Fiscal decentralisation in times of financial crises

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Abstract

The virtues of fiscal decentralisation are usually assessed against the provision of local public goods, little is said about its impact on public finances. There is, however, a growing concern that central governments losing control over part of the budget could negatively affect public finances, especially in times of adverse financial conditions. The present work shows that these concerns are misplaced. The empirical investigation on 19 OECD countries, over the period 1980-2010, shows that expenditure decentralisation improves the central budget balance without prejudice for local budgets, thus improving the overall country's fiscal position. This effect is reinforced when combined with tax autonomy. During periods of financial crises, the disciplinary role of fiscal decentralisation appears to be even stronger, raising concerns about the recentralisation trend recently pursued by some advanced economies precisely to face fiscal distress and economic stagnation.

JEL Classification: fiscal decentralisation; government budget balance; banking crisis
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1 Introduction

In the past twenty years, most OECD countries have decentralized revenue and spending powers to sub-central levels of government, enhancing regional autonomy (Blöchliger and Rabesona, 2009). These reforms were implemented to improve countries' overall economic performance via a more efficient provision of public goods. At the same time, however, decentralization reduces the central government's control over the public finances, with the risk of local governments running pro-cyclical policies and, in times of fiscal crisis, undermining fiscal consolidation measures.

Although the consolidated literature on fiscal decentralisation focuses on the increasing efficiency in the provision of local public goods (Oates, 1972), recent studies have highlighted the fiscal risk arising from coordination failures, lack of adequate administrative capacity, common pool problems, and even moral hazard behaviour — with local jurisdictions free riding on the bail-out propensity of central governments in case of financial troubles (Goodspeed, 2002). While efficiency gains from decentralisation may improve the government budget (e.g., Neyapti, 2010), common pool problems and other types of coordination failures among local and with central governments may work against it (e.g., de Mello, 2000; Rodden, 2002). Should these problems arise, decentralisation may jeopardize national fiscal policies, thus endangering the country's macroeconomic stability (Ter-Minassian, 1997).

The present work contributes to this literature, and to a better understanding of the impact of fiscal decentralisation on budget balances, by addressing two issues often overlooked by previous studies: (i) the impact of decentralisation on local budgets; and (ii) the role of macroeconomic (financial) shocks in this context.

The former aspect is essential to evaluate the potential disciplinary effect of decentralisation as the devolution of taxing and expenditure powers changes the vertical relationship among tiers of government, and may have a different impact on central and local budgets. This distinction is also important for policy consideration, allowing to capture whether decentralisation reforms produce a simple "shift" of the fiscal burden from the central to the local one, or a "saving" effect, or both. Previous studies, by focusing on consolidated government budgets, are not able to disentangle these two effects (for instance, Neyapti, 2010).

The importance of separately accounting for central and local budgets is also shown by Figure 1, which compares the time trend of the central, local, and consolidated budget balances over the period 1980-2010, considering the average values of 19 OECD countries.[1] The local budget displays a relatively stable trend compared to the central one. Although the consolidated government balance is largely determined by the central government outcome, i.e. surplus/deficit, the contribution of local governments is all but negligible. Indeed, recent data on federal countries indicate that sub-national governments significantly contribute to public sector indebtedness (IMF, 2012).

[Figure 1]

The second contribution is related to financial shocks. They are a specific concern of central governments, which fear that local governments may undermine their response to the shock. The events related to the 2007 global financial crisis and the subsequent "Great Recession" have highlighted how the fiscal balance can be heavily influenced by macroeconomic and financial instability. In a recent study, Reinhart and Rogoff (2011) show that banking crises determine a surge in public debt as a result of expansionary fiscal policies implemented to counter the negative effects of the crisis on the economy. The deterioration of public finances triggered a widespread consolidation efforts, especially among EU countries (Spilimbergo et al., 2008; Jordà and Taylor, 2013). In this context, decentralisation could be perceived as an obstacle to the central governments' effort to stabilise the economy, given that local expenditure and taxing powers are out of their direct control. As a consequence, many countries — either autonomously or as a result of supra-national institutions' pressure — have introduced fiscal rules to limit the discretion of sub-national governments (Debrun et al., 2008; Wyplosz, 2011).[2] Actually, the European financial crisis was also pushing the EU to move beyond regulation exploring public policies as responses to the crisis and to get stabilization. Whether competences to meet the goal should be centralized or decentralized is

[1] Throughout the paper we use the terms local, sub-national, sub-central, regional, and jurisdictional as synonymous to indicate any tier of government below the national/central/federal.

[2] Other countries, like Italy, have tightened already-existing fiscal rules.

still an open question (Caporaso et al., 2015). More recently a tendency to go beyond fiscal rules and towards a recentralisation process has also emerged (Kickert, 2012; IEB, 2013). The question remains of whether a decentralized public administration retains sufficient flexibility to deal with macroeconomic challenges during a financial crisis.

Our empirical investigation reveals that decentralisation of expenditure powers has a positive impact on the overall budget of a country. On average, a 1% increase in the amount of decentralized resources improves the overall government fiscal balance by between 3.3% and 4.6%. It emerges that this disciplinary effect works mainly via the improvement in the central budget, with no significant impact detected at the local level. This evidence goes against the view that decentralisation harms public finances by reducing the power of the central government and increasing moral hazard type of behaviour at the local level. Interestingly, when expenditure decentralisation is accompanied by tax revenue decentralisation (thus, reducing the vertical fiscal imbalance), both the central and local budget balances significantly improve. These results show that the opportunistic behaviour of local governments can be limited by making them responsible for financing most of local spending.

In terms of macroeconomic stability, the analysis shows that fiscal decentralisation is not an obstacle to fiscal discipline. Indeed, the disciplinary role of expenditure decentralisation is actually stronger during financial crises. This may happen because, with a number of functions delegated to a lower level, the central government can find it easier to face the economic turmoil without adversely affecting its budget balance.

To summarise, expenditure decentralisation plays a disciplinary role for countries' budget balance. This role is enhanced by contextual tax revenue decentralisation, which has positive effects on the local budget. More importantly, the analysis suggests that governments should not worry about losing control on part of their budget, as the discipling role of decentralisation is not affected by financial crises. In fact, having a streamlined central budget may provide the central government with more flexibility to deal with adverse economic conditions.

The rest of the paper is organised as follows. Section 2 provides a review of the relevant literature. Section 3 illustrates the empirical strategy and the data used in the empirical analysis. The results arising from the various specifications of the model are presented in section 4, and section 5 concludes.

2 Literature review

The traditional approach to public economics considers three main government functions: allocative, redistributive, and macroeconomic stabilisation (Musgrave, 1959). Of these functions, only the allocative can be effectively decentralised, as sub-central governments would lack the necessary scale and competence to carry on redistributive policies or macroeconomic stabilisation policies. Moreover, uncoordinated local policies may be pro-cyclical and lead to excessive budget deficits.

Opposing this view is the public choice literature that sees in the decentralisation of fiscal powers the way to "tame the Leviathan", so contributing to the reduction of countries' chronic deficits. Indeed, the distribution of taxing powers across different levels of government can encourage vertical and horizontal fiscal competition, as well as increase transparency. Overall, the relevant implication for fiscal discipline is that the level of deficit in a country should be inversely related to the degree of fiscal decentralisation since, through the latter, the inefficiency of the whole public sector is reduced. In the same vein, the political economy approach considers the virtues of a government "closer" to citizens, which would be more willing to cooperate with a government that better reflects their expectations (Tiebout, 1956).

Contrasting views are present also in the empirical literature. Some works highlight the negative impact of decentralisation on macroeconomics outcomes due to the pro-cyclical nature of decentralised policies (Tanzi, 2000; Fedelino and Ter-Minassian, 2009; Rodden and Wibbels, 2010) and to coordination failures among different tiers of government (Tanzi, 1996; Ter-Minassian, 1997). This may lead to the existence of a certain deficit bias and may hinder the implementation of fiscal adjustments inducing soft budget constraints at the sub-central level (Wibbels, 2003; Rodden et al., 2003) as the central government may be unable to credibly commit to not bailing out local governments, especially when the latter are too big and politically strong.[3]

[3]This can also happen when sub-national governments have either little political power or low legitimacy leading to some

Using a sample of 30 countries over the period 1970-1995, de Mello (2000) finds that the degree of tax autonomy of sub-national governments increases both central and local public deficits, possibly due to intergovernmental coordination failures. However, this result may be driven by the sample which includes both developed and developing countries. Given the institutional difference between the two groups of countries, the impact of decentralisation may well differ (Fukasaku and de Mello, 1998).

Restricting the analysis to OECD countries and distinguishing between revenue and expenditure, decentralisation contributes to the macroeconomic impact with mixed results. Thornton (2009) suggests that revenue decentralisation does not affect fiscal discipline, particularly when revenues over which sub-central governments have full autonomy are considered. Eyraud and Lusinyan (2013) analyze the impact of vertical fiscal imbalances (the gap between sub-national expenditure and own revenue) on the overall fiscal performance. They find that general government fiscal balances improve by 1% of GDP for each 10% reduction in vertical fiscal imbalances. Moreover, spending decentralisation appears to be detrimental to the overall fiscal performance when it is not accompanied by adequate and high sub-national own tax revenues. Finally, Neyapti (2010) shows that revenue decentralisation reduce budget deficits, but that the strength of this effect varies according to a number of country-specific factors such as the size of the population.

The above mentioned studies mainly focused on countries' consolidated budget, without separately investigating the impact of decentralisation on central and local budgets. Recent studies have tried to move the focus to the local budget. For instance, Asatryan et al. (2012) based on a sample of 23 OECD countries over the period 1975-2000 find an association between greater fiscal autonomy and higher sub-national budgetary discipline. Likewise, in a study limited to federal countries (Austria, Belgium, Germany and Spain), Foremny (2014) shows that deficits of sub-national sectors can be avoided through tax autonomy. This empirical evidence is also backed by the following two specific case studies. Argimón and de Cos (2012) find that greater discretionary revenue-raising capacity for Spanish regions is associated with more disciplined sub-national governments. Freitag and Vatter (2008) find that more autonomous Swiss cantons - in terms of their revenue independence and administrative decentralisation - are more likely to maintain balanced budgets in times of economic recessions.

Finally, one of the main concern of the central government is the loss of power over part of the budget. This concern is accentuated in times of fiscal crisis, when it is more difficult to keep a balanced budget and when national consolidation policies maybe undermined by local pro-cyclical policies. Surprisingly, little attention has been devoted to the role of fiscal decentralisation in such context. Canuto and Liu (2010) constitutes an exception, the authors study the impact of financial crisis on sub-national debt financing, showing a deterioration in fiscal positions across regions and lower tiers of government. Likewise, Foremny and Von Hagen (2013) investigate the effects of sub-national tax autonomy on the performance of sub-national governments for 15 EU member states over the period 1995-2010, with a particular focus on the years following the financial crisis of 2008. They compare unitary versus federal state finding unitary states tend to shield local government from the impact of macroeconomic shocks, taking most of the burden of fiscal adjustment.

3 The empirical analysis

The empirical analysis is based on an unbalanced panel of 19 OECD countries over the years 1980-2010 providing us with a longer series than previous studies.[4] This 30-year time frame is necessary to investigate the impact of fiscal decentralisation in times of financial shocks.

The empirical strategy consists in estimating several specifications of a well-established model enriched with variables capturing the role of fiscal decentralisation, financial distress conditions, and the interactions between the two. The analysis starts by estimating the relationship between several measures of government budget balance and alternative indicators of fiscal decentralisation, using a common set of control variables. The basic specification of our two-way fixed-effects model is the following:

correlation between revenue decentralisation and public deficits (Rodríguez-Pose and Gill, 2003).

[4]Our sample includes Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom and the United States.

$$BB_{it} = \alpha FD_{it} + \beta x'_{it} + a + f_i + \tau_t + \epsilon_{it} \quad (1)$$

Given our interest in the decomposition of the budget balance into its main components, we use separately three different measures of the dependent variable BB_{it}: the consolidated, the central, and the sub-central budget balance all expressed as ratios over GDP.[5] Positive values of BB are consistent with net lending, while negative ones correspond to net borrowing.

Our variable of interest is an indicator of fiscal decentralisation, FD. We use separately four different indicators of decentralisation. The first two are measures of expenditure and revenue decentralisation, respectively. It is widely acknowledged that the two measures represent different and independent indicators of the degree of fiscal decentralisation. For example, Gemmell et al. (2013), in relation to economic growth, and Jin and Zou (2002), in relation to government size, reach different conclusions when separately investigating the expenditure and the revenue side. In detail, both expenditure ($Expdec$) and revenue ($Revdec$) decentralization are calculated as the share of sub-central government expenditures (revenues) minus the intergovernmental transfer spending (revenue) of that government level divided by consolidated general government expenditures (revenues).

The third indicator explicitly accounts for tax decentralisation, providing a proxy for the fiscal accountability of the local government. $Taxrevdec$ is calculated as the ratio between sub-central governments' tax revenues and general government's tax revenues.

Finally, the fourth indicator measures the degree of sub-national "fiscal equivalence" between taxation and spending powers. In detail, fiscal equivalence ($Fiscaleq$) is measured as the share of sub-national government own revenues on sub-national government expenditures.[6] High values of $Fiscaleq$ indicate a better correspondence between sub-central own revenues and expenditures, while low values of the index suggest the presence of vertical imbalances as local spending is not fully covered by own local revenues (thus, intergovernmental transfers are present).

The OECD Fiscal Decentralisation Database is used to collect data on the first three fiscal variables, while $Fiscaleq$ is computed by the World Bank.

The first three indicators suffer from well-known shortcomings, related to their potential overestimation of the actual degree of fiscal decentralisation (Ebel and Yilmaz, 2003). These indicators provide only a quantitative measure of decentralisation without qualifying the actual decision power of the local government over its budget. Stegarescu (2004, 2005) provides a more accurate index of tax revenue decentralisation which considers only autonomous taxes, i.e. taxes over which the local government can decide the rate, or the base, or both. However, the coverage is limited to the 1965-2001 period, and using it would prevent us from studying the recent years characterized by interesting developments and events, such as the global financial crisis of 2007-2009 and the adoption of fiscal consolidation measures to limit budget imbalances and consolidate countries' public finances.

We initially estimate our models with the Ordinary least squares (OLS) fixed-effects estimator with corrected standard errors robust to heteroskedasticity, cross-sectional dependence, and autocorrelation (Driscoll and Kraay, 1998).[7] While controlling for a number of potential characteristics of the data, that estimator does not account for potential endogeneity issues. In fact, while fiscal decentralization may affect public balances (as argued extensively in the literature review above), it may be hypothesized that governments could resort to decentralization reforms in an effort to increase their fiscal discipline. Moreover, there could be a third, external factor, affecting both the budget balance and the decentralization degree at the same time, such as an external/international obligation. Including both country and time fixed effects in our empirical model aims at controlling for such possibilities, but we feel compelled to go beyond that in order to account for potential endogeneity issues. That is why we also report Two-stage

[5] The consolidated budget balance is built as the sum between central and sub-central governments balances for the sake of cross-country comparability. Indeed, our calculation of consolidated budgets does not include social security funds that are recorded differently in countries of our sample.

[6] A dummy variable is included in panel regression when accrual data are merged with cash data to control for differences in the fiscal decentralisation database (Seiferling, 2013).

[7] The Pesaran (2004) CD test indicates that residuals are cross-sectionally correlated for consolidated and central balance specifications. Moreover, as the error term is also likely to be serially correlated, we use a four-lag correction for auto-correlated errors as benchmark after observing the residual correlation over time. However, results are robust to increasing the lag-structure. The equation referred to local budget balance is estimated using the fixed-effects estimator with heteroskedasticity-robust standard errors.

least squares (2SLS) estimates of all the model specifications in which the fiscal decentralization variables are instrumented with their lagged values that were chosen appropriately looking at the diagnostic tests.[8]

The analysis based on equation (1) provides an overview of the impact of different measures of decentralisation on the consolidated, central and local budgets. This impact, however, maybe different in times of macroeconomic instability. To this purpose, equation (1) is enriched by a banking crisis indicator following previous studies (Reinhart and Rogoff, 2008, 2011). In detail, we add a dummy variable accounting for the years in which a banking crisis is occurring, $Bankcrisis$, by taking advantage from Laeven and Valencia (2013) database. They define a banking crisis as an event that meets two conditions: *i)* significant signs of financial distress in the banking system; *ii)* significant banking policy intervention measures in response to significant losses in the banking system. The year when both criteria are satisfied represents the year when the crisis became systemic; this guarantees that the crisis is dated at the first signs of major problems in the banking system.[9]

The most comprehensive specification is as follows:

$$BB_{it} = \alpha FD_{it} + \varphi Bankcrisis_{it} + \phi FD \times Bankcrisis_{it} + \beta x_{it}^{'} + a + f_i + \tau_t + \epsilon_{it} \qquad (2)$$

The coefficient φ captures the potential adverse effect of a banking crisis. When the interaction term is included, the overall effect of fiscal decentralisation on budget balance is determined by the sum of coefficients α and ϕ, where ϕ represents the difference between periods of banking crisis and "normal" periods. If the coefficient ϕ is statistically different from zero, it means that the impact of decentralisation changes in times of financial distress.

The rest of the right-hand-side variables included in equations (1) and (2) are as follows: population size (Pop) is used to control for potential scale effects in the provision of public goods and services that can improve fiscal balance, and for potential congestion effects that can adversely affect it. The dependency ratio ($Depratio$) captures the degree of economic and fiscal pressure exerted over the working age population by the young (under 15 years old) and by the elderly population (over 64 years old). As the dependency ratio increases, the budget balance may worsen due to the fact that young and elderly people are net recipients of the fiscal system. On the other hand, the budget balance could actually improve if pensioners and retirees tend to be net contributors to the fiscal system.

The business cycle effects are captured by means of the real $GDP\ growth$ rate and the unemployment rate ($Unemp$). During economic recessions, governments might implement deficit-spending measures to stimulate the economy and favour a more rapid economic recovery. Thus, a higher unemployment rate could be accompanied by a worsening of the budget balance, while when GDP growth is positive the government budget balance is more likely to improve. The first-order lagged value of the real GDP growth rate enters in the panel regression analysis to deal with potential reverse causality issues. Moreover, the lagged value of real $GDP\ growth$ reflects the fact that deficit/surplus decisions are normally delayed with respect to the economic cycle.

We also control for potential globalization effects by means of the share of trade (the sum of export and import) on GDP ($Trade\ openness$) and the Chinn-Ito index (Chinn and Ito, 2008) measuring the openness degree in capital account transactions ($Financial\ openness$). Higher values of both indices are consistent with a more open economy. The effect of globalization on public finances is unclear *a priori*. On the one hand, it may exert a positive influence due to its pressure on governments to take advantage from more prudent fiscal policies and avoid investors and firms leaving indebted/unstable countries (de Mello, 2005). On the other hand, globalization can stimulate fiscal profligacy and increase tax competition across countries (Stegarescu, 2009; Ermini and Santolini, 2014): tax cuts may be accompanied by deficit-financing policies to attract investors in the short run (Razin and Sadka, 1991).

Several political variables are considered by the literature as additional determinants. In our model, the effects of party ideology is captured by the variable $Left$, which corresponds to the percentage of the

[8] We test the validity of the full set of instrumental variables used in the panel regression by performing the Hansen (1982) *J*-statistic for over-identifying restrictions. We find that the test accepts the null-hypothesis of overidentification in all case.

[9] More generally, the dating of banking crises has traditionally relied primarily on the identification of 'events' or subjective criteria to determine when a banking crisis takes place. Moreover, the database on banking crises episodes is further complemented with dates for sovereign debt and currency crises during the same period. However, for our purposes the banking crises index is the best in order to capture and depict a financial distress.

left-wing parties' members on total cabinet posts. A negative correlation between $Left$ and the budget balance may be expected as the left-wing parties are thought to be more likely to enlarge the public sector's scope than right-wing parties (Persson and Svensson, 1989; Franzese, 2000). The electoral cycle (measured by the dummy variable $Election$ assuming the value 1 in years of general elections) also matters for the public budget. Incumbent politicians may favour expansionary policies prior to elections (Eslava, 2011) without raising taxes. It is also possible that the incumbents may try to gain consensus by simply changing the budget expenditure composition without affecting the surplus/deficit (Drazen and Eslava, 2010). The degree of government fractionalisation, $Govfrac$, is also included in the model, as according to the literature coalition governments can be more prone to run budget deficits with respect to majority-party governments (Roubini and Sachs, 1989).

As recent studies highlight the importance of rule-based mechanisms in improving fiscal outcomes (Schaechter et al., 2012; Budina et al., 2012), we include a dummy variable taking the value 1 when a balanced budget rule (BBR) is adopted in the country and zero otherwise. On the one hand, the adoption of fiscal rules in a decentralized setting could promote more efficient and effective fiscal policies at all levels, and it could also mitigate the possible coordination failures arising from decentralisation. On the other hand, little influence should be expected when rules are not effectively implemented or can be easily manipulated (Neyapti, 2013). In this case, adopting rules in a decentralized setting could worsen the inefficiencies caused by coordination failures and dampen the virtuous effects due to fiscal competition across sub-national governments.

Finally, we include as a control the first-order lagged value of the debt-to-GDP ratio, $Debt$, and the short term interest rate, $Interest\ rate$, to take into account for the role of monetary policy in this framework. The relationship between $Debt$ and the budget balance is ambiguous, depending on whether high debt is a sign of contemporary deficits or whether it is capable of triggering fiscal prudence and consolidation. Detailed information on variables' source and definitions and their summary statistics as well is provided in the Appendix (see Tables A1 and A2, respectively).

Both models includes country- and time-fixed effects to control for time-invariant unobserved countries' characteristics and shocks common to all countries. An error term ϵ, normally distributed with zero mean and constant variance, is included in the models as well as a constant term a.

4 Results

4.1 Baseline model

This section illustrates the OLS and 2SLS estimation of model (1), reported in Tables 1 and 2, respectively. According to the OLS estimation, expenditure decentralisation positively affects the consolidated budget balance (column 1, Table 1), confirming previous findings (Neyapti, 2010; Eyraud et al., 2012). In terms of magnitude, a 1% increase in $Expdec$ improves the consolidated budget balance by 3.7%, when relevant variables are evaluated at their mean value. The elasticity calculated for mean values of the explanatory variables is 4.6. Both results are confirmed by the 2SLS estimates in Table 2, where the estimated elasticities are slightly larger (4.8% and 5.4%). The reason for this positive impact seems to lie in the contemporaneous improvement of the central government budget and the lack of any deterioration of local budgets (see column 5).

Revenue decentralisation ($Revdec$) does not appear to significantly affect any of the governmental budget balances. Its coefficient is negative in one case, but not statistically different from zero at standard confidence levels, thus not supporting the hypothesis of coordination failures due to overlapping taxing power among different tiers of government (de Mello, 1999). However, when decentralisation is based on a higher degree of tax autonomy, a significant effect of budget balances emerges. In detail, tax revenue decentralisation ($Taxrevdec$) appears to be positively related to the local budget balance (column 11, Table 1, with an estimated elasticity equal to 2.4. The 2SLS estimates in Table 2 support this finding, and also uncover a positive effect on the consolidated budget balance (with an elasticity of 4.2).

The last of the decentralisation indicators ($Fiscaleq$) is consistently and positively associated with all budget balances, suggesting that fiscal discipline is enhanced when sub-national governments' spending is financed with adequate local taxation. This is consistent with the theoretical view that increasing local taxing powers induce sub-national policy-makers to compete for attracting tax base. Governments could

do that by implementing efficient fiscal policies (Brennan and Buchanan, 1980), leading to lower levels indebtedness. According to our estimates, a 1% increase in $Fiscaleq$ determines up to 1.4% increase in the consolidated surplus. The 2SLS estimates confirm this effect, although the $Fiscaleq$ coefficient becomes not-statistically significant with respect to the local budget (see column 12, Table 2).

Overall, it appears that fiscal decentralisation plays a non-negligible role for (better) public finances of advanced economies. Moreover, a saving effect seems to emerge in the case of central governments' accounts as decentralising spending tasks improves the central balance without any either negative or positive effects on the local budget. To improve the latter, the decentralisation process should be well-designed as proved by the result with the $Fiscaleq$ index. Thus, the asymmetry between expenditure and tax decentralisation, which is normally experienced by OECD countries, should be shrank.

The rest of the right-hand-side variables also offer interesting results. For instance, the existence of a national balanced budget rule leads to more fiscal discipline: the BBR coefficients are always positive and statistically significant in most of the specifications. This suggests that a national fiscal rule can help keeping spending under control and possibly even rationalizing intergovernmental transfers in order to alleviate the common pool problem of public budgeting.[10] Furthermore, the results show that public debt is positively associated with the sub-central government budgets, while it negatively affects the central government budget in few cases. This seems to be consistent with the theoretical approach developed by Weingast et al. (1981) on federal funds: while the marginal cost of federal/central funds is distributed over the whole federation, the benefits are concentrated within each individual jurisdiction, generating a behavior which is reasonable from the perspective of individual sub-national governments in relation to the public debt-to-GDP ratio. Our results also outline that a more restrictive monetary policies, proxied by higher interest rates, is mainly beneficial for the local budget (see $Interestrate$ in Table 2). Higher interest rates on bonds could induce local governments to hardly recur to the private credit market to finance deficit-spending, so leading to the implementation of more parsimonious fiscal policies.

Country size, measured by the logarithm of population, Pop, is another significant determinant of budget balances. Larger countries appear to be more prone to deteriorated consolidated and central budget balances, suggesting that economies of scale in public goods provision are not likely to be exploited. As for the structure of the population, the dependency ration, $Depratio$, weakly and negatively affects the budget balance of the various tiers of government, as the estimated coefficients are rarely statistically significant.

As expected, favorable economic conditions – signaled by low unemployment rates – contribute to improve both the consolidated and central budget surpluses, possibly by generating extra fiscal revenues. Although rarely significant, we also find that an acceleration in the real *GDP* growth improves them but worsen local budget balances. Openness in trade and financial markets are detrimental for both the consolidated and central budget balances. Thus, under globalization pressure, national governments are more likely to cut taxes and/or overspend, possibly to attract foreign investors (Sergi, 2007).

Finally, the political variables only seem to affect the local budgetary decisions, with a positive effect coming from a fragmented national government ($Govfrac$) and a negative one coming from associated to the proportion of left-wing seats in the national assembly ($Left$).

[Table 1]

[Table 2]

4.2 Controlling for banking crises

The first set of estimates dealing with the occurrence of banking crises are presented in Tables 3 and 4 (obtained with OLS and 2SLS, respectively). Basically, the model used is that of equation (1) enriched with the $Bankcrisis$ dummy variable. The inclusion of such variable only marginally affects the coefficients associated with the fiscal decentralisation indices. While in terms of statistical significance there is

[10] Sub-national fiscal rules can also exist, and even though they can be important to support local fiscal discipline (Sutherland et al., 2005; Foremny, 2014), only limited information on them is available therefore we do not include them in the analysis (the OECD provides data on those only for the years 2005 and 2011. Actually, previous studies show that sub-national fiscal rules do not seem to play a role in ensuring better performances, in contrast to rules pertaining to the general and the central government (Debrun et al., 2008; Afonso and Hauptmeier, 2009; Eyraud et al., 2012).

little to notice, the magnitude of the $Expdec$ coefficients is slightly smaller. Similarly, the $Fiscaleq$ results hold when controlling for the occurrence of banking crises. The results for the rest of the explanatory variables are similar to those of the baseline estimates presented in the previous subsection.

As expected, the sign of $Bankcrisis$ is negative – when statistically significant – across specifications. Years during which such a crisis occurs are characterized by worsened consolidated and central governmental balances (see columns 1-8 in Tables 3 and 4). The local budget balances, on the other hand, do not seem to be significantly affected by such an event. This reflects, to some extent, the stable trend of sub-central budget balance over time as already observed in Figure 1. In fact, the lack of any statistically significance of $Bankcrisis$ for local public finances is somehow not surprising as during banking crises we usually witness a marked expansion in government-guaranteed debt, which again does not show up in the sub-central government figures (Reinhart and Rogoff, 2008). It also suggests that the factors affecting fiscal imbalances and debt accumulation at the sub-national level are likely to differ from those at the central government level.

Thus, OECD countries experience large increases in public deficits during banking crises, which may be associated with a greater use of counter-cyclical fiscal policy (Laeven and Valencia, 2013) as well as with a shortfall in revenues. Moreover, Reinhart and Rogoff (2011) prove that banking crises (even those of a purely private origin) increase the likelihood of sovereign default as often preceded or accompanied by public debt crises. Fiscal stimulus packages are normally being promoted by the highest level of government rather than sub-national units.

[Table 3]

[Table 4]

We now turn to the estimation of model (2), including an interaction term between the $Bankcrisis$ dummy and the decentralisation variables. In this case, the coefficients of the decentralisation variables are only indicative of their influence in normal times. When a crisis occurs, the overall effect of decentralisation on governments' budget balance has to be calculated by summing the coefficients of both the FD variable and the interaction term (i.e. α plus ϕ).

The new battery of estimates in Tables 5 and 6 does not overturn the results obtained so far. On the contrary, they better qualify them, particularly with regards to expenditure decentralisation whose role during banking crises changes in an interesting way. In normal times, the $Expdec$ elasticity with respect to the consolidated government balance is equal to 3.0% (4.2% according to the 2SLS estimates), but it increases to 3.9% (5.0%) during times of financial distress. Thus, decentralizing spending tasks unambiguously yields an improvement in the budget balance at higher government levels, with negligible effects at the sub-central level.

The shift of expenditure responsibilities from central to sub-central authorities is likely to give more flexibility to national governments in reacting to economic downturns without worsening their public finances. The spending shift may also imply a central public saving allowing policy-makers to use these resources to alleviate deficit bias and do not make worse their fiscal outcomes, even in a negative macroeconomic framework. This result goes, to some extent, against a general "recentralization" view that has recently taken place in some European countries (e.g., Spain, Italy) as a remedy to react to the financial and budgetary distress (IEB, 2013).

The specification of model (2) including the other fiscal decentralisation indices ($Revdec$, $Taxrevdec$, and $Fiscaleq$) do not uncover additional meaningful interaction effects. There is only weak evidence in favour of revenue decentralisation being beneficial for consolidated and central balances during banking crises: this happens according to the 2SLS estimates (see columns 2 and 6 in Table 6), but it is not confirmed by the OLS ones.

With regards to the rest of the right-hand-side variables, the estimates arising from model (2) broadly confirm those of model (1).

[Table 5]

[Table 6]

5 Concluding remarks

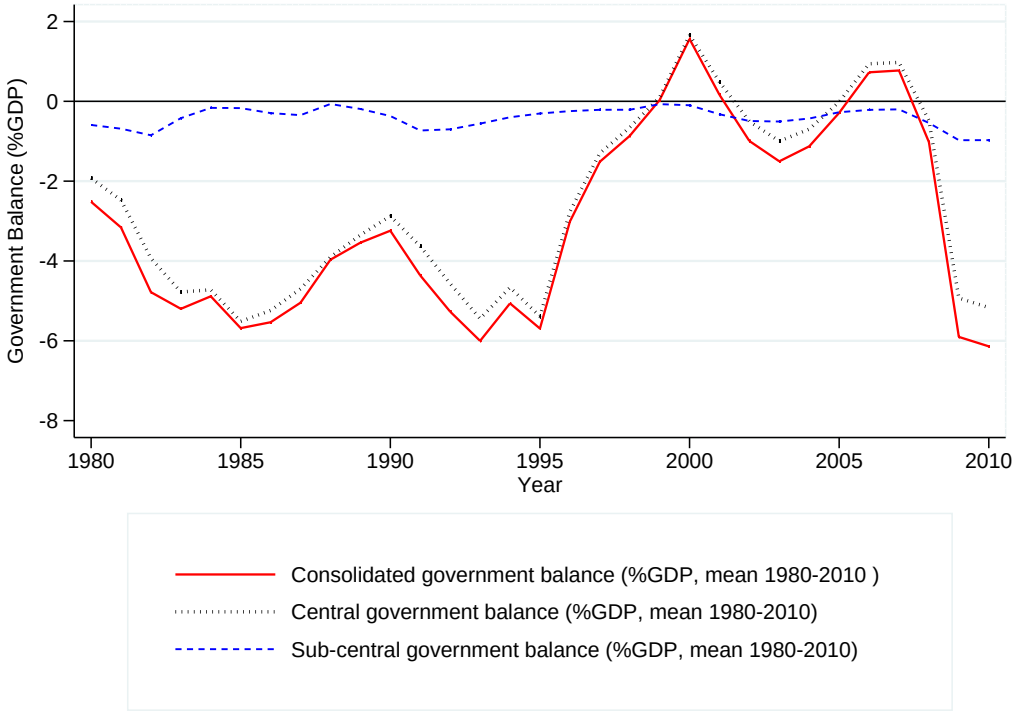
Fiscal decentralisation reforms often raise governments' concerns about the loss of control over the budget and the risk of not being able to implement effective macroeconomic stabilisation policies when needed (i.e., in times of financial distress).

The analysis conducted in the present paper, however, lends support to thesis that fiscal decentralisation does not induce fiscal deficit nor hamper stabilisation policies of the central government. The decentralisation of expenditure powers improves the central budget without any shift of the burden to the local budgets. Moreover, when expenditure decentralisation is accompanied by tax revenue decentralisation, the sub-national budget balance also improves significantly.

The disciplinary role of fiscal decentralisation is even stronger in times of financial crises proving that fiscal decentralisation is not an obstacle to country's sounder fiscal positions and macroeconomic stability. From a policy viewpoint, the intense "recentralisation" process of government authority occurred in recent years in some advanced economies (e.g., Spain and Italy) to face the severity of the crisis and the difficulty of budgetary consolidation would not seem justified by our empirical findings.

Put differently, it is not possible to deduce from our evidence that any type of decentralisation impedes governments' fiscal sanity and healthy budget management even – and especially – in times of financial distress and economic downturns.

Figure 1: Trend of central, sub-central and consolidated government budget balances over the period 1980-2010



Source: Own elaborations on OECD Fiscal decentralisation database.

Table 1: The OLS estimation results of baseline model (1)

	Consolidated budget balance				*Central budget balance*				*Local budget balance*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Expdec	0.250***				0.262***				-0.012			
	(4.36)				(4.28)				(-0.94)			
Revdec		0.003				-0.019				0.022		
		(0.04)				(-0.30)				(0.93)		
Taxrevdec			0.072				0.017				0.055***	
			(1.50)				(0.37)				(3.98)	
Fiscaleq				0.055***				0.030***				0.025**
				(5.09)				(2.84)				(2.09)
Pop (log)	-25.598**	-31.303*	-36.709**	-26.491**	-24.785**	-30.601**	-36.803**	-26.051**	-0.814	-0.702	0.094	-0.440
	(-2.17)	(-1.89)	(-2.24)	(-1.96)	(-2.39)	(-1.97)	(-2.46)	(-2.00)	(-0.20)	(-0.17)	(0.03)	(-0.10)
Depratio	-0.115	-0.007	-0.069	-0.234***	-0.102	0.020	-0.044	-0.183***	-0.013	-0.027	-0.025	-0.051
	(-1.33)	(-0.07)	(-0.75)	(-3.75)	(-1.22)	(0.21)	(-0.48)	(-2.62)	(-0.36)	(-0.74)	(-0.90)	(-1.41)
GDP growth$_{t-1}$	0.178	0.345	0.348*	0.189*	0.195	0.369	0.348*	0.172	-0.017	-0.024	0.000	0.017
	(1.13)	(1.57)	(1.89)	(1.75)	(1.19)	(1.57)	(1.78)	(1.62)	(-0.45)	(-0.59)	(0.001)	(0.34)
Unemp	-0.447***	-0.546***	-0.554***	-0.460***	-0.394***	-0.503***	-0.510***	-0.431***	-0.053	-0.043	-0.044	-0.029
	(-5.38)	(-7.98)	(-8.31)	(-8.99)	(-4.98)	(-6.92)	(-7.27)	(-6.05)	(-1.43)	(-1.21)	(-1.36)	(-0.81)
Trade openness	-0.054**	-0.068*	-0.045	0.018	-0.067**	-0.083*	-0.061	-0.004	0.014**	0.015***	0.015**	0.023***
	(-1.99)	(-1.68)	(-1.13)	(0.80)	(-2.45)	(-1.93)	(-1.39)	(-0.19)	(2.46)	(2.73)	(2.52)	(2.67)
Financial openness	-0.354	-0.147	-0.816***	0.314	-0.308	-0.058	-0.753**	0.455	-0.046	-0.090	-0.062	-0.141
	(-1.05)	(-0.33)	(-2.70)	(0.92)	(-0.85)	(-0.13)	(-2.22)	(1.47)	(-0.44)	(-0.77)	(-0.61)	(-1.35)
Debt$_{t-1}$	0.034	0.011	0.005	-0.017	0.023	-0.002	-0.009	-0.028**	0.011	0.013*	0.014**	0.010
	(1.45)	(0.46)	(0.22)	(-1.39)	(0.99)	(-0.09)	(-0.38)	(-2.19)	(1.35)	(1.67)	(2.13)	(1.12)
Interest rate	0.181	0.215*	0.099	0.110	0.135	0.167	0.052	0.091	0.046	0.048	0.047	0.019
	(1.35)	(1.71)	(0.88)	(1.08)	(0.92)	(1.22)	(0.45)	(0.88)	(1.16)	(1.12)	(1.19)	(0.56)
BBR	2.498***	1.941***	1.463***	2.112***	2.152***	1.547***	1.123**	1.858***	0.346*	0.394**	0.340**	0.253
	(4.95)	(3.40)	(3.17)	(3.72)	(4.52)	(2.77)	(2.27)	(3.20)	(1.87)	(2.20)	(2.55)	(1.46)
Govfrac	0.202	0.416	0.695	0.237	-0.154	-0.005	0.071	-0.432	0.356	0.421	0.623**	0.668**
	(0.21)	(0.39)	(0.60)	(0.16)	(-0.19)	(-0.01)	(0.07)	(-0.38)	(1.13)	(1.39)	(2.34)	(2.08)
Election	-0.051	-0.057	-0.038	-0.141	-0.098	-0.105	-0.073	-0.200	0.046	0.048	0.036	0.059
	(-0.46)	(-0.49)	(-0.40)	(-1.02)	(-0.92)	(-0.94)	(-0.82)	(-1.31)	(0.72)	(0.74)	(0.61)	(1.18)
Left	-0.006	-0.004	-0.001	0.001	-0.004	-0.001	0.002	0.003	-0.002*	-0.003*	-0.003***	-0.002**
	(-1.22)	(-0.81)	(-0.27)	(0.25)	(-0.85)	(-0.32)	(0.67)	(0.66)	(-1.71)	(-1.86)	(-3.24)	(-2.00)
R2-Within	0.694	0.650	0.630	0.680	0.685	0.632	0.607	0.664	0.293	0.294	0.318	0.383
F-test	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Group No.	18	18	19	19	18	18	19	19	18	18	19	19
Obs. No.	369	369	405	336	369	369	405	336	369	369	405	336

Note: t-statistics in parenthesis. p-value is reported for the tests. Significant at level ***1%, **5%, *10%.

Table 2: The 2SLS estimation results of baseline model (1)

	Consolidated budget balance				*Central budget balance*				*Local budget balance*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Expdec	0.329***				0.311***				0.018			
	(3.835)				(3.622)				(1.276)			
Revdec		0.079				0.051				0.027		
		(0.839)				(0.548)				(1.087)		
Taxrevdec			0.095*				0.039				0.054***	
			(1.750)				(0.722)				(5.132)	
Fiscaleq				0.111***				0.107***				0.004
				(2.98)				(2.95)				(0.41)
Pop (log)	-25.568**	-38.254**	-35.829**	-33.429***	-25.505**	-37.544**	-35.998**	-29.716***	-0.063	-0.710	0.106	-3.714
	(-2.273)	(-2.503)	(-2.558)	(-3.66)	(-2.274)	(-2.428)	(-2.503)	(-3.43)	(-0.027)	(-0.350)	(0.056)	(-1.51)
Depratio	-0.071	-0.021	-0.075	-0.142	-0.024	0.029	-0.049	-0.105	-0.047*	-0.050**	-0.025	-0.037
	(-0.626)	(-0.189)	(-0.758)	(-1.38)	(-0.220)	(0.262)	(-0.498)	(-1.02)	(-1.883)	(-2.176)	(-1.177)	(-1.45)
GDP growth$_{t-1}$	0.215	0.420**	0.364**	0.202*	0.281**	0.473***	0.363**	0.189*	-0.066**	-0.053*	0.001	0.013
	(1.553)	(2.327)	(2.480)	(1.91)	(2.058)	(2.584)	(2.428)	(1.83)	(-2.309)	(-1.909)	(0.026)	(0.44)
Unemp	-0.515***	-0.604***	-0.532***	-0.275**	-0.451***	-0.537***	-0.489***	-0.254**	-0.064**	-0.067**	-0.043*	-0.021
	(-6.537)	(-6.671)	(-6.694)	(-2.56)	(-5.490)	(-5.454)	(-5.903)	(-2.31)	(-2.026)	(-2.184)	(-1.794)	(-0.64)
Trade openness	-0.048	-0.067	-0.043	-0.005	-0.066*	-0.086*	-0.059	-0.018	0.019***	0.019***	0.015***	0.013*
	(-1.371)	(-1.420)	(-1.037)	(-0.20)	(-1.927)	(-1.811)	(-1.378)	(-0.72)	(3.069)	(3.213)	(3.088)	(1.76)
Financial openness	-0.573	-1.064*	-0.867**	0.268	-0.618	-1.047*	-0.803**	0.473	0.045	-0.016	-0.063	-0.206***
	(-1.065)	(-1.751)	(-2.407)	(0.72)	(-1.154)	(-1.724)	(-2.150)	(1.33)	(0.403)	(-0.149)	(-0.910)	(-2.60)
Debt$_{t-1}$	0.027	0.003	0.004	-0.048**	0.010	-0.013	-0.010	-0.056***	0.017***	0.016***	0.014***	0.008*
	(1.562)	(0.143)	(0.241)	(-2.56)	(0.583)	(-0.671)	(-0.568)	(-2.90)	(3.682)	(3.754)	(3.770)	(1.72)
Interest rate	0.013	0.044	0.107	0.161	-0.056	-0.031	0.060	0.143	0.068**	0.075**	0.046**	0.017
	(0.115)	(0.367)	(1.193)	(1.49)	(-0.523)	(-0.269)	(0.655)	(1.37)	(2.407)	(2.557)	(2.062)	(0.67)
BBR	2.174***	1.377***	1.481***	2.928***	1.766***	0.993**	1.142***	2.632***	0.408**	0.384**	0.336***	0.296
	(4.306)	(2.729)	(3.225)	(5.12)	(3.754)	(2.086)	(2.605)	(4.79)	(2.551)	(2.527)	(2.965)	(1.48)
Govfrac	-0.021	-0.268	0.911	1.735	-0.730	-1.049	0.278	1.143	0.708***	0.781***	0.620***	0.592**
	(-0.025)	(-0.257)	(0.959)	(1.64)	(-0.870)	(-1.002)	(0.278)	(1.10)	(2.798)	(3.288)	(3.200)	(2.42)
Election	-0.187	-0.123	-0.050	-0.148	-0.227	-0.167	-0.084	-0.200	0.040	0.044	0.033	0.052
	(-0.838)	(-0.535)	(-0.227)	(-0.63)	(-1.068)	(-0.748)	(-0.387)	(-0.85)	(0.601)	(0.669)	(0.581)	(0.82)
Left	-0.000	-0.001	-0.001	0.004	0.002	0.001	0.002	0.006	-0.002**	-0.003***	-0.003***	-0.002*
	(-0.115)	(-0.316)	(-0.217)	(0.99)	(0.448)	(0.251)	(0.490)	(1.44)	(-2.131)	(-2.684)	(-3.155)	(-1.85)
R2-Within	0.721	0.675	0.627	0.670	0.714	0.656	0.605	0.650	0.312	0.339	0.318	0.332
F-test	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hansen *J* test	0.407	0.566	0.113	0.672	0.504	0.303	0.312	0.286	0.242	0.189	0.176	0.110
Group No.	18	18	19	19	18	18	19	19	18	18	19	19
Obs. No.	333	333	403	307	333	333	403	307	333	333	402	307

Note: Instruments: second and third order lagged values of fiscal decentralisation indicators in regressions (1)-(12); first order lagged value of tax revenue decentralisation in regression (11). *t*-statistics in parenthesis. *p*-value is reported for the tests. Significant at level ***1%, **5%, *10%.

Table 3: The OLS estimation results of baseline model (1) with banking crisis among controls

	Consolidated budget balance				*Central budget balance*				*Local budget balance*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Expdec	0.225***				0.236***				-0.011			
	(3.76)				(3.64)				(-0.76)			
Revdec		-0.004				-0.026				0.022		
		(-0.06)				(-0.41)				(0.91)		
Taxrevdec			0.049				-0.008				0.057***	
			(0.83)				(-0.14)				(3.90)	
Fiscaleq				0.056***				0.032***				0.024**
				(5.25)				(3.07)				(2.12)
Banking crisis	-1.508***	-1.986***	-1.954***	-1.170***	-1.565***	-2.069***	-2.069***	-1.350***	0.056	0.083	0.114	0.180
	(-4.60)	(-5.38)	(-5.49)	(-3.47)	(-5.00)	(-6.09)	(-6.08)	(-4.00)	(0.31)	(0.50)	(0.78)	(0.93)
Pop (log)	-27.159**	-32.581**	-38.775**	-26.111**	-26.404***	-31.932**	-38.990***	-25.613**	-0.755	-0.649	0.215	-0.498
	(-2.41)	(-2.17)	(-2.46)	(-2.13)	(-2.77)	(-2.35)	(-2.78)	(-2.24)	(-0.18)	(-0.15)	(0.07)	(-0.12)
Depratio	-0.117	-0.022	-0.078	-0.213***	-0.104	0.005	-0.053	-0.159***	-0.013	-0.026	-0.025	-0.054
	(-1.54)	(-0.29)	(-0.99)	(-3.93)	(-1.41)	(0.07)	(-0.70)	(-2.79)	(-0.35)	(-0.69)	(-0.84)	(-1.50)
GDP growth$_{t-1}$	0.143	0.277	0.262	0.130	0.158	0.298	0.257	0.104	-0.015	-0.021	0.005	0.026
	(0.74)	(1.07)	(1.22)	(1.12)	(0.77)	(1.06)	(1.10)	(0.88)	(-0.40)	(-0.49)	(0.13)	(0.52)
Unemp	-0.425***	-0.506***	-0.513***	-0.432***	-0.371***	-0.461***	-0.467***	-0.399***	-0.054	-0.045	-0.046	-0.033
	(-4.96)	(-6.91)	(-7.12)	(-7.77)	(-4.40)	(-5.63)	(-5.90)	(-5.01)	(-1.50)	(-1.32)	(-1.50)	(-0.99)
Trade openness	-0.045	-0.054	-0.034	0.027	-0.058*	-0.069	-0.048	0.006	0.013***	0.015***	0.015***	0.021***
	(-1.51)	(-1.32)	(-0.80)	(1.40)	(-1.92)	(-1.57)	(-1.06)	(0.29)	(2.61)	(2.87)	(2.60)	(2.90)
Financial openness	-0.258	-0.037	-0.524*	0.485	-0.208	0.057	-0.445	0.653**	-0.049	-0.094	-0.079	-0.167*
	(-0.86)	(-0.10)	(-1.89)	(1.35)	(-0.62)	(0.14)	(-1.40)	(2.03)	(-0.48)	(-0.84)	(-0.83)	(-1.72)
Debt$_{t-1}$	0.027	0.003	-0.001	-0.018	0.015	-0.010	-0.015	-0.028**	0.011	0.013*	0.014**	0.011
	(1.07)	(0.13)	(-0.03)	(-1.39)	(0.62)	(-0.38)	(-0.61)	(-2.14)	(1.41)	(1.76)	(2.28)	(1.17)
Interest rate	0.228	0.271**	0.177	0.177	0.184	0.225	0.134	0.169	0.044	0.046	0.042	0.008
	(1.56)	(1.99)	(1.43)	(1.52)	(1.16)	(1.54)	(1.09)	(1.44)	(1.20)	(1.13)	(1.17)	(0.29)
BBR	2.562***	2.089***	1.517***	1.920***	2.218***	1.702***	1.179**	1.637***	0.344*	0.387**	0.337***	0.283
	(5.15)	(4.02)	(3.27)	(3.49)	(4.88)	(3.42)	(2.47)	(2.92)	(1.90)	(2.24)	(2.68)	(1.58)
Govfrac	0.394	0.618	1.046	0.421	0.045	0.205	0.444	-0.219	0.349	0.413	0.603**	0.640*
	(0.42)	(0.60)	(0.96)	(0.28)	(0.05)	(0.20)	(0.44)	(-0.19)	(1.09)	(1.38)	(2.30)	(1.92)
Election	-0.103	-0.125	-0.101	-0.184	-0.152	-0.176*	-0.140*	-0.250*	0.048	0.051	0.039	0.066
	(-0.96)	(-1.10)	(-1.20)	(-1.45)	(-1.54)	(-1.68)	(-1.86)	(-1.80)	(0.70)	(0.75)	(0.65)	(1.21)
Left	-0.006	-0.003	-0.001	0.001	-0.003	-0.001	0.002	0.003	-0.002*	-0.003*	-0.003***	-0.002*
	(-0.99)	(-0.61)	(-0.22)	(0.16)	(-0.63)	(-0.14)	(0.65)	(0.55)	(-1.68)	(-1.84)	(-3.19)	(-1.84)
R2-Within	0.706	0.671	0.651	0.688	0.699	0.657	0.633	0.676	0.294	0.296	0.321	0.387
F-test	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Group No.	18	18	19	19	18	18	19	19	18	18	19	19
Obs. No.	369	369	405	336	369	369	405	336	369	369	405	336

Note: See Table 1.

Table 4: The 2SLS estimation results of baseline model (1) with banking crisis among controls

	Consolidated budget balance				*Central budget balance*				*Local budget balance*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Expdec	0.319***				0.299***				0.021			
	(3.61)				(3.36)				(1.36)			
Revdec		0.055				0.026				0.029		
		(0.61)				(0.29)				(1.13)		
Taxrevdec			0.069				0.011				0.056***	
			(1.27)				(0.21)				(5.24)	
Fiscaleq				0.110***				0.106***				0.004
				(3.048)				(3.046)				(0.412)
Banking crisis	-1.073**	-1.805***	-1.973***	-1.586***	-1.230***	-1.934***	-2.087***	-1.672***	0.157	0.129	0.113	0.086
	(-2.19)	(-3.69)	(-4.39)	(-3.279)	(-2.62)	(-4.03)	(-4.68)	(-3.375)	(1.08)	(0.96)	(1.11)	(0.677)
Pop (log)	-27.113**	-40.285***	-37.752***	-33.938***	-27.320**	-39.721***	-38.031***	-30.25***	0.206	-0.565	0.203	-3.686
	(-2.438)	(-2.666)	(-2.721)	(-3.835)	(-2.464)	(-2.595)	(-2.664)	(-3.621)	(0.087)	(-0.275)	(0.105)	(-1.493)
Depratio	-0.083	-0.039	-0.082	-0.093	-0.038	0.010	-0.058	-0.053	-0.045*	-0.049**	-0.025	-0.040
	(-0.754)	(-0.369)	(-0.891)	(-0.949)	(-0.352)	(0.096)	(-0.611)	(-0.540)	(-1.773)	(-2.088)	(-1.143)	(-1.514)
GDP growth$_{t-1}$	0.190	0.368**	0.281*	0.122	0.253*	0.417**	0.275*	0.105	-0.063**	-0.049*	0.005	0.017
	(1.348)	(2.029)	(1.901)	(1.045)	(1.819)	(2.273)	(1.833)	(0.904)	(-2.241)	(-1.778)	(0.211)	(0.578)
Unemp	-0.482***	-0.545***	-0.487***	-0.227**	-0.413***	-0.474***	-0.442***	-0.203*	-0.069**	-0.071**	-0.046*	-0.024
	(-6.181)	(-6.366)	(-6.616)	(-2.172)	(-5.101)	(-5.093)	(-5.701)	(-1.888)	(-2.218)	(-2.376)	(-1.928)	(-0.729)
Trade openness	-0.042	-0.058	-0.031	0.001	-0.060*	-0.077	-0.046	-0.011	0.018***	0.019***	0.015***	0.012*
	(-1.195)	(-1.250)	(-0.768)	(0.048)	(-1.716)	(-1.636)	(-1.107)	(-0.500)	(3.018)	(3.202)	(3.009)	(1.749)
Financial openness	-0.550	-0.973*	-0.582*	0.492	-0.593	-0.950	-0.501	0.710**	0.043	-0.023	-0.079	-0.218***
	(-1.057)	(-1.667)	(-1.663)	(1.387)	(-1.140)	(-1.619)	(-1.377)	(2.089)	(0.375)	(-0.205)	(-1.125)	(-2.700)
Debt$_{t-1}$	0.020	-0.007	-0.002	-0.052***	0.003	-0.024	-0.016	-0.060***	0.018***	0.017***	0.014***	0.008*
	(1.212)	(-0.371)	(-0.143)	(-2.931)	(0.162)	(-1.242)	(-1.018)	(-3.300)	(3.820)	(3.878)	(3.872)	(1.779)
Interest rate	0.055	0.109	0.184**	0.233**	-0.007	0.039	0.141	0.219**	0.062**	0.070**	0.042*	0.013
	(0.502)	(0.952)	(2.093)	(2.271)	(-0.065)	(0.347)	(1.564)	(2.175)	(2.184)	(2.414)	(1.877)	(0.517)
BBR	2.360***	1.710***	1.521***	2.727***	1.976***	1.350***	1.184***	2.420***	0.384**	0.360**	0.334***	0.306
	(4.604)	(3.357)	(3.504)	(4.908)	(4.224)	(2.901)	(2.916)	(4.659)	(2.365)	(2.291)	(2.970)	(1.526)
Govfrac	-0.133	-0.517	1.294	2.071**	-0.859	-1.316	0.683	1.497	0.726***	0.799***	0.596***	0.574**
	(-0.167)	(-0.545)	(1.496)	(2.034)	(-1.094)	(-1.360)	(0.753)	(1.495)	(2.793)	(3.291)	(3.058)	(2.298)
Election	-0.200	-0.148	-0.118	-0.202	-0.242	-0.193	-0.155	-0.257	0.042	0.046	0.036	0.055
	(-0.894)	(-0.654)	(-0.546)	(-0.874)	(-1.131)	(-0.882)	(-0.735)	(-1.107)	(0.624)	(0.695)	(0.645)	(0.868)
Left	-0.000	-0.001	-0.001	0.004	0.002	0.002	0.002	0.006	-0.002**	-0.003***	-0.003***	-0.002*
	(-0.039)	(-0.137)	(-0.177)	(0.974)	(0.543)	(0.466)	(0.557)	(1.424)	(-2.152)	(-2.717)	(-3.161)	(-1.838)
R2-Within	0.727	0.692	0.650	0.685	0.723	0.677	0.632	0.667	0.312	0.342	0.320	0.334
F-test	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hansen *J* test	0.282	0.634	0.261	0.865	0.333	0.357	0.662	0.677	0.385	0.197	0.154	0.124
Group No.	18	18	19	19	18	18	19	19	18	18	19	19
Obs. No.	333	333	403	307	333	333	403	307	333	333	402	307

Note: See Table 2.

Table 5: The OLS estimation results of baseline model (2)

	Consolidated budget balance				*Central budget balance*				*Local budget balance*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Expdec	0.208***				0.218***				-0.010			
	(4.02)				(4.68)				(-0.70)			
Expdec*Banking crisis	0.059*				0.064*				-0.004			
	(1.68)				(1.89)				(-0.57)			
Revdec		-0.032				-0.055				0.023		
		(-0.26)				(-0.44)				(1.03)		
Revdec*Banking crisis		0.049				0.051				-0.002		
		(1.06)				(1.16)				(-0.21)		
Taxrevdec			0.039				-0.016				0.055***	
			(0.52)				(-0.23)				(3.70)	
Taxrevdec*Banking crisis			0.039				0.031				0.008	
			(0.84)				(0.73)				(0.80)	
Fiscaleq				0.056				0.032				0.024**
				(1.41)				(0.88)				(2.02)
Fiscaleq*Banking crisis				0.004				-0.002				0.007
				(0.22)				(-0.12)				(1.17)
Banking crisis	-3.504***	-3.107***	-2.611***	-1.433	-3.709***	-3.230***	-2.590***	-1.221	0.205	0.123	-0.020	-0.212
	(-2.82)	(-2.80)	(-2.91)	(-1.37)	(-3.06)	(-2.93)	(-2.92)	(-1.17)	(0.70)	(0.53)	(-0.10)	(-0.60)
Pop (log)	-27.144	-31.776	-37.777	-26.167	-26.388	-31.099	-38.197	-25.585	-0.757	-0.677	0.420	-0.582
	(-1.29)	(-1.23)	(-1.54)	(-1.32)	(-1.37)	(-1.22)	(-1.54)	(-1.39)	(-0.18)	(-0.16)	(0.13)	(-0.14)
Debt_{t-1}	0.034	0.005	-0.000	-0.018	0.023	-0.008	-0.015	-0.028	0.011	0.013*	0.014**	0.010
	(1.01)	(0.16)	(-0.01)	(-0.52)	(0.73)	(-0.27)	(-0.43)	(-0.82)	(1.34)	(1.76)	(2.28)	(1.05)
Interest rate	0.229*	0.269**	0.175	0.175*	0.185	0.223	0.133	0.170	0.044	0.046	0.042	0.005
	(1.82)	(2.04)	(1.63)	(1.67)	(1.32)	(1.48)	(1.07)	(1.50)	(1.20)	(1.13)	(1.15)	(0.17)
Depratio	-0.139	-0.025	-0.081	-0.215	-0.128	0.001	-0.055	-0.158	-0.012	-0.026	-0.025	-0.057
	(-0.69)	(-0.11)	(-0.37)	(-0.91)	(-0.61)	(0.01)	(-0.24)	(-0.66)	(-0.32)	(-0.69)	(-0.82)	(-1.55)
GDP growth_{t-1}	0.121	0.263	0.259	0.131	0.134	0.283	0.255	0.103	-0.014	-0.020	0.005	0.027
	(0.91)	(1.58)	(1.56)	(0.86)	(0.91)	(1.53)	(1.37)	(0.65)	(-0.37)	(-0.49)	(0.11)	(0.57)
Unemp	-0.467***	-0.534***	-0.522***	-0.434***	-0.416***	-0.491***	-0.474***	-0.398***	-0.051	-0.044	-0.048	-0.036
	(-3.86)	(-3.02)	(-3.75)	(-3.10)	(-3.35)	(-2.75)	(-3.39)	(-2.61)	(-1.52)	(-1.39)	(-1.58)	(-1.08)
Trade openness	-0.043	-0.054	-0.033	0.027	-0.057	-0.069	-0.048	0.005	0.013**	0.015***	0.015***	0.022***
	(-0.75)	(-0.99)	(-0.55)	(0.56)	(-1.05)	(-1.34)	(-0.84)	(0.12)	(2.55)	(2.86)	(2.63)	(2.90)
Financial openness	-0.266	-0.018	-0.524	0.485	-0.217	0.077	-0.445	0.653	-0.049	-0.095	-0.079	-0.168*
	(-0.35)	(-0.02)	(-0.75)	(0.83)	(-0.29)	(0.09)	(-0.60)	(1.14)	(-0.47)	(-0.84)	(-0.84)	(-1.73)
BBR	2.425***	1.934**	1.450**	1.922**	2.072***	1.541**	1.126*	1.636**	0.354**	0.393**	0.323**	0.287
	(3.37)	(2.52)	(2.04)	(2.44)	(2.96)	(2.08)	(1.65)	(2.06)	(2.00)	(2.25)	(2.46)	(1.59)
Govfrac	0.305	0.575	1.045	0.390	-0.051	0.161	0.443	-0.204	0.355	0.414	0.602**	0.593*
	(0.23)	(0.49)	(0.73)	(0.22)	(-0.04)	(0.14)	(0.28)	(-0.11)	(1.10)	(1.37)	(2.26)	(1.69)
Election	-0.112	-0.138	-0.100	-0.187	-0.161	-0.189	-0.139	-0.249	0.049	0.051	0.040	0.062
	(-0.49)	(-0.57)	(-0.46)	(-0.92)	(-0.76)	(-0.84)	(-0.69)	(-1.30)	(0.71)	(0.75)	(0.67)	(1.15)
Left	-0.006	-0.003	-0.000	0.001	-0.003	-0.001	0.002	0.003	-0.002*	-0.003*	-0.003***	-0.002*
	(-0.76)	(-0.35)	(-0.05)	(0.08)	(-0.48)	(-0.06)	(0.31)	(0.33)	(-1.68)	(-1.84)	(-3.13)	(-1.84)
R2-Within	0.713	0.676	0.654	0.688	0.707	0.662	0.635	0.676	0.296	0.296	0.324	0.393
F-test	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
F-test $\alpha = \phi = \varphi$	0.000	0.019	0.002	0.173	0.000	0.012	0.005	0.122	0.601	0.718	0.009	0.135
$\alpha + \phi$	0.268***				0.282***							
Group No.	18	18	19	19	18	18	19	19	18	18	19	19
Obs. No.	369	369	405	336	369	369	405	336	369	369	405	336

Note: See Table 1.

Table 6: The 2SLS estimation results of baseline model (2)

	Consolidated budget balance				*Central budget balance*				*Local budget balance*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Expdec	0.286***				0.259***				0.027*			
	(3.40)				(3.09)				(1.88)			
Expdec*Banking crisis	0.056**				0.067**				-0.011**			
	(2.00)				(2.48)				(-1.97)			
Revdec		0.016				-0.014				0.030		
		(0.17)				(-0.15)				(1.16)		
Revdec*Banking crisis		0.062*				0.064**				-0.002		
		(1.92)				(2.08)				(-0.28)		
Taxrevdec			0.058				0.003				0.053***	
			(1.02)				(0.05)				(5.07)	
Taxrevdec*Banking crisis			0.040				0.032				0.008	
			(1.25)				(1.04)				(1.44)	
Fiscaleq				0.111***				0.107***				0.004
				(3.04)				(3.05)				(0.45)
Fiscaleq*Banking crisis				0.016				0.009				0.007*
				(0.85)				(0.47)				(1.68)
Banking crisis	-2.964***	-3.185***	-2.648***	-2.530**	-3.502***	-3.353***	-2.624***	-2.190*	0.538**	0.168	-0.027	-0.340
	(-2.90)	(-3.68)	(-3.81)	(-2.01)	(-3.46)	(-3.85)	(-3.71)	(-1.70)	(2.378)	(0.987)	(-0.203)	(-1.34)
Pop (log)	-26.725**	-38.771***	-36.672***	-34.444***	-26.856**	-38.164***	-37.170***	-30.529***	0.131	-0.607	0.444	-3.915
	(-2.43)	(-2.69)	(-2.73)	(-3.80)	(-2.47)	(-2.62)	(-2.69)	(-3.57)	(0.06)	(-0.30)	(0.23)	(-1.58)
Depratio	-0.099	-0.043	-0.085	-0.096	-0.057	0.006	-0.059	-0.055	-0.042*	-0.048**	-0.025	-0.041
	(-0.90)	(-0.41)	(-0.91)	(-0.98)	(-0.53)	(0.06)	(-0.62)	(-0.56)	(-1.65)	(-2.08)	(-1.16)	(-1.57)
GDP growth$_{t-1}$	0.170	0.339**	0.280*	0.125	0.230*	0.388**	0.274*	0.106	-0.059**	-0.049*	0.005	0.019
	(1.27)	(2.02)	(1.93)	(1.07)	(1.74)	(2.27)	(1.85)	(0.92)	(-2.11)	(-1.76)	(0.21)	(0.64)
Unemp	-0.534***	-0.589***	-0.495***	-0.229**	-0.476***	-0.519***	-0.448***	-0.204*	-0.058*	-0.070**	-0.048**	-0.025
	(-6.92)	(-6.74)	(-6.67)	(-2.20)	(-6.02)	(-5.49)	(-5.70)	(-1.90)	(-1.92)	(-2.32)	(-2.00)	(-0.75)
Trade openness	-0.041	-0.057	-0.031	0.001	-0.060*	-0.075*	-0.046	-0.011	0.018***	0.019***	0.015***	0.012*
	(-1.20)	(-1.26)	(-0.76)	(0.04)	(-1.74)	(-1.66)	(-1.11)	(-0.51)	(3.01)	(3.21)	(2.99)	(1.73)
Financial openness	-0.569	-0.913	-0.585*	0.484	-0.616	-0.888	-0.504	0.706**	0.047	-0.025	-0.080	-0.221***
	(-1.13)	(-1.64)	(-1.68)	(1.36)	(-1.24)	(-1.59)	(-1.39)	(2.07)	(0.41)	(-0.22)	(-1.14)	(-2.73)
Debt$_{t-1}$	0.030*	-0.003	-0.002	-0.055***	0.014	-0.019	-0.016	-0.062***	0.016***	0.017***	0.014***	0.007
	(1.82)	(-0.14)	(-0.13)	(-2.98)	(0.88)	(-1.07)	(-1.01)	(-3.28)	(3.39)	(3.81)	(3.89)	(1.48)
Interest rate	0.059	0.111	0.182**	0.222**	-0.002	0.041	0.139	0.214**	0.061**	0.070**	0.042*	0.009
	(0.55)	(0.98)	(2.08)	(2.16)	(-0.02)	(0.37)	(1.55)	(2.12)	(2.18)	(2.42)	(1.86)	(0.33)
BBR	2.145***	1.442***	1.448***	2.766***	1.718***	1.073**	1.127***	2.442***	0.427***	0.368**	0.318***	0.324
	(4.26)	(2.74)	(3.26)	(4.95)	(3.77)	(2.20)	(2.69)	(4.70)	(2.61)	(2.24)	(2.79)	(1.61)
Govfrac	-0.209	-0.467	1.304	1.977*	-0.950	-1.265	0.691	1.446	0.742***	0.798***	0.601***	0.531**
	(-0.27)	(-0.50)	(1.51)	(1.93)	(-1.23)	(-1.33)	(0.76)	(1.44)	(2.84)	(3.29)	(3.06)	(2.10)
Election	-0.175	-0.140	-0.118	-0.208	-0.212	-0.186	-0.155	-0.260	0.037	0.045	0.037	0.052
	(-0.78)	(-0.62)	(-0.55)	(-0.90)	(-1.00)	(-0.85)	(-0.74)	(-1.13)	(0.55)	(0.69)	(0.65)	(0.82)
Left	-0.001	-0.000	-0.000	0.004	0.001	0.002	0.002	0.006	-0.002**	-0.003***	-0.003***	-0.002*
	(-0.21)	(-0.11)	(-0.06)	(0.98)	(0.34)	(0.50)	(0.65)	(1.42)	(-2.06)	(-2.73)	(-3.09)	(-1.82)
R2-Within	0.736	0.699	0.653	0.685	0.733	0.685	0.634	0.668	0.310	0.343	0.324	0.340
F-test	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
F-test $\alpha = \phi = \varphi$	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.060	0.580	0.000	0.385
$\alpha + \phi$	0.342***	0.078		0.127***	0.326***	0.050		0.115***	0.016		0.061***	
Hansen J test	0.287	0.754	0.257	0.978	0.338	0.443	0.662	0.615	0.405	0.203	0.141	0.162
Group No.	18	18	19	19	18	18	19	19	18	18	19	19
Obs. No.	333	333	403	307	333	333	403	307	333	333	402	307

Note: See Table 2.

A Appendix

A.1 Data source and variables definition

Table 7: Data source and variable definition

Variable	*Data description*	*Data source*
Consolidated budget balance	General government net lending (+)/net borrowing (-) as percentage of GDP.	Own calculations on OECD Fiscal decentralization Database.
Central budget balance	Central government net lending (+)/net borrowing (-) as percentage of GDP.	OECD Fiscal decentralization Database.
Local budget balance	Sub-central governments net lending (+)/net borrowing (-) as percentage of GDP.	OECD Fiscal decentralization Database.
Expdec	The percentage of sub-central government expenditures minus the intergovernmental transfer spending of that government level divided by consolidated general government expenditures.	OECD Fiscal decentralization Database.
Revdec	The percentage of sub-central government revenues minus the intergovernmental transfer revenues of that government level divided by consolidated general government revenues.	OECD Fiscal decentralization Database.
Taxrevdec	Sub-central tax revenue as percentage of consolidated general government tax revenue.	OECD Fiscal decentralization Database.
Fiscaleq	Sub-central government own source revenue as a share of sub-national expenditures.	The World Bank Fiscal decentralization indicators.
Banking crisis	Dummy equal to 1 for year of banking crisis.	Laeven and Valencia (2013).
Pop	Population, total.	World Development Indicators (WDI hereafter).
Depratio	Age dependency ratio as percentage of working-age population.	WDI.
GDP growth	Growth of real GDP, percent change.	Armingeon et al. (2014).
Unemp	Unemployment rate as a percentage of civilian labour force.	Armingeon et al. (2014).
Trade openness	Sum of import and export as percentage of GDP	WDI.
Financial openness	The Chinn-Ito index for the degree of openness in capital account transactions.	Armingeon et al. (2014).
Debt	Gross public debt, percent of GDP.	Mauro et al. (2013).
Interest rate	Short-term real interest rate.	OECD.
BBR	Dummy equal to 1 for national budget balanced rule.	Schaechter et al. (2012).
Govfrac	The probability that two deputies picked at random from among the government parties will be of different parties.	Database of Political Institutions (2012).
Election	Dummy equal to 1 for year of national legislative election.	Database of Political Institutions (2012).
Left	Social-democratic and other left parties in percentage of total cabinet posts, weighted by days.	Armingeon et al. (2014).

A.2 Descriptive statistics

Table 8: Descriptive statistics

Variable	*Obs.*	*Mean*	*Std. Dev.*	*Min*	*Max*
Consolidated budget balance	442	-2.51	4.81	-30.61	18.79
Central budget balance	442	-2.11	4.70	-30.68	20.01
Local budget balance	442	-0.40	0.75	-4.47	1.35
Expdec	400	36.75	14.28	4.05	66.45
Revdec	400	24.35	15.13	2.43	55.23
Taxrevdec	588	17.74	13.99	0.76	49.22
Fiscaleq	468	62.69	21.25	18.60	97.70
Banking crisis	589	0.17	0.37	0	1
Pop (thousand)	589	36798	59219	3413	309300
Depratio	589	50.52	3.98	43.30	70.02
GDP growth	570	2.34	2.31	-8.54	11.63
Unemp	589	7.69	3.87	0.18	24.17
Trade Openness	589	70.04	32.26	16.57	183.81
Financial Openness	572	1.71	1.10	-1.86	2.44
Debt	570	58.36	26.00	9.63	134.07
Interest rate	589	7.40	5.00	0.19	24.90
BBR	494	0.63	0.48	0	1
Govfrac	589	0.30	0.28	0.00	0.83
Election	589	0.29	0.46	0	1
Left	589	36.76	38.57	0.00	100.00

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