MUNICIPAL FRAGMENTATION AND ECONOMIC PERFORMANCE IN OECD TL2 REGIONS[1]

David BARTOLINI

Abstract

The present work looks at the relationship between institutional structure and economic performance at the regional level. The work focuses on one particular aspect, the number of municipalities in a given region (municipal fragmentation) and the impact on regional development measured as GDP per capita growth. The impact of municipal fragmentation on regional development is not clear *a priori*. The theory of fiscal decentralisation maintains that institutions closer to citizens can better deal with their needs, thus providing services and public goods in a more efficient way. This closeness, however, implies the presence of many local governments (e.g., municipalities), which may create problems in terms of policy spillovers and (dis)economies of scale.

The present work tests the impact of municipal fragmentation on a sample of OECD TL2 regions, in the period 1996-2011. The analysis shows that the impact of fragmentation on regional performance depends on regional territorial characteristics. In particular, the negative impact of fragmentation increases with the share of regional population living in urban areas. In fact, for "rural" regions the effect is small or even positive where a high share of the population lives in rural areas. This is because the costs and benefits of decentralisation have a different impact in urban and rural regions. In urban regions, the benefit of internalising policy spillovers (and reducing transaction costs) is higher than the loss of proximity, because population is geographically concentrated and commutes more than population in rural areas, where policy spillovers are smaller and the costs associated with the loss of proximity higher.

The implications for countries' economic policies are threefold. Firstly, countries should not consider the degree of administrative fragmentation *per se*, it is important to weight it for the rural index at the regional level. For instance, when considering France as a whole the level of municipal fragmentation is the second highest among OECD countries, but most of this fragmentation stems from rural regions. Secondly, the analysis implicitly recognises the importance of dealing with governance gaps in urban regions; for instance, the lack of co-operation in transport policies is especially detrimental for the performance of metropolitan areas. Thirdly, the overall effect of a reduction of municipal fragmentation would depend on the types of regions within each country.

To sum-up, the present work shows the importance of territorial characteristics for administrative performance, thus advocating for a place-based approach to institutional reforms.

Keywords: Regional growth, Institutions, Local government

JEL Classification: R11, R50

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Introduction

1. The governance structure of a country has important consequences for its economic performance. Along with the "traditional" factors of production – labour, capital and technology –institutions have received increasing attention as drivers of economic growth (Williamson, 1975; North, 1990; Acemoglu and Robinson, 2006). In this framework, a well-functioning public administration provides policies and regulations that are essential to create a sound business environment. An important – and often overlooked – component of the public administration is its multilevel structure. In most OECD countries, governance is shared among administrative bodies at different territorial levels, e.g. regional, provincial, and local level.

2. The rationale for a multi-layered government structure rests on the possibility to better accommodate the needs of the local community, improve accountability, and increase their "voice" towards higher levels of governments. The economic literature on fiscal decentralisation is based on the idea that administrative bodies "closer" to people can provide policies that better match citizens' preferences (Oates, 1972). The presence of a fragmented administration allows for better access to policymakers, improving political accountability. It is not possible, however, to conclude that more administrative fragmentation is always better, because of drawbacks related to the efficient scale of provision of public goods (small jurisdictions may suffer from diseconomy of scale) and policy spillovers (the possibility that effects/benefits of a policy go beyond the administrative boundaries). Both problems can be addressed with increasing co-operation amongst the local institutions, but there is a cost, a transaction cost, associated with the process of negotiation and co-operation (Williamson, 2010). The impact of administrative fragmentation on the economic performance of regions and countries is therefore not univocal; it depends on the relevance of spillovers, transactions costs, and the importance of matching citizens' preferences.

3. The policy interest on the relationship between administrative structure and economic performance has increased in recent years. Partly as a consequence of economic crisis, many countries have proposed territorial reforms for the reduction of administrative fragmentation, with the implicit aim of contributing to fiscal consolidation through a more efficient use of resources (see Table 1). For instance, the Italian government has recently started a reform that will lead to the elimination of an intermediate level of government (the provincial level) and the creation of a metropolitan layer for the governance of the main Italian metropolitan areas; the Netherlands have implemented reforms to eliminate "city regions" and proposed a reform for the reduction of the number of provincial governments; the Greek government has pursued a drastic reduction of the number of municipalities and a redefinition of the role and size of the intermediate level of government.

4. In this context, the present work focuses on municipal fragmentation arguing that the impact of territorial administrative reforms on regional economic performance depends on regional territorial characteristics. In particular, the analysis focuses on the rural index, defined as the share of population living in rural areas in each region. This measure is correlated to population density, but avoids the risk of having low densely populated regions although most of the population concentrates in few areas. Our hypothesis is that urban regions (i.e., regions with a low share of population living in rural areas) benefit from a reduction of institutional fragmentation, which would reduce transaction costs and policy spillovers, whereas rural regions (i.e., regions with a high share of population living in rural areas) would not be affected by the degree of fragmentation or even benefit from it, as it allows a better match of policies to citizens' preferences. For instance, policies related to transportation are likely to require more co-ordination in urban regions than in rural ones, where the surface area of municipalities is usually bigger and the daily commuting system is more likely to be embedded within the administrative borders of the municipality.

5. The empirical analysis conducted on a cross-section of 250 TL2 OECD regions shows that municipal fragmentation has a negative impact on the economic growth of TL2 regions, measured as the annual average growth rate of real per-capita GDP over the period 1996-2011. GDP growth is also negatively affected by the share of population living in rural areas, that is, rural regions tend to growth less than urban ones. However, the interaction between fragmentation and the rural index provides a somewhat different picture: the higher the rural index, the lower the negative effect of fragmentation. In fact, municipal fragmentation is positively correlated to economic growth in TL2 regions where more than 30% of the population lives in rural areas.

6. The economic intuition behind this result relates to the different distribution of the population between rural and urban areas. In rural areas, the population is scattered across a vast territory, so that the benefits of a closer administrative body, a smaller municipal size, is likely to overcome transaction costs (in terms of co-ordination and policy spillovers). Moreover, these costs are lower than in urban areas because of lower spillovers.[2] By contrast in urban areas the internalisation of spillovers and the reduction of transaction costs are more important than the loss of proximity.

7. The implications for countries' economic policies are threefold. Firstly, countries should not consider the measure of administrative fragmentation *per se*, it is important to weight it for the rural index at the regional level. For instance, when considering France as a whole the level of municipal fragmentation is the second highest among OECD countries, but most of this fragmentation relates to rural regions. Secondly, the analysis implicitly recognises the importance of dealing with governance gaps in urban regions; for instance, the lack of co-operation in policy delivery is especially detrimental for the performance of urban regions. Thirdly, the overall effect of a reduction of municipal fragmentation would depend on the types of regions within each country.

8. The analysis, therefore, confirms the importance of territorial characteristics for institutional performance at the regional level, providing support for a place-based approach to governance. For instance, the principle guiding municipal amalgamation should not be the average municipal size at the country level, but it should be weighted for the rural/urban characteristics of each region.

9. Although the results of the analysis points towards a place-based governance structure, it is important to stress the need for a comprehensive approach to governances. Territorial reforms directed only at urban (or rural) areas would have an impact on the balance of power within the regions. The recent creation of metropolitan governance bodies (for instance in Italy and France) implicitly decreases the "voice" of non-metropolitan areas towards the central government, running the risk of overlooking the needs of population living outside the metropolitan areas. The multilevel governance structure of a country should accommodate for differences between regions (based on their population density) and, at the same time, take into account the balance of administrative powers between different areas of the country.

10. The rest of the paper is organised as follows. The next section provides a review of the literature on decentralisation and multilevel governance. Then, a brief description of some recent territorial administrative reforms and a snapshot of the current administrative structure in OECD countries are provided. The paper continues with the description of the data and of the econometric strategy. Results for

2 . A complementary explanation can be based on the concept of average match with citizens' preferences. It seems reasonable to assume that people living in the same area have similar needs in terms of public policies. If this is the case, a unique regional policy would achieve a better (average) match the more urban (i.e., concentrated) is the region. By contrast, in regions characterised by a high share of population in rural areas, it is more difficult to match the policy to the needs of the population, on average there would be more people dissatisfied. Therefore, the benefits of fragmentation are higher in rural than in urban regions.

the municipal fragmentation are presented. A final section concludes with a summary of the main results and suggestions for further work.

Related Literature

11. The analysis of the impact of the multilevel governance structure on economic performance at regional level has received scant attention from the academic literature. In a recent OECD work, Ahrend et al (2014) provide evidence of a negative impact of municipal fragmentation on the economic performance (productivity) of metropolitan areas. Our analysis complements Ahrend et al (2014) by showing that municipal fragmentation is indeed a problem that increases with the degree of urbanisation of a region.

12. The economic literature has mainly focused on the link between fiscal federalism and economic growth.[3] The main focus is the analysis of decentralisation on aggregate performance, such as gross domestic product and inequality among regions. This set of works, however, has not reached a shared and univocal conclusion, with some empirical contributions showing a positive effect of decentralisation on GDP (Lin and Liu, 2000; Akai and Sakata, 2002; Iimi, 2005), while others conclude that there is either no impact or that the impact is negative (Davoodi and Zou, 1998; Zhang and Zou, 1998; Thornton, 2007; Rodriguez-Posé and Ezcurra, 2011). The contrasting evidence emerging from the empirical literature can be attributed to the differences in the sample of countries used for the analysis and the different time periods, along with a difficulty to converge on a shared definition of fiscal decentralisation. Part of the explanation could also be attributed to the lack of inclusion of regional characteristics in the analysis. Ultimately, decentralisation affects the governance structure at the sub-national level, and the effect for a country is the aggregation of the impact of decentralisation in each region. Therefore, even at the aggregate level the effect of a territorial reform may depend on whether the country is constituted by mainly urban or rural regions.

13. Treisman (2002a) provides an account of the possible benefits and drawbacks of decentralisation. The possible advantages of decentralisation are the greater accountability of the elected politicians and the better knowledge of local conditions relevant to policy. The more fragmented is the administration, the smaller is the jurisdiction of the lower tiers of government. The drawbacks of decentralisation are described as duplication and waste of resources, and lower competence of local governments with respect to central ones.

14. As regards municipal fragmentation, the economic literature has mainly focused on the amalgamation of municipalities. The main motivation for municipal mergers is economies of scale and scope and the internalisation of spillovers in the provision of local public goods. This literature, however, focuses on the efficient provision, without considering the impact of fragmentation on economic development (Dollery and Robotti, 2008).

15. Several OECD publications have focused on multilevel governance, highlighting the importance of vertical and horizontal co-ordination as one of the main governance gaps (Charbit, 2011; Charbit and Michalun, 2009). The challenge of co-ordination increases with administrative fragmentation, and may account for the negative impact on economic performance. This might be one of the main reasons for the negative impact of fragmentation on the economic performance of TL2 regions, providing additional rationale for dealing with co-operation gaps.

3. For an excellent and concise review of the literature see Feld *et al*. (2004), which covers both theoretical and empirical issues.

16. This brief and selected overview of the literature shows that the economic and political science literature on governance and fiscal decentralisation fails to take into account territorial characteristics of countries and regions. By contrast, the regional economic literature while accounting for regional and geographical features (population density, surface area, industrial clusters, etc.) fails to take into account the governance structure (OECD 2009; OECD 2012). The present work tries to fill this gap by using the rural index as an explanatory variable for the impact of administrative fragmentation on regional economic performance.

Sub-national government structure in OECD countries

17. Although the focus of the present analysis is on municipal fragmentation, it is worthwhile to provide a comprehensive picture of the sub-national administrative structure, which can be best described considering two separate dimensions. A vertical dimension, which accounts for the multilevel structure of the public administration, consisting in three, two, or one tier of sub-national government (SNG). Public administration organised in a one tier of SNG, consists of just the central government and the local governments . This is the case for countries such as Slovenia, Estonia and Portugal. In the case of two tiers of SNG, there is an administrative body between the central and the local level of government. Finally, in the case of three tiers, there is a State/Regional level and an intermediate level of government between the regional and the municipal level. This is the case, for instance, in France or Italy. The same holds for the United States with State and County administration positioned between the Federal and the local administration.

18. The horizontal dimension refers to the number of administrative bodies at each sub-national level. The analysis conducted in the present work considers the fragmentation at the municipal level, as it is present in all countries. The fragmentation of the intermediate levels is difficult to compare among countries with different multilevel structure.[4]

19. Table 2 describes the administrative structure in OECD countries, providing an account of the number of administrative bodies at each level of government.

Table 1. SNG structure in OECD countries, 2012

2012-2013	Municipal level	TL3 (intermediate or State/Regional level	TL2 (State/Regional level)
Federations & quasi-federations			
Australia	565		8
Austria	2354		9
Belgium	589	10	6
Canada	4147		13
Germany	11327	295	16
Mexico	2457		32
Spain	8116	52	17
Switzerland	2408	26	
United States	35879	3031	50

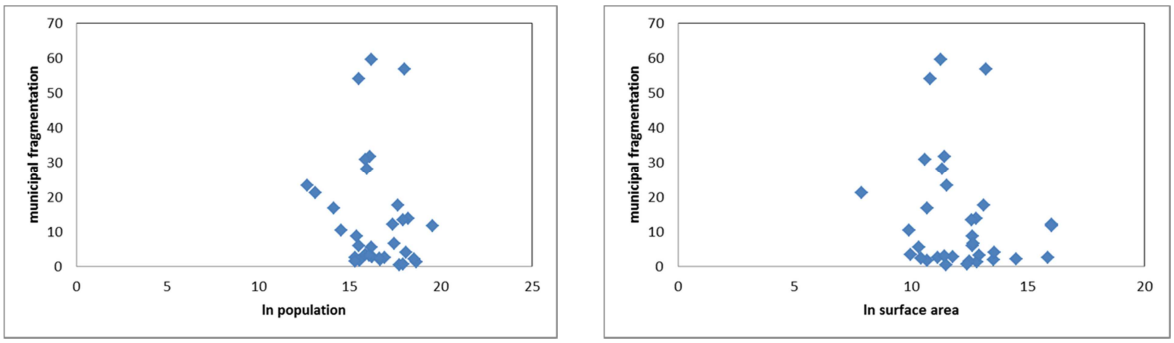
4 . A measure of horizontal fragmentation at an intermediate level of government can be conducted only on such countries whose multilevel government structure includes those levels, thus limiting the analysis to a subset of OECD countries.

Unitary States			
Chile	345		15
Czech Republic	6253	14	
Denmark	98		5
Estonia	226		
Finland	320		
France	36700	101	27
Greece	325	13	
Hungary	3177	19	
Iceland	74		
Ireland	114		
Israel	254		
Italy	8092	110	20
Japan	1719	47	
Korea[1]	227	17	
Luxembourg	106		
Netherlands	408	12	
New Zealand	67	11	
Norway	428	18	
Poland	2479	380	16
Portugal[1]	308		2
Slovak Republic	2927	8	
Slovenia	211		
Sweden	290	20	
Turkey	2950	81	
United Kingdom[1]	406	28	3

Source: OECD 2013 "Sub-national governments in OECD countries: key data" (brochure), OECD, Paris.

20. From Table 2 it emerges a considerable variation in the number of administrative bodies at each level of government, among OECD countries. Furthermore, municipal fragmentation seems not to be related to population size or surface area. Figure 1 plots municipal fragmentation, constructed as the number of municipalities per 100,000 inhabitants in each country, against countries' population and surface area – both expressed in logarithms. It appears that the larger municipal fragmentation is achieved by countries within average population and surface area. The three countries with the highest degree of fragmentation, that are singled out in Figure 1, are Slovak Republic (54), France (56.7), and Czech Republic (59.5). Although France and Czech republic differ in terms of population size and surface area, they are both at the top of the distribution in terms of municipal fragmentation.

Figure 1. Municipal fragmentation in OECD countries



Source: Elaboration on OECD (2013) Subnational governments in OECD countries: key data

Administrative territorial reforms may result in asymmetries between urban and rural areas

21. The last ten years have been characterised by an intense activity of reform of the sub-national administrative structure in many OECD countries (see Table 1). In some cases, the process has received a further stimulus by the economic crisis which forced many governments to pursue a path of fiscal consolidation. Territorial administrative reforms, especially the reduction of administrative bodies, could lead to a more efficient use of resources and thus contribute to countries' financial stability.

Table 2. Territorial administrative reforms in a selection of OECD countries

Country, year	Municipal fragmentation	Multilevel structure	Note
Latvia, 2009	Reduction of the number of municipalities from 527 to 119	Abolished the intermediated level of government (26 districts), leaving only one level of sub-national government (the municipal level)	The reform did not distinguish between urban and rural areas.
Germany, 2006 - 2011	Trend of mergers between municipalities leading to a decline from 16,216 in 1990 to 11,327 municipalities in 2012 (a drop of 30%)		The trend of mergers affected some Federal States more than others; for instance, in 2011 the number of municipalities in Saxony-Anhalt was reduced from 840 to 219 (where 44% of the population lives in rural areas)

Italy, 2014	No mergers of municipalities, but inter-municipal co-operation is encouraged for municipalities with less than 5,000 inhabitants	Transformation of the intermediate level of government (provinces) into an assembly of mayors. Creation of ten metropolitan governance bodies (città metropolitana) for the administration of large cities	Some provinces are transformed in metropolitan bodies while other in assembly of majors. This may create an asymmetry in terms of functions and competences.
France, 2014		In December 2013 was passed a law creating new governance structure for the top three metropolitan areas (Paris, Lyon, and Aix-Marseille) as well as for 11 other urban areas of more than 400,000 inhabitants on a voluntary basis. According to a draft law the competences of the intermediate level, *départements*, may be modified, and merges among them and among regions considered. The reform of the Regional level of government was adopted in 2014	The reform implicitly introduces an asymmetric governance structure between big urban centres and rural regions
Greece, 2010-11	In January 2011, the number of municipalities decreased from 1,033 to 325 (a three-fold drop)	The 54 departments were replaced by 13 democratically elected regions, including two metropolitan regions (Attica and Thessaloniki)	The so-called *Kallikratis* reform, adopted as part of the 3852/2010 law and operational since 1 January 2011, is both a territorial reform and institutional reform.
Denmark, 2007	As a result of the territorial administrative reform the number of municipalities dropped from 271 to 98, with an average population of 55,000 inhabitants.	Replacement of 13 counties by 5 newly created regions (at the NUTS2 level)	The reform included a new distribution of tasks between levels of government, and a new financing and equalisation system. The merger of municipalities was achieved by imposing a limit of 20,000 inhabitants for any municipality.

Source: Various sources compiled by OECD; Dexia (2012) *Sub-national public finance in the European Union*, Dexia editions, Paris; Nam, Chang-woon, "Subnational Government System in the EU and Its Recent Reforms", CESifo DICE Report 11 (4), 2013.

22. In some countries a reform of the municipal fragmentation is also accompanied by a reform of the multilevel structure of governance with a different distribution of powers among the different tiers of sub-national governments. In territorial reforms, however, the scope is often nationwide, with no distinction between urban and rural territories. One exception is the Italian reform aiming at creating metropolitan governance bodies only in metropolitan areas, thus determining and asymmetry in the governance structure between metropolitan areas and the rest of the territory. Overall, it appears that when deciding on the need of reducing fragmentation the local/regional specific characteristics are rarely taken into account by policy makers.

Description of the data

23. The empirical analysis is conducted on a cross-section of 251 TL2 regions, representing 23 OECD countries.[5] The classification TL2 corresponds to the territorial level immediately below the central level. This territorial level corresponds, for instance, to the *regional* level in France, and the *state* level in the USA. Data are obtained from the OECD Regional Statistics Database. For the time variant variables, the average of the variable in the relevant period has been computed. The growth of the gross regional product is calculated as the average annual growth of *per capita* GDP at constant PPP for the years 1996-2011.[6] The level of GDP in 1996 is used as a proxy for the initial level of economic development of each region.

24. The rural index is constructed taking the ratio of the population living in *rural areas* with respect to the total population of the TL2 region.[7] Rural areas are defined as settlements/municipalities where the density of the population is lower than 150 inhabitants per square kilometre (OECD 2011). The average value of the rural index in our sample is 0.43, indicating that in the "average" region 43% of the population lives in rural areas.

25. The indicator of horizontal fragmentation is constructed as the ratio between the number of municipalities and the population in each TL2 region. Data about number of municipalities are obtained from countries' Census statistics.[8]

26. Several economic and demographic indicators, that are important determinant of economic performance, are taken into account as control variables. Among them of particular importance are human capital, innovation, and type of political system. Human capital is one of the main determinant of labour productivity, contributing to GDP growth (Barro and Sala-i-Martin, 2004). In the analysis the attainment level of education of the work force is used as a proxy of human capital; this indicators measures the share of the labour force with primary, secondary and tertiary education.[9] The impact of innovation on regional performance is measured through the number of patents registered in each region. Finally, a dummy variable accounting for the political system – Federal or Unitary – is considered, as local governments in federal countries may have more autonomy than in unitary ones.

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5 . For analytical purposes the OECD classifies each country's territory in TL2 and TL3 territories. The former is the territorial level immediately below the national level – it corresponds to the territory of regions in Italy and France and to the territory of the States in the USA. The TL3 territory is the way in which TL2 territories are further divided. It corresponds to the territory of *province* in Italy, *departments* in France, and counties in the USA. The territorial level does not necessary correspond to an administrative tier. For instance, in the Netherlands there is no administrative body corresponding to the TL2 territory, as below the central government there is only the provincial administration (corresponding to the TL3 definition) and the municipal level.

6 . For the TL2 regions of Norway and Korea, the average annual growth is calculated for the period 2003-2007. For the TL2 regions of Turkey the average annual growth is calculated for the period 2004-2007.

7 . For Australia the number of local unit used to calculate the rural index amount to 1415 which is larger than the official number of municipalities (565) because it considers cities, towns, municipalities, boroughs, shires and districts. For consistency with this indicator also the indicator of municipal fragmentation is constructed using this definition of municipalities.

8 . Data on the number of counties in US are from the National Association of Counties, Research Division, 440 First Street, NW, Washington, DC 20001. (202) 393-6226 (as published in the webpage http://www.charlestoncounty.org/stats/bystate.htm). For the U.S., sub-county general purpose administrative units are used as "municipalities".

9. Two Canadian TL2 regions, namely Yukon and Northern Territories, have been excluded from the analysis because of lack of data on education attainment.

The econometric model

27. The empirical analysis is conducted considering a linear econometric model where the institutional variables are introduced and interacted with the rural index. A set of control variable are included, as shown in the following equation

$$g_i = cons + \beta_1 rur_i + \beta_2 frag_i + \beta_3 rurfrag_i + \beta_4 X_i + \varepsilon_i$$

where g_i is the annual average growth rate of *per capita* regional gross product in region *i*, *cons* is a constant term, *rur* is the rural index for region *i*, and *I* accounts for administrative fragmentation (i.e., municipal fragmentation). Finally, X_i is a vector of control variables, including the main socio-economic variables that may influence TL2 economic performance. The control variables are population and population density, the level of regional *per capita* GDP in 1996, the number of patents, a dummy variable for the political system, and education attainment of working age population.

28. The model is estimated using an OLS (ordinary least square) estimator and robust standard errors. The use of a panel would not add much information to the analysis as the relevant institutional variables are time invariant (or rarely changing in time). Therefore the results of the empirical analysis are driven by the comparison between regions rather than the evolution of fragmentation within each region.

Results

29. The first column of Table 3 presents the results of the estimation of a model without territorial characteristics, that is without the rural component. The coefficient associated with municipal fragmentation is negative but not statistically significant showing that the rural index is important for the identification of the institutional impact on regional performance. A part from patents which has not a significant impact on performance, the other control variables have the expected sign: initial value of GDP is negative and significant supporting the idea of regional convergence; education has a positive and significant impact on performance, which increases with the level of education.

Table 3. Estimation results of the impact of horizontal fragmentation on regional TL2 economic growth

dependent variable: GDP_pc	(1) g_total (1996-2011)	(2) g_total (1996-2011)	(3) g_total (1996-2011)	(4) g_pre crisis (1996-2007)	(5) g_post crisis (2008-2011)
rur		-0.00821***	-0.00680**	-0.00669**	-0.00710
		(0.00286)	(0.00270)	(0.00323)	(0.00453)
frag	-1.39e-05	-0.000112***	-4.34e-05*	-2.65e-05	-8.99e-05**
	(2.24e-05)	(3.73e-05)	(2.23e-05)	(2.89e-05)	(3.86e-05)
rurfrag		0.000181***	0.000143***	7.74e-05**	0.000322***
		(4.82e-05)	(2.53e-05)	(3.33e-05)	(4.94e-05)
federal	0.00165	0.00177	-0.0344***	-0.0354***	-0.0316***
	(0.00213)	(0.00215)	(0.00785)	(0.00895)	(0.00982)
popdens	1.89e-06*	1.17e-06	-3.91e-07	-1.66e-07	-1.01e-06
	(1.07e-06)	(1.12e-06)	(8.60e-07)	(9.83e-07)	(9.22e-07)
grp1996	-5.71e-07***	-5.68e-07***	-5.58e-09	-3.66e-08	7.97e-08
	(1.88e-07)	(1.85e-07)	(7.40e-08)	(9.47e-08)	(1.12e-07)
patents	-8.49e-06	-1.06e-05	-9.29e-06*	-7.47e-06	-1.43e-05
	(1.01e-05)	(9.90e-06)	(5.37e-06)	(6.11e-06)	(9.03e-06)
primary	-0.000263***	-0.000279***	2.45e-05	2.01e-05	3.67e-05

	(5.84e-05)	(5.81e-05)	(0.000158)	(0.000167)	(0.000238)
tertiary	0.000235***	0.000195**	0.000230	0.000232	0.000224
	(8.34e-05)	(8.50e-05)	(0.000221)	(0.000262)	(0.000300)
Constant	0.0319***	0.0374***	0.0392***	0.0471***	0.0176***
	(0.00368)	(0.00402)	(0.00560)	(0.00675)	(0.00633)
Observations	250	250	250	250	250
R-squared	0.301	0.332	0.738	0.624	0.807
F	8.401	9.206	.	.	
Country dummies	No	No	Yes	Yes	Yes

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

30. The second and third columns of Table 3 present the results of the estimation of the model with the rural index and the interaction term; column 3 presents the results of the regression with country dummies in order to account for possible country's effects on the economic performance of TL2 regions. The results show a negative impact of both the rural index and fragmentation on economic performance. These results are statistically significant at the 1% level in column 2 and at 5% and 10% in column 3, where country dummies are introduced. The estimated value of the interaction term is positive and statistically significant at the 1% level in both estimations.[10]

31. The effect of fragmentation on regional performance is therefore given by the direct effect and the interaction term. In particular, given the negative sign of the former and the positive sign of the interaction term, it appears that the negative impact decreases with the rural index (i.e., the share of population living in rural areas). The marginal impact of fragmentation on economic growth is negative for the most urbanised regions and decreases with the share of population living in rural areas increase, turning positive for the most rural regions. According to the estimation in column (3), where country dummies are taken into account, the marginal impact of fragmentation on GDP growth is

$$\frac{\partial g}{\partial frag} = -(0.000043) + (0.000143)rur$$

which shows a negative impact for low values of the rural index. The impact turns positive for regions in which more than 30% of the population lives in rural areas, which corresponds to 30% of the regions in the sample and 76% of the population. In fact, if the region is characterised by a rural index equal to 0, that is all the population lives in urban areas, then the marginal impact of fragmentation is -0.000043. This implies that a 10% reduction in the index of fragmentation produces a 0.8% increase in the annual per capita growth rate.

32. The economic rationale behind this result lies in the different weight that two contrasting forces have in urban and rural regions. On one side, amalgamation is justified because it favours economies of scale in the provision of local public goods, as well as allowing the internalisation of policy spillovers, thus reducing transaction costs. On the other side, amalgamation of municipalities may reduce the match of policies with citizens' preferences and the possibility of their "voice" to be heard at higher levels of the

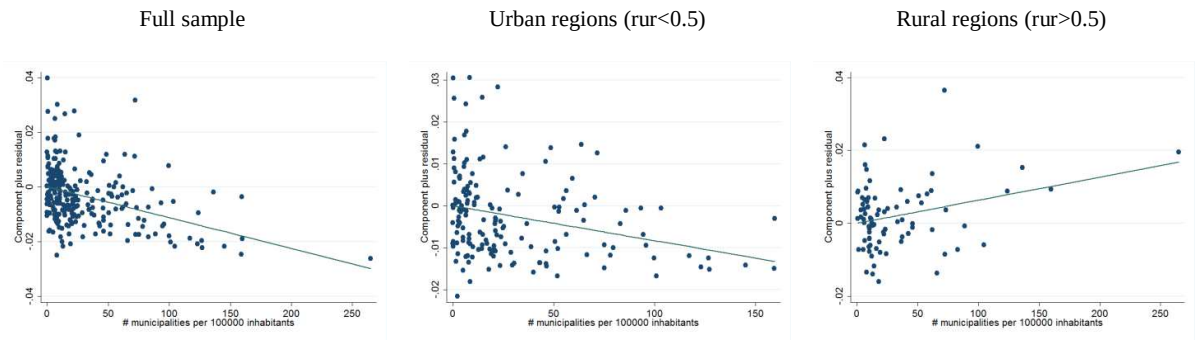
10. The analysis produces similar results if we use valued added per worker instead of GDP per capita as dependent variable. In other words, the impact of institutional fragmentation on the growth of labour productivity is similar to our results for GDP per capita growth. The present analysis is conducted with respect to GDP per capita because data are available for more years and more regions than data on labour productivity.

administration. The analysis suggests that the benefits of amalgamation overcome the costs only in urban regions. This is due to the different distribution of the population over the territory. In urban areas the population is concentrated, so that the economic interactions are likely to go over the administrative borders of a jurisdiction, thus benefitting from amalgamation more than rural areas where the population is spread over a vast territory and interactions are weaker. For instance, in terms of transportation policy amalgamation would favour urban areas more than rural once because of the more intense commuting in urban areas. Similarly, in terms of loss of representation and access to politicians, this is more a problem in rural areas where population is spread over a vast territory than in urban areas.

33. It is worth highlighting that although the direction of this effect is robust, the exact magnitude may change with different specifications of the model. For instance, when country dummies are not considered (column 2), all the variables of interests are still significant and maintain the same sign, but their magnitude changes; so that the impact of fragmentation becomes positive for regions where more than 60% of the population lives in rural areas.

34. The different impact that we get in urban and rural region can be grasped graphically by running a post regression diagnosis. Figure 2 shows three different component-plus-residual plots of fragmentation for the whole sample, a sub-sample of predominantly urban and predominantly rural regions, respectively.

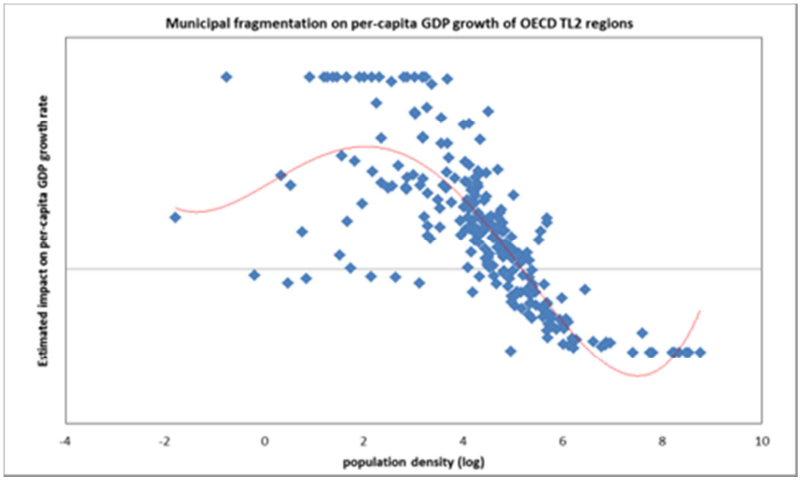
Figure 2. Impact of fragmentation on GDP - post regression diagnostic



35. The post regression plot shows that the negative impact of municipal fragmentation is actually driven by the regions in our sample with a rural index lower than 0.5 (166 regions). The sub-sample of regions with a rural index greater than 0.5 (84 regions) shows actually a positive relationship, although the relationship is really driven by a few regions, indicating that municipal fragmentation is not really important for the economic growth of rural regions.

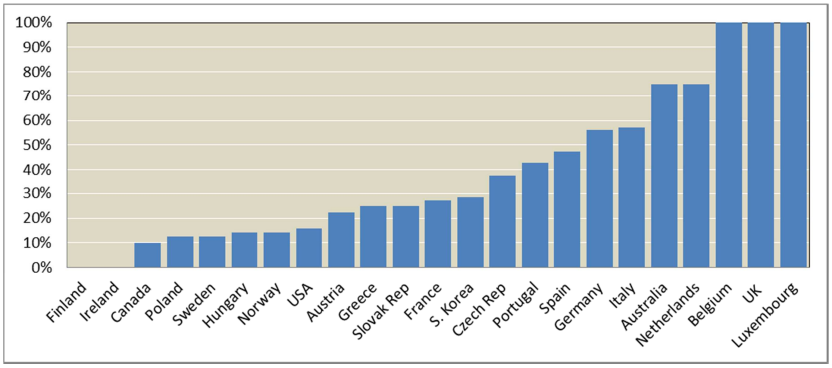
36. Figure 4 plots the average impact of horizontal fragmentation (computed using the estimated marginal impact) on TL2 regions with respect to their population density. It shows a negative relationship with regions above the horizontal zero line actually benefitting from fragmentation. The plot shows that as the population density increases the impact become negative. It is worth noting that this relationship is not obtained if we consider only population size, meaning that the estimated impact of the administrative reform does not depend on the population size of a region but on the concentration (density) of the population in rural areas (rural index). In the appendix, the same relationship is computed and represented separately for each country in our sample.

Figure 3. Estimated effect of institutional fragmentation on annual per-capita GDP growth, in TL2 regions (with country effects)



37. The analysis shows that in few countries a reduction of municipal fragmentation is likely to have a homogeneous effect, either positive or negative (Figure 4). In Belgium, and Luxembourg the positive effect is driven by the high density of population over the whole territory, which in geographical terms (especially for Luxembourg) is quite small. For the UK, the result is most probably driven by the partition of the territory in large TL2 statistical units, so that most of the population lives in the urban centres within these regions. In most of the countries the effect is estimated to be positive in some regions and null or negative in others.

Figure 4. Share of TL2 units within each country gaining from a reduction of municipal fragmentation



38. The analysis covers the 15 year period between 1996 and 2011. The most relevant event occurring in this period is the global financial and economic crisis unfolded since 2008. In order to account for this change in the economic environment, the analysis is replicated on two sub-periods: the pre-crisis period, from 1996 to 2007; and the post-crisis period 2008-2011. The results of the analysis performed on these two sub-samples are consistent with the analysis conducted over the whole period, the rural index and the indicator of administrative fragmentation display a negative impact on GDP growth, while the interaction term is positive. The difference is on the magnitude of the estimated coefficient and its statistical significance. It appears that the negative impact of the rural index is statistically significant only in the pre-crisis period, while the negative impact of fragmentation is statistically significant only in the

post-crisis period. This is consistent with the view that the financial crisis struck harder in urban and metropolitan areas. Interestingly, fragmentation seems to emerge as a significant problem only during the crisis. The large magnitude and statistical significance of the interaction term in the post-crisis period reinforces the message that municipal fragmentation is a problem in mainly urban regions and seems to be amplified in periods of economic recession or stagnation.

39. To summarise, the most important implication of the empirical analysis is a support for place-based institutional arrangements, which should take into account territorial characteristics – such as population density and the share of population living in rural areas. For instance, a policy aiming at reducing the number of municipalities should focus more on urban than rural areas. In other words, it might be efficient in terms of economic development to reduce the number of municipalities in urban areas, while keeping – even small – municipalities in rural regions.

Concluding remarks

40. The analysis provides evidence of a differentiated impact of the sub-national administrative structure (institutional fragmentation) on regions, in particular, fragmentation represents a negative drag on GDP per capita growth the more urban is the region. In fact, in regions where most of the population lives in rural areas municipal fragmentation appears to have no impact or enhancing growth. For OECD TL2 regions with more than 30% of people living in rural areas, fragmentation is actually positively correlated to economic growth.

41. The results of the empirical analysis suggest that reforms of the administrative structure of a country should take into account regional territorial features, advocating for a place-based approach to institutional reform. The reduction of municipal fragmentation may lead to better economic performance only in regions where most of the population lives in urban areas (e.g., regions that contain metropolitan areas).

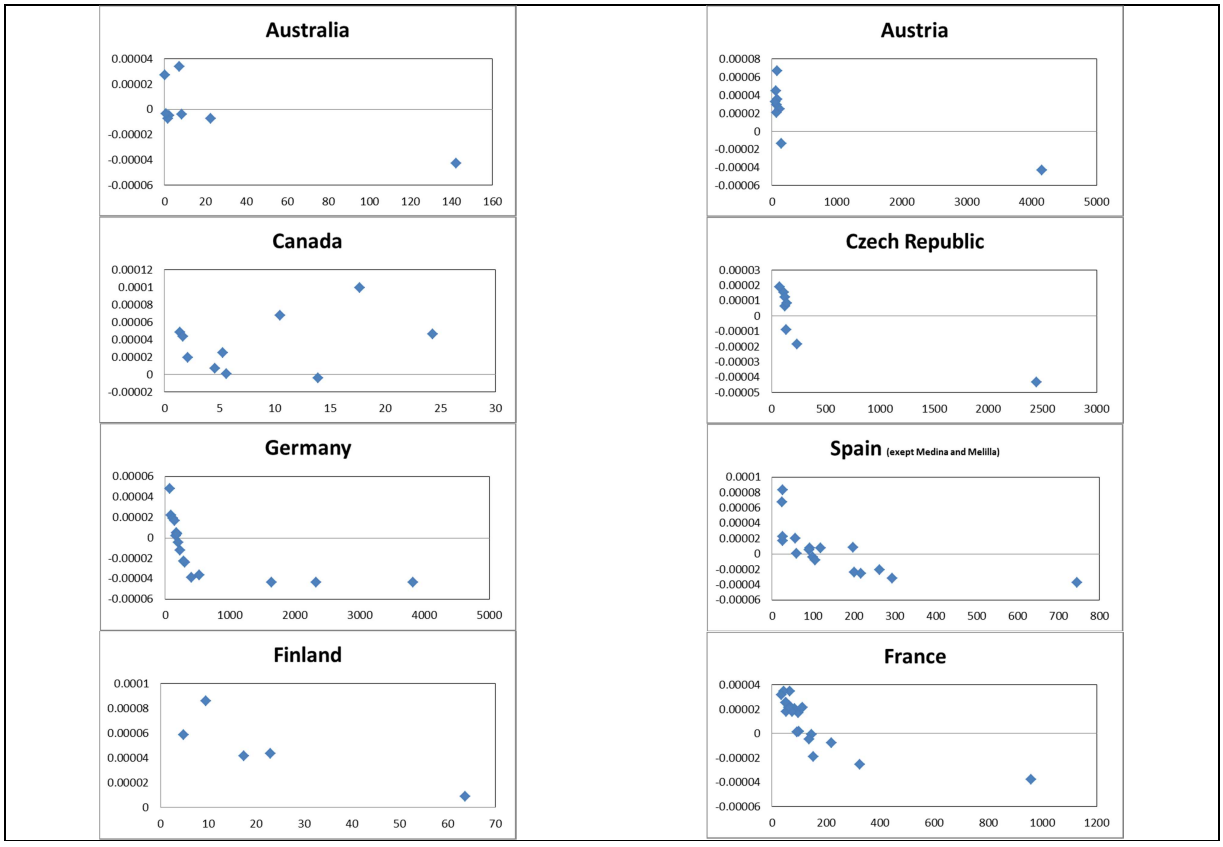
42. The implications for countries' economic policies are threefold. Firstly, countries should not consider the measure of administrative fragmentation *per se*, it is important to weight it for the rural index at the regional level. For instance, when considering France as a whole the level of municipal fragmentation is the second highest among OECD countries, but most of this fragmentation relates to rural regions. Secondly, the analysis implicitly recognises the importance of dealing with governance gaps in urban regions; for instance, the lack of co-operation in policy delivery is especially detrimental for the performance of urban regions. Thirdly, the overall effect of a reduction of municipal fragmentation would depend on the types of regions within each country.

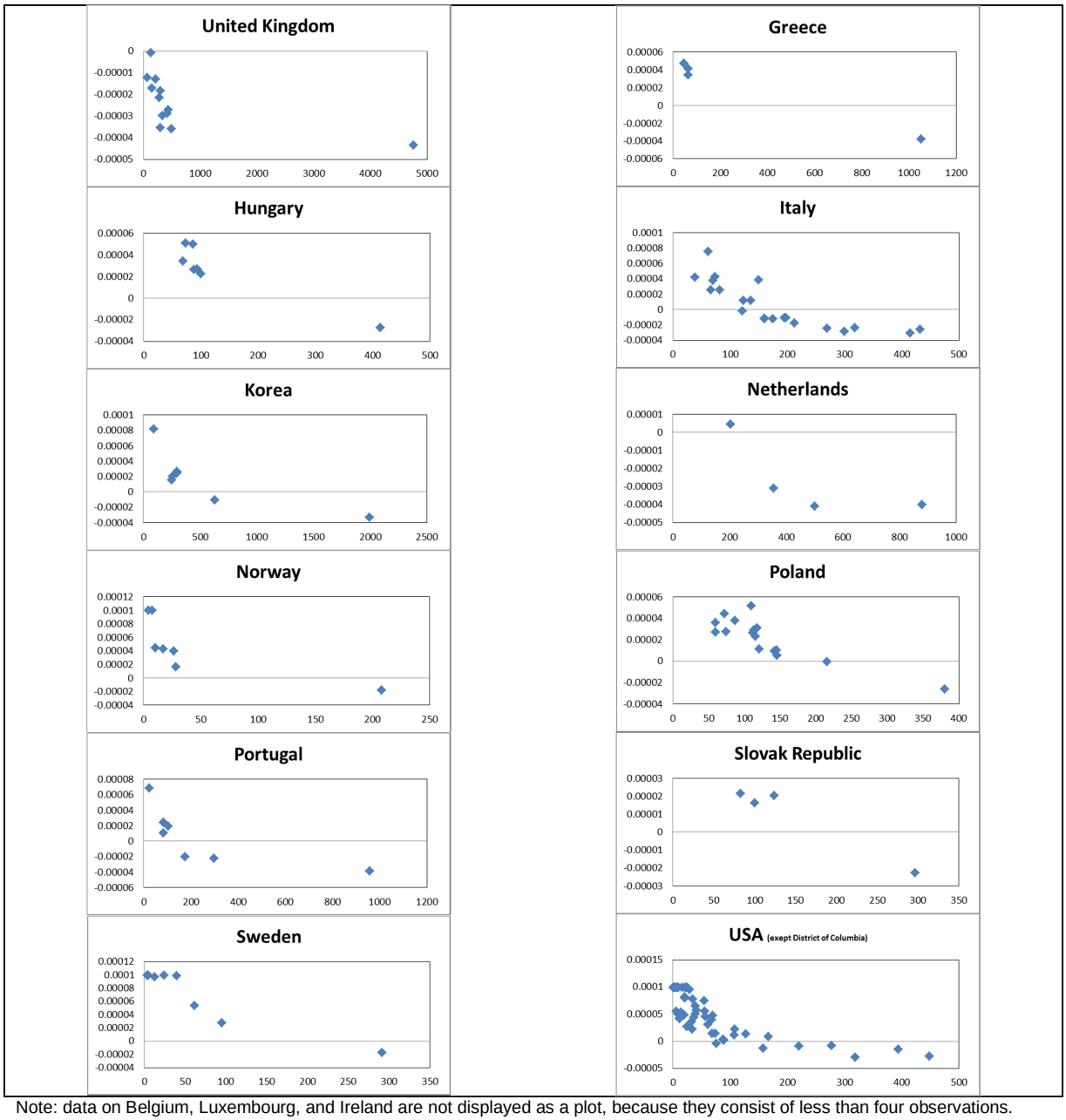
43. The present work represents a first attempt to look into the relationship between administrative structure and economic performance from the perspective of regional development. The analysis is just a starting point to investigate the impact of governance in territories characterised by different population density. A more in-depth analysis of governance, than just considering fragmentation, would shed light on the cost and benefits of having a more or less fragmented administration structure.

APPENDIX: IMPACT OF MUNICIPAL AGGLOMERATION IN OECD COUNTRIES

44. The analysis conducted on municipal fragmentation in the previous sections shows a different impact according to the population density. The negative impact of municipal fragmentation is mainly an issue in urban regions, whereas fragmentation appears to have no (or positive) effect on rural regions. In table 4 the effect of fragmentation (as estimated in our model) on per-capita GDP growth is plotted against regional population density for each country in our sample (with more than 3 TL2 regions).

Table 4. Impact of fragmentation on per-capita GDP growth, by country





Note: data on Belgium, Luxembourg, and Ireland are not displayed as a plot, because they consist of less than four observations.

45. The analysis shows the same relationship with population density of TL2 regions in each OECD country. The only exception is Canada where the negative relationship between impact of the fragmentation and population density does not follow a negative path. This is most probably due to the low density of all TL2 regions in Canada (the most densely populated region accounts for 24.3 inhabitants per square Km). This also shows one of the limits of the analysis, the size of TL2 regions varies quite a lot among OECD countries.

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