

## Regional redistribution and risk sharing in Italy: the role of different tiers of government

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**Regional redistribution and risk sharing in Italy: the role of different tiers of government**

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2 Regional redistribution and risk sharing in Italy: the role of different tiers of government  
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16  
17 Abstract

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19 This paper provides estimates of the redistribution and risk sharing across regional jurisdictions  
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21 accomplished by the public sector in Italy. In this analysis the multi-level structure of the Italian  
22  
23 government and the financial relations which link the different layers of government are explicitly  
24  
25 considered. Using panel data for the period 1996-2002 we find that public policies in Italy  
26  
27 significantly reduce differences in per-capita GDP across regions. However public budget, far from  
28  
29 providing insurance against idiosyncratic shocks, greatly emphasizes income fluctuations across  
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31 regions.  
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37 Keywords: Fiscal policy, Redistribution, Risk sharing, Inter-governmental relations, Regions  
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40 JEL classification: E62, H23, H50, H70  
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1  
2 La redistribution régionale et le partage des risques en Italie:  
3 le rôle des divers niveaux d'administration.  
4

5  
6  
7 Arachi et al.  
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9

10 Cet article cherche à fournir des estimations de la redistribution et du partage des risques à travers  
11 des circonscriptions d'action régionale et réalisés par le secteur public italien. Cette analyse  
12 approfondit la structure à niveaux multiples de l'administration italienne et examine ouvertement  
13 les rapports financiers qui relient les divers niveaux d'administration. A partir des données  
14 provenant des enquêtes permanentes pour la période de 1996 à 2002, il s'avère que les politiques  
15 publiques en Italie réduisent sensiblement les écarts du PIB régional par tête. Cependant, les  
16 dépenses publiques, loin de fournir une protection contre des chocs particuliers, soulignent les  
17 fluctuations du revenu à travers les régions.  
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19

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21  
22 Politique fiscale / Redistribution / Partage des risques / Rapports entre les niveaux d'administration  
23 / Régions  
24

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27 Classement JEL: E62; H23; H50; H70  
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30 Redistribución regional y riesgo compartido en Italia: el rol de los diferentes niveles de  
31 gobierno  
32

33  
34 Giampaolo Arachi, Caterina Ferrario and Alberto Zanardi  
35

36 Abstract  
37

38 En este artículo ofrecemos las estimaciones de la redistribución y el riesgo compartido en  
39 varias jurisdicciones regionales del sector público en Italia. En este análisis se consideran  
40 expresamente la estructura multinivel del gobierno italiano y las relaciones financieras  
41 vinculadas a los diferentes estratos de gobierno. Con ayuda de datos de panel para el  
42 periodo 1996-2002 observamos que las políticas públicas en Italia reducen  
43 considerablemente las diferencias entre los niveles del PIB per cápita en las regiones. Sin  
44 embargo, en el presupuesto público, lejos de ofrecer un seguro contra los choques  
45 idiosincrásicos, se acentúan en gran medida las fluctuaciones de ingresos en las  
46 regiones.  
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56 Keywords:

57 Política fiscal

58 Redistribución

59 Riesgo compartido

60 Relaciones intergubernamentales

## Regiones

JEL classification: E62, H23, H50, H70

**Regionale Umverteilung und Risikoteilung in Italien: die Rolle der verschiedenen Regierungsebenen**

Giampaolo Arachi, Caterina Ferrario and Alberto Zanardi

## Abstract

In diesem Beitrag schätzen wir das Ausmaß der Umverteilung und Risikoteilung zwischen verschiedenen regionalen Rechtsprechungsgebieten des öffentlichen Sektors in Italien. Ausdrücklich in der Analyse berücksichtigt werden die mehrschichtige Struktur der italienischen Regierung sowie die finanziellen Beziehungen, die die verschiedenen Regierungsebenen miteinander verbinden. Anhand von Paneldaten für den Zeitraum von 1996 bis 2002 stellen wir fest, dass die öffentlichen Politiken in Italien die Unterschiede des Pro-Kopf-BIP zwischen den Regionen signifikant verringern. Im öffentlichen Haushalt werden die Einkommensfluktuationen innerhalb der Regionen jedoch stark betont, statt eine Absicherung gegen idiosynkratische Störungen zu gewährleisten.

## Keywords:

Steuerpolitik

Umverteilung

Risikoteilung

Beziehungen zwischen Regierungen

Regionen

JEL classification: E62, H23, H50, H70

## 1. INTRODUCTION

There is a growing body of recent theoretical and empirical literature on fiscal measures to redistribute income and mitigate asymmetric shocks between the regions of a national state or the states of a federation. Much interest was sparked by the run-up to the European Monetary Union in the 1990s, while early empirical studies on individual countries have focused on the US and Canada, only a few on other countries.

However, this literature does not adequately investigate how different institutional arrangements affect income redistribution and risk sharing. In countries with multi-level government structure, jurisdictions are interconnected in terms of financial flows by a variety of schemes. Generally they involve transfers from the central government budget to the other levels of government to reduce fiscal disparities between regions. The risk-sharing and redistributive properties of these schemes need to be considered separately.

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2 This is done here for Italy, a country with a particularly complex institutional structure in which  
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4 intergovernmental relations are ruled by a number of different tax-sharing, revenue-sharing and  
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6 grant arrangements. In addition, the last decade has witnessed a radical intergovernmental fiscal  
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8 reform, increasing the tax autonomy of regional and local governments. Regional redistribution and  
9  
10 risk sharing in Italy is of peculiar interest also because Italian regions differ enormously in size,  
11  
12 population, demographic structure and level of economic development, in particular with its  
13  
14 distinctive North-South disparity.  
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17  
18 This paper is organised as follows. Section 2 offers a critical review of the relevant literature.  
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20 Section 3 sketches the main features of the Italian institutional framework with particular reference  
21  
22 to the system of intergovernmental fiscal relations. Section 4 presents the data and Section 5  
23  
24 discusses the specification of the econometric model that we use to derive a summary measure of  
25  
26 the income redistribution and risk sharing produced by the fiscal system. The results are presented  
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28 in Section 6. Section 7 concludes.  
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## 38 2. LITERATURE REVIEW

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42 The redistributive properties of the public budget have long been acknowledged (PERSSON and  
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44 TABELLINI, 1996, p. 980). Recent research has also focused on the risk sharing (or insurance) that  
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46 fiscal transfers may provide to sub-national (or federal) jurisdictions in the event of asymmetric  
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48 income shocks. This “federal government smoothing” (ASDRUBALI *et al.*, 1996) is one of the three  
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50 channels for income smoothing, along with the capital and credit markets.  
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52

53  
54 The redistribution of income among regions in a unitary or federal state generally aims at  
55  
56 reducing *ex-ante* or long-term disparities. The policy tools used may be designed to redistribute  
57  
58 income either between jurisdictions (intergovernmental equalization schemes) or between citizens  
59  
60 living in different territories (social security schemes).

1  
2 In a multi-level government framework, taxes and intergovernmental transfers may also provide  
3  
4 inter-regional insurance against asymmetric income shocks (temporary or permanent), thus  
5  
6 smoothing income and consumption. A considerable body of literature on self-enforcing risk-  
7  
8 sharing agreements (KIMBALL, 1988; COATE and RAVALLION, 1993, KOCHERLAKOTA, 1996)  
9  
10 supports the conclusion that it is optimal for individual jurisdictions to enter an inter-regional  
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12 insurance scheme even when they are risk-averse, provided that risks are to some degree  
13  
14 independent. In addition, inter-regional insurance mechanisms are advocated by the literature on  
15  
16 optimal currency areas (KENEN, 1969).  
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20  
21 Early studies of risk sharing examined interstate insurance in federal states, mainly the US  
22  
23 (SALA-I-MARTIN and SACHS, 1992; VON HAGEN, 1992; ASDRUBALI *et al.*, 1996). Interest in income  
24  
25 and consumption smoothing through the public budget was prompted by European integration,  
26  
27 which deprived states in the euro-area of monetary policy power and allowed only limited scope for  
28  
29 national borrowing to respond to asymmetric shocks. In this framework, euro-area states cannot  
30  
31 deploy the traditional policy tools, so risk sharing at the EU level, through federal taxes and  
32  
33 transfers, is acknowledged as a necessary feature of monetary unions (EICHENGREEN, 1993; FATÁS  
34  
35 *et al.*, 1998).  
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40 The extent of redistribution and risk sharing across regions has been measured empirically in a  
41  
42 number of works, initially concerned with the degree of income equalization and smoothing within  
43  
44 currency unions. Early studies focused on the US (SALA-I-MARTIN and SACHS, 1992; VON HAGEN,  
45  
46 1992; ASDRUBALI *et al.*, 1996), on the US and Canada (BAYOUMI and MASSON, 1995), or on the  
47  
48 US, Canada and the UK (GOODHART and SMITH, 1993). Later, the concern for the future prospects  
49  
50 of EMU member states fostered a wave of studies on European countries, either comparing them  
51  
52 with the US or Canada (ITALIANER and PISANY-FERRY, 1992, on the US, France and Germany;  
53  
54 MÉLITZ and ZUMER, 2002, on the US, Canada, France and Germany; OBSTFELD and PERI, 1998, on  
55  
56 the US, Canada and European countries; PADOVANO, 2007, on the US and Italy) or focusing on  
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58 selected countries, such as Italy (DECRESSIN, 2002), or Italy and the UK (DEDOLA *et al.*, 1999).  
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The first wave of empirical studies raised a number of methodological issues in that, despite their similar econometric strategies, they reached conflicting results on the degree of redistribution and risk sharing in the US. Estimates of risk sharing across states in the US range from as low as 10-15% (VON HAGEN, 1992; ITALIANER and PISANI-FERRI, 1992; ASDRUBALI *et al.*, 1996; MÉLITZ and ZUMER, 1998) to as high as 30-40% (SALA-I-MARTIN and SACHS, 1992; BAYOUMI and MASSON, 1995). MÉLITZ and ZUMER (2002) argued that these discrepancies could reflect the differing accounting criteria used to select the data. Essentially all studies regress a regional “economic activity” variable (output or income) including net transfers from the public sector on the same regional variable before transfers.<sup>1</sup>

The first crucial choice is therefore the “activity” variable, which is sometimes personal income and sometimes GDP. The latter is obviously more comprehensive, comprising items (e.g. depreciation) that are not counted in measuring personal income. The second choice relates to the definition of net transfers from the public sector, and is again between “narrow” measures (direct taxes and money transfers to households only) and “broader” ones (also including transfers in kind, public consumption and investments). As is illustrated by MÉLITZ (2004), these two choices significantly affect the estimated magnitude of redistribution and risk sharing. Specifically, combining a “narrow” measure of net transfers (e.g. money transfers net of taxes) with a “broad” measure of regional activity (e.g. GDP) leads to an underestimation of the degree of risk sharing; the opposite may result in an overestimation. Accordingly, to avoid misestimation, the measures used should be chosen for consistency: both activity and transfers should be gauged either narrowly or broadly.

As to the measure of transfers, DECRESSIN (2002) argues convincingly that the public sector impact cannot be captured by direct taxes and money transfers alone. A substantial factor in redistribution and risk sharing is the impact of transfers in kind, public consumption and investments. So we follow DECRESSIN (2002) in defining net transfers in terms of fiscal residua.

The fiscal residuum by a specific level of government is given by the difference between its total



1  
2 public expenditure (net of interest payments and transfers to other levels of government) and its  
3  
4 total revenues (net of transfers from other levels of government).<sup>2</sup> Taking this “broad” notion of net  
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6 transfers, for consistency we take GDP as our measure of economic activity.  
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9 In addition to the overall impact of public policies, the literature has also investigated the  
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11 differential effects of specific instruments (direct taxes, social insurance, transfers and grants).  
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13 Studies on direct taxes and money transfers have generally found that redistribution is mainly  
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15 driven by direct taxation, with social insurance, transfers and grants playing at most a minor role  
16  
17 (SALA-I-MARTIN and SACHS, 1992; VON HAGEN, 1992; BAYOUMI and MASSON, 1995). A noteworthy  
18  
19 exception is the work of MÉLITZ and ZUMER (2002), which found the opposite result for US and  
20  
21 Canadian data. DECRESSIN (2002), using a broader definition of net government transfers that also  
22  
23 includes public consumption and investment plus subsidies to firms and indirect taxes, showed that  
24  
25 in Italy most inter-regional redistribution stems from public expenditure, while the estimated  
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27 contribution of revenue is modest.  
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33 The results on the composition of the risk-sharing effect are mixed. SALA-I-MARTIN AND SACHS  
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35 (1992) and VON HAGEN (1992) on the US and ANDERSSON (2004) on Sweden found that most  
36  
37 income smoothing across regions is due to the tax system, while the role of transfers is minor. But  
38  
39 BAYOUMI and MASSON (1995) and MÉLITZ AND ZUMER (2002) provided evidence, based on US and  
40  
41 Canadian data, that transfers are the largest component in risk sharing. For Italy, DECRESSIN (2002)  
42  
43 found that public consumption plays the main role in risk sharing and, in contrast with the rest of  
44  
45 the literature, that fiscal revenues (and also public investment) amplify the effects of regional  
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47 shocks on economic activity.  
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51 However, a major shortcoming seems to affect the existing literature: it does not pay sufficient  
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53 attention to one important institutional profile, namely the role of the different tiers of government.  
54  
55 This is surprising, as some of these studies suggest that the distribution of powers among different  
56  
57 tiers of government may affect the magnitude of fiscal flows for risk-sharing purposes (BAYOUMI  
58  
59 and MASSON, 1995; ANDERSSON, 2004). Regional and local government taxes and expenditures are  
60

1  
2 clearly irrelevant to inter-regional redistribution and risk sharing when each authority's budget is  
3  
4 fully financed by own revenues. In most countries, however, budgets are interdependent by virtue  
5  
6 of different transfer schemes, mostly involving the central government but sometimes directly  
7  
8 connecting different local or regional units. In such a framework the policies of regional and sub-  
9  
10 regional governments may take on an inter-regional dimension.  
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13  
14 This point was partially acknowledged by BUETTNER (2002) who analysed the income-  
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16 smoothing effect of fiscal equalization across West German Länders. He found that almost half of  
17  
18 the risk sharing accomplished by the public sector is due to the transfers via the system of fiscal  
19  
20 equalization.  
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23  
24 However, Buettner's approach is not entirely satisfactory for two reasons. First, his distinction  
25  
26 between own taxes, tax sharing and transfers in the budget of sub-regional governments is not really  
27  
28 relevant to measuring the amount of resources transferred from one region to another. For example,  
29  
30 consider a country where sub-national governments have no taxing power and are financed entirely  
31  
32 by central government transfers. If a tax is devolved to them and transfers reduced by an amount  
33  
34 that exactly matches the yield of the new tax, region by region, there will be no change in the inter-  
35  
36 regional allocation of resources.  
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40 Second, there is an important distinction that Buettner's paper overlooks, namely whether the  
41  
42 purpose of the inter-regional flows is to offset "vertical" or "horizontal" fiscal imbalances. Vertical  
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44 imbalance refers to the fact that even if the budget of the public sector overall is balanced, any  
45  
46 given level of government may be in surplus or in deficit. Horizontal imbalance refers to the  
47  
48 differences between revenues and expenditures of different jurisdictions at the same tier of  
49  
50 government. In this case, transfers operate even if that level has a balanced budget in the aggregate.  
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52 Vertical and horizontal imbalances are addressed by different policy instruments in different  
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54 countries. In a few cases (such as Germany) each type of imbalance is corrected by separate policy  
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56 measures: vertical imbalance by tax-sharing or grants from the centre; horizontal, by transfers from  
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58 the regions with greater fiscal capacity to those with less. More frequently (as in Australia, Canada  
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1  
2 and Italy) vertical and horizontal imbalances are dealt with together through an integrated system of  
3  
4 equalization transfers from the central government. In these cases, a transfer from the central  
5  
6 government to sub-national governments can be always disaggregated into a vertical component  
7  
8 (“vertical fiscal flows”) to produce the desired total amount of resources for the sub-national  
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10 governments in the aggregate, and a horizontal one (“horizontal fiscal flows”), which redistributes  
11  
12 across sub-national jurisdictions within a given level of government.  
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15  
16 We develop an approach to take into account the foregoing. First, we analyse Italian public  
17  
18 intervention by calculating regional fiscal residua separately for each level of government. Then we  
19  
20 break these inter-regional fiscal flows down into a vertical and a horizontal component and measure  
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22 the role of each in redistribution and risk sharing.  
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### 30 3. THE ITALIAN INSTITUTIONAL FRAMEWORK

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35 Italy is marked by stark structural and economic disparities between regions. Table 1 shows that  
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37 regions differ widely in surface area (a relevant feature for economies of scale in public production)  
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39 and in population density and age structure (the population is substantially younger in the South  
40  
41 than in the North, with obvious impacts on health care and pension expenditures). And regional  
42  
43 disparities in economic development are considerably more pronounced than in other European  
44  
45 countries (SINN and WESTERMANN, 2001). Moving from the northern to the southern regions, per  
46  
47 capita GDP is cut in half, with inevitable impact on fiscal capacity. This geographical dualism  
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49 explains, *inter alia*, the particular emphasis, in the Italian political debate, on inter-regional  
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51 redistribution.  
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59 TABLE 1 APPROXIMATELY HERE  
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2 Italy has three main tiers of government – central, regional (including regions and local health  
3 units) and local (including provinces and municipalities) – plus the nationwide social security  
4 system (pensions and unemployment insurance). There are 15 ordinary statute regions, 5 special  
5 statute regions<sup>3</sup>, 102 provinces, and more than 8,000 municipalities ranging in size from small  
6 towns to large cities.  
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13 Sub-national governments enjoy significant autonomy in both expenditure and revenue, but it is  
14 not easy to describe the specific assignment of expenditure responsibilities and taxing powers  
15 because of the strong financial relations between the various tiers of government. Table 2 gives an  
16 overview of revenues, expenditures and deficits of general government and its main components  
17 (central government, sub-national authorities, social security institutions) in 2002.<sup>4</sup>  
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28 TABLE 2 APPROXIMATELY HERE  
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33 The Italian public sector is quite large by international standards. Including intergovernmental  
34 transfers, nearly half of both expenditures and revenues can be imputed to central government, the  
35 rest being divided roughly equally between sub-national governments and social security  
36 institutions (Table 2). Budgets for all the levels of government are near balance. However, this  
37 picture changes dramatically when intergovernmental transfers are netted out. The expenditures of  
38 both sub-national governments and social security institutions greatly exceed own revenues (by  
39 respectively 5.7 and 4.0 percentage points of GDP)<sup>5</sup>; the opposite holds for central government.  
40 This means that the deficits of sub-national governments and social security institutions are  
41 essentially covered by central government transfers; as a consequence, the fiscal deficit arises  
42 almost entirely at central level (vertical fiscal imbalances). Moreover, Italy has no explicit scheme  
43 of direct transfers between different jurisdictions at the same sub-national level of government  
44 (regions, provinces or municipalities). Therefore transfers from the centre also serve to reduce  
45 horizontal fiscal imbalances.  
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2 Table 3 reports the composition of the financing of public expenditure (gross of transfers) by the  
3 various fiscal instruments (taxes, social security contributions, transfers, other revenues, deficit) for  
4 each level of government. Even after the massive decentralisation process of the 1990s,<sup>6</sup> grants  
5 from other levels of government still provide a very substantial share of total revenues of sub-  
6 national governments and social security institutions. The table also shows how limited local  
7 governments' dependence on the regions is: the bulk of their transfer revenues comes directly from  
8 central government.  
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21 TABLE 3 APPROXIMATELY HERE  
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26 In assessing the role of a fiscal system in inter-regional redistribution and risk sharing, it should  
27 be stressed that central government grants result at least partially from equalising mechanisms.  
28 Basically, both for regional and for local governments, fiscal equalization consists in redistributing  
29 the yield of central government taxes to cover the difference between the expenditure requirements  
30 and the own tax capacity of regions and municipalities. Given the major role of transfers, one could  
31 further investigate the redistribution and income-smoothing effects of the public budget by looking  
32 directly at the taxes, contribution income and expenditures of the central government and the social  
33 security institutions (which operate nationwide) together with intergovernmental transfers  
34 (BUETTNER, 2002). However, the results would be misleading, as is explained in Section 2, since a  
35 series of recent reforms have replaced transfers from the central government with own taxes (or  
36 contributions) assigned to sub-national governments or social security institutions. So we shall look  
37 to the budgets of each individual level of government, considering the corresponding revenues and  
38 expenditures net of all transfers received from or paid to other levels. The methodology we develop  
39 for measuring the actual vertical and horizontal flows between regions is described in Section 4.  
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#### 4. THE DATA

Following DEGRESSIN (2002), we analyse fiscal residua to evaluate redistribution and risk sharing by each tier of government. As noted, the fiscal residuum of a jurisdiction is the difference between the total expenditure of a specific tier of government (net of interest payments and transfers to other levels), which benefits the residents of that jurisdiction, and the total revenues (again net of transfers) collected from residents. A positive residuum means that the local residents benefit from resources provided by the rest of the country (expenditures in the jurisdiction exceed revenues collected there); a negative residua means that the territory gives up part of its resources to finance expenditures elsewhere.

The data are taken from the Territorial Public Accounts (TPA) produced by the Italian Ministry of Economy<sup>7</sup>. They give the allocation of the revenue and expenditure flows of each level of government (central, regional, local, social security institutions) for the 20 Italian regions for the period 1996-2002.

The TPA are based on the general government budget on a cash basis. In this respect, our data differ from those used by DEGRESSIN (2002), i.e. the territorial economic accounts for Italian general government, which are available on an accrual basis for the period 1983-1992. In the TPA, the regionalisation of public flows is derived by treating each region as if it were a separate economy with its own public administration, subject to the constraint that for each variable the figures for the regions must add up to the national, general government figure. The main problem is attributing the spending of central government and social security institutions to the regions. In these accounts, expenditure flows are regionalised according to what we can call the *expenditure principle*: they are imputed to the territory where the means of production for the relevant public services and investments are located. However, this allocation of expenditures may differ significantly from the territorial location of the benefits from the expenditure (the *benefit principle*). For this reason, the original dataset has been adjusted to fit our requirements by two different procedures. First, for central government expenditures, consistency between the two principles

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2 depends on the nature of the publicly provided goods. For pure national public goods, public  
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4 intervention benefits all citizens equally, so the regionalisation of financial flows according to the  
5  
6 expenditure principle does not coincide with that according to the benefit principle. For publicly  
7  
8 provided private goods, however, it may be presumed that the expenditure principle largely matches  
9  
10 the benefit principle. Accordingly, we revised central government expenditures by the following:  
11  
12

- 13 - in the case of pure national public goods, total expenditures were regionalised  
14 according to the population distribution;  
15
- 16 - in the case of publicly provided pure private goods, the regionalisation of the TPA  
17 was retained;  
18
- 19 - in the case of publicly provided mixed goods, featuring both public and private  
20 characteristics, our rule-of-thumb was to apply the population criterion and the expenditure  
21 principle in equal proportions.  
22

23  
24 The TPA also needed revision with reference to regional governments' health services  
25 expenditure (which accounts for nearly 80% of total regional budgets). These flows, regionalised  
26 according to the expenditure principle, were attributed entirely to the regional jurisdiction  
27 responsible for the expenditure (where the services are provided), regardless of where the patients  
28 actually reside. This distinction proves to be significant in Italy, where there is considerable inter-  
29 regional mobility of National Health Service patients (especially from southern to northern regions).  
30 To measure the real benefits of health care to residents in each jurisdiction, the raw data on regional  
31 expenditures were adjusted for net expenditures for inter-regional patient mobility, determined, for  
32 each region, as expenditures for services to non-residents less expenditures by other regions for  
33 services to the region's own residents.  
34  
35

36 We generate two sets of fiscal residua. First they are straightforwardly calculated for each tier of  
37 government  $j$ , year  $t$  and region  $i$  as:  
38  
39

$$40 R_{jt}^i = G_{jt}^i - T_{jt}^i$$

where  $G_{jt}^i$  is total public non-interest expenditure (net of transfers to other levels of government) and  $T_{jt}^i$  total revenues (net of incoming transfers). The second set adjusts this first set of residua to distinguish vertical from horizontal financial flows, i.e. transfers between different tiers of government and those redistributing revenues among regions at the same level.

The numerical transposition procedure for generating this second set of residua is as follows. Horizontal flows for each region are calculated in such a way as to reach a nationwide balanced budget for each level of government; the fiscal residuum of each region is increased (or decreased) when that tier of government is in surplus (or deficit) at nationwide level i.e. it has a negative (or positive) residuum. For the central government, which typically has more revenues than required to finance its own expenditure, the revenues pertaining to each region are reduced proportionally so that total revenues equal total expenditures for the aggregate of the 20 regions. Then if, after this correction, region  $i$  has a positive residuum, this means that central government expenditure there is funded in part by revenues raised by the central government in other regions, once central government revenues that go to finance other levels of government are subtracted. Therefore, the new residua represent the horizontal flows of resources resulting from central government policies, net of resources collected and transferred to other levels of government.

Formally, let  $T_{Ct}^i$  and  $G_{Ct}^i$  respectively be central government fiscal revenue and expenditure in region  $i$  in year  $t$ . The fiscal residua that measure horizontal flows through the central government are then defined as:

$$RH_{Ct}^i = G_{Ct}^i - \alpha T_{Ct}^i$$

$$\text{where } \alpha_t = \frac{\sum_{i=1}^{20} G_{Ct}^i}{\sum_{i=1}^{20} T_{Ct}^i}.$$

The remaining tiers of government (regional, local and social security) typically record deficits (i.e. positive fiscal residua) at the nationwide level, as they generally benefit from transfers from the central government. In this case the procedure is the reverse. To isolate horizontal flows, for each level of government, the expenditures of each territory are proportionally reduced so as to achieve a



balanced budget over the sum of the 20 regions for that level. As before, the resulting residua for each region and each level of government represent the horizontal flows from a given level of government, net of expenditures financed by transfers from other levels.

The new residua for government level  $j$  in year  $t$  are defined as:

$$RH_{jt}^i = \beta_{jt} G_{jt}^i - T_{jt}^i$$

$$\text{where } \beta_{jt} = \frac{\sum_{i=1}^{20} T_{jt}^i}{\sum_{i=1}^{20} G_{jt}^i}.$$

Finally, the flows of resources between tiers of government – vertical flows – are derived as a by-product of the above procedure. The associated fiscal residua are computed as the difference between, on the one hand, the total amount of expenditures subtracted from the budget of sub-national governments and, on the other hand, the total amount of reductions applied to central government revenues to isolate horizontal flows. The fiscal residua due to vertical flows are thus those associated with the portion of expenditure programs that sub-national governments and social security institutions finance via revenue raised by the central government.

Formally we define the fiscal residua due to vertical flows,  $RV_t^i$ , as follows:

$$RV_t^i = \sum_j (1 - \beta_{jt}) G_{jt}^i - (1 - \alpha_t) T_{Ct}^i.$$

Tables 4 and 5 describe, respectively, the two sets of fiscal residua through the fundamental statistics (mean and standard deviation), calculated in per capita terms. In Table 4, which refers to the first set of residua, general government as an aggregate shows a substantial primary surplus (i.e., net of interest payments) averaging 825 euro per capita. This surplus is due to the above discussed exclusion of interest on public debt from our definition of public expenditure. The overall surplus results from the combination of the considerable central government surplus (about 3,500 euro per capita) and deficits at all other tiers of government (regional, local and social security). This pattern highlights the key feature of the Italian system of intergovernmental relations mentioned in Section 3: despite the decentralisation in the last decade, most public revenue is collected by the central government and allocated to the other tiers via different systems of intergovernmental transfers.

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A comparison of the residua in different regions gives a preliminary picture of the main patterns characterising of inter-regional fiscal flows in Italy. First, there is substantial redistribution from the wealthier to the poorer jurisdictions (i.e. those with per capita GDP above or below the national average). Moreover, the size of the residua is to some extent correlated with the surface area of the region – generally higher in smaller regions (Liguria, Umbria, Marche, Molise, Basilicata). In addition, there are sizeable financial transfers from the ordinary statute to the special statute regions (Valle d'Aosta, Trentino Alto Adige, Friuli Venezia Giulia, Sicilia, Sardegna) irrespective of GDP. Finally, the variability of per capita residua over time differs considerably from region to region. As regards general government, this variability seems to be positively correlated with per capita GDP. Residua are generally larger in richer regions. However, if we examine the standard deviation of general government fiscal residua along with that of GDP for each region, no clear pattern emerges. In some regions, high or low GDP variability is matched by high or low fiscal residua variability, but in others the reverse holds. Accordingly, the data give no clear indication on the risk-sharing role of the public budget. But it is worth noticing that with few exceptions local government residua show very low variability, suggesting that this level accomplishes very little smoothing, if any.

TABLE 4 APPROXIMATELY HERE

For horizontal flows only, Table 5 shows a strong redistributive impact of central government. Except for Lazio, all the regions with above-average GDP transfer resources to the regions whose GDP is below the average. And there is evidence of horizontal redistribution also for regional and local governments. Horizontal redistribution by social security institutions is highly polarised, with only five regions providing net financing to the others. The last column of the table shows that a good portion of inter-regional redistribution is generated by spending programmes run by sub-national governments and social security institutions but financed by central government.

TABLE 5 APPROXIMATELY HERE

## 5. THE SPECIFICATION OF THE ECONOMETRIC MODEL

The literature generally relates redistribution to public programmes aiming at offsetting long-run regional income differentials, while risk sharing refers to short-term relief from asymmetric shocks. Though tenuous in theory – as redistribution can be simply seen as risk sharing over a longer time span (OBSTFELD and PERI, 1998; DECRESSIN, 2002; VARIAN, 1980) – this partition can be useful in analysing the effects of public policy.<sup>8</sup>

The literature has taken two main econometric approaches. That proposed by OBSTFELD and PERI (1998) and applied to Italian data by DECRESSIN (2002) estimates a bivariate VAR. The amount of redistribution is recovered from the estimated steady state relationship between the regional “activity” variable plus fiscal residuum and the regional activity variable alone; risk sharing is measured by the contemporary response or from the impulse responses of the two variables (DECRESSIN, 2002).

In the second approach the degree of redistribution and the degree of risk sharing are estimated separately, with two different regressions. With reference to redistribution, VON HAGEN (1992) regresses annual values of taxes and transfers in levels on annual values of incomes.

A more common specification is that suggested by BAYOUMI and MASSON (1995), which resorts to long-run average levels:

$$\bar{y}_i = \alpha_1 + \beta_1 \bar{x}_i + \eta_i \quad (1)$$

where overscored variables denote averages over time and all variables have been divided by nationwide values to control for shocks that are common to all regions and that may be absorbed via the national budget, i.e.:

$$x_{it} = \frac{X_{it}}{\sum_{i=1}^{20} X_{it}}, \quad y_{it} = \frac{Y_{it}}{\sum_{i=1}^{20} Y_{it}}$$

where  $X_{it}$  is per capita GDP in region  $i$  and year  $t$ , while  $Y_{it}$ , is given by  $X_{it}$  plus the fiscal residuum.

The amount of redistribution is given by  $1 - \beta_1$ : a region with income or output 1 euro higher-than-average ends up with disposable resources  $1 - \beta_1$  euro higher-than-average, implying a redistribution of  $\beta_1\%$  of income or output.

As for the evaluation of risk sharing, a widely used functional specification is BAYOUMI and MASSON (1995):

$$\Delta y_{it} = \theta_i + \gamma_1 \cdot \Delta x_{it} + \varepsilon_{it} \quad (2)$$

where  $x_{it}$  and  $y_{it}$  refer to income or output of region  $i$  at time  $t$ , respectively before and after net public transfers, and  $\Delta$  denotes first differences at time  $t$ .

MÉLITZ and ZUMER (2002) showed that (2) is equivalent to:

$$y_{it} - \bar{y}_i = \gamma_2 (x_{it} - \bar{x}_i) + v_{it} \quad (3)$$

when  $\theta_i$  is equal to zero (where  $\bar{y}$  and  $\bar{x}$  denote average values over time).

The same authors note that equations (1) and (3) can be summarised in one single equation yielding the same estimates for the relevant parameters:

$$y_{it} = \alpha_1 + \beta_1 \bar{x}_i + \gamma_2 (x_{it} - \bar{x}_i) + \zeta_{it} \quad (4)$$

The degree of risk sharing, like redistribution, will be measured by  $1 - \gamma_1$  or  $1 - \gamma_2$ .

In this paper we take this second approach, estimating redistribution and risk sharing separately by using the fiscal residua as a gauge of public sector impact. However, in our view the specification based on (1) and (2) or (3) is not entirely satisfactory for data, like ours, that display regional trends.

To illustrate this point, we must first formally define our variables. Our measure of economic activity is a broad one, namely regional per capita GDP. Figure 1 shows the values of per capita GDP for the largest northern region, Lombardia, and for a large southern one, Campania. On average, over the estimation period per capita GDP in Lombardia is 30% above the national mean, but it displays a clear downward trend. For Campania, the reverse pattern holds: per capita GDP

averages 35% below the national mean, but with a clear upward trend. Given these regional trends, it would be inappropriate to take the average values over the entire estimation period to distinguish between redistribution and risk sharing, as is assumed in equations (1) and (3).

FIGURE 1 APPROXIMATELY HERE

Accordingly we propose a variant of MÉLITZ and ZUMER (2002), where in equations (1) and (3) the averages of  $y$  and  $x$  are replaced by their trends. In order to isolate the trend and the cyclical component we apply the HODRICK and PRESCOTT (1997) filter, region by region, to both the  $x$  and  $y$  series.<sup>9</sup> Then we run the following two regressions to estimate, respectively, the redistributive and risk-sharing effects of public intervention, as measured by the fiscal residuum:

$$\tilde{y}_{it} = \alpha_2 + \beta_2 \tilde{x}_{it} + \mu_{it} \quad (5)$$

$$y_{it} - \tilde{y}_{it} = \gamma_3 (x_{it} - \tilde{x}_{it}) + \nu_{it} \quad (6)$$

where trend components are denoted by tildes. Like equations (1) and (3), these two equations may be summarised in one single equation:

$$y_{it} = \alpha_2 + \beta_2 \tilde{x}_{it} + \gamma_3 (x_{it} - \tilde{x}_{it}) + \xi_{it}. \quad (7)$$

## 6. RESULTS

Our regression results are reported in Table 6. The upper part shows the coefficients when fiscal residua are calculated without separating vertical from horizontal flows (see Table 4). The lower part presents the regression results when the two types of flow are distinguished and the fiscal residua are those described in Table 5. To measure the impact of each tier of government, we run a series of regressions – adopting both the definitions of fiscal residua – starting with one level of government (central) and then sequentially adding to the dependent variable the fiscal residua of successive levels. We also disaggregate the fiscal residua by considering first, as an endogenous

1  
2 variable, per capita GDP less revenue and then per capita GDP less revenue plus expenditure (i.e.  
3  
4 per capita GDP plus the fiscal residuum).  
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8  
9 TABLE 6 APPROXIMATELY HERE  
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## 11 12 13 14 15 16 6.1 REDISTRIBUTION 17

18  
19 Columns (1) and (2) of Table 6 show the degree of inter-regional redistribution measured by an  
20  
21 OLS estimate of equation (5). An OLS estimate of equation (1) results in the same degree of  
22  
23 redistribution, so the latter results are not reported here.  
24

25  
26 The estimate for inter-regional redistribution by general government amounts to 27.6% of GDP  
27  
28 (column 2, row 4), which is remarkably close to the value of 24.5% found by DEGRESSIN (2002) for  
29  
30 the period 1983-1992 using specification (1).  
31

32  
33 Our dataset enables us to extend Decressin's analysis by isolating the contribution of each tier of  
34  
35 government to the total redistribution effected by general government. The first row in column (2)  
36  
37 reports the value of the estimated coefficient when the dependent variable is per capita GDP plus  
38  
39 the central government fiscal residuum. This coefficient, then, is a measure of the redistribution  
40  
41 generated by this level of government alone.  
42

43  
44 In the second row the regional government fiscal residuum is added to the dependent variable.  
45  
46 The difference between the coefficient in the first row and that in the second measures the  
47  
48 redistributive effect of regional government programmes. Adding in the fiscal residua of the other  
49  
50 tiers one by one, we can measure the redistribution effected by local government and social  
51  
52 security.  
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54  
55 Examining first the upper part of the table (where horizontal and vertical flows are considered  
56  
57 jointly), the coefficients show that all levels except the regions contribute positively to income  
58  
59 redistribution. The estimated value of  $1-\beta_2$  rises when both the local government and the social  
60

1 security fiscal residua are added in turn, suggesting that these tiers of government redistribute  
2 income across territories; but when the fiscal residuum of the regional governments is added, the  
3 coefficient falls, implying that the overall impact of regional government intervention is regressive.  
4 In any case, the impact of those levels of government is modest. Most of the redistribution is due to  
5 central government, which redistributes 25.7% of per capita GDP.  
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13 Separating horizontal from vertical flows (lower part of Table 6), OLS estimates show that most  
14 of inter-regional redistribution is accomplished through horizontal flows, which redistribute 25.1%  
15 of GDP. Vertical flows account for only 2.5% (i.e., the difference between the horizontal flows'  
16 contribution and overall redistribution by general government), or less than a tenth of the total  
17 redistributive effect. When levels of government are considered separately, the effects of horizontal  
18 flows are not significantly different from those of total flows (vertical plus horizontal): most of the  
19 redistribution between regions results from central government, which redistributes 19.4% of GDP.  
20 Again, local governments and social security institutions play a limited role and regional  
21 government policies are somewhat regressive.  
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35 Further insights come from an analysis of the relative contributions of revenues and  
36 expenditures to inter-regional redistribution. Column (1) of Table 6 reports the coefficients  
37 estimated when the endogenous variable is per capita GDP less revenues. Those coefficients  
38 provide a measure of the redistributive impact of taxes and social security contributions levied by  
39 the different tiers of government. The difference, row by row, between the values of column (1) and  
40 of column (2) measures the redistribution brought about by public expenditure. Inspection of the  
41 upper part of Table 6 shows that central government taxes and contributions (row 1) play a limited  
42 role (5.9% of GDP) in redistributing resources across territories. The bulk of the redistribution by  
43 central government is accomplished by public expenditure. Revenues always contribute positively  
44 to redistribution at each level of government. The redistributive impact of expenditures by the other  
45 tiers is quite limited or even, as in the case of the regions, regressive.  
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In what follows we seek to interpret the results reported in the lower part of Table 6. We recall that the horizontal inter-regional flows generated by the central government have been determined by a proportional reduction of the revenues accruing to that level of government, as described in Section 4. This explains why when horizontal flows are considered in isolation the degree of redistribution accounted for by central government taxes and contributions is more than halved, from 5.9% in row (1) to 2.3% in row (5). The same argument explains why the overall impact of the central government (and of general government overall) remains large when the focus is on horizontal flows (row 5, column 2): the main redistributive component of public policies (i.e. expenditures) is still entirely included in the fiscal residuum.

The result – that general government expenditure and revenues are significant channels of inter-regional redistribution in Italy – is consistent with the findings of DEGRESSIN (2002). What is novel in our analysis is the evidence on the role of each tier of government in total redistribution. Specifically, we show the large part played by taxes and contributions (15.4% of GDP), especially when levied by regional and local governments and by social security institutions, and the regressive effect of regional expenditure programmes.

## 6.2 RISK SHARING

Columns (3) to (8) of Table 6 report the estimated coefficients under the three different specifications discussed in Section 5. First look at the upper section of the table, with the results for total flows (horizontal plus vertical). The MÉLITZ and ZUMER (2002) approach, based on equation (3) (columns (3) and (4)) yields an estimate for overall risk sharing provided by general government of 35.4% (column (4)) which is considerably higher than the values found by DEGRESSIN (2002), which range from 8% to 15% for the period 1983-1992.

The most interesting result, though, is that the other two specifications lead to the opposite conclusion. The fixed-effect estimate of equation (2) (columns (5) and (6)) gives a value of  $\gamma_1$  greater than 1 for general government, implying that public intervention has an overall risk-



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2 enhancing effect on the economy. Even more surprising is the magnitude of the effect: idiosyncratic  
3  
4 shocks are amplified by 40.3% (column (6)).  
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6  
7 The OLS estimate of equation (6) (columns (7) and (8)) confirms the risk-enhancing impact of  
8  
9 public policies, though to a smaller extent (30.2%; column 8).  
10

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12 This striking variance in the estimates depends on the trends in regional variables discussed  
13  
14 above. As explained in Section 5, with no regional trends in the data, equations (3) and (2) would  
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16 yield the same estimates, while if the data show regional trends, equation (3) is mis-specified and  
17  
18 the estimates are biased.  
19

20  
21 It is worth emphasising this point, in that MÉLITZ and ZUMER (2002) argued strongly that “[...]”  
22  
23 employing levels or first differences makes no difference at all” with supporting evidence from the  
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25 US, Canada, France and UK. Their conclusion, diametrically opposite to our own, probably reflects  
26  
27 the different period covered. Their observations span at least 16 years. Given that  $x$  and  $y$  are  
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29 normalised to the national values, they are unlikely to show regional trends over such a long period.  
30  
31 In fact, the relevance of regional trends when the time dimension is small also emerges from the  
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33 evidence provided by DEGRESSIN (2002) on a 9-year dataset. Using equation (3), he estimates risk  
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35 sharing at 13.3%, but when regional trends are allowed for, using equation (2), that value drops,  
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37 significantly, to 8%.  
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42 Having shown the importance of regional trends in analysing our own dataset, let us now focus  
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44 on the specification of equation (6), which is more suitable to determining the income-smoothing  
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46 effect of public policies against regional idiosyncratic shocks.  
47  
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49  
50 First, comparing columns (7) and (8) of Table 6 makes it clear that the risk-enhancing impact of  
51  
52 general government fiscal residua depends on the dynamics of revenue. The coefficient in row (4)  
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54 falls from -45.7% to -30.2% when public expenditure is added to per capita GDP less revenue. This  
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56 confirms the results of DEGRESSIN (2002), who provides evidence of a pro-cyclical effect of taxes  
57  
58 and contributions, albeit on a smaller scale than derived here.  
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2 It is interesting to disaggregate the regional income-smoothing effect across tiers of government.  
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4 Central government and social security institutions follow the pattern of general government as a  
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6 whole, i.e. strongly risk-enhancing revenues and mildly risk-reducing expenditures; regional and  
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8 local governments, the reverse: providing insurance through taxes but amplifying regional shocks  
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10 through their expenditures.  
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14 The overall picture is thus complicated, and devising a consistent explanation for all these  
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16 findings is not easy. One reason for the risk-amplifying effect of general government revenue may  
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18 be the modest amount of direct taxation, which accounts for just one third of total Italian  
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20 government revenues. The other two main sources of revenue, indirect taxes and social security  
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22 contributions, are not directly correlated with income (and so may remain fairly stable in the face of  
23  
24 a shock) and are moderately regressive. Another, more methodological, factor is our use of budget  
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26 data on a cash basis. Firms and the self-employed pay taxes in three instalments. In June and  
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28 November each year they make payments on account of their tax liability for the year, and in June  
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30 of the following year they pay any balance due between the tax liability based on their tax returns  
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32 for the past year and the sum of the payments on account. Account payments are based on the  
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34 previous year's income, so tax revenue from firms and the self-employed is lagged by one year with  
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36 respect to income. This may be one reason why revenue does not decrease after a negative shock to  
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38 regional income or increase after a positive one.  
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45 It is harder to explain why regional and local government revenues generate a risk sharing  
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47 effect. The case of local governments is particularly puzzling, as their taxes are levied essentially on  
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49 wealth (chiefly the municipal real estate tax), so that the base is relatively insulated from the  
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51 economic cycle. As for regional governments some insights into revenue dynamics can be gained  
52  
53 from an examination of the reforms enacted between 1996 and 2002. The regions were assigned  
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55 new taxes (mainly a value added business tax) and a new system of inter-regional transfers was  
56  
57 introduced (ARACHI and ZANARDI, 2004).  
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2 Our last surprising result is the strong pro-cyclical impact of regional government expenditure.  
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4 About 80% of regional budgets consist of National Health Service funding, which in theory should  
5  
6 not be related to the cyclical component of regional GDP and should thus offer some insurance  
7  
8 against idiosyncratic shocks. This clash between theory and empirical evidence is perhaps best  
9  
10 explained by the repeated efforts of the central government to curb health spending, with measures  
11  
12 that may have hit regions asymmetrically and thus accentuated negative shocks.  
13  
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15  
16 The lower part of Table 6 shows the relative contribution of horizontal and vertical flows.  
17  
18 Redistribution is driven mainly by horizontal flows, risk sharing by vertical flows. The latter are  
19  
20 strongly pro-cyclical, as they consist of fiscal residua computed as the difference between a share of  
21  
22 regional, local, and social security expenditure (the first two pro-cyclical, the latter counter-cyclical)  
23  
24 and a share of central government revenue (which is strongly pro-cyclical).  
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## 30 7. CONCLUSION

31  
32 In this paper we seek to measure income redistribution and risk sharing between Italian regions  
33  
34 effected by the public sector. The multi-level structure of Italian government and the financial  
35  
36 relations (in terms of tax-sharing and grants) that link the different tiers are considered explicitly.  
37  
38 This allows us to break down the redistributive and income-smoothing effects of public policies  
39  
40 according to the institutional units that effect them.  
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44  
45 Using panel data for 1996-2002 we find that taxes and expenditures significantly reduce  
46  
47 regional differences in per capita GDP. A region whose per capita GDP is 1 euro higher or lower  
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49 than the national average ends up, after public intervention, about 72 cents higher or lower. Most of  
50  
51 the redistributive impact is due to central government, while the contribution of local government  
52  
53 and social security institutions is minor, and that of regions is regressive. Horizontal flows of  
54  
55 resources across territories, those involving the same level of government, account for about 90% of  
56  
57 total redistribution; just 10% comes from vertical flows, i.e. expenditures by sub-national  
58  
59 governments financed by transfers from the central government. As for the relative effects of  
60

1  
2 specific fiscal instruments, the bulk of the redistribution comes via central government expenditure,  
3  
4 while the spending of the other levels is distributionally neutral or even regressive. In terms of the  
5  
6 total redistribution produced by each level of government, revenues are much more important for  
7  
8 regional and local governments and social security institutions than for the central government.  
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10  
11 As for risk sharing, the public budget in Italy has no smoothing effects on regional economies  
12  
13 hit by asymmetric, region-specific shocks. On the contrary, public policies greatly accentuate the  
14  
15 variance of annual GDP across regions by about 30.2%. This risk-enhancing effect is driven mainly  
16  
17 by the revenues of the central government, only partially offset by the income-smoothing behaviour  
18  
19 of social security expenditures. The effects of regional and local government are quite modest and  
20  
21 of opposite sign. Finally, our estimates highlight a sharp contrast between horizontal and vertical  
22  
23 flows in terms of risk-sharing properties. The impact of the former is relatively minor and counter-  
24  
25 cyclical, that of the latter is substantial and strongly pro-cyclical.  
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30  
31 An interesting area for future research is the links between inter-regional risk sharing and  
32  
33 cyclical income-smoothing. A growing body of empirical literature (reviewed by EUROPEAN  
34  
35 COMMISSION, 2006) has found evidence of pro-cyclical use of fiscal policy in a number of  
36  
37 industrialised countries, in particular during good times. Some of the explanations for this may also  
38  
39 apply to the amplification of regional idiosyncratic shocks that we have documented here. For  
40  
41 example, lags in revenue collection may explain both phenomena. However, it is not clear whether  
42  
43 other sources of pro-cyclicality may also account for the pattern of regional risk sharing across tiers  
44  
45 of government. For example, simple “political economy” explanations for the observed pro-cyclical  
46  
47 behaviour of fiscal policy<sup>10</sup> would imply the same behavioural pattern at all tiers of government,  
48  
49 while our inquiry finds evidence of a diametrically opposite behaviour between central government  
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51 and social security institutions on the one hand and regional and local governments on the other.  
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Table 1: Regional indicators (2002)

Regions	Surface area (Sq km)	Population	Population density	Population <15 years (%)	Population >64 years (%)	GDP (millions of euro)	Per capita GDP (thousands of euro)	Per capita GDP (index)
Piemonte	25,399	4,270,215	168	12.0	21.3	106,200	24.9	114.3
Valle d'Aosta	3,262	122,040	37	12.9	19.5	3,374	27.6	127.1
Lombardia	23,857	9,246,796	388	13.2	18.2	255,086	27.6	126.8
Trentino-Alto Adige	13,619	962,464	71	16.0	17.1	27,284	28.3	130.3
Veneto	18,364	4,642,899	253	13.5	18.3	112,520	24.2	111.4
Friuli-Venezia Giulia	7,845	1,198,187	153	11.4	21.6	29,683	24.8	113.9
Liguria	5,416	1,577,474	291	10.6	25.4	37,855	24.0	110.3
Emilia Romagna	22,123	4,080,479	184	11.6	22.3	110,659	27.1	124.6
Northern Italy	119,885	26,100,544	22	12.8	20.2	682,660	26.2	120.2
Toscana	22,992	3,566,071	155	11.7	22.3	84,942	23.8	109.5
Umbria	8,456	848,022	100	12.3	22.6	17,458	20.6	94.6
Marche	9,694	1,504,827	155	12.9	21.8	32,364	21.5	98.9
Lazio	17,203	5,205,139	303	14.1	17.7	130,012	25.0	114.8
Abruzzo	10,794	1,285,896	119	13.9	20.5	23,753	18.5	84.9
Central Italy	69,139	11,124,059	161	13.1	20.4	288,528	25.9	119.2
Molise	4,438	321,697	72	14.2	21.4	5,512	17.1	78.8
Campania	13,595	5,760,353	424	18.7	14.2	84,597	14.7	67.5
Puglia	19,348	4,040,990	209	16.8	15.8	60,057	14.9	68.3
Basilicata	9,992	597,000	60	15.7	18.7	9,261	15.5	71.3
Calabria	15,080	2,011,338	133	16.7	17.2	27,752	13.8	63.4
Sicilia	25,708	5,003,262	195	17.4	16.7	73,475	14.7	67.5
Sardegna	24,090	1,643,096	68	13.9	16.1	27,594	16.8	77.2
Southern Italy	112,251	20,663,632	184	16.7	16.7	288,249	13.9	64.1
Italy	301,277	57,888,245	192	14.3	18.9	1,259,437	21.8	100.0

Source: Istat

Table 2: General government: expenditures, revenues and deficits by different levels of government (% GDP, 2002)

	General government	Central government		Sub-national governments		Social security institutions	
		gross of transfers from/to other public institutions	net of transfers from/to other public institutions	gross of transfers from/to other public institutions	net of transfers from/to other public institutions	gross of transfers from/to other public institutions	net of transfers from/to other public institutions
Total expenditures	47.4	27.4	16.9	14.7	14.7	16.1	15.9
Total revenues	44.5	24.4	24.2	13.9	8.1	17.1	12.4
Deficit	-2.8	-3.0	7.3	-0.8	-6.5	0.9	-3.5

Source: Istat, Conti ed aggregati economici delle Amministrazioni pubbliche, SEC95 series

Table 3: Public sector: financing of total expenditures by institutional levels (% total expenditures, 2001)

	Taxes	Social security contributions	Transfers from						Other revenues	Deficit
			(1)	(2)	(3)	(4)	(5)	(6)		
Central government (1)	78.3	0.2	0.0	0.5	0.0	0.0	0.0	0.1	10.7	10.2
Social security institutions (2)	0.0	70.1	27.4	0.0	0.0	0.0	0.0	0.4	2.0	0.0
Regions (3)	40.9	0.0	53.0	0.0	0.0	0.0	0.2	0.3	4.9	0.8
Local health units (4)	0.0	0.0	0.0	0.0	90.2	0.0	0.2	0.3	8.3	1.1
Provinces and Municipalities (5)	28.5	0.0	21.9	0.0	13.2	0.0	0.0	1.3	33.5	1.6
Other public institutions (6)	3.6	0.2	52.0	4.7	12.6	0.0	3.4	5.1	18.6	-0.2
Duplicative items	0.0	0.0	57.7	1.2	33.5	0.0	0.6	1.6	5.5	-0.1
Public sector	58.3	23.6	24.2	0.5	14.0	0.0	0.2	0.7	11.5	6.6

Source: Ministero dell'Economia e delle Finanze, Relazione Generale sulla Situazione Economica del Paese, Vol. III, Tab. Appendix SP.1

Table 4: Fiscal residua for different levels of government (per capita average values 1996-2002, euro 2002)

	GDP		General government		Central government		Regional government		Local government		Social security	
	Average	Standard deviation	Average	Standard deviation	Average	Standard deviation	Average	Standard deviation	Average	Standard deviation	Average	Standard deviation
Piemonte	24,168	884	-2,100	730	-4,671	436	678	162	495	57	1,397	279
Val D'Aosta	28,254	534	3,397	1,211	-5,682	491	6,046	840	1,421	302	1,612	201
Lombardia	27,152	624	-4,893	669	-6,430	404	806	193	264	223	466	260
Trentino Alto Adige	27,489	695	631	894	-5,604	444	4,581	430	1,298	178	356	235
Veneto	24,494	627	-2,841	558	-4,467	334	815	264	377	49	434	228
Friuli Venezia Giulia	23,720	875	-727	433	-4,519	357	1,534	256	659	75	1,599	194
Liguria	22,533	1,625	232	400	-4,131	358	955	184	583	98	2,824	274
Emilia Romagna	26,420	840	-3,180	491	-5,664	404	750	322	425	62	1,309	204
Toscana	22,993	953	-1,049	743	-4,107	289	857	579	589	70	1,612	222
Umbria	20,207	843	797	385	-2,865	291	799	92	945	171	1,918	175
Marche	21,201	677	-538	316	-3,330	332	929	255	565	96	1,298	166
Lazio	22,889	1,009	-2,252	653	-4,289	316	740	393	434	398	863	288
Abruzzo	18,042	744	779	456	-1,920	291	856	275	567	48	1,277	148
Molise	16,445	860	2,471	368	-897	190	1,363	191	718	78	1,287	182
Campania	13,363	760	1,927	379	-729	223	1,069	205	712	60	875	122
Puglia	13,865	786	1,689	261	-974	197	932	230	477	24	1,253	130
Basilicata	15,036	870	2,923	300	-286	250	1,299	276	891	61	1,018	146
Calabria	12,943	792	3,440	376	-106	254	1,514	187	711	46	1,321	136
Sicilia	13,938	742	2,846	338	-838	191	1,605	177	875	26	1,203	135
Sardegna	15,760	752	2,617	606	-1,377	316	1,894	369	924	51	1,176	162
Italy	20,890	818	-825	378	-3,499	282	1,053	149	553	64	1,068	176

Fiscal residuum = expenditure net of all transfers to other levels of government - revenue net of all transfers from other levels of government

Public expenditure excluding interest payments

Source: based on data from Ministero dell'Economia e delle Finanze, Conti pubblici territoriali and Istat, Conti territoriali

Table 5: Vertical and horizontal flows in fiscal residuals (per capita average values 1996-2002, euro 2002)

	General government	Horizontal flows				Vertical flows
		Central government	Regional government	Local government	Social security	
Piemonte	-2,100	-673	-215	-18	136	-1330
Val d'Aosta	3,397	-1,287	1,363	547	290	2484
Lombardia	-4,893	-1,562	-187	-429	-703	-2012
Trentino Alto Adige	631	-1,262	1,288	350	-699	955
Veneto	-2,841	-615	-92	-89	-564	-1482
Friuli Venezia Giulia	-727	-481	246	9	240	-741
Liguria	232	-260	11	-83	1,327	-763
Emilia Romagna	-3,180	-1,119	-280	-176	-19	-1586
Toscana	-1,049	-335	-249	-30	367	-803
Umbria	797	353	-341	263	671	-148
Marche	-538	68	-91	9	176	-700
Lazio	-2,252	58	-136	-166	-546	-1462
Abruzzo	779	873	-36	101	299	-458
Molise	2,471	1,362	260	227	364	258
Campania	1,927	1,424	141	255	170	-63
Puglia	1,689	1,215	86	127	463	-204
Basilicata	2,923	1,713	155	355	229	471
Calabria	3,440	1,797	367	302	542	432
Sicilia	2,846	1,241	354	388	447	416
Sardegna	2,617	1,143	426	373	306	369
Italy	-825	0	0	0	0	-825

Fiscal residuum = expenditure net of all transfers to other levels of government - revenue net of all transfers from other levels of government

Public expenditure excluding interest payments

Source: based on data from Ministero dell'Economia e delle Finanze, Conti pubblici territoriali and Istat, Conti territoriali

Table 6: Degree of redistribution and risk sharing through fiscal flows (1996–2002)

	Redistribution				Risk sharing			
	Eq. (5)		Eq. (3)		Eq. (2)		Eq. (6)	
	$1 - \beta_2$		$1 - \gamma_2$		$1 - \gamma_1$		$1 - \gamma_3$	
Number of observations	140		140		120		140	
Endogeneous variable	(1) GDP minus revenue	(2) GDP plus fiscal residuum	(3) GDP minus revenue	(4) GDP plus fiscal residuum	(5) GDP minus revenue	(6) GDP plus fiscal residuum	(7) GDP minus revenue	(8) GDP plus fiscal residuum
	Total flows (horizontal plus vertical)							
(1) Central government	0.059 (0.009)	0.257 (0.007)	-0.284 (0.032)	-0.040 (0.055)	-0.468 (0.075)	-0.338 (0.103)	-0.450 (0.061)	-0.341 (0.084)
(2) (1)+Regional governments	0.079 (0.010)	0.210 (0.032)	-0.337 (0.114)	0.251 (0.156)	-0.288 (0.332)	-0.437 (0.445)	-0.176 (0.198)	-0.356 (0.291)
(3) (2)+Local governments	0.105 (0.011)	0.232 (0.037)	-0.351 (0.127)	-0.341 (0.160)	-0.266 (0.392)	-0.407 (0.454)	-0.109 (0.236)	-0.330 (0.291)
(4) (3)+Social security institutions	0.154 (0.020)	0.276 (0.036)	-0.550 (0.187)	0.354 (0.161)	-0.724 (0.571)	-0.403 (0.437)	-0.457 (0.351)	-0.302 (0.285)
	Horizontal flows							
(5) Central government	0.023 (0.003)	0.194 (0.004)	-0.108 (0.012)	0.071 (0.043)	-0.158 (0.024)	-0.054 (0.082)	-0.155 (0.022)	-0.073 (0.065)
(6) (1)+Regional governments	0.037 (0.006)	0.188 (0.010)	-0.146 (0.091)	0.438 (0.095)	0.005 (0.263)	0.012 (0.145)	0.083 (0.154)	0.099 (0.127)
(7) (2)+Local governments	0.056 (0.006)	0.209 (0.014)	-0.148 (0.099)	0.493 (0.108)	0.041 (0.311)	0.031 (0.161)	0.151 (0.185)	0.127 (0.139)
(8) (3)+Social security institutions	0.082	0.251	-0.251	0.514	-0.224	-0.044	-0.044	0.084

(0.011) (0.015) (0.137) (0.099) (0.423) (0.152) (0.255) (0.144)

Source: based on data from Ministero dell'Economia e delle Finanze, Conti pubblici territoriali

White corrected standard errors in parentheses pertain to respectively  $\beta$  or  $\gamma$

Regional constants are included as regressors but not reported

The designated equations, to which  $\beta_2$ ,  $\gamma_1$ ,  $\gamma_2$  and

$\gamma_3$  refer, are as follows:

Equation (2):

$$\Delta y_{it} \equiv \theta_i + \gamma_1 \cdot \Delta x_{it} + \varepsilon_{it}$$

Equation (3):

$$y_{it} - \bar{y}_i = \gamma_2 (x_{it} - \bar{x}_i) + v_{it}$$

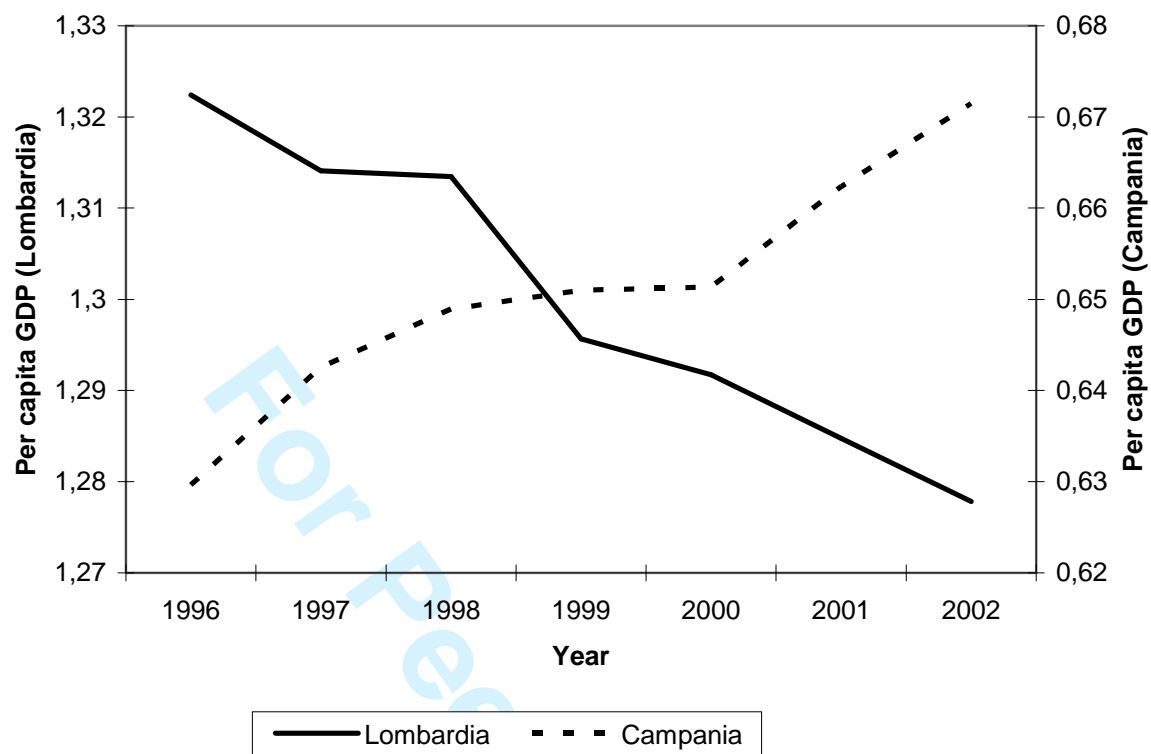
Equation (5):

$$\tilde{y}_{it} = \alpha_2 + \beta_2 \tilde{x}_{it} + \mu_{it}$$

Equation (6):

$$y_{it} - \tilde{y}_{it} = \gamma_3 (x_{it} - \tilde{x}_{it}) + u_{it}$$

Figure 1: Standardised per capita GDP in Lombardia and Campania (1996-2002, thousands of euro)





<sup>1</sup> The literature usually disregards the effect of public sector policy on the equilibrium GDP or income. The analysis of the Keynesian effects is relevant in considering regional attitudes on separation from national states (BROSIO and REVELLI, 2003).

<sup>2</sup> Interest on the public debt is excluded in order to make the results comparable with those of the existing literature, which usually does not apportion interest expenditure on a regional basis, as the criteria for doing so would be highly arbitrary.

<sup>3</sup> For geographical, historical and cultural reasons, the Italian Constitution established 5 autonomous regions with special statutes, having broader spending powers than the ordinary statute regions and correspondingly larger financial transfers from the central government.

<sup>4</sup> This is the last year for which the data used in the empirical section of this paper are available.

<sup>5</sup> However, the reforms of local government finance adopted during the 1990s have almost halved this vertical fiscal gap for regions and municipalities.

<sup>6</sup> See ARACHI and ZANARDI (2004).

<sup>7</sup> MINISTERO DELL'ECONOMIA E DELLE FINANZE,  
[http://www.dps.mef.gov.it/cpt/banca\\_dati\\_home.asp](http://www.dps.mef.gov.it/cpt/banca_dati_home.asp)

<sup>8</sup> The usefulness of the distinction is apparent in comparing our results here with the findings of PADOVANO (2007). Using data on the 20 Italian regions for 1963-2001, he estimates the degree of progression across jurisdictions of public sector revenues. The results show a geographically progressive tax regime for the period 1996-2001. In theory this would imply a positive degree both of redistribution and of risk-sharing. Our own analysis, however, confirms only the redistributive and not the risk-sharing impact of public sector revenue; indeed, general government revenue actually appears to amplify idiosyncratic shocks.

<sup>9</sup> Following RAVN and UHLIG (2002) and MARAVALL and DEL RIO (2001) we set the penalty parameter equal to 7.

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3 <sup>10</sup> Short-sighted governments may underestimate the longer term negative consequences of deficits;  
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5 pressure groups, in competing for resources, neglect the general repercussions on the public  
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7 finances (the common pool problem). The result is a tendency for deficits to accumulate. As long as  
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9 a deficit bias is present irrespective of cyclical conditions, pro-cyclical policies could emerge.  
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