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## Institutional reforms, private sector, and economic growth in Africa

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Working Paper No. 2011/40

## **Institutional Reforms, Private Sector, and Economic Growth in Africa**

Mawussé K. N. Okey\*

July 2011

### **Abstract**

The aim of this paper is to analyse the effect of institutional reforms on the revival of African economies. We study the impact of positive changes in business environment indicators of the Doing Business project and the Economic Freedom Index of the Heritage Foundation on the private sector development indicators and economic performances of African countries. Econometric estimations with panel data of African countries during the period 2003–08 indicate that differences across countries over time in terms of private investment, foreign direct investment, domestic credit to private sector, and the growth rate of gross domestic product are significantly influenced by differences in efforts of institutional and economic reforms.

**Keywords:** institutional reforms, private sector, economic growth

**JEL classification:** C33, O17, O55, P48

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## 1 Introduction

The relationship between institutional reforms and economic performance is now the subject of several studies that analyse empirically (Djankov et al. 2006) or theoretically (Antunes et al. 2008) the impact of reforms on the indicators of economic performance of countries, especially on their private sector. Often defined as all private enterprises, whose capital is majority-owned by private individuals or private companies, the private sector is a powerful driver of real rapid growth. It is also understood through indicators like the share of private sector investment in gross domestic product (GDP), changes in foreign direct investment (FDI), manufacturing exports, and the evolution of domestic credit to private sector (Ruhashyankiko and Yehoue 2006). Other studies incorporate into the private sector analysis, entrepreneurship, the creation of small and medium-sized enterprises (SMEs), and the informal sector.

Therefore, institutional brakes to these indicators of dynamism of the private sector can give a fatal blow to a country's economic performance. Through the Doing Business programme, the World Bank provides a quantification assessment of regulations that apply to SMEs in various fields, notably regulations for starting a business, dealing with construction permits, employing workers, registering property, arranging credit, protecting investors, paying taxes, trading across borders, enforcing contracts, and closing a business. These indicators, elaborated to measure the reform of the institutions, became fundamental to a successful development, and have significant effects on the economic performance of the countries. Moreover, referring to North (1990), institutions can be defined as the rules of society, the combination of constraints that shape human interaction between people.

Following North (1990), several studies, notably Acemoglu et al. (2001), Djankov et al. (2006), and Antunes et al. (2008), have explored the concepts of institutions and institutional reforms and their relationship with economic performance. Most of these studies generally tested the hypothesis that differences in capital accumulation, productivity, and the level of income per capita is basically due to differences in social infrastructure across countries. Social infrastructure means the political institutions and governments that determine the economic environment in which individuals accumulate knowledge, and where firms accumulate capital and produce output. Indeed, social infrastructure favourable to high levels of output provide a good economic environment, promote capital accumulation, acquisition of knowledge, invention and technology transfer. But some reforms through regulations and laws are often the main driver of diversion in economics.

Carlin and Seabright (2008) show that the literature on the importance of business climate for economic development is too wide and often contradictory. Moreover, the relative importance of constraints in the business climate varies from one country or group of countries to another. For example in South and East Asia, access to finance is a problem in fewer countries than many other constraints, in Latin and Central America, the tax administration is less problematic than many other constraints, and in the OECD countries, policy uncertainty is a less frequent problem than other constraints. The enterprises in South Asian countries do not classify the anti-dumping practices as problematic, but these practices are raised as a major problem in African countries. Analysis of Nabli et al. (2008) helps to understand the progress in reforms and private sector development in the Middle East and north Africa. It shows the critical role played

by relations between the public and the private sector in determining progress in reforms and their impact on private sector development.

The 2007 and 2008 editions of Doing Business provide some results according to which the heaviness and slowness of the formalities creating an enterprise in some African countries, as well as expenses to which those that try to create an individual enterprise are exposed, constitute some obstacles to the development of the private sector. According to the 2009 edition, African countries have adopted more positive reforms in 2007–08 than in any previous year covered by Doing Business and three of the top ten reformers in the world are in Africa: Senegal, Burkina Faso, and Botswana. Reforms are also increasing in countries emerging from conflict: Liberia, Rwanda, Sierra Leone, and Mauritius. Note that these reforms take place in an institutional environment that is not at all significant. According to the report by Transparency International (2009), among 180 countries, the Sub-Saharan Africa countries and the Middle East are among the most corrupt. For example, the USA, perceived as not corrupt, is at 18th place, while Zimbabwe is 166th, Nigeria 121st, Kenya, 147th, Ethiopia, 126th, and Cameroon is 141st. This report mentions notable advances in some African countries, like Rwanda (102nd). These characteristics may also explain differences in economic performance of African countries.

We note, however, that even if the business climate indicators are clearly defined and vary considerably from one African country to another, many questions remain about their relevance in explaining differences in economic performance between countries and differences in the size of the private sector. Thus we can ask whether differences between countries in indicators of business climate are a source of differences in economic performance of African countries. If yes, what are the indicators that explain the differences in the more dynamic private sector? This paper aims to determine the impact of positive changes in business environment indicators of the Doing Business programme and the Economic Freedom Index of the Heritage Foundation on the private sector development indicators and economic performances of African countries.

The rest of the paper is organized as follows: in Section 2 we evaluate the progress in economic reforms and the status of recent economic performance in African countries. In Section 3 we review the economic literature on the relationship between institutions, and private sector growth. We present, as a result of a theoretical model, in Section 4 results of econometric estimates of the effects of some institutional indicators on the private sector, and the growth rate in Section 5. In the last section, we draw some conclusions and remarks on future prospects for reform.

## **2 Reforms, business environment, and economic performance of African countries**

The Doing Business project, launched a few years ago, is studying the situation of SMEs of countries and the regulations that apply to them during their life cycle. Doing Business is also currently one of the standard tools used to measure the impact of national regulations on business activity. The report of 2009 covers ten types of indicators in 181 countries. The project uses information provided by governments, universities, specialists, and evaluation panels. The fundamental objective is to gather the information needed to assess the regulation of business and improve it. This project

provides information on almost every African country, of which some characteristics are described in the paragraphs below.

## 2.1 Institutional reform efforts

In 2009 at least one African country (Mauritius) appears on the list of top 25 countries for ease of doing business. Four countries are among the top 10 reformers in the period 2007–08 (Senegal, Burkina Faso, Botswana, and Egypt). The reformers are also relevant in the formal sector through the creation of businesses and jobs, one of the best ways to reduce poverty. However, it is noted that some countries like Rwanda have made great effort in terms of institutional reforms. In contrast we note that during the period some reforms have actually helped to make business activities more difficult. The most striking case is the set of reforms in Zimbabwe in recent years. As noted in Table 1, the facilitation of business creation and cost reduction of import and export are the areas where most African countries have undertaken reforms. In contrast, fewer reforms were undertaken in the field of business closures. In sum, the implementation of reforms clearly shows the commitment of governments creating strong institutions and adopting sound policies, thus helping to attract investors.

But there is room to do more. African firms still face greater regulatory and administrative burdens, and less protection of property and investor rights, than firms in any other region. Many African countries are on the bottom of the list of rankings on the ease of doing business; thus, nine countries in recent years are among the last ten on the list: Niger, Eritrea, Chad, Sao Tome and Principe, Burundi, Congo, Guinea-Bissau, Central African Republic, and the Democratic Republic of Congo.

Table 1: Number of African countries that have made positive reforms during the period 2003–8 in fields covered by Doing Business

Period	Starting a business	Obtaining licenses	Employing workers	Property registration	Getting credit	Protecting investors	Paying taxes	International trade	Enforcement contracts	Closing a business
2003–04	1	0	0	1	2	1	2	2	2	0
2005–06	11	3	0	13	2	2	11	5	5	1
2006–07	12	6	1	12	5	1	7	9	5	1
2007–08	16	8	2	10	12	3	8	14	2	1
Total	40	17	3	36	21	7	27	30	14	3

Source: author's computations based on the Doing Business data base (World Bank 2004 2005, 2006a, 2006b, 2008).

## 2.2 A growth variously allocated

The growth rate of the region grew on average 6 per cent during the last decade, thanks to the improvement of macroeconomic conditions and the reduction of conflicts on the continent. Following five years of sustained economic growth above 5 per cent per year, Africa posted a 5.7 per cent growth in 2008, slightly below the 6.1 per cent in 2007. The reduction in GDP growth in 2008 was caused by two main global factors: the surge in food and oil prices, significantly reducing the purchasing power of households and thereby curbing consumption; and worldwide financial turbulences in the second

semester, causing a fall in external demand which in turn weighed negatively on non-diversified and non-extrovert African economies(BAD 2009b).

Table 2: Classification of countries

Class	Number of country
High-income	1
Upper-middle-income	5
Lower-middle-income	13
Low-income	33
Total	52

Source: World Bank (2008).

Growth in 2008 is variously distributed among regions of the continent. East Africa has recorded the highest growth (7.3 per cent) following the remarkable performance of Ethiopia, Rwanda, and Sudan. Growth was moderate in North Africa (5.8 per cent) and West Africa (5.4 per cent). Central Africa has the lowest growth (5.0 per cent), partly due to the contraction in growth in Chad and Central Africa (AfDB 2009b). Despite these economic results, it is clear (as presented in Table 2) that most African countries are still classified as low-income countries, (33 countries) and only one country, Equatorial Guinea, is a high-income country—a situation due to the fact that most of its export revenue comes from primary products such as petroleum. Appendix A lists the countries by level of income per capita. Note, that Libya is not part of this analysis.

### 2.3 A strong preponderance of the informal sector

Table 3 presents, in order of importance, the weight of the informal sector in national income for 24 countries in Africa. In Zimbabwe, Tanzania, and Nigeria the informal sector contributes over 50 per cent of national income.

In contrast, in countries like South Africa, Cameroon, and Botswana, the informal sector is less developed. These situations are due to a number of factors including disparities in regulations. Indeed, when the regulation guiding the creation and the exploitation of a firm are complex, the entrepreneurs give up operating in the formal sector and pursue their activities in the informal sector.

Table3: Classification of countries according to the weight of the informal sector  
in national income

Countries	Weight of the informal sector (% of the national income )	Countries	Weight of the informal sector (% of the national income )
Zimbabwe	59.4	Côte d'Ivoire	39.9
Tanzania	58.3	Madagascar	39.6
Nigeria	57.9	BurkinaFaso	38.4
Zambia	48.9	Ghana	38.4
Benin	45.2	Tunisia	38.4
Senegal	43.2	Morocco	36.4
Uganda	43.1	Egypt	35.1
Niger	41.9	Kenya	34.3
Mali	41.0	Algeria	34.1
Ethiopia	40.3	Botswana	33.4
Malawi	40.3	Cameroon	32.8
Mozambique	40.3	South Africa	28.4

Source: author's computations based on World Bank (2004).

## 2.4 A relatively high number of private companies

According to Esfahani(2000) many developing countries, particularly those with poor institutions, maintained for a long time large and inefficient public sectors during the 1980s and 1990s, also the share of state corporations in GDP remains around 14 per cent in low-income economies, it oscillated between 8 per cent and 10 per cent in middle-income countries, and declined from 9 per cent to 7 per cent in industrialized economies. During the 1990s, the number of private companies in most African countries was around 75 and 98 per cent of the total number of enterprises. This shows the importance of private sector in African economies during this period that coincided with the period of privatization (Appendix table A1 and A2).

## 3 Literature review

### 3.1 Institutions, private sector, and growth

Traditional analyses of public policy on entrepreneurship focus on the effects of taxation, subsidies, and governmental services, such as entrepreneurial training and provision of social insurance, on risk taking, and occupational choice (Hyytinen and Takalo 2003).

The recent studies address a lot more roles of the institutions (North 1990) and the improvement of the business climate through the reforms and regimentations that constitute a major interest of the Doing Businessprogramme. For Chemin (2009) a less developed legal system constitutes an obstacle to entrepreneurship, the weakness of the legal system reduced the incentive to start an activity because it reduces the security of property rights, reducing the possibilities to access the credit. The improvement of the legal system is therefore fundamental for economic growth.



The judiciary may affect entrepreneurship through two mechanisms. First, efficient judiciaries that swiftly punish law violations may improve entrepreneurs' confidence in their property rights. Johnson and al. (2000) show in a theoretical model that an improvement of the level of laws attracts more businesses towards the formal economy—this process can later be reinforced by a larger fiscal basis. Second, the legal institutions can affect entrepreneurship through the credit markets. Bianco et al. (2005) show that the key function of courts in credit relationships is to force solvent borrowers to repay when they fail to do spontaneously. By the same token, poor judicial enforcement increases opportunistic behaviour in borrowers: anticipating that creditors will not be able to recover their loans easily and cheaply via courts, borrowers are more tempted to default. Creditors respond to this strategic behavior by reducing credit availability.

### **3.2 The indicators of institutional reforms**

Since 2004 Doing Business has been tracking reforms aimed at simplifying business regulations, strengthening property rights, opening up access to credit, and enforcing contracts by measuring their impact on ten indicator sets. According to Doing Business (2009), few years of Doing Business data have enabled a growing body of research on how performance on Doing Business indicators (and reforms relevant to those indicators) relate to desired social and economic outcomes. These studies succeed various findings among which, one can mention:

- Lower barriers to start-up are associated with a smaller informal sector;
- Lower costs of entry can encourage entrepreneurship and reduce corruption;
- Simpler start-up can translate into greater employment opportunities.

There are some of these indicators which are the object of more studies: it is about the protection of the investors and the execution of the contracts, but it does not mean that the others are less important.

#### *3.2.1 Investor protection*

Castro et al. (2004) seek to answer the question of whether investor protection promotes economic growth. They show through a theoretical model that investor protection has two opposing effects on economic growth. First, the demand effect that improved investor protection leads to better risk-sharing, which promotes a strong demand for capital. This effect implies a positive relationship between investor protection and economic growth. Second, the effect of supply works in the opposite direction—better investor protection implies a high interest rate due to changes in demand forecasts and a high interest rate reduces the income of entrepreneurs.

Empirically La Porta et al. (1998) show that the effect of supply is lower than the demand effect in countries with lower restrictions on capital flows. If investors are not protected, the financial markets fail to grow and banks become the only sources of funding. Therefore, companies fail to reach the size they would need to be competitive because of inadequate funding, which hampers economic growth. The existence of legal

and regulatory instruments to protect investors account for more investment decisions than the characteristics of the business (World Bank 2008).

Other studies such as Haidar (2008) confirm that the level of investor protection determines the differences in growth rate of GDP between countries and countries with better protections for investors grow faster than those with low protection. Economies that rank among the best in the index of investor protection imposes strict conditions for disclosure of information to shareholders and give general access to information, both before and during court proceedings, so determine the liability of directors.

Using a cross-sectional analysis, Perotti and Volpin (2006) show that the rate of entry of new firms and the total number of procedures are positively correlated with investor protection in areas that are financially dependent. Then countries with greater credibility of political institutions have better investor protection and a low entry cost. The results show also that investor protection depends on both the quality of legal rules and their performances; it is influenced by politicians and bureaucrats. Weak contract enforcement reduces access to finance and creates an effective barrier to entry for poor entrepreneurs.

### *3.2.2 Contract enforcement*

In absence of efficient courts, firms invest less and reduce their business operations, they prefer to move within a small group of people they know and with whom they have worked together. Antunes and Cavalcanti (2007) examine how differences in the levels of informal sector and per capita income between countries can be explained by costs related to regulations and the degree of enforcement of financial contracts with a general equilibrium model (GEM) with heterogeneous agents and credit constraints. The results show that: (1) costs related to regulations and the level of contract performance do not explain the differences in the informal sector observed in the USA and Europe, (2) for developing countries like Peru, enforcing contracts and costs are important in explaining the size of the informal sector, and (3) costs and contract enforcement are not important in explaining income differences observed between countries. Still using a GEM with heterogeneous agents, Antunes et al. (2008) show that differences across countries in intermediation costs and enforcement generate differences in occupational choice, firm size, credit output, and income inequality.

Reforms in other areas, such as creditors' rights, help to increase the number of bank loans only if contracts can be enforced in the courts (Safavian and Sharma 2007). A study conducted in 41 developing countries, shows that every 10 per cent improvement in resolving commercial disputes will decrease by 2.3 per cent from the informal sector of the national economy (Dabla-Norris et al. 2008).

### *3.2.3 Starting a business*

The ease of starting a business can be analysed through the procedures, time, cost, and minimum capital to be paid to start a business. Simplification of entry procedures in the formal sector encourages the creation of new businesses. Facilitating entry into the formal sector has led to an increase of about 4 per cent of new businesses. There is also a correlation between the simplification of procedures for business creation and increased productivity of existing enterprises. The situation analysis of 97 countries shows that reducing entry costs in an amount equivalent to 80 per cent of income per capita has increased the total factor productivity (TFP) of about 22 per cent. The

analysis of 157 countries shows that the same reduction in entry costs results in an increase of about 29 per cent of output per employee (Berseghyan 2008). The analysis of firm entry into the formal sector in Mexico shows that competition from new entrants leads to lower prices by 1 per cent, and reduced 3.5 per cent corporate income in a fiscal year (World Bank 2008).

### *3.2.4 Paying taxes*

Economic theory is divided on the question of the effect of tax on entrepreneurship (Fossen and Steiner 2009). On the one hand, high taxes are a barrier to private sector activity. Gentry and Hubbard (2000) argue that tax reduces income after taxes for entrepreneurs who discourage risky projects. On the other hand, governments can encourage entrepreneurship by sharing the risk through taxation.

Henrekson (2007) argues that it is difficult to establish empirically a negative relationship between tax level and entrepreneurship, because high taxes can stimulate self-employment, but reduce the productive entrepreneurship. Djankov et al. (2008) reveal that tax rates, unless accompanied by higher private investment, fewer formal businesses per capita, and rates of entrepreneurship, lower. The analysis indicates, for example, that an increase of 10 per cent effective tax rate on corporate profits reduces the ratio of investment to GDP by 2 per cent. In countries where taxes are high and gains seem low, many companies simply prefer to remain informal.

### *3.2.5 Trading across borders*

The Doing Business project measures the procedural requirements, including the number of necessary documents and the associated time and cost (excluding trade tariffs) for exporting and importing. The more time consuming the export or import process, the less likely that a trader will be able to reach markets in a timely fashion. This affects the ability of business development and job creation. A study of 126 countries evaluated the possible loss from export trade by 1 per cent for each additional day. For perishable agricultural products, the cost amounts to nearly 3 per cent of the volume of transactions for each additional day. Some non-agricultural products are also subject to timing, such as fashion accessories and consumer electronics. Another study found that each additional signature for an exporter must obtain trading volume down by 4.2 per cent. For high-end exports, the reduction is about 5 per cent (Sadikov 2007).

We realize that there is a variety of indicators of reform not negligible, even in the African context. Thus in our study we incorporate relatively more indicators of reform in the econometric analysis. This will allow us to be a little more comprehensive compared to other studies that focus sometimes sparingly on only one or two indicators to see what is most relevant for Africa.

## **4 Methodological approach**

The analysis approach is crucial in determining the relevance of the results of the effect of reforms on economic performance. Thus, according to Carlin and Seabright (2008), the ability of cross-sectional regressions to reveal which agencies or elements of the business environment really matter for long-term development is severely limited by: (1) the correlation between the approximations that are used to characterize them, (2)

the problems in measuring the variables of the business environment—the persistence of institutions over time, (3) the limited number of countries, and (4) the lack of credible instruments to deal with the problem of reverse causality, as the measurement errors and omitted variables are correlated.

In this study, to determine the effects of positive changes in indicators of business climate on private sector development, we proceed first by presenting a theoretical model based on endogenous growth models. Second, we consider empirical equations in which the private sector indicators are explained by indicators of institutional reform.

#### 4.1 The model

Econometric models for analysing the role of institutions and institutional reforms on economic performance are often derived from endogenous growth models.

Let us consider the Cobb-Douglas production function

$$Y_{it} = A_{it} K_{it}^{\alpha} L_{it}^{\beta} \quad (1)$$

where  $Y$  is the level of output,  $A$  the level of productivity,  $K$  the stock of capital,  $L$  the stock of labour,  $i$  and  $t$  stand for country and time, respectively.

Assuming that the production function exhibits constant return to scale with respect to physical inputs, can be written in per capita terms as

$$y_{it} = A_{it} k_{it}^{\alpha} \quad (2)$$

where, lower case letters refer to per capita units.

The traditional approach in the empirical literature on growth and institutions is to include a measure of institutional quality in a linearly additive term to a conventional growth regression

$$g = B_z Z + B_I I + \eta \quad (3)$$

where  $I$  is a measure of institutional quality and  $Z$  is a set of control variables (following the theory,  $Z$  typically includes at minimum, initial income, physical capital investment, and human capital investment). This approach can be theoretically justified by assuming that  $A$  is a linear function of institutional quality.

However, the literature on institutions suggests a more complex relationship between institutions and growth. For example, North (1990) shows that institutions affect not only the production efficiency but also the technology employed. This suggests the possibility of some type of threshold levels of institutional quality that must be met before different technology can be employed. Specifically, it suggests the possibility that institutions should be viewed as a variable that indexes the aggregate production function.

$$Y_i = A_i K_i^{\alpha_0} L_i^{\beta_0} \text{ if } I_t < I_0$$

$$Y_i = A_i K_i^{\alpha_i} L_i^{\beta_i} \text{ if } I_i \geq I_0 \quad (4)$$

where the coefficients  $\alpha_i$  and  $\beta_i$  vary with the underlying institutional state  $I_i$ . The quality  $I_0$  is the threshold level of institutional quality that must be achieved to exploit the new level of technology (Bernard and Jones 1996).

The treatment of institutions as indexing the aggregate production function in the empirical analysis of growth is important, as it implies the presence of multiple growth regimes and thus parameter heterogeneity (Minier 2007).

Jalilian et al. (2007) assume a simple Keynesian capital accumulation rule according to the following specification

$$dk/dt = sy - (n + \delta)k \quad (5)$$

where  $dk/dt$  is the rate of change of the per capita capital stock assumed to be equal to the flow of savings (or investment) minus capital depreciation and the growth of the labour force. In this equation,  $s$  is the share of gross saving in output per capita,  $\delta$  is the depreciation of capital, and  $n$  is the rate of growth of population as a proxy for the growth of the labour force.

Setting (5) equal to zero, leads us to the solution of the steady state capital stock per capita  $k = sy / (n + \delta)$ .

Tacking the logarithm of both sides of equation (2) and replacing the solution of the steady-state solution of  $k$  into (2) gives the solution of the steady-state solution for output per capita which is as follows

$$\ln(y_{it}^*) = \left[ 1/(1 - \alpha) \right] \left[ \ln A_{it} + \alpha \ln(s_{it}/(n_{it} + \delta_{it})) \right] \quad (6)$$

where (\*) means the value at steady state.

We adopt the assumption of Mankiw et al. (1992) that economies tend to their steady state according to the following approximation

$$\ln y_{it} - \ln y_{i0} = \lambda (\ln y_{it}^* - \ln y_{i0}) \quad (7)$$

where  $y_0$  represents the initial level of income per capita and  $\lambda = (1 - e^{-\eta})$  the dynamic adjustment to the steady state,  $\eta$  is the speed of convergence. From equation (5) we can drive growth in output per capita as follows

$$g_{it} = (\lambda/t) (\ln y_{it}^* - \ln y_{i0}) \quad (8)$$

If we replace  $(\ln y_{it}^*)$  by the equivalent of equation (4) that gives us a relationship of growth of output per capita

$$g_{it} = \left( \lambda/t(1-\alpha) \right) \left[ \ln A_{it} + \alpha \ln \left( s_{it}/(n_{it} + \delta_{it}) \right) \right] - (\lambda/t) \ln y_{i0} \quad (9)$$

TFP plays an important role in growth; we assume that the dynamic takes the following form

$$A_{it} = A_{i0} e^{\gamma t}, \quad (10)$$

where  $A_{i0}$  specifies the initial level of productivity and  $\gamma$  its rate of efficiency growth per period. Substituting Equation (10) into equation (9), the growth rate of output per capita is represented by the following relationship

$$g = \phi_1 \ln A_{i0} + \phi_2 \gamma + \phi_3 \ln \left( s_{it}/(n_{it} + \delta_{it}) \right) - \phi_4 \ln y_{i0} \quad (11)$$

where  $\phi_1 = \lambda/t(1-\alpha)$ ,  $\phi_2 = \lambda/(1-\alpha)$ ,  $\phi_3 = \lambda\alpha/t(1-\alpha)$ , and  $\phi_4 = \lambda/t$ .

Adding some control variables and qualitative variables and a stochastic term to equation (11) we obtain an econometric model to assess the role of institutional reforms in economic performance.

This specification is similar to Temple and Johnson (1995). Jalilian et al. (2007) emit an additional assumption after the recent literature on regulation. In developing countries the rate of efficiency growth  $\gamma$  directly varies with the quality of regulatory institutions in the country.

In our study we focus on one component of growth: the contribution of the private sector. Dalamagas (1998) shows that the rate of growth of output per capita depends on the rate of growth of per capita of private capital and public capital approximated by the annual share of investment (public and private) in production.

$$g = a g^{pub} + (1-a) g^{priv} \quad (12)$$

The point here is to isolate the growth rate in the private sector

$$g^{priv} = \left[ 1/(1-a) \right] g - \left[ a/(1-a) \right] g^{pub} \quad (13)$$

where  $g^{priv}$  and  $g^{pub}$  respectively denote the growth rate of private sector sizes and the sizes of the public sector.

## 4.2 Empirical equations

We empirically analyse the effects of institutional and economic reforms on differences in economic performance particularly in terms of indicators of the dynamism of the private sector through an econometric estimation for a panel of African countries. To do this, following the theoretical analysis above, we use the following econometric model inspired by Djankov et al. (2006) studying the effect of regulation on growth

$$SP_{it} = \alpha_0 + \alpha_1 RI_{it} + \delta X_{it} + \varepsilon_{it} \quad (14)$$

*RI* refers to the institutional reforms, it is here *dbreform*, and *dbnbrefeconomicf*. Pitlik and Wirth (2003) use as a measure of economic reform indices of economic freedom by the Fraser Institute. There is also a growing use of the Economic Freedom Index by the Heritage Foundation/Wall Street Journal Annual. According to Dreher and Rupperecht (2007) recent studies suggest the use of changes in the Economic Freedom Index to measure the liberalization reforms (Heinemann 2004).

Amin and Djankov (2009a, 2009b) adopt two measures of the Doing Business reforms: first, the information encoded as a binary variable that equals 1 if a country implements a positive reform during the year and 0 otherwise. Second, an alternative measure that is equal to (log of 1 plus) the number of indicators on which the reforms have increased during the year. The Doing Business data have the advantage of covering a specific set of policy reforms.

Our analysis adopts the same indicators of reform. In this study, institutional reforms are measured by annual changes in indicators of business environment of the World Bank and the Economic Freedom Index of the Heritage Foundation.

$X$  is the set of control variables to have good estimates of different equations. These include inflation, government spending on investment, and income level  $\mathcal{E}$  is the error term incorporating variables not taken into account by the model.

*SP*, the dependent variable (private sector) is decomposed into several indicators, taking into account the various aspects of the private sector. We estimate four equations. We capture the private sector by indicators such as private investment, the gross fixed capital formation of private sector (*lpriv*), domestic credit to private sector (*ldcps*), and FDI (*fdim*). Otherwise we add the growth rate of GDP (*reel\_gdp*).

### 4.3 The data and econometric strategy

In this study we use indicators of the business environment of the World Bank available in the Doing Business database over the period 2003–08. Data on gross fixed capital formation private sector, domestic credit to the private sector, and FDI come from the African Development Indicators statistical yearbooks, and the pocketbook of the AfDB (AfDB 2009a, 2009b), and data on institutions and institutional reform come from the database of Doing Business (various editions from 2003 to 2008), and the Heritage Foundation (Economic Freedom Index) over the period 1995 to 2008. The corruption perception index is from the Transparency International data. Some countries are not included in the estimations, due to unavailability of data, for example, Somalia and Libya.

#### 4.3.1 Econometric estimations

We perform regressions on panel data in order to capture the effects of changes in indicators of reforms during the period. In most cases, some variables are considered in logarithms; this not only allows us to use linear relationships, but also to smooth the variable by reducing the amplitudes.

#### 4.3.2 Problems of simultaneity and endogeneity

Potential problems that can support this study are the simultaneity bias or reverse causality and endogeneity problem. The Granger causality test is often used to establish

the direction of causality. This test requires relatively long periodseries, but the temporal dimension of our data on indicators of reforms is limited to allow for implementation of this test. Fortunately many studies, including Jalilian et al. (2007) and Djankov et al. (2006), lead to strong results with a causality, ranging reforms to economic performance. We will adopt this causality in this study.

On the other hand, private sector and institutional reforms indicators may be potentially endogenous. Thus the estimators of ordinary least squares (OLSs) are not robust. Two stage least squares (2SLS) or instrumental variables methods are often recommended to prevent the potential endogeneity bias. In this study we use the generalized method of moments (GMM) and robust GMM that is more efficient than the method of instrumental variables in the presence of heteroscedasticity. Our instruments are the determinants of reforms. Moreover, for getting some ideas on the validity of our instrument variables, tests of Sargan, and the J statistic of Hansen were implemented on the four equations.

## 5 Results and interpretations of the econometric analysis

The results of our estimates are contained in Appendix B. According to these results, the institutional reforms significantly affect the private sector and the differences in economic performance of African countries.

### 5.1 Private investment

We use econometric methods of OLSs with fixed effects, the GMM and GMM robust to heteroskedasticity. We perform the analysis first for all African countries, then these countries are classified into two groups according to their legal origin. Hence we have estimations for countries with French legal origin and countries with British legal origin.

The results of our estimations of the private investment equation (Appendix tables B2 to B4) show that for all Africa, the Doing Business programme (assuming the variable *bdreform*) explains significant private investment. The results also reveal the significance of the reforms when we consider only countries with British legal origin. In contrast the reforms do not seem to explain significantly private investment in Francophone countries. So when we move from a status quo to a situation of reform, private investment increased between 0.61 per cent and 0.83 per cent for all African and between 0.79 per cent and 1.02 per cent for countries with British legal origin.

Moreover, if we consider the number of reform (*ldbnbref*), a 1 per cent increase in the number of reform causes an increase in private investment by 0.47 per cent for the whole Africa and between 0.67 per cent and 0.99 per cent for countries with British legal origin. The Economic Freedom Index is significant in explaining private investment for countries with British legal origin. Our explanation for these results is that the reforms are still inadequate in countries with French legal origin. There remains much to do in these countries, in order to expect significant effects on the private sector. The non-significance of the Economic Freedom Index reveals that the Doing Business institutional reforms are relatively more relevant for the revival of private investment.



Other institutional factors (corruption, democracy, investor protection index) explain significantly private investment. Corruption affects negatively private investment, a move from a below-average to an above-average level of corruption decreases private investment by 0.1 per cent and 0.3 per cent for all Africa and for Francophone countries. But the effect is higher when considering only countries with British legal origin; these effects are between 0.7 and 0.8 per cent. The Doing Business investor protection index affects significantly private investment but the effect is ambiguous, because the sign of its coefficient in the estimated equations is sometimes contrary to our expectations.

It should also be noted that public investment affects negatively private investment for the whole countries (crowding-out effect). An increase in public investment of 1 per cent leads to a decrease of private investment by 2 per cent. We get the same results if we consider only the Francophone countries. In contrast, effects are not significant for countries with British legal origin. The increase in private sector credit promotes private investment. When bank credits to the private sector increased by 1 per cent, private investment increased by 4 per cent for all countries, 2 per cent for the Francophone countries and between 3 per cent and 4 per cent for English-speaking countries. Financial development is therefore crucial for the revival of private investment in African countries.

## **5.2 Bank credit to private sector**

The results of the estimation of the equation of bank credit to the private sector are compiled in Appendix tables B5 to B7. These results show that for all Africa, the Doing Business programme and reforms for economic freedom explain significantly (at 1 per cent) the expansion of bank credits to the private sector.

When a country implements reforms in at least one of the fields covered by the Doing Business programme, the credit to the private sector increased between 0.09 per cent and 0.78 per cent if we consider the whole countries, between 0.01 per cent and 0.69 per cent for countries with French legal origin, and 0.5 for the countries with British legal origin.

If we consider the number of reforms, when the number of areas covered by the reforms increases by 1 per cent, credit to the private sector increases between 0.08 per cent and 5.76 per cent for all countries, between 0.08 per cent and 6 per cent for the Francophone countries and the effect is ambiguous for the Anglophone countries (the elasticity is between -0.8 and 0.77).

Considering the overall score of Economic Freedom Index, economic freedom reforms affect significantly and positively the credit to the private sector and an increase (corresponding to standard deviation of the indices) leads to an increase in credit to the private sector between 0.02 percent and 0.1 percent for all countries, the effects are similar if one considers only the Francophone countries or countries with British legal origin. Reforms for economic freedom affect similarly the Francophone countries and Anglophone countries.

Other institutional factors are also relevant in explaining the credit to the private sector. Corruption negatively affects the development of private sector credit. The transition from a low level of corruption to high levels causes a reduction in bank credit to the private sector by 0.08 per cent for all Africa, 0.09 per cent for Francophone countries at

0.05 levels. It is in contrast not relevant in explaining the credit level of countries with British legal origin. Democracy affects positively and significantly the credit to private sector. An increase in the level of democracy equal to one standard deviation of the index Polity2 causes an increase in private credit by 0.04 per cent for all countries, 0.05 per cent for the Francophone countries and between 0.06 per cent, and 0.09 per cent for Anglophone countries.

It should also be noted that factors such as inflation, income level and public and private investment affect positively credit to the private sector for all countries and even when considering only the Francophone and Anglophone countries. The level of national income per capita is significant in all equations of bank credit to the private sector. It explains positively bank credit to private sector. Our explanation for this is that access to credit is positively correlated with the level of wealth. Thus in the relatively richer countries, with a more developed financial system, it is easy for a potential entrepreneur to have access to bank credit. Consequently, reforms for reducing the level of poverty of people and providing more resources will enable them to have easy access to bank loans, as they face the constraints and guarantees imposed by banks, which exclude the poor. Most African countries are classified as low-income countries; therefore, considerable efforts of better allocation of these scarce resources are needed to boost private sector development and economic growth.

### **5.3 Foreign direct investment**

The results in Appendix tables B8 to B10 show that reforms create situations that attract foreign investors. Thus the implementation of reforms in at least one of the areas covered by Doing Business leads to an increase of FDI between 3 per cent and 4 per cent at (0.01 significant level) for all African countries, between 4 per cent and 5 per cent for the Francophone countries and 4 per cent for Anglophone countries.

The investor protection index of Doing Business explains significantly and positively FDI of the continent. The reforms in the direction of protecting investors attract foreign investment. Improving the protection index equal to one standard deviation of this index leads to an increase in FDI between 0.36 per cent and 0.42 per cent for the whole of Africa, between 0.2 per cent and 1 per cent for the Francophone countries and between 0.6 per cent and 0.8 per cent for countries with British legal origin. Indeed, FDI is often from multinational firms that are sensitive to levels of protection for minority shareholders against the private use of corporate assets by directors and conditions that guarantee the protection of the profits of the shareholder.

### **5.4 The growth rate**

The results of estimating the growth equation which incorporates indicators of institutional reforms and private sector indicators are contained in Appendix tables B11 to B13. The results show a direct effect that the reforms may have on growth and an indirect effect through the indicators of private sector development.

The Economic Freedom Index affects significantly and positively the economic growth rate. The improvement of this index by 1 per cent, leads to an increase in growth rate between 2 per cent and 4 per cent for all Africa. The implementation of reform in at least one of the areas covered by Doing Business leads to an increase in growth rate between 1 per cent and 3 per cent at a significance level of 10 per cent for countries

with British legal origin. The number of Doing Business programme reforms seems not to have a significant direct effect on the growth rate when considering separately Francophone or Anglophone countries, but for the whole, the elasticity is 3 per cent at 0.01 significant levels. This low significance may be explained by the fact that much remains to be done on reform in economic and legal institutions to boost African economies. The results confirm the presence of an indirect relationship through the indicators of private sector development.

An increase of 1 per cent of FDI leads to an increase of the growth rate by 0.9 per cent for the whole of Africa, when private investment increases by 1 per cent, the growth rate increases by 1.1 per cent for countries with British legal origin. The institutional variables like democracy and corruption affect significantly the growth rate.

## **6 Conclusion**

This paper aims to determine the effect of positive changes in indicators of business climate of the Doing Business programme, the Economic Freedom Index of the Heritage Foundation and the corruption perception index of Transparency International, on the differences in economic performance in Africa.

Our investigations through econometric panel data estimation show that differences across countries over time in terms of private investment, FDI, domestic credit to private sector, and the growth rate of GDP, are significantly influenced by differences in efforts of institutional and economic reforms. Therefore, institutional reforms are sources of job creation, attraction of foreign investors, and growth for African countries. The revival of African economies also depends on improving economic and legal institutions. As recommendations, we propose refined studies for each African country to identify the right way and areas of reform, encourage further reforms and periodic assessment of their effects in different areas of economies. This study reveals again the relevance of the Doing Business indicators and hence the importance of this evaluation programme as a lantern to African countries on the choice of levels of regulation for sustained growth.

## Appendix A

Appendix table A1: Classification of countries according to level of income

Class	Countries	Number
High-income	Equatorial Guinea South Africa, Botswana, Gabon, Maurice, Seychelles.	1
Upper-middle-income	Algeria, Angola, Cameroun, Cap-Verde, Djibouti, Egypt, Lesotho, Morocco, Namibia, Congo, Soudan, Swaziland, Tunisia.	5
Lower-middle-income	Benin, Burkina-Faso, Burundi, Côte d'Ivoire, Eritrea, Ethiopia, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Niger, Nigeria, Uganda, Democratic Republic of Congo, Rwanda, SaoTomé andPrincipe, Senegal, Sierra Leone, Tanzania, Chad, Togo, Zambia, Zimbabwe, Central Africa, Comoros, Somalia.	13
Low-lowincome		33
Total		52

Source: World Bank(2008).

Appendix table A2: Total number of enterprises

Year	Total						
	Benin	Burkina Faso	Cameroon	Central Africa	Côte d'Ivoire	Niger	Senegal
1990	2 516	135		216	2 237	866	1 144
1991	2 870	163		207	1 927	945	1 208
1992	3 210	174		207	1 965	817	1 022
1993	3 662	172	1 524		1 985	796	1 153
1994	4 045	211	1 515		2 157	752	1 173
1995	4 484	219	1 486		2 137	716	1 248
1996	4 972	219	1 427		2 410	728	1 406
1997	5 512	221	1 971		2 972	1 015	1 397
1998	6 313		1 876			1 215	
1999	7 091		1 693				

Source: Afristat (available at: <http://www.afristat.org>).

Appendix table A3: Description of variables and data sources

Variables	Description	Source
Lgpri	Private investment: gross fixed capital formation of private sector (in logarithm) Africa	Africa Development Indicators (2009, available at: <a href="http://data.worldbank.org/data-catalogue/africa-development-indicators">data.worldbank.org/data-catalogue/africa-development-indicators</a> ), statistical yearbooks, and pocketbook of the AfDB (2009a, 2009b)
Ldcps	Bank credit to private sector (in logarithm), Djankov et al. (2006)	Africa Development Indicators (2009)
Fdim	Amount of FDI (net inflow), lfdi= logarithm value, lfdigdp = value to GDP in logarithm	Africa Development Indicators (2009)
reel_gdp	Real GDP growth rate	Africa Development Indicators 2009
Dbreform	Binary variable that takes the value 1 if the country adopted the reform at least one year and 0 otherwise Amin and Djankov (2009)	Doing Business database, various editions from 2003 to 2008: World Bank (2004, 2005, 2006a; 2006b, 2008)
Dbnbref	Number of areas defined by Doing Business, in which the reforms were implemented during one year	Doing Business database, various editions from 2003 to 2008: World Bank (2004, 2005, 2006a; 2006b, 2008)
Economicf	Economic Freedom Index (overall score), Lefi = logarithm value on a scale of 1 to 100	Heritage Foundation/Wall Street Journal
db_ipi	Investor Protection Index (0-10)	Doing Business database, various editions from 2003 to 2008: World Bank (2004, 2005, 2006a; 2006b, 2008)
Cpi	Average score of the Corruption Perception Index on a scale from 0 (most corrupt) to 10 (least corrupt)	Transparency International
Democrati1	Democracy Political rights index (Freedom House) values ranging between 1 (more	Freedom House (available at: <a href="http://freedomhouse.org/template.cfm?page=1">freedomhouse.org/template.cfm?page=1</a> )

	freedom) and 7 (least freedom)	
Polity2	Democracy (-10) to (+10) PolityIV index	PolityIV
Lgni	Income per capita (log) (in logarithm)	Africa Development Indicators (2009)
Lgpui	Gross fixed capital formation in the public sector (in logarithm)	Africa Development Indicators (2009)
Inflation	Rate of inflation (using the index of consumer prices)	Africa Development Indicators(2009)
Centre	Dummy indicating the countries of the region of central Africa	
North	Dummy indicating the countries of the region of North Africa	
East	Dummy indicating the countries of the region of east Africa	
West	Dummy indicating the countries of the region of West Africa	
South	Dummy indicating the countries of the region of South region of Africa	

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## AppendixB: Estimations

Appendix tableB1: Descriptivestatistics

Variables	Obs.	Mean	Std. Dev.	Min.	Max.
Private sector and growth indicators					
Lgpri	671	1,832	0,676	-2,302	3,412
Ldcps	714	2,457	1,238	-4,126	5,08
Fdim	700	425,643	1 383,362	-1 303,86	18 741,48
reel_gdp	700	4,797	7,592	-31,3	106,28
Institutional reforms indicators					
Dbreform	306	0,458	0,499	0	1
Dbnbref	306	0,922	1,343	0	7
Economicf	644	53,232	8,301	23,659	72,558
db_ipi	306	4,513	1,244	2	8
Institutional variables					
Cpi	417	3,036	1,091	0,7	6,4
democrati1	686	4,528	1,815	1	7
polity2	672	0,481	5,246	-9	10
Other variables (control)					
Lgni	714	6,333	1,092	4,382	9,462
Lgpui	683	2,355	0,744	-1,300	4,722
Inflation	616	25,066	203,169	-14,548	4 145,107
Other variables ( <i>dummies</i> )					
Centre	714	0,137	0,344	0	1
North	714	0,098	0,298	0	1
East	714	0,216	0,412	0	1
West	714	0,314	0,464	0	1
South	714	0,235	0,424	0	1

Source: author's estimations.

Appendix table B2: Private investment, all Africa

	FE	IV-GMM	IV-GMM	FE	IV-GMM	IV-GMM
Dbreform	0.022 (0.57)	0.612 (1.87)*	0.832 (2.82)***			
Lefi	-0.084 (0.26)	-0.285 (0.46)	-0.795 (1.42)	-0.111 (0.34)	-0.362 (0.68)	-0.573 (1.39)
Cpi	0.141 (3.08)***	0.293 (4.85)***	0.313 (5.65)***	0.141 (3.09)***	0.290 (5.51)***	0.283 (5.97)***
democrati1	0.097 (2.22)**	-0.055 (1.43)	-0.037 (1.10)	0.098 (2.26)**	-0.099 (3.83)***	-0.083 (3.75)***
db_ipi	0.019 (0.56)	-0.051 (1.29)	-0.025 (0.61)	0.017 (0.51)	-0.079 (2.53)**	-0.084 (2.98)***
Lgni	0.008 (0.08)	-0.094 (1.63)	-0.053 (1.02)	-0.010 (0.10)	-0.122 (2.65)***	-0.101 (2.79)***
Lgpui	-0.122 (1.62)	-0.214 (2.62)***	-0.199 (2.34)**	-0.124 (1.66)*	-0.222 (3.26)***	-0.207 (3.20)***
Ldcps	0.477 (4.45)***	-0.023 (0.29)	0.010 (0.12)	0.483 (4.53)***	0.033 (0.47)	0.020 (0.29)
lfdi_	-0.002 (0.10)	0.036 (1.38)	0.028 (1.20)	-0.005 (0.22)	0.056 (2.78)***	0.049 (2.94)***
Dbnbref				0.017 (1.15)	0.034 (0.43)	0.201 (2.55)**
_cons	0.399 (0.29)	3.371 (1.48)	4.672 (2.27)**	0.614 (0.44)	4.247 (2.22)**	4.752 (3.19)***
$R^2$	0.19	-0.02	-0.32	0.19	0.30	0.03
$N$	242	201	201	242	201	201

Notes: t statistics in parenthesis ; FE : OLSfixed effects;IV-GMM.

\*  $p < 0.1$ , significant at 10%; \*\*  $p < 0.05$ , significant at 5%; \*\*\*  $p < 0.01$  significant at 1%.

Source: author's estimations.



Appendix table B3: Private investment, Francophone areas

	FE	IV-GMM	IV-GMM	FE	IV-GMM	IV-GMM
Dbreform	0.012 (0.27)	-0.112 (0.44)	0.244 (0.87)			
Lefi	-0.687 (1.32)	0.295 (0.32)	0.475 (0.61)	-0.706 (1.35)	0.212 (0.23)	0.595 (0.75)
Cpi	0.184 (4.07)***	0.287 (5.10)***	0.308 (6.11)***	0.184 (4.05)***	0.305 (5.02)***	0.283 (5.23)***
democrati1	0.043 (0.98)	-0.120 (3.45)***	-0.101 (3.19)***	0.042 (0.96)	-0.118 (3.80)***	-0.108 (4.16)***
db_ipi	-0.026 (0.69)	-0.125 (2.28)**	-0.106 (2.11)**	-0.026 (0.69)	-0.116 (2.50)**	-0.127 (3.18)***
Lgni	-0.053 (0.41)	-0.100 (1.49)	-0.105 (2.32)**	-0.060 (0.46)	-0.106 (1.55)	-0.116 (2.71)***
Lgpui	-0.159 (2.09)**	-0.164 (1.99)**	-0.204 (2.62)***	-0.158 (2.08)**	-0.162 (1.99)**	-0.214 (2.65)***
Ldcps	0.597 (4.90)***	-0.024 (0.35)	0.004 (0.06)	0.600 (4.91)***	-0.003 (0.03)	0.000 (0.00)
lfdi_	0.006 (0.23)	0.036 (1.33)	0.025 (1.03)	0.004 (0.17)	0.040 (1.48)	0.029 (1.27)
Dbnbref				0.007 (0.40)	-0.064 (0.78)	0.083 (0.87)
_cons	3.191 (1.38)	1.948 (0.60)	0.890 (0.32)	3.314 (1.41)	2.149 (0.66)	0.740 (0.26)
$R^2$	0.26	0.35	0.30	0.26	0.32	0.32
$N$	157	134	134	157	134	134

Notes: t statistics in parenthesis ; FE : OLS fixed effects; IV-GMM.

\*  $p < 0.1$ , significant at 10%; \*\*  $p < 0.05$ , significant at 5%; \*\*\*  $p < 0.01$  significant at 1%.

Source: author's estimations.

Appendix table B4: Private investment,Anglophone areas

	FE	IV-GMM	IV-GMM	FE	IV-GMM	IV-GMM
Dbreform	-0.027 (0.35)	0.787 (2.04)**	1.024 (2.49)**			
Lefi	0.235 (0.47)	-1.345 (1.87)*	-1.284 (2.49)**	0.122 (0.24)	-1.297 (2.01)**	-1.565 (3.22)***
Cpi	-0.073 (0.47)	0.684 (3.88)***	0.695 (4.28)***	-0.049 (0.31)	0.723 (4.35)***	0.882 (5.52)***
democrati1	0.284 (2.53)**	0.104 (1.15)	0.088 (1.18)	0.300 (2.63)**	0.128 (1.32)	0.194 (2.35)**
db_ipi	0.153 (2.31)**	-0.009 (0.14)	-0.054 (0.74)	0.144 (2.14)**	-0.017 (0.32)	-0.070 (1.19)
Lgni	0.255 (1.34)	-0.204 (2.14)**	-0.179 (1.86)*	0.193 (1.03)	-0.256 (2.94)***	-0.296 (3.36)***
Lgpui	0.065 (0.29)	-0.153 (0.67)	-0.257 (1.66)*	-0.010 (0.04)	-0.015 (0.06)	0.111 (0.56)
Ldcps	0.290 (1.27)	0.348 (2.03)**	0.309 (2.09)**	0.318 (1.41)	0.352 (2.44)**	0.377 (2.89)***
lfdi_	0.011 (0.22)	0.022 (0.41)	0.007 (0.12)	0.009 (0.18)	0.048 (1.15)	0.043 (1.08)
dbnbref				0.020 (0.64)	0.239 (1.68)*	0.381 (2.64)***
_cons	-3.216 (1.33)	5.427 (2.51)**	5.544 (3.14)***	-2.356 (0.99)	5.076 (2.83)***	5.404 (4.02)***
$R^2$	0.27	-0.17	-0.61	0.28	0.22	-0.29
$N$	85	67	67	85	67	67

Notes: t statistics in parenthesis ; FE : OLSfixed effects;IV-GMM.

\*  $p<0.1$ , significant at 10%;\*\*  $p<0.05$ ,significant at 5%; \*\*\*  $p<0.01$  significant at 1%.

Source: author's estimations.

Appendix table B5: Credit to private sector,all Africa

	FE	FE1	RE1	IV- GMM1	IV- GMMR	FE1	FE2	IV- GMM2	IV- GMMR
dbreform	0.091 (3.13)* **	-0.034 (1.25)	-0.025 (0.92)	0.869 (2.03)**	0.776 (2.18)**				
economicf	0.022 (3.73)* **	0.024 (4.47)** *	0.025 (4.61)** *	0.094 (3.74)** *	0.118 (5.06)** *	0.021 (3.59)** *	0.025 (5.02)** *	0.108 (4.39)** *	0.125 (5.10)** *
cpi		-0.081 (2.25)**	-0.075 (2.09)**	-0.004 (0.04)	-0.027 (0.27)		-0.070 (1.95)*	-0.039 (0.41)	-0.076 (0.69)
polity2		0.037 (2.91)** *	0.041 (3.43)** *	-0.015 (0.99)	-0.013 (1.07)		0.041 (3.16)** *	-0.008 (0.63)	-0.008 (0.66)
inflation		0.002 (0.69)	0.001 (0.66)	0.021 (2.37)** *	0.031 (4.08)** *			0.024 (2.72)** *	0.031 (3.88)** *
lgni		0.401 (6.75)** *	0.375 (6.59)** *	0.284 (3.70)** *	0.270 (3.71)** *		0.420 (7.59)** *	0.224 (2.75)** *	0.227 (2.96)** *
lgpri		0.213 (4.42)** *	0.205 (4.21)** *	-0.184 (1.80)*	-0.200 (1.91)*		0.177 (3.78)** *	-0.204 (2.00)**	-0.195 (1.86)*
lgpui		0.284 (5.07)** *	0.266 (4.75)** *	-0.266 (2.30)**	-0.367 (2.85)** *		0.258 (4.97)** *	-0.308 (2.68)** *	-0.394 (3.14)** *
lfdi_		-0.007 (0.42)	-0.013 (0.83)	-0.083 (2.66)** *	-0.078 (2.00)**		-0.011 (0.70)	-0.077 (2.57)**	-0.075 (1.95)*
Centre			-1.811 (3.29)** *	-0.549 (2.78)** *	-0.459 (2.30)**			-0.508 (2.55)**	-0.468 (2.44)**
East			-1.006 (1.80)*	-0.045 (0.23)	-0.056 (0.31)			-0.142 (0.71)	-0.140 (0.70)
South			-0.946 (1.81)*	-0.185 (0.99)	-0.258 (1.82)*			-0.255 (1.50)	-0.314 (2.46)**
West			-0.733 (1.41)						
North				0.649 (3.29)** *	0.739 (3.90)** *			0.660 (3.40)** *	0.717 (3.68)** *
dbnbref						0.030 (2.58)**	-0.019 (1.85)*	0.255 (2.15)**	0.204 (1.65)*

_cons	1.323 (4.19)* **	-2.353 (4.67)** *	-1.227 (1.79)*	-3.387 (3.49)** *	-4.358 (4.62)** *	1.370 (4.31)** *	-2.376 (5.10)** *	-3.382 (3.55)** *	-4.053 (4.27)** *
$R^2$	0.10	0.52		0.47	0.42	0.08	0.50	0.48	0.47
$N$	276	229	229	211	211	276	246	211	211

Notes: t statistics in parenthesis ; FE(RE) : OLSfixed effects(Random effects);IV-GMM(R): GMM(Robust).

\*  $p < 0.1$ , significant at 10%; \*\*  $p < 0.05$ , significant at 5%; \*\*\*  $p < 0.01$  significant at 1%.

Source: author's estimations.

Appendix table B6: Credit to the private sector, Francophone areas

	FE	FE1	RE1	IV- GMM1	IV- GMMR	FE1	FE2	IV- GMM2	IV- GMMR
Dbreform	0.112 (3.04)* **	-0.001 (0.02)	0.010 (0.28)	0.685 (1.44)	0.365 (0.94)				
economicf	0.019 (2.17)* *	0.021 (2.88)** *	0.023 (2.97)** *	0.052 (1.55)	0.084 (2.93)** *	0.017 (1.90)*	0.025 (3.71)** *	0.050 (1.56)	0.068 (2.39)**
cpi		-0.087 (2.32)**	-0.080 (2.04)**	0.048 (0.57)	0.089 (1.00)		-0.082 (2.19)**	-0.045 (0.47)	0.015 (0.15)
polity2		0.045 (3.57)** *	0.050 (3.81)** *	0.004 (0.24)	0.007 (0.47)		0.049 (3.81)** *	0.008 (0.48)	0.014 (0.81)
inflation		0.006 (1.44)	0.005 (1.24)	-0.009 (0.52)	0.005 (0.32)			-0.007 (0.50)	-0.003 (0.22)
lgni		0.284 (3.32)** *	0.272 (3.33)** *	0.250 (2.77)** *	0.197 (2.52)** *		0.302 (3.46)** *	0.237 (2.52)**	0.181 (2.45)**
lgpri		0.307 (5.45)** *	0.298 (5.03)** *	-0.405 (3.34)** *	-0.372 (3.49)** *		0.285 (5.09)** *	-0.377 (3.10)** *	-0.380 (3.43)** *
lgpui		0.358 (6.29)** *	0.355 (5.97)** *	0.105 (0.89)	-0.001 (0.01)		0.339 (6.51)** *	0.106 (0.89)	0.079 (0.66)
lfdi_		-0.042 (2.39)** *	-0.053 (2.91)** *	-0.099 (2.07)**	-0.071 (1.38)		-0.044 (2.42)**	-0.157 (2.35)**	-0.117 (1.75)*
Centre			0.316 (0.50)	-0.736 (3.81)** *	-0.691 (3.95)** *			-0.666 (3.11)** *	-0.633 (3.42)** *
North			1.987 (2.94)** *	0.813 (3.59)** *	0.710 (3.09)** *			0.960 (3.59)** *	0.906 (3.05)** *
South			0.836 (1.12)	0.081 (0.23)	-0.278 (0.95)			-0.007 (0.02)	-0.204 (0.77)
West			1.030 (1.70)*						
East				0.485 (1.87)*	0.535 (1.80)*			-0.001 (0.00)	0.219 (0.48)
dbnbref						0.027 (1.86)*	-0.004 (0.35)	0.301 (1.89)*	0.207 (1.31)
_cons	1.387	-1.613	-2.458	-1.350	-2.579	1.525	-1.851	-0.665	-1.435

	(2.93)* **	(2.16)**	(3.04)** *	(1.05)	(2.24)**	(3.18)** *	(2.47)**	(0.46)	(1.01)
$R^2$	0.09	0.61		0.72	0.74	0.05	0.56	0.68	0.72
$N$	168	145	145	139	139	168	156	139	139

Notes: t statistics in parenthesis; FE(RE) : OLS fixed effects(Random effects);IV-GMM(R): GMM.(Robust)

\*  $p<0.1$ , significant at 10%;\*\*  $p<0.05$ ,significant at 5%; \*\*\*  $p<0.01$  significant at 1%.

Source: author's estimations.

Appendix table B7: Credit to the private sector, Anglophone areas

	FE	FE1	RE1	IV- GMM1	IV- GMMR	FE1	FE2	IV- GMM2	IV- GMMR
dbreform	0.058 (1.19)	-0.055 (1.17)	-0.057 (1.31)	-0.465 (1.34)	-0.578 (2.20)**				
economicf	0.025 (3.04) ***	0.016 (1.46)	0.017 (1.71)*	0.123 (3.17)** *	0.110 (3.73)** *	0.024 (2.97)** *	0.018 (2.18)**	0.115 (2.46)**	0.136 (3.11)** *
cpi		-0.131 (1.33)	-0.127 (1.42)	0.046 (0.22)	0.129 (0.85)		-0.101 (1.04)	-0.145 (0.56)	-0.185 (0.75)
polity2		0.063 (1.71)*	0.052 (1.76)*	0.070 (3.17)** *	0.076 (4.30)** *		0.083 (2.13)**	0.100 (3.42)** *	0.106 (4.04)** *
inflation		-0.000 (0.15)	-0.000 (0.11)	0.023 (2.09)**	0.028 (3.33)** *			0.018 (1.32)	0.029 (2.21)**
lgni		0.430 (4.82)** *	0.436 (5.26)** *	0.286 (1.98)**	0.291 (2.78)** *		0.440 (5.13)** *	0.531 (2.56)**	0.410 (2.28)**
lgpri		0.052 (0.65)	0.054 (0.73)	0.209 (1.42)	0.124 (1.07)		0.006 (0.08)	0.402 (2.01)**	0.437 (2.11)**
lgpui		-0.034 (0.23)	-0.021 (0.15)	-0.940 (3.57)** *	-0.963 (4.81)** *		-0.146 (1.09)	-0.963 (2.97)** *	-1.086 (4.45)** *
lfdi_		0.083 (2.68)** *	0.083 (2.87)** *	0.023 (0.39)	0.019 (0.45)		0.061 (2.14)**	0.005 (0.08)	0.028 (0.52)
East			2.794 (2.10)**	-0.142 (0.52)	-0.061 (0.25)			-0.181 (0.55)	-0.413 (1.29)
South			2.245 (1.76)*	-0.303 (1.36)	-0.301 (1.86)*			-0.674 (2.12)**	-0.646 (2.37)**
West			2.564 (1.86)*						
dbnbref						0.037 (1.76)*	-0.020 (1.05)	-0.459 (2.49)**	-0.387 (2.11)**
_cons	1.295 (2.94) ***	-1.365 (1.39)	-3.784 (2.38)**	-4.265 (3.00)** *	-3.598 (3.54)** *	1.332 (3.05)** *	-1.088 (1.36)	-4.657 (2.70)** *	-4.917 (2.75)** *
R <sup>2</sup>	0.12	0.58		0.55	0.52	0.13	0.57	0.31	0.33
N	108	84	84	72	72	108	90	72	72

Notes: t statistics in parenthesis ; FE(RE) : OLSfixed effects(Random effects);IV-GMM(R): GMM(Robust).

\*  $p < 0.1$ , significant at 10%; \*\*  $p < 0.05$ , significant at 5%; \*\*\*  $p < 0.01$  significant at 1%.

Source: author's estimations.

Appendix table B8: FDI (% of GDP), allAfrica

	Lfdigdp	lfdigdp	Lfdigdp	lfdigdp	Lfdigdp	IV-GMM	IV-GMM
dbreform	0.300 (2.63)***	0.416 (3.36)***	0.221 (1.95)*	0.207 (1.68)*	0.130 (1.16)	2.669 (2.30)**	3.155 (2.97)***
lefi	-2.458 (2.52)**	-1.930 (1.94)*	-0.825 (0.77)	-0.977 (0.87)	-0.654 (0.68)	-5.443 (1.11)	-2.860 (0.57)
lgni		-0.571 (2.29)**		-0.278 (0.96)	0.161 (1.04)	0.289 (1.68)*	0.267 (1.63)
inflation			0.012 (1.25)	0.005 (0.50)	0.011 (1.08)	-0.022 (0.65)	-0.008 (0.24)
db_ipi			0.032 (0.30)			0.422 (2.22)**	0.358 (2.06)**
ldcps				0.057 (0.18)	-0.437 (2.83)***	-0.636 (1.59)	-0.799 (1.97)**
lgpri				0.063 (0.28)	0.225 (1.20)	0.691 (2.36)**	0.572 (1.89)*
lgpui				0.788 (3.24)***	0.877 (4.75)***	1.093 (2.84)***	0.889 (2.12)**
Centre					1.140 (1.82)*		
North					1.323 (1.89)*		
South					1.042 (1.82)*		
West					1.035 (1.99)**		
cpi						0.086 (0.42)	0.041 (0.22)
polity2						-0.155 (3.80)***	-0.168 (4.63)***
_cons	10.406 (2.69)***	11.963 (3.07)***	3.705 (0.86)	4.066 (0.83)	-0.286 (0.08)	14.927 (0.85)	6.030 (0.34)
$R^2$	0.05	0.08	0.03	0.10		-0.27	-0.49
$N$	260	260	243	236	236	211	211

Notes: t statistics in parenthesis ; FE : OLSfixed effects;IV-GMM: GMM.

\*  $p < 0.1$ , significant at 10%; \*\*  $p < 0.05$ , significant at 5%; \*\*\*  $p < 0.01$  significant at 1%.

Source: author's estimations.



Appendix table B9: FDI (% of GDP), Francophone areas

	Lfdigdp	lfdigdp	Lfdigdp	lfdigdp	Lfdigdp	IV-GMM	IV-GMM
dbreform	0.388 (2.74)***	0.383 (2.36)**	0.369 (2.35)**	0.282 (1.67)*	0.271 (1.78)*	4.209 (2.24)**	5.954 (4.07)***
lefi	1.022 (0.59)	1.042 (0.59)	0.950 (0.48)	1.861 (0.91)	0.058 (0.04)	-5.648 (0.94)	-7.708 (1.41)
lgni		0.024 (0.06)		0.200 (0.46)	0.234 (1.20)	0.318 (1.27)	0.262 (1.11)
inflation			0.010 (0.46)	0.004 (0.19)	0.013 (0.68)	-0.082 (1.59)	-0.113 (2.41)**
db_ipi			0.243 (1.78)*			0.813 (2.10)**	1.012 (3.28)***
ldcps				-0.639 (1.46)	-0.699 (4.26)***	-1.048 (2.89)***	-1.159 (3.31)***
lgpri				0.072 (0.23)	0.154 (0.63)	0.354 (0.83)	0.161 (0.39)
lgpui				0.975 (3.31)***	0.876 (4.10)***	1.084 (2.84)***	1.151 (3.28)***
Centre					-0.610 (0.93)		
East					-2.823 (3.47)***		
South					-0.593 (0.82)		
West					-0.554 (0.97)		
cpi						0.291 (0.97)	0.405 (1.84)*
polity2						-0.130 (2.11)**	-0.157 (3.11)***
_cons	-3.620 (0.52)	-3.854 (0.49)	-4.491 (0.58)	-9.272 (1.02)	-1.377 (0.23)	14.186 (0.69)	21.316 (1.13)
R <sup>2</sup>	0.05	0.05	0.07	0.13		-0.62	-1.88
N	164	164	153	152	152	139	139

Notes: t statistics in parenthesis ; FE : OLSfixed effects;IV-GMM:

\*  $p < 0.1$ , significant at 10%; \*\*  $p < 0.05$ , significant at 5%; \*\*\*  $p < 0.01$  significant at 1%.

Source: author's estimations.

Appendix tableB10: FDI (% of GDP), Anglophone areas

	lfdigdp	lfdigdp	Lfdigdp	lfdigdp	lfdigdp	IV-GMM	IV-GMM
dbreform	0.209 (1.10)	0.354 (1.81)*	0.016 (0.10)	0.135 (0.73)	0.019 (0.11)	-0.293 (0.35)	-0.391 (0.53)
lefi	-3.848 (3.23)***	-2.561 (1.98)*	-2.679 (1.80)*	-3.796 (2.35)**	-3.125 (2.24)**	-17.934 (3.73)***	-21.901 (6.10)***
lgni		-0.759 (2.24)**		-0.930 (2.43)**	-0.371 (1.17)	-0.204 (0.79)	-0.394 (1.85)*
inflation			-0.003 (0.26)	-0.013 (0.96)	-0.009 (0.71)	-0.127 (2.96)***	-0.165 (4.65)***
db_ipi			-0.318 (2.14)**			0.608 (2.50)**	0.813 (4.90)***
ldcps				1.062 (2.32)**	0.365 (0.99)	1.197 (2.10)**	1.408 (3.95)***
lgpri				0.309 (0.99)	0.387 (1.38)	0.924 (2.54)**	0.944 (3.01)***
lgpui				0.454 (0.82)	0.506 (1.21)	3.750 (3.99)***	3.974 (6.38)***
East					-3.431 (1.68)*		
South					-2.500 (1.45)		
West					-2.627 (1.32)		
cpi						-0.001 (0.00)	0.051 (0.15)
polity2						-0.355 (4.63)***	-0.391 (7.56)***
_cons	16.209 (3.44)***	15.985 (3.48)***	13.376 (2.23)**	17.993 (2.45)**	15.722 (2.51)**	59.021 (3.57)***	74.341 (5.54)***
R <sup>2</sup>	0.12	0.18	0.14	0.24		0.04	-0.35
N	96	96	90	84	84	72	72

Notes: t statistics in parenthesis ; FE : OLSfixed effects;IV-GMM.

\*  $p < 0.1$ , significant at 10%; \*\*  $p < 0.05$ , significant at 5%; \*\*\*  $p < 0.01$  significant at 1%.

Source: author's estimations.

Appendix table B11: Growth, all Africa

	FE1	FE2	IV-GMM	IV-GMM Rob	Prob FE1	Prob FE2	Prob IV- GMM	Prob GMM Rob
dbnbref	0.019 (0.63)	0.035 (0.97)	0.144 (1.58)	0.128 (1.83)*				
lefi	2.234 (3.55) ***	2.131 (2.38)**	3.934 (2.12)**	3.544 (2.21)**	2.243 (3.57)** *	2.170 (2.43)**	4.123 (2.07)**	3.655 (2.17)**
cpi	- 0.138 (1.46)	-0.039 (0.34)	-0.098 (0.44)	-0.124 (0.60)	-0.139 (1.47)	-0.041 (0.36)	-0.075 (0.31)	-0.102 (0.48)
democrati1	0.206 (1.85) *	0.214 (1.68)*	-0.117 (1.23)	-0.116 (1.46)	0.206 (1.85)*	0.205 (1.62)	-0.121 (1.21)	-0.117 (1.42)
lgni		-0.490 (2.01)**	-0.221 (1.31)	-0.275 (1.78)*		-0.474 (1.95)*	-0.218 (1.26)	-0.279 (1.76)*
lfdigdp		0.053 (0.91)	0.868 (2.35)**	0.944 (2.80)***		0.058 (1.00)	0.896 (2.32)**	0.974 (2.79)***
ldcps		0.276 (0.96)	-0.523 (1.18)	-0.355 (0.96)		0.252 (0.89)	-0.528 (1.14)	-0.353 (0.93)
lgpri		-0.069 (0.37)	0.956 (1.57)	0.962 (1.68)*		-0.051 (0.27)	0.916 (1.44)	0.936 (1.60)
lgpui		0.084 (0.44)	-0.615 (1.47)	-0.782 (2.02)**		0.089 (0.46)	-0.651 (1.48)	-0.836 (2.04)**
inflation		-0.014 (1.84)*	0.008 (0.60)	0.003 (0.21)		-0.014 (1.82)*	0.010 (0.69)	0.003 (0.23)
dbreform					0.041 (0.54)	0.078 (0.82)	0.240 (1.05)	0.250 (1.16)
_cons	- 7.882 (3.10) ***	-5.326 (1.38)	-11.833 (2.09)**	-9.843 (1.83)*	-7.919 (3.12)** *	-5.539 (1.44)	-12.476 (2.06)**	-10.148 (1.82)*
$R^2$	0.08	0.13	-3.38	-3.44	0.08	0.13	-3.59	-3.67
$N$	248	216	216	216	248	216	216	216

Notes: t statistics in parenthesis ; FE : OLSfixed effects;IV-GMM.

\*  $p<0.1$ , significant at 10%;\*\*  $p<0.05$ ,significant at 5%; \*\*\*  $p<0.01$  significant at 1%.

Source: author's estimations.

Appendix table B12: Growth, Francophone areas

	FE1	FE2	IV-GMM	IV-GMM Rob	Prob FE1	Prob FE2	Prob IV- GMM	Prob GMM Rob
dbnbref	0.021 (0.49)	0.046 (0.84)	0.102 (0.66)	0.100 (0.76)				
lefi	2.954 (2.01) **	4.095 (2.16)**	3.535 (1.10)	3.551 (1.43)	2.980 (2.02)**	4.241 (2.24)**	3.895 (1.08)	3.863 (1.43)
cpi	- 0.165 (1.28)	-0.175 (1.11)	0.103 (0.17)	0.166 (0.32)	-0.164 (1.27)	-0.171 (1.08)	0.172 (0.23)	0.225 (0.38)
democrati1	0.272 (1.78) *	0.269 (1.52)	-0.073 (0.49)	-0.086 (0.77)	0.275 (1.78)*	0.264 (1.49)	-0.075 (0.48)	-0.087 (0.76)
lgni		-0.593 (1.46)	0.195 (0.75)	0.141 (0.76)		-0.531 (1.35)	0.207 (0.77)	0.154 (0.78)
lfdigdp		0.049 (0.58)	0.103 (0.24)	0.091 (0.24)		0.061 (0.74)	0.078 (0.17)	0.071 (0.18)
ldcps		-0.058 (0.13)	-1.162 (1.28)	-1.119 (1.48)		-0.096 (0.22)	-1.231 (1.19)	-1.182 (1.38)
lgpri		0.163 (0.53)	2.177 (2.01)**	2.019 (2.30)**		0.186 (0.61)	2.122 (1.81)*	1.987 (2.20)**
lgpui		0.163 (0.62)	0.362 (0.90)	0.333 (0.81)		0.171 (0.65)	0.370 (0.89)	0.342 (0.78)
inflation		-0.017 (0.92)	0.007 (0.21)	0.003 (0.10)		-0.018 (0.94)	0.008 (0.22)	0.004 (0.11)
dbreform					0.028 (0.24)	0.089 (0.61)	0.219 (0.44)	0.219 (0.49)
_cons	- 11.17 7 (1.89) *	-12.314 (1.48)	-16.238 (1.48)	-15.817 (1.84)*	-11.291 (1.91)*	-13.259 (1.62)	-17.673 (1.42)	-17.111 (1.79)*
$R^2$	0.06	0.12	-3.95	-3.49	0.06	0.12	-4.14	-3.70
$N$	154	139	139	139	154	139	139	139

Notes: t statistics in parenthesis ; FE : OLSfixed effects; IV-GMM.

\*  $p < 0.1$ , significant at 10%; \*\*  $p < 0.05$ , significant at 5%; \*\*\*  $p < 0.01$  significant at 1%.

Source: author's estimations.

Appendix table B13: Growth, Anglophone areas

	FE1	FE2	IV-GMM	IV-GMM Rob	Prob FE1	Prob FE2	Prob IV- GMM	Prob GMM Rob
dbnbref	0.008 (0.26)	0.042 (1.24)	0.022 (0.32)	0.010 (0.16)				
lefi	2.001 (4.63) ***	0.936 (1.22)	3.272 (2.26)**	3.248 (2.19)**	1.944 (4.54)** *	0.831 (1.09)	3.070 (2.25)**	2.927 (2.10)**
cpi	-0.074 (0.64)	0.234 (1.26)	-0.714 (3.53)** *	-0.704 (4.00)***	-0.089 (0.77)	0.202 (1.12)	-0.682 (3.62)***	-0.637 (3.66)***
democrati1	0.015 (0.11)	0.086 (0.65)	-0.322 (2.71)** *	-0.314 (3.96)***	0.014 (0.11)	0.053 (0.42)	-0.287 (2.63)***	-0.267 (3.39)***
lgni		-0.386 (1.71)*	0.013 (0.14)	0.022 (0.26)		-0.466 (2.00)*	0.008 (0.09)	0.008 (0.10)
lfdigdp		0.041 (0.67)	0.305 (1.86)*	0.262 (1.93)*		0.031 (0.51)	0.309 (1.98)**	0.253 (1.89)*
ldcps		0.350 (1.24)	-0.630 (2.01)**	-0.714 (2.67)***		0.399 (1.43)	-0.589 (1.99)**	-0.663 (2.73)***
lgpri		-0.191 (1.25)	1.136 (3.52)** *	1.296 (5.12)***		-0.158 (1.06)	1.060 (3.51)***	1.149 (4.61)***
lgpui		-0.033 (0.13)	-1.146 (3.17)** *	-1.137 (3.93)***		-0.106 (0.42)	-1.097 (3.23)***	-1.063 (3.84)***
inflation		-0.018 (3.00)** *	0.003 (0.30)	0.001 (0.11)		-0.018 (3.04)** *	0.004 (0.35)	0.002 (0.16)
dbreform					0.072 (1.01)	0.151 (1.75)*	0.276 (1.80)*	0.248 (1.90)*
_cons	-6.038 (3.42) ***	-0.695 (0.20)	-6.335 (1.48)	-6.443 (1.24)	-5.791 (3.28)** *	0.444 (0.12)	-5.921 (1.47)	-5.564 (1.13)
R <sup>2</sup>	0.24	0.44	-0.64	-0.78	0.25	0.46	-0.47	-0.47
N	94	77	77	77	94	77	77	77

Notes: t statistics in parenthesis ; FE : OLSfixed effects;IV-GMM.

\*  $p < 0.1$ , significant at 10%; \*\*  $p < 0.05$ , significant at 5%; \*\*\*  $p < 0.01$  significant at 1%.

Source: author's estimations.

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