higher interregional inequality in comparison to less decentralised nations. However, the differential between the more and less decentralised nations declined after the Great Recession. Figure 3(c) shows the impact of the Great Recession on interregional inequality at varying levels of expenditure decentralisation. The overall immediate impact of the Great Recession on interregional inequality was lower, but a modest amount, as the level of expenditure decentralisation increased.

Figure 4 plots the results of our tax revenue decentralisation models. Very similar to Figure 3, we see a large general impact of the Great Recession on interregional inequality. The

Figure 3: Impact of the Great Recession and Local Expenditure Decentralisation on Interregional Inequality

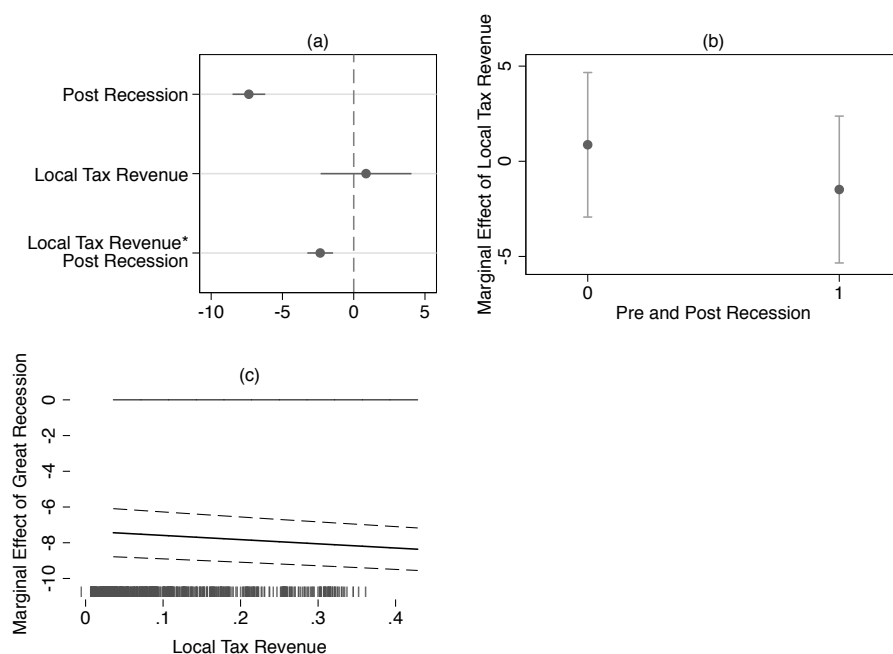


relationship between interregional inequality and tax revenue decentralisation is positive but not significant. This implies no clear link between revenue decentralisation and interregional inequality overall. After the Great Recession, however, interregional inequality fell, in relative terms, in revenue decentralised nations. As Figure 4(b) shows, we see interregional inequality decline in the Post-Recession period relative to the Pre-Recession period. However, this effect is not substantial.

The impact of the Great Recession on interregional inequality across different levels of revenue decentralisation is shown in Figure 3(c). From the lowest levels of tax revenue decentralisation to the highest, we see a decline of interregional inequality approximating 2.4 points, or 10% lower interregional inequality.

Overall, our results suggest that the Great Recession was associated with declining interregional inequality in fiscally decentralised nations. Importantly, we should not necessarily

Figure 4: Impact of the Great Recession and Local Tax Revenue Decentralisation on interregional Inequality

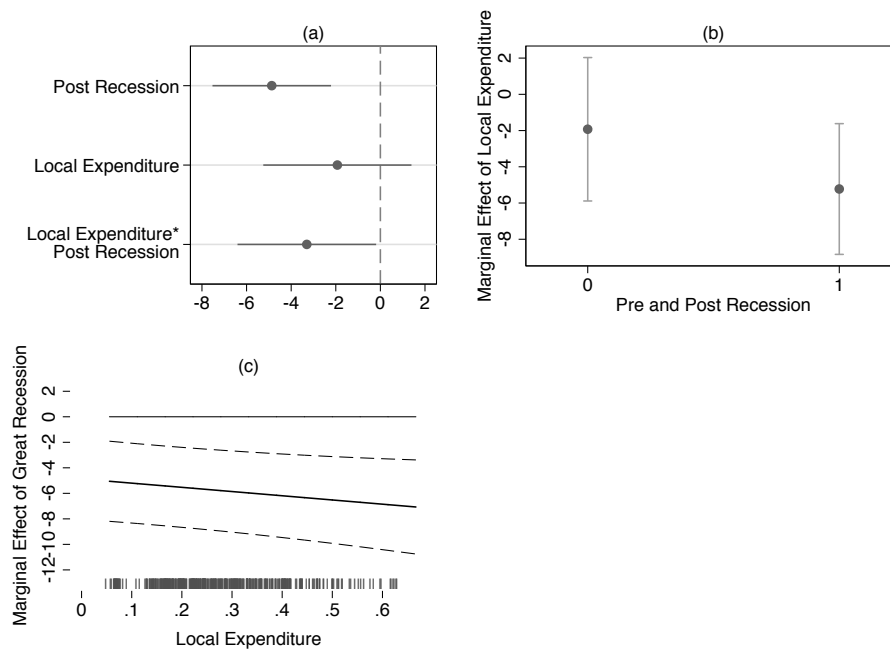


interpret this result as showing that fiscal decentralisation in fact helped regions to equilibrate their income under conditions of fiscal crisis. Rather, we suggest this result shows that fiscal decentralisation, adopted in the first place to preserve market conditions that produced inequalities across regions, acted as expected following the Great Recession. With the Great Recession having the general effect of dampening productivity, in relative terms, of the most productive regions, we saw fiscally decentralised nations preserve that market-driven distribution. The results for interpersonal inequality and redistribution show that fiscally decentralised systems do less to reduce inequality. With regard to interregional inequality after the Great Recession, had economic stabilizers been as extensive in fiscally decentralised nations, we would have seen little change in interregional inequality as central welfare states picked up the slack in the more impacted regions. Thus, a decline in interregional inequalities in this case does not represent an unequivocally positive result for economic redistribution.

5.2 Hypothesis 1 Results: Redistribution

Figures 5 and 6 show our results for our redistribution dependent variable. The first coefficient estimates, for the Post-Recession period, reveals the period after 2008 was associated with lower levels of government redistribution than previous periods, on average. Across the two models, the decline in redistributive effort was around 11%. Importantly, this does not imply that governments spent less on redistribution in the Post-Recession period (they spent more, see OA Table 4) but that these efforts were not able to reduce market inequality as effectively as they did in previous periods. This result is consistent with the rise in overall interpersonal inequality seen in Figures 7 and 8.

Figure 5: Impact of the Great Recession and Local Expenditure Decentralisation on Redistribution



The general (endogenous) relationship expenditure decentralisation and redistribution is negative, but not significant, in our sample. After the Great Recession, we see a significant negative relationship between expenditure decentralisation and redistribution. Figure

5(b) shows that, while expenditure decentralised nations were statistically indistinguishable from less decentralised nations prior to the Great Recession, they revealed significantly lower levels of redistribution in the Post-Recession period. In the Post-Recession period, expenditure decentralised nations were associated with approximately 15% lower redistribution. Figure 4(c) shows the impact of the Great Recession across the full range of expenditure decentralisation. At the lowest levels of decentralisation, the Great Recession was associated with declines in redistribution of approximately 4.5 points, or 12% of average redistribution. At the highest levels of expenditure decentralisation, redistribution measures at approximately 16% lower after the Great Recession.

Figure 6: Impact of the Great Recession and Local Tax Revenue Decentralisation on Redistribution

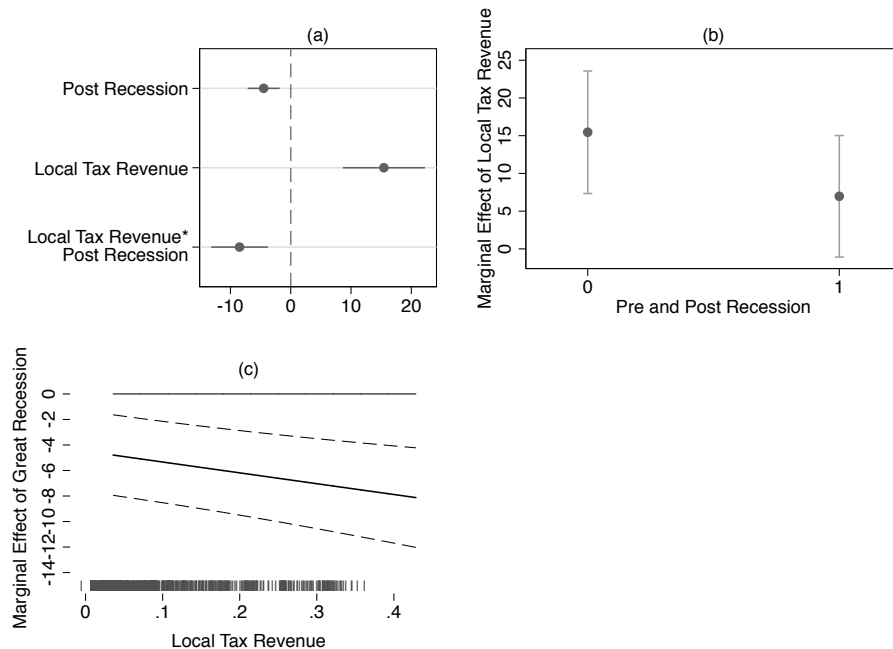


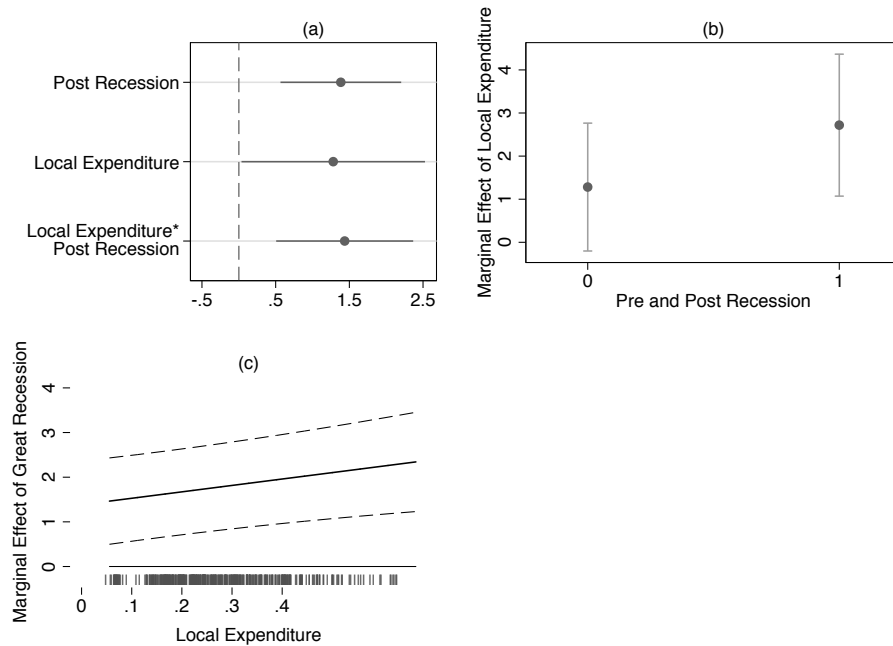
Figure 6 shows the link between tax revenue decentralisation and redistribution. Overall, tax revenue decentralisation is associated with higher levels of redistribution. Figure 6(b) demonstrates that revenue decentralised nations had substantially higher levels of redistribution. However, in the period after the Great Recession, revenue decentralised nations had

levels of redistribution that were not distinguishable from more revenue centralised nations. Figure 6(c) shows a large drop in redistribution at increasing levels of revenue decentralisation. While redistribution fell around 4 points (10%) in the most revenue centralised nations, redistribution fell double that in the most revenue decentralised nations in comparison with the Pre-Recession period.

5.3 Hypothesis 2 Results: Interpersonal Inequality

The results of our estimates for interpersonal inequality are shown in Figures 7 and 8. The first coefficient estimates in both models, for the Post-Recession period, reveal that the period after 2008 was associated with higher levels of interpersonal inequality than previous periods, on average. The mean value of interpersonal inequality is 28.4 in our full sample. The average effect is an increase in interpersonal inequality of around 1.4 points, or a 5% increase.⁵

Figure 7: Impact of the Great Recession and Local Expenditure Decentralisation on Interpersonal Inequality

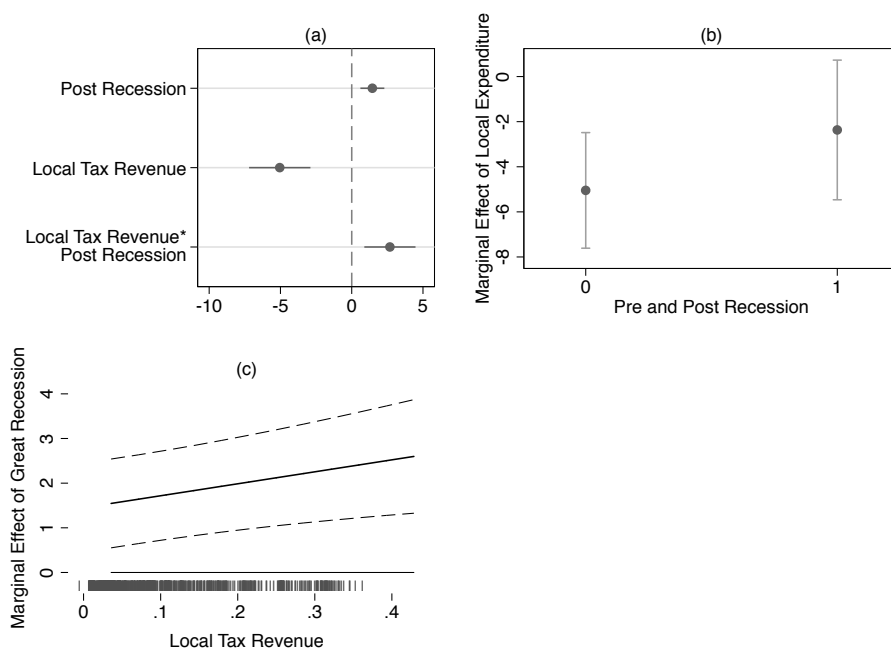


The general relationship between the fiscal decentralisation measures and interpersonal inequality again depends on the type of fiscal decentralisation. In countries with high levels of expenditure decentralisation, we see a positive and significant association with interpersonal inequality (Figure 7). This may reflect a structure of governance whereby fiscal responsibility is delegated to local levels to avoid centralised redistribution, or to reward local politicians (Rodden and Wibbels 2002). After the Great Recession, we see an exacerbation of this positive relationship between expenditure decentralisation and interpersonal inequality, shown in Figure 7(b). Prior to the Great Recession, expenditure decentralised nations had, on average, disposable gini levels approximately 2 point higher, or 7% higher. After the Great Recession, inequality was close to 14% higher in expenditure decentralised nations. Figure 7(c) shows the climb in interpersonal inequality driven by the Great Recession at varying levels of expenditure decentralisation. At the lowest levels of expenditure decentralisation, interpersonal inequality rose around 1.5 points. At the highest levels of expenditure decentralisation, the Great Recession increased interpersonal inequality nearly 50% more than the lowest level of expenditure decentralisation, to 2.2 points.

The overall relationship between tax revenue decentralisation and interpersonal inequality is negative. This implies that inequality is lower in revenue decentralised nations, perhaps because countries with high levels of local tax collection tend to be those with economically productive regions and relatively strong local governments. In these countries, such as Germany, local tax collection reflects strong state capacity and redistributive effort in the country overall. This relationship between revenue decentralisation and lower inequality appears quite strong and substantively important in the Post-Recession period.

However, once we observe the shock of the Great Recession, revenue decentralised nations are not distinguishable from revenue centralised nations with regard to interpersonal inequality. As shown in Figure 8(b), the association goes from a significant, negative 5 points in the Pre-Recession period, to insignificant, negative 2 points in the Post Recession pe-

Figure 8: Impact of the Great Recession and Local Tax Revenue Decentralisation on Interpersonal Inequality



riod. In the absence of a research design to identify a shock to the existing distributive arrangements, we may attribute a negative effect of revenue decentralisation on interpersonal inequality. These results suggest the “true” effect of revenue decentralisation may be to increase inequality.

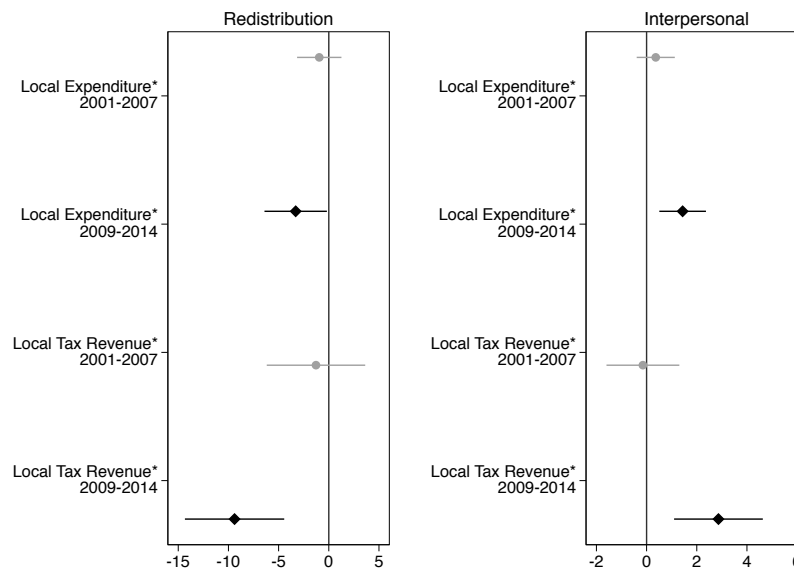
Figure 8(c) shows the impact of the Great Recession as revenue decentralisation goes from the highest to the lowest levels. At the lowest levels of revenue decentralisation, the Great Recession was associated with an increase in interpersonal inequality of approximately 1.5 points, or 5%. At the highest levels of revenue decentralisation, interpersonal inequality increased 8% on average.

6 Parallel Trends Analysis

Difference in differences analyses depend on an assumption that the observed outcomes reflect a change in the period under examination. Stated otherwise, in the absence of treat-

ment, the difference between the 'treatment' (Post-Recession) and 'control' (Pre-Recession) groups would be constant over time. To assess this parallel trends assumption, we repeat our analysis with a different "window" of treatment (Malesky, Nguyen and Tran 2014). Specifically, we code a new dummy variable to reflect the 5 year window prior to the examination period (2001-2007). If the two groups were on parallel trends, we should observe that coefficients of the interaction term for the decentralisation measures and the alternative window are not significantly different from zero. We should see no clear impact of this arbitrary five year period on the outcomes of interest.

Figure 9: Parallel Trends Analysis, Hypotheses 1 and 2



Notes: Results from previous window (2001-2007) are shown in red. Post-Recession results shown in grey.

In Figure 9, we show the results of this analysis for our primary dependent variables of interest, redistribution and interpersonal inequality, to assess the substantive distributive impact of the fiscal decentralisation. The results in black are those from main analysis of the Post-Great Recession period. We expect those to be significantly associated with interpersonal inequality, redistribution, and interpersonal inequality as seen in Figures 3, 4, 5, 6,

7 and 8. The results shown in grey are the coefficient estimates from the artificial window for the 2001-2007 period. We expect those results to be not significantly different from zero. In every case we find the artificial window provides insignificant results. Figure 9 provides strong support for the parallel trends assumption for those variables.⁶

7 Conclusion

This paper has presented a systematic effort to evaluate the distributional impact of the Great Recession in advanced industrial democracies. We have focused on two channels: (1) the spatial impact of the contraction, and its associated effect on interregional and interpersonal inequality; and (2) the capacity of centralised versus decentralised redistributive systems to curb the increase in inequality. Our findings suggest that the recession in more fiscally decentralised contexts was associated with a reduction in the scope of interregional inequalities, which helps to explain the associated reduction in the overall levels of redistribution, and a significant increase in the levels of interpersonal income inequality and associated reductions in redistribution.

This research contributes to existing debates on fiscal federalism and its implications for inequality and social welfare. While federalism has been linked theoretically and empirically to reduced distributive effort and higher inequality, this research has struggled to isolate the direction of causality. Our findings confirm the anti-redistributive inclination of fiscal federalism. Importantly, we find that both expenditure and revenue-side fiscal federalism is associated with lower redistributive effort. Local expenditure has long been known to be associated with less redistributive states. While local tax revenue is correlated with higher redistribution and lower inequality in general, once we examine the effects of the shock, local tax revenue is associated with lower redistribution and higher inequality. Thus, both main forms of fiscal federalism appear to limit redistributive effort, by limiting risk pooling, when we examine their effects after a shock.

Moving forward, we see three potential lines of research that speak to the scope conditions of the analysis in this paper. First, we plan to examine the role of fiscal decentralisation and the Great Recession on distributive outcomes in less developed nations. We consider the OECD sample to reflect a best-case-scenario for both decentralisation and redistributive outcomes. For decentralisation, we have long known that the design of and effect of decentralisation in developing nations appears to differ from those observed in advanced industrial democracies (Rodden and Wibbels 2002; Beramendi, Rogers and Díaz-Cayeros 2017). Thus, we may expect the effects of decentralisation in the Post-Recession period to be much worse on redistribution in developing nations. Similarly, we know that countries outside of the OECD in general have much weaker automatic stabilizers that result from smaller governments. We anticipate a clearer effect of the Great Recession on redistributive outcomes in nations with far weaker welfare states and more individuals likely to dip into poverty.

Second, we see potential gains in unpacking the evolving patterns of regional disparities in response to the Great Recession with more disaggregated data. Which regions suffered relatively more will provide more nuanced clues to understand how shocks interact with heterogenous economic geography, and the political implications thereof. Finally, in the same context, it is pressing to move beyond the study of short-run effects and study which areas, sectors, regions are able to bounce back relatively faster than others and with which distributional implications. The more productive regions have been the quickest to recover from the Recession, shown in studies of regional “resilience” (Brakman, Garretsen and van Marrewijk 2015; Martin and Sunley 2015; Sensier and Artis 2016; Lee 2014; Fröhlich and Hassink 2018). Introducing a more sophisticated time dimension into the focus of this study will help uncover important underlying mechanisms behind the patterns of inequality associated with decentralisation around the world.

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Table 1: Full Results

	(1)	(2)	(3)	(4)	(5)	(6)
<i>Dependent variable:</i>	interregional Inequality		Redistribution		Interpersonal Inequality	
Post-Recession	-7.423*** (0.737)	-7.355*** (0.697)	-4.870*** (1.616)	-4.487*** (1.611)	1.384*** (0.498)	1.450*** (0.511)
Local Expenditure _{t-1}	1.862 (1.271)		-1.928 (2.020)		1.281* (0.757)	
Post-Recession*Local Expenditure_{t-1}	-0.901** (0.445)		-3.298* (1.890)		1.437** (0.565)	
Local Tax Revenue _{t-1}		0.866 (1.937)		15.450*** (4.142)		-5.048*** (1.308)
Post-Recession*Local Tax Revenue_{t-1}		-2.351*** (0.548)		-8.489*** (2.861)		2.681** (1.091)
ln(Per capita GDP) _{t-1}	1.491 (1.030)	1.614* (0.938)	4.230* (2.196)	2.887 (2.214)	-0.813 (0.656)	-0.386 (0.704)
Working Age Population _{t-1}	0.300** (0.149)	0.293** (0.144)	0.010 (0.123)	0.056 (0.121)	-0.180*** (0.033)	-0.200*** (0.033)
Trade Openness _{t-1}	0.0114 (0.009)	0.0137* (0.008)	-0.0345** (0.016)	-0.0374** (0.016)	0.015*** (0.004)	0.016*** (0.004)
Proportional Representation	0.530 (0.351)	0.547 (0.382)	1.279*** (0.331)	0.605* (0.365)	-1.114*** (0.173)	-0.891*** (0.133)
Leftist Government _{t-1}	0.001 (0.002)	0.000 (0.002)	0.011*** (0.004)	0.009** (0.004)	0.002 (0.002)	0.002 (0.002)
Market Inequality _{t-1}	0.096* (0.055)	0.074 (0.045)	0.655*** (0.126)	0.676*** (0.115)	0.096*** (0.021)	0.077*** (0.018)
interregional Inequality _{t-1}	0.837*** (0.016)	0.832*** (0.016)				
Redistribution _{t-1}			0.202*** (0.026)	0.205*** (0.020)		
Interpersonal Inequality _{t-1}					0.412*** (0.025)	0.417*** (0.023)
Observations	363	363	363	363	363	363
R-squared	0.989	0.989	0.975	0.976	0.992	0.992
Number of Countries	21	21	21	21	21	21
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes

Notes. Estimation method is OLS with panel corrected standard errors using yearly data with the lagged dependent variable. All time-varying independent variables lagged one year. All regressions include country and year fixed effects. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.10

Notes

¹To capture the potential effect of specifics of the design of fiscal decentralisation, and to ensure that our results do not depend on one particular aspect of fiscal decentralisation, our empirical analyses use measures of both expenditure and revenue decentralisation.

²On the effects of economic shocks on interpersonal inequality, see e.g., Lovell et al. (1994); Ravallion (2001); Williamson (2005). On the effects of shocks on interregional inequality, see Rodríguez-Pose and Gill (2006); Rodríguez-Pose (2012); Bouvet et al. (2011).

³In those decentralised contexts in which wealthier regions are not in a position to effectively defend their interests in the context of an exacerbated competition for scarce resources, as in Catalonia recently, the very institutional stability of the federation comes into question.

⁴The overall level of government spending to reduce inequality increased. The level of government spending to reduce inequality is distinct from redistribution conceptualized as the government's effort to reduce the market and disposable income gap.

⁵This estimate is likely conservative, because it includes extensive control variables, the lagged dependent variable, and year and country fixed effects. Base model results excluding the lagged dependent variable are closer to 4 points, or 14%.

⁶We are primarily focused on the outcome variables of redistribution and interpersonal inequality. The parallel trends results also hold for our premise, interregional inequality, but we are less concerned with pre-existing trends in regional convergence prior to the Great Recession.