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Decentralization and Intra-Country Transfers in the Great Recession: The Case of the EU

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Abstract: The classic arguments of Musgrave (1959) and Oates (1972) are that the redistribution and stabilization functions should be assigned to the federal level of government. The argument is that redistribution is difficult to achieve at lower levels because the public good nature of redistribution and the mobility of individuals and firms. Likewise, stabilization is difficult to achieve because fiscal stimulus of lower levels of government is likely to be underused due to spillover effects and a limited ability to service debt obligations. These arguments suggest that under-provision of redistributive spending should accompany greater decentralization. They also suggest that subnational policies aimed at macroeconomic stabilization are likely to be less effective than national ones, an important issue in an economic crisis. In this paper I examine data on intra-country social protection transfers in the EU before and after the crisis. The results support the classic federalism assignment. For both reasons of redistribution and stabilization, social protection expenditures are best assigned to the central level of government. Regression results indicate that greater decentralization lowers social protection expenditures and a greater vertical fiscal imbalance and greater subnational deficits result in more spending on things other than social protection.

Keywords: decentralization, transfers, social protection, federalism

JEL Codes:

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I. Introduction

The Great Recession was a large shock in the European Union. Every single country in the EU entered a recession in the years between 2008 and 2014. The length and depth of the recession varied across countries, however. As detailed in Table 1, the number of quarters in recession (measured as negative GDP growth) between 2008 and 2014 varied from a low of 5 in France and 6 in Germany to a high of 18 in Spain and 19 in Greece, with an average of 10.8. Between 2000 and 2007 the average number of quarters of negative growth was 2.4. The average unemployment rate (measured by an EU standardized rate) was 4.5 percent form 2000-2007 and rose to 6.4 percent afterwards. The variation across countries was notable. Table 1 shows that in Spain and Greece the unemployment rate doubled, while in Germany it fell from a 6.5 percent average from 2000-2007 to a 4.0 percent average from 2008 to 2014.

Table 1 also shows that social protection expenditures in these Eurozone EU countries increased on average from 23 percent of GDP in 2000-2007 to 26.2 percent of GDP in 2008-2014. Again one observes significant variation across countries that to some extent mirror differences in the depth of the recession. Hard hit countries like Spain, Greece, and Ireland saw social protection transfers increase by 4.3, 6.1 and 4.5 percent of GDP respectively while Germany experienced a decline of 0.1 percent.

Table 1
Social Protection, Unemployment and Recession Length
Before and after the Great Recession in the EU

Country	Social Protection (% of GDP)		Change in Social Protection (% of GDP)	Quarters of Recession		Unemployment Rate*	
	2000-2007	2008-2014		2000-2007	2008-2014	2000-2007	2008-2014
Austria	27.3%	28.2%	1.0%	2	7	2.9%	3.3%
Belgium	26.0%	28.1%	2.1%	4	8	4.5%	4.7%
Finland	25.2%	28.5%	3.3%	0	14	5.7%	5.4%
France	27.9%	31.0%	3.1%	0	5	5.1%	5.7%
Germany	27.9%	27.7%	-0.1%	2	6	6.5%	4.0%
Greece	19.2%	25.3%	6.1%	4	19	5.7%	11.2%
Ireland	15.6%	20.1%	4.5%	2	10	2.9%	7.7%
Italy	23.9%	27.6%	3.8%	7	12	4.4%	5.4%
Luxembourg	19.1%	22.2%	3.1%	3	9	2.6%	3.3%
Netherlands	24.0%	27.4%	3.4%	0	8	2.4%	3.8%
Portugal	20.8%	24.4%	3.6%	5	13	4.6%	8.5%
Spain	19.4%	23.7%	4.3%	0	18	6.2%	13.8%
Average	23.0%	26.2%	3.2%	2.4	10.8	4.5%	6.4%

*Unemployment rate is Eurostat adjusted series which is adjusted to try to standardize across countries.
Source: Author calculations based on Eurostat data.

The Great Recession was thus a large shock to the EU in which intra-country social protection transfers were used extensively. At the same time EU rules on budget deficits put a limit on the degree to which countries, including their lower levels of government, could borrow to increase social transfers, and the crisis has revived a debate about inter-country fiscal transfers. In this paper I compute measures of decentralization and vertical fiscal imbalance and examine how these measures affected intra-country social protection expenditures in the EU before and after the crisis.

The paper is related to several strands of the previous literature on decentralization. Fundamentally, the classic arguments of Musgrave (1959) and Oates

(1972) are that the redistribution and stabilization functions should be assigned to the federal level of government. The classic argument is that redistribution is difficult to achieve at lower levels of government in part because of the public good nature of redistribution and in part because of the mobility of individuals and firms. For instance, Oates (1972, p. 33) argues[1]:

> Even though members of all jurisdictions may wish a more egalitarian distribution of income within the society as a whole, it requires concerted action on the part of all subcentral governments to achieve the desired result; any single local government is seriously constrained in its capacity to alter substantially the existing distribution of income.

While it may be argued that mobility is lower in Europe than in the US, the EU is meant to facilitate movement of labor and capital and the recent strong movement of firms in response to separatist rhetoric within Spain suggests that mobility is an important factor to consider in Europe. The classic argument with respect to macroeconomic stabilization policy is that fiscal stimulus of lower levels of government is likely to be underused because of spillover effects and a limited ability to service debt obligations.[2]

These fundamental arguments suggest that decentralization and the finance of subnational governments (SNGs) may affect social protection spending in a number of ways. First, expenditures on goods with external benefits at the subnational level may lead to inefficient competition between jurisdictions. While much has been written about competition in taxes, there is less work on competition involving expenditures.[3]

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[1] For perspectives on the mobility issue see for instance Epple and Romer (1991) and Goodspeed (1989).
[2] Carlino and Inman (2013) find evidence supporting the positive spillover argument in the US and quote Oates as follows: "The case for having the central government assume primary responsibility for the stabilization function appears, therefore, to rest on a firm economic foundation. (L)ocal government cannot use conventional stabilization tools to much effect and must instead rely mainly on beggar-thy-neighbor policies, which from a national standpoint are likely to produce far from the desired results. The central government, on the other hand, is free to adopt monetary policies and fiscal programs involving deficit finance; consequently, the stabilization problem must be resolved primarily at the central government level." (Oates, 1972, p.30).
[3] For recent surveys on tax competition see for instance Keen and Konrad (2013) and Devereux and Loretz (2013). The literature on expenditure competition started perhaps with Case, Hines and Rosen (1993). See also the discussion and references in Brueckner (2000).

If redistribution exhibits characteristics of a public good, downward expenditure competition would be likely at the subnational level as regional governments would be caught in a type of prisoner's dilemma in which each region would like to increase expenditures but is not convinced that other regions would do the same. Or, said another way, if social protection expenditures have positive spillovers, economic theory suggests that under-provision is a likely outcome, and greater under-provision should accompany greater decentralization.

The financing of subnational governments may also affect social protection expenditures. It is well accepted that efficient incentives require subnational governments to fund expenditures from their own taxes on the margin but transfers are also used extensively by all countries. The gap between SNG spending and own-revenue is sometimes referred to as the vertical fiscal imbalance (VFI). Unfortunately, over-reliance on transfers (making transfers a more likely marginal source of funds) combined with subnational government expenditure responsibilities and weak institutions can lead to a soft budget constraint, which would imply inefficient spending on the part of subnational governments.[4] A small but growing literature finds that transfer dependency negatively affects the government budget balance (e.g. Eyraud and Lusinyan, 2013) although de Mello (2000) finds this only for developing and not developed countries.

Transfers from one level of government to another are also considered in the macroeconomic literature on smoothing shocks. The evidence in this literature is however mainly for automatic stabilizers in the US. Early contributions include Sachs

[4] Boadway and Tremblay (2006) discuss optimal fiscal imbalance in a world of certainty while Goodspeed (2002) discusses the soft budget constraint problem and its political underpinnings in a federal system. On the soft budget constraint problem see also the references in Goodspeed (2017).

and Sala-i-Martin (1991) who find on the order of 40 percent smoothing for the US although Von Hagen (1998) points out that the estimates of Sachs and Sala-i-Martin combine both permanent differences between states and temporary differences due to the business cycle. Von Hagen considers the effect of transfers on the former as redistribution and the effect on the latter as insurance and when he differentiates between permanent and temporary differences he finds close to 50 percent smoothing of permanent differences but only 10 percent smoothing of temporary business cycle differences. Asdrubali, Sorensen and Yosha (1996) expand on the channels through which smoothing takes place and find a higher estimate of 75 percent smoothing but this is due mainly to the integrated capital markets in the US.

The main results of my paper indicate that greater decentralization lowers social protection as a percent of GDP and that this relationship does not significantly change with the onset of a crisis.[5] This is consistent with the argument that redistributive spending such as social protection is harder to achieve at lower levels of government.[6] The paper is not able to answer exactly how this happens but the evidence suggests that funds may be shifted by SNGs towards spending on other categories, possibly by increasing deficits.

The main results concerning vertical fiscal imbalance generally show that, when measured in two standard ways, an increase in the (lagged) VFI lowers social protection as a percent of GDP, but less so in a crisis. The negative relationship implies that greater transfers allow SNGs to shift spending away from social protection and towards

[5] The results of the paper hold as well with social protection measured per capita but these results are omitted to save space.

[6] Beramendi and Rogers (2017) address a somewhat different but related issue. Some of their results are consistent, namely that more fiscally decentralized nations have more inequality and less redistribution. However, using a difference in difference approach they find this to be greater after the Great Recession than before.

other spending categories, but that in a crisis the shifting is more limited. When measured in a third way that includes the deficit there are some subtle differences. Overall, the results suggest that (1) when not in crisis a greater VFI (relatively greater transfers or transfers plus deficit) results in spending on things other than social protection, (2) transfers are used in part to limit decreases in social protection in a crisis, and (3) the evidence on deficits suggests that SNG deficits are used to fund expenditures other than social protection.

The main policy conclusions from this analysis support the classic division of functions of government. For both reasons of redistribution and stabilization, social protection expenditures are best assigned to the central level of government. The evidence suggests that more decentralized systems provide less social protection and greater transfers or SNG deficits can be shifted to fund areas other than social protection.[7]

The remainder of the paper is organized as follows. The next section discusses the panel data set and presents a fiscal description of the SNGs of the sample countries. Measures of decentralization and the vertical fiscal imbalance are calculated and presented for the countries of the sample both before and after 2007. Section III explains the empirical approach. Section IV presents the results. Section V concludes.

[7] Lago-Peñas, Martinez-Vazquez, and Sacchi (2017) find that budget rules may be an important control for stability. Our fixed country effect regressions control for this but it is less clear that such rules can prevent the shifting of funds.

II. Data and Fiscal Description of Subnational Governments

To examine the effects of decentralization and SNG transfer receipts on social protection expenditures I use a panel data set compiled from Eurostat and the OECD from 2000 to 2014 for the 12 countries that constitute the Eurozone in that period. All nominal variables are converted to real 2010 euros.

Data on social protection expenditures are from Eurostat. Eurostat defines social protection as expenditures on sickness, healthcare and invalidism; disability; old age; parental responsibilities; the loss of a spouse or parent; unemployment; housing; and social exclusion. Eurostat is also the source for economic variables such as GDP and the employment rate as well as demographic variables such as population, the proportion young, the proportion old, the proportion female. Thus the data used for Table 1 is all from Eurostat. The quarters of recession variable is computed by counting as a recessionary quarter one with negative GDP growth.

Data on fiscal variables at the subnational and national level are from the OECD and include subnational transfer receipts, subnational expenditures, subnational own revenue where subnational is defined as state (or regional) plus local governments. In addition, the OECD is the source for total government expenditures and revenues (at all levels of government). Tables 2, 3, and 4 present computations based on the OECD data for SNG transfer receipts (Table 2), measures of decentralization (Table 3) and measures of the vertical fiscal imbalance (Table 4) all computed from the OECD data. While the Eurostat system of national and regional accounts (ESA) is a potential alternative source for fiscal data, among the difficulties in using this source is that 2010 saw a definitional change in own taxes. This and other issues are avoided by using the OECD data.

Table 2 details SNG receipts of transfers from the central government as reported by the OECD, comparing the averages from 2000-2007 with 2008-2014. Almost all countries saw an increase in SNG transfer receipts in absolute euros per capita. Ireland, which experienced a large fall, is the main exception but this appears due to a transfer of many of the expenditures of SNGs to the central government as seen in Table 3. Greece and Portugal also experienced a fall. The largest increases in per capita terms were in Finland, Luxembourg, and Austria. As a percent of GDP these countries saw increases of 1.8%, 0.6%, and 0.3% in SNG transfer receipts. As a percent of social protection expenditures, SNG transfers were more varied. Eight countries experienced falls in SNG transfers as a percent of social protection expenditures. As SNG transfers were rising for most countries, social protection expenditures were apparently not rising by as much in some countries.

Table 2
Subnational Government Transfer Receipts

Country	SNG Transfers (% of GDP)		SNG Transfers (% of SP)		SNG Transfers (per capita, euros)	
	2000-2007	2008-2014	2000-2007	2008-2014	2000-2007	2008-2014
Austria	12.2%	12.4%	44.5%	44.0%	4047	4478
Belgium	13.0%	13.3%	50.0%	47.4%	4131	4482
Finland	4.9%	6.6%	19.3%	23.2%	1628	2322
France	2.9%	3.3%	10.4%	10.8%	877	1044
Germany	4.4%	4.7%	15.8%	16.8%	1297	1528
Greece	2.4%	2.3%	12.6%	9.3%	482	448
Ireland	8.6%	2.3%	56.8%	11.9%	3108	905
Italy	5.7%	6.3%	24.1%	22.9%	1613	1680
Luxembourg	2.1%	2.7%	11.2%	12.2%	1619	2169
Netherlands	9.8%	10.0%	40.9%	36.6%	3540	3822
Portugal	2.1%	1.9%	9.9%	7.8%	341	315
Spain	9.9%	10.2%	51.1%	43.3%	2296	2347
Average	6.5%	6.3%	28.9%	23.8%	2082	2128

Source: Author calculations based on OECD data.

Two standard measures of decentralization are SNG own-revenue as a percent of total government revenue and SNG expenditures as a percent of total government expenditures. The former excludes transfers and any SNG deficit or surplus while the latter includes both of these. Table 3 computes these two measures from the OECD data and examines how these two decentralization measures changed before and after 2008. In terms of expenditure, five countries experienced a decrease in the decentralization measure while in terms of revenue seven countries saw an increase. Overall, the picture is mixed with the measure of revenue decentralization expanding on average and the measure of expenditure decentralization contracting on average. The difference is sometimes pronounced: Spain experiences an increase in decentralization on the revenue measure and a decrease on the expenditure measure. Apart from Spain, Finland and Belgium see the largest increase in decentralization by revenue and also by expenditure. Table 3 also illustrates the variation across countries in decentralization measures. On both measures the most decentralized countries are Germany, Finland, and Spain.

Table 3
Measures of Decentralization before and after the Great Recession

Country	Decentralized Revenue R/TGR		Decentralized Expenditure E/TGE		Change in Decentralization	
	2000-2007	2008-2014	2000-2007	2008-2014	Measure 1	Measure 2
Austria	10.0%	9.7%	30.7%	30.8%	-0.3%	0.1%
Belgium	16.5%	18.5%	36.9%	38.6%	2.0%	1.7%
Finland	25.2%	28.9%	37.3%	40.4%	3.7%	3.0%
France	14.6%	15.6%	19.0%	20.1%	1.0%	1.1%
Germany	34.4%	35.7%	37.9%	39.0%	1.3%	1.1%
Greece	2.6%	2.9%	7.0%	6.4%	0.3%	-0.6%
Ireland	8.8%	6.5%	32.4%	10.4%	-2.3%	-22.0%
Italy	19.2%	18.6%	30.6%	29.4%	-0.5%	-1.2%
Luxembourg	7.1%	6.0%	12.1%	11.0%	-1.1%	-1.2%
Netherlands	11.0%	9.8%	34.1%	32.0%	-1.2%	-2.1%
Portugal	9.9%	10.8%	14.2%	13.4%	0.9%	-0.8%
Spain	23.7%	27.4%	46.0%	45.5%	3.7%	-0.5%
Average	15.3%	15.9%	28.2%	26.4%	0.6%	-1.8%

Notes: R = SNG Revenue; E = SNG Expenditure; TGR = Total Government Revenue; TGE = Total Government Expenditure

Source: Authors calculations based on OECD data.

Table 4 examines the use of transfers by SNGs across countries via a measure of the vertical fiscal imbalance (VFI) and also details how the VFI changed before and after 2008. The VFI is measured in two ways: SNG transfers relative to SNG revenues and SNG transfers relative to SNG expenditures. One of the interesting facts that can be gleaned from Table 4 is that the VFI generally improved among the countries hardest hit by the Great Recession. Any rise in SNG transfers was apparently limited relative to any increase in SNG revenues or expenditures, resulting in a fall in VFI. A possible reason for this, an increase in SNG deficits, is explored via an alternative VFI measure that is shown in Table 5. The alternative measure computes the VFI using transfers received plus the deficit in the numerator of the VFI measure. The most striking results

are for Spain and Belgium where the change in the measured VFI before and after the Great Recession moves to positive, very significantly so in Spain. Thus increased deficit financing at the subnational level appears to have been an important factor in some countries. If ultimately these deficits must be covered by the central government, soft budget constraint issues arise. This measure is also used as an alternative in the regressions and will be commented on further at that point of the paper.

Table 4
Measures of Vertical Fiscal Imbalance before and after the Great Recession
(Excluding Deficit)

Country	Measure 1 (T/R)		Measure 2 (T/E)		Change in VFI	
	2000-2007	2008-2014	2000-2007	2008-2014	Measure 1	Measure 2
Austria	71.2%	72.5%	77.0%	78.8%	1.3%	1.7%
Belgium	61.2%	58.9%	69.8%	64.5%	-2.2%	-5.2%
Finland	26.7%	29.9%	26.6%	29.6%	3.2%	3.0%
France	28.6%	29.6%	29.3%	29.8%	1.0%	0.5%
Germany	22.2%	22.9%	24.5%	26.6%	0.7%	2.0%
Greece	69.2%	65.0%	71.7%	68.4%	-4.3%	-3.3%
Ireland	68.1%	50.1%	68.0%	50.2%	-17.9%	-17.8%
Italy	40.5%	42.2%	39.9%	43.1%	1.7%	3.3%
Luxembourg	42.5%	50.6%	46.0%	57.5%	8.1%	11.5%
Netherlands	67.7%	70.5%	66.7%	68.5%	2.8%	1.8%
Portugal	34.4%	29.6%	32.7%	29.4%	-4.8%	-3.3%
Spain	51.6%	50.6%	55.5%	51.2%	-1.0%	-4.3%
Average	48.6%	47.7%	50.6%	49.8%	-1.0%	-0.8%

Notes: T = SNG Transfer Receipts; R = SNG Revenue; E = SNG Expenditure

Source: Authors calculations based on OECD data.

Table 5

Alternative Measures of Vertical Fiscal Imbalance before and after the Great Recession (Including Deficit)

Country	Measure 1 (T+D)/R		Measure 2 (T+D)/E		Change in VFI	
	2000-2007	2008-2014	2000-2007	2008-2014	Measure 1	Measure 2
Austria	63.7%	64.7%	68.9%	70.2%	1.1%	1.3%
Belgium	48.9%	50.3%	55.8%	55.1%	1.4%	-0.7%
Finland	26.8%	30.8%	26.7%	30.5%	4.0%	3.8%
France	26.3%	29.1%	26.9%	29.3%	2.7%	2.3%
Germany	12.6%	9.1%	13.7%	10.4%	-3.5%	-3.3%
Greece	65.9%	60.1%	68.2%	62.9%	-5.8%	-5.2%
Ireland	68.2%	50.0%	68.0%	49.8%	-18.2%	-18.2%
Italy	42.1%	39.8%	41.4%	40.7%	-2.3%	-0.7%
Luxembourg	35.0%	38.8%	37.6%	43.9%	3.8%	6.3%
Netherlands	69.2%	73.3%	68.2%	71.3%	4.2%	3.1%
Portugal	39.6%	30.7%	37.6%	29.8%	-8.8%	-7.8%
Spain	44.6%	49.9%	47.9%	49.8%	5.3%	1.9%
Average	45.2%	43.9%	46.7%	45.3%	-1.4%	-1.4%

Notes: T = SNG Transfer Receipts; D = SNG Deficit; R = SNG Revenue; E = SNG Expenditure

Source: Authors calculations based on OECD data.

III. Empirical Approach

To estimate the effects of decentralization and SNG receipt of transfers on social protection expenditures, I use two main empirical strategies, combined with various alternative measures of the main variables. In each strategy country fixed effects are used to control for institutional (and other unobserved) differences across countries. The first strategy also allows time fixed effects.

Each specification takes as the dependent variable a measure of social protection and regresses that on measures of decentralization or the VFI, a measure of the crisis

point, and fixed effects. More specifically, the first strategy consists of a set of regressions of the following form:

$$(1) \qquad \text{Log SP}_{it} = \alpha_0 + \alpha_1 RY_{it} + \alpha_2 D_{it} + \alpha_3 D^* RY_{it} + \alpha_4 C_i + \alpha_5 T_t + u_{it}$$

$$(2) \qquad \text{Log SP}_{it} = \alpha_0 + \alpha_1 RY_{it} + \alpha_2 VFI_{it} + \alpha_3 VFI^* RY_{it} + \alpha_4 C_i + \alpha_5 T_t + u_{it}$$

where SP is a measure of social protection, RY is a crisis indicator for country i in year t measured as a year with two quarters of negative growth for country i, D is a measure of decentralization for country i in year t, VFI is a measure of vertical fiscal imbalance for country in year t, C are country fixed effects and T represents time fixed effects.

The second strategy takes the start of the Great Recession as the crisis point and compares the effects before and after the Great Recession using a difference-in-difference approach where the Great Recession is defined as starting after 2007:

$$(3) \qquad \text{Log SP}_{it} = \alpha_0 + \alpha_1 A07_t + \alpha_2 D_{it} + \alpha_3 D^* A07_{it} + \alpha_4 C_i + u_{it}$$

$$(4) \qquad \text{Log SP}_{it} = \alpha_0 + \alpha_1 A07_t + \alpha_2 VFI_{it} + \alpha_3 VFI^* A07_{it} + \alpha_4 C_i + u_{it}$$

Each strategy has its advantages but the difference-in-difference approach does not allow time effects to be included.

In addition to the two different strategies, the main variables are measured in different ways. Social protection expenditures are measured alternatively in per capita terms and as a proportion of GDP. Since the results are qualitatively similar, I report below only the results using social protection as a percent of GDP.

The measure of decentralization is computed alternatively as SNG expenditures as a percent of total government expenditures or SNG revenues as a percent of total government revenue. The vertical fiscal imbalance is computed in three alternative

ways. Two are standard: transfers received by SNGs as a percent of total SNG revenues and as a percent of total SNG expenditures. A third measure adds the SNG deficit to transfers in the numerator.

The point of recessionary crisis is also measured in two different ways depending on the specification. In the first strategy, I compute negative GDP growth by quarter, and count any year with two quarters of negative growth as a recessionary year. This provides a country and year specific variable of a recession. The second strategy employs a difference in difference approach where the "before" period is 2000-2007 and the "after" period is 2008-2014.

In addition, I include a number of controls for socio-economic characteristics. Demographic differences and changes are controlled for by including the proportion of young (ages 15 to 29), the proportion of old (age 65 and older), and the proportion female. The employment rate is also included and GDP is included in some specifications.

There are several econometric problems that need to be addressed. As already mentioned, institutional differences between countries are controlled for using country fixed effects in both specifications. The first approach also allows time fixed effects to be added, controlling for common shocks in the same year across countries. The second approach defines the Great Recession shock as the period after 2008 so one cannot include year effects. A second important econometric problem is that the VFI and decentralization variables are likely endogenous. While we try to measure the crisis point, there is likely some error and it is not being measured perfectly. Unmeasured parts of the shock may well affect both our SNG measures (decentralization and VFI) and social protection. To correct for this I use lagged values for both the

decentralization variable and the VFI variable. Finally the difference in difference approach is subject to the criticism that the same trend that occurs after 2007 could have occurred before 2007 as well. I conduct a common trends test to see if this is the case.

IV. Results

A. Decentralization Results

I first present results for decentralization. The main result that is consistent across most specifications is that greater decentralization lowers social protection as a percent of GDP.[8] When using a year-specific crisis indicator of recession, the results are that this relationship does not change when in a crisis regardless of the measure of the dependent variable or the decentralization variable. When using the D-D method the results generally show that after the Great Recession greater decentralization results in even lower social protection expenditures as a percent of GDP than before the crisis.[9]

Tables 6A and 6B present results for the first empirical strategy when the dependent variable is the log of social protection expenditures as a percent of GDP. In Table 6A the decentralization measure is SNG revenue as a proportion of total government revenue while in 6B it is SNG expenditures as a proportion of total government expenditures. The specifications that include country and time fixed effects (columns 3 and 4) indicate that greater decentralization reduces social protection expenditures as a percent of GDP and a recession year increases social protection as a percent of GDP. The insignificance of the interaction term indicates that the effect of decentralization does not change in a recession year.

[8] This result also holds using social protection per capita as the dependent variable. I do not present these results to save space.

[9] I conduct a common trends test using 2004 instead of 2007. In contrast to before and after 2007, the results indicate no difference before and after 2004.

Table 6A: Decentralization and Social Protection Expenditures in a Recession
(Decentralization measure = SNG revenue/ Total Government Revenues)

	(1)	(2)	(3)	(4)
Dependent Variable: Log of social protection expenditures as percent of GDP				
Recession year	0.0198	0.0198	0.0470***	0.0304***
	(0.0176)	(0.0348)	(0.0148)	(0.00917)
DecentR(-1)	0.374***	0.374***	-0.273***	-0.296***
	(0.0911)	(0.106)	(0.102)	(0.101)
RY*DecentR(-1)		1.06e-05	-0.123	
		(0.206)	(0.0865)	
propold	1.731***	1.731***	-2.518***	-2.497***
	(0.553)	(0.555)	(0.747)	(0.749)
propyoung	-5.307***	-5.307***	-0.810*	-0.685
	(0.524)	(0.534)	(0.482)	(0.476)
propfemale	1.367	1.367	-1.883	-1.248
	(1.993)	(2.001)	(3.180)	(3.161)
employrate	1.147***	1.147***	-1.559***	-1.552***
	(0.251)	(0.252)	(0.280)	(0.281)
Constant	2.679***	2.679***	5.441***	5.083***
	(0.997)	(1.002)	(1.680)	(1.668)
Observations	164	164	164	164
R-squared	0.631	0.631	0.955	0.955
Year FE	No	No	Yes	Yes
Country FE	No	No	Yes	Yes

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

Table 6B: Decentralization and Social Protection Expenditures in a Recession
(Decentralization measure = SNG expenditure/SNG Total Government Revenues)

	(1)	(2)	(3)	(4)
Dependent Variable: Log of social protection expenditures as percent of GDP				
Recession year	0.0203	0.0140	0.0478***	0.0296***
	(0.0178)	(0.0349)	(0.0146)	(0.00915)
DecentE(-1)	0.362***	0.350***	-0.272***	-0.294***
	(0.0962)	(0.111)	(0.0985)	(0.0981)
RY*DecentE(-1)		0.0457	-0.146	
		(0.220)	(0.0914)	
propold	1.718***	1.721***	-2.494***	-2.471***
	(0.557)	(0.559)	(0.745)	(0.749)
propyoung	-5.385***	-5.365***	-0.726	-0.609
	(0.527)	(0.538)	(0.479)	(0.476)
propfemale	1.199	1.215	-0.726	-0.171
	(2.006)	(2.013)	(3.139)	(3.138)
employrate	1.112***	1.110***	-1.441***	-1.444***
	(0.255)	(0.256)	(0.284)	(0.285)
Constant	2.800***	2.791***	4.774***	4.462***
	(1.002)	(1.006)	(1.659)	(1.657)
Observations	164	164	164	164
R-squared	0.625	0.625	0.956	0.955
Year FE	No	No	Yes	Yes
Country FE	No	No	Yes	Yes

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

Tables 7A and 7B present the difference-in-difference specification using social protection benefits as a percent of GDP as the dependent variable. Again the table labeled A presents results for the revenue measure of decentralization while the table labeled B presents the results for the expenditure measure of decentralization. The final column (4) presents the results with fixed country effects and I concentrate on these results. In both Tables 7A and 7B social protection expenditures are higher after 2007. Using the revenue measure in Table 7A indicates no effect of decentralization before 2007 but that greater decentralization results in lower social protection expenditures after 2007. Using the expenditure measure of decentralization in Table 7B the results

indicate greater decentralization lowers social protection expenditures before 2007 and that this is magnified after 2007.

Table 7A: Decentralization and Social Protection Expenditures in a Recession
(Decentralization measure = SNG revenue/ Total Government Revenues)

	(1)	(2)	(3)	(4)
Dependent Variable: Log of social protection expenditures as percent of GDP				
After 2007	0.0695***	0.0739***	0.0709**	0.133***
	(0.0181)	(0.0170)	(0.0302)	(0.0176)
DecentR(-1)		0.386***	0.375***	-0.168
		(0.0868)	(0.125)	(0.120)
A07*DecentR(-1)			0.0205	-0.214**
			(0.174)	(0.0935)
GDP	9.49e-09	2.46e-09	2.59e-09	-1.79e-07
	(1.29e-08)	(1.24e-08)	(1.25e-08)	(1.09e-07)
propold	1.279**	1.499**	1.486**	-0.235
	(0.630)	(0.602)	(0.614)	(0.683)
propyoung	-4.742***	-4.476***	-4.471***	-2.329***
	(0.542)	(0.545)	(0.549)	(0.458)
propfemale	2.793	3.273	3.313	-13.60***
	(2.106)	(2.025)	(2.060)	(3.169)
employrate	1.223***	1.101***	1.097***	-1.401***
	(0.252)	(0.243)	(0.245)	(0.374)
Constant	1.901*	1.569	1.552	11.45***
	(1.053)	(1.015)	(1.028)	(1.705)
Observations	175	164	164	164
R-squared	0.644	0.669	0.669	0.931
Year FE	No	No	No	No
Country FE	No	No	No	Yes

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

Table 7B: Decentralization and Social Protection Expenditures in a Recession
(Decentralization measure = SNG expenditure/ Total Government Expenditures)

	(1)	(2)	(3)	(4)
Dependent Variable: Log of social protection expenditures as percent of GDP				
After 2007	0.0695***	0.0770***	0.0608**	0.140***
	(0.0181)	(0.0171)	(0.0302)	(0.0174)
DecentE(-1)		0.391***	0.335***	-0.277**
		(0.0915)	(0.126)	(0.113)
A07*DecentE(-1)			0.119	-0.285***
			(0.183)	(0.0976)
GDP	9.49e-09	2.92e-09	3.77e-09	-2.07e-07*
	(1.29e-08)	(1.25e-08)	(1.26e-08)	(1.06e-07)
propold	1.279**	1.471**	1.384**	-0.0358
	(0.630)	(0.605)	(0.620)	(0.668)
propyoung	-4.742***	-4.520***	-4.488***	-2.168***
	(0.542)	(0.547)	(0.551)	(0.450)
propfemale	2.793	3.239	3.479*	-12.80***
	(2.106)	(2.033)	(2.070)	(3.068)
employrate	1.223***	1.054***	1.025***	-1.193***
	(0.252)	(0.245)	(0.249)	(0.365)
Constant	1.901*	1.618	1.522	10.93***
	(1.053)	(1.018)	(1.030)	(1.649)
Observations	175	164	164	164
R-squared	0.644	0.666	0.667	0.934
Year FE	No	No	No	No
Country FE	No	No	No	Yes

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

Greater decentralization is thus associated with lower social protection expenditures as a percent of GDP. This is consistent with classic arguments that assign redistribution and stabilization to the central level of government. If redistribution exhibits characteristics of a public good, each region would like to increase expenditures but is not convinced that other regions would do the same. If social protection expenditures have positive spillovers, economic theory suggests that lower social protection expenditures should accompany greater decentralization.

B. Vertical Fiscal Imbalance Results

I next turn to results concerning the vertical fiscal imbalance (VFI). The main results generally show that an increase in the VFI (measured using two standard definitions of VFI) lowers social protection but less so in a recession year or after 2007. A third measure of the VFI is used that includes transfers and the SNG deficit in the numerator. The results using the third measure differ in two respects. The third measure yields a smaller impact of the VFI on social protection expenditures than the first two measures; and the interaction term using the third measure implies a smaller difference of the impact of a smaller VFI in a recession year or after 2007. Overall, the results suggest that (1) when not in crisis a greater VFI (relatively greater transfers or transfers plus deficit) results in spending on things other than social protection, (2) transfers are used in part to limit decreases in social protection in a crisis, and (3) the evidence on deficits suggests that SNG deficits are used to fund expenditures other than social protection.

I again begin with the results from the first strategy. Tables 8A and 8B present the results using the log of social expenditures as a percent of GDP as the dependent variable. Table 8A uses transfers as a proportion of SNG revenue as a measure of VFI and Table 8B uses transfers as a proportion of SNG expenditures. Columns (3) and (4) include fixed country and year effects. Results for the full specification in column (3) indicate a negative coefficient for the lagged VFI and a positive coefficient for its interaction with the recession year in both Table 8A and 8B. The recession year coefficient is negative and significant using the revenue measure in Table 8A but insignificant using the expenditure measure in 8B.

The interpretation here is that if a country is not in a recession, higher transfers that create a larger VFI do not increase social protection expenditures, and in fact such

expenditures fall as a percent of GDP. This implies that the larger VFI resulting from increased transfers relative to SNG expenditures increases spending on things other than social protection. When in recession, higher transfers offset somewhat the negative impact of the VFI suggesting that in recessions greater transfers are helping to maintain social expenditure protection as a percent of GDP.

Table 8A: Vertical Fiscal Imbalance and Social Protection Expenditures in a Recession
(VFI measure = SNG transfers/SNG Revenue)

	(1)	(2)	(3)	(4)
Dependent Variable: Log of social protection expenditures as percent of GDP				
Recession year	0.0160	-0.0535	-0.0444*	0.0303***
	(0.0182)	(0.0614)	(0.0263)	(0.00937)
VFI1 (-1)	0.138**	0.108*	-0.169**	-0.144
	(0.0540)	(0.0598)	(0.0851)	(0.0873)
RY*VFI1 (-1)		0.139	0.146***	
		(0.117)	(0.0481)	
propold	1.779***	1.763***	-2.244***	-2.697***
	(0.571)	(0.571)	(0.755)	(0.763)
propyoung	-5.634***	-5.565***	-0.503	-0.534
	(0.548)	(0.551)	(0.480)	(0.494)
propfemale	1.461	1.628	-3.294	-1.279
	(2.086)	(2.089)	(3.240)	(3.268)
employrate	1.381***	1.382***	-1.737***	-1.614***
	(0.263)	(0.262)	(0.281)	(0.286)
Constant	2.576**	2.495**	6.185***	5.155***
	(1.052)	(1.053)	(1.712)	(1.729)
Observations	164	164	164	164
R-squared	0.608	0.611	0.956	0.953
Year FE	No	No	Yes	Yes
Country FE	No	No	Yes	Yes

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

Table 8B: Vertical Fiscal Imbalance and Social Protection Expenditures in a Recession
(VFI measure = SNG transfers/SNG Expenditure)

	(1)	(2)	(3)	(4)
Dependent Variable: Log of social protection expenditures as percent of GDP				
Recession year	0.0174	-0.0357	-0.0281	0.0297***
	(0.0181)	(0.0580)	(0.0252)	(0.00937)
VFI2 (-1)	0.139***	0.114**	-0.153**	-0.123
	(0.0498)	(0.0560)	(0.0748)	(0.0752)
RY*VFI2 (-1)		0.103	0.109**	
		(0.107)	(0.0443)	
propold	1.738***	1.736***	-2.390***	-2.771***
	(0.568)	(0.568)	(0.758)	(0.757)
propyoung	-5.622***	-5.560***	-0.472	-0.503
	(0.544)	(0.548)	(0.489)	(0.499)
propfemale	1.688	1.791	-2.389	-0.634
	(2.090)	(2.093)	(3.238)	(3.219)
employrate	1.398***	1.397***	-1.692***	-1.601***
	(0.262)	(0.262)	(0.283)	(0.286)
Constant	2.453**	2.403**	5.712***	4.814***
	(1.054)	(1.056)	(1.708)	(1.701)
Observations	164	164	164	164
R-squared	0.611	0.613	0.955	0.953
Year FE	No	No	Yes	Yes
Country FE	No	No	Yes	Yes

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

Tables 9A and 9B repeat the analysis of Tables 8A and 18B but use an alternative measure of the VFI. The alternative measure includes the deficit of the SNG as well as transfers in the numerator. The results are similar. When not in a recession year, an increase in the VFI lowers social protection indicating that both transfers and deficit financing are being used to finance other sorts of expenditures. In a recession year, the effect is mitigated somewhat.

Table 9A: Vertical Fiscal Imbalance and Social Protection Expenditures in a Recession
VFI measure = (SNG Transfers + Deficit)/SNG Revenue

	(1)	(2)	(3)	(4)
Dependent Variable: Log of social protection expenditures as percent of GDP				
Recession year	0.0194	-0.0180	-0.0171	0.0289***
	(0.0182)	(0.0561)	(0.0243)	(0.00940)
VFI1 (-1)	0.131***	0.112*	-0.126*	-0.0954
	(0.0495)	(0.0569)	(0.0646)	(0.0636)
RY*VFI1 (-1)		0.0712	0.0861**	
		(0.101)	(0.0420)	
propold	1.634***	1.641***	-2.499***	-2.810***
	(0.569)	(0.570)	(0.762)	(0.756)
propyoung	-5.563***	-5.514***	-0.476	-0.507
	(0.543)	(0.548)	(0.495)	(0.501)
propfemale	2.077	2.119	-1.298	0.0565
	(2.142)	(2.146)	(3.252)	(3.222)
employrate	1.372***	1.372***	-1.629***	-1.571***
	(0.261)	(0.262)	(0.286)	(0.288)
Constant	2.272**	2.251**	5.123***	4.433**
	(1.083)	(1.085)	(1.714)	(1.701)
Observations	164	164	164	164
R-squared	0.609	0.610	0.954	0.953
Year FE	No	No	Yes	Yes
Country FE	No	No	Yes	Yes

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

Table 9B: Vertical Fiscal Imbalance and Social Protection Expenditures in a Recession
VFI measure = (SNG Transfers + Deficit)/SNG Expenditure

	(1)	(2)	(3)	(4)
Dependent Variable: Log of social protection expenditures as percent of GDP				
Recession year	0.0202	0.000412	-0.000601	0.0289***
	(0.0182)	(0.0515)	(0.0226)	(0.00942)
VFI2 (-1)	0.115***	0.104**	-0.0870*	-0.0645
	(0.0434)	(0.0508)	(0.0515)	(0.0492)
RY*VFI2 (-1)		0.0360	0.0529	
		(0.0877)	(0.0368)	
propold	1.589***	1.600***	-2.652***	-2.857***
	(0.569)	(0.571)	(0.766)	(0.755)
propyoung	-5.522***	-5.493***	-0.513	-0.540
	(0.541)	(0.547)	(0.498)	(0.500)
propfemale	2.095	2.098	-0.660	0.198
	(2.144)	(2.149)	(3.282)	(3.241)
employrate	1.367***	1.366***	-1.605***	-1.576***
	(0.261)	(0.262)	(0.288)	(0.289)
Constant	2.269**	2.267**	4.789***	4.355**
	(1.083)	(1.086)	(1.730)	(1.710)
Observations	164	164	164	164
R-squared	0.609	0.609	0.953	0.952
Year FE	No	No	Yes	Yes
Country FE	No	No	Yes	Yes

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

Tables 10A and B present the results for the difference-in-difference approach using social protection expenditures as a percent of GDP as the dependent variable. When the revenue measure of the VFI is used in Table 10A, the last column which includes country fixed effects indicates no effect of the VFI on social protection expenditures before 2007 but a highly significant increase after 2007.[10] This means that an increase in the VFI after 2007, likely due to an increase in transfers by governments, led to an increase in social protection expenditures as a percent of GDP.

[10] I again conduct a common trends test using 2004 instead of 2007. In contrast to before and after 2007, the results again indicate no difference before and after 2004.

Table 10B uses the expenditure measure of VFI and indicates a negative impact on social protection expenditures prior to 2007 which is mitigated after 2007. This suggests that increased transfers prior to 2007 were not resulting in increases in social protection expenditures but were used for expenditures other than social protection.

Table 10A: Vertical Fiscal Imbalance and Social Protection Expenditures in a Recession
(VFI measure = SNG transfers/SNG Revenue)

	(1)	(2)	(3)	(4)
Dependent Variable: Log of social protection expenditures as percent of GDP				
After 2007	0.0695***	0.0730***	-0.0422	0.0375
	(0.0181)	(0.0176)	(0.0472)	(0.0266)
VFI1(-1)		0.167***	0.0568	-0.123
		(0.0563)	(0.0694)	(0.0979)
A07*VFI1(-1)			0.237***	0.124***
			(0.0902)	(0.0462)
GDP	9.49e-09	2.30e-08	2.64e-08*	-2.04e-07*
	(1.29e-08)	(1.40e-08)	(1.38e-08)	(1.08e-07)
propold	1.279**	1.103*	1.113*	0.213
	(0.630)	(0.626)	(0.615)	(0.686)
propyoung	-4.742***	-4.720***	-4.519***	-2.411***
	(0.542)	(0.566)	(0.561)	(0.478)
propfemale	2.793	4.419**	4.829**	-10.56***
	(2.106)	(2.201)	(2.166)	(3.043)
employrate	1.223***	1.288***	1.302***	-1.131***
	(0.252)	(0.251)	(0.247)	(0.367)
Constant	1.901*	0.972	0.771	9.748***
	(1.053)	(1.111)	(1.093)	(1.638)
Observations	175	164	164	164
R-squared	0.644	0.647	0.662	0.930
Year FE	No	No	No	No
Country FE	No	No	No	Yes

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

Table 10B: Vertical Fiscal Imbalance and Social Protection Expenditures in a Recession
(VFI measure = SNG transfers/SNG Expenditure)

	(1)	(2)	(3)	(4)
Dependent Variable: Log of social protection expenditures as percent of GDP				
After 2007	0.0695***	0.0744***	-0.0198	0.0580**
	(0.0181)	(0.0175)	(0.0462)	(0.0263)
VFI1(-1)		0.172***	0.0868	-0.171**
		(0.0522)	(0.0645)	(0.0861)
A07*VFI1(-1)			0.186**	0.0816*
			(0.0845)	(0.0435)
GDP	9.49e-09	2.55e-08*	2.84e-08**	-2.29e-07**
	(1.29e-08)	(1.40e-08)	(1.39e-08)	(1.09e-07)
propold	1.279**	0.998	0.980	0.270
	(0.630)	(0.626)	(0.618)	(0.695)
propyoung	-4.742***	-4.682***	-4.529***	-2.318***
	(0.542)	(0.561)	(0.558)	(0.476)
propfemale	2.793	4.868**	5.278**	-10.72***
	(2.106)	(2.211)	(2.192)	(3.030)
employrate	1.223***	1.300***	1.301***	-1.135***
	(0.252)	(0.250)	(0.247)	(0.368)
Constant	1.901*	0.739	0.545	9.858***
	(1.053)	(1.117)	(1.107)	(1.628)
Observations	175	164	164	164
R-squared	0.644	0.651	0.662	0.930
Year FE	No	No	No	No
Country FE	No	No	No	Yes

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

Tables 11A and 11B repeat the analysis of Tables 10A and 10B but use the alternative measure of the VFI that includes the deficit of the SNG as well as transfers in the numerator. These results show a negative effect of the VFI on social protection expenditures and no difference after 2007. Given the previous results indicating a positive effect of the VFI after 2007, this means that the SNG deficit is responsible for the coefficient becoming negative – that is, the result that a higher VFI lowers social protection expenditures when the VFI measure includes the deficit. Further this

relationship does not vary after 2007. Thus higher deficits are not being used to increase social protection expenditures; rather they are being used to fund other programs both in a crisis and out of a crisis.

Table 11A: Vertical Fiscal Imbalance and Social Protection Expenditures in a Recession
VFI measure = (SNG Transfers + Deficit)/SNG Revenue

	(1)	(2)	(3)	(4)
Dependent Variable: Log of social protection expenditures as percent of GDP				
After 2007	0.0695***	0.0748***	-0.00159	0.0642**
	(0.0181)	(0.0176)	(0.0474)	(0.0262)
VFI2(-1)		0.154***	0.0871	-0.176**
		(0.0504)	(0.0634)	(0.0709)
A07*VFI2(-1)			0.146*	0.0694
			(0.0844)	(0.0423)
GDP	9.49e-09	2.12e-08	2.32e-08*	-2.45e-07**
	(1.29e-08)	(1.37e-08)	(1.37e-08)	(1.08e-07)
propold	1.279**	0.968	0.912	0.341
	(0.630)	(0.632)	(0.629)	(0.698)
propyoung	-4.742***	-4.625***	-4.523***	-2.310***
	(0.542)	(0.562)	(0.562)	(0.471)
propfemale	2.793	5.066**	5.452**	-10.13***
	(2.106)	(2.267)	(2.263)	(3.005)
employrate	1.223***	1.275***	1.258***	-1.086***
	(0.252)	(0.250)	(0.249)	(0.369)
Constant	1.901*	0.651	0.485	9.534***
	(1.053)	(1.145)	(1.142)	(1.612)
Observations	175	164	164	164
R-squared	0.644	0.648	0.655	0.930
Year FE	No	No	No	No
Country FE	No	No	No	Yes

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

Table 11B: Vertical Fiscal Imbalance and Social Protection Expenditures in a Recession
VFI measure = (SNG Transfers + Deficit)/SNG Expenditure

	(1)	(2)	(3)	(4)
Dependent Variable: Log of social protection expenditures as percent of GDP				
After 2007	0.0695***	0.0752***	0.0299	0.0775***
	(0.0181)	(0.0176)	(0.0450)	(0.0248)
VFI2(-1)		0.135***	0.0957*	-0.138**
		(0.0439)	(0.0567)	(0.0550)
A07*VFI2(-1)			0.0825	0.0435
			(0.0754)	(0.0376)
GDP	9.49e-09	2.06e-08	2.17e-08	-2.48e-07**
	(1.29e-08)	(1.36e-08)	(1.37e-08)	(1.08e-07)
propold	1.279**	0.927	0.885	0.297
	(0.630)	(0.634)	(0.635)	(0.701)
propyoung	-4.742***	-4.576***	-4.521***	-2.338***
	(0.542)	(0.562)	(0.564)	(0.467)
propfemale	2.793	5.063**	5.302**	-10.02***
	(2.106)	(2.265)	(2.274)	(3.026)
employrate	1.223***	1.269***	1.252***	-1.095***
	(0.252)	(0.250)	(0.250)	(0.370)
Constant	1.901*	0.659	0.562	9.478***
	(1.053)	(1.143)	(1.146)	(1.623)
Observations	175	164	164	164
R-squared	0.644	0.648	0.651	0.929
Year FE	No	No	No	No
Country FE	No	No	No	Yes

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

V. Conclusion

The Great Recession provides an opportunity to examine some fundamental questions regarding decentralization and the redistributive and stabilization functions of government. Viewing the Great Recession as a shock, we examine the effect of decentralization and vertical fiscal imbalance on social protection expenditures.

The main results of my paper indicate first that greater decentralization lowers social protection as a percent of GDP and that this relationship does not significantly change with the onset of a crisis. Second, when not in crisis a greater VFI (relatively greater transfers or transfers plus deficit) lowers expenditures on social protection and results in spending on things other than social protection. This result is less pronounced in a recession, suggesting that transfers are used in part to limit decreases in social protection in a crisis. Third, the evidence when measuring the VFI with deficits included suggests that SNG deficits are used to fund expenditures other than social protection.

The main policy conclusions from this analysis support the classic division of functions of government. For both reasons of redistribution and stabilization, social protection expenditures are best assigned to the central level of government. The evidence suggests that more decentralized systems provide less social protection and greater transfers or SNG deficits can be shifted to fund areas other than social protection.

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