



Working Paper 52

The Effect of Central Grants on Local Tax and Non-tax Revenue Mobilisation in a Conflict Setting: Evidence from Côte d'Ivoire

Tiangboho Sanogo and Jean-François Brun

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Tiangboho Sanogo and Jean-François Brun

Summary

This analysis uses panel data from thirty-five departments over the period 2001-2011 to analyse the effect of grants from central government on local revenue mobilisation in Côte d'Ivoire. The study considers the two components of local own revenue in Côte d'Ivoire: tax revenue (LTR) and non-tax revenue (LNTR). To perform the investigation, the analysis is based on a carefully-constructed novel dataset, and very recent and appropriate econometric estimators (Grouped Fixed Effects (GFE)). The GFE method assumes that unobserved heterogeneity can be constant and/or varying over time among individual departments. We combine this method with Instrumental Variable (IV) regressions in a two-stage least squares procedure to control for endogeneity of grants. Overall, the results show a statistically significant and positive effect of central grants on local mobilisation of tax and non-tax revenue. Thus, the study finds that central grants to municipalities do not displace local revenue, but instead lead to higher revenue. However, the effect on tax revenue is more important than that on non-tax revenue. A 10 per cent increase in total grants to local government is associated with a 4.1 per cent increase in tax revenue mobilised by local administration, while increasing non-tax revenue by only 1.8 per cent. We also find that, although conflict has a negative impact on mobilisation of local revenue, this impact remains generally limited. The conflict is not significant at 5 per cent statistical significance.

Keywords: local government; intergovernmental transfers; municipalities; fiscal decentralisation; grouped fixed effect; conflict; Côte d'Ivoire.

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Contents

Summary	3	
Acknowledgements	5	
Acronyms	5	
Introduction	6	
1 Intergovernmental transfers and local revenue mobilisation in the literature	7	
2 Empirical framework: fiscal decentralisation in Côte d'Ivoire	9	
2.1 Overview of Côte d'Ivoire	9	
2.2 Local revenue structure in Côte d'Ivoire	10	
2.3 Central grants and local own revenue in Côte d'Ivoire	13	
3 Empirical analysis	16	
3.1 Data	16	
3.2 Summary statistics	17	
3.3 Descriptive statistics	17	
3.4 Econometric specification	18	
3.5 Grouped patterns and consistency of the GFE approach	20	
4 Main results	22	
5 Conclusion	27	
Appendices	28	
References	33	
Tables		
Table 1	Revenue structure across different categories of local government, Côte d'Ivoire, 2012	12
Table 2	Distributional rule of revenue collected by GTD in Côte d'Ivoire	15
Table 3	Local tax revenue collected by GTD and distributed across governments, post-conflict Côte d'Ivoire, 2012	16
Table 4	Bayesian Information Criterion and the optimal number of groups	20
Table 5	Effect of central grants on total local revenue GFE 2SLS estimation	23
Table 6	Effect of central grants on local non-tax revenue GFE 2SLS estimation	24
Table 7	Effect of central grants on local tax revenue GFE 2SLS estimation	26
Figures		
Figure 1	Local government revenue structure in Côte d'Ivoire	10
Figure 2	Local government revenue structure as percentage of GDP, Côte d'Ivoire, 2004 and 2005 (all levels of sub-government)	11
Figure 3	Composition of municipality revenue structure as percentage of total revenue, Côte d'Ivoire, 2001-2011	12
Figure 4	Composition of basic grants, post-conflict Côte d'Ivoire, 2010-2012	13
Figure 5	Composition of local non-tax revenue, Côte d'Ivoire, 2002-2007	14
Figure 6	Local non-tax revenue vs. central grants (2001-2011)	18
Figure 7	Local tax revenue vs. central grants (2001-2011)	18
Figure 8	Group-specific time effects	21

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Acronyms

ACLED	Armed Conflict Location and Event Dataset
BIC	Bayesian Information Criterion
DGDDL	Directorate in Charge of Decentralisation and Local Development
FE	Fixed Effects
GDP	Gross Domestic Product
GFE	Grouped Fixed Effects
GTD	General Tax Directorate
HLSS	Household Living Standard Survey
INS	National Statistical Institute
IV	Instrumental Variable
LGOR	Local government own revenue
LNTR	Local non-tax revenue
LTR	Local tax revenue
OLS	Ordinary Least Squares
UVICOCI	Côte d'Ivoire Union for Cities and Municipalities

Introduction

In the last decades, a growing literature has stressed the potential (dis)incentive effects of central transfers on local revenue mobilisation in sub-Saharan Africa. Since the 1980s, many of these countries have been pursuing fiscal decentralisation as a main policy reform. Some of them, such as Uganda and South Africa, have significantly increased local own revenue by assigning tax-raising responsibilities to local authorities – consequently improving accountability and tax compliance. However, in most African countries central governments have been reluctant to release taxing responsibilities to sub-national governments (Bird 2010). In these countries, there is a considerable imbalance between responsibility for expenditure and revenue collected, as the decentralisation of expenditure has often not been accompanied by equivalent revenue-raising responsibilities (Dahlberg et al. 2008). Transfers from central government therefore constitute the most important source of local revenue – these are often tied to specific projects, with limited decision-making responsibilities for local authorities (Rajaraman and Vasishtha 2000). The dependence of local government on grants has led to a number of problems that have been well analysed in the literature (Martinez-Vasquez et al. 2013; Knight 2002; Mogues and Benin 2012; Caldeira and Rota-Graziosi 2014). First, local government is likely to be discouraged from collecting their own revenue, subsequently reducing their financial autonomy and accountability to citizens. However, central transfers can also stimulate local revenue mobilisation when the distributional formula includes local tax effort as a condition of receiving the grants (Bahl 2000).¹

In many sub-Saharan African countries such as Côte d'Ivoire – where the process of fiscal decentralisation started in 1980 – transfers represent almost 80 per cent of total local revenue in some jurisdictions (DGDDL 2014). This high dependence on central transfers has been made worse by the political conflict that the country experienced from 2002 to 2010. The conflict may have eroded the local tax base, or central government might have diverted revenue away from grants for military spending.

The purpose of this paper is to look beyond the impact of central grants on local government revenue mobilisation in Côte d'Ivoire, and explore the channels through which they operate in a conflict setting. For this purpose, we explore the hypothesis that the effect of grants differs for mobilisation of local tax or non-tax revenue. Given that the country experienced a long period of political instability, we also examine whether this conflict context affects the capacity of local government to raise taxes, and consequently mitigates the link between local revenue mobilisation and central grants. The idea behind this hypothesis is that the conflict might affect the local tax base and non-tax base differently, as the former seems to be more stable than the latter.²

This study makes two contributions to literature. First, we use a novel database on local government revenue combined with conflict indicators and the national Household Living Standard Survey (HLSS) in Côte d'Ivoire. To the best of our knowledge, this study is the first to analyse the effect of grants on local mobilisation with such a disaggregated dataset in Côte d'Ivoire. Second, the paper uses an improved econometric method based on Grouped Fixed Effects (GFE), which estimates group membership from the data and controls for both time-varying and unvarying heterogeneity across departments. This differentiates our analysis from previous studies on intergovernmental transfers, which typically assume that unobserved heterogeneity is constant over time.

¹ The terms 'central transfers' and 'central grants' are often used here to refer to grants allocated by central government to local government.

² In Côte d'Ivoire property taxes, essentially based on urban residential and commercial buildings and local businesses, represent the most important part of the local tax base. They appear to be more stable and less likely to be affected by conflict than local non-tax revenue, which is based on fees and charges – as shown in Sections 2.2 and 2.3.

The main conclusion is that central transfers increase local revenue mobilisation. The magnitude of this impact differs depending on the two components of local own revenue.³ The grants effect is more important for tax revenue than non-tax revenue. Moreover, the results show that, though conflict has had a negative impact on local revenue mobilisation, this impact remains generally limited. The main results of this paper contradict those of Mogues and Benin (2012), who find that greater past external transfers to Ghana's districts do not encourage internal revenue-raising. A possible explanation for the difference between Mogues and Benin (2012) and our results is that the effect differs depending on the specific country context, including the scope of local government revenue assignment, its discretion in setting rates on tax and fee bases, and other potential constraints affecting the ability of local government to increase its own revenue. Other potential reasons for the different results may be the allocation formulas used in Ghana, which do not contain a criteria sufficient to promote improvements in local government revenue mobilisation, as shown by Mogues and Benin (2012). The difference might also be explained by the method we use, which allows controlling for time-varying heterogeneity.

The remainder of the paper is organised as follows. Section 1 provides an overview of the literature, highlighting channels through which transfers might affect local revenue mobilisation. In Section 2, we carry out a statistical analysis of Côte d'Ivoire's transfer system, and present the potential correlation of transfers with local revenue mobilisation. Section 3 provides an analysis of the decentralisation process and local government's revenue structure in Côte d'Ivoire. We interpret the main results and perform robustness checks on our findings in Section 4. Section 5 concludes and discusses the policy implications.

1 Intergovernmental transfers and local revenue mobilisation in the literature

Relying on the theoretical and empirical literature, this section discusses channels through which transfers might affect local tax mobilisation.

First, literature has shown that local revenue mobilisation is boosted when local governments control large tax bases – this allows them to get responsibility over the use of this revenue and to spend it according to local preferences. Providing that local authorities' accountability increases with tax-raising responsibilities, the preferences of the people are better accounted for (Oates 1993). When taxpayers receive the services they expect it is assumed they will accept paying taxes, resulting in less resistance to cost-recovery of user charges (Bahl 1999). In this regard, transfers might be perceived as a kind of windfall resource, crowding out local own revenue and reducing subsequent accountability and the incentive for local government to collect revenue internally (Caldeira and Rota-Graziosi 2014). Many studies have also found that transfers can be a source of inefficiency, affecting local tax performance. Bahl and Linn (1992) and Moore (2008), studying local fiscal federalism in developing countries, argue that grants can make local government less accountable for their fiscal decisions and reduce tax effort, as transfer dependency is widespread in most of these countries.

³ According to legislation, local own revenue has two principle components: revenue collected by local tax administrations, and tax revenue collected on behalf of local government by the General Tax Directorate and shared according to a predefined formula.

Second, intergovernmental transfers may impact local revenue performance due to corruption. Prud'homme (1995: 211) suggests that 'local politicians and bureaucrats are likely to be more subject to pressing demands from local interest groups'. Therefore, local authorities can divert grants away from their intended objectives, such as delivery of services, for personal gain. This is more prevalent in developing countries, where local elections are often based on tribal and/or political affiliation. Moreover, in low-income countries local authorities are more likely to spend external grants ineffectively than the resources they have raised (Bird and Smart 2002).

Furthermore, intergovernmental transfers might have a positive impact on equality among and within local government, which will consequently affect tax compliance and revenue mobilisation. Indeed, central government often uses grants, such as equalisation grants, to address regional disparities. This results in improved local wellbeing, and therefore increases the tax base for local government. On the other hand, some authors have also shown that transfers aimed at reducing inequality might have a negative effect due to the complexity of some equalisation programmes. Buettner (2006), for example, finds that the volume of grants received by municipalities is likely to be inversely related to the local tax rate, leading to more inequality, due to variations in the tax base. He develops a theoretical model accounting for an incentive effect of fiscal decentralisation on tax effort using data on German municipalities. Moreover, Liu and Zhao (2011) show that inequalities can decrease tax compliance.⁴ They explain that in a context of high inequality citizens will avoid tax, resulting in substantial loss of revenue. As most developing countries are characterised by large regional disparities, an equalisation system can lead to important loss of revenue mobilisation at the local level. This was the main point made by Canavire-Bacarreza et al. (2012), when analysing the main factors explaining the poor revenue collection performance of sub-national governments in Peru. They find that, when distributed without consideration of the relative expenditure needs of local government, transfer of revenue from extractive industries creates a disincentive effect on tax effort.

Intergovernmental transfers can affect tax performance through their impact on economic growth. As Martinez-Vasquez and Rider (2006) show, high transfer dependency induces a lack of fiscal discipline among local government. This threatens the ability of a country to sustain high rates of economic growth. In addition, using transfers to soften local budget constraints, as is common in developing countries, represents a threat to macroeconomic stability. Indeed, by expecting support from central government in case of financial trouble, local government might have an incentive to increase their deficit. Rodden (2006) and Martell and Smith (2004), focusing on Germany and the United States respectively, find that local governments that expect a bailout tend to borrow more than those that do not. Other authors support this idea, and claim that local governments that face soft budget constraints are potentially inefficient in spending. This is likely to create macroeconomic instability, which will reduce tax effort (Ter-Minassian 1997; Weingast 2009; Bird 2010; World Bank 2001). This may therefore potentially hinder economic growth and consequently reduce tax effort. This argument is consistent with the results of de Mello (2000), who finds that reliance on intergovernmental transfers worsens fiscal positions at the central level for non-OECD countries.

Although intergovernmental transfers may constitute a threat to macroeconomic stability they can reduce the volatility of local tax revenue, which partly depends on economic growth. Bordignon (2000) argues that the soft budget constraints of Italian local government generate efficiency losses by inducing a lack of political accountability, and undermines the soundness of public finances. However, the improved efficiency in service delivery predicted by the fiscal federalism literature is also based on intergovernmental competition (Tiebout 1956). This

⁴ They also show that inequalities can erode the quality of institutions.

competition requires a hard budget constraint among jurisdictions that must bear the full financial consequences of their policy decisions (Weingast 2009). In this way, the dependence of local government on transfers may mitigate the expected results from fiscal decentralisation, and thus reduce revenue mobilisation.

It is believed that the assignment criteria for transfers plays a key role in the relationship between local revenue mobilisation and central transfers. According to Bird and Vaillancourt (2006), these criteria must be designed in a way that does not discourage local authorities from collecting their own source revenue. Unfortunately, in low-income countries the allocation is often motivated by political rather than economic and social considerations, as shown by Chambas (2010) and Caldeira and Rota-Graziosi (2014) in the case of Benin. Transfers are also excessively delayed and volatile, as argued by Fjeldstad and Heggstad (2012) when examining constraints and opportunities in English-speaking African countries. This, in turn, negatively affects the local administration's ability to implement the strategy for local development. There is also evidence that intergovernmental transfers are diverted away from service delivery due to political targeting (Banful 2011).

As highlighted above, the effect of central transfers on tax performance highlighted above varies widely across countries, depending on their tax structure. The effects are particularly important in sub-Saharan African countries, as local government is highly dependent on central transfers. However, this relationship has received little attention in literature, even though fiscal decentralisation has been implemented since the 1990s.

2 Empirical framework: fiscal decentralisation in Côte d'Ivoire

2.1 Overview of Côte d'Ivoire

Côte d'Ivoire is a sub-Saharan African country; more than half its population of 22 million live in urban areas (World Bank 2012). The country is recovering from eleven years of economic stagnation and political conflict, which culminated in a post-election crisis in 2010-2011. Since 1980, Côte d'Ivoire has attempted to implement decentralisation by transferring responsibility for expenditure and revenue-raising to sub-national governments, with the aim of improving effectiveness and efficiency in the delivery of public services.

The revenue structure of local government in Côte d'Ivoire is largely inherited from the French colonial period. Law No. 55-1489 of 18 November 1955 established various operational municipalities in Abidjan, Bouaké and Grand Bassam, which did not have financial autonomy. After independence in 1960, decentralisation, and especially the financial autonomy of local government, were clearly not a priority for the central government. Although municipal council members and mayors were elected, the central government only started the process of decentralisation under Law No. 80-1162 of 17 October 1980. This law defined a specific status and electoral regime for municipalities, and created thirty-seven municipality councils in addition to Abidjan. In 2000 the government adopted a new constitution, which sets out the principle for administration and financial autonomy of local authorities. This constitution subdivides the country into a multi-tiered system with 19 regions at the top level: these are divided into 58 departments led by department councils, 197

municipalities at the lowest level, and 2 districts (Abidjan and Yamoussoukro).⁵ The Ministry of Interior is responsible for management and development of decentralisation, through the Directorate in Charge of Decentralisation and Local Development (DGDDL). DGDDL collaborates with the Ministry of Economy and Finance through the Public Treasury Directorate to define the amount of intergovernmental transfers and their allocation. These administrations interact with local governments, which are organised under the Côte d'Ivoire Union for Cities and Municipalities (UVICOCI). The relationship between central and local government is managed through a trusteeship system with two levels that approve their decisions and provide advice and assistance.

In the process of reinforcing the fiscal autonomy of local government, more than thirty-five legislative decrees and laws have been passed to assign expenditure functions and revenue sources across lower levels of government. These responsibilities often relate to the provision of important and diverse public services, such as health and education facilities, water and sanitation, local urbanisation, and building. The responsibilities also include some sources of tax revenue, which, though limited, can contribute significantly to local total revenue.

2.2 Local revenue structure in Côte d'Ivoire

In Côte d'Ivoire, as in many developing countries, total local revenue represents a small fraction of Gross Domestic Product (GDP). Figure 1 shows the average local government revenue structure, including: central grants; local revenue collected by the central government through the General Tax Directorate (GTD), which we call Local Tax Revenue (LTR);⁶ Local Non-Tax Revenue (LNTR), specifically collected by local administration; and other revenue.

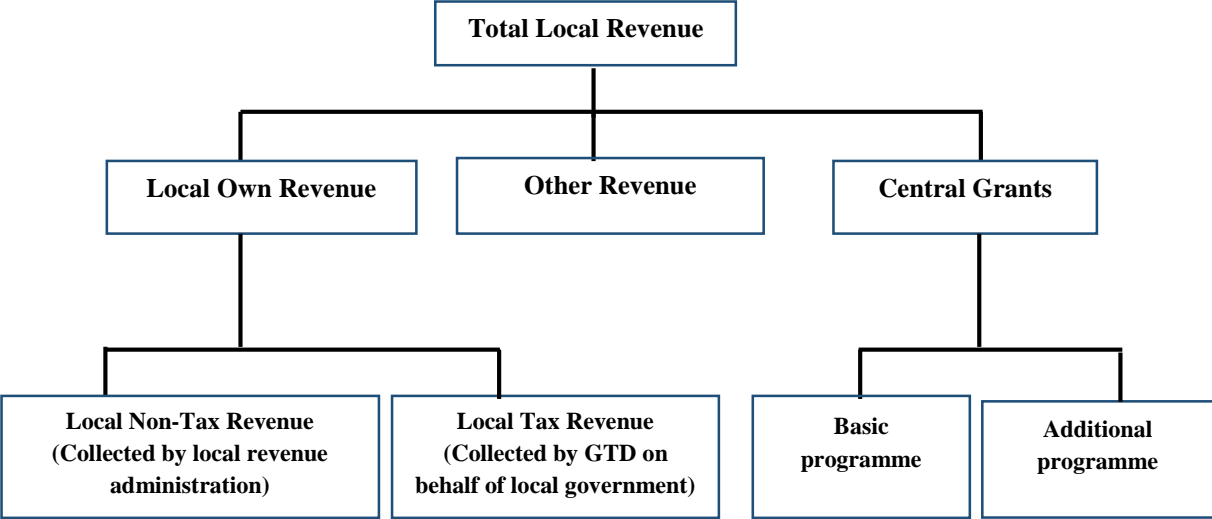


Figure 1 Local government revenue structure in Côte d'Ivoire

⁵ Since 2011, although the number of municipalities has remained almost unchanged, the Ivorian government has reorganised the country into 14 districts (with full autonomy for Abidjan and Yamoussoukro), 31 regions, 95 departments, and 198 municipalities, each with an elected mayor.

⁶ According to legislation, local own revenue has two principle components: revenue collected by the local tax administration, and tax revenue collected on behalf of local government by the General Tax Directorate (GTD) and shared according to a predefined formula.

Figure 2 shows the percentage of GDP contributed by different types of local revenue. Total local revenue represents only 0.64 per cent and 0.53 per cent of GDP for 2004 and 2005 respectively. LTR represents the larger share of this total revenue, with on average 0.26 per cent of GDP over the two years. At the same time, central grants account for 0.20 per cent of GDP. Revenue collected by local administration (LNTR) was only 0.13 per cent of GDP. According to the Ivorian Constitution many sources of revenue are classified as other revenue: this includes miscellaneous revenue, external aid, loans, and ordinary reserve funds 'Fonds des Reserves Ordinaires'. Other revenue accounted for about 0.1 per cent of GDP in 2005.

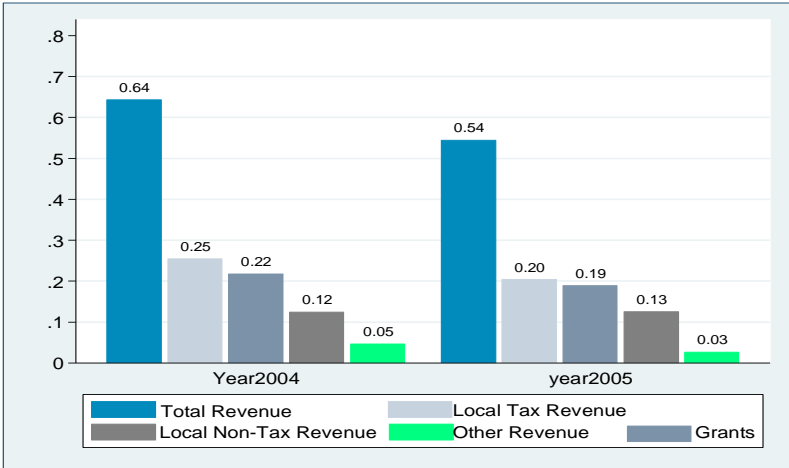


Figure 2 Local government revenue structure as percentage of GDP, Côte d'Ivoire 2004 and 2005 (all levels of sub-government)

When analysing by sub-government categories over the last decade, we find that these figures hide considerable disparities in revenue source. Figure 3 reflects the relative composition of total municipality revenue over the period 2001-2011. Over this period, grants from the central government contributed on average more than 50 per cent of total municipality revenue, and slightly decreased in the three-year period leading up to the 2010 national election.⁷ During the same period municipalities have collected a small part of their total revenue, accounting for on average less than 25 per cent of total revenue. However, tax revenue represents on average 20 per cent of municipality total revenue and remains relatively constant in absolute terms up to 2011. This revenue is part of local own revenue and depends on the local tax potential. Combining this two components, local own revenue reaches 45 per cent of total revenue. This contribution is relatively low compared to developing countries like Benin, where municipalities' own revenue contributed 69 per cent of total revenue over the period 2003 to 2008.

⁷ This trend suggests a possible reassignment of resources to election expenditure, since the allocation criteria of these grants remain mostly under the discretion of central government.

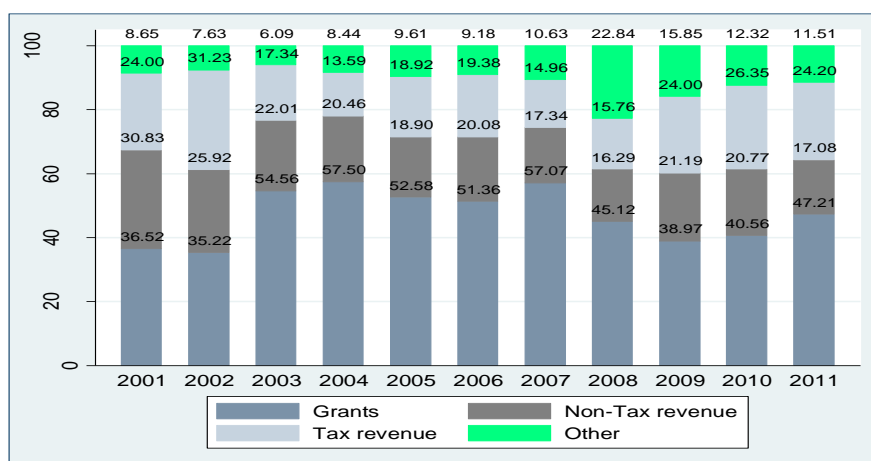


Figure 3 Composition of municipality revenue structure as percentage of total revenue, Côte d'Ivoire 2001-2011

Moreover, this average hides significant variations and disparities between large urban municipalities and small rural ones. In fact, Côte d'Ivoire is characterised by wide tax disparities among regions, as Bahl (2000) noted for developing and transition countries. Table 1 shows the structure of total municipality revenue for different categories of municipalities in 2012. While municipalities in Abidjan and large urban municipalities (e.g. Daloa and Korhogo) internally mobilise more than 45 per cent of their total revenue, smaller municipalities (e.g. Bédiala and Kaniasso) are almost fully dependent on grants from central government as they collect less than 10 per cent of total revenue. Some northern municipalities (e.g. Kanakono and Kouto) collect almost no revenue, as LNTR accounts for less than 1 per cent of total revenue (DGDDL 2014). These disparities justify the use of grants to reduce inter-regional inequalities in revenue potential. In order to make this equalisation policy more effective and pro-poor, as well as to improve local revenue mobilisation, a number of issues must be considered: the revenue source supporting these transfers, the distribution formula used to allocate resources, and expenditure responsibilities of local government.

Table 1 Revenue structure across different categories of local government, Côte d'Ivoire, 2012

Category	Municipality	Tax revenue		Non-tax revenue		Central grants		Other		Total revenue value
		Value*	%	value	%	value	%	value	%	
Abidjan	Adjame	923.85	(44.12)	973.03	(46.47)	197.21	(9.42)			2094.09
	Abobo	581.26	(25.80)	911.59	(40.46)	179.09	(7.95)			2252.83
Large	Daloa	241.59	(25.13)	441.53	(45.92)	278.40	(28.95)			961.52
	Kohorgo	168.40	(34.19)	200.28	(40.67)	51.15	(10.39)	72.67	(14.75)	492.49
Middle	Tanda	37.83	(21.45)	26.58	(15.07)	98.70	(55.97)	13.23	(7.50)	176.35
	Biankouma	8.72	(6.89)	24.46	(19.32)	47.74	(37.71)	45.68	(36.08)	126.60
Small	Bédiala	0.38	(0.40)	11.18	(11.61)	82.33	(85.52)	2.38	(2.48)	96.27
	Kaniasso	0.30	(0.47)	1.79	(2.86)	60.06	(95.87)	0.50	(0.80)	62.65

*Base data - millions of Franc CFA, unless otherwise specified; percentage of total local revenue in parentheses

Source: Calculation by authors with Côte d'Ivoire data collected by the Ministry of Interior (DGDDL).

2.3 Central grants and local own revenue in Côte d'Ivoire

Central transfers are the most important source of financing for almost all municipalities in Côte d'Ivoire. There are two sources of central grants: a basic and an additional allocation programme.

The Ivorian government organises a first type of transfers, named 'Aide de l'Etat' (basic programme). The total endowment of this fund is determined annually by the Directorate General for Budget in collaboration with local government, and approved by a majority vote in the Ivorian Parliament. This structure is determined by a mix of grants for capital expenditure, 'dotation générale pour investissement'; and grants for recurrent expenditure, 'dotation générale de fonctionnement'. The basic allocation aims to help municipalities to provide a minimum level of public services to their constituencies. The distributional formula is based on many indicators, such as the size of municipalities, the presence of central government institutions, and the size of the population. The amounts vary from FCFA250 per capita for the most populated municipalities, to FCFA1000 per capita for less populated localities. These amounts were established in 2001, and may be modified from year to year depending on central government budgeting. The allocation criteria for grants for capital expenditure rely to an extent on the discretion of the central government and economic policy goals.

The second type of grants, 'aide exceptionnelle' (additional allocation), serves to cover exceptional costs that certain authorities come up against. According to the Ivorian constitution, this grant is only allocated to the municipalities of Yamoussoukro, Bouaké, Korhogo and Abidjan.

When analysing the allocation of basic grants over the three post-conflict years, figures show that transfers made for operational expenditure tend to be higher than those made for capital expenditure in all municipalities. In the western and northern regions, which were more affected by conflict, grants for capital expenditure are almost equal to grants for operational expenditure (Figure 4).

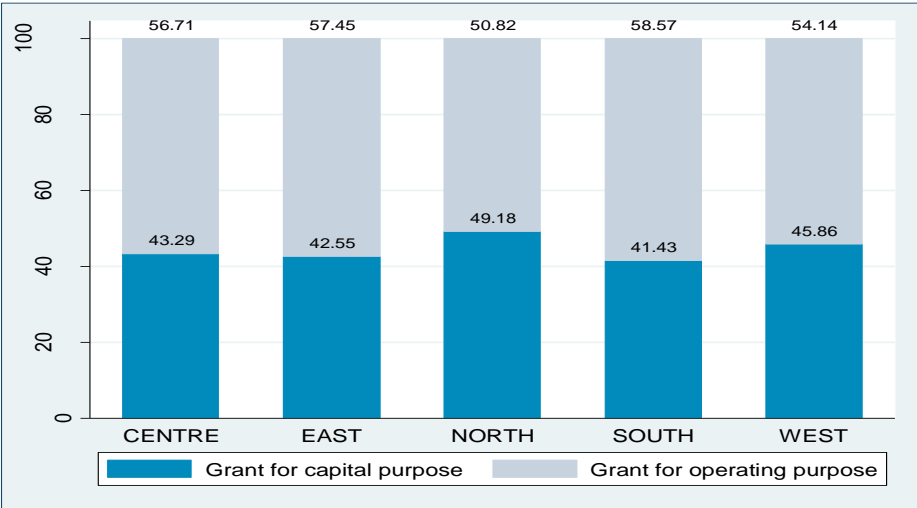


Figure 4 Composition of basic grants, post-conflict Côte d'Ivoire, 2010-2012

These figures may reflect the central government’s vision of ensuring greater access to basic services after the conflict, and reducing regional disparities. As the northern region experienced a higher incidence of violence due to the conflict, the share of capital grants to northern municipalities is higher than that to municipalities that were under the control of the regular army. Note that literature has pointed out that transfer systems organised to reduce disparities amongst regions (horizontal imbalance), by transferring more revenue to poorer regions, can produce disincentives. Some municipalities can free-ride on the tax effort of other municipalities and under-exploit their tax potential, as showed by Weingast (2014). Having highlighted the different components of the grants received by municipalities, now we turn to the composition of their local own revenue.

Local own revenue in Côte d’Ivoire is composed of Local Tax Revenue (LTR), collected on behalf of local government by the central tax administration and shared according to predefined formulas, and Local Non-Tax Revenue (LNTR), which is collected by municipalities.⁸

The principal sources of LNTR are: licences, residential tax and various charges (for business, market, construction permits, bars, shows, advertising, hotels, etc.); service fees (water, sanitation, waste collection, etc.); and vehicle tax (often shared with the centre). From 2002 to 2007, on average the tax on small local businesses and licences contributed the most important share of local own revenue, with more than 26 per cent, while lease fees accounted for less than 6 per cent. On average, from 2002 to 2007 market fees and flat tax together represented almost 50 per cent of municipality own revenue (DGDDL 2014). It is worth noting that the revenue collected internally is under the control of local government.

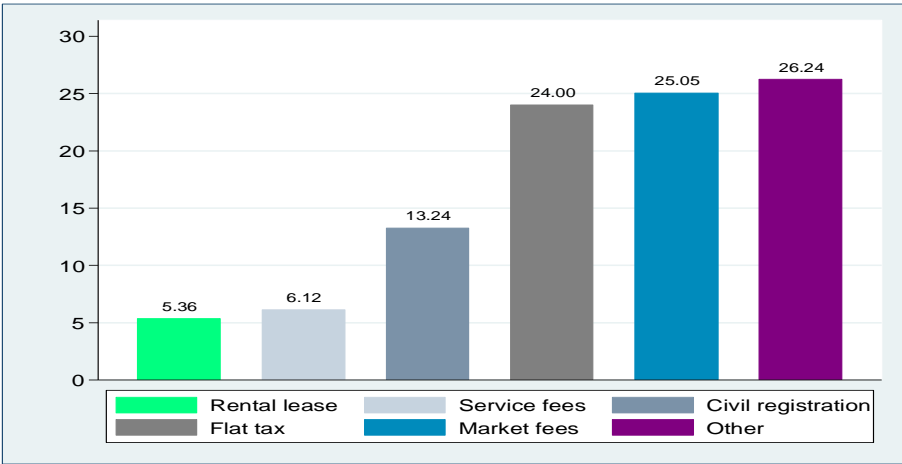


Figure 5 Composition of local non-tax revenue, Côte d'Ivoire, 2002-2007

The Directorate General for Tax, in collaboration with municipalities, collects LTR on behalf of local governments, and transfers this revenue to them. This process aims to make local tax mobilisation more efficient, since the capacity of municipalities is often limited. Consistent with the literature,⁹ some local taxes in Côte d’Ivoire are well managed by the central government. Table 2 breaks down these taxes and the distributional rules across different

⁸ It is worth noting that local non-tax revenue, although called non-tax, contains small local revenue sources that can be classified as taxes.

⁹ Bird (2000) notes that a large number of taxes are well managed by the central government.

level of government. LTR includes property tax,¹⁰ which is based on local residence tax, real property tax, land tax (non-built areas), and lastly tax on the public road network, hygiene and sanitation. These taxes are distributed across six levels of government (municipalities, cities,¹¹ departments, regions, districts and the central government). The other sources of tax revenue are motor vehicle tax (vignette), synthetic tax, patent and licence and tax on gambling (casino). Forty per cent of these taxes are allocated to municipalities; central government receives 10 per cent, except for local residence tax, of which 60 per cent of revenue is kept by central government. Only revenue from vignette is equally distributed between municipalities and central government, with 20 per cent for each. The other 60 per cent is shared across other levels of local government (Table 2). As municipalities are the only level of local government with tax-raising responsibilities, this redistribution can prevent municipalities from developing their revenue-raising capacity.

Table 2 Distributional rule of revenue collected by GTD in Côte d'Ivoire

Type of revenue		Distributional formula					
		Municipality	City	District	Department	Region	Central government
Other taxes	Patent and licences	40%	5%	5%	25%	15%	10%
	Synthetic tax	40%	no	no	25%	10	15%
	Tax on casinos	no	no	100%	no	no	no
Vignette	Motor vehicle tax	20%	5%	10%	30%	15%	20%
Property tax	Tax on public road network, hygiene and sanitation	40%	5%	5%	25%	15%	10%
	Real property tax	40%	5%	5%	25%	15%	10%
	Land tax (non-built or vacant lands)	40%	5%	5%	25%	15%	10%
	Local residence tax	40%	no	no	no	no	60%

Source GTD-Côte d'Ivoire

Table 3 summarises the distribution of tax revenue across sub-governments in 2012. The share of municipalities is slightly less than the 40 per cent noted in the constitution. On average, this share reaches FCFA36.87 billion – 35.4 per cent. Only the revenue from vignette complies with the law, with 20 per cent allocated to municipalities (FCFA2.13 billion). The central government withheld 29 per cent LTR in 2012. In Côte d'Ivoire, business licences are intended to be a significant revenue source for local government. The share of the central government represents more than 25.2 per cent, clearly above the percentage fixed by the law (10 per cent). While 39.9 per cent is allocated to municipalities, 18.5 per cent to districts and 7 per cent to departments, central government retains more revenue than what is planned by the formula. A review of this formula and the devolution of some tax-raising responsibilities to local government could reinforce the link between local authorities and citizens.

¹⁰ Unfortunately in Côte d'Ivoire the availability of relevant property registers and data is limited. As in many African countries, Côte d'Ivoire does not include agricultural land in the property tax base.

¹¹ Only the cities of Abidjan and Yamoussokro.

Table 3 Local tax revenue collected by GTD and distributed across governments, post-conflict Côte d'Ivoire, 2012

Government level *	PATENT				Synthetic tax	Game tax	Vignette	Stamp duties	Property Tax	Sub-Total2	Total
	Purchasers	Traders	Public Transport	Sub-Total1 Patent							
Central Government	75.99 (32.66)	8912.47 (25.12)	769.92 (26.08)	9758.39 (25.24)	2715.50 (52.49)	0 (0.00)	1756.24 (16.49)	4290.5 (97.7)	11727.89 (26.01)	20490.15 (31.3)	30248.54 (29.05)
District	0.8 (0.34)	10182.92 (28.70)	546.45 (18.51)	10730.18 (27.75)	441.53 (8.53)	161.28 (100.00)	3394.18 (31.89)	0 (0.00)	10269.54 (22.78)	14266.55 (21.80)	24996.73 (24.01)
Department	67.37 (28.95)	2194.01 (6.18)	474.48 (16.07)	2735.88 (7.07)	101.68 (1.96)	0 (0.00)	976.57 (9.17)	0 (0.00)	1536.05 (3.41)	2614.3 (3.99)	5350.18 (5.14)
Municipality	88.46 (38.02)	14181.63 (39.98)	1160.63 (39.32)	15430.73 (39.91)	1914.19 (37.00)	0 (0.00)	2138.67 (20.09)	0 (0.00)	17387.6 (38.57)	21440.47 (32.76)	36871.21 (35.42)
Other	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	2378.31 (22.34)	100.74 (2.29)	4164.51 (9.24)	6643.57 (10.15)	6643.57 (6.38)
TOTAL	232.64	35471.04	2951.50	38655.19	5172.92	161.28	10643.99	4391.24	45085.59	65455.04	104110.24

* Base data - millions of Franc CFA, unless otherwise specified ; percentage of different revenue allocated to each level of government in parentheses

Source: Calculation by authors with Côte d'Ivoire data from Directorate General of Taxation.

3 Empirical analysis

3.1 Data

The analysis draws mainly on three sources of data. The first one is a local government revenue and expenditure dataset (Sanogo 2015). This dataset has been constructed from two major sources: the Administrative Account of municipalities collected by the DGDDL, and the National Account relating to local government from the Ministry of Economy and Finance. This dataset provides information on local government revenue for 115 municipalities over the period 2001-2011. It contains Local Government Own Revenue (LGOR), transfers from the central government, and other revenue. Our variable of interest is central grants. In addition, we use data on expenditure available for 117 municipalities over the same period, aggregated into 35 departments. We then compute the rate of execution of local expenditure. These rates are used by central government to allocate grants to local governments in Côte d'Ivoire.¹² For socioeconomic and demographic factors that are additional determinants of LGOR performance, we use the dataset collected by the National Statistical Institute (INS), which is based on the national Household Living Standard Survey (HLSS) for the years 2002 and 2008.¹³ The HLSS is a national demographic and economic survey providing information on living conditions, infrastructure, poverty, education, employment and other covariates. The HLSS design ensures representativeness of Côte d'Ivoire's 196 municipalities. Approximately 70 households were surveyed in each locality, with a total of 10,800 and 13,657 households respectively in 2002 and 2008. Based on this dataset, and following Mogues and Benin (2012), we construct measures of potential explanatory variables that allow to control for tax base and the capacity of local governments to collect their own taxes.

¹² This rate is calculated for each expenditure type through the following formula, where t represents the year:

$$Rate_t = \frac{Expenditures\ executed_t}{Forecasts\ of\ Expenditure_t} * 100$$

¹³ The surveys provide information on whether the household has access to several facilities like running water, electricity, health and education infrastructure. They also contain information about households own durable assets such as fridge, computer, car, etc.

We additionally use information relative to geographical distribution of the population from INS to calculate the density of population and the share of urban population over the period under study.

Third, conflict indicators are computed using data from the Armed Conflict Location and Event Dataset (ACLED) (Raleigh et al. 2010). ACLED contains information on the exact dates and location of political violence, the conflict events, and a fatality index measuring the intensity of each event.¹⁴ The conflict events selected in this data include three types of battles (violence against civilians, remote violence and rioting), protests (non-violent demonstrations) and other non-violent events. We multiply these conflict events with the fatality index of each event by locality to control for conflict effects.¹⁵

Finally, we combine these three data sources and aggregate at departmental level to construct a panel spanning eleven years (2001-2011) for thirty-five departments.

3.2 Summary statistics

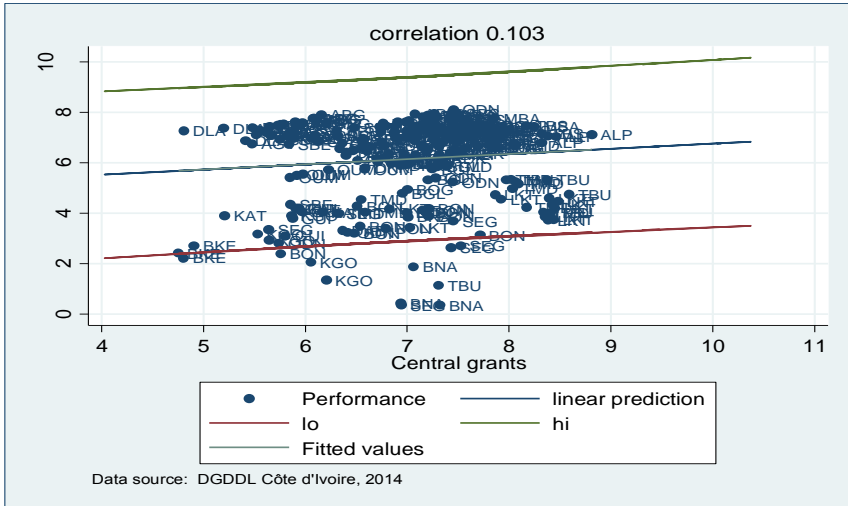
As shown in Appendix Table A2, the mean of total grants per capita taken over the sample is approximately FCFA1551 with a standard deviation of about 3491 across the country. This amount varies more in the southern departments (4099.59) compared to the northern departments (1067.34), with a higher incidence of conflict as indicated by standard deviation. Appendix Table A2 also shows statistically significant differences between the conflict-affected northern region and the south in households' living conditions and tax base. For example, the mean poverty headcount rate in the northern area reaches 42 per cent, which is higher than the mean for all the sample (38 per cent) and that of southern departments (36 per cent). Inequality is also higher in these most-affected departments, as shown by standard deviation of poverty headcount rate. See Appendix Table A2 for a more detailed description of departments' characteristics and summary statistics.

3.3 Descriptive statistics

In this sub-section, we investigate the correlation between local revenue mobilisation and central grants. To measure revenue mobilisation, we use per capita own revenue (tax and non-tax). Figures 6 and 7 show the relationship between central grants, and local tax revenue and non-tax revenue respectively. The correlations are presented for the two components in order to compare the revenue collected by the local administration with that collected by the General Tax Directorate. As suggested in Figure 6, an increase in grants seems to positively affect the local revenue collected by local tax administration (LNTR) (correlation = 0.103). However, the trend of this relationship differs slightly when assessing for LTR, as indicated by the prediction line in Figure 7 (correlation = -0.059). LNTR varies more significantly across the country than LTR. Nevertheless, all these graphs suggest a significant relationship between the grants received by departments and their performance in raising their own revenue, although this correlation seems weak. This difference between LNTR and LTR in terms of correlation also reveals the importance of disaggregating local own revenue when assessing the relationship between grants and local revenue performance, which will be examined in detail in the following section.

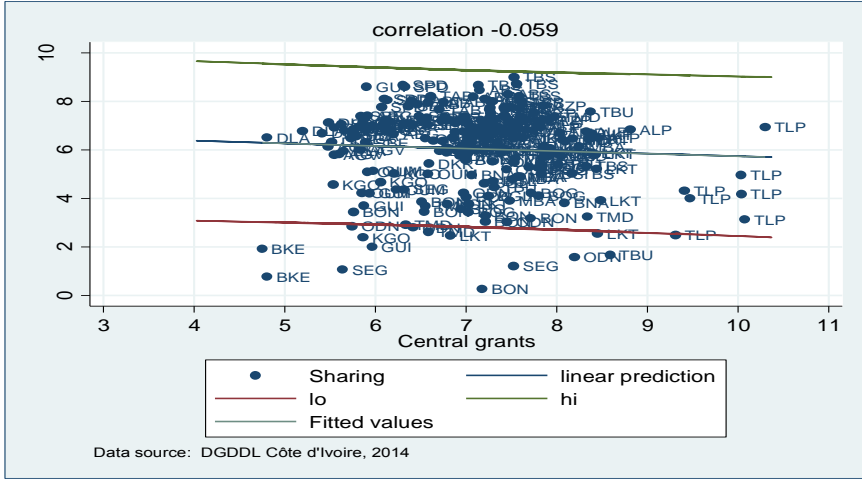
¹⁴ The fatality index reports the number of deaths due to each event, lower numbers represent least violence. The fatality index varies from 1 to 10 with 10 for the highest incidence of violence.

¹⁵ As our interest period is characterised by political instability and sporadic conflict events, it is reasonable to think that this context may have negatively affected the capacity of local government to raise taxes.



Source: Calculation by authors with Côte d'Ivoire data collected by DGDDL.

Figure 6 Local non-tax revenue vs. central grants (2001-2011)



Source: Calculation by authors with Côte d'Ivoire data collected by DGDDL.

Figure 7 Local tax revenue vs. central grants (2001-2011)

3.4 Econometric specification

Unlike existing literature on fiscal decentralisation, we take advantage of up-to-date developments in the econometric literature, and use the Grouped Fixed Effect (GFE) method recently developed by Bonhomme and Manresa (2015) for this analysis.

We mainly adopt Mogues and Benin’ (2012) model specification where local revenue is measured by per capita internal local revenue and depends on the level of central grants. However, contrary to their approach, we assume that local governments’ unobserved heterogeneity is not constant over the period under study, and specify a different approach to consider for specific characteristics that vary over time following the baseline GFE model below:

$$Y_{it} = \lambda + \theta X_{it} + \alpha_{git} + \varepsilon_{it} \quad i = 1, \dots, N \quad t = 1, \dots, T \quad (1)$$

Y_{it} represents the dependent variable, X_{it} is a set of explanatory variables. ε_{it} represents an idiosyncratic disturbance. An important contribution of this model is the inclusion of the group-specific unobservable effects $\alpha_{g_{it}}$ where $g_i \in \{1, \dots, G\}$ is a group membership which maps individual units into groups that are estimated endogenously with the parameters of our specification. For this approach, both the group-specific time patterns and individual group membership are left unrestricted and estimated from the data.

We modify model (1) to incorporate time-invariant fixed effects, the two components of local own revenue, and time-variant grouped effects using the following specification:

$$\ln(LGOR)_{it} = \lambda + \theta_1 \ln(grants)_{it} + \theta_2 x_{it} + \alpha_{g_{it}} + \eta_i + \varepsilon_{it} \quad (2)$$

The dependent variable $\ln(LGOR)_{it}$ is the log of per capita local own revenue (LGOR). It represents internal funds generated by each department i at time t (LNTR or LTR). Our variable of interest $\ln(grants)_{it}$ is a log of grants per capita to department i at time t (basic and addition allocation). We follow the existing literature to identify control variables that proxy for local revenue performance represented by x_{it} (economic, demographic and social characteristics). The group-specific unobservable effects $\alpha_{g_{it}}$ will be modified to account for the department-specific fixed effect η_i as presented above. In sum, specific socioeconomic variables and other explanatory variables included in the estimating regression are additional potential determinants of locally-generated revenue, especially factors that determine the tax revenue base and the capacity of local government to collect taxes.

The endogeneity problem is one of the most important concerns when analysing the effect of central grants on revenue performance of local government. Local own revenue can inversely determine grants when central government rewards local governments that commit their own revenue to some public spending, as outlined by Caldeira and Rota-Graziosi (2014) and Knight (2002). As this relationship is the opposite of our analysis, the reverse causality induces a bias in estimations. A second potential source of endogeneity is that there are unobserved features of departments which are indirectly correlated with the internally-generated revenue through the grants that local government is able to attract. For example, the internal effectiveness of local government in terms of tax collection and local technical staff training are unobservable in our model. It is therefore hard to consider the allocation of grants as an exogenous factor affecting local government revenue mobilisation.

In order to account for this possibility, we follow Knight (2002) in using the political affiliation of local government as an instrumental variable of central grants. We use a dummy variable that takes 1 if the local government has the same political affiliation as central government, and 0 otherwise. Being a member of the majority party is very determinant in a local government receiving a greater share of grants.¹⁶ We also take advantage of our data, which allows computing the execution rate of expenditure in each locality. This rate is estimated from budgets of capital and current expenditure, by finding the difference between budgets and actual expenditure at the end of each fiscal year. The rate of consumption of the budget is a good instrumental variable for grants since the jurisdictions that spend more of the amount budgeted receive larger grants the following year. This means that the execution rate is likely to be correlated with grants allocated. Moreover, the execution rate is less likely to be correlated with revenue collected by local government, as it is an exogenous formula used by central government when setting the overall amount of grants to be transferred. The estimations results will help confirming these two requirements for instrumental variables to be valid.

¹⁶ The central government allocates more grants to members of their own party across the country in order to increase the opportunity for re-election of their fellow party members, and therefore to increase the likelihood of their retaining majority control (Knight 2002).

Following Bonhomme and Manresa (2015) in implementing instrumental variable (IV) techniques used in linear panel data models, a first-differenced equation is combined with the GFE as presented below:

$$\Delta \ln(LGOR)_{it} = \theta_1 \Delta \ln(transf)_{it} + \theta_2 \Delta x_{it} + \Delta \alpha_{g_{it}} + \Delta \varepsilon_{it} \quad (3)$$

Another potential concern is the possible dependency of current taxing decisions on the previous level of taxation. To alleviate with potential intertemporal dependence between current tax decisions and the previous level of taxation, we include lagged own revenue as covariate.

3.5 Grouped patterns and consistency of the GFE approach

In order to avoid arbitrary setting of the group number that may cause a bias in parameter estimates, we follow Bonhomme and Manresa (2015) in using a Bayesian Information Criterion (BIC) to derive the optimal number of groups.¹⁷ We then run the model to assign groups to departments. The misspecification of the number of groups depends on whether the number of groups is above or below the true one. To avoid this bias, we consistently estimate equation (2) for several numbers of groups to identify the optimal number of groups that minimise the bias from the estimation. Table 4 reports the BIC, the GFE coefficient estimates for total transfers and selected covariates and the standard errors. The parameter $\hat{\sigma}^2$ and the BIC are computed using a maximum number of groups $G_{max}=5$. In order to compare with the Fixed Effect (FE) method, we report in the last row of the table the results of FE regression under the same specification. The results suggest that a substantial amount of cross-country heterogeneity is time-varying. This finding is consistent with those reported in Bonhomme and Manresa (2015). In fact, the objective function of FE is higher than the one of GFE for $G=4$, suggesting that a substantial amount of department heterogeneity might be time-varying. Moreover, the standard errors of GFE are lower than those of FE, confirming the consistency of GFE approach on our data. Interestingly, Table 4 shows that the value of the BIC decreases steadily as G increases, and reaches a minimum once $G=4$. This BIC increases for $G=5$. This result suggests that the optimal number of groups according to BIC is $G=4$. Thus, the following estimations in this analysis will be using $G=4$.

Table 4 Bayesian Information Criterion and the optimal number of groups

Groups	Obs	BIC	Objective function	Coefficient estimated (transfer)	Standard errors bootstrapped
1	385	0.69	-	-	-
2	385	0.64	52.93	0.066	0.96
3	385	0.50	37.28	0.102	0.87
4	385	0.24	23.27	0.259**	0.90
5	385	0.36	15.64	0.307***	1.03
Fixed effects		-	22.61	0.225**	0.11

There are several reasons in favour of using the GFE estimator rather than FE approach to control for local government's unobserved specific characteristics. First, the GFE method is well-suited to deal with the characteristics of our data that have a short length of time (2001-2011), and which have a small within-department variance of total transfer. In fact, according

¹⁷ The following equations are used to calculate this optimal number of groups:

$$BIC(G) = \frac{1}{NT} \sum_{t=1}^T \sum_{i=1}^N (y_{it} - x'_{it} \hat{\theta}^{(G)} - \hat{\alpha}_{it}^{(G)})^2 + \hat{\sigma}^2 \frac{GT+N+K}{NT} [\ln(NT)] \quad \text{with} \quad \hat{\sigma}^2 = \frac{1}{NT - G_{max}T - N - K} \sum_{i=1}^N \sum_{t=1}^T (y_{it} - x'_{it} \hat{\theta} - \hat{\alpha}_{git})^2$$

With G the number of groups, \hat{G} the optimal number of groups that minimise the BIC, an upper bound of \hat{G}_{max} , $\hat{\sigma}^2$ is a low bias estimates of the variance of the idiosyncratic disturbance, K the number of parameters of estimation.

to Bonhomme and Mansera (2014), the GFE estimator performs well with such small panel data, and produces consistent estimates as long as the number of groups is correctly specified. The second reason comes from the conflict that the country experienced, which was characterised by several rounds of events with different intensity and location around the departments, as shown by Dabalén et al. (2012). This effect, combined with the capacity of each department to recover from an economic downturn, tends to cluster departments in time and space in terms of revenue performance.¹⁸ To sum up, the shocks from the conflict affect each individual unit differently. The GFE model allows for time-varying unobservables in a period that is characterised by a large number of phases, as in our case. As argued by Bartolucci et al. (2015), the omitted individual characteristics or shocks may induce time-varying unobservable individual characteristics. They also highlight the importance of accounting for these effects by using GFE methods.

Figure 8 reports the unobserved trends of revenue performance using four groups (G=4), and highlights trends in the variables of interest. We find the presence of time-varying patterns across different groups in our data. Figure 8 shows that the four groups experience unstable paths of performance over time. For example, the left panel reports a high dispersion of groups' patterns in the high incidence periods of conflict (2002 and 2010).¹⁹ The left panel shows that the parameter estimated $\hat{\alpha}_{git}$ is varying over time. Moreover, in the right and middle panels, the paths of transfer and own revenue differ from one group to another, through groups 2 and 4 seem to follow very similar paths. We find therefore several cases of robust evidence of departments' heterogeneity that need to be grouped according to their performance in revenue mobilisation and attracting transfers. These differences could not be accounted for by considering only the fixed specific effects.²⁰

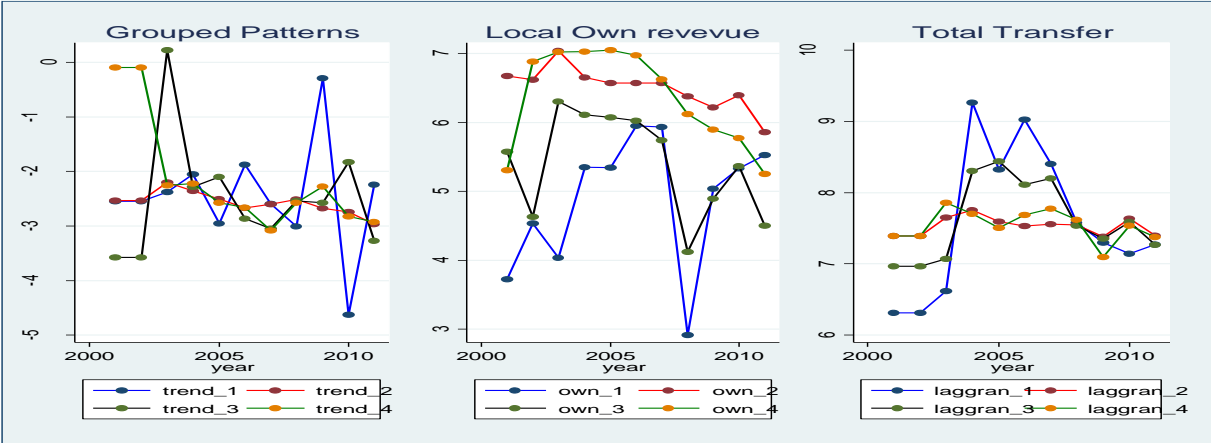


Figure 8 Group-specific time effects

¹⁸ See the maps in Appendix D for the distribution of the conflict around the country.
¹⁹ As the departments are affected differently by conflict and characterised by disparities in revenue potential, the trend of their revenue performance could follow different paths according to their specific unobservable characteristics.
²⁰ For example, Knight (2002) demonstrates that some aspects of US state's preferences are unobservable and that a fixed effect may not correct this endogeneity problem if these unobservable characteristics within a state vary over time.

4 Main results

This section presents the empirical results from estimating several specifications of model (3) above, using thirty-five departments over eleven years.

The results of the basic regression are presented in table 5 relative to the total local revenue (LNTR and NTR). We first compare Ordinary Least Square (OLS) estimation, GFE and the specifications controlling for endogeneity. The GFE model fits the data well (Column 2), explaining for about 70 per cent of the variation in local own revenue compared to OLS (Column 1). Considering that the model is not misspecified, the results show also that using GFE approach is relevant by looking at statistical significance of our interest variables. The parameter estimates for GFE are consistent with the signs predicted by theory and are significant at 5 per cent level. A 10 per cent increase in total central grants to local government induces approximately 6.2 per cent increase in own revenue mobilised by local administration (Column 2). The subsequent columns show the results of GFE combined with instrumental variable (IV) regressions in a two-stage least squares (GFE 2SLS) procedure. Once we control for endogeneity, the standard deviation of local own revenue decreases in magnitude and the estimates get accuracy. The overall conclusion from this comparison is that the GFE estimator deals well with this analysis compared with OLS regression.²¹

²¹ We also run the same specifications with the Fixed Effects and Random Effects methods: these results support the consistency of GFE regression in this analysis by producing similar results of the key variables on interest.

Table 5 Effect of central grants on total local revenue GFE 2SLS estimation

Dependent variable : Local Total Revenue	(1) OLS	(2) GFE	(3) GFE_2SLS	(4) GFE_2SLS	(5) GFE_2SLS	(6) GFE_2SLS	(7) GFE_2SLS	(8) FE
D.Grants	0.029 (0.14)	0.585*** (0.223)	0.552*** (0.188)	0.54*** (0.19)	0.54*** (0.20)	0.55*** (0.19)	0.57*** (0.19)	0.094 (0.14)
D.lag_Total local revenue		0.065** (0.056)	0.197*** (0.053)	0.198** (0.05)	0.205*** (0.05)	0.187*** (0.05)	0.204*** (0.05)	
D.Education	1.682 (2.54)	3.44 (3.35)	2.163 (3.726)	2.18 (1.96)	2.02 (2.16)	2.41 (1.96)	1.73 (2.16)	1.84 (2.54)
D.Poverty headcount	0.0102 (0.01)	0.003 (0.015)	-0.004 (0.014)	-0.005 (0.01)	-0.003 (0.01)	-0.005 (0.01)	-0.004 (0.013)	0.007 (0.017)
D.Informal sector	-1.206 (2.075)	-4.04 (2.74)	-3.95** (3.891)	-3.39** (1.447)	-3.72** (1.520)	-3.41** (1.446)	-3.70** (1.518)	-1.66 (-1.96)
D.Other revenue	-0.104 (0.0735)	-0.052 (0.064)	-0.006 (0.057)	0.0520 (0.0567)	0.0610 (0.0634)	0.0511 (0.056)	0.0594 (0.063)	-0.02 (0.069)
D.Population density	-0.0146 (0.0165)	-0.791 (1.886)	-0.34 (1.48)	0.181 (0.548)	0.445 (0.700)	0.176 (0.545)	0.389 (0.668)	-0.02 (0.018)
D.(Conflict events)				-0.237 (0.150)		0.946 (1.5)		
D.(Conflict events weighted)					-0.124 (0.0999)		-0.261 (0.57)	
D.(Conflict*grants)						-0.0386 (0.0236)		
D.(Conflict weighed*grants)							0.032 (0.075)	
Constant	0.00675	1.81	2.76	2.42	6.800	2.65	6.32	-0.03
Observations	164	130	104	104	92	104	92	164
R-squared	0.024	0.674	0.691	0.699	0.560	0.699	0.561	0.32
Sargan-Hansen (P-value)			0.14	0.15	0.16	0.16	0.16	
Cragg-Donald Wald F statistic			87.31	74.17	88.18	68.37	88.591	
Anderson canon (P-value)			0.00	0.00	0.00	0.00	0.00	
Group FE	No	No	Yes	Yes	Yes	Yes	Yes	No
Year FE	No	YES	Yes	Yes	Yes	Yes	Yes	No
Department FE	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors clustered at the department level in parentheses / significant at 10%; ** significant at 5%;
*** significant at 1%

Table 6 shows the results of model (3) using as dependent variable local non-tax revenue – that is, revenue mobilised by local administration presented in per capita terms. In Column 2, ignoring the endogeneity, the preliminary findings provide evidence that per capita transfers taken as a whole to departments are likely to increase non-tax revenue mobilised locally. A 10 per cent increase in total grants to local government is associated with approximately a 1.81 per cent increase in non-tax revenue mobilised by local administration. However, the results of this column are difficult to interpret since the estimates coefficients may be biased due to the endogeneity of grants. As discussed in the previous section, there are several reasons for considering central grants as endogenous and that they need to be addressed. The GFE combined with 2SLS results are displayed in the subsequent Columns 3-7. The resulting parameter estimates are also in accordance with those of our baseline specification (Column 2), that central grants have a statistically significant effect on revenue collected by local government. This means that grants have no disincentive effects on local revenue mobilisation, and are likely to boost the local tax base as demonstrated in literature. However

the coefficients decrease and vary between 1.20 per cent and 1.41 per cent through the different specification since we correct endogeneity.

Table 6 Effect of central grants on local non-tax revenue GFE 2SLS estimation

Dependent variable : Local Non-Tax Revenue (LNTR)	(1) OLS	(2) GFE	(3) GFE_2SLS	(4) GFE_2SLS	(5) GFE_2SLS	(6) GFE_2SLS	(7) GFE_2SLS
D.Grants	0.0318 (0.082)	0.181*** (0.068)	0.148** (0.059)	0.140** (0.060)	0.118* (0.064)	0.116* (0.064)	0.052 (0.073)
D.lag_LNTR		0.0144 (0.019)	0.0148 (0.017)	0.0154 (0.017)	0.0150 (0.018)	0.0207 (0.017)	0.0198 (0.018)
D.Education	-1.160 (1.452)	0.204 (0.725)	-0.257 (0.618)	-0.313 (0.616)	-0.490 (0.688)	-0.33 (0.612)	-0.418 (0.674)
D.Poverty headcount	-0.003 (0.010)	-0.0006 (0.004)	-0.005 (0.0039)	-0.005 (0.0039)	-0.005 (0.004)	-0.005 (0.0039)	-0.002 (0.0042)
D.Informal sector	-0.80 (1.184)	-2.02*** (0.597)	-2.24*** (0.456)	-2.25*** (0.454)	-2.32*** (0.483)	-2.219*** (0.451)	-2.286** (0.473)
D.Other revenue	0.091* (0.041)	0.029 (0.02)	0.033* (0.017)	0.033* (0.017)	0.050** (0.02)	0.0352* (0.017)	0.0557** (0.019)
D.Population density	0.006 (0.009)	0.03*** (0.007)	-0.033 (0.162)	0.037 (0.172)	0.128 (0.222)	0.062 (0.172)	0.286 (0.233)
D.(Conflicts events)				-0.056 (0.046)		-0.6202 (0.418)	
D.(Conflicts events weighted)					-0.019 (0.031)		-0.41** (0.185)
D.(Conflict*grants)						-0.087 (0.0660)	
D.(Conflict weighed*grants)							-0.0598** (0.0277)
Constant	-0.02	-0.38***	-0.23	-0.39	-0.54	-0.439	-0.941
Observations	174	132	106	106	92	106	92
R-squared	0.37	0.767	0.79	0.79	0.67	0.79	0.68
Sargan-Hansen (P-value)			0.12	0.12	0.124	0.13	0.12
Cragg-Donald Wald F statistic			120.03	119.2	106.10	119.86	107.04
Anderson canon (P-value)			0.00	0.00	0.00	0.00	0.00
Group FE	No	No	Yes	Yes	Yes	Yes	Yes
Year FE	No	YES	Yes	Yes	Yes	Yes	Yes
Department FE	No	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors clustered at the department level in parentheses / significant at 10%; ** significant at 5%; *** significant at 1%

Moreover, the inclusion of lagged own revenue as a control, in order to alleviate potential concerns of inter-temporal dependence of local revenue mobilisation, is consistent with these results. The coefficient estimate is positive and statistically significant at 5 per cent. Our results relative to the effect of grants are consistent with those of Caldeira and Rota-Graziosi (2014), who predict a positive impact of grants on Benin's communes' own-source revenue. However, these findings contradict the results of Mogues and Benin (2012), who find that greater past external transfers to Ghana's district governments do not encourage internal revenue generation. A possible explanation is that the effect differs depending on the specific country context – such as the scope of local governments' revenue assignment, discretion in setting rates on their tax and fee bases, and other potential constraints affecting the ability of local governments to increase their own revenue. It seems that the effects of grants on local

revenue mobilisation depend on the characteristics of the process of fiscal decentralisation. The difference might also be explained by the method we use, which allows controlling for time-varying specific unobserved characteristics. Other potential reasons for the different results may be the allocation formulas used in Ghana, which do not contain a criteria sufficient to promote improvements in local government revenue mobilisation, as shown by Mogues and Benin (2012). A distributional formula based on a predetermined percentage of revenue allocated to local government, as presented in Section 2.3, seems to encourage internal revenue generation in Côte d'Ivoire. It is worth noting that our results are consistent with the theoretical prediction from fiscal federalism theory supported by Bahl (2000), who argues that transfers to local government might increase their fiscal capacity.

The other explanatory variables have the expected sign on non-tax revenue mobilisation. For example, the level of knowledge and understanding in a department (share of households having a primary school degree) has a positive effect on local revenue mobilisation. It is also worthwhile mentioning that when correcting for endogeneity, the poverty headcount ratio has a negative effect on local revenue mobilisation, although the coefficient on this variable loses its statistical significance in most specifications (Tables 6 and 7). A plausible explanation is that local revenue is collected from the people. The wealthier people are, the higher the revenue performance, and vice versa. The share of informal sector has a negative and significant effect on local revenue mobilisation, especially for non-tax revenue. This is intuitive as local government collects LNTR from small businesses.

Table 7 replicates the specifications of Table 6, but using local tax revenue instead of non-tax revenue. The results confirm the findings in Table 6. Interestingly, though tax revenue is not directly mobilised by local administration, grants from central government have a positive and statistically significant effect on local tax revenue mobilisation. It is worth noting that the coefficients on the effect LTR is higher than those on LNTR. This suggests that grants from central government are more likely to boost local tax revenue collected by the General Tax Directorate than the revenue collected by local administration. One possible reason for this difference might be that the tax base for LTR is larger, and local administrations are often weak compared to the General Tax Directorate. This difference supports the idea that several taxes are well managed by the central government, as Bird (2000) argued. For example, property tax is collected better by the General Tax Directorate than by the local administration.

As the country experienced a conflict over our period of interest, it is reasonable to think that this context may have negatively affected the capacity of local government to raise revenue. To allow for this possibility, we control for a number of conflict variables that capture, for example, a potential change in central government priorities, a persistent threat of civil war, and deterioration of public infrastructure. In addition, there was considerable displacement of population across regions and departments that could potentially affect the ability of local government to collect taxes. We consider separately the effect of two conflict indices (Columns 4 and 5 of Tables 6 and 7), and their indirect effect on revenue mobilisation (Columns 6 and 7 of Tables 6 and 7). The results reported for both LNTR and LTR suggest that conflict has no significant impact on revenue performance. The estimated coefficients of the interaction term with total grants are not statistically significant in any specification, suggesting that local government revenue performance was not affected by the combined effect of conflict and central grants. This unexpected result could be explained by the fact that the conflict was characterised by several short rounds of events with different intensity, and located in different departments (Dabalén and Paul 2012). With the exception of Abidjan, regions with a higher incidence of violence were concentrated in the northern and western parts of the country. The overall effect was limited in the country. It is also important to note that the conflict measures used in our analysis are not exhaustive. We believe that further analysis based on household surveys could provide more accurate results.

Table 7 Effect of central grants on local tax revenue GFE 2SLS estimation

Dependent variable : Local Tax Revenue (LTR)	(1) OLS	(2) GFE	(3) GFE_2SLS	(4) GFE_2SLS	(5) GFE_2SLS	(6) GFE_2SLS	(7) GFE_2SLS
D.Grants	-0.002 (0.14)	0.391* (0.23)	0.41* (0.21)	0.375* (0.21)	0.421* (0.22)	0.456* (0.245)	0.396* (0.292)
D.lag_LTR		0.150 (0.11)	0.18** (0.086)	0.18** (0.08)	0.14 (0.09)	0.168** (0.087)	0.144 (0.093)
D.Education	2.785 (2.44)	1.34 (2.70)	1.27 (1.964)	1.13 (1.95)	1.28 (2.03)	1.25 (1.956)	1.158 (2.166)
D.Poverty headcount	0.013 (0.01)	-0.006 (0.01)	-0.00 (0.01)	-0.002 (0.015)	-0.003 (0.01)	-0.002 (0.015)	-0.003 (0.012)
D.Informal sector	-0.314 (1.991)	-1.538 (1.890)	-1.37 (1.40)	-1.429 (1.396)	-1.310 (1.465)	-1.408 (1.392)	-1.36 (1.505)
D.Other revenue	-0.17** (0.07)	-0.054 (0.06)	0.0003 (0.05)	0.0015 (0.053)	0.014 (0.06)	0.002 (0.053)	0.0159 (0.060)
D.Population density	-0.02 (0.01)	0.119 (0.56)	-0.392 (0.48)	-0.19 (0.52)	-0.26 (0.60)	-0.266 (0.51)	-0.178 (0.781)
D.(Conflict events)				-0.136 (0.138)		1.004 (1.256)	
D.(Conflict events weighted)					-0.0170 (0.0729)		-0.104 (0.486)
D.(Conflict*grants)						-0.02 (0.02)	
D.(Conflict weighed*grants)							-0.0119 (0.065)
Constant	0.046	-0.373	0.841	0.393	0.396	-0.109	0.193
Observations	164	113	91	91	81	91	81
R-squared	0.05	0.54	0.59	0.59	0.54	0.59	0.54
Sargan-Hansen (P-value)			0.37	0.39	0.49	0.40	0.49
Cragg-Donald Wald F statistic			49.79	49.36	52.50	69.58	53.29
Anderson canon (P-value)			0.00	0.00	0.00	0.00	0.00
Group FE	No	No	Yes	Yes	Yes	Yes	Yes
Year FE	No	Yes	Yes	Yes	Yes	Yes	Yes
Department FE	No	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors clustered at the department level in parentheses / significant at 10%; ** significant at 5%;
*** significant at 1%

Robustness checks

In order to explore the consistency of our results against a potential weak identification of instruments used or misspecification, we report in Appendix Tables B1 and B2 a number of robustness checks. First, we divide the sample into two parts, according to the signing of the 2007 peace agreement.²² The event was important and officially marked the end of the conflict. All parties engaged in the conflict were supposed to participate in government. By running GFE 2SLS estimation for total local revenue, we find that our conclusions hold, the main coefficients of interest of grants are positive and statistically different from zero at 5 per

²² The 2007 peace agreement was signed by all political parties in the country, and marked the end of tension. Both sides agreed to a free and fair general election to be held in 2008. We believe that this event might have induced a change in the behaviour of local government.

cent significance level, although the magnitude of the effect varies slightly compared to previous specifications. In order to assess the sensitivity of our results to the inclusion of additional variables, we include successively the control variables and add the illiteracy rate accounting for the level of knowledge. We compare also several estimations using four-year averages both for LNTR and LTR (Appendix Table B2). These do not alter the previous findings, and the main results hold across the different estimation and grants.

Are the instruments valid and relevant?

We check for the validity and the relevance of the instrumental variables used for estimation. The Hansen p-values reported for all specifications are relatively high, and exceed the 5 per cent level of significance. The joint null hypothesis (exogeneity) cannot be rejected at any reasonable significance level. This suggests that our instruments are valid – that is, uncorrelated with the error term, and that the excluded instruments are correctly excluded from the estimated equation. We test the relevance of the excluded instruments by looking at the p-values for the coefficient on the excluded variables in the first-stage estimates (Appendix Table C3). The results show that the instruments are globally relevant. The Anderson Canon p-values confirm that the excluded instruments are correlated with the endogenous regressors (grants). We reject the null hypothesis that the equations are under-identified. The Cragg-Donald Wald F statistic for weak identification test exceeds the Stock-Yogo critical values at any size. This suggests that our instruments are not weakly correlated with the endogenous regressors.

5 Conclusion

This paper analyses the effects of transfers from central government on local revenue mobilisation in Côte d'Ivoire. More specifically, we explore the hypothesis that the effect of grants varies depending on the type of local revenue and the specificities of the recipient local government. The research first relies on the existing literature to highlight the relevant channels through which these transfers may affect the revenue mobilisation of local government. This study goes further by analysing the distributional formula of grants. Given that the country experienced a long period of political instability, we also examine whether this conflict context affects the capacity of local government to raise taxes, and consequently mitigates the link between local revenue mobilisation and central grants.

The main conclusion is that central transfers increase local revenue mobilisation. But the magnitude of this impact differs depending on the two components of local own revenue. The effect of grants is more important for tax revenue than non-tax revenue. Moreover, the results show that, though conflict has had a negative impact on local revenue mobilisation, this impact remains generally limited. The main results of this paper contradict those of Mogues and Benin (2012), who find that greater past external transfers to Ghana's districts do not encourage internal revenue-raising. A possible explanation for the difference is that the effect differs depending on the specific country context. It might also be explained by the method we use, which allows controlling for time-varying heterogeneity. The conclusion of this research supports the idea that taxes such as property tax are well managed by the central government, as Bird (2000) argues.

Appendices

Appendix A Revenue structure and statistics

Table A1 Local tax revenue collected by GTD and distributed across governments, post-conflict Côte d'Ivoire, 2012

Government level	PATENT				Synthetic tax	Game tax	Vignette	Stamp duties	Property Tax	Sub-Total2	Total
	Purchasers	Traders	Public Transport	Sub-Total1 Patent							
Central Government	75.99	8912.47	769.92	9758.39	2715.50	0	1756.24	4290.5	11727.89	20490.15	30248.54
	(32.66)	(25.12)	(26.08)	(25.24)	(52.49)	(0.00)	(16.49)	(97.7)	(26.01)	(31.3)	(29.05)
District	0.8	10182.92	546.45	10730.18	441.53	161.28	3394.18	0	10269.54	14266.55	24996.73
	(0.34)	(28.70)	(18.51)	(27.75)	(8.53)	(100.00)	(31.89)	(0.00)	(22.78)	(21.80)	(24.01)
Department	67.37	2194.01	474.48	2735.88	101.68	0	976.57	0	1536.05	2614.3	5350.18
	(28.95)	(6.18)	(16.07)	(7.07)	(1.96)	(0.00)	(9.17)	(0.00)	(3.41)	(3.99)	(5.14)
Municipality	88.46	14181.63	1160.63	15430.73	1914.19	0	2138.67	0	17387.6	21440.47	36871.21
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(20.09)	(0.00)	(38.57)	(32.76)	(35.42)
Other	0	0	0	0	0	0	2378.31	100.74	4164.51	6643.57	6643.57
	0	(0)	(0)	(0)	(0)	(0)	22.34)	(2.29)	(9.24)	(10.15)	(6.38)
TOTAL	232.64	35471.04	2951.50	38655.19	5172.92	161.28	10643.99	4391.24	45085.59	65455.04	104110.24

Percentage of different revenue allocated to each level of government

Source: Calculation by authors with Côte d'Ivoire data from Directorate General of Taxation.

Table A2 Summary statistics

Variable	ALL Sample			Northern		Southern	
	Obs	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Population	385	98190	116880	126560	180587	85188	67276
Poverty headcount ratio	385	0.38	0.16	0.42	0.18	0.36	0.14
Density (persons per km ² land area)	385	56.36	41.09	27.21	13.29	69.72	42.59
Urban (share of urban population)	352	0.45	0.23	0.46	0.16	0.44	0.26
Household annual consumption	385	930755.9	545811	841559.2	521151.1	971637.7	552910
Illiteracy rate	385	0.6	0.14	0.73	0.12	0.54	0.1
Education (primary school degree-CEPE)	385	0.3	0.08	0.28	0.08	0.31	0.08
Share with no access to electricity	380	0.44	0.21	0.51	0.2	0.41	0.2
Informal (share of informal sector)	380	0.61	0.1	0.62	0.09	0.61	0.1
Share of households with no access to water	365	0.57	0.2	0.59	0.18	0.56	0.21
Population health	380	0.16	0.09	0.16	0.09	0.16	0.1
Conflict events (number of conflict events)	385	5.99	9.36	4.74	5.14	6.57	10.71
Conflict events (weighted with fatality index)	378	899.49	4264.63	63.6	312.93	1260.44	5059.12
Share with access to credit	365	0.45	0.4	0.5	0.41	0.42	0.39
Local Non-Tax Revenue (LNTR) per capita	385	666.33	767.19	109.45	344.99	921.57	772.65
Local Tax-Revenue (LTR) per capita	385	662.26	1068.76	100.91	287.06	919.54	1191.11
Total Own Revenue per capita	385	2213.49	3636.71	811.01	1199.53	4163.44	31933.32
Central grants per capita	385	1551.24	3491.70	710.10	1067.34	1936.76	4099.59
Miscellaneous revenue per capita	385	378.85	1564.62	135.95	390.41	490.18	1861.51
Total Expenditure	385	3062994	19000000	79808.01	89162.37	4430288	22900000

Appendix B: Robustness checks

Table B1 Robustness check: Effect of central grants on total local revenue GFE 2SLS regressions by period (before and after 2007 Peace Agreement signing)

Dependent variable : Total Local Revenue	Before Peace Agreement				After Peace Agreement			
	(1) GFE_VI	(2) GFE_VI	(3) GFE_VI	(4) GFE_VI	(5) GFE_VI	(6) GFE_VI	(7) GFE_VI	(8) GFE_VI
D.Grants	2.226*** (0.558)	2.215*** (0.556)	2.209*** (0.552)	2.209*** (0.552)	0.870** (0.382)	0.841** (0.385)	0.834** (0.37)	0.75** (0.38)
D.Poverty		0.564 (1.22)	0.528 (1.22)	0.528 (1.22)		-0.0116 (0.020)	-0.014 (0.019)	-0.012 (0.019)
D.Density			-0.067 (0.0762)	-0.067 (0.076)			-2.13** (1.057)	-2.162** (1.053)
D.Illiteracy				-1.30 (1.73)				-2.30 (2.52)
Constant	0.118	-0.045	0.099	0.099	-0.617	-0.62	4.75*	4.81*
Observations	51	51	51	51	111	111	111	111
R-squared	0.532	0.535	0.542	0.542	0.429	0.431	0.451	0.455
Sargan-Hansen (P-value)	0.14	0.13	0.11	0.11	0.89	0.89	0.94	0.95
Cragg-Donald Wald F statistic	22.41	21.86	21.31	21.31	102.41	98.81	98.561	93.27
Anderson canon (P-value)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Group FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Department FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table B2 The effect of central grants on LTR and LNTR OLS, FE and GFE estimation, 4-year average period

Dependent variable	Local Non-Tax Revenue			Local Tax Revenue		
	OLS	FE	GFE	OLS	FE	GFE
	4-year average			4-year average		
Log_Grants	0.44* (0.22)	0.42* (0.23)	0.37*** (0.11)	0.49* (0.25)	0.76** (0.30)	0.49* (0.25)
Education	4.100* (2.407)	1.525 (1.575)	2.92*** (1.09)	3.046 (2.60)	-2.173 (2.04)	2.62 (2.73)
Poverty	-0.0270** (0.012)	0.0175 (0.011)	0.0044 (0.006)	-0.044*** (0.014)	0.026* (0.014)	-0.059*** (0.015)
Informal sector	-1.269 (2.536)	1.799 (1.68)	0.225 (1.28)	-3.004 (2.742)	0.767 (2.193)	-4.394 (3.158)
Other revenue	0.0065 (0.073)	0.0056 (0.044)	-0.018 (0.032)	0.016 (0.0793)	-0.006 (0.057)	-0.0250 (0.077)
Density of population	0.013*** (0.0039)	0.006 (0.0145)	0.0008 (0.001)	0.013*** (0.004)	0.009 (0.018)	0.01*** (0.004)
Constant	3.090	1.83	2.53*	4.98	0.98	7.79**
Observations	83	83	83	79	79	79
R-squared	0.212	0.926	0.887	0.244	0.892	0.443
Group FE	No	No	Yes	No	No	Yes
Department FE	No	Yes	Yes	No	Yes	Yes

Appendix C Consistency of GFE method

Table C1 Departments, group membership and revenue autonomy

SOUTH			NORTH		
Department	Group membership	Revenue autonomy (Quantile)	Department	Group membership	Revenue autonomy (Quantile)
ALEPE	1	Middle	BONDOUKOU	1	High
BONGOUANOU	1	High	BOUNA	1	High
MAN	1	High	DABAKALA	1	High
SAKASSOU	1	High	BOUNA	1	High
TIEBISSOU	1	High	DABAKALA	1	High
TOULEPLEU	1	High	KATIOLA	1	High
ABENGOUROU	2	High	SAKASSOU	1	High
ABOISSO	2	High	SEGUELA	1	Low
ADIAKE	2	Middle	TOUBA	2	Low
ADZOPE	2	High	BOUAKE	2	High
AGBOVILLE	2	High	KOHORGO	3	Low
AGNIBILEKRO	2	High	ODIENNE	3	Low
DALOA	2	High	TANDA	4	Low
MBAYAKRO	2	High			
SANPEDRO	2	Middle			
SASSANDRA	2	Middle			
TIASSALE	2	High			
DAOUKRO	2	Middle			
TOUMODI	3	Low			
BANGOLO	4	High			
GUIGLO	4	High			
LAKOTA	4	Low			
OUME	4	High			
SOUBRE	4	Middle			

Table C2 Group assignment and departments' revenue autonomy

Group	Local revenue autonomy	Percentage of each category in the groups	Comments
Group 1	Low autonomy	7.14	Although group membership does not assume a particular spatial distribution, the maps (Appendix Figures D4 and D5) show a geographical clustering resulting from estimation. The group estimation has also classified departments with a sort of correlation in local revenue autonomy. The results show for example that group 1 contains 85% of departments with high revenue, while group 3 is 100% composed by departments with low revenue autonomy.
	Middle autonomy	7.14	
	High autonomy	85.71	
Group 2	Low autonomy	7.14	
	Middle autonomy	28.57	
	High autonomy	64.29	
Group 3	Low autonomy	100.00	
	Middle autonomy	0.00	
	High autonomy	0.00	
Group 4	Low autonomy	33.33	
	Middle autonomy	16.66	
	High autonomy	50	

Table C3 2SLS First stage results for mean specifications of Tables 6 and 7

Dependent variable: Central Grants	(1)	(2)	(3)	(4)	(5)	(6)
	Local Non-Tax Revenue			Local Tax Revenue		
D.Political affiliation	0.0060 (0.0332)	0.0022* (0.0346)	0.015** (0.0415)	0.012 (0.034)	0.0072* (0.037)	0.031* (0.044)
D.lag_Execution rate	0.0356** (0.0215)	0.0369* (0.0217)	0.035* (0.0219)	0.0343* (0.0210)	0.0365* (0.0214)	0.0366* (0.0212)
D2.lag_Grants	0.509*** (0.0383)	0.511*** (0.0386)	0.530*** (0.0375)	0.514*** (0.0467)	0.519*** (0.0463)	0.540*** (0.0461)
D.Education	-1.499* (0.889)	-1.428* (0.833)	-1.256* (0.728)	-1.446 (0.897)	-1.342 (0.828)	-1.156 (0.729)
D.Poverty rate	0.00066 (0.0032)	0.00074 (0.003)	0.0025 (0.0025)	0.00102 (0.0033)	0.0012 (0.0031)	0.0033 (0.0027)
D.Informal secteur	-0.223 (0.459)	-0.200 (0.454)	-0.235 (0.432)	-0.222 (0.498)	-0.194 (0.498)	-0.264 (0.479)
D.Other revenue	-0.000338 (0.0163)	-0.00236 (0.0159)	-0.00214 (0.0175)	-0.00209 (0.0168)	-0.00495 (0.0165)	-0.00704 (0.0187)
D.Population Density	-0.0119 (0.0112)	-0.0134 (0.0109)	-0.0245** (0.0123)	-0.0143 (0.0116)	-0.0166 (0.0111)	-0.0269** (0.0122)
D.lag_LNTR	0.0237 (0.0156)	0.0261* (0.0155)	0.0242 (0.0191)			
D.lag_LTR				0.0412* (0.0214)	0.0507** (0.0198)	0.0578* (0.0291)
D.Conflict		-0.0495 (0.0525)			-0.0655 (0.0494)	
D.Weighted conflict			-0.0456** (0.023)			-0.0505*** (0.018)
Constant	-0.0051	-0.0032	0.0182	0.00128	0.0042	0.0189
Observations	106	106	92	93	93	81
R-squared	0.832	0.835	0.854	0.812	0.818	0.836

Appendix D

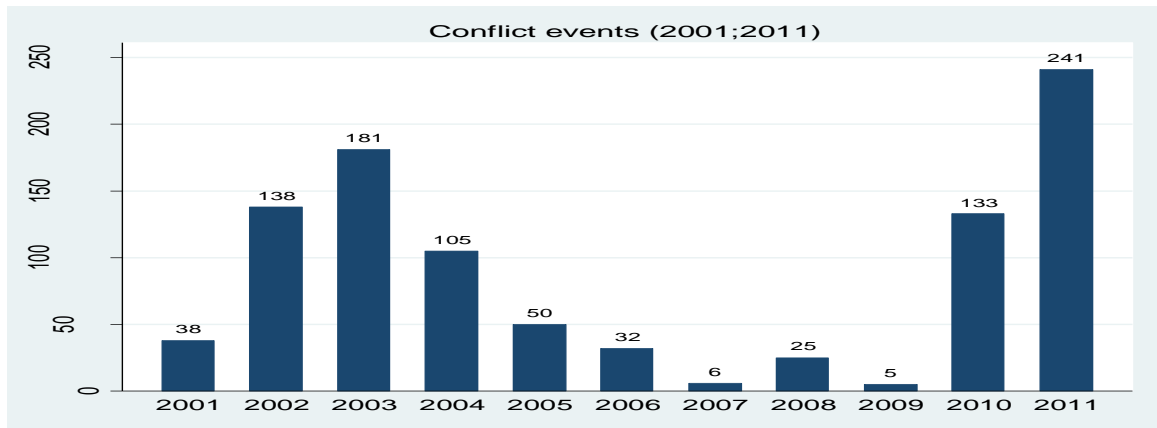


Figure D1 Evolution of conflict events in Côte d'Ivoire

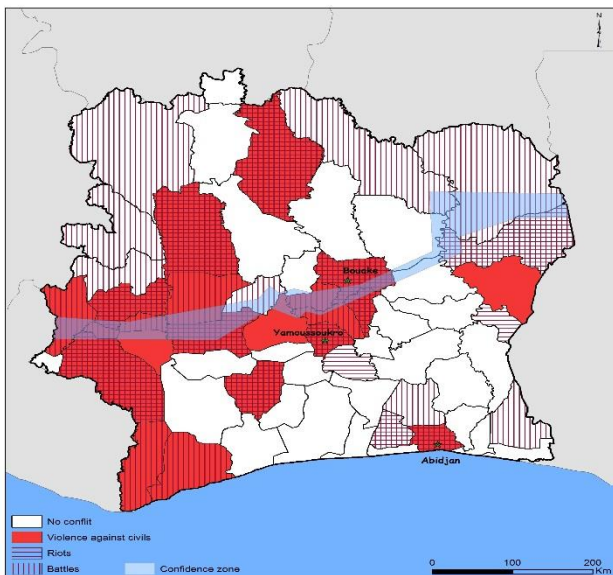


Figure D2 Violence against civilians and confidence zone

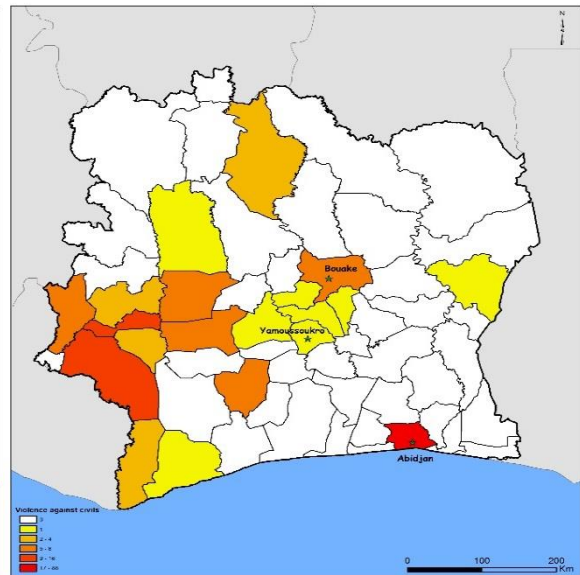


Figure D3 Violence against civilians

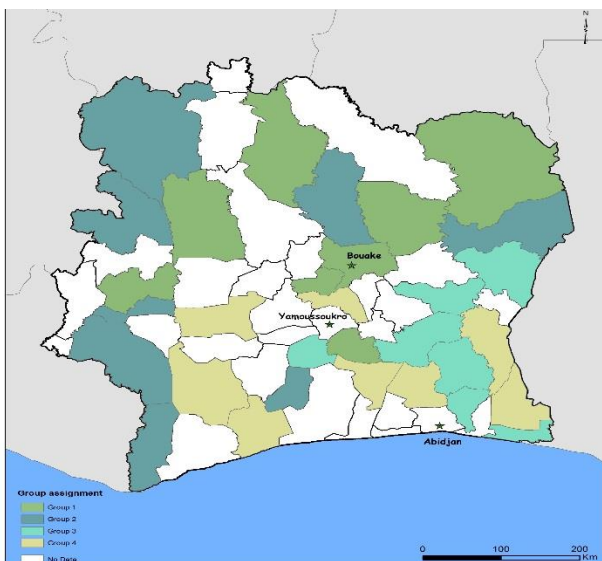


Figure D4 Patterns of heterogeneity



Figure D5 Local revenue autonomy

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