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**DOES GLOBALIZATION MATTER ON FISCAL
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Abstract

In this paper we re-examine the effects of globalization on fiscal decentralization of OECD by using the overall KOF index of globalization and its main subcomponents — economic, political and social integration. Using different indicators of fiscal decentralization, we find a positive impact of the overall index of globalization on both revenue and expenditure decentralization side, although not robust across different panel data specifications. Focusing on the links between decentralization and different aspects of globalization, we find that both economic and social integration foster fiscal decentralization, whereas political integration checks growth of it.

Keywords: Globalization; Economic integration; Political integration; Social integration; Fiscal decentralization; Panel data analysis

JEL Classification: F5, F15, H7, H87

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1 Introduction

Decentralization of authority to local governments is a spreading trend observed over the last three decades across several OECD countries. The traditional theory of fiscal federalism (Tiebout, 1956; Oates, 1972) supports the idea that decentralization offers better possibilities to accomplish higher levels of preferences heterogeneity in the population. A different explanation is suggested by the more recent political economy literature, which shows that high levels of heterogeneity in a large and economically integrated country are associated to a higher demand for decentralization in order to forestall secessions of minority groups and rich regions. In particular, following the literature on separatism and the formation and redrawing of political borders (Alesina and Spolaore, 1997; Bolton and Roland, 1997; Alesina et al., 2000), it can be addressed the relationship between globalization and decentralization. It has been suggested that economic integration may change incentives for regional government autonomy, both in the form of secessionism of small regions or decentralization. Economic integration reduces the benefits of scale economies of a large jurisdiction but not the cost of heterogeneity. In fact, international integration of markets can lower obstacles to fragmentation of central authority by reducing the economic costs of smallness, mainly related to the possibility to accrue economies of scale. This implies a positive correlation between decentralization and globalization. By contrast, several argumentations are offered to the opposite point of view that globalization can smooth the trend towards decentralization. It has been demonstrated that under globalization and correlated regional specialization, countries and their regions face a higher exposure to international unexpected asymmetric economic shocks, this generates demands for compensation through a more generous welfare system (the so-called “compensation hypothesis”).² Accordingly, Garrett and Rodden (2003) suggest that it may be expected a positive nexus between economic integration and fiscal centralization since macroeconomic stabilization and redistributive function of government are more efficient if pursued at the central government level.

Empirical evidence on the relationship between globalization and fiscal decentralization are scanty and controversial. Garrett and Rodden (2003) investigate the impact of trade and capital openness on sub-national shares of public revenues/expenditures on a panel of developed and developing countries. They find that globalization fosters fiscal centralization. Opposite conclusions are drawn for OECD countries by Stegarescu (2009), who finds that fiscal decentralization increases under economic integration. This author also explores the impact of political integration on fiscal decentralization. He argued that political integration promotes the removal of trade and factor movements, thus it fosters the positive impact of economic integration on decentralization. Moreover, political integration reduces the costs of smallness, thus increasing the incentive to efficient decentralization, since certain public goods are provided more economically by a super-national authority at a larger scale. Table 1 illustrates the indicators of globalization adopted in the two empirical studies and summarizes their main results. According to the table, we observe that the difference in the results between the two studies are more striking when the relationship between trade openness and fiscal decentralization is concerned.

The current paper contributes to the existing literature on the link between globalization and fiscal decentralization by re-examining the effects of globalization on fiscal decentralization of OECD with the adoption of the overall KOF index of globalization (Dreher, 2006b; Dreher et al, 2008) in empirical analysis. This indicator is more accurate and comprehensive than those employed by Garret and Rodden (2003) and Stegarescu (2009) since it accounts for the combined effect of several economic, social and political integration

² See Rodrick (1998), Persson and Tabellini (1996).

aspects. On the contrary, the indicators used in the two previous studies consider the impact of single aspects of globalization, such as trade or financial openness, avoiding to capture the effects due to the interconnections across them. We also account for the specific effects played on fiscal decentralization by economic, political and social integration using the main subcomponents of the overall KOF index. To our knowledge, the implication of social integration has not been previously analysed, although it may offer interesting implications. Firstly, social cohesion stimulates the inter-jurisdictions mobility of people, workers and firms across jurisdictions, putting pressures towards local governments to ask for more fiscal autonomy in order to compete for attracting tax base inside jurisdictions. Secondly, social integration can strength the demand for the preservation of local cultural identity from minority groups, involving the intervention of local governments.

In our empirical analysis we use a panel of 23 countries for the period 1975-1999. As indicators of fiscal decentralization we employ tax revenue and revenue decentralization index developed by Stegarescu (2004, 2005) that account for local government fiscal autonomy. Moreover, we also adopt more traditional indexes of revenue and expenditure decentralization provided by the International Monetary Fund's (IMF) Government Finance Statistics (GFS). We perform both static and dynamic panel data analysis in order to obtain more robust results. Empirical evidence shows that fiscal decentralization is positively and significantly correlated with the overall index of globalization, even if results are more robust when the static panel analysis is carried on. Economic integration is significantly associated to higher demand for local autonomous taxation in both the static and dynamic panel analysis. Our result confirms Stegarescu's (2009) evidence on the OECD conducted with different indicators of economic integration. We also find a significant negative correlation between the KOF index of political integration and revenue decentralization, although, only in the panel dynamic analysis. This result is in contrast with Stegarescu's (2009) evidence. On the side of social integration, a positive and significant impact of the KOF index of social integration on fiscal decentralization is shown in both the static and dynamic analysis. This effect may reflect the willingness of subnational governments to reinforce their competitiveness and to safeguard local cultural identity. Cultural proximity and the removal of linguistic and information barriers can favor inter-jurisdictional mobility of productive factors across countries, exacerbating local governments competition and increasing the demand for fiscal decentralization. Increasing social integration can also stress the necessity of promoting local identity as preventing international cultural homologation. Thus, fiscal decentralization may be invoked as a way to regain local interests representation. The evidence on social integration is particularly interesting because adds a new issue in the political economy literature that deserves a thorough investigation.

The remaining of the paper is articulated as follows: section 2 illustrates the literature on the links between fiscal decentralization and the features of globalization; section 3 describes data and variables; section 4 illustrates econometric analysis; section 5 concludes.

Tab. 1 The empirical evidence on the relationship between fiscal decentralization and globalization

Author	Sample	Method	FD index	Econ. Integr. index	Political Integr. index
Garret and Rodden (2003)	48 developed developing countries, 1978-1997	Cross-section; Pooled	The IMF's GFS expenditure and revenue decentralization index	Trade openness (-*) (=Export+Import/GDP) Capital account openness (-*) (1= open; 0= no)	
Stegarescu (2009)	23 OECD countries, 1965-2001	Fixed-effects	Tax revenue decentralization index (Stegarescu, 2004, 2005) The IMF's GFS expenditure decentralization index	Trade openness (+*) (=Export+Import/GDP) EU trade (=the share of export plus import to/from EU countries on total foreign trade) The Quinn/Inclan financial openness index (+ ^a *)	EU expenditure (EU expenditure in % of total public expenditure of EU countries) interacted with EU dummy ('Sandwich hypothesis.') (+ ^a) EU integration index

Legend: (+*/-*) is the sign of the statistically significant coefficient; a= coefficient is statistically significant only on the side of expenditure decentralization.

2 Decentralization and the many dimensions of globalization

In the modern world, economic integration is one manifest aspect of globalization. When related to decentralization, the major challenge is to provide additional empirical evidence in order to shed light on divergent theoretical views which demonstrate that both centralization and decentralization incentives can be associated with market integration. From one side, economic integration can be responsible of a political ‘disintegration’ due to the emergence of secession movements. According to the literature on political separatism (Alesina and Spolaore, 1997; Alesina et al. 2000), economic openness lowers the benefits of minority groups of the population, like ethnic, cultural and linguistic groups, to keep joining a larger political jurisdiction. The benefits of scale economies obtained by a large jurisdiction from the spread of the costs of certain public goods (like defence, internal security, judicial system, education, large public investments) over many taxpayers is significantly reduced in global market but not the costs of satisfying heterogeneous preferences in a large population. Smaller groups therefore have convenience in the formation of an independent and more homogeneous political jurisdictions (Alesina et al., 2000). In countries with geographically concentrated minority groups or high levels of income inequality between regions, economic integration strengthens, and make them more credible, secession threats (Garret and Rodden, 2003). Under these circumstances, decentralization represents a less costly alternative to secessionist movements and it may be generally preferred and implemented. Decentralization can be an attractive and less costly solution to avoid secessionism in large countries (Bolton and Roland, 1997) because it allows regions to implement own economic and political strategies and minority groups to represent and satisfy better their own interests. On the other side, economic integration can increase regional economic risks (Rodrik, 1998) and regional exposure to asymmetric shocks. This produces an increase in the demand for interregional risk-sharing and income redistribution provided by central government (Persson and Tabellini, 1996). It has been argued that economic integration increases the demand for social protection and government welfare policies against economic insecurity and volatility externally generated (Cameron, 1978; Rodrik, 1998). Indeed, it is optimal to pursue stabilization policies at central government level to recover from aggregate shocks, to guarantee inter-regional risk sharing policies in response to region specific shocks and to accomplish with redistribution those regions which are structurally penalized by economic integration. Basically, centralization may best respond to sub-national government demand for protection against economic uncertainty and risk insurance.

Considering globalization in term of political cohesion, there are some reasons to assume a positive link between political integration and fiscal decentralization. Making particular reference to the UE experience, Stegarescu (2009) suggests that political integration is likely to promote decentralization of power to lower levels of government. He argues that the costs of smallness are even reduced under political integration given that, according to the ‘Sandwich hypothesis’, we observe a supranational authority which operates on a very large scale of several member countries to provide certain public goods and services. Moreover, the same mechanism that squeezes central government authority between the strengthening of the supra-national body and the increasing influence of the sub-national governments is a catalyst for demand of higher degree of decentralization emerging from below within member countries.¹ Notwithstanding, empirical estimates provided by Stegarescu (2009) offer only partial evidence to these argumentations. The more robust result he finds in this regard is that “There is only some limited evidence for the ‘Sandwich’ hypothesis [...]. Political integration

¹ Tanzi (2008) has stressed that globalization reduces the importance of national governments by devolving tax power to supra-national institutions and sub-national governments.

as measured by EU expenditure exerts a positive effect on decentralization of both expenditure and tax-raising powers in linguistically heterogeneous EU countries” (p. 714). Considerations in favor of a negative nexus between political integration and fiscal decentralization can be built on Dreher’s (2006a) argumentations. Political integration can confine the effects of tax competition produced by economic integration. Briefly speaking, economic integration favours inter-countries and interregional mobility of factors of production that leads to a high competitive environment (Dreher, 2006a). As an attempt to attract tax base, regions may be willing to enjoy larger fiscal autonomy and tax power to reduce tax rate, which can translate into a higher demand for decentralization.² A race to the bottom can take place. Political integration can reduce the stress of competition by means of tax harmonization policies³ and informal or formal agreements that leads less room for local fiscal autonomy. This means that an increase in political integration can result in a reduced trend for decentralization. Given that theoretical literature proposes conflicting expectations, it is left to empirical analysis to assess the effect of political integration.

In previous studies on the nexus between globalization and fiscal decentralization emerges a lack of evidence on the link between social integration and fiscal decentralization. Social integration can be interpreted as cultural proximity, share of common habits among citizens of different countries and easiness of exchange of information that facilitates the creation of communicative networks. Higher level of social integration facilitates the approval of common commercial agreements together with inter-jurisdictional mobility of people and firms. Under these circumstances, it is likely that sub-national level of governments ask for more autonomy from the central government in order to compete for attracting resources and tax base from elsewhere. In this case a positive effect of social integration in fiscal decentralization can be expected. A positive nexus between decentralization and social integration can be assumed also on the basis of a different reasoning. Firstly, a recent socio-economic and cultural debate is stressing the importance of the so-called ‘glocalization’, initially conceptualized by Robertson (1992). This neologism, that merges the terms of globalization and localization, resumes features of global processes and strategies incorporated into the local setting (Shamsuddoha, 2008). According to CERFE et al. (2003, p. 2) glocalization “aims to integrate the strong powers of global governance, that largely fails to realize the importance of cultural diversity and the strength of the local dimension, with the powers of local governance, often dangerously left to their own devices; [...] The ultimate aim of this design is to base international stability, not on a new warfare pattern but on a shared and general “peace-building” activity, seen as an indispensable precondition for economic and social development. In this way, a virtuous circle can be activated that will eventually result in a realistic foundation for the sustainability of peace”. This approach emphasizes the relevance of links to global surroundings and networks, that is the importance of international socio-cultural integration, while empowering local communities and improving local resources value, also by developing and promoting distinctiveness and local cultural identity against an unwanted imposition of uniformity. It requires incorporating and combining both global and local interests and needs while taking advantages of international opportunities. Increasing social integration, therefore, can stress the necessity of recovering elements of local identity as preventing international cultural homologation. Under such

² A recent theoretical model by Liberati and Sciala (2011) has shown that economic integration can change the vertical structure of the public sector size when it induces a reduction in central government tax revenue. In this circumstance, they show that economic integration produces a reduction in the level of general (central) government expenditure and an increase in both local government taxation and the degree of public sector decentralization.

³ Tanzi (1999, 2008) has highlighted the necessity of supra-national tax coordination across integrated countries to mitigate the effects of tax competition and to provide ‘global’ public goods.

pressures, the promotion of decentralization appears as the natural political strategy to implement more accountable and democratic governance in order to increase the participation of local authorities and stakeholders and to give voice to local heterogeneity within a context of shared social values and habits among countries. Secondly, socially integrated countries are more willing to avoid conflict and to live peacefully (Colletta and Cullen, 2000; Colletta et al., 2001). It has been observed that decentralization can be conceived as an instrument for peace building and, especially in a situation where peace already exists, as in the large part of OECD countries under analysis, for sustaining and enhancing stability (Kauzya, 2005).⁴ A possible reason why decentralization helps to reduce conflicts is that it allows minority group to be better represented and to enhance their perceptions of citizenship, preventing social exclusion, inter-group grievances and conflicts over public goods and services provision (Scott, 2009). As a result, more socially integrated countries could demand higher level of decentralization with the purpose to promote prospects for peace and, as a reinforce mechanism, to enhance social cohesion. Nevertheless, Sharma (2009) highlights that glocalization is generating tendencies towards supranational governance and centralization on one side and for localization and decentralization on the other side. Whether social integration enhances or reduces the transfer of power to sub-national governments is in the main an unresolved question in theory, calling for empirical work.

3 Data and variables

Different indicators of fiscal decentralization are used in the empirical analysis. Accordingly, we employ the tax revenue decentralization index (TAXREVDEC) as well as the revenue decentralization index (REVDEC), both released by Stegarescu (2004, 2005) for a set of 23 OECD countries for the period 1965/75-2001. They are computed by including only autonomous taxes and own revenue sources where sub-central governments have discretion over autonomous tax rate, autonomous tax base or both.⁵ We adopt these indicators for our empirical analysis since they are more accurate to describe the real local government autonomy and thus the real extent of fiscal decentralization. In fact, it has been asserted that aggregate budgetary data do not reflect the real assignment of functions, resources and decision-making powers to different levels of government and, thus, the fiscal autonomy of sub-central governments (Stegarescu, 2005). We also compare these results with those obtained by employing a commonly used proxy for the vertical government structure, that is the shares of sub-national revenue (REVDEC_GFS) and expenditure (EXPDEC) on total government revenue and expenditure⁶, respectively, as released by the IMF's GFS. These traditional indicators are criticized because they overestimate the degree of fiscal decentralization (Ebel and Yilmaz, 2003; Stegarescu, 2004, 2005). In fact, expenditure decentralization index includes expenditure decisions mandated by central government while revenue decentralization indicators do not discriminate among piggybacked taxes, shared taxed and locally determined own taxes. Accordingly, the IMF's GFS indicators identify a kind of fiscal decentralization where local fiscal responsibilities are shared by both central and local government. Therefore, compared to Stegarescu's indicators, they are less specific as

⁴ Actually, Kauzya (2005) is sceptical about the effectiveness of decentralization to enforce peace where the framework of the shared exercise of power does not ensure that several actors play for the well-being of each citizen and where hostility over power sharing prevails, such as in a situation of war.

⁵ Unfortunately, we can only use data on tax and revenue decentralization since those of expenditure decentralization are not available in Stegarescu (2004, 2005).

⁶ Both sub-national and total government expenditure do not include current and capital transfers to other levels of government.

proxy of local government fiscal autonomy but, given that the GFS' indicators are widely used in empirical analysis, they represent a useful benchmark/standard for robustness analysis and for comparison with other studies.

To explore the nexus between globalization and fiscal decentralization we use the overall KOF index of globalization (Dreher, 2006b; Dreher et al, 2008). This indicator is more appropriate than previous ones since it subsumes different features of globalization in a unique index. In previous empirical studies (Garret and Rodden, 2003; Stegarescu, 2009), the share of import and export in gross domestic product has been adopted as indicator of economic integration. Additionally, a dummy variable for country restrictions on capital account transactions and the Quinn-Inclan index have been employed to measure financial openness (see Tab. 1). These indicators capture only peculiar or circumscribed effects of globalization and do not account for the whole and more complex effect of globalization due to interaction of economic phenomena. On the contrary, the KOF index is developed on the basis of 23 variables.⁷ These variables cover several elements of globalization, ranging from intensity and restriction of economic flows to number and typology of personal contacts and to political engagement among countries. The whole set of variables are then summarized into three sub-indices, i.e. economic, political and social globalization index, and an overall index of globalization. The indexes are composite indicators since they account for multiple and different aspects of globalization. It can be assumed that they better depict a complex concept such as globalization than single and partial indicators. Therefore, we believe that the adoption of these indexes permits to study the impact of the integration process on fiscal decentralization in a more accurate manner. Accordingly, we take as independent variables the overall (GlobKOF) and the three different KOF indexes of globalization in order to test the impact of globalization as a whole and distinct economic, political and social integration in fiscal decentralization. The KOF index related to economic integration (EconKOF) resumes information about actual flows (i.e., trade, foreign direct investment, portfolio investment, income payments to foreign nationals) and economic restrictions (i.e., hidden import barriers, mean tariff rate, autonomous taxes on international trade and capital account restrictions). The determinants of the political KOF index of integration (PolKOF) are the presence of embassies in a country, the joining of international treaties, the membership in international organizations and the participation in U.N. Security Council Missions. Finally, the social KOF index of globalization (SocKOF) is elaborated on the basis of data on: i) personal contacts, measured in terms of telephone traffic, transfers on GDP, international tourism, foreign population on total population, international letters per capita; ii) information flows, based on internet users, television, trade in newspapers as percent of GDP; iii) cultural proximity, measured as number of McDonald's restaurants, number of Ikea, and trade in books. Finally, the overall KOF index of globalization (KOF) is obtained by a weighting procedure of the previous sub indexes according to the technique of the principal components analysis. These indexes range from 0 to 100, where higher values denotes higher degree of globalization.

As control variables we include population size (POP) and the percentage of population who live in urban area (URBAN).⁸ According to Litvack and Oates (1970) and Wallis and Oates (1988), a positive correlation between population size and fiscal decentralization may be expected. They also argue that a more concentrated population in urban area is associated to a more economically provision of a wider range of public services at the local level of government. Accordingly, fiscal decentralization should increase when a large share of a state's population lives in urban areas. Another indicator of population used in empirical

⁷ For an upgrade of data source see Dreher et al. (2008).

⁸ See Letelier (2005) for past empirical evidence on the determinants of fiscal decentralization.

analysis is represented by the share of population under 15 years old (YOUNG). A positive impact of this indicator on fiscal decentralization is consistent with the explanation that public goods and services (such as schooling) benefited by young people are more efficiently provided by sub-national governments because of heterogeneous preferences. On the other hand, a negative effect may be consistent with the presence of economies of scale in the provision of public goods benefited by young people, making prevail a uniform level provision from central government.

We also control for the ‘heterogeneity’ hypothesis (Oates, 1972). Accordingly, a higher degree of heterogeneity in the population leads to a more efficient decentralized provision of public goods and services because they can be tailored on the preferences and tastes of citizens. This hypothesis is mainly tested by using the two following indicators of population homogeneity⁹ developed by Tanja Ellingsen (2000): the percentage of the largest linguistic (LING) and ethnic (ETH) group in the population. Ellingsen’s data have the advantage of covering a long time period (1945-1994) and, therefore, being very useful in panel data analysis. The disadvantage is that they are not developed for recent years. In the panel regressions, we also add per-capita gross domestic product (GDP) at constant 2000 US\$. With regard to GDP indicator, opposite effects on decentralization may emerge (Wallis and Oates, 1988). An increase in per capita income can be associated to a higher demand for a wider range of public services and goods at the local level. Accordingly, we may expect a positive correlation between fiscal decentralization and the GDP indicator (Panizza, 1999). On the other hand, a negative nexus between per capita income and fiscal decentralization can be also expected according to Wallis and Oates’ (1988, p. 15) hypothesis: “The higher the level of per capita income in a state the more centralized, other things equal, should be its public sector as a result of a higher level of involvement in redistributive programs”.

In our empirical analysis we use unbalanced panels of 23 OECD¹⁰ member countries for the period 1975-1999.¹¹ This makes our results strictly comparable with those of Stegarescu (2009). Basically, we focus our empirical investigation on the third phase of the globalization process started in 1980 and not yet concluded (Collier and Dollar, 2003). Since many OECD countries are federal and/or European Union (EU) members characterized by a common programme of social, economic and political integration,¹² we control for both institutional effects. As in Stegarescu (2009), the effects of the EU membership is captured by means of a dummy variable that assumes value 1 if country belongs to EU and zero otherwise. Following Cerniglia (2003), we control for the federal structure of government using FEDERAL variable that assumes values 1 and 2 if country has a weak and strong federal government structure, respectively, and zero otherwise. Since sub-national governments in federal countries have more autonomy in terms of both tax and spending decisions than those in unitary countries, a positive effect of FEDERAL is expected on fiscal decentralization.¹³

⁹ Indicators of population homogeneity are used in Wallis and Oates (1988) and Cerniglia (2003).

¹⁰ Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, United States.

¹¹ We use 23 OECD countries for the period 1975-1999 because Stegarescu’s (2004, 20005) data on fiscal decentralization are developed for this same set of countries and are not extended for more recent years. In our empirical analysis we consider a shorter time period to reduce the number of missing data in the sample.

¹² The adhesion to the European Economic and Monetary Union project and to the Schengen Agreement for a free circulation of people from several EU countries, together with the creation of the common market across EU countries have produced more integrated economies in the ‘old continent’.

¹³ Data sources and variable definitions are in appendix 1 whereas descriptive statistics are in appendix 2.

4 Econometric analysis

For a better comparison of our results with those of Stegarescu (2009), we estimate the relationship between fiscal decentralization and the many dimensions of integration according to the following empirical specification:

$$FDindex_{i,t} = c + \alpha KOFindex_{i,t} + \beta X_{i,t} + f_i + \tau_t + \mu_{i,t} \quad (1)$$

where the dependent variable *FDindex* corresponds to fiscal decentralization indexes for country *i* ($i=1, \dots, N$) at time *t* ($t=1, \dots, T$), that is TAXREVDEC, REVDEC, REVDEC^{GFS} and EXPDEC. The variable *KOFindex* corresponds to the KOF indicators of globalization: GlobKOF, EconKOF, PolKOF, SocKOF. Econometric specification (1) includes matrix *X* of control variables as illustrated in the previous section. All variables are transformed in natural logarithmic form with the exception of LING, ETHN and dummies. A constant term *c*, country fixed-effects f_i and time effects τ_t are included in model (1) as well as the iid error term μ .

As estimation approach of model (1), we use the ordinary least square (OLS) estimator with panel correct standard errors (PCSEs) (Beck and Katz, 1995, 1996).¹⁴ This procedure corrects for the presence of panel heteroskedasticity, panel autocorrelation and contemporaneous cross-sectional correlation which have been detected by performing tests.¹⁵ In tables 2-5 we report the OLS-PCSEs estimation results of the panel static model for each fiscal decentralization indicator. We estimate model (1) with and without the inclusion of Ellingsen's indicators of ethno-linguistic homogeneity in order to extend the time length of our sample up to 1999. In fact, these indicators are developed up to 1994, with a relevant reduction in the time length of the time-series cross-section data. According to the F test results, country fixed-effects are statistically significant and, therefore, are not removed in the panel regressions.¹⁶ Focusing on the panel static estimation results reported in columns 1-2 of tables 2-5, it emerges that globalization is positively and significantly correlated with fiscal decentralization. The coefficient of GlobKOF assumes positive and statistically significant signs with the only exception of estimation results concerning to TAXREVDEC. Moving to analyse the main subcomponents of GlobKOF index, we can observe that the overall correlation between globalization and decentralization is mainly driven by economic and social integration aspects. In particular, we observe that the coefficient of the EconKOF index (col. 3-4, tabb. 2-5) assumes a positive and significant sign in all panel static regressions with the larger impact on TAXREVDEC, comparing other measures of fiscal decentralization. The coefficient of the EconKOF index assumes values 0.89 and 0.98 with regards to TAXREVDEC, whereas it ranges between 0.28 and 0.43 concerning the others indexes of decentralization. Our results on economic integration confirm Stegarescu's (2009) evidence on the OECD. However, they are in contrast to Garrett and Rodden's (2003) results based on a larger sample of developed and developing countries. As regards results on social integration, a positive and significant correlation with fiscal decentralization indicators is detected. The magnitude of the SocKOF index coefficient ranges from 0.30 to 0.60 and it is almost 0.48 with regards to expenditure decentralization. By contrast, we do not find any

¹⁴ The OLS-PCSEs is strongly recommended in time-series cross-section analysis when errors are nonspherical (Beck & Katz, 1995; Beck, 2001).

¹⁵ The heteroskedasticity is investigated by running the Breusch-Pagan (1979) /Cook-Weisberg (1983) test and the Modified Wald test for groupwise heteroskedasticity (MW-GWH) (Greene, 2000). We adopt Arellano and Bond's (1991) test for the investigation of serially correlated errors. Finally, cross-sectional independence is tested by Breusch and Pagan's (1980) Lagrange multipliers test.

¹⁶ The results of F test and of the other diagnostic tests can be available upon the authors' request.

statistically significant evidence of the PolKOF index in the panel static regression analysis.

The panel static estimation results show mixed effects of POP on fiscal decentralization according to the type of index of fiscal decentralization adopted in the empirical analysis. In line with the theoretical predictions (Wallis and Oates, 1988), a growth in population produces a significant growth in fiscal decentralization measured by the GFS's indicators (see tabb. 4-5). By contrast, a negative and significant correlation between POP and TAXREVDEC is observed in table 2. Mixed effects also emerge between GDP and fiscal decentralization indicators. A negative link between GDP and TAXREVDEC is found consistently with the hypothesis that growth in per-capita GDP may be accompanied to higher demand for income redistribution programs, involving higher fiscal centralization (Wallis and Oates, 1988). On the contrary, in table 5, a positive correlation between GDP and EXPDEC is detected in accordance to the theoretical predictions of Panizza (1999) and the most of the past empirical evidence. About the effects of population concentrated in urban area, a positive impact is found in accordance with the theory. Results show that the coefficient of YOUNG assumes a negative and significant sign with regards to Stegarescu's indicators. The negative correlation suggests the presence of economies of scale in public goods provision benefited by young people. In tables 3-5 emerges that a larger linguistic homogeneity is associated to a lower degree of fiscal decentralization in the spirit of Oates's (1972) theorem. However, in table 3, we observe that a larger ethnic homogeneity is accompanied to a higher degree of revenue decentralization. Although ETHN has not predict sign, similar evidence are found in the empirical literature.¹⁷ About the OECD sample, Cerniglia (2003) finds that the index of religious group homogeneity is negatively correlated with fiscal centralization. However, she shows that when Belgium is dropped from the sample, this index assumes the sign predicted by the theoretical literature.¹⁸ Finally, we find that the EU membership is associated to a higher degree of fiscal centralization on the side of revenue and higher degree of fiscal decentralization on the side of expenditure decisions. This result may signal the emergence of the common-pool problem in the EU area. In table 3 the positive effect of FEDERAL on REVDEC is in line with our expectation, suggesting that federal countries have a higher degree of fiscal decentralization than unitary countries. By contrast, the negative and significant effect of FEDERAL on REVDEC_GFS may be due to the fact that the GFS' indicators do not accurately measure the degree of fiscal decentralization. However, federal countries implement forms of fiscal decentralization based on autonomous fiscal responsibilities and decisions of local governments not shared with central government. Therefore, a negative effect of FEDERAL on the GFS' indicators can be rational.

We perform Davidson-MacKinnon (1993) test to control for endogeneity problems. We find that both GlobKOF and SocKOF index may be endogenous in the static panel regressions with Stegarescu's indicators as well as GlobKOF and EconKOF in the regressions with the expenditure decentralization index as dependent variable. Thus, we re-estimate the static panel data model by instrumenting the KOF indicators. As instrumental variables we use the second order lag of: the KOF index used in the panel regression, GDP and YOUNG. We add the control variables and year dummies to this set of instruments. The model is estimated with the feasible efficient two step generalized method of moment (FEGMM) estimator. In presence of heteroskedasticity this estimator is preferred to the two stage least square (2SLS) estimator because it is more efficient. On the other side, the FEGMM may perform poorer in

¹⁷ Wallis and Oates (1988) find that a more homogenous population in terms of white people in US states is associated to higher degree of fiscal decentralization. However, they also show that this effect can be the resultant of the 'southern effect' omission in the regression analysis.

¹⁸ We do not obtain any significant change in the sign of ETHN variable and in its statistical significance when we drop Belgium in our sample.

small sample.¹⁹ Keeping these caveats in mind, in table 6 we report the FEGMM estimation results for the variables of our interest with additional indications about the statistical significance of the 2SLS estimated coefficients. The strength of instrumental variables is detected by the Hansen (1982) J statistic for over-identifying restrictions. Through table 6, we observe that the Hansen J test always accepts the null-hypothesis of the validity of the set of instrumental variables. The FEGMM estimation results confirm the previous finding. The main difference is that the coefficient of GlobKOF becomes statistically significant in panel regressions with TAXREVDEC index.

Tab. 2 The panel static model results on the impact of globalization on tax revenue decentralization

	TAXREVDEC							
	1	2	3	4	5	6	7	8
GlobKOF	0.718 (1.62)	0.800 (1.32)						
EconKOF			0.893*** (3.01)	0.980** (2.31)				
PolKOF					-0.190 (-1.02)	-0.288 (-0.90)		
SocKOF							0.483* (1.94)	0.431 (1.46)
GDP	-0.596** (-2.10)	-0.489 (-1.14)	-0.498* (-1.70)	-0.351 (-0.77)	-0.605** (-2.10)	-0.486 (-1.09)	-0.639** (-2.31)	-0.545 (-1.26)
URBAN	2.188*** (4.20)	2.291*** (3.24)	2.368*** (4.53)	2.371*** (3.22)	2.291*** (4.35)	2.283*** (2.98)	2.236*** (4.65)	2.367*** (3.47)
POP	-3.228*** (-3.57)	-3.487*** (-2.67)	-2.980*** (-3.33)	-3.059** (-2.22)	-3.471*** (-3.66)	-3.851*** (-2.63)	-3.219*** (-3.83)	-3.544*** (-2.75)
YOUNG	-0.010* (-1.86)	-0.008 (-1.29)	-0.012* (-1.92)	-0.009 (-1.32)	-0.012* (-1.93)	-0.008 (-1.25)	-0.010* (-1.84)	-0.007 (-1.27)
ETHN		0.014 (0.74)		0.009 (0.49)		0.011 (0.57)		0.016 (0.84)
LING		-0.018 (-1.42)		-0.013 (-1.03)		-0.019 (-1.44)		-0.020 (-1.59)
FEDERAL	0.099 (1.07)	0.087 (0.82)	0.114 (1.20)	0.087 (0.82)	0.077 (0.83)	0.047 (0.45)	0.113 (1.23)	0.086 (0.81)
EU	-0.021 (-0.22)	-0.015 (-0.08)	-0.017 (-0.19)	0.026 (0.14)	-0.010 (-0.11)	0.034 (0.17)	-0.032 (-0.34)	-0.025 (-0.13)
c	49.21*** (3.10)	52.02** (2.17)	42.89*** (2.70)	42.80* (1.67)	56.70*** (3.40)	63.04** (2.37)	50.23*** (3.44)	54.76** (2.33)
rho	0.789	0.720	0.798	0.764	0.808	0.792	0.755	0.702
Countries No.	23	20	23	20	23	20	23	20
D-MK test	0.049	0.009	0.311	0.244	0.057	0.851	0.026	0.011
Observations No.	566	391	566	391	566	391	566	391

Note: time and fixed effects are included in all panel regressions; standard errors robust to heteroschedasticity and first-order autocorrelation; z statistics in parentheses; p-value: *p < 0.10, **p < 0.05, ***p < 0.01.

¹⁹ For details on the instrumental variable and GMM approach see Baum et al (2003).

Tab. 3 The panel static model results on the impact of globalization on revenue decentralization

	REVDEC							
	1	2	3	4	5	6	7	8
GlobKOF	0.636*** (3.02)	0.476** (1.99)						
EconKOF			0.285* (1.77)	0.081 (0.44)				
PolKOF					-0.069 (-0.75)	-0.031 (-0.26)		
SocKOF							0.387*** (3.34)	0.294** (2.42)
GDP	0.005 (0.03)	0.032 (0.19)	0.046 (0.30)	0.034 (0.19)	-0.021 (-0.14)	0.013 (0.07)	-0.072 (-0.50)	-0.026 (-0.15)
URBAN	0.190 (0.52)	-0.304 (-0.62)	0.438 (1.16)	-0.144 (-0.28)	0.430 (1.04)	-0.144 (-0.28)	0.201 (0.56)	-0.314 (-0.68)
POP	0.134 (0.36)	0.219 (0.42)	0.038 (0.09)	0.144 (0.26)	-0.147 (-0.36)	0.103 (0.20)	0.104 (0.28)	0.158 (0.31)
YOUNG	-0.004 (-1.42)	-0.003 (-0.92)	-0.006* (-1.88)	-0.004 (-1.08)	-0.006* (-1.73)	-0.004 (-1.07)	-0.005 (-1.31)	-0.003 (-0.89)
ETHN		0.017* (1.92)		0.017* (1.86)		0.019** (1.98)		0.019** (2.04)
LING		-0.009* (-1.80)		-0.009* (-1.76)		-0.010* (-1.95)		-0.011** (-2.06)
FEDERAL	0.216** (2.41)	0.143 (1.39)	0.213** (2.33)	0.134 (1.30)	0.160* (1.76)	0.137 (1.32)	0.198** (2.21)	0.143 (1.38)
EU	-0.048 (-1.10)	-0.165* (-1.85)	-0.041 (-0.93)	-0.145* (-1.65)	-0.029 (-0.65)	-0.136 (-1.53)	-0.043 (-0.96)	-0.152* (-1.69)
c	-2.650 (-0.37)	-2.218 (-0.22)	-1.002 (-0.13)	-0.034 (-0.00)	4.171 (0.55)	1.272 (0.13)	-0.428 (-0.06)	0.178 (0.02)
rho	0.659	0.655	0.673	0.677	0.736	0.668	0.669	0.640
D-MK test	0.001	0.019	0.150	0.409	0.895	0.985	0.000	0.013
Countries No.	21	19	21	19	21	19	21	19
Observations No.	432	319	432	319	432	319	432	319

See note in table 2.

Tab. 4 The panel static model results on the impact of globalization on revenue decentralization

	REVDEC_GFS							
	1	2	3	4	5	6	7	8
GlobKOF	0.947*** (4.25)	0.797*** (2.85)						
EconKOF			0.380** (2.54)	0.169 (1.02)				
PolKOF					-0.079 (-0.67)	-0.069 (-0.37)		
SocKOF							0.616*** (5.70)	0.500*** (4.22)
GDP	-0.165 (-0.99)	-0.183 (-0.89)	-0.091 (-0.54)	-0.149 (-0.71)	-0.188 (-1.12)	-0.197 (-0.97)	-0.293* (-1.83)	-0.297 (-1.48)
URBAN	1.568*** (3.98)	1.639*** (3.14)	1.741*** (4.38)	1.741*** (3.15)	1.738*** (4.08)	1.742*** (3.24)	1.605*** (4.54)	1.660*** (3.38)
POP	0.702** (2.01)	0.823* (1.96)	0.597* (1.67)	0.759* (1.71)	0.353 (0.94)	0.638 (1.51)	0.700** (2.12)	0.700* (1.68)
YOUNG	-0.002 (-0.86)	-0.002 (-0.80)	-0.003 (-1.05)	-0.002 (-0.89)	-0.003 (-1.06)	-0.002 (-0.86)	-0.002 (-0.79)	-0.002 (-0.76)
ETHN		0.003 (0.72)		0.005 (1.10)		0.006 (1.44)		0.003 (0.90)
LING		-0.009* (-1.91)		-0.009* (-1.89)		-0.011** (-2.22)		-0.011** (-2.36)
FEDERAL	-0.026 (-1.10)	-0.038* (-1.73)	-0.018 (-0.70)	-0.036 (-1.43)	-0.036 (-1.41)	-0.039 (-1.59)	-0.039* (-1.74)	-0.048** (-2.30)
EU	0.008 (0.21)	0.067 (0.79)	0.010 (0.24)	0.078 (0.84)	0.016 (0.38)	0.093 (0.99)	0.020 (0.52)	0.085 (1.06)
c	-17.59*** (-2.75)	-18.51** (-2.31)	-14.89** (-2.24)	-15.73* (-1.80)	-8.083 (-1.20)	-12.31 (-1.56)	-15.12** (-2.54)	-14.10* (-1.80)
rho	0.709	0.664	0.701	0.675	0.730	0.655	0.678	0.651
D-MK test	0.312	0.832	0.193	0.299	0.374	0.354	0.292	0.832
Countries No.	22	20	22	20	22	20	22	20
Observations No.	464	353	464	353	464	353	464	353

See note in table 2.

Tab. 5 The panel static model results on the impact of globalization on expenditure decentralization

	EXPDEC							
	1	2	3	4	5	6	7	8
GlobKOF	1.063*** (4.74)	1.054*** (3.23)						
EconKOF			0.426*** (3.46)	0.363** (2.43)				
PolKOF					0.147 (1.22)	0.154 (0.74)		
SocKOF							0.477*** (4.20)	0.469*** (3.27)
GDP	0.370*** (3.24)	0.338** (2.23)	0.436*** (3.41)	0.420** (2.38)	0.308** (2.46)	0.304* (1.87)	0.234** (1.98)	0.215 (1.44)
URBAN	1.547*** (2.79)	1.389* (1.93)	1.751*** (2.93)	1.564* (1.93)	1.664*** (2.71)	1.451* (1.88)	1.632*** (2.82)	1.419** (2.01)
POP	0.764*** (3.71)	0.794*** (2.62)	0.636*** (2.80)	0.866** (2.45)	0.425* (1.81)	0.602* (1.78)	0.616*** (2.82)	0.602* (1.89)
YOUNG	-0.002 (-1.03)	-0.002 (-0.95)	-0.003 (-1.17)	-0.002 (-1.01)	-0.003 (-1.16)	-0.002 (-1.07)	-0.002 (-1.02)	-0.002 (-1.01)
ETHN		0.005 (0.90)		0.009 (1.60)		0.010** (1.98)		0.006 (1.25)
LING		-0.004 (-1.21)		-0.003 (-0.85)		-0.006* (-1.70)		-0.007** (-2.01)
FEDERAL	0.006 (0.30)	-0.001 (-0.03)	0.016 (0.84)	0.012 (0.51)	0.002 (0.11)	-0.0003 (-0.01)	-0.009 (-0.46)	-0.013 (-0.46)
EU	0.119*** (2.75)	0.318*** (3.38)	0.112** (2.43)	0.304*** (3.03)	0.124*** (2.70)	0.333*** (3.19)	0.125*** (2.87)	0.355*** (3.75)
c	-23.58*** (-5.77)	-23.10*** (-3.79)	-20.26*** (-4.30)	-23.31*** (-3.02)	-14.16*** (-3.35)	-16.53** (-2.56)	-17.77*** (-4.35)	-16.33*** (-2.64)
rho	0.603	0.520	0.634	0.583	0.645	0.551	0.628	0.509
D-MK test	0.069	0.055	0.182	0.001	0.422	0.680	0.130	0.253
Countries No.	22	20	22	20	22	20	22	20
Observations No.	463	352	463	352	463	352	463	352

See note in table 2.

Tab. 6 The FEGMM estimation results of the panel static model

	TAXREVDEC				REVDEC				EXPDEC		
	I	II	I	II	I	II	I	II	I	II	II
GlobKOF	2.828 ^{§***} (3.41)	4.665 ^{§***} (3.40)			1.952 ^{§***} (3.53)	2.422 ^{§***} (3.38)			1.247 ^{§***} (3.86)	1.694 ^{§***} (4.06)	
EconKOF											1.134 ^{§***} (4.87)
SocKOF			1.547 ^{§***} (3.74)	2.061 ^{§***} (3.23)			1.256 ^{§***} (4.14)	1.319 ^{§***} (3.33)			
Hansen J test	0.321	0.848	0.450	0.974	0.109	0.757	0.484	0.396	0.960	0.563	0.303
Observation No.	525	356	525	356	411	300	411	300	427	318	318

Note: mod. I/II excludes/includes ETHN and LING variables; §= the 2SLS estimated coefficient is statistically significant; the set of instrumental variables used in model I are: X, τ , the second order lag of the KOF indicator used in the static panel regression and GDP; the instrumental variables used in model II are: X, τ , the second order lag of the KOF indicator used in the static panel regression and of YOUNG (GDP for panel regressions with TAXREVDEC index); time and fixed effects are included in all panel regressions; robust-clustered standard errors; t-statistics in parentheses; p-value: *p < 0.10, **p < 0.05, ***p < 0.01.

4.1 The panel dynamic analysis

In this section we perform a panel unit roots analysis as a robustness check for spurious regression problems in time-series cross-sections. We perform three panel unit root tests¹ widely adopted in the literature. In particular, we consider tests developed by Levin, Lin and Chu (2002) and Im, Pesaran and Shin (2003) which will be referred to them as the LLC and IPS test, respectively.² Under the null-hypothesis of both tests all individuals time series in the panel are non-stationary.³ Both tests take care of heteroskedasticity and autocorrelation in the error term structure but not of cross-sectional dependence. For this reason, we also perform Pesaran's (2007) test based on a 'cross-sectionally augmented Dickey-Fuller' (CADF) regression. The null and alternative hypothesis of the CADF test are identical to those of the IPS test. Results of the panel unit root tests in table 7⁴ tests suggest that TAXREVDEC is not seriously affected by non-stationary problems. Clear indications about non-stationary time series are given for REVDEC_GFS, EconKOF, PolKOF and POP. In all other cases, tests give ambiguous indications about the presence of unit root. Non-stationary processes can be removed by means of the first-differences transformation of variables. As shown in table 7, the panel unit root tests performed on the first-differenced variables indicate that the problem of non-stationary is generally solved.⁵

In model (1), we transform all variables in first-differences. This transformation removes fixed effects and constant term from the model. In order to control for the dynamic process and check for robustness results, we introduce the first-differenced lagged dependent variable $\Delta\text{FDindex}_{i,t-1}$ on the right-side of model (1) as shown in equation (2).

$$\Delta\text{FDindex}_{i,t} = \rho\Delta\text{FDindex}_{i,t-1} + \alpha\Delta\text{KOFindex}_{i,t} + \beta\Delta X_{i,t} + \Delta\tau_t + \Delta\mu_{i,t} \quad (2)$$

The econometric literature suggests that model (2) is estimated by the instrumental variable estimator in order to remove correlation between $\Delta\text{FDindex}_{i,t-1}$ and $\Delta\mu_{i,t}$.⁶ In table 8 we report the FEGMM estimation results for the variables of our interest with additional indications about the statistical significance of the 2SLS estimated coefficients.⁷ As instrumental variables, we use the lagged values of both dependent and exogenous variables in first-differences and/or levels too (Anderson and Hsiao, 1981, 1982). Through table 8, we observe that Hansen (1982) J test always accepts the null-hypothesis of the validity of the set of instrumental variables.

¹ See Breitung and Pesaran (2008) for a recent survey on unit roots and cointegration tests in panel data.

² See Westerlund and Breitung (2010) for a recent survey on the LLC and IPS tests.

³ The alternative hypothesis of the LLC test concerns that all individuals time series are stationary. By contrast, under the IPS alternative hypothesis some individual series are non-stationary and other ones stationary.

⁴ We do not report the panel unit root tests results for LING and ETHN because several countries have been dropped by running tests. The drop is due to the low time variation of these variables.

⁵ Non-stationary cross-sectional time series may be co-integrated. We test the existence of panel cointegration by performing Kao's (1999) ADF-type test, Pedroni's (1999, 2004) and Westerlund's (2007) tests. Both the Kao ADF-type and Pedroni tests suggest the presence of panel cointegration problems. However, since these tests are not robust in presence of cross-sectional dependence, we also perform Westerlund's tests. Results of Westerlund's tests show that panel cointegration is not a serious problem for the basic empirical specification estimated. The results of the panel cointegration tests are available upon request to the authors.

⁶ Another estimators of dynamic panel data are the one step generalised method of moments (GMM) estimator developed by Arellano and Bond (1991) and an extended version known as the System (SYS-) GMM estimator (Arellano and Bover, 1995; Blundell and Bond, 1998). We do not use these estimators because of the instrument proliferation problem (Roodman, 2009).

⁷ Detailed estimation results are available upon request to the authors.

Tab.7 Results of the panel unit root tests

Variables in levels	LLC t*-stat	IPS W-stat	CADF Z-[T-bar]	Variables in first difference	LLC t*-stat	IPS W-stat	CADF Z-[T-bar]
TAXREVDEC	-3.26 (0.001)	-2.42 (0.008)	-3.37 (0.000)	Δ TAXREVDEC	-13.61 (0.000)	-14.31 (0.000)	-10.97 (0.000)
REVDEC	-2.35 (0.009)	0.16 (0.564)	1.34 (0.910)	Δ REVDEC	-11.01 (0.000)	-10.49 (0.000)	-9.22 (0.000)
REVDEC_GFS	0.311 (0.622)	1.793 (0.963)	2.32 (0.990)	Δ REVDEC_GFS	-12.17 (0.000)	-11.43 (0.000)	-8.46 (0.000)
EXPDEC	-2.03 (0.021)	0.32 (0.626)	2.15 (0.984)	Δ EXPDEC	-10.28 (0.000)	-8.66 (0.000)	-6.40 (0.000)
GlobKOF	-0.18 (0.429)	4.83 (1.000)	-2.64 (0.004)	Δ GlobKOF	-17.13 (0.000)	-16.81 (0.000)	-13.47 (0.000)
EconKOF	1.14 (0.874)	7.12 (1.000)	0.602 (0.727)	Δ EconKOF	-17.09 (0.000)	-15.83 (0.000)	-10.38 (0.000)
PolKOF	-0.33 (0.370)	-0.75 (0.226)	1.72 (0.957)	Δ PolKOF	-14.91 (0.000)	-13.12 (0.000)	-15.96 (0.000)
SocKOF	0.72 (0.763)	2.59 (0.995)	-2.88 (0.002)	Δ SocKOF	-42.05 (0.000)	-25.42 (0.000)	-12.47 (0.000)
GDP	0.95 (0.829)	5.82 (1.000)	-1.86 (0.032)	Δ GDP	-10.29 (0.000)	-10.49 (0.000)	-8.74 (0.000)
URBAN	-17.03 (0.000)	-4.98 (0.000)	-0.99 (0.162)	Δ URBAN	-48.68 (0.000)	-21.56 (0.000)	-0.44 (0.330)
POP	0.99 (0.838)	6.39 (1.000)	-0.54 (0.293)	Δ POP	-5.28 (0.000)	-6.05 (0.000)	-5.13 (0.000)
YOUNG	77.06 (1.000)	-6.64 (0.000)	-3.36 (0.000)	Δ YOUNG	180.73 (1.000)	-6.98 (0.000)	-4.42 (0.000)

Note: Variables are in logarithms. All test includes individual effects. The p-value of the panel unit root test statistic is stated in parenthesis. The Schwarz information criterion is adopted for selection of lag length. Spectral estimation is performed with Bartlett kernel and bandwidth is selected with Newey-West method.

The estimated coefficient of the first-differences lagged dependent variable $\hat{\rho}$ is positive and statistically significant in all panel regressions. In table 8 it emerges that the coefficient of GlobKOF is not significant. This result does not confirm the implications of the static analysis. As regards the subcomponents of globalization, dynamic panel estimates show that economic integration significantly promotes decentralization only when TAXREVDEC is concerned. The general tendency of a negative correlation between (tax)revenue decentralization and political integration, emerged in the static analysis, is confirmed in the panel dynamic analysis. However, the coefficient of political integration becomes significantly negative only in the dynamic analysis (see col. 5-6, tab. 8). This result is in contrast with Stegarescu's evidence conducted by different indicators of political integration. He finds some evidence on the 'Sandwich hypothesis' based on a positive effect between political integration and fiscal decentralization on the linguistically heterogeneous EU countries. As regards social integration, the FEGMM estimation results confirm the positive and significant sign of the coefficient of SocKOF for revenue decentralization indicators, already found in the static analysis.

Overall, the panel dynamic estimation results indicate that globalization affects fiscal decentralization mainly through its subcomponents rather than as a whole. Moreover, they show that economic, political and social integration affects fiscal decentralization on the side of revenue rather than on the side of expenditure. In fact, any statistical evidence of the KOF indexes is found on expenditure decentralization index.

Tab. 8 The panel dynamic model results on the impact of globalization on fiscal decentralization

	Δ TAXREVDEC ^(a)							
	1	2	3	4	5	6	7	8
Δ GlobKOF	-0.167 (-0.47)	-0.064 (-0.32)						
Δ EconKOF			0.370 ^{§*} (1.97)	0.318 [§] (1.50)				
Δ PolKOF					-0.088 (-0.72)	-0.159 ^{**} (-2.78)		
Δ SocKOF							-0.278 (-1.39)	-0.104 (-0.66)
Hansen J test	0.717	0.669	0.620	0.507	0.711	0.632	0.698	0.611
Obs. No.	474	310	474	310	474	310	474	310
	Δ REVDEC ^(b)							
	1	2	3	4	5	6	7	8
Δ GlobKOF	-0.258 (-1.50)	-0.099 (-0.49)						
Δ EconKOF			-0.085 (-0.58)	-0.295 (-1.64)				
Δ PolKOF					-0.308 ^{**} (-2.19)	-0.307 ^{§*} (-1.77)		
Δ SocKOF							0.139 (1.49)	0.256 ^{***} (3.01)
Hansen J test	0.544	0.272	0.520	0.418	0.560	0.236	0.527	0.323
Obs. No.	358	268	358	268	358	268	358	268
	Δ REVDEC_GFS ^(c)							
	1	2	3	4	5	6	7	8
Δ GlobKOF	0.577 (1.58)	0.484 (1.51)						
Δ EconKOF			0.086 (0.47)	-0.048 (-0.27)				
Δ PolKOF					-0.333 ^{**} (-2.57)	-0.380 ^{§*} (-2.06)		
Δ SocKOF							0.566 ^{**} (2.39)	0.640 ^{***} (2.87)
Hansen J test	0.373	0.178	0.293	0.185	0.279	0.123	0.645	0.370
Obs. No.	388	287	388	287	388	287	388	287
	Δ EXPDEC ^(d)							
	1	2	3	4	5	6	7	8
Δ GlobKOF	0.236 (1.18)	0.249 (0.94)						
Δ EconKOF			-0.012 (-0.12)	-0.026 (-0.26)				
Δ PolKOF					0.006 (0.10)	-0.061 (-0.55)		
Δ SocKOF							0.213 (1.45)	0.224 (1.52)
Hansen J test	0.384	0.145	0.450	0.174	0.455	0.163	0.440	0.124
Obs. No.	374	274	374	274	374	274	374	274

Note: the FEGMM estimator; § = the 2SLS estimated coefficient is statistically significant; in all panel regressions the included instruments are ΔX . (a) The excluded instruments are: Δ TAXREVDEC_{t-2}, URBAN_{t-2}, YOUNG_{t-2}, Δ GDP_{t-2}, Δ YOUNG_{t-3}; the additional excluded instruments in columns 1 3 5 7: FEDERAL_{t-2}; the additional excluded instruments in columns 2 4 6 8: Δ FEDERAL_{t-2}, Δ URBAN_{t-2}, LING_{t-3}, Δ EU_{t-2}. (b) excluded instruments: REVDEC_{t-3} (REVDEC_{t-2} in column 2 4 6 8, Δ FEDERAL_{t-2}, Δ EU_{t-2}, EU_{t-2}. (c) the excluded instruments: REVDEC_GFS_{t-3}; Δ YOUNG_{t-2}; Δ GDP_{t-2}. The additional excluded instruments in columns 2 4 6 8: Δ FEDERAL_{t-2}. (d) the excluded instruments: EXPDEC_{t-2}, Δ GDP_{t-3}, Δ YOUNG_{t-2}, Δ URBAN_{t-3}, Δ FEDERAL_{t-2} (FEDERAL_{t-2} in column 2 4 6 8); t statistics in parentheses; finite-sample adjustment for cluster-robust standard errors; *p-value <0.10, **p<0.05, ***p<0.01.

Tab. 9 The panel dynamic model results with endogenous globalization

	Δ TAXREVDEC				Δ REVDEC				Δ EXPDEC		
	I	II	I	II	I	II	I	II	I	II	II
Δ GlobKOF	0.576 (0.48)	0.623 (0.93)			0.288 (0.72)	-0.024 (-0.05)			0.427 (0.35)	0.082 (0.30)	
Δ EconKOF											0.012 (0.07)
Δ SocKOF			0.821 (1.32)	0.313 (0.74)			0.101 (0.52)	0.272 (0.75)			
Hansen test	0.722	0.558	0.584	0.471	0.582	0.280	0.544	0.338	0.354	0.160	0.179
Obs. No.	474	310	474	310	358	268	358	268	374	274	274

Note: mod. *I/II* excludes/includes ETHN and LING variables; the FEGMM estimator; §= the 2SLS estimated coefficient is statistically significant; instrumental variables are the second order lag of the KOF index used in the dynamic panel regression and the set of instruments described in table 8; finite-sample adjustment for cluster-robust standard errors;t statistics in parentheses; p-value: *p <0.10, **p<0.05, ***p <0.01.

Accounting for the endogeneity problem detected in the static analysis, we estimate the dynamic panel model instrumenting the globalization index with its second order lag. Overall, estimation results in table 9 confirm previous finding with the exception of the impact of social integration on REVDEC, that becomes not statistically significant.

5 Concluding remarks

A growing trend towards greater fiscal decentralization has characterized several OECD countries in the last decades. The empirical literature highlights that this trend can be caused by higher degree of economic integration across countries. In this paper, we re-examine the effects of globalization on fiscal decentralization of OECD by using the overall KOF index of globalization and its main subcomponents – economic, political and social integration. In particular, the effects of social integration on fiscal decentralization are not previously examined in the literature, although they offer interesting implications. Both static and dynamic panel models are estimated in order to obtain robust results.

The empirical analysis shows that globalization matters for decentralization of OECD countries mainly through its subcomponents rather than as a whole. In fact, the positive impact of the overall KOF index of globalization on both revenue and expenditure decentralization indicators detected in the static analysis turns out to be insignificant when panel dynamic techniques are performed. Another relevant result is that the subcomponents of globalization mainly affect fiscal decentralization on the side of revenue rather than on the side of expenditure. In particular, we find a positive and significant correlation between economic integration and tax revenue decentralization. This evidence is in line with Stegarescu's (2009) finding. Different explanations may be consistent with this evidence. The political economy literature on secessions suggests that the devolution of decision-making powers and fiscal responsibilities to sub-national governments make dampen secessionism pressures in integrated economies. Another possible explanation is that higher mobility of productive factors caused by economic integration would induce sub-national governments to compete among them to attract mobile tax base.

Evidence in favor of revenue centralization are observed in the panel dynamic analysis when countries are more politically integrated. This finding is in sharp contrast with Stegarescu's (2009) results. In a dynamic setting we observe that the effects of political and economic integration on fiscal decentralization go in opposite directions. Our evidence may be consistent with the explanation that political integration can discipline the effects of international tax competition caused by higher inter-countries migration of mobile tax base in integrated economies, crowding out the effects of economic integration (Dreher, 2006a).

Finally, the more interesting result concerns the role played by social integration in promoting fiscal decentralization. Some possible interpretations of this result can be suggested. The first one has an economic nature. Cultural proximity and the removal of barriers in information flows generate an environment in favor of inter-mobility of tax base across countries. Local governments demand for more fiscal autonomy in order to attract mobile resources from abroad. Secondly, socio-political considerations could be take into account. Scholars of 'glocalization' observe that social and political integration reduce the importance of national belonging in favor of the emergence of a supranational identity but, concurrently, strength the demand for the preservation of local cultural identity from the local governments. This could imply a higher demand for fiscal from the ethnic and linguistic minority groups in order to safeguard their own interests.

Overall, our results indicate that globalization is a complex phenomenon and needs a thorough investigation of its different facets. Further empirical analyses are, in particular, suggested to disentangle the causes of the significant correlation between the subcomponents of globalization and fiscal decentralization.

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Appendix 1: Data sources and variable definitions

Variable	Data description	Data source
TAXREVDEC	Sub-central government own tax revenue/General government total tax revenue.	Stegarescu (2004, 2005)
REVDEC	(Sub-central government own tax revenue + non-tax cap. Revenue)/(General government total tax revenue + non-tax capital rev.).	Stegarescu (2004, 2005)
REVDEC_GFS	(Sub-national government total revenue)/(Central government total revenue + Sub-national government total revenue).	The IMF's GFS
EXPDEC	(Sub-national total government expenditure - current capital transfers to other levels of national government)/(Central total government expenditure + Sub-national total expenditure - current capital transfers to other levels of national government).	The IMF's GFS
GlobKOF	Aggregated index of economic, political and social globalization	Dreher (2006), Dreher et al. (2008) http://globalization.kof.ethz.ch/
EconKOF	<i>Index components: i) Actual Flows:</i> Trade (percent of GDP); Foreign Direct Investment, stocks (percent of GDP); Portfolio Investment (percent of GDP); Income Payments to Foreign Nationals (percent of GDP). <i>ii) Restrictions:</i> Hidden Import Barriers; Mean Tariff Rate; Taxes on International Trade (% of current revenue); Capital Account Restrictions.	Dreher (2006), Dreher et al. (2008) http://globalization.kof.ethz.ch/
PolKOF	<i>Index components:</i> Embassies in Country; Membership in International Organizations; Participation in U.N. Security Council Missions; International Treaties.	Dreher (2006), Dreher et al. (2008) http://globalization.kof.ethz.ch/
SocKOF	<i>Index components: i) Data on Personal Contact:</i> Telephone Traffic; Transfers (percent of GDP); International Tourism; Foreign Population (percent of total population); International letters (per capita); <i>ii) Data on Information Flows:</i> Internet Users (per 1000 people); Television (per 1000 people); Trade in Newspapers (% of GDP); <i>iii) Data on Cultural Proximity:</i> Number of McDonald's Restaurant (per capita); Number of Ikea (per capita); Trade in books (% of GDP).	Dreher (2006), Dreher et al. (2008) http://globalization.kof.ethz.ch/
GDP	Per-capita gross domestic product (GDP) at constant 2000 US\$.	World Development Indicators (WDI) of the World Bank
URBAN	Population in urban area (% of the total population).	WDI of the World Bank
POP	Population, total.	WDI of the World Bank
YOUNG	Population 0-14 (% of the total population).	WDI of the World Bank

Variable	Data description	Data source
LING	Largest linguistic group (% of the population).	Ellingsen (2000)
ETHN	Largest ethnic group (% of the population).	Ellingsen (2000)
FEDERAL	1= weak federal government structure; 2= strong federal government structure; 0= otherwise.	Klaus Armingeon, Sarah Engler, Panajotis Potolidis, Marlène Gerber, Philipp Leimgruber. Comparative Political Data Set 1960-2008, Institute of Political Science, University of Berne 2010.
EU	1= European Union membership; 0= otherwise.	Authors' compilation

Appendix 2: Descriptive statistics

	Obs. No.	Mean	St.Dev.	Min	Max
TAXREVDEC	570	18.79	16.7	0.00	61.50
REVDEC	432	24.41	15.4	4.13	64.69
REVDEC_GFS	467	22.63	13.9	1.61	54.60
EXPDEC	466	30.50	13.6	1.45	59.18
GlobKOF	575	70.83	11.3	40.86	92.72
EconKOF	575	66.85	14.6	29.75	97.22
PolKOF	575	82.05	13.7	40.68	98.78
SocKOF	575	67.50	14.9	31.39	94.22
GDP	575	18920.72	6989.24	5043.21	41616.34
URBAN	575	75.23	13.3	27.66	97.26
POP	575	34200000	54100000	218000	279000000
YOUNG	575	20.84	3.44	14.40	31.22
LING	400	87.82	13.01	59.00	99.00
ETHN	400	87.74	14.62	34.00	99.00
FED	572	0.54	0.84	0	2
EU	575	0.50	0.50	0	1

REFERENCES

- Alesina, A., Spolaore, E. (1997). On the number and size of nations. *Quarterly Journal of Economics*, 112, 1027-56.
- Alesina, A., Spolaore, E., Wacziarg, R. (2000). Economic integration and political disintegration. *American Economic Review*, 90, 1276-1296.
- Anderson, T. W., Hsiao, C. (1981). Estimation of dynamic models with error components. *Journal of the American Statistical Association*, 76, 598–606.
- Anderson, T. W., Hsiao, C. (1982). Formulation and estimation of dynamic models using panel data. *Journal of Econometrics*, 18, 47–82.
- Arellano, M., Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *Review of Economic Studies*, 58, 277–297.
- Arellano, M., Bover, O. (1995). Another look at the instrumental variable estimation of error-components models. *Journal of Econometrics*, 68, 29–51.
- Baum, C. F., Schaffer, M. E., Stillman, S. (2003). Instrumental Variables and GMM: Estimation and Testing. *The Stata Journal*, 3, 1-31.
- Beck, N. (2001). Time-series-cross-section data: What have we learned in the past few years?. *Annual Review of Political Science*, 4, 271–93.
- Beck, N., Katz, J. N. (1995). What to do (and not to do) with time-series cross-section data. *American Political Science Review*, 89, 634-647.
- Beck, N., Katz, J.N. (1996). Nuisance vs. Substance: Specifying estimating times-series-cross-section models. *Political Analysis*, 6, 1-36.
- Blundell, R., Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel models. *Journal of Econometrics*, 87, 115-143.
- Bolton, P., Roland, G. (1997). The break-up of nations: A political-economy analysis. *Quarterly Journal of Economics*, 112, 1057-1090.
- Breusch, T. S., Pagan, A. R. (1979). A Simple Test for Heteroscedasticity and Random Coefficient Variation. *Econometrica*, 47, 1287–1294.
- Breusch, T. S., Pagan, A. R. (1980). The Lagrange multiplier test and its application to model specification in econometrics. *Review of Economic Studies*, 47, 239-253.
- Breitung, J., Pesaran, M. H. (2008). Unit root and cointegration in panels. In L. Matyas and P. Sevestre (Eds.), *The Econometrics of panel data (Third ed.)* Springer-Verlag, 279-322.
- Cameron, D. (1978). The Expansion of the Public Economy: A Comparative Analysis. *American Political Science Review*, 72, 1243-1261.
- CERFE (2003), Glocal Forum, World Bank Institute. Glocalization. *Research Study and Policy Recommendations*. Rome: CERFE.
- Cerniglia, F. (2003). Decentralization in the public sector: quantitative aspects in federal and unitary countries. *Journal of Policy Modelling*, 25, 749–776.
- Colletta, N. J., Cullen, M. L. (2000). *Violent conflict and the transformation of social capital. Lessons from Cambodia, Rwanda, Guatemala, and Somalia*. Washington: The World Bank.
- Colletta, N. J., Lim, T. G., Kelles-Viitanen, A. (2001). *Social cohesion and conflict prevention in Asia: Managing diversity through development*. Washington: The World Bank.
- Collier, P., Dollar, D. (2003). *Globalizzazione, crescita economica e povertà. Rapporto della Banca Mondiale*, Bologna: Il Mulino.

- Cook, R. D. Weisberg, S. (1983). Diagnostics for heteroscedasticity in regression. *Biometrika*, 70, 1–10.
- Davidson, R., MacKinnon, J. (1993). *Estimation and Inference in Econometrics*, New York: Oxford University Press.
- Dreher, A. (2006a). The influence of globalization on autonomous taxes and social policy: An empirical analysis for OECD countries. *European Journal of Political Economy*, 22, 179-201.
- Dreher, A. (2006b). Does Globalization Affect Growth? Empirical Evidence from a new Index. *Applied Economics*, 38, 1091-1110.
- Dreher, A., Gaston, N., Martens, P. (2008). *Measuring Globalization - Gauging its Consequence*, New York: Springer.
- Ebel, R. D., Yilmaz, S. (2003), ‘On the measurement and impact of fiscal decentralization’, in J. Martinez-Vazquez and J. Alm (Eds.), *Public Finance in Developing and Transitional Countries: Essays in Honor of Richard Bird*, Cheltenham: Elgar.
- Ellingsen, T. (2000). Colorful community or ethnic withces’ brew? Multiethnicity and domestic conflict during and after the cold war. *Journal of conflict resolution*, 44, 228-249.
- Garrett, G., Rodden, J. (2003). Globalization and fiscal decentralization, in Kahler, M. and Lake, D. (eds.), *Governance in a global economy: political authority in transition*, Princeton, NJ: Princeton University Press, 87-109.
- Greene, W. H. (2000). *Econometric analysis* (4th edn.). Upper Saddle River, N.J.: Prentice Hall.
- Hansen, L. (1982). Large sample properties of generalized method of moments estimators. *Econometrica*, 50, 1029–54.
- Im, K. S., Pesaran, M. H., Shin, Y. (2003). Testing for unit roots in heterogeneous panels, *Journal of Econometrics*, 115, 53-74.
- Kao, C. (1999). Spurious regression and residual-based tests for cointegration in panel data, *Journal of Econometrics*, 90, 1-44.
- Kauzya, J.M. (2005). *Decentralization: Prospects for Peace, Democracy and Development. DPADM Discussion paper*, UNDESA.
- Letelier, L. (2005). Explaining fiscal decentralization. *Public Finance Review*, 33, 155-183.
- Levin, A., Lin, C. F., Chu, CS. J. (2002). Unit root tests in panel data: asymptotic and finite-sample properties. *Journal of Econometrics*, 108, 1-24.
- Litvack, J. M., Oates, W. E. (1970). Group size and the output of public goods: Theory and application to state-local finance in the United States. *Public Finance*, 25, 42-60.
- Liberati, P., Sciala, A. (2011). How economic integration affects the vertical structure of the public sector. *Economics of Governance*, 12, 385-402.
- Oates, W. E. (1972). *Fiscal federalism*, New York: Harcourt Brace Jovanovich.
- Panizza, U. (1999). On the determinants of fiscal centralization: Theory and evidence. *Journal of Public Economics*, 74, 97–139.
- Pedroni, P. (1999). Critical values for cointegration tests in heterogeneous panels with multiple regressors, *Oxford Bulletin of Economics and Statistics*, 61, 653-670.
- Pedroni, P. (2004). Panel cointegration: asymptotic and finite sample properties of pooled time series tests with an application to the PPP hypothesis, *Econometric Theory*, 20, 597-625.
- Persson, T., Tabellini, G. (1996). Federal fiscal constitutions: risk sharing and redistribution. *Journal of Political Economy*, 104, 979-1009.
- Pesaran, M. H. (2007). A simple panel unit root test in the presence of cross section

- dependence. *Journal of Applied Econometrics*, 22, 265-312.
- Robertson, R. (1992). *Globalization: Social Theory and Global Culture*. London: SAGE.
- Rodrik, D. (1998). Why do more open economies have bigger governments?. *Journal of Political Economy*, 106, 997-1032.
- Roodman, D. (2009). Practitioners' corner. A note on the theme of too many instruments. *Oxford Bulletin of Economics and Statistics*, 71, 135–158.
- Scott, Z. (2009). Decentralisation, Local Development and Social Cohesion: An Analytical Review. *Governance and Social Development Resource Centre (GSDRC) Research Paper*.
- Shamsuddoha, M. (2008). Globalization to Glocalization: A Conceptual Analysis. Available at SSRN: <http://ssrn.com/abstract=1321662>.
- Sharma, C. K. (2009). Emerging dimensions of decentralization debate in the age of globalization. *Indian Journal of Federal Studies*, 19, 47-65.
- Stegarescu, D. (2004). Public sector decentralisation: measurement concepts and recent international trends. *ZEW Discussant Paper* n. 04-74.
- Stegarescu, D. (2005). Public sector decentralisation: measurement concepts and recent international trends. *Fiscal Studies*, 26, 301-333.
- Stegarescu, D. (2009). The effects of economic and political integration on fiscal decentralization: Evidence from OECD countries. *Canadian Journal of Economics*, 42, 694-718.
- Tanzi, V. (1999). Does the world need a world tax organization?. In Razin, A., Sadka, E. (Eds.), *The economics of globalization*. Cambridge UK: Cambridge University Press.
- Tanzi, V. (2008). The future of fiscal federalism. *European Journal of Political Economy*, 24, 705-712.
- Tiebout, C.M. (1956). A Pure Theory of Local Expenditures. *Journal of Political Economy*, 64, 416-424.
- Wallis, J., Oates, W. (1988). Decentralization in the public sector: An empirical study of state and local government. In Harvey S. Rosen. (Ed.), *Fiscal federalism: Quantitative studies*, Chicago: University of Chicago Press.
- Westerlund, J. (2007). Testing for error correction in panel data. *Oxford Bulletin of Economics and Statistics*, 69, 709–748.
- Westerlund, J., Breitung, J. (2010). Lessons from a decade of IPS and LLC. *Econometric Reviews*, 32, 547-591.