Decentralisation in Africa and the nature of local governments' competition: Evidence from Benin

Abstract

Decentralization has been put forward as a powerful tool to reduce poverty and improve governance in Africa. The aim of this paper is to highlight the presence of spillovers resulting from local expenditures policies and to identify the nature of the induced strategic interactions among local governments. A two-jurisdiction model of public expenditure is developed which differs from the literature by capturing the extreme poverty of some local governments in developing countries through a generalized notion of Nash equilibrium: the constrained Nash equilibrium. We show how and under which conditions spillovers among jurisdictions induce strategic behaviours of local officials. By estimating a spatial lag model for a panel data of the 77 *communes* in Benin from 2002 to 2008, our empirical analysis not only establishes the existence of interactions between local governements, but also defines the nature of such interactions by highlighting strategic complementarity of jurisdictions' public spending. This result raises the issue of coordination among local governments and more broadly it questions the efficiency of decentralisation in developing countries in lines with the Oates' theorem.

JEL Classification: D72, H2, H7.

Keywords: Local expenditures, developing countries, decentralisation, constrained Nash equilibrium, strategic complementarity, spatial econometrics.

Emilie Caldeira,[‡] Martial Foucault[♯] and Grégoire Rota-Graziosi[*‡]

‡: CERDI-CNRS, Université d'Auvergne, Economics Dept
Mail address: 65 boulevard François Mitterrand, 63000 Clermont-Ferrand, France
Email: emiliecaldeira@gmail.com.

*: Fiscal Affairs Department, International Monetary Fund.
Mail address: 700 19th Street, N.W., Washington, D.C., 20431, USA
Email: grotagraziosi@imf.org

♯: Universite de Montreal, Political Science Dept.
Mail address: CP 6128, succ. centre-ville.
Montreal, Qc, H3C3J7, Canada
Email: martial.foucault@umontreal.ca

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1 Introduction

For a decade, decentralisation has been implemented by a large number of developing countries, especially in Africa. The World Bank in particular views this devolution as one of the major economic reforms on its agenda. In response to the failure of central states to lead the countries' development or to limit the risk of civil conflicts in ethnically fragmented countries, decentralisation is perceived as a way to ensure political stability, to improve accountability and responsiveness of local leaders, to increase the efficiency of public policies, and ultimately to reduce poverty.

Two main (and non-exclusive) arguments might explain this infatuation with decentralisation in developing countries. The first one is what we can call the 'proximity principle': decentralisation moves local public decision-makers closer to citizens. By doing this, decentralisation improves preferences matching by providing a greater diversity of public services to a heterogeneous population (Oates, 1972). Moreover, by reducing informational asymmetries between those in power and those governed, decentralisation should induce a higher accountability of governments and a better efficiency in public spending. The second principle dates at least from Tiebout (1956) and may be called the 'competition principle'. Indeed, decentralisation is supposed to induce some interjurisdictional competition among political powers: 'Voting with feet' and yardstick competition (Salmon, 1987) may be other ways to increase the efficiency of public spending.

However, the literature on decentralisation in developing countries essentially focuses on the 'proximity principle'. A reason is for Bardhan (2002) that 'the institutional context (and therefore the structure of incentives and organisation) in both developing and transition economies is quite different from those in advanced industrial economies'. This author recommends 'to go beyond the traditional fiscal federalism literature' which is essentially associated with the 'competition principle'. To some extent most developing countries would not meet implicit or explicit assumptions posed by the First-Generation Theory of Fiscal Federalism.[1] The Tiebout model could not be applied to developing countries where the population mobility appears to be strongly limited. Then the existence of a yardstick com-

[1] See Oates (2005) and Vo (2010) for comprehensive surveys of this literature specifying First and Second-Generation Theory of Fiscal Federalism.

petition is at least debatable in the context of young democracies. Finally, apart from the corruption issue emphasized by Prud'homme (1995) or Bardhan and Mookherjee (2005), developing countries face some administrative capacity constraints that the rich countries do not suffer.

These pitfalls have induced the literature on decentralisation in developing countries to focus on the effectiveness of the first argument, the 'proximity principle'. For instance, Faguet (2004) shows that decentralisation in Bolivia has improved the responsiveness of public investment to local needs. Alderman (2002) establishes that Albanian local officials manage anti-poverty programs more accurately and cost-effectively than a central government agency since they are better informed. Bardhan and Mookherjee (2005) and Galasso and Ravallion (2005) have also highlighted that decentralisation improves anti-poverty policies in particular through better intra-regional targeting. These analyses suggest that decentralisation may lead to poverty reduction through a bottom up process. However none of these authors consider the other side of decentralisation, the 'competition principle', which stresses the jurisdictions' interactions.

The aim of this paper is to study the relevance of the 'competition principle' in a developing economy. This principle relies on the existence of local public goods spillovers which are a widespread feature in developed countries. Kelejian and Prucha (1998), Sole-Olle (2006), Redoano (2007) or Foucault, Madies, and Paty (2008) estimate expenditure reaction functions and provide empirical evidence on expenditure spillovers among (local) governments respectively in US, EU, Spain and France. In the context of decentralisation, an important distinction between developing and developed countries concerns the limited administrative capacities for which the rich countries do not face. This constraint may be sufficient to explain the absence of any strategic behaviour among local governments in poor countries and to justify the current dominant approach of decentralisation in development economies.

To deal with the extreme poverty of some local governments and their very limited administrative capacity in developing countries, we develop a theoretical framework where two jurisdictions determine their level of public good in presence of spillovers. We consider a generalized version of Nash equilibrium(s), i.e. constrained Nash Equilibrium(s), which distinguish our framework forms preceding studies in fiscal federalism. We establish un-

der which conditions interactions among local governments emerge. Our empirical strategy consists in estimating expenditure reaction functions, looking for interactions between geographically or ethnically close jurisdictions. It relies on a spatial lag model for a panel data of the 77 communes of Benin, a representative African country, from 2002 to 2008. We unambiguously establish the existence of local expenditure interactions, contingent on a sufficient level of local fiscal resources. Moreover, we tackle the theoretical vagueness on the nature of interjurisdictional competition: Local public spending are strategic complements. Interactions exist not only among neighbouring *communes* but also among those similar in terms of ethnic composition.

Our analysis contributes to a more comprehensive view of decentralisation in developing countries. It is in line with some previous works such as Akin, Hutchinson, and Strumpf (2005) or Arze, Martinez-Vasquez, and Puwanti (2008) who consider local governments interactions: The former analyses decentralised health care in Uganda and the latter investigates local public spending in Indonesia.[2] Decentralisation induces strategic behaviours even in an African country as Benin. Moreover, the nature of these interactions, that is strategic complementarity, raises the issue of coordination among local governments. The level of spillovers is a critical condition to the efficiency of decentralisation as Oates (1972) emphasized it. Finally, the interjurisdictional interactions that we highlight may involve some kind of competition among local governments. The 'competition principle' and the 'proximity principle' are both at work in developing countries. Their final effect in terms of populations' welfare remains however to appreciate.

The remainder of the paper is divided into four sections. Section 2 develops a theoretical analysis of local public spending interactions which takes into account resource constraints of some local governments. In Section 3, after a brief overview of Benin, we test the existence of interactions among Beninese local governments between 2002 and 2008. Section 4 discusses the main results by exploring the relevance of two mechanisms of the 'competition principle': 'Voting with feet' and yardstick competition. Section 5 concludes and raises some future challenges to appreciate the decentralisation's efficiency in presence of the strategic

[2] Chavis (2009) studies the effect of competition on decentralisation efficiency in Indonesia. The author considers the extent to which the cost per square meter of road project decreases in the number of villages which compete to obtain grants from the central government. The appreciation of competition is limited to the number of competitors. There is no analysis of interactions.

complementarity of local officials behaviour.

2 Theoretical background

In this section, we present a simple theoretical model to capture the behavioral logic of local governments in defining the levels of public spending in a developing country. We take into account some constraints on these strategic behaviours which result from the extreme poverty of some local governments. Indeed, the poorest *communes* in Benin: Bassila, Cobly, Kandi or Kari-Mama respectively display an average level of *per capita* annual resources during the period we study (2002-2008) of 168, 526, 734 and 861 CFAF (respectively equivalent to \$0.31, \$0.97, \$1.35 and \$1.58). Finally beyond its realism the proposed framework is built in a such way to fit with our empirical tools and their underlying assumptions, in particular those of spatial econometrics.

2.1 The model

We consider two jurisdictions (i and j) of the same level. We do not study political issues and then adopt a normative approach. The utility function of a representative individual in jurisdiction i is given by $W^i(x_i, g_i, \theta_{ij} g_j)$, where x_i is the private consumption, g_i the public spending in jurisdiction i, and θ_{ij} is an exogenous non negative parameter, which represents the degree of spillover effect for inhabitants in jurisdiction i from the public good provided in jurisdiction j. We consider situations where spillovers are not symmetric ($\theta_{ij} \neq \theta_{ji}$).[3] We define $\theta = (\theta_{ij}, \theta_{ji})$.

Since spatial empirics use weighting matrices for the strategic variables (g_{ij}), the unique consistent aggregation technology of local public goods is the weighted summation. Thus, it follows:

$$W^i(x_i, g_i, \theta_{ij} g_j) = V^i(x_i, g_i + \theta_{ij} g_j),$$

where the weight is the parameter θ_{ij}.

Our analysis focuses exclusively on current local public spending, since it is better con-

[3] This assumption is linked to our empirical work too. Since proximity matrices are normalised, their sum is equal to unity for each i. Thus, we have $\theta_{ij} = \theta_{ji}$ if and only if jurisdictions i and j have the same number of neighbours for a proximity matrix based on contiguity.

trolled by local governments than investment expenditures. Indeed these latter are often ordered and financed by central government. Current spending are a mix of public and merit goods. We are not able to say whether local public spending is a complement or a substitute to private consumption. Thus, without loss of generality concerning our analysis of jurisdictions' interactions, we consider a quasi-linear utility function where both local public spending and private consumption are Edgeworth-independent:

$$V^i\left(x_i, g_i + \theta_{ij} g_j\right) = x_i + v\left(g_i + \theta_{ij} g_j\right),$$

where the function $v\left(.\right)$ is the appreciation of local public goods in jurisdiction i (assumed to be identical accros jurisdictions). This function is increasing in its argument $v'\left(.\right) > 0$. The sign of its second derivative, however, remains indeterminate. Indeed the concavity of function $v\left(.\right)$, which is often assumed in the literature, would restrict our theoretical analysis of jurisdictional interactions to the case of strategic substitutes.

We ignore the issue of local debt, which is the focus of an important literature on soft budget constraints. Very few countries in Africa allow their local governments to run into debt. Thus, private consumption is equal to net income, and the local government faces the following hard budget constraint:

$$R_i = x_i + c\left(g_i\right), \tag{1}$$

where R_i is the income of jurisdiction i and $c\left(.\right)$ is the cost of providing an amount g_i of local public good. This cost is assumed to be increasing and convex: $\frac{dc(g_i)}{dg_i} > 0$ and $\frac{d^2c(g_i)}{dg_i^2} > 0$. This convexity reflects the increasing marginal cost of public funds. Since we focus on current spending and not on public investments, we ignore scale economies. This assumption is not rejected by a preliminary empirical test on our data.[4] In order to have some interior solutions when the jurisdiction is not constrained by its wealth, we assume that

$$\forall i, j, \quad c''\left(g_i\right) > v''\left(g_i + \theta_{ij} g_j\right). \tag{2}$$

[4] We show the absence of scale economies in providing current public spending according to the size of jurisdiction (measured by the population density, $dens$). Both signs of first and second derivatives are positive and significantly different from zero: $g_i = 3.751^{**}.dens_i + 0.001^{***}.dens_i^2$. Detailed results are provided in Table 1 in the appendix.

The convexity of the cost function of public spending must be superior to the variation of the marginal utility of public goods. This condition obviously holds as long as the function $v(.)$ is concave.

Substituting the expression of the private consumption given by (1) into the initial welfare function, we obtain the following objective function, denoted by U^i, which only depends on the strategic variables (g_i, g_j):

$$U^i(g_i, \theta_{ij} g_j) = R_i - c(g_i) + v(g_i + \theta_{ij} g_j).$$

Each local government chooses its level of public spending, considering as given the levels of public good in the other jurisdiction. The played game is static and the Nash equilibrium may be constrained. Indeed, we take into account situations where a local government is too poor to finance the minimum of public spending. For instance in 2007, some Beninese *communes* like Lalo, So-Ava and Materi had a total budget respectively equal to \$15,432, \$31,148 and \$32,955, which corresponds to a total *per capita* revenue of \$0.17, \$0.35 and \$0.33**.** At the same period, Cotonou had a municipal budget about 1000 times higher (\$19 millions or \$26 *per capita).* These financial gaps incite us to generalize the notion of Nash Equilibrium by considering a constrained Nash equilibrium denoted by $g_i^*(\theta)$,

$$g_i^*(\theta) = \min\{\overline{g}_i, \widetilde{g}_i(\theta)\},$$

where $\overline{g}_i$ is given by the budget constraint: $R_i - c(\overline{g}_i) = 0$; and $\widetilde{g}_i(\theta)$ is the solution of the unconstrained Nash equilibrium:

$$\begin{cases} \widetilde{g}_i(\theta) \equiv \underset{g_i \geqslant 0}{\arg\max} U^i\left(g_i, \theta_{ij} g_j^*\right) \\ \widetilde{g}_j(\theta) \equiv \underset{g_j \geqslant 0}{\arg\max} U^j\left(g_j, \theta_{ij} g_i^*\right) \end{cases}$$

The set of strategies for each jurisdiction i is compact and it corresponds to $[0, \overline{g}_i]$. The First Order Condition (FOC) of the preceding program for player (*commune*) i is

$$-\frac{dc(g_i)}{dg_i} + v'\left(g_i + \theta_{ij} g_j^*(\theta)\right) = 0. \tag{3}$$

The Second Order Condition (SOC) is respected under condition (2).

We focus on the nature of competition among jurisdictions when it exists. These strategic interactions are captured through the sign of $\frac{dg_i}{dg_j}$. Following Bulow, Geanakoplos, and Klemperer (1985), we define local public goods as strategic complements (resp. substitutes) if and only if the marginal utility of public good in jurisdiction i is increasing (resp. decreasing) in the level of local public goods in the other jurisdictions, more formally if $\frac{\partial^2 U^i(g_i,\theta_{ij}g_j)}{\partial g_i \partial g_j} > 0$ (resp. < 0). If jurisdiction i is constrained by its wealth, that is, if $c\left(\widetilde{g}_i\left(\theta\right)\right) > R_i$, we have $g_i^* = \overline{g}_i$ and $\frac{\partial g_i}{\partial g_j} = 0$; otherwise $g_i^* = \widetilde{g}_i\left(\theta\right)$ and the application of the envelope theorem to (3) yields:

$$\frac{\partial g_i}{\partial g_j} = -\frac{\frac{\partial^2 U^i(g_i,\theta_{ij}g_j)}{\partial g_i \partial g_j}}{\frac{\partial^2 U^i(g_i,\theta_{ij}g_j)}{\partial g_i^2}}. \tag{4}$$

Since the denominator corresponds to the SOC of the maximisation program, the sign of $\frac{\partial g_i}{\partial g_j}$ is then equivalent to the sign of $\frac{\partial^2 U^i(g_i,\theta_{ij}g_j)}{\partial g_i \partial g_j}$, which also corresponds to the sign of $v''\left(.\right)$.[5]

2.2 Comparative statics

We will now consider a unilateral change in the degree of the spillovers experienced in jurisdiction i from jurisdiction j. By so doing we can compare the impact of an increase of public spending by a neighbouring jurisdiction and the same variation of a more distant jurisdiction on the level of public spending in jurisdition i. In other words, we estimate the consequences of geographic or ethnic proximity on local governments' public spending.

For comparative statics' analysis, we follow Caputo (1996). Indeed, unlike single-agent models, knowing of how a parameter affects the marginal value of the i th player's decision variables in a static game is not sufficient to determine the Nash equilibrium comparative statics for the level of the i th player's decision variables. We also have to determine how the parameter's change affects the other player's best reply, and finally how these last variations impact on the marginal value of the i th player's decision variable.

Considering the unconstrained Nash equilibrium ($\forall i,\ g_i^*\left(\theta\right) = \widetilde{g}_i\left(\theta\right)$) the differentiation

[5] If this last expression is positive, then the game played by each jurisdiction is supermodular and at least one equilibrium exists.

of (3) with respect to θ_{ij} for both jurisdictions yields:

$$\begin{pmatrix} U_{11}^{i}(.) & \theta_{ij}v''(.) \\ \theta_{ji}v''(.) & U_{11}^{j}(.) \end{pmatrix} \begin{pmatrix} \frac{\partial \widetilde{g}_i(\theta)}{\partial \theta_{ij}} \\ \frac{\partial \widetilde{g}_j(\theta)}{\partial \theta_{ij}} \end{pmatrix} = \begin{pmatrix} -\theta_{ij}\widetilde{g}_j(\theta)v''(.) \\ 0 \end{pmatrix}.$$

Applying the Cramer rule we then obtain:

$$\begin{array}{l} \frac{\partial \widetilde{g}_i(\theta)}{\partial \theta_{ij}} = -\frac{\theta_{ij}\widetilde{g}_j(\theta)}{|J|}v''\left(\widetilde{g}_i(\theta)+\theta_{ij}\widetilde{g}_j(\theta)\right)U_{11}^{j}\left(\widetilde{g}_j(\theta),\theta_{ji}\widetilde{g}_i(\theta)\right), \\ \frac{\partial \widetilde{g}_j(\theta)}{\partial \theta_{ij}} = \frac{\theta_{ij}\theta_{ji}\widetilde{g}_j(\theta)}{|J|}v''\left(\widetilde{g}_i(\theta)+\theta_{ij}\widetilde{g}_j(\theta)\right)v''\left(\widetilde{g}_j(\theta)+\theta_{ji}\widetilde{g}_i(\theta)\right). \end{array} \tag{5}$$

where J is the Jacoby matrix and its determinant is given by

$$|J| = \begin{vmatrix} U_{11}^{i}\left(\widetilde{g}_i(\theta),\theta_{ij}\widetilde{g}_j(\theta)\right) & \theta_{ij}v''\left(\widetilde{g}_i(\theta)+\theta_{ij}\widetilde{g}_j(\theta)\right) \\ \theta_{ji}v''\left(\widetilde{g}_j(\theta)+\theta_{ji}\widetilde{g}_i(\theta)\right) & U_{11}^{j}\left(\widetilde{g}_j(\theta),\theta_{ji}\widetilde{g}_i(\theta)\right) \end{vmatrix}. \tag{6}$$

Generally, the sign of $|J|$ remains indeterminate, since it does not rely on the sign of the Hessian matrix of a single optimisation problem as Caputo (1996) emphasizes it. Thus, without additional assumptions about the stability or uniqueness of the Nash equilibrium, for instance, we cannot sign $|J|$. We then obtain the following PROPOSITION:

Proposition 1 *Under our assumptions, we have:*
(i) If the jurisdiction i is constrained by its wealth ($c\left(\widetilde{g}_i(\theta)\right) > R_i$), a change in θ_{ij} has no effect on the level of provided public good in both jurisdictions;
(ii) If the jurisdiction j is constrained by its wealth, a change in θ_{ij} has no effect on the level of provided public good in jurisdiction j but increases (decreases) the level of public good in jurisdiction i if public goods are strategic complements (substitutes);
(iii) If no jurisdiction is constrained, an increase in the degree of spillover from jurisdiction j to i (θ_{ij}) involves a variation in the same (opposite) sense in both jurisdictions if local public goods are strategic complements (substitutes).

Proof. *(i)* If $g_i^*(\theta) = \overline{g}_i$, it is then obvious that $\frac{\partial g_i^*(\theta)}{\partial \theta_{ij}} = 0$ and $\frac{\partial g_j^*(\theta)}{\partial \theta_{ij}} = 0$ from differentiation of (3) with respect to θ_{ij}.
(ii) If $g_j^*(\theta) = \overline{g}_j$ and $g_i^*(\theta) = \widetilde{g}_i(\theta)$, then we have $\frac{\partial g_j^*(\theta)}{\partial \theta_{ij}} = 0$ which yields

$$\frac{\partial g_i^*(\theta)}{\partial \theta_{ij}} = -\frac{\theta_{ij}\overline{g}_j v''\left(g_i+\theta_{ij}\overline{g}_j\right)}{\frac{\partial^2 U^i(g_i,\theta_{ij}g_j)}{\partial g_i^2}},$$

which is positive if the function $v(.)$ is convex, given (4) local public goods are strategic complements.

(iii) If $g_i^*(\theta) = \widetilde{g}_i(\theta)$ and $g_j^*(\theta) = \widetilde{g}_j(\theta)$, we obtain from (5)

$$\frac{\partial \widetilde{g}_i(\theta)}{\partial \theta_{ij}} \frac{\partial \widetilde{g}_j(\theta)}{\partial \theta_{ij}} = -\theta_{ji} \left(\frac{\theta_{ij} \widetilde{g}_j(\theta) v''(\widetilde{g}_i(\theta) + \theta_{ij} \widetilde{g}_j(\theta))}{|J|} \right)^2 v''(\widetilde{g}_j(\theta) + \theta_{ji} \widetilde{g}_i(\theta)) U_{11}^j(\widetilde{g}_j(\theta), \theta_{ji} \widetilde{g}_i(\theta)).$$

■

The parameter θ_{ij} represents the degree of 'proximity' that jurisdiction i experiences from the local public good provided by jurisdiction j. This 'proximity' will be expressed in geographic or ethnic terms in our empirical analysis. An increase in θ_{ij} may represent for instance the reduction of the transportation costs to move across *communes* i and j, or a stronger similarity in their ethnic composition. Such a variation would induce two effects on g_i, a direct effect and an indirect (strategic) one through the level of public good provided by the neighbour (g_j). If jurisdiction i is constrained by its wealth, any change in θ_{ij} does not affect the equilibrium value. Indeed, neither the direct effect, nor the strategic effect would come into play, since the level of public spending in this jurisdiction is at the corner. If the other jurisdiction, namely j, is constrained, then only the direct effect of θ_{ij} would influence g_i. An increase of θ_{ij} induces an increase (decrease) in g_i local public expenditures are strategic complements (substitutes). Finally, if no jurisdiction is constrained, then both effects are at play. Without additional assumptions, however, particularly on the sign of $|J|$, we can only conclude that an increase in θ_{ij} would induce an increase or a decrease of levels of local public goods in both jurisdictions in the presence of strategic complements. Otherwise, that is in the presence of strategic substitutes, an exogenous change of θ_{ij} would involve opposite variations among jurisdictions.

Following Dixit (1986) or Kolstad and Mathiesen (1987), we may assume the uniqueness and the stability of the Nash equilibrium through the following assumption:[6]

$$|J| > 0. \tag{7}$$

This relation enables us to pinpoint the sense of variations resulting from the two kinds of

[6] If we adopt the contraction approach (see Vives, 1999), the condition of equilibrium uniqueness involves

$$U_{11}^i(g_i, \theta_{ij} g_j) + \left| v_{12}^i(g_i, \theta_{ij} g_j) \right| < 0,$$

which yields that $|J|$ is positive.

parameter changes. We obtain the following PROPOSITION:

Proposition 2 *Under our assumptions and (7),*
(i) An increase in the degree of spillover from jurisdiction j to i (θ_{ij}) entails an increase in the level of public goods in both jurisdictions if local public goods are strategic complements.
(ii) An increase in the degree of spillover from jurisdiction j to i (θ_{ij}) entails a decrease in the level of public good in jurisdiction i and an increase in the level of public good in jurisdiction j if local public goods are strategic substitutes.

Proof. Immediate from (5). ■

Assuming the uniqueness of the Nash equilibrium allows us to specify the sense of deviation of public spending when the degree of spillovers varies. To sum up our theoretical results, we show that spillovers among jurisdictions may involve strategic behaviours, which in turn lead to a competition process. However, the presence of local public goods spillovers is not a sufficient condition of strategic behaviours among *communes*. Without restricting the nature of such a competition, we estimate to what extent the level of provided public good is affected by a deviation in the degree of spillovers.[7]

Our theoretical framework yields the following implications: (1) The provision of local public goods with spillovers may induce two cases: (a) Strategic interactions in terms of complements or substitutes (classical result), (b) No strategic interactions due to the insufficient level of fiscal resources and despite positive externalities (largely ignored by the relevant literature); (2) Under the presence of strategic complements, the expected quantity of public goods in jurisdiction i will positively depend on the level of public good allocated by jurisdiction j; (3) In the presence of strategic substitutes, an opposite relationship is expected; (4) The sign of such a strategic interaction is not determined *a priori*, since different measures of contiguity (geographical or ethnic) may be put forward.

3 Empirical evidence of public spending interactions in a less developed country: The case of Benin

Our empirical analysis focuses on Benin, a young democracy, which is representative of the Sub-Saharan region. After a brief overview of this country, we test the existence of strategic

[7] PROPOSITION 2 (*ii*) is similar to Proposition 8 in Bloch and Zenginobuz (2007) who consider only the case of strategic substitutes.

interactions among local governments' spending by estimating a spatial dynamic econometric model.

3.1 Benin overview

With a *per capita* income of $570 in 2007 and a ranking of 163th out of 177 countries,[8] Benin remains one of the poorest countries of the world. As many African countries, Benin is ethnically fragmented with about 42 recorded ethnies (see Figure 2).[9] Since its independence on August 1$^{\text{rst}}$, 1960, the history of Benin has been chaotic. A succession of military governments ended in 1972 with the last military coup led by Mathieu Kerekou and the establishment of a government based on Marxist-Leninist principles. A move to democracy began in 1989. Two years later, free elections ushered in former Prime Minister Nicephore Soglo (a former World Bank official) as President. Kerekou regained power in 1996 in elections fraught with irregularities and won subsequent elections in 2001. Having served two terms and being over 70, he was ineligible to run in the presidential elections of 2006. He was succeeded by Thomas Boni Yayi, an independent political outsider who had previously headed the West African Development Bank. In March 2007, President Yayi Boni strengthened his position after the legislative elections where his coalition, 'Force Cauris pour un Bénin Emergent (FCBE)' won the largest number of seats (35 out of 83) and negotiated a pro-government majoritarian coalition in Parliament with seven minor parties.

This democratic evolution was accompanied by a huge transformation of the political and administrative organisation. Since 1998, Benin has undergone a decentralisation process that became effective with the first local elections in 2002-2003. The second local elections took place in 2008.[10] As depicted in Figure 1, Benin is divided into twelve *départements* which are after decentralisation subdivided into 77 *communes*, themselves divided into 546 districts. *Départements* are managed by a representative of the central government. In contrast, *communes* are governed by a directly elected local government. The average size of

[8] Human Development Report (2007).

[9] Among the 42 ethnic groups, the most prominent are the Fon and the Adjas in the south, the Baribas and the Sombas in the north and the Yorubas in the south-east. As Figure 2 displays, the north is less fragmented than the south more urbanized.

[10] The first round of municipal elections held on December 15^{th}, 2002 and the second round on January 19^{th}, 2003 with an average rate of turnout estimated at 70 percent.

communes, presented in the following map, reaches about 90,000 inhabitants.

Insert Figure 1

In January 1999, law 97-029 defined the transferred competencies from the central government to the 77 *communes*. Theoretically, competencies of Beninese *communes* range from elementary school to economic development and include transport infrastructure, environment (hygiene), health and social goods, tourism, security or market-place management. As in most of African countries, however, this competencies' transfer was not accompanied by an adequate transfer of resources. Beninese *communes* are characterised by a very low level of resources (only about 4.5 percent of country tax revenues or equivalently 0.7 percent of GDP).[11] Moreover, important inequalities appear between *communes*: The resources of the ten poorest *communes* represent 5 percent of the five richest ones (see Figure 3 for the DHS score by *commune*).

Insert Figures 2 and 3

3.2 Econometric framework

Horizontal interactions entail a fiscal reaction function that depicts how the decision variable for a given jurisdiction depends on the decisions of other jurisdictions. To test the existence and the strenght of such functions, we test spatial dependence in a panel data framework. Following the relevant empirical literature, we consider a specification in the most general form in which *commune* i public expenditure in year t, defined by G_{it}, is a function of its neighbours' same public choice, G_{jt}. It gives the following specification:

$$G_{it} = \sum_{ij} \rho_{ij}.G_{jt} + \beta.X_{it} + \alpha_i + \varepsilon_{it}, \tag{8}$$

[11] Local resources are mainly *communes*' own resources (about 70 percent). Property taxes and licences to exercise a trade or profession ('patente') represent 90 percent of local tax revenues (see Chambas, 2010 for a detailed analysis of local fiscal resources in Sub-Saharan Africa, particularly in Benin). Retroceded taxes, which come from transfers of state tax revenue to local governments, account for about 10 percent of local resources.

where $i = 1, \ldots, n$ denotes a *commune* and $t = 1, \ldots, T$ a time period, α, β and ρ are unknown parameters and ε_{it} a random error. We allow G_{it} to depend on a vector of specific controls X_{it} and we include a *commune*-specific effect, α_i. In this way, we correct for all time-invariant *communes'* characteristics, observed or unobserved.

Since there are too many parameters ρ_{ij} to be estimated, the usual procedure is to consider:

$$G_{it} = \rho.A_{jt} + \beta.X_{it} + \alpha_i + \varepsilon_{it}, \tag{9}$$

where $A_{jt} = \sum \theta_{ij}.G_{it}$ is the weighted average vector of public spending in the set of the other local governments j at time t.

We explore a variety of weighting schemes to allow different patterns of spatial interactions. First, we choose a common geographical definition of neighbouring jurisdictions based on a contiguity matrix, denoted by θ^{neigh}, where the value one is assigned if two jurisdictions share the same border and zero otherwise. Second, we define an ethnic weight matrix, θ^{ethn}, based on the ethnic proximity of communes' inhabitants.[12] In doing so, we test the existence of spending interactions between *communes* which are similar with respect to ethnicity. Finally, we consider two benchmark weighting schemes: A uniform weight matrix $\left(\theta^{uni}\right)$ where weights are assumed to be identical for all *communes* j and a 'placebo' weight matrix $\left(\theta^{plac}\right)$ where weights are random.[13] The uniform scheme captures the critic of Manski (1993): The interdependence of fiscal choices may result from a 'common intellectual trend' that drives fiscal choices in the same directions and not from jurisdictions' strategic behaviours. The 'placebo' matrix, also used in Lockwood and Migali (2009), ascertains that observed interactions are not an artefact of the estimation procedure.[14]

In order to take into account the persistency in public expenditure we consider a dynamic version of equation (9) and introduce the lagged dependent variable, G_{it-1} as a right-hand side:

$$G_{it} = \lambda.G_{it-1} + \rho.A_{jt} + \beta.X_{it} + \alpha_i + \varepsilon_{it}. \tag{10}$$

[12] More precisely, ethnic proximity is defined as the probability that two individuals randomly drawn from two distinct *communes* belong to the same ethnic group Figure 3 depicts the distribution of ethnic fragmentation in Benin.

[13] We generate a random number distributed between zero and one for each *commune*. Then, the weight assigned between two *communes* is the difference between its random numbers.

[14] Weights are normalised so that their sum equals unity for each i for all weight matrices. This assumes that spatial interactions are homogeneous: Each neighbour has the same impact on the *commune*.

Regression (10) raises some important econometric issues as described by Brueckner (2003). First, public spending are jointly determined. Thus neighbours' decisions are endogenous and correlated with the error term ε_{it}. Ordinary least squares estimation of the parameters is then inconsistent, requiring alternative estimation methods based on the instrumental variables method (IV) or on maximum likelihood (ML).[15] Second, the omission of explanatory variables that are spatially dependent may generate spatial dependence in the error term, which is given by: $\varepsilon_{it} = \tau\theta\varepsilon_{it} + v_{it}$.[16] Ignoring spatial error dependence may provide false evidence of strategic interaction. To deal with this problem, two approaches are available: The ML estimator which takes into account the error structure (see Case, Rosen, and Hines, 1993) or the IV method which yields consistent estimations even with spatial error dependence (see Kelejian and Prucha, 1998).[17] Previous analysis of local governments interactions[18] use the tests of Anselin, Bera, Florax, and Yoon (1996) to verify the hypothesis of error independence, since these are not contaminated by uncorrected spatial error dependence and may detect the presence of spatial lag dependence. However as Nickell (1981) mentionned, the introduction of a lagged dependent variable induces the inconsistency of the previous estimators. We then use the GMM System estimator after verifying the hypothesis of error independence and estimating the static model with the ML estimator. This econometric strategy is commonly shared in the relevant literature. The GMM estimators allow us to control for both unobserved country-specific effects and potential endogeneity of the explanatory variables. We also introduce a trend variable, T_t, to capture shocks in each period which are common to all local governments and other specific controls commonly used

[15] With the IV approach, a typical procedure is to use the weighted average of neighbours' control variables as instruments (see Kelejian and Prucha, 1998). The ML method consists in using a non-linear optimisation routine to estimate the spatial coefficient ρ (see Brueckner, 2003).

[16] Using a data panel helps to eliminate spatial error dependence which arises through spatial autocorrelation of omitted variable, since the influence of such variables is partly captured in community-specific intercept terms.

[17] With the IV approach, a typical procedure is to use the weighted average of neighbours' control variables as instruments (see Kelejian and Prucha, 1998). The ML method consists in using a non-linear optimisation routine to estimate the spatial coefficient ρ (see Brueckner, 2003).

[18] For instance, Brueckner (1998), Brueckner and Saavedra (2000), Saavedra (2000) or Foucault, Madies, and Paty (2008).

in the empirical literature. We then obtain:

$$\begin{aligned} G_{it} = \quad & \lambda.G_{it-1} + \rho.A_{jt} + \beta_1.D_{it} + \beta_2.N_{dt} + \beta_3.O_{ct} + \beta_4.PR_{it} \\ & + \beta_5.E_{t-1} + \beta_6.E_t + \beta_7.E_{t+1} + \beta_8.T_t + \alpha_i + \varepsilon_{it}, \end{aligned} \tag{11}$$

where D_{it} is the population density of jurisdiction i on year t, which captures scale economies in public spending and may be spatially distributed.[19] Due to the lack of data at the communes' level to appreciate wealth variations we consider the employment rate in département d on year t, denoted by N_{dt}. This variable enables a partial control of common shocks which would also be spatially correlated. O_{ct} is a trade openness measure at country level which controls for macroeconomic shocks, since developing countries are vulnerable to foreign trade (Rodrik, 1998).[20] Other control variables are introduced in regression (11): a dummy variable, denoted by PR_{it}, captures some partisan effects;[21] dummies for election years, denoted by E_{t-1}, E_t and E_{t+1}, allow to test the opportunistic behaviour hypothesis of local policy-makers.[22] With respect to our theoretical results (Proposition 1), $\rho \neq 0$ involves the existence of some strategic interactions. Moreover, $\rho > 0$ ($\rho < 0$) means that an increase in the degree of spillovers involves a variation in the same (opposite) sense of local public goods' levels, that is public spending are strategic complements (substitutes).

In the theoretical section we also highlighted that strategic interactions may be restricted by the extreme poverty of some local governments. To test this hypothesis, we define a common indicator of fiscal autonomy, denoted by F_{it}, which is the ratio of jurisdictions' own resources to their total resources, and we consider the following specification:

$$\begin{aligned} G_{it} = \quad & \lambda.G_{it-1} + \rho.A_{jt} + \varphi.AF_{it} + \beta_1.D_{it} + \beta_2.N_{dt} + \beta_3.O_{ct} \\ & + \beta_4.PR_{it} + \beta_5.E_{t-1} + \beta_6.E_t + \beta_7.E_{t+1} + \beta_8.T_t + \alpha_i + \varepsilon_{it}, \end{aligned} \tag{12}$$

[19] Population density is the number of inhabitants per square kilometer. *Per capita* expenditures and population density are in log. *Per capita* expenditures are corrected for inflation.

[20] We measure the trade openness as a ratio of total foreign trade (exports plus imports) to GDP as it is most often used in empirical studies.

[21] The variable takes the value1 if the local government in jurisdiction i has the same partisan affiliation than the president in office. Until he stepped down in March 2006, Mathieu Kérékou enjoyed strong support in the north of the country (Alibori, Atacora, Borgou and Donga) which was considered as his fief. When Boni Yayi was elected, he affirmed his desire for political openness. His fiefs are concentrated in the south of the country, in particular, Atlantic, Collines and Mono. Finally, over the whole time period, about 40 percent of the departments have shared the same partisan affiliation as the President in office.

[22] E_{t-1}, E_t and E_{t+1} are dummy variables which take the value one respectively the year before, the year of and the year after the election and zero otherwise.

where $AF_{it} = A_{jt} * F_{it}$. If strategic interactions are actually contingent on communes' fiscal autonomy, we should observe: (1) the coefficient of A_{jt} is not significant; and (2) the coefficient of AF_{it} is significant and positive (negative) if public spending are strategic complements (substitutes).

3.3 Results

Our dataset covers the 77 communes of Benin for the period 2002-2008. The communes' data for current spending come from the Beninese Ministry of Finances and Economy. The other control variables are drawn from World Development Indicators, Afrobarometers, Demographic and Health Surveys and 77 monographs provided by the European Union.

First, we investigate whether jurisdictions' public spending are correlated and which are the more likely sources of correlation: Spatial lag or spatial error dependence. We follow Anselin, Le Gallo, and Jayet (2006) who proposed two in-depth tests based on the Lagrange Mutiplier principle for panel data that indicate the most likely source of spatial dependence. We first estimate (11) using OLS for both contiguity and ethnic matrix without taking into account the influence of public spending in other jurisdictions ($\rho = 0$) and the lagged value of our dependent variable ($\lambda = 0$). Spatial tests results are shown in Table 2. They indicate the presence of spatial lag dependence for public spending but not the existence of spatial error dependence for both matrices.

Second, since the hypothesis of error independence is verified, we estimate (11) using ML with specific-effects for both contiguity and ethnic matrices without taking into account the lagged value of our dependent variable ($\lambda = 0$). However we consider the influence of the expenditure set by other jurisdictions ($\rho \neq 0$). The estimation results are presented in Table 3. The coefficient of the weight average vector is always significant and positive.

Finally, the one step robust GMM System provides an estimation of our dynamic model (11) for all weighting schemes, taking into account the lagged value of our dependent variable ($\lambda \neq 0$). We adopt the assumption of weak exogeneity of employment rates and trade openness while other explanatory variables are assumed to be strictly exogenous. The weighted average vector of *per capita* public spending of other local governments is, as noted before, suspected of endogeneity. The lagged levels of variables are used as instruments in the re-

gressions in level as well as in the regressions in difference. We collapse instruments and limit their number since too many instruments lead to inaccurate estimation of the optimal weight matrix, biased standard errors and, therefore, incorrect inference of overidentification tests (see Roodman, 2009).[23] Table 4 displays estimation results.

Insert Table 4

We focus our attention on (1) (2) (3) (4) and (5), that is, the GMM System estimations for contiguity, ethnic, uniform and placebo matrices. First we note: (*i*) The orthogonality conditions are respected;[24] (*ii*) The coefficient on the lagged dependent variable is always significant and positive, confirming the consistency of the autoregressive specification;[25] (*iii*) After correction for endogeneity, the coefficient of the weighted average vector of public spending in the set of the other local governments is significant at least at 1 percent level and positive for ethnic and contiguity matrices.

Following Manski (1993) these preliminary results are not sufficient to conclude to the existence of strategic interactions. Indeed a common trend would drive local governments' decisions in the same direction, yielding a positive sign of the interactions' coefficient but not a specific pattern in the type of *communes* with which to interact. The coefficient of interaction with the uniform matrix is significant (column (3)). To go beyond Manski's critic we estimate the coefficient for the contiguity matrix after checking for common trends. It appears in column (4) that the neighbouring interactions coefficient remains significantly positive: Local governments actually interact with each other.[26] Moreover, the placebo matrix (column (5)) does not show any evidence of strategic interactions. Interactions among

[23] The lags of at least two earlier periods for weak exogenous variables and three earlier periods for endogenous variables are used as instruments. The lagged dependent variable is instrumented by lags of the dependent variable from at least two earlier periods. We use two lags for endogenous and weak exogenous variables.

[24] The consistency of the estimator depends on whether lagged values of explanatory variables are valid instruments. The criteria for the selection of instruments are two specification tests (Arellano and Bond, 1991). With the Hansen test, we test the null hypothesis of the overall validity of instruments' orthogonality conditions. The second test is about the serial correlation of residuals. It examines the hypothesis that the residuals from the first-differentiated estimating equation are not second-order correlated. In our case, both statistics confirm the validity of the instruments used.

[25] As this coefficient provides an estimate λ varying between 0.411 and 0.629, the result indicates some level of persistency in public expenditure.

[26] The interactions' coefficient also remains significantly positive for the ethnic matrix after a similar correction.

jurisdictions which are geographically or ethnically close are then not an artefact of our estimation procedure. Note that we also establish in Table 5 that there were no strategic interactions before 1998, the date of the beginning of the decentralisation process in Benin.[27]

We conclude that there are strategic interactions between neighbouring jurisdictions**.** Moreover, public spending are strategic complements, as it is the case in most empirical studies.[28] An average increase of 10 percent in the neighbouring jurisdictions' public spending induces an increase of around 6.2 percent in local expenditure. These interactions also exist between *communes* that are ethnically close but they are less important (5.1 percent).[29] Columns (7) and (8) provide some robustness tests of these results. We consider some alternative matrices: The θ^{neigh2} matrix, in which the value of one is assigned if two *communes* belong to the same *département* and zero otherwise; the θ^{ethn2} matrix where the value of one is assigned if two *communes* have the same dominant ethnic group and zero otherwise. The coefficient of the weighted average vector of public spending of the other local governments remains positive and significant at the 5 percent level for the θ^{neigh2} matrix and at 10 percent for the ethnic matrix θ^{ethn2}.

Columns (9) and (10) concern regression (12), which allow us to appreciate the effect of *communes*' wealth constraints. As expected, the coefficient of the interaction variable between neighbours' spending decisions and the indicator of fiscal autonomy (φ) is positive and significant. Moreover the coefficient for strategic interaction alone (ρ) is no longer significant. We unambiguously conclude that strategic interactions only exist among unconstrained local governments. Finally, considering the proposed control variables we observe an opportunistic behaviour of local jurisdictions since dummies associated with the pre-election years indicate an increase in public spending.[30] Moreover having a local government with the political

[27] We run the same regressions as previously for the period 1994 to 1998. The coefficients of interaction with all matrices are not significant.

[28] Note that, in their study of Public Health Sector in Uganda Akin, Hutchinson, and Strumpf (2005) provide evidence for the hypothesis that spillover effects cause spending on public goods in one district to reduce spending on public goods in neighbouring districts. Local public spending are, in this case, strategic substitutes.

[29] Since different ethnic groups are located in close geographical areas, we can assume that the geographic matrix overlies the ethnic matrix. We estimate the coefficient for the ethnic matrix after checking for geographical interactions in column (6) and it remains significant and stable.

[30] To understand the sign of the coefficient associated with the election year dummy, one must refer to the election calendar and budget votes. Local elections took place at the beginning of March and the definitive budget must be adopted before 31 March. Therefore, in the year before the elections, decision-makers increase current expenditures and decrease them the year after, since the definitive budget is approved.

affiliation of the President in office increases public expenditure too.[31]

Our empirical work suggests that decentralisation has induced interjurisdictional strategic interactions among Beninese communes with regard to current expenditure that appear to be strategic complements. Moreover, our results confirm that such strategic interactions are contingent on communes' fiscal autonomy in this developing country.

4 Discussion

Before concluding we return to some potential explanations of the existence of interjurisdictional spillovers, more specifically on two mechanisms of the 'competition principle': The interjursidictional migration, that is the Tiebout hypothesis and the electoral pressure or in other words the yardstick competition. The existence of interjurisdictional interactions we have established leads us to reconsider these arguments.

Despite the lack of relevant data, we may mention some facts concerning interjurisdictional migrations in Benin. It is straightforward to show that differences in relative demographic growth of Beninese communes cannot be explained by differences in birthrate alone. For instance, Abomey-Calavi, a dynamic commune which spreads over Cotonou has an annual population growth rate of 9.44 percent while Boukoumbé, a very rural commune, has an annual population growth rate of 0.41 percent. Internal migrations exist in Benin and seem to be largely guided by the opportunities offered by cities.[32] The migration's motives are various[33] - schooling, job search or family link - but could be connected, at least partially, to the provision of public goods at local level as in developed countries. Moreover, these migrations occur generally between communes belonging to the same département[34] which could explain the existence of strategic interactions between geographically close communes.

Since our dataset covers two local elections (2003 and 2008), we are able to extend our

[31] Note that we find a positive and significant sign for the parameter associated with the employment rate, which indicates the effect of economic conjuncture. The trend variable remains, as expected, significant and negative. Indeed, per capita public expenditure has decreased by 75% over the period despite little growth between 2004 and 2006.

[32] The analysis of the migrants' distribution (Third Census of Population and Housing, 2002) shows that the *départements* of Atlantique and Littoral, the most urbanized, welcome 41.3 percent of migrants, that is more than 4 migrants on 10.

[33] Third Census of Population and Housing (2002)

[34] For instance, in the *département* of Couffo, more than half of the migrants lived in the same *département*. Moves between contiguous *départements* are also important: more than half of immigrants of the *département* of Atlantique lived in the *département* of Littoral.

preceding empirical analysis to test the existence of some kind of yardstick competition among Beninese *communes*. During electoral period political campaigns should increase interactions among local governments, since more information is available on the fiscal policies of local decision-makers, inducing or reinforcing a yardstick competition effect. Hence, the empirical challenge consists in evaluating the impact of elections on strategic interactions. A straightforward way to test such an effect is to interact the neighbours' spending decisions (A_{jt}) with the election years dummy and estimate two different interaction coefficients, one for years of election (EY_t) and one for all the other periods (NEY_t).[35] If elections actually reinforce the exposure of jurisdictions, we should observe the coefficient of ($A_{jt} \times EY_t$) being more significant and higher than the coefficient of ($A_{jt} \times NEY_t$) as policymakers should be particularly concerned about their neighbours' decisions during election periods.

Insert Table 6

As expected, Table 6 shows that the coefficient is slightly higher and more significant in election periods than in other periods with both matrices, indicating that expenditure decisions are slightly more dependent on neighbours during election periods. However Wald tests do not indicate that coefficients are significantly different at the 10 percent level. Yardstick competition may have some effects, but it is not the main channel of communes' interactions.

5 Conclusion

The aim of our paper was to study local governments' interactions in Benin. These interactions could be very modest given the scarcity of local public resources. We show that this is not the case. Indeed, we establish that decentralisation in Benin entailed interjurisdictional interactions. These interactions are not a common trend. They exist not only among neighbouring local jurisdictions but also among communes which are close in terms of ethnic composition. We also emphasise both the influence of partisan affiliation and the oppor-

[35] Formally, we test

$$\begin{aligned} G_{it} = \quad & \lambda S_{it-1} + \rho'.(A_{jt} \times EY_t) + \rho''.(A_{jt} \times NEY_t) + \beta_1.D_{it} + \beta_2.N_{dt} \\ & + \beta_3.O_{ct} + \beta_4.PR_{it} + \beta_5.EY_t + \beta_6.NEY_t + \beta_7.T + \alpha_i + \varepsilon_{it}, \end{aligned} \tag{13}$$

where $EY_t = E_{t-1} + E_t$ and $NEY_t = (1 - (E_{t-1} + E_t))$.

tunistic behaviour of local governments before elections. This African democracy appears to be as concerned as developed democracies with strategic fiscal interactions.

The existence of strategic complementarity among local governments in developing countries may have some attractive consequences for the issue of decentralisation in these countries. In the game theory literature, strategic complementarity is often associated to the issue of the multiplicity of Nash Equilibriums, that is a coordination issue, while strategic substituability raises the question of existence of a Nash Equilibrium. In the context of decentralisation in developing countries, our result mean that several equilibria may exist and some may be Pareto-dominated. A theoretical indecision then remains on the success or failure of decentralisation in terms of populations' welfare. This indecision may only be solved through further empirical studies. However, strategic complementarity may also induce some interesting features in particular in the context of foreign aid. Assume for instance that a *commune* receives foreign aid which leads to increase local public spending. Due to our result of strategic complementarity, such an increase will induce similar variations of public spending in neighbouring *communes*. A multiplier comparable to the social multiplier put forward by Glaeser, Sacerdote, and Scheinkman (2003) should exist since it is a direct consequence of strategic complementarity and positive spillovers. This multiplier which remains to evaluate in Benin and more broadly in African countries may reinforce the appeal of decentralized foreign aid.

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A Appendix

A.1 Figure and Tables

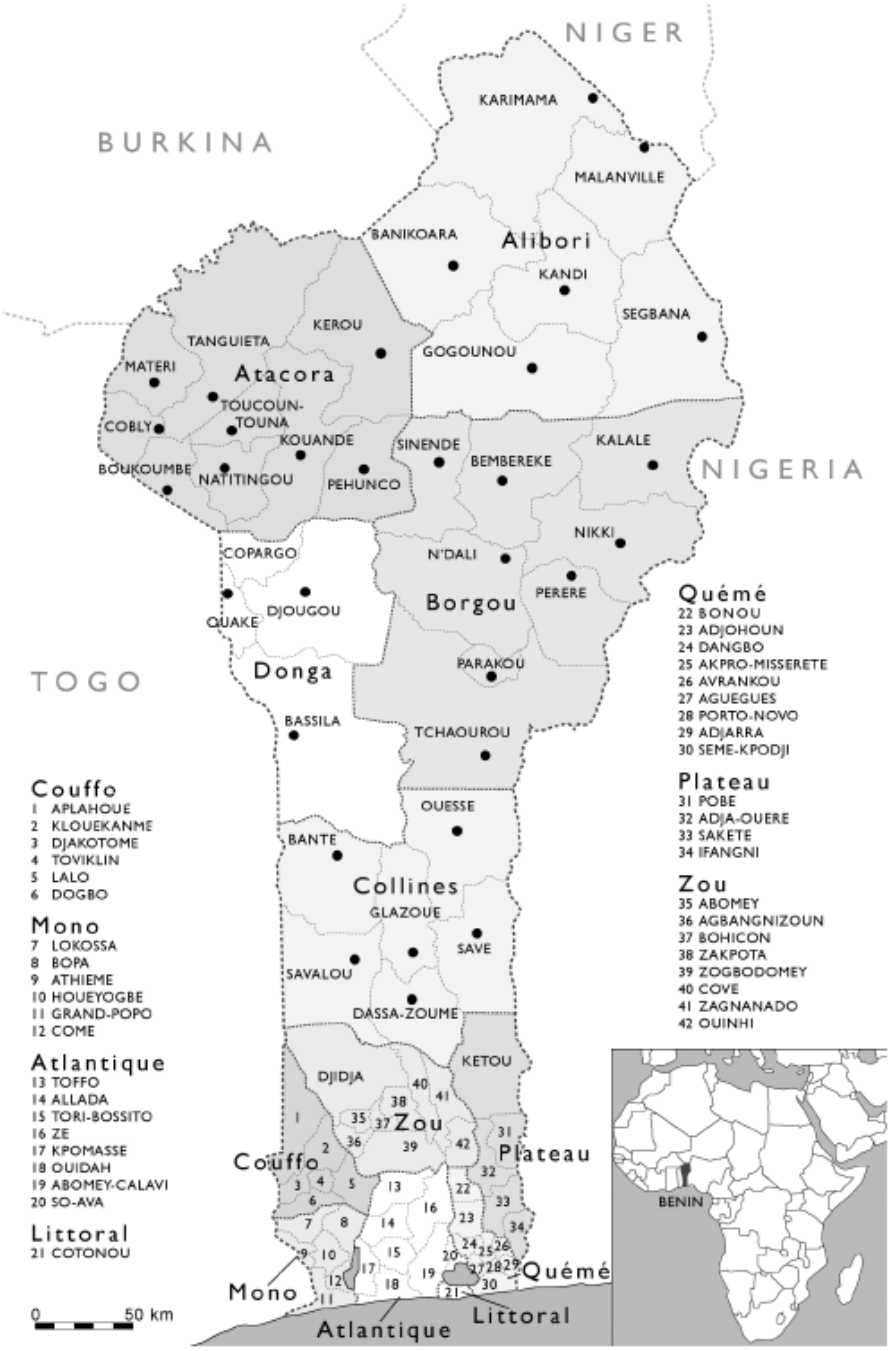

Figure 1: Administrative map of Benin

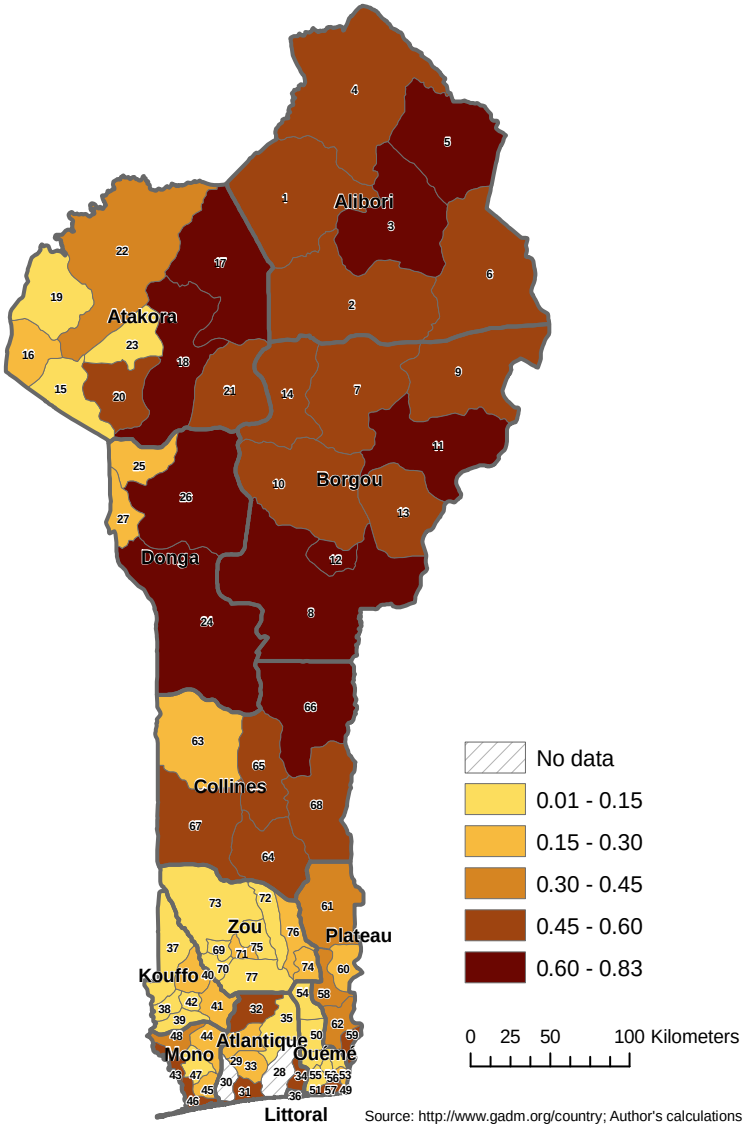

Figure 2: Ethnic fragmentation

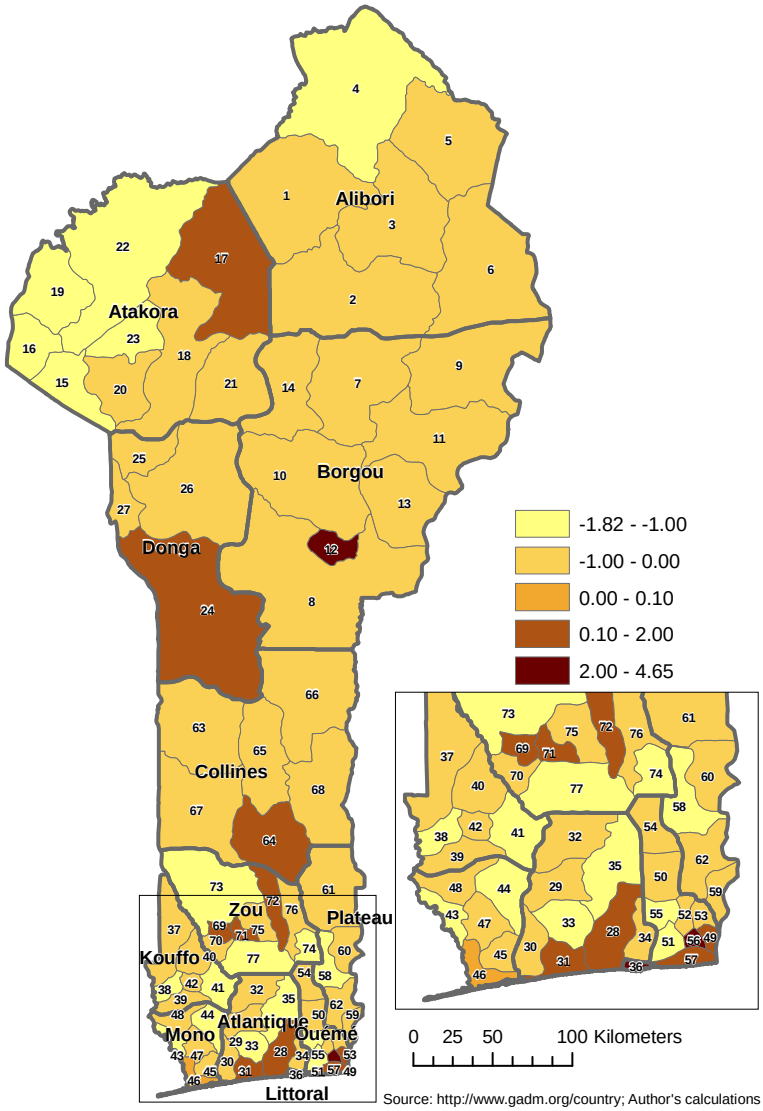

Figure 3: DHS (poverty) score

Table 1: Estimation results for the presence of scale economies - Specific effects

Dependent variable: Current expenditure of '*commune*' i ($G_{i;t}$)	
Population density	2.540** (1.41)
Squared Population density	0.001*** (0.00)
Haussman test: p-value	0.34
Observations	429

Robust standard errors are in brackets.***: coefficient significant at 1 percent level, **: at 5 percent level, *: at 10 percent level.

Table 2: LM tests - Spatial lag and spatial error dependence

Weighting scheme	(1) θ^{neigh}	(2) θ^{ethn}
LMlag (p-value)	13.33 (0.001)	11.97 (0.005)
LMerr (p-value)	1.35 (0.25)	0.60 (0.43)
Observations	462	462

Table 3: Estimation results with spatial lag dependence - ML estimator

Dependent variable: Current expenditure of '*commune*' i ($G_{i;t}$)		
Weighting scheme	(1) θ^{neigh}	(2) θ^{ethn}
Spending in city j	0.255*** (0.07)	0.443** (0.19)
Population density	0.025 (0.06)	0.022 (0.06)
Employment rate	-0.003 (0.01)	-0.003 (0.01)
Trade openness	0.115** (0.05)	0.167*** (0.05)
Partisan Affiliation	0.288** (0.11)	0.244** (0.11)
Trend	-0.124** (0.05)	-0.065** (0.01)
Election year t-1	0.214** (0.09)	0.169* (0.10)
Election year t	-0.666*** (0.19)	-0.361 (0.30)
Election year t+1	-0.568*** (0.09)	-0.549*** (0.10)
Log-likelihood	-206.54	-207.57
N	462	462

Robust standard errors are in brackets.***: coefficient significant at 1 percent level, **: at 5 percent level, *: at 10 percent level.

Table 4: Estimation results for dynamic model - GMM-System[36]

Dependent variable: Current expenditure of *commune* i ($G_{i;t}$)										
Weighting scheme	(1) θ^{neigh}	(2) θ^{ethn}	(3) θ^{uni}	(4) θ^{uni}	(5) θ^{plac}	(6) θ^{ethn}	(7) θ^{neigh2}	(8) θ^{ethn2}	(9) θ^{neigh}	(10) θ^{ethn}
Lagged dep. var.	0.569***	0.527***	0.580**	0.411**	0.629***	0.403**	0.410*	0.768***	0.678***	0.652***
	(0.22)	(0.21)	(0.22)	(0.20)	(0.21)	(0.19)	(0.27)	(0.14)	(0.21)	(0.21)
Spending in *communes* j	0.623**	0.513***	0.384*	0.472**	-0.202	0.468***	0.653***	0.769**	0.155	0.130
	(0.28)	(0.19)	(0.20)	(0.19)	(0.20)	(0.18)	(0.18)	(0.32)	(0.40)	(0.33)
Population density	0.104	0.252**	0.222*	0.179	0.173	0.210*	0.275	0.101	0.088	0.158
	(0.11)	(0.11)	(0.12)	(0.12)	(0.10)	(0.12)	(0.12)	(0.08)	(0.11)	(0.10)
Employment rate	0.052***	0.020*	0.011*	0.061***	0.015	0.060***	0.059***	0.037**	0.032**	0.017*
	(0.02)	(0.01)	(0.008)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Trade openness	-0.080	-0.073	-0.094	-0.001	-0.148**	-0.025	-0.054	-0.106	-0.117*	-0.135*
	(0.06)	(0.07)	(0.08)	(0.07)	(0.07)	(0.07)	(0.08)	(0.07)	(0.06)	(0.07)
Partisan Affiliation	0.395**	0.722**	0.239	0.612***	0.143	0.953***	0.528**	0.813**	0.131	0.453*
	(0.15)	(0.31)	(0.18)	(0.21)	(0.15)	(0.31)	(0.23)	(0.33)	(0.38)	(0.35)
Trend	-0.469***	-0.285***	-0.297***	-0.347***	- 0.419***	-0.345***	-0.443***	-0.419***	-0.512***	-0.463*
	(0.11)	(0.09)	(0.10)	(0.11)	(0.05)	(0.10)	(0.09)	(0.06)	(0.11)	(0.09)
Election year t-1	0.347***	0.294**	0.348**	0.207**	0.434***	0.190*	0.305***	0.343***	0.494***	0.584***
	(0.11)	(0.13)	(0.14)	(0.11)	(0.10)	(0.11)	(0.10)	(0.11)	(0.17)	(0.16)
Election year t	-0.055	-0.482**	-0.502**	0.672	-1.077***	-0.244	-0.215	-0.241	-0.044	-0.112
	(0.02)	(0.24)	(0.25)	(0.42)	(0.39)	(0.38)	(0.49)	(0.53)	(0.63)	(0.29)
Election year t+1	-0.307**	-0.357***	-0.391***	-0.090*	-0.569***	-0.318	-0.318***	-0.257*	-0.497**	-0.567***
	(0.12)	(0.09)	(0.09)	(0.11)	(0.10)	(0.10)	(0.11)	(0.14)	(0.19)	(0.11)
Spending in neighbours j				0.794***		0.617**				
				(0.20)		(0.20)				
Interact term AF_{it}									0.592**	0.673**
									(0.25)	(0.32)
Fiscal autonomy									-4.405**	-4.784*
									(1.78)	(2.56)
AR(1) test: p-value	0.004	0.001	0.001	0.005	0.000	0.002	0.030	0.000	0.001	0.000
AR(2) test: p-value	0.240	0.138	0.101	0.300	0.102	0.315	0.425	0.209	0.117	0.152
Hansen test: p-value	0.176	0.201	0.126	0.568	0.007	0.502	0.403	0.130	0.242	0.584
Nb of instruments	19	19	19	28	19	28	19	19	25	25
Nb of units	63	63	63	63	63	63	62	62	63	63
N	324	324	324	324	324	324	319	318	324	324

[36] Robust standard errors. are in brackets.***: coefficient significant at 1 % level, **: at 5 % level, *: at 10 % level. We adopt the assumption of weak exogeneity of employment rates and trade openness. The weighted average vector of per capita public spending of other local governments is, as noted before, suspected of endogeneity. Other explanatory variables (Population density, time dummies, election dummies, partisan affiliation, trends) are assumed to be strictly exogenous. The lagged levels of variables are used as instruments in the regressions in level as well as in the regressions in difference. We collapse instruments and limit the number. The lags of at least two earlier periods for weak exogenous variables and three earlier periods for endogenous variables are used as instruments. The lagged dependent variable is instrumented by lags of the dependent variable from at least two earlier periods. We use two lags for endogenous and weak exogenous variables.

Table 5: Estimation results for dynamic model 1994-1998 - GMM-System[37]

Dependent variable: Current expenditure of *commune* i ($G_{i;t}$)				
Weighting scheme	(1) θ^{neigh}	(2) θ^{ethn}	(3) θ^{neigh2}	(4) θ^{ethn2}
Lagged dep. var.	0.835***	0.872***	0.887***	0.965***
	(0.14)	(0.12)	(0.11)	(0.10)
Spending in *communes* j	-0.093	0.205	0.002	0.926
	(0.13)	(0.25)	(0.35)	(0.85)
Population density	0.082	0.061	0.041	0.001
	(0.05)	(0.04)	(0.02)	(0.05)
Employment rate	0.012	0.008	0.001	0.005
	(0.01)	(0.01)	(0.01)	(0.01)
Trade openness	-0.001	-0.001	-0.001	-0.006
	(0.005)	(0.005)	(0.005)	(0.005)
Partisan Affiliation	0.095	0.225	0.022	0.001
	(0.12)	(0.23)	(0.07)	(0.08)
Trend	-0.001	-0.038	-0.001	-0.168
	(0.11)	(0.04)	(0.03)	(0.14)
AR(1) test: p-value	0.001	0.001	0.001	0.001
AR(2) test: p-value	0.840	0.726	0.881	0.751
Hansen test: p-value	0.262	0.467	0.494	0.553
Nb of instruments	16	16	16	16
Nb of units	63	63	62	63
N	241	241	237	241

[37] Robust standard errors. are in brackets.***: coefficient significant at 1 % level, **: at 5 % level, *: at 10 % level. We adopt the assumption of weak exogeneity of employment rates and trade openness. The weighted average vector of per capita public spending of other local governments is, as noted before, suspected of endogeneity. Other explanatory variables (Population density, time dummies, election dummies, partisan affiliation, trends) are assumed to be strictly exogenous. The lagged levels of variables are used as instruments in the regressions in level as well as in the regressions in difference. We collapse instruments and limit the number. The lags of at least two earlier periods for weak exogenous variables and three earlier periods for endogenous variables are used as instruments. The lagged dependent variable is instrumented by lags of the dependent variable from at least two earlier periods. We use two lags for endogenous and weak exogenous variables.

Table 6: Testing for yardstick competition - GMM-System[38]

Dependent variable: Current expenditure of '*commune*' i ($G_{i;t}$)				
Weighting scheme	(2) θ^{neigh}	(2) θ^{ethn}	(3) θ^{neigh2}	(4) θ^{ethn2}
Spending in non election years	0.915***	1.239***	0.897***	1.013***
	(0.11)	(0.12)	(0.14)	(0.11)
Spending in election years	0.989***	1.289***	1.002***	1.449***
	(0.09)	(0.13)	(0.09)	(0.26)
Lagged dep. var.	0.569***	0.434**	0.695***	0.521*
	(0.22)	(0.24)	(0.21)	(0.29)
Population density	0.052	0.333***	0.190*	0.222
	(0.11)	(0.12)	(0.10)	(0.16)
Employment rate	0.068***	0.031**	0.070***	0.068***
	(0.01)	(0.01)	(0.01)	(0.02)
Trade openness	-0.138*	-0.020	-0.212***	-0.016
	(0.07)	(0.08)	(0.07)	(0.11)
Partisan Affiliation	0.476**	1.510***	0.507**	1.462***
	(0.24)	(0.28)	(0.22)	(0.36)
Trend	-0.430***	-0.097	-0.482***	-0.365***
	(0.08)	(0.08)	(0.07)	(0.12)
Election years	-0.387	0.353	-0.570	3.577*
	(0.40)	(0.76)	(0.72)	(2.17)
AR(1) test: p-value	0.003	0.001	0.001	0.201
AR(2) test: p-value	0.193	0.186	0.517	0.106
Hansen test: p-value	0.153	0.123	0.492	0.125
Wald test: p-value	0.157	0.438	0.264	0.112
Nb of instruments	20	20	20	20
Nb of units	62	63	62	62
N	324	324	319	318

[38] Robust standard errors. are in brackets.***: coefficient significant at 1 % level, **: at 5 % level, *: at 10 % level. We adopt the assumption of weak exogeneity of employment rates and trade openness. The weighted average vector of per capita public spending of other local governments is, as noted before, suspected of endogeneity. Other explanatory variables (Population density, time dummies, election dummies, partisan affiliation, trends) are assumed to be strictly exogenous. The lagged levels of variables are used as instruments in the regressions in level as well as in the regressions in difference. We collapse instruments and limit the number. The lags of at least two earlier periods for weak exogenous variables and three earlier periods for endogenous variables are used as instruments. The lagged dependent variable is instrumented by lags of the dependent variable from at least two earlier periods. We use two lags for endogenous and weak exogenous variables.