Fiscal interest in Flanders: The impact of tax autonomy on productive expenditure

Sander RAMBOER (*)
VIVES, KU LEUVEN

The fiscal interest approach emphasizes the importance of own revenue generation in advancing the accountability of subnational governments, their responsiveness to constituents' needs and the general performance of their jurisdictions. If fiscal decentralization affects public officials' incentives in such a way that their policy choices are more growth-oriented, one would expect to see this reflected in subnational spending. Based on that premise, this study analyzes the impact of tax decentralization in Belgium on the share of productive public expenditure in Flanders. While some evidence is found that own revenue retention boosts productive spending, doubt is cast on the results due to limitations in the empirical approach. For all specifications the coefficient for tax decentralization is positive, but not always significant. Furthermore, the preferred specification, which tries to account for lags in decision making and the presence of vertical fiscal imbalance, likely suffers from collinearity.

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1   Introduction

A substantial part of the fiscal federalism literature is devoted to analyzing the relationship between fiscal decentralization and growth. Despite a vast amount of research, a conclusive answer to whether decentralization in fact aids or abates growth remains elusive. In theory however, an optimal degree of fiscal decentralization can spur growth in various ways. One such way is developed under the fiscal interest approach which focusses on the incentive inherent to local revenue retention. As tax autonomy is decentralized, local governments are no longer required to hand over their locally raised revenue. Fiscal decentralization then provides an extra incentive to spur local development because a resulting increase in house prices, business activity or constituents' income will raise own tax revenue. So under the right circumstances, fiscal decentralization could positively affect growth, regardless of the actual goals driving local public officials.

To test the fiscal interest theory, this study does not examine the relationship between decentralization and growth but instead analyzes the impact of tax autonomy on specific categories of expenditure. Assuming local government can affect growth through spending, fiscal interest suggests that, in an attempt to broaden the tax base, an increase in tax autonomy will lead to a disproportionate increase in productive public expenditure. Such expenditure can be broadly defined as any spending generating feedback effects in tax revenue. Some infrastructure projects for instance may raise property values while others may attract business and affect employment, in turn raising local property and income tax revenue. To test this hypothesis, the study directs attention to Flanders, a region in Belgium that obtained tax and spending autonomy through several stages of decentralization.

The rest of the paper is structured as follows. First an overview of fiscal federalism theory is provided which introduces the basic notions and concepts in the literature. The next part then builds on these principles, and in particular those of the fiscal interest theory, to develop the study's hypothesis. The third part brings Belgium forward as the subject of analysis and takes a step back to explain why this country is particularly suited for study. Subsequently the fourth part sets the stage for the actual analysis by describing the methodology and giving an overview of the data. Finally the fifth part presents the regression results while a discussion concludes the paper.

2   An introduction to fiscal federalism

Fiscal federalism is a subfield of public economics that studies which expenditure functions and revenue raising powers are best decentralized and to what degree. The foundation of fiscal federalism was laid by Samuelson's theory of public expenditure (1954) and Musgrave's theory of public finance (1959). Subsequently the literature gained further ground through the seminal contributions of Tiebout (1956), Oates (1972) and Brennan and Buchanan (1980). Currently, the literature is seeing a second wave of contributions generally referred to as the Second Generation Theory (SGT) of fiscal federalism (Qian and Weingast (1997)).

2.1   First Generation Theory

Perhaps the best way to describe First Generation Theory (FGT) is to consider the three branches of public finance introduced by Musgrave (1959): macroeconomic stabilization, income redistribution and resource allocation. While the first and second objectives are considered more attainable under central control, decentralization has been argued to improve allocation. Indeed, the main drive behind FGT is the advantage subnational governments have over national government in catering to local preferences. In effect, fiscal decentralization allows welfare gains from a more efficient allocation of public sector resources, barring cost advantages at the central level.

This principle is also present in the paper by Tiebout (1956) who expanded Samuelson's work (1954) on the nature of public goods by introducing local public goods. In Tiebout's model consumer-voters move to communities that best satisfy their preferences relating to the provision of such goods (i.e. Tiebout sorting). As such, local expenditure can rely on a preference revelation mechanism that is more effective than the political mechanism which suffers from freeriding. Therefore the true demand for local public goods is met (and taxed) efficiently.

The idea that decentralized provision of public services, reflecting local preferences and costs, maximizes welfare, is captured in Oates' Decentralization Theorem (DT):

> *For a public good—the consumption of which is defined over geographical subsets of the total population, and for which the costs of providing each level of the good are the same for the central or for the respective local government—it will always be more efficient (or at least as efficient) for local governments to provide Pareto–efficient levels of output for their respective jurisdictions than for the central government to provide <u>any</u> specified and uniform level of output across all jurisdictions.*
> (Oates 1972, p. 35)

In short, FGT presents a tradeoff of allocative efficiency (decentralization) versus economies of scale and spillover internalization (centralization).

Lastly, Brennan and Buchanan (1980) stepped away from the view of government as benevolent and welfare maximizing. Instead, they characterized it as a Leviathan or a monopoly trying to maximize tax revenue. Given mobility of firms and constituents, fiscal decentralization then helps constrain these expansionary tendencies as local governments compete with each other.

A more thorough review of first generation literature is provided by Oates (2005, 2008) and Vo (2009), among others. Suffice to say that FGT is generally supportive of fiscal decentralization. Coincidentally, in the 1990s several Eastern European and developing countries started a process of decentralization (see e.g. Smoke (2001), Rodríguez-Pose and Krøijer (2009) and Aristovnik (2012)). This trend has actively been supported by supranational institutions like the World Bank and the OECD [1] and has evidently contributed to the empirical literature, albeit with mixed results regarding the impact of fiscal decentralization. Some empirical works for instance, note the apparently destabilizing fiscal behavior following decentralization in Latin-America (see e.g. Willis et al. (1999) and Tommasi et al. (2001)). In turn these observations have contributed to a new theoretical strand in the literature (Oates (2008)).

2.2 Second Generation Theory

Second Generation Theory takes a different approach to fiscal decentralization and is more articulate about the conditions under which decentralization is (not) appropriate (see e.g. Prud'Homme (1995), Tanzi (1996)). As Weingast ((2006), p.3) points out, second generation literature is varied and large, and there is no clear demarcation between the generations. Essentially, the initial tradeoff in FGT still holds: *"[…] the key insight remains that heterogeneity and spillovers are correctly at the heart of the debate about the gains from [de-]centralization."* (Besley and Coate, (2003), p. 2628)

As a starting point, Oates (2005) distinguishes between two broad sources from which SGT draws. The *first* stream of influence springs from public choice theory and political economy. Indeed, SGT is often referred to as the political economy approach to fiscal federalism as it takes into account political institutions and their incentives. Unlike FGT but in the spirit of Brennan and Buchanan (1980), SGT drops the assumption of a benevolent, welfare maximizing government. Instead participants in political processes are thought to have their own objective functions, maximizing utility within the political and fiscal constraints. The *second* source of contributions comes from the literature on information problems. More in particular, principle-agent models from industrial organization

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1   See for instance the Fiscal Decentralization Initiative

theory are applied to the information asymmetry that exists between politicians and the electorate (or even between national and subnational government). This asymmetry results from the inability to directly observe politicians effort and because of the discrepancy between their utility maximization and that of voters. Together these two sources shaped a literature that builds further on FGT to embody political institutions and imperfect information.

Besides Oates (2005), Lockwood (2006), Weingast (2006) and Porcelli (2009) also review contributions to Second Generation Theory. Lockwood in particular considers two basic arguments in SGT, the preference matching argument and the electoral accountability argument.

The first argument refers to the reasoning introduced by FGT that decentralization brings government closer to the people. In effect, decentralization improves allocative efficiency because public services are more aligned with local preferences. Despite the logic behind this claim, Lockwood argues that FGT cannot substantiate the preference matching argument without relying on the assumption of policy uniformity in a centralized system, which implies a uniform level of public goods across all regions. SGT on the other hand can. It does so most notably by presenting models of legislative behavior that incorporate preference heterogeneity and the inefficiencies particular to decentralized and centralized systems. Such models allow to compare the levels of public good provision reached in each system through different methods of decision making that are characterized by an equilibrium seeking bargaining process (see e.g. Lockwood (2002, 2008) and Besley and Coate (2003)).

The second argument in SGT literature is also based on political institutional frameworks and the incentives they encompass. In particular it states that fiscal decentralization helps hold elected officials accountable. One way of defining such accountability is by the degree to which institutions allow rent diversion away from productive public expenditure or by the degree to which said institutions allow lobbying to distort decision-making (Lockwood (2006)). Elections for instance induce accountability through a selection and discipline effect (Besley and Smart (2007)). Selection occurs as bad incumbents are voted out of office while the discipline effect denotes the incumbent's incentive to refrain from rent-seeking in order to improve his chances of reelection. Decentralization then strengthens these effects as it allows constituents to compare the performance of local public officials and their programs across neighboring local governments. This concept is referred to as yardstick competition (Besley and Case (1995)). Beyond the scope of elections, there is another way fiscal decentralization can constrain rent-seeking behavior, namely through tax competition. As local governments compete for residents or firms the price of public good provision (taxes and user charges) may get better aligned with its cost, thereby increasing spending efficiency (Edwards and Keen (1996)). On the other hand, if competition gets too intense a "race to the bottom" could ensue in which tax rates are driven down with the intent to attract other governments' mobile factors. In contrast to the Tiebout literature this might lead to inefficient

outcomes as investment decisions are distorted and less mobile factors suffer, either from a decrease in public service provision due to lower tax revenues or from an increase in the tax burden falling upon them due to their immobility. Tax competition doing more harm than good might then be an argument for limiting the extent of tax decentralization.

This in turn raises the issue of the design of decentralization. While too much local tax autonomy can be harmful, too little may defeat the purpose of decentralization. In fact, it is nearly inevitable that revenue from the decentralized share of taxes falls short of the amount needed to finance the devolved spending commitments. This follows from FGT's explicit assignment of spending and taxing responsibilities to different levels of government, based on their appropriateness at these levels and the role they play in society. Furthermore, FGT noted the use of transfers to internalize spillovers and level the playing field among local governments (i.e. fiscal equalization), effectively filling the gap between own tax revenue and spending. SGT however places more emphasis on the incentives created by such a discrepancy - often referred to as the Vertical Fiscal Imbalance (VFI). More in particular, a state of high VFI has been associated with irresponsible fiscal behavior. Transfer dependency for instance can create bailout expectations which, if not kept in check, can lead to fiscal indiscipline (see the works collected by Rodden, Eskeland and Litvack (2003)). In addition, reliance on transfers rather than own tax revenue can generate spending inefficiency through a common pool effect or the so-called flypaper effect which is related to fiscal illusion (see e.g. Courant et al. (1979), Turnbull (1998)). All in all then it seems there is a role cut out for tax autonomy in promoting accountability. Furthermore, reduced corruption and higher spending efficiency could both spur local development. Still, there is another way in which tax decentralization can induce growth, as will be discussed in the next section.

3   Hypothesis Development

3.1   Fiscal interest

The notion that the design of tax and transfer systems has an impact on subnational government's incentives is further developed under the "fiscal interest approach". Weingast (2009) raises this approach when he surveys the SGT literature in search of an answer to why decentralized systems show diverging economic performances. Particularly with regard to developing countries he stresses the institutional conditions of "market-preserving federalism" that sustain interjurisdictional competition through which corruption is kept in check and local prosperity is fostered [2]. Additionally and in a complementary way he presents the idea that, whatever their goals, subnational public officials will prefer policies that relax their budget constraint. Stated differently, they are biased towards policies that increase their revenue and allow them to finance and further their activities. As Weingast notes this perspective differs from Brennan and Buchannan's (1980) Leviathan hypothesis because officials are allowed other goals, not fueled by rent seeking behavior. In any case, the reasoning implies that different systems of transfer and taxation will influence the policy choice of local governments and by consequence, their economic performance[3]. One example is the view that local property taxes incentivize local government to maximize property values (and thereby the tax base) through capitalization of public services and taxation (see e.g. Glaeser (1996) and Fischel (2001)). Aside from this broad notion, Weingast finds more concrete support in Wallis, Sylla and Legler (1994) and Shleifer (1997) who respectively discuss tax reform in the US and the transitional economy of Poland.

Aside from promoting tax decentralization, the fiscal interest approach proposes to better control for the disincentivising effects of transfer reliance by making transfers conditional on the amount of revenue collected locally. Weingast (2009) in particular promotes a step function in transfer systems such that the more revenue subnational governments raise, the smaller the proportion (per bracket) they have to contribute to the pool. Therefore, by increasing marginal revenue retention rates, fiscal interest deters free riding that would otherwise occur if local tax revenue was just collected and equally distributed among all local governments (i.e. "the fisal law of 1/n", see Carreaga and Weingast (2003)). There are in fact several studies which have shown empirically that higher marginal retention rates positively influence local economic development (see e.g. Blanchard and Shleifer (2000), Desai, Freinkman and Goldberg (2003), Jin et al. (2005), Lin and Liu (2000) and Zhuravskaya (2000)). However, as Treisman (2006) argues, an interesting corollary is that these fiscal incentives might not adequately substitute for the potential loss of the central government's stake in local growth.

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2   Referring to Montinola, Qian and Weingast (1995) these five conditions are: 1) a delineated scope of authority 2) subnational autonomy 3) a common market 4) institutional authority and 5) a hard budget constraint.

3   For a broader review of the incentives associated with own revenue generation or transfers, see Pöschl and Weingast (2013).

It is therefore vital to be aware of the limits to tax decentralization, even aside from the concern for tax competition or the need for national taxes as instruments for redistribution and stabilization. In fact, Pöschl and Weingast (2013) note at least three conditions for local taxes to bring about the posited incentives: they should be visible, have a broad base and be tied to growth or prosperity of the residents. The first condition helps to hold officials accountable while the second prevents them from catering to specific groups bearing the tax burden. Lastly, when subnational governments can affect the prosperity of their constituents, a tax conditional on that will induce growth enhancing policies.

3.2 Fiscal interest and public expenditure

While the fiscal interest approach covers many ideas its main proposition suggests that local public officials are induced to help their economy grow when part of the proceeds flow back to them (i.e. soften their budget constraint). Given the authority to spend, higher tax autonomy should then lead these officials to aim public policy towards economic performance. Empirically one would expect to see this reflected in budget appropriations aimed more towards productive investment, that is expenditure with the potential to broaden the tax base. As tax decentralization increases the marginal retention rate, so should the marginal benefit of investing in such programs relative to other spending.

To my knowledge few empirical studies treat fiscal decentralization as a possible determinant of local public expenditure. While the link between decentralization and growth has widely been researched, only a handful of studies focus on spending composition as a channel. Naturally, a main theme in these works is allocative efficiency. Faguet (2004) for instance tests the preference matching argument by analyzing whether decentralization in Bolivia altered local investment patterns such that they were more aligned with indicators of need. Other studies on preference heterogeneity tend to focus more on general changes in the composition of spending, for instance by distinguishing between capital and consumption expenditure (Alegre (2010)) or between the kinds of goods that are provided locally (private, pure public or publically provided private goods cf. Granado et al. (2005)). More from a fiscal competition perspective one could also analyze changes in the total amount of expenditure, capturing the size of government (see e.g. Fiva (2006)). Finally, Kappeler and Välilä (2008) test several hypothesis related to fiscal competition and preference matching, by analyzing a regrouping of ten government functions into four types of public investment and three types of public goods. In a related study Kappeler, Solé-Ollé, Stephan and Välilä (2012) do the same but, more like this paper, focus on subnational rather than total spending. In either case, the findings are in line with fiscal interest.

Nevertheless, given the paucity and otherwise mixed results of research concerned with decentralization and the composition of public expenditure, this papers simply aims to add to the literature and analyze the implications of the fiscal interest theory. Of particular interest then is the following hypothesis:

Fiscal decentralization positively influences the share of productive expenditure in sub-national spending.

Before moving on to the analysis the next section discusses why Belgium is a suitable test subject for such a hypothesis.

4   Setting

4.1   Belgium

To analyze the impact of fiscal decentralization on expenditure this study focusses on Belgium. Officially a federal country since 1993, Belgium has gone through six state reforms driven by strong centrifugal forces. The first reform of 1970 had roots in a long-lasting language conflict between the Dutch speaking north and the French speaking south. The Flemish demand for recognition and cultural autonomy culminated in the establishment of Communities. Following the spirit in which they were founded, these Communities obtained responsibilities with respect to cultural matters and were established along fixed language boundaries. Through later reform new government functions were devolved involving "matters pertaining to the individual" such as education and health and social services.

At the same time foundations were laid for the establishment of Regions, their realization however had to wait until the second reform of 1980. The Regions arose largely in response to Walloon demand for more economic sovereignty. As such they were endowed with responsibilities pertaining to transport, the environment, public works, employment and evidently, economic development. Among others, these categories are generally described as "matters pertaining to territory". The actual territory these subnational entities covered was also determined by the language boundaries but Brussels, which is considered bilingual and therefore part of both the Flemish and French Community, was set to form a separate Region, the Brussels-Capital Region. Yet an agreement regarding its institutions was only reached during the third reform of 1989. Additionally, with regard to Regional matters the German-speaking Community fell under the authority of the Walloon Region. Furthermore, unlike Wallonia, Flanders decided to merge the institutions of its Region and Community. All in all, Belgium can be described as a Federal monarchy comprised of three Regions, three Communities and four language areas, run by six governments and held accountable by an equal amount of parliaments.

Figure 1
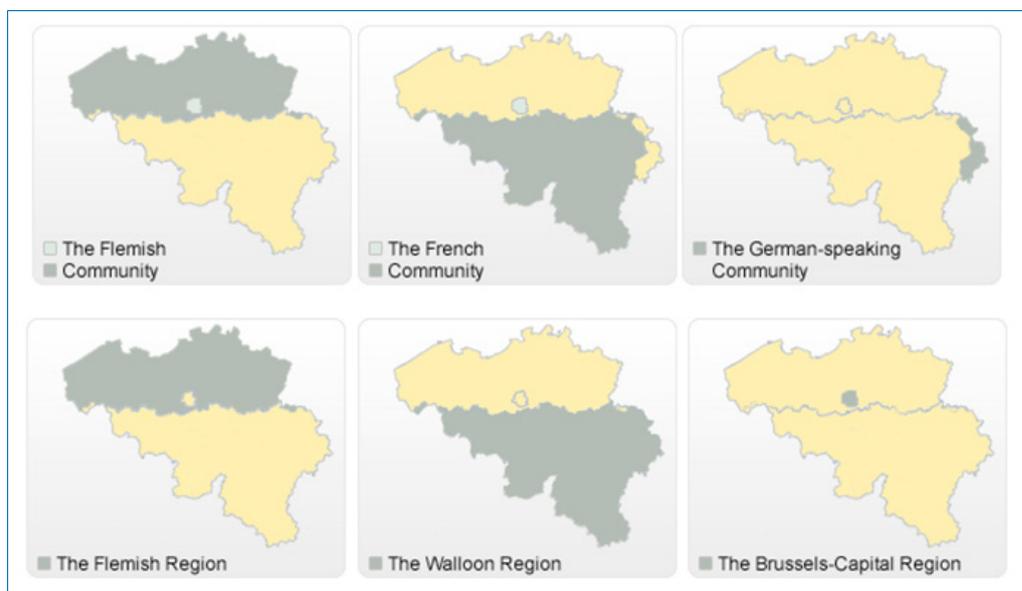
Source: www.belgium.be

Further complicating Belgium's federal structure is the way the separate entities are financed. From their conception in 1980 Regions were constitutionally allowed to levy taxes. So were the Communities, but the bilingual nature of Brussels rendered the determination of a tax base infeasible and the Communities' tax authority was therefore deemed impracticable. As such, the Communities have always been financed by grants, while the Regions can partly rely on taxes. Own tax-based finance was only introduced gradually however such that Regional revenue was mostly grant-based at the onset. Markedly, article 170 §2 of the constitution, which had originally granted the tax authority, implicitly allows the federal legislature to infringe upon it when deemed necessary. This restraint was further made explicit in the Act of 23 January 1989 stipulating that no tax may be levied on a matter that is subject to federal taxation (non bis in idem). However, in the context of further spending decentralization following the third reform of 1989, the Special Finance Act of 16 January 1989 formalized the financing mechanisms and laid the groundwork for true tax autonomy. Since then the Special Finance Act has been amended four times, of which those centered around the fifth (2001) and the sixth (2014) reform greatly expanded tax competences. As the latest reform is not yet reflected in policy or data, the reform of 2001 will above all capture the attention of this study.

4.2   Fiscal interest

Of particular interest in the following analysis are the incentives flowing from the design of the financing mechanisms, not only with respect to the tax system but regarding transfers as well. Starting off with grant-based revenue, a first

distinction needs to be made between incentives from horizontal redistribution and those originating from the actual transfer. To fund the Communities, the federal government decentralizes a share of revenue from both the personal income tax (PIT) and the value added tax (VAT). Transfers for the Regions however are based solely on PIT revenue. The total amount of transfers are not linked to either VAT or PIT revenues but were historically determined and then indexed. The PIT transfers are indexed according to GDP growth [4] and the CPI while the VAT transfers are indexed according to the CPI and a factor representing need [5]. Since 2007 the VAT transfers are also indexed to 91 % of GDP growth, similar to a separate share of VAT revenue which was granted following the 2001 state reform. So while the total amount of funds to be redistributed is not linked to the revenues collected, there is a small incentive to generate growth as transfers are indexed. Notably however this indexation is based on national GDP and not regional GDP so in a sense there is a risk of freeriding.

The real incentive however lies in the horizontal redistribution, which mainly affects the Regions but to some extent the Communities as well. More in particular, from 1989 onwards the PIT grant was redistributed entirely according to the entities' respective share in the PIT yield [6] whereas before, the share of the population and surface area held two thirds of the weight. This principle is referred to as the "juste retour" but was only gradually implemented between 1989 and 1999 (Gérard (2001), p. 20). The VAT grant on the other hand is redistributed according to needs as defined by the amount of students registered in each Community. Following the 2001 reform however, the redistribution of additionally obtained VAT transfers was gradually adjusted towards the juste retour mechanism [7]. Nevertheless, the biggest share of Community revenue is still based on a principle of need. Furthermore, counteracting the juste retour is a system of horizontal fiscal equalization. More in particular, for each percentage point below the average per capita PIT revenue, a Region receives a considerable amount of revenue from the federal government. In theory a situation can then arise in which a gain in PIT revenue (in line with the juste retour) does not cover the subsequent loss in equalization grant. This so-called development trap is also discussed in Cattoir and Verdonck (2002), Leibfritz (2009) and Decoster and Sas (2011). The risk of this occurring however is small (Decoster and Sas 2011, p. 11) and the issue appears to have been resolved in the latest reform of the Special Finance Act (Decoster and Sas (2012), p. 15).

Turning now to own revenues, the original Special Finance Act defined a number of regional taxes (see table 1). Additionally, the Regions were allowed to raise "piggyback" taxes on the federal PIT and grant tax reductions. Yet the conditions under which such a refund could be granted were not entirely clear. Furthermore the authority to determine the base, tax rate and exemption for the

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4   This indexation was introduced gradually: 10% in 1994 , 15 % in 1995, 20 % in 1996, 70 % in 1997, 75% in 1998, 97.5% in 1999 and 100% in the year 2000 (Gérard 2001, p. 21).

5   80 % of the growth of the population younger than 18 years old, for the Community with the highest growth.

6   With a 20:80 split of PIT revenue in the Brussels-Capital Region going to the Flemish and French-speaking Community respectively.

7   From 35 % in 2001 to 100 % in 2012.

regional taxes did not lie entirely with the Regions. This changed following the fifth reform of 2001 as refund rules were made explicit while more taxes were decentralized and the Regions gained complete tax authority (see table 2). The importance of obtaining effective control over decentralized taxes is articulated in the studies by Stegarescu (2005) and Blöchliger and King (2006) which show that traditional measures of fiscal decentralization based on tax revenue overestimate the degree of decentralization because they do not account for the extent of tax autonomy. In addition, Thornton (2007) and Baskaran and Feld (2013) call into question the result found when using such measures to estimate the macroeconomic impact of fiscal decentralization.

With regard to Belgian decentralization then, it is interesting to note a study by the research center CERPE of the University of Namur in which Thonet, Scorneau, Schmitz and Deschamps (2013) calculate fiscal autonomy indicators for the period 2002-2012. These indicators are based on fiscal revenue but also include "fictional" revenue for taxes whose rates have been set to zero and additional revenue from the PIT piggy-back tax set at the maximum rate allowed. This effectively produces potential fiscal autonomy indicators. These shares well exceed 50 % for both the Brussels-Capital and Flemish Region but the ratio is well below that level for the Walloon Region, despite a clear positive trend. A separate study by Decoster, Valenduc and Verdonck (2009) evaluates another potential autonomy measure, namely that of the High Council of Finance which distinguishes between (a) autonomy defined by the ability to alter base, rate and exemptions, (b) autonomy that can solely change the rate and (c) autonomy further restricted by progressivity. Using this typology, the High Council of Finance concludes that fiscal autonomy has increased considerably following the 2001 reform as the share of fiscal revenues characterized by complete fiscal autonomy rises from 7 to approximately 45 % while fiscal revenues of which the rate can be altered increases from 9 to around 55 %. Despite illustrating the concrete changes of the reform, the authors raise several objections to the measure. These are mainly centered around the observation that such an indicator cannot control for qualitative aspects like the strenuousness of altering certain tax bases or having the option to collect taxes on the regional level. To further analyze the increase of fiscal autonomy, Decoster et al. (2009) examine the different modifications made between 2002 and 2009 with respect to the regional taxes. They come to the conclusion that the Regions have exercised their new fiscal powers fairly intensively. In the alterations of the tax rates, bases and exemptions, the authors find the positive principles of fiscal federalism reflected although they also note the possibility of fiscal competition. Furthermore the authors remark a more proactive role of the Flemish Region relative to the more defensive behavior of the other Regions, most likely due to the more comfortable financial position of the former. Lastly, a similar statement is made by Van der Stichele and Verdonck (2003, p. 211) with respect to the use of fiscal powers before the 2001 reform.

All in all, from a fiscal interest perspective two main factors have positively influenced the incentive to spur growth and generate more revenue: fiscal decentralization and the juste retour mechanism.

Table 1: jurisdiction over Regional taxes before 2001 reform

Regional taxes	Base	Rate	Exemption	Revenues
Tax on gambling and betting	Regional	Regional	Regional	100 % Regional
Tax on automatic amusement machines	Regional	Regional	Regional	100 % Regional
Tax on drinking establishments	Regional	Regional	Regional	100 % Regional
Inheritance tax	Federal	Regional	Regional	100 % Regional
Radio-TV fee	Federal	Federal	Federal	100 % Community
Real estate tax	Federal	Regional	Regional	100 % Regional
Registration fees on the transfer for payment of real property	Federal	Regional	Regional	8,316 % Regional (1985) 9,73 % Regional (1986) 41,408 % Regional (1993)

Source: Van der Stichele and Verdonck (2003), Verdonck and Deschouwer (2003)

Table 2: jurisdiction over Regional taxes after 2001 reform

Regional taxes	Base	Rate	Exemption	Revenues
Tax on gambling and betting	Regional	Regional	Regional	100 % Regional
Tax on automatic amusement machines	Regional	Regional	Regional	100 % Regional
Tax on drinking establishments	Regional	Regional	Regional	100 % Regional
Inheritance tax	Regional	Regional	Regional	100 % Regional
Radio-TV fee	Regional	Regional	Regional	100 % Regional
Real estate tax	Regional	Regional	Regional	100 % Regional
Registration fees on the transfer for payment of real property	Regional	Regional	Regional	100 % Regional
Mortgage registration fees	Regional	Regional	Regional	100 % Regional
Duties on gifts	Regional	Regional	Regional	100 % Regional
Road fund tax on automobiles	Regional	Regional	Regional	100 % Regional
Vehicle registration fees	Regional	Regional	Regional	100 % Regional
Eurovignette	Regional	Regional	Regional	100 % Regional

Source: Van der Stichele and Verdonck (2003), Verdonck and Deschouwer (2003)

4.3   Autonomy

Because of the change in financing that emphasized tax autonomy, this study is centered around the fifth reform of 2001. It would be wrong however to dismiss the importance of the four state reforms that preceded this fiscal decentralization. As noted earlier, Weingast (2009) describes how the variety of economic outcomes observed in federal systems can be explained by considering the extent to which they satisfy the five conditions of market-preserving federalism.

Failing to meet these requirements may lead the theorized implications of fiscal decentralization to differ from what is seen in reality. While this is of particular concern to developing countries, developed countries too can differ in how they assign authority to different levels of government. In fact, many (panel) studies involving fiscal federalism are criticized for the use of decentralization indicators which not only fail to account for adequate tax autonomy, but also for spending power (see e.g. Bach, Blöchliger and Wallau (2009), Gomes (2012)) and more broadly, institutional authority (see e.g. Sorens (2011)).

In that context it might prove useful to take a closer look at what had already been established, through reform, before the tax decentralization of 2001. The following overview makes abstraction of Brussels as it is a uniquely complicated case that should not affect this study. First off, by the first state reform (1970) Belgian political parties had already split into two separate, unilingual parties. When the Communities were established, their functions were carried out by a Culture Council. This council was not directly elected but was composed of representatives from the national parliament and was headed by a Minister of Culture for each linguistic group. With the second reform (1980) regional competencies were established and both Communities and Regions received their own autonomous institutions, a government and a parliament. The specific competencies attributed to the subnational entities, then and over time, are defined in the Constitution and described more precisely in the Special Act of 1980. Over these matters the Communities and Regions have complete sovereignty. Given the concise delineation of responsibilities there is no hierarchy between federal laws and regional decrees as each entity has legislative jurisdiction over their own competencies. However, to supervise the constitutional division of powers, the Court of Arbitration (now the Constitutional Court) was founded along with the establishment of the governments and parliaments.

As previously discussed, the Special Finance Act of 1989 described the financing mechanisms of Regions and Communities. These are largely characterized by financial autonomy as the PIT and VAT block grants have no spending provisions. However, on top of these transfers there exist budget appropriations which are more specifically geared towards certain programs such as the activation of the unemployed, cooperation between universities and expenses for foreign students, yet these are small compared to the block grants. Finally, the fourth reform (1993) not only established Belgium as a federal monarchy but also granted the federal entities "constitutive autonomy", implying they were able to independently settle the organization and operation of their institutions. In addition, the entities obtained the competence to conclude treaties and the first direct elections were held in 1995. Members of parliament were no longer allowed to have a seat in both the federal and subnational parliaments. The two reforms since 1993 have mainly dealt with devolving more spending responsibilities and refinancing the Regions and Communities. Amendments regarding institutional matters have focused predominantly on Brussels. Interestingly, a fiscal federalism index developed by Sorens (2011) that specifically accounts for political and legislative autonomy, ranked Belgium fifth in 2006 just behind Canada, Switzerland, the U.S. and Spain. All in all a decent ranking considering how young Belgium's federation is relative to the top three.

Far from being a deepgoing analysis, the previous overview provides at least some reassurance that tax decentralization occurred in an appropriate environment - even as it is still being developed (cf. sixth state reform) the foundation is there. Essentially, the piecewise and discontinuous evolution that characterized Belgian federalization, is what allows the following analysis to take place. At the same time however the asynchronous decentralization of spending vis-à-vis taxing competencies gives rise to a separate issue in the literature, that of Vertical Fiscal Imbalance. As mentioned in the literature review a state of VFI is often associated with low fiscal autonomy and its consequences. On the other hand, it makes economic sense for there to be a gap between own spending and revenue, for instance because of the concern for local tax competition or for reasons of redistribution, stabilization or economies of scale at the national level. Nevertheless, given the size of the gap it is likely that, at least for some time, the disadvantages have outweighed the advantages of keeping tax authority at the national level. This discrepancy should therefore be taken into account when estimating the impact of decentralization.

A final remark is in order. Due to time constraints and data availability priority was given to the Flemish Region. Incidentally the Flemish Region has been shown to have made most use of its tax autonomy. Whether this has also translated into expenditure policy changes will be the subject of the following analysis. Regardless, studying the impact on the Walloon region's spending, investments in particular, is equally important as what matters is the change in incentives following tax decentralization.

5   Empirical Design

The aim of this study is to test the existence of a relationship between fiscal incentives and productive expenditure within the Belgian federal context. Following the discussion regarding financing mechanisms this translates to finding an impact of fiscal decentralization and the juste retour on the share of productive expenditure. Particularly the discontinuity in tax revenue following the fifth reform is of interest.

Given the double and asymmetrical structure of the Belgian federation, there are several ways to start this analysis. A yearly study published by the CERPE research team takes two approaches. In a comparison of public expenditures between the federal entities Thonet, Scorneau, Schmitz and Deschamps (2013) distinguish between expenditures made by a linguistic group (with the exception of the German speaking population) and expenditures made on a certain territory (i.e. Flanders, Brussels and Wallonia). These approaches make sense from both a historical and a financial standpoint, but are not very practical. Indeed, either comparison requires several corrections to account for the transfers made between entities, particularly with respect to the bilingual area of Brussels. The approach I will be taking instead is to look solely at the revenue and expenditure budgets of the Regions. This also makes sense, if only because Regions impose taxes and historically gained the lion's share of productive expenditures. A possible counterargument to this logic is the amount of cooperation that occurs between Regions and Communities at either side of the country. This of course is reflected in the merging of the entities in Flanders and the transfer of responsibilities between the Walloon Region and Francophone Community (cf. Saint-Quentin Agreement of 1993). This warrants further research.

5.1   Data and Methodology

The general model, of which several modifications will be estimated, is specified as follows:

Productive Expenditure $_t$

$$= \beta_o + \beta_1 \text{ Fiscal Decentralization}_t + \beta_2\, PIT\, grant_t + \beta_3 \text{ Spending Decentralization}_t$$
$$+ \beta_4 \text{ Demographic Controls}_t + \beta_5 \text{ Economic Controls}_t + \beta_6 \text{ Fiscal Control}_t$$
$$+ \beta_7 \text{ Government} + u_t$$

The dependent variable, together with the PIT grant and the two decentralization variables are all based on data obtained from the Flemish budget. How these measures were constructed is described in more detail further below.

Before I elaborate on that however, I discuss the other covariates which could possibly affect the share of productive expenditure. A complete list of all variables and their sources can be obtained upon request. Aside from the Flemish government, most data were obtained from the Federal Planning Bureau and the Federal Public Services Finance and Economy.

5.1.1   Data

5.1.1.1   Control variables

Many studies are dedicated to analyzing the different determinants of the composition of public expenditure. An overview of these studies and their findings is provided by Sanz and Velázquez (2002). In line with their conclusions the following determinants are controlled for.

First, the group of "**demographic controls**" attempts to capture the impact of demographic developments on the composition of public expenditures. Aside from regional population growth and population density, it includes variables related to the age structure: measures reflecting ageing (grey pressure), workforce replacement (green pressure) and dependency (green-grey pressure). These measures are the ratio of respectively the number of people aged 60 years and over; the number of people aged 20 and under; and both age groups relative to the working age population (20-65). Second, the group of "**economic controls**" accounts for economic developments which are captured by the change in CPI (base year 2013), real GDP growth in chained (2005) euros and the unemployment rate as defined by the Federal Planning Bureau, with and without older unemployed persons. Third, the "**fiscal control" covariate** is simply consolidated gross debt at the regional and federal level, an attempt to capture fiscal discipline or episodes of fiscal consolidation. Additionally, gross debt is included as a percentage of GDP. Fourth and last, the "**government" variable** represents the composition of the Flemish government. For each party the number of positions in the government is tracked and additionally a separate dummy keeps score of whether a party was part of the coalition. As such the variable helps account for shifts in expenditure policy which are due to political ideology or change in government. Arguably however, a change in policy emphasis is exactly what the analysis is trying to capture. At any rate, regardless of policy goals, fiscal interest theory expects productive expenditure to increase because the resulting uptick in revenue can be spent in whatever way is preferred.

With the exception of CPI all covariates were available at the regional level and for the entire time period considered. For regional GDP however, no consistent time series was available so instead I used national GDP.

5.1.1.2 Budgetary variables

The variables reflecting productive expenditure, fiscal decentralization and spending decentralization were constructed from a dataset of the Federal Public Service (FPS) Finance [8]. The dataset for this particular study traces income and spending for all Regions and Communities, including the Community Commissions, for a period of 25 years, from 1989 till 2013. Flemish expenditure data for 1989 was not available however and therefore the complete sample stretches from 1990 to 2013.

The dataset itself is gathered from the governments' decrees on the budget, which were voted on by the parliaments, ratified by the governments and finally published in the Belgian Official Journal. In compiling the data, the FPS Finance consistently used the adjusted budgets as source for presenting a breakdown in revenue and expenditure, which I then used. Furthermore, the sums maintained are payment appropriations which cover the amount of payments the governments are allowed to make throughout the year to honour old and new commitments [9]. While these appropriations are subject to certain corrections (including the ESA [10] accounting corrections) they are not controlled for in the data because the adjusted amounts are not published in the Belgian Official Journal [11].

With respect to the data for Flanders, the breakdown of expenditures according to departments and some of the largest functions, is missing for the years 1989 and 1991 to 1994 in the dataset. Using the aforementioned source I was able to reconstruct the missing data along similar lines. A bigger problem however was a shift in the representation of the budgets and consequently of the functional breakdown. This change occurred following the implementation of "Beter Bestuurlijk Beleid" a thorough reorganization of the Flemish public administration. The most notable change with regard to the budget was the shift in breakdown from seven "Departments" to thirteen "Policy Areas" going from 2007 to 2008. Fortunately, these new Policy Areas roughly contain the old Departments and the deeper breakdown in functions that were of interest (i.e. the productive expenditures) is more or less maintained. One exception however is the "Economy" function, parts of which were transferred to "Environment, Nature and Energy" (Energy) and "Flemish Foreign Affairs" (International Entrepreneurship) while what remained was merged into "Economy, Science and Innovation". For sake of consistency I reconstructed the old Econo-

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8   Statistics on public finance were traditionally made available as part of the "Conjunctuurnota". From April 2013 on, this series is no longer published in print. Instead the FPS has set out to digitize the statistics, several of which can now be accessed on their website: http://financien.belgium.be/nl/Statistieken_en_analysen/statistieken/. The dataset I used in the analysis however, is not yet available online but can be obtained upon request.

9   As opposed to commitment appropriations which determine the total allowable cost of legal commitments entered into throughout the financial year.

10   European System of National and Regional Accounts.

11   The corrected payments are however presented in the General Explanations ("algemene toelichting") of the budget, which can be obtained from the different parliaments.

my function and applied corrections where necessary [12]. Nevertheless, over the years certain expenditures have moved from one program to the other so some inconsistency remains. On the other hand, the chosen expenditure functions are large enough to account for most of these shifts in composition. Then again this general approach leaves a lot to be desired.

Finally the choice and construction of the variables is as follows. First, as both institutions merged, revenue and expenditure for the Region and Community is presented in one budget. With respect to revenue, income sources for the Region are easily distinguished from those of the Community [13]. This allows for a whole series of fiscal decentralization variables. Aside from the share of regional taxes in regional revenue (i.e. the variable consistently referred to as "fiscal decentralization"), the dataset allows for the possibility to analyze the impact of each individual tax or to examine only the share of taxes decentralized after 2001. The former possibility is of interest because local taxes that have a broader base and are tied to growth or prosperity are more conducive to fiscal interest. This does not apply to all regional taxes but one could make a case for real estate tax, inheritance tax and the registration fees. The latter possibility is of interest because it helps identify the additional impact of the 2001 financing reform. Finally, an extra variable was included which places the regional PIT grant relative to regional revenue, this is practically the complement of the regional tax decentralization variable. Additionally, a measure was added of the growth in PIT grant relative to CPI and GDP growth (to which the grant has been indexed, albeit gradually).

With respect to expenditure, the identification of each entities' spending was less straightforward. While most departments or policy areas have a competency description that clearly belongs to the Region or Community, some expenditures have a common interest (e.g. "Flemish Government", "General Administration", "Finance"). These amounts were divided among the two entities according to a revenue ratio that reflects the share of Regional versus Community competencies that were clearly identifiable [14], which is about 30/70. This is more or less the approach taken by the CERPE researchers, Thonet et al. (2013).

The total amount of regional expenditures identified in this way, was used as the denominator for the share of **productive expenditures**. The nominator consists of the following functions, either separately or together: "economy", "employment", "road infrastructure and transport" and "shipping and waterway

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12   Details made available upon request.

13   Revenues not clearly belonging to any of the two entities (exceptional or one-time revenues) were divided among both according to the ratio of regional to Community expenditure.

14   There was some doubt regarding the expenditure for "Home Affairs" but upon further investigation it was revealed that these funds largely go to the municipalities (over 80%). Data made available by Belfius Research further showed that municipal expenditure per function, not funded by revenue generated by that function and thus in part funded by "Home Affairs", is also split roughly by a 30/70 ratio of Regional versus Community competency related expenditure.

infrastructure". These functions are considered productive in the sense that they are most likely to have a positive feedback with respect to fiscal revenue. Without digging deeper in the budgets no further breakdown to more specific programs or other expenditure was possible. One regional competency that is certainly missing in that regard, is science policy.

Lastly, to control for changes in the productive share that are solely due to the devolution of competencies I include various indicators of spending decentralization like the ratio of regional to federal revenue, the ratio of Flanders to all revenue etcetera. Figures 2 and 3, along with all other figures in the appendix, graphically represent the times series for the budgetary variables.

5.1.1.3 Sample properties

The shortest time series in the sample is that of the dependent variable, productive expenditure. As such, the sample size (length) is defined by its 24 observations, from 1990 to 2013. Since this study involves time series, the different variables are not likely to be independent, instead I have to rely on the concept of stationarity. Indeed, the (large sample) OLS estimator in time series regressions is consistent only if the variables are stationary, weakly dependent (ergodic) and contemporaneously exogenous (predetermined) and if there is no perfect multicollinearity. Additionally, unbiasedness requires strict rather than contemporaneous exogeneity. Furthermore, in order to validate the model (or use standard inference procedures) errors should follow a white noise process.

To find stationary processes I examined the plots and correlograms of each time series, took (log) differences where necessary and tested for a unit root using the (Covariate) Augmented Dicky Fuller test with lag lengths ranging between 5 and 8. The results of this test, for the variables that are part of the estimations presented in this paper, are reported in table 3 [15]. All variables in the dataset are difference stationary except for the regional population which was trend but not difference stationary. To avoid spurious regression, the estimations are based on series in differences and as such, the variables should henceforth be interpreted in terms of change or growth (even when they are not referred to as such).

Before moving on to these estimations, more descriptive statistics are in order. A particular concern for the analysis is the possible correlation between the budgetary covariates. The correlation between the stationary series of fiscal decentralization and regional PIT grant, is consistently (and significantly) stronger than -0.71 [16] for various specifications of the grant (e.g. as a share in total revenue or relative to GDP and CPI). This is of course because the regional

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15   Results for the other variables are in the R-file of this study, made available upon request.

16   According to the Pearson's product-moment correlation.

PIT grant is practically the complement of the share of regional tax revenue in regional revenue. This collinearity implies that both cannot be in the same equation if we want to estimate the impact of either. Correlation between the stationary series of fiscal decentralization and the different specifications of spending decentralization, is low at 0.13 and below. Finally, correlation among other covariates is mostly negligible, with the (logical) exceptions of population density and population (0.84), unemployment and GDP (-0.62) and consolidated gross debt and GDP (-0.62).

Table 3: augmented Dickey Fuller unit root tests (for lag length 5)

Variable name	Statistic	P-value
Share of productive expenditure	-23.247	0,4014
First differences	-18.461	0,002642
Share of productive expenditure – Employment	-15.131	0,5043
First differences	-44.784	0,003121
Share of productive expenditure – Road & transport	-17.097	0,4099
First differences	-44.072	0,003587
Fiscal decentralization	-15.399	0,7759
First differences	-42.903	0,004512
Fiscal decentralization – Lambermont taxes only	-12.115	0,6454
First differences	-4.251	0,004877
Spending decentralization – (regional/federal) (trend)	-30.995	0,1357
First differences	-57.462	0,0002692
Spending decentralization – (Flanders/all)	-30.995	0,1357
First differences	-61.597	0,0001
Consolidated gross debt	-14.038	0,8238
First differences	-33.776	0,02706
Population density trend	-60.143	0,0006964
First differences	-28.707	0,06969
Green pressure	-15.887	0,7566
First differences	-49.382	0,001267
Grey pressure	-15.134	0,786
First differences	-50.144	0,001091
Unemployment rate (no elder unemployed)	-31.326	0,1304
First differences	-29.994	0,05511
CPI	-0,1097	0,9899
First differences	-43.136	0,004315

5.1.2 **Methodology**

In the next section, several specifications of model (1) will be estimated by OLS.

First, a set of baseline regressions are presented that were built from the ground up to see which covariate has an impact on productive expenditure. Additionally the full model (1) was estimated -without the PIT grant- and sequentially, the most insignificant variables were excluded until a reasonable fit was obtained, taking into account joint significance, (multi)collinearity, the (adjusted) R-squared and other criteria like AIC and SIC.

Taking a closer look at the data and considering its historical context, leads to a second set of regressions, namely one with interactions and a breakdown of productive expenditures. As figures 2 and 3 show, fiscal decentralization saw an upward shift following the 2001 reform. To account for the additional effect of this reform, an interaction is included between fiscal decentralization and a dummy for the post reform period (henceforth called "interaction a"). This is more clearly shown in figure 4. A second promising interaction is one between spending and fiscal decentralization (henceforth "interaction b"). This interaction has the potential to account for a differential impact of fiscal decentralization when spending decentralization is low as opposed to when it is high. Given that spending decentralization preceded fiscal decentralization in Belgium, the interaction might capture the influence of VFI. Finally, plotting the share of productive expenditure against fiscal decentralization (see figure 5) and comparing this with similar plots of the productive expenditure functions (figures 6 and 7) suggests separate regressions for employment and infrastructure might be useful. Finally, to account for lags in the decision making process several dynamic models are specified as well.

6 Results

The results of the OLS estimation of the specifications outlined above, are presented in tables 4 through 6 which are included in the appendix. The standard errors are put between parentheses under each coefficient. If the fiscal interest theory is somewhat applicable to the Belgian federal context, one would expect to find a positive impact of an increase in tax autonomy, proxied by the share of own tax revenue, on productive expenditure relative to other types of spending. Given that the regressions involve time series however, a more strict interpretation has to be maintained namely that of an increase in the relative growth of own tax revenue positively affecting the relative growth of productive expenditure.

6.1 Baseline regressions

Interestingly enough, in regressions with only one independent variable, the only covariate to significantly affect the share of productive expenditure is green pressure (see model III table 4). Spending decentralization also has a significant impact but only when it is specified as Flanders' share in public spending of all the federal entities (including the federal level). Nonetheless, throughout the various specifications, spending decentralization (in whichever way measured) has a negative impact on the share of productive expenditure. This is most likely due to the disproportionate decentralization of "non-productive" spending competencies and was to be expected. Drilling down from the full model (1), the model with the smallest corrected [17] Akaike Information Criterion (AICc) is one with (significant) green pressure and the indicator for the number of positions for CD&V in the government coalition, which is insignificant. However, AICc has a rather strong penalty for extra parameters so instead model (VII) is presented for which the F-test indicates joint significance but where only green pressure and CD&V are individually significant. Again only those variables were retained that were not highly insignificant and whose exclusion considerably reduced the R^2. Fiscal decentralization is one of these variables but spending decentralization is not. To check whether spending decentralization turning insignificant is not due to multicollinearity I calculated the Variance Inflation Factors (VIF). These values were all relatively low (lower than 1.9) indicating that the standard errors would not have been much smaller had the variables been completely uncorrelated.

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17   AICc, AIC with a correction for small sample sizes.

6.2   Regressions with interaction terms

As shown in table 6 interacting fiscal decentralization with a post reform dummy does not significantly impact the share of productive expenditure. This interaction does change sign however, from negative to positive, when controlling for spending decentralization. While the VIFs are still considered to be low [18], correlation between the interaction and spending decentralization is rather high at around 0.57. Correlation between the period dummy and spending decentralization is low (-.16) and insignificant (p-value of 0.473). At any rate, the interaction's sign being positive and its coefficient being considerably higher than that of fiscal decentralization alone, makes economic sense. Furthermore, the strong correlation and change in sign implies that spending decentralization is a variable not to be omitted, which also makes sense. Lastly, drilling down again results in a model with a significant, negative impact of population density (growth) and green pressure. Joint significance (0.01 p-value) and R^2 (0.61) are high but apart from the period dummy, no other covariate's coefficient is individually significant. The small but positive coefficient for the period dummy probably captures the rise in productive expenditure that occurred post reform (cf. figure 2) that is left unexplained. This could be the result of an institutional change that is not capture by any of the budgetary variables, or it could reflect yet another omitted variable correlated with the period dummy. Lastly, the Ljung-Box test for serial correlation does not reject that the error terms are independently distributed and VIFs are still below 1.9.

Table 7 presents estimates for two regressions with an interaction between spending and fiscal decentralization. The first regression includes spending and fiscal decentralization as the only additional covariates. As in the baseline regressions, spending decentralization has a significant and negative impact. There is no joint significance however and no other variable has a significant coefficient. Adding controls turns both the fiscal decentralization and interaction coefficient significant. However, none of the control variables have a significant impact, despite joint significance. As in the previous regression, fiscal decentralization has a positive impact but more interestingly, the interaction coefficient is positive and very large. One possible interpretation for this is that as spending decentralization rises, VFI increases and the potential gains from fiscal decentralization grow larger. These potential gains are then reflected in the impact on productive expenditure. The size of the coefficient on the other hand, is simply because it measures the impact of two shares that are interacted. As before there are some concerns for multicollinearity, particularly between these two variables. Their VIFs are 2.38 and 3.1, well below the rule of thumb of 10 or even 4 (O'Brien (2007)), but then again the sample size is small as well. Additionally the case against collinearity is less strong because the coefficient for fiscal decentralization more than doubles in comparison to the baseline estimate. Analyzing the residuals and performing a Ljung-Box (and Breusch-Godfrey) test shows that there is no serial correlation in the error terms.

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18   1.7 and 1.9 maximum, depending on which variable represents spending decentralization.

Finally, table 8 shows estimates for regressions with "employment" and "road and transport" infrastructure as dependent variables. With respect to the infrastructure regression, there is joint significance right off the bat when spending and fiscal decentralization are the only independent variables (p-value 0.016). Again, spending decentralization has a significant, negative effect while fiscal decentralization has a positive yet insignificant impact, albeit almost significant at the 10 % level. Adding the unemployment rate and population density to the equation results in an entirely significant estimation, with a higher R^2 and joint significance. Furthermore, there is no multicollinearity or serial correlation of the error terms detected. Like Kappeler and Välilä (2008) then, a significant and positive impact of fiscal decentralization on infrastructure expenditure is found. Similar (and significant) coefficients are shown when focusing only on the taxes regionalized after the 2001 reform. Lastly, for the employment regression, both spending and fiscal decentralization have significant coefficients, but only when their interaction (also significant) is part of the model. This again causes concern for collinearity, which is somewhat substantiated by the higher VIF value for the interaction term (3.2), despite it being below most rules of thumb. Additionally, the coefficient for fiscal decentralization is negative –just like spending decentralization- but this is compensated by the positive interaction coefficient.

6.3　Lag regressions

The final regression table (9) reports on the OLS estimation of the interaction b) specifications supplemented with lags. The concerns for collinearity remain and because now an autoregressive term is included, strict exogeneity can no longer be assumed. Therefore the Ljung-Box test cannot be used to test for serial correlation (Hayashi (2000), p.144-149). Instead the p-value for the Breusch-Godfrey test is shown which does not reject the null of no serial correlation in the errors up to order 5.

For each regression the lagged values are significant but the current values are not. This could indicate a lag in decision making and payment of certain investments (payment appropriations cover old commitments too). According to the AICc criterion, excluding the current values leads to a better model. Furthermore the gain in goodness of fit following the inclusion of green pressure and debt, outweighs the increase of complexity as the AICc gets even smaller. Finally, once again, fiscal decentralization is found to have a positive impact while spending decentralization has a negative influence and the interaction of both is large and positive.

7 Discussion

7.1 Limitations and suggestions for future research

This simple analysis is clearly not without limitations. In addition to the sample size being small, the regressions likely suffer from collinearity and endogeneity. First I discuss these problems, followed by more general limitations, after which I propose improvements to the current way of estimation and directions for further research.

7.2 Collinearity and endogeneity

Several signs hinted at the collinearity between fiscal decentralization and the interactions included in the models. First off, because fiscal decentralization was part of the interaction there naturally was a correlation between the variables. Additionally, big changes in the coefficient of either the interaction or fiscal decentralization, plus the individual insignificance of the latter versus the joint significance of the specification, are indicative of multicollinearity. Furthermore, while not huge, the relatively higher VIF values of the variables were troubling as well.

With respect to OLS estimation, collinearity is not necessarily a problem unless there is perfect multicollinearity, which is not the case. While collinearity does not bias the results, it does cause inefficiency. So both the small sample size and the collinearity are producing large standard errors, leading to the acceptance of the null more easily. Excluding the interactions from the models is a solution but in doing so valuable information is lost. Furthermore, if the interaction truly has a separate and significant impact, a risk of endogeneity arises.

Endogeneity is already a concern however, for several reasons. One reason is the possibility of measurement error in the budgetary variables, particularly for the independent variable which I constructed myself from data that already showed inconsistencies. Another concern is reverse causality or simultaneity. If the hypothesis holds that there is a feedback from productive expenditure to tax revenue, then the fiscal decentralization variable is somewhat dependent on the share of productive expenditure. This endogeneity issue is not likely to be contemporaneous however so OLS is still consistent. Nevertheless, to rule out these concerns a proper instrument is needed, the choice of which is not obvious. The first lag of fiscal decentralization cannot be used as it was found to positively impact the productive expenditure share. A larger lag might do the trick but a weak instrument will lead to less precise estimates and the current regressions already suffer from low efficiency. Furthermore, if there is serial correlation in the measurement error, a lag instrument is out of order.

7.2.1 Data limitations

The dataset has limited the analysis in a number of ways, it needs to be remarked however that to my knowledge this was the largest dataset available. Other datasets that provided a better and more consistent breakdown of expenditures (like that of CERPE's yearly comparison) did not cover as much as half of the period that was covered here. Nevertheless it could be a worthwhile endeavor to consult the adjusted decrees and compose a separate functional breakdown of expenditure. Particularly because important productive expenditure including science and innovation (and to some extent education) is not being considered. Furthermore, unproductive spending was undoubtedly included in the categories on which this study relies.

Other limitations in the data pertain to the choice of variables. First off, if VFI truly leads to a differential impact of fiscal decentralization, then a separate variable should account for this that minimizes the concern for collinearity. Additionally, fiscal incentives were proxied by fiscal decentralization measured as the share or regional tax revenue in total regional revenue. A nice alternative would be to calculate the marginal revenue retention rates. With respect to regional taxes however this would not be an interesting approach since there is only one tax that was gradually regionalized, namely the registration fees on the transfer for payment of real property. Finally, regarding the PIT grant, the gradual introduction rate of the juste retour or perhaps the ratio of PIT received to PIT collected could be included.

7.2.2 Other estimation approaches

The fiscal reform of 2001 thoroughly expanded regional taxing powers. To account for this structural break in the time series, a post reform time dummy was added and interacted with the fiscal decentralization variable. This was not entirely satisfactory, leaving several challenges to be dealt with.

First of all, the reform of 2001 not only caused a level shift in revenue but also changed the nature of fiscal decentralization (through more autonomy). As such, the estimate found confounds the effects of increased regional tax revenue (i.e. retention rates) and increased fiscal authority. Second, the relationship between fiscal decentralization and the share of productive expenditure is not likely to be entirely linear. If fiscal decentralization induces more productive expenditure and if the revenues obtained from the resulting growth are used to fund other programs - effectively decreasing the share of productive expenditure - perhaps a square root or inverse u relation is more applicable. Third, the reform also decentralized spending and inherently made changes to the way the federal entities function, so other elements are in play. Overarching these arguments is the fact that the study lacks a counterfactual. While the pre-reform period provides some indication, what would have happened without the reform remains unknown. Perhaps more advanced regression techniques, involving segmented or interrupted time series can deal with this issue.

Finally, a clear objective for future research is to analyze how fiscal decentralization affected the other Regions. While Flanders was in a more comfortable position to "experiment" with fiscal policy, the Walloon Region too has made use of their fiscal powers (see e.g. Verdonck (2009) and Decoster, Valenduc and Verdonck (2009)). Furthermore, the Regions were originally established so that Wallonia could spend according to the needs of its economy, this provides an interesting context for further research.

7.3　Conclusion

Fiscal federalism theory and empirical research weigh the gains from fiscal decentralization against the costs. In doing so, First Generation Theory emphasizes the tradeoff between spillover internalization, economies of scale and allocative efficiency. Second Generation theory adds to this the dimension of incentives and institutions which affect both public officials and the electorate. Within this broad literature few studies have analyzed the impact of fiscal decentralization on the composition of public expenditure. Yet, if fiscal decentralization is to induce discipline, accountability or improved preference matching then surely this is reflected in public policy and, by extension, in government spending? In that context, the fiscal interest theory states that the retention of own tax revenue stimulates policy oriented towards local development. This outcome does not necessarily conflict with other theories. Indeed, in light of preference matching, the additional revenue obtained from investing in local economic activity can go towards other policy goals.

To extend the understanding of fiscal decentralization and its consequences, this study set out to test the fiscal interest theory and see whether it implies an increased incentive to spend "productively". As such, this study made no judgment on the desirability of either productive spending or decentralization but merely tried to examine their relationship in a specific context. That context was the refinancing of the Belgian federal entities marked specifically by the 2001 fiscal reform. This study is particularly relevant however in light of the *latest* finance reform (2014) which put further emphasis on the role of fiscal autonomy in regional "responsibilization".

Nevertheless, the results in this study can only partially support the fiscal interest theory. In particular, the finding of Kappeler et al. (2012) that fiscal decentralization boosts subnational infrastructure expenditure, seems to hold for Flanders too. However, for a broader category of productive expenditure no robustly significant impact of fiscal decentralization was found. Only when adding an interaction term of fiscal decentralization and spending decentralization, does the former significantly affect the share of productive expenditure. It is nonetheless noteworthy that the growth in fiscal decentralization was always positively related to the change in the share of productive expenditure, albeit insignificantly. Furthermore, the findings underscores the importance of accounting for Vertical Fiscal Imbalance. Additionally, the estimation of a dynamic model suggests the importance of lags in the decision making process.

8 Annex

8.1 Tables: results of OLS regressions

Table 4: baseline OLS regressions

	(I)	(II)	(III)	(IV)
Independent variable *(share)*	Productive Expenditure	Productive Expenditure	Productive Expenditure	Productive Expenditure
(intercept)	- 0.005686 (0.006180)	- 0.003000 (0.006125)	- 0.010485* (0.006029)	- 0.002860 (0.005754)
Fiscal decentralization	0.100621 (0.131729)			
Spending decentralization (regional/federal)		- 0.504972 (0.473617)		
Spending decentralization (Flanders/all)				- 2.172401* (1.204157)
Green pressure			-3.741149** (1.633640)	
N	23	23	23	23
R2	0.02703	0.05135	0.1998	0.1342
Joint F-statistic (p-value)	0.4535	0.2984	0.03247	0.08558

*Note: *, ** or *** denote significance at the 10, 5 or 1% level, respectively.*

Table 5: baseline OLS regressions

	(V)	(VI)	(VII)
Independent variable (share)	Productive Expenditure	Productive Expenditure	Productive Expenditure
(intercept)	- 0.004094 (0.006332)	-0.003895 (0.005979)	-0.004657 (0.011983)
Fiscal decentralization	0.103972 (0.131279)	0.093765 (0.125656)	0.137545 (0.111772)
Spending decentralization (regional/federal)	- 0.513960 (0.478011)		
Spending decentralization (Flanders/all)		-2.144250* (1.217653)	
Green pressure			-6.48296*** (0.0028)
CPI			-0.006997 (0.006418)
CD&V			0.010872 ** (0.004637)
N-VA			0.011280 (0.007522)
R2	0.0802	0.1576	0.4461
Joint F-statistic (p-value)	0.4334	0.1799	0.05425
VIF	1.0; 1.0	1.0; 1.0	1.0; 1.5; 1.1; 1.8; 1.45
AICc			-91.42738

Table 6: OLS regression with lag specification, interaction and controls

Independent Variable (share)	Baseline	Interaction a) : fiscal decentralization*period 2002-2013			
	Productive Expenditure	Productive Expenditure	Productive Expenditure	Productive Expenditure	Productive Expenditure
(intercept)	- 0.004094	- 0.015136*	- 0.013228	-0.010342	0.003836
	(0.006332)	(0.008505)	(0.008614)	(0.008715)	(0.011800)
Fiscal decentralization	0.103972	0.142513	0.125095	0.089818	0.151114
	(0.131279)	(0.134138)	(0.134102)	(0.133177)	(0.103604)
Interaction a)		- 0.296014	0.203818	0.530673	0.533007
		(0.622753)	(0.761351)	(0.792268)	(0.609494)
2002-2013 dummy		0.020060	0.018672	0.012073	0.031649*
		(0.012339)	(0.012315)	(0.012881)	(0.011621)
Spending decentralization (regional/ federal)	- 0.513960		- 0.651433		
	(0.478011)		(0.578771)		
Spending decentralization (Flanders/all)				-2.585446	-2.077405
				(1.621958)	(1.275497)
Population density					-6.363331*
					(2.496298)
Green pressure					-3.215002*
					(1.390121)
R2	0.0802	0.1461	0.2023	0.2518	0.6083
Joint F-statistic (p-value)	0.4334	0.3797	0.369	0.2401	0.01064
AICc					-94.57386
Ljung-Box test p-value lag length 5					0.2191
VIF	1.0; 1.0	1.1; 1.1; 1.1	1.1; 1.7; 1.1; 1.5	1.1; 1.9; 1.3; 1.8	1.2; 1.9; 1.7; 1.9; 1.6; 1.1

Table 7: OLS regressions with interactions and controls

	Baseline	Interaction b) : spending*fiscal decentralization	
Independent Variable (share)	Productive Expenditure	Productive Expenditure	Productive Expenditure
(intercept)	-0.003895 (0.005979)	-0.005121 (0.006002)	0.004729 (0.013485)
Fiscal decentralization	0.093765 (0.125656)	0.256355 (0.183875)	0.358541 ** (0.166683)
Spending decentralization (Flanders/all)	-2.144250* (1.217653)	-2.975925* (1.389668)	-3.744549** (1.384652)
Consolidated gross debt			-3.106.951 (2.24409)
Population density			-0.017529 (0.012748)
Green pressure			-2.668.805 (1.583754)
Interaction b)		69.222433 (57.689218)	113.65426* (54.940595)
R2	0.1576	0.217	0.502
Joint F-statistic (p-value)	0.1799	0.1899	0.05329
AICc		-91.40112	-89.05396
Ljung-Box test p-value lag length 5			0.3239
VIF	1.0; 1.0	2.1; 1.3; 2.6	2.38; 1.8; 1.25; 1.26; 1.2; 3.1

Table 8: OLS regressions with interactions and controls – breakdown productive expenditure share

Independent Variable (Share)	Road and Transport	Road and Transport	Road and Transport	Employment	Employment
(intercept)	0.001419 (0.003275)	0.013493* (0.006647)	0.013417* (0.006706)	- 0.0001661 (0.0024384)	0.003204 (0.005714)
Fiscal decentralization	0.115531 (0.067902)	0.126104* (0.061602)		-0.0998174 (0.0685361)	-0.124771* (0.071232)
Fiscal decentralization only Lambermont taxes			0.100297* (0.051203)		
Spending decentralization (Flanders/federal)	- 0.682149** (0.247243)	-0.205399*** (0.066900)	-0.202665** (0.067303)	- 0.1515999* (0.0771159)	-0.148227* (0.07460)
Unemployment rate (no elders)		0.007317* (0.003888)	0.007195* (0.003928)		
Population density		-2.556691* (1.278184)	-2.531428* (1.288547)		
CPI					-0.003031 (0.002779)
Grey pressure					0.689220 (0.567584)
Interaction b)				8.4095807** (3.5586782)	8.452815** (3.50742)
R2	0.3397	0.5244	0.5167	0.2337	0.359
Joint F-statistic (p-value)	0.01575	0.007118	0.008125	0.1588	0.1465
AICc	-121.3316	-121.851	-121.4816	-133.1667	-125.1506
Ljung-Box test p-value lag length (minimum)		0.4411	0.8117	0.9543	0.7381
VIF	1	1.03 or less	1.04 or less	1.9; 2.0; 3.07	2.2; 2.0; 1.1; 1.2; 3.2

Table 9: OLS regression with lag specification, interaction and controls

Independent Variable (share)	Productive Expenditure	Productive Expenditure	Productive Expenditure
(intercept)	-0.008961	-0.009610	-0.013823**
	(0.006181)	(0.005605)	(0.005071)
Lagged productive expenditure	-0.536802**	-0.62682***	-0.581382***
	(0.236184)	(0.214675)	(0.191139)
Fiscal decentralization	0.101422		
	(0.111357)		
Lagged fiscal decentralization	0.422621**	0.441872**	0.295988*
	(0.180270)	(0.174060)	(0.157823)
Spending decentralization (Flanders/all)	-1.209466		
	(1.298698)		
Lagged spending decentralization (Flanders/all)	-3.206259**	-2.860253*	-2.997055**
	(1.464871)	(1.423443)	(1.226698)
Consolidated gross debt			-0.009377
			(0.010524)
Green pressure			-4.066584**
			(1.579184)
Interaction b)	115.482362*	112.829309*	123.322489**
	(54.466964)	(53.803683)	(47.077899)
N	22	22	22
R2	0.4565	0.3951	0.6075
Joint F-statistic (p-value)	0.1143	0.06073	0.01557
AICc	-82.81199	-89.93459	-89.97218
Breusch-Godfrey test (order up to 5) p-value	0.1288	0.353	0.4909
VIF	1.6; 1.0; 2.7; 1.5; 1.9; 2.9	1.4; 2.5; 1.8; 2.9	1.5; 2.8; 1.5; 1.1; 1.8; 3.0

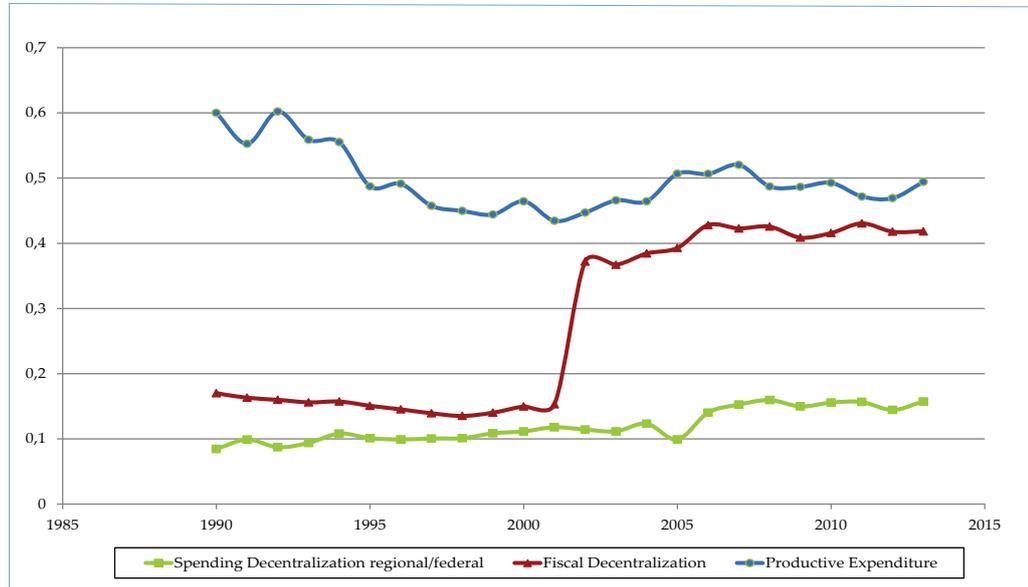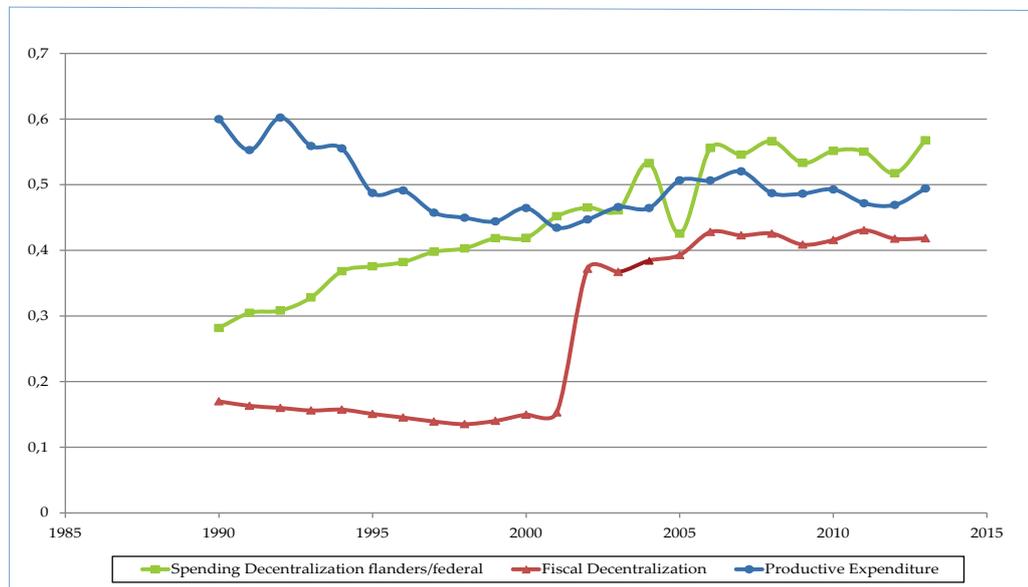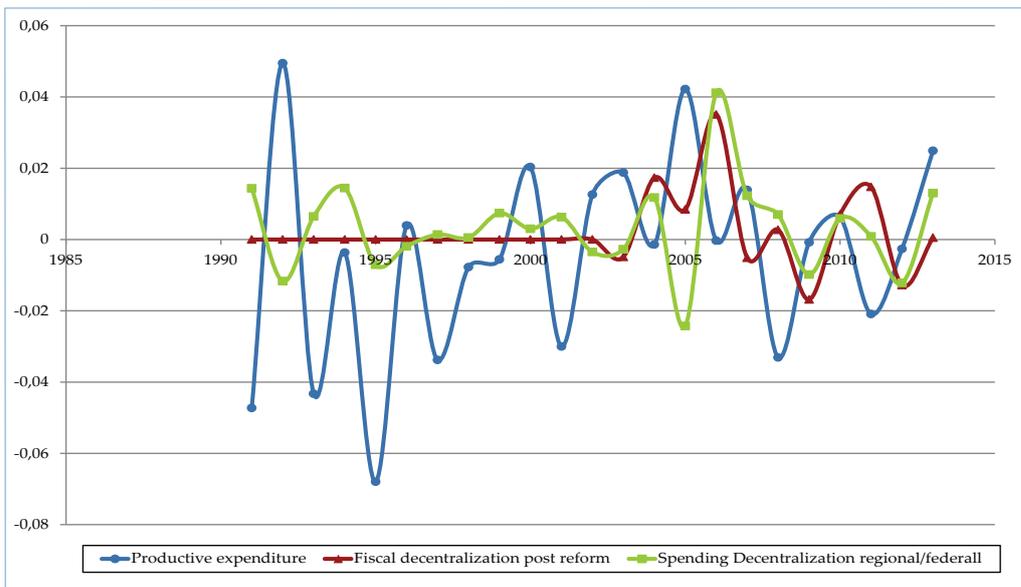## 8.2 Figures

Figure 2

Figure 3

Figure 4

Figure 5: infrastructure expenditure share and fiscal decentralization
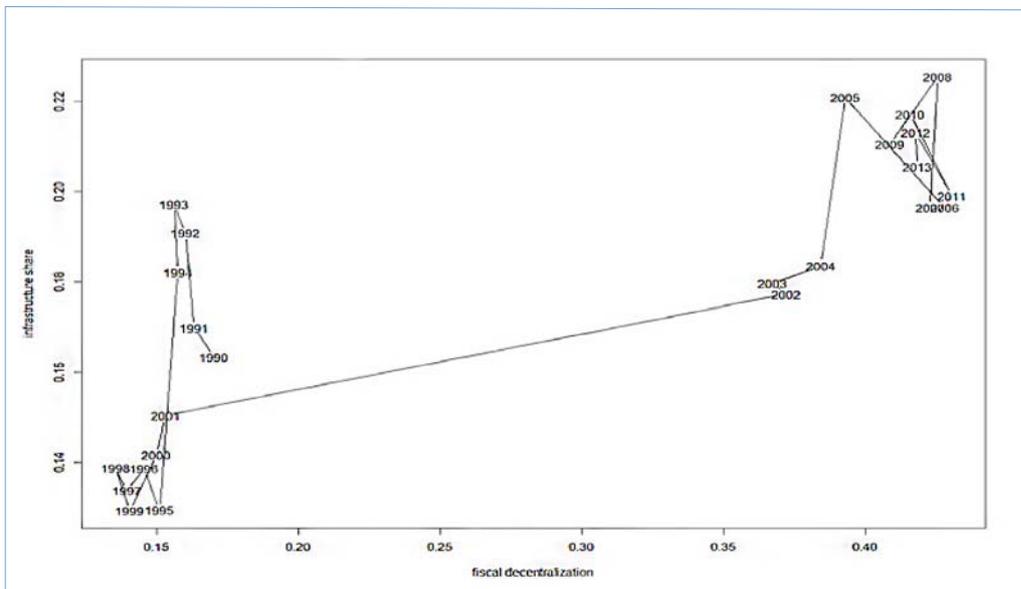
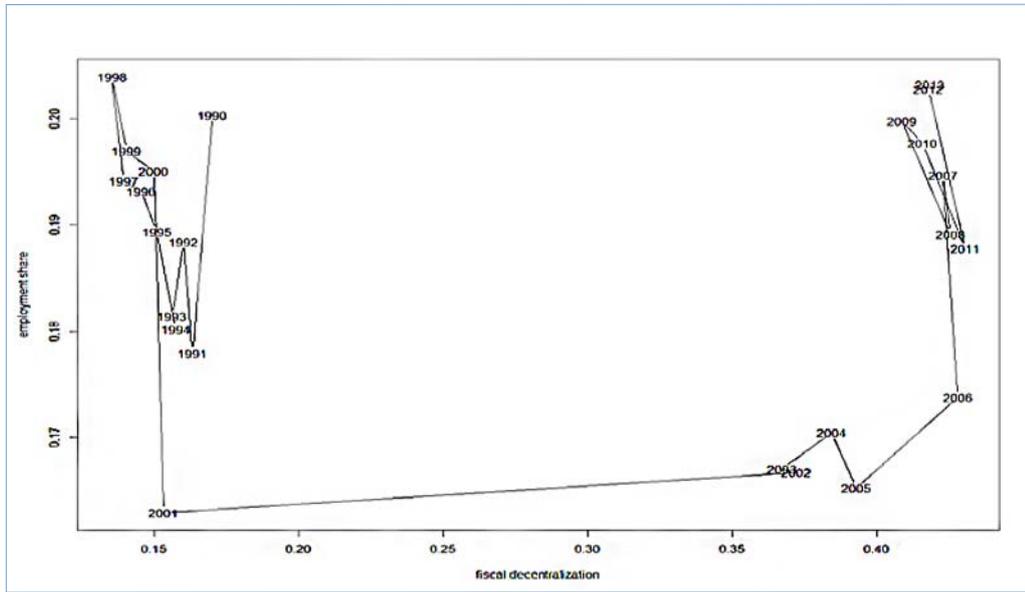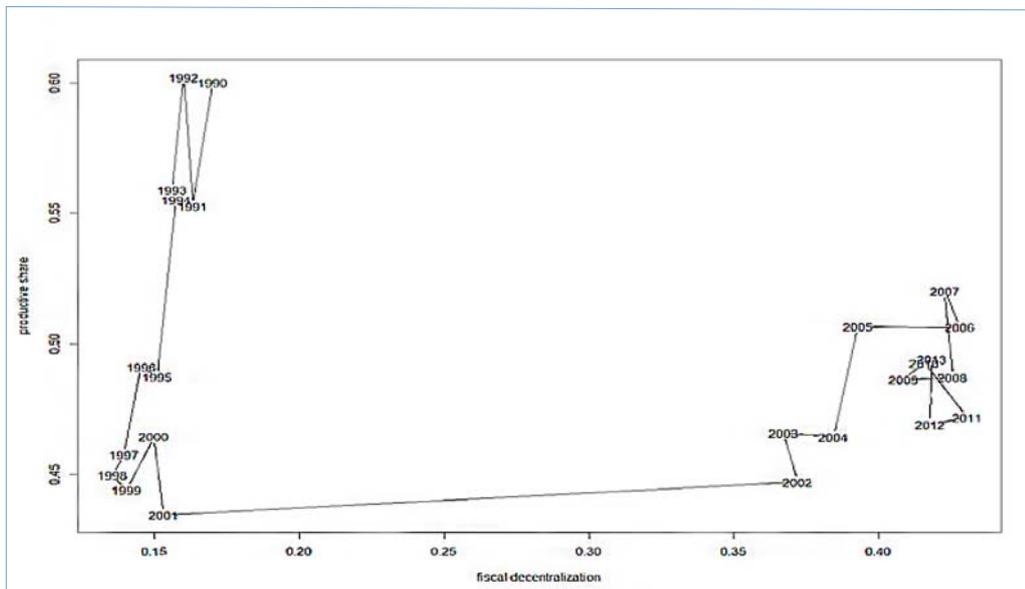Figure 6: employment expenditure share and fiscal decentralization

Figure 7: productive expenditure share and fiscal decentralization

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