

Economic Growth in Guinea and How to Accelerate It

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Abstract

This paper addresses two main questions: (1) What are the binding constraints to Guinea's economic growth? and (2) What would it take to accelerate growth in the country? Using the growth diagnostic approach, the paper finds three binding constraints to growth: (i) lack of good infrastructure (roads and electricity), (ii) low access to finance, and (iii) poor governance. Simulation results highlight the need for total factor productivity growth for higher gross domestic product growth rates over the medium term. Specifically, Guinea needs 1 to 2 percent total factor

productivity growth to maintain 5 to 7 percent gross domestic product growth, with a 16 to 21 percent investment rate by 2020. The lower bound of the range of the investment rate is similar to Guinea's experience in the past decade; the upper bound is slightly superior to the country's recent performance. The paper discusses some of the policy options to consider to address the key binding constraints to economic growth as well as to overcome the challenge of increasing total factor productivity growth in Guinea.

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1. Introduction

Guinea has rich natural resource endowments, especially in mining, agriculture and hydropower. It has almost the two-thirds of world reserves of bauxite, as well as large reserves of iron ore, gold, diamonds, uranium, and some 20 other minerals. Guinea has one of the largest unexploited iron deposits known in the world, in the Simandou mountains. The country's water potential is estimated at 27,000 m³ per capita and per year. Large rivers such as the Niger, Senegal and Gambia have their source in Guinea, making the country the "water tower" of West Africa. With such important endowment of water resources, Guinea can develop a hydroelectric potential estimated at more than 6,000 megawatts. Moreover, Guinea's huge agricultural potential remains largely unexploited. Of 6.2 million hectares of arable land, only 25 percent is farmed and of 364,000 hectares for irrigation potential, less than 10 percent is developed.

Despite its enormous potential, Guinea remains one of the poorest countries in the world. Guinea's GDP per capita is estimated at US\$531 (2015), and with a Human Development Index of 0.414, the country was ranked 183th of 185 countries in 2016 (UNDP, 2016). Moreover, poverty has increased from 49 percent (national poverty line) in 2002 to 55 percent in 2012. After the Ebola crisis, poverty has probably further increased in the country.

Lack of economic growth largely explains the paradox between rich natural resources endowments and the low level of human development and high level of poverty in Guinea. Indeed, since its independence in 1958, so far, the highest economic growth rate achieved by the Guinean economy is 6.3 percent and this growth peak was reached in 1988. Furthermore, since the mid-1990s, Guinea's economic growth has been lagging that of the ECOWAS sub-region.

This paper contributes to filling in the gap in growth research on Guinea. It contributes to evidence-based policy making by highlighting measures that are necessary to accelerate economic growth and poverty reduction in Guinea. More specifically, this paper contributes to the efforts aiming at understanding factors behind Guinea's slow growth rates by applying the growth diagnostic approach, developed by Hausmann, Rodrik and Velasco (2005) (HRV from now on). The HRV approach allows identifying the binding constraints to private sector-led growth that a country faces. The paper also examines prospects for Guinea's economic growth over the medium to long-term, by applying the long-term growth model developed by the World Bank. The long-term growth model allows identifying the required investment rate to achieve a target GDP growth, given the growth rate of Total Factor Productivity (TFP) and other growth fundamentals. The model also allows estimating the trajectory of the poverty headcount rate, given the economic growth rate.

The rest of the paper is organized as follows. The next section examines Guinea's economic growth trend, while highlighting political and economic circumstances that marked the country and which could contribute to a better understanding of Guinea's growth performance. Section 3 applies the HRV approach, with the objective of identifying the binding constraints to economic growth in the country. Guinea's growth prospects are examined in section 4 by applying the long-term growth model, with the objective of identifying possible growth paths and their effects on poverty, as well as the investment and TFP growth rates that are required for achieving target economic growth rates. Section 5 examines the possibility for TFP growth, which the paper has found as

fundamental for achieving a sustained and high economic growth rate over the medium-term in Guinea. Section 6 concludes the paper with policy recommendations.

2. Guinea's growth trend analysis: Political-economy and historical perspective

The analysis of Guinea's long-term growth trend uses a methodology that combines the analysis of available data and reading of existing works on the same subject to compensate for lack of data. Three main periods are distinguished: (1) from independence (1958) to 1973, (2) from 1973 to 1981, and (3) the period 1987-2015. The analysis of economic growth trend during the last period is based on data collected from the World Bank's 2017 World Development Indicators (WDI), while the analyses of the other two periods are based on existing studies, mainly a Country Economic Memorandum prepared in 1984 by the World Bank, and a policy document, *Programme Intérimaire de Redressement National 1985-1987*, prepared in 1985 by the government of Guinea. The interruption in the periods of analysis reflects the difficulty of getting regular GDP growth data for the country, especially before 1987.

2.1 Economic growth through 1973

Following its independence on October 2nd, 1958, Guinea adopted a socialist production and central planning approach to economic development. This was a shift of paradigm, as until independence, traditional small-scale individual production, mainly in agriculture dominated the economy. To implement its strategy, the government created a system of state enterprises controlling almost all the economy. In parallel, central controls were imposed for exchange policies, prices and wages. To some extent, the choice of socialist and centralized production system was the attempt of the government to fill the gap left by the abrupt disappearance of foreign capital, entrepreneurship and expertise, following the unexpected break of relation with the former colonial power, France.¹ Skills transfer between the former colonial power and the new State of Guinea did not happen. Archives were destroyed. Guinea was deprived of management experience and techniques with the departure of foreign experts that had the monopoly of such tools and skills. In such circumstances, the new State of Guinea had to create almost from the scratch a network of enterprises and public service, and a new administration.

The government's efforts to finance massive public investment needs were not successful due to difficulties to mobilize domestic savings and attracting foreign investors. Soon, Guinea faced financing difficulties, that the government had tried to overcome by increasing credit to the public sector. Rapid growth of credit led to high inflation, the erosion of national currency and rising balance of payments deficits.² The situation was cumbersome, as by 1973, the volume of exports was lower than their level before independence. Balance of payments problems led to shortage of foreign exchange and cutbacks of imports and limited activities for public manufacturing enterprises. Lack of foreign exchange for imports of spare parts and other inputs as well as for replacement investment led to the decline in productive capacity below installed capacity. Moreover, very low official producer prices, and the sharply reduced purchasing power of the

¹ Out of the 8 countries of the former *Afrique Occidentale Française* (a federation of West Africa's French former colonies), Guinea was the only that voted against the Referendum of September 28, 1958 that proposed *l'Union Française*, which was a political organization between France and its former colonies.

² Rapid growth of credit to the public sector was facilitated by the departure of Guinea from the CFA Franc Zone (the currency union for 8 Western and 6 Central francophone African countries), that Guinea left on March 1st, 1960.

country's currency left few incentives for farmers to produce beyond subsistence needs. Consequently, by 1973, Guinea's economy was in an unenviable situation. The annual GDP growth rate was only 2 percent between 1960 and 1973, which was lower than the population growth rate. The current account deficit exceeded US\$170 million (18 percent of GDP), while the resource gap reached US\$100 million, exports covering barely one-third of the country's imports. Money supply amounted to 44 percent of GDP, double that of other West African countries.

2.2 Economic growth during the period between 1973 and 1981

The period 1973-81 was marked by the opening of two mines in 1973 (*Compagnie des Bauxite de Guinée, CBG*) and 1974 (*Office des Bauxites de Kindia, OBK*), which gave a short-lived boost to economic growth. Between 1973-77, the average annual economic growth was 5.8 percent, but excluding mining, the average annual growth rate was only 2.6 percent, which was below the average population growth rate during that period. Over the period 1973-81, mining was the driver of economic growth in Guinea, but by 1977 the sector reached its maximum level of production. In addition, mining production faced difficulties because of the 1980s international commodities crisis, and operating problems (transport and power supply with OBK). Consequently, from 1977, the average annual growth rate was 0.7 percent, leading to 3.2 percent average growth rate during the period 1973-81.

In addition to difficulties faced by the mining sector, a low level of productive investment and misallocation of public investment had led to slow economic growth during the period 1973-81. Guinea's investment rate was low, averaging less than 15 percent of GDP between 1973-81, compared to 16.3 percent for African low-income countries, back then. During 1975-81, Guinea had one of the few negative growth rates of investment in Africa, the other cases being countries that faced civil wars. Public investment was the main component of fixed capital formation, due to an adverse environment to private investment. Public investment was primarily guided by central development plans. Private investment was not encouraged, and a distorted price structure also contributed to the lagging private investment.

The allocation of public investment was also less efficient. For instance, during the period 1973-78, the industry sub-sector received 40 percent of public investment, mainly for the completion of the OBK mine project and the rehabilitation of industrial parastatals. Until 1980, OBK functioned well but had faced difficulties since then. The performance of the rehabilitated public industrial enterprises was poor, due to the failure to assure the input supply (domestic agricultural production or imports), deficient power supply and transport facilities, lack of foreign exchange for maintenance, poor marketing and management, and distorted price environment. Investment for rural development was neglected, efforts were concentrated on the industry sub-sector with a focus on mines. For instance, during the period 1967-71, rural development represented only 7 percent of total investment. During the period 1973-78, efforts were made in favor of rural development, which represented 27 percent of public investment. However, other supports, including spare parts for mechanized plows, inputs, trainings, and extension services for rural development were missing. Likewise, other complementary factors for rural development, such as transports were also missing. Indeed, while rural development investment increased from 7 to 27 percent between the period 1964-71 and 1973-78, that of public works and transport had declined from 33 to 15 percent over the same period.

By 1979, the government recognized the limits of its policies and had initiated a series of economic and institutional reforms. The main areas of reform were: (i) increased tolerance of private domestic trade and some encouragement of private enterprise, (ii) opening to foreign direct investment, (iii) diversification of official and private capital sources, (iv) gradual introduction of efficiency criteria and market signals in the parastatal sector, (v) exercising fiscal responsibility and restraint in government expenditure, and (vi) strengthening the country's economic management. These reforms addressed some of the most urgent problems faced by the Guinean economy, and some of them were pursued by the regime that succeeded to Sekou Touré's regime.

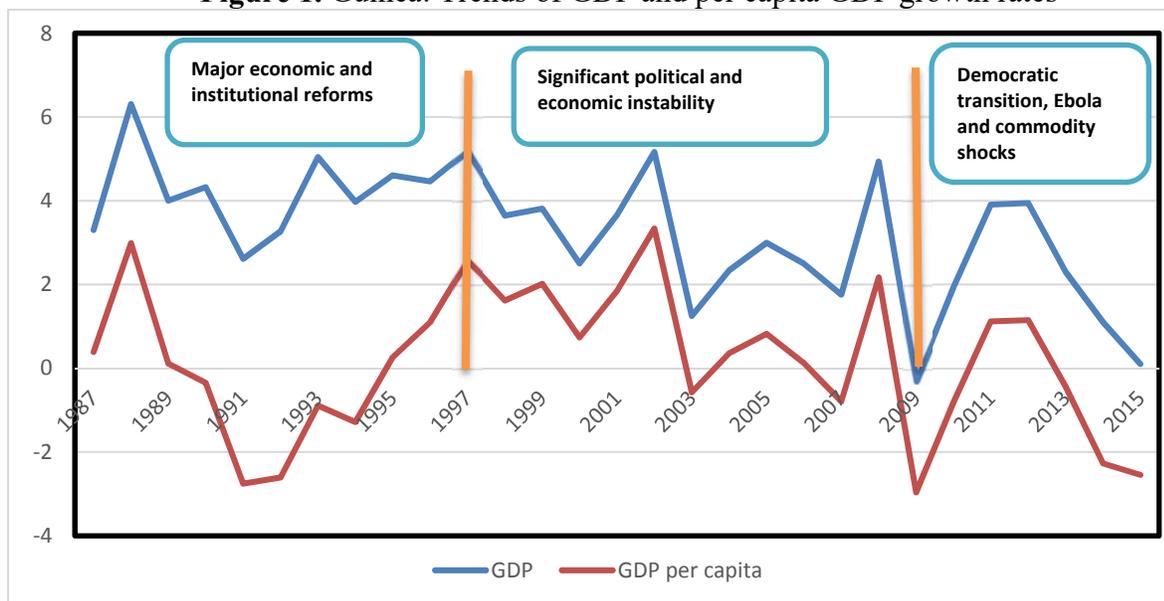
2.3 Economic growth during the period 1987-2015

During the period 1987-2015, Guinea's GDP growth rate has followed a trend that could be summarized in three main episodes. GDP per capita has followed similar trends. The first growth episode spans from 1987 to 1997, during which the average GDP growth rate was 4.3 percent. The second growth episode was a long and fluctuating, but declining growth period, when Guinea's average growth rate was 2.9 percent. The third growth episode started in 2010 and ended in 2015. During the third episode, the average growth rate was just 2.2 percent.

Each of the three identified growth episodes reflects specific circumstances that Guinea has experienced. The first growth episode was the period of major economic and institutional reforms in Guinea. In the aftermath of his seizure of power, in an address to the nation pronounced on December 22, 1986, President Conté laid out his vision for the country's development and key reforms that he planned to undertake.³ Following that address, a number of reforms were introduced to make Guinea a modern liberal economy, based on capitalism rules. The current country's currency, the Guinean franc was introduced on January 1, 1986 in replacement of the former currency, syli. Concomitantly, the new currency was devaluated by 92 percent to reflect its market value. In the same vein, private commercial banks were created, and reforms were introduced to dismantle the system of domestic price control inherited from the former socialist regime, privatization operations were organized, contributing to Guinea's nascent private sector. Reforms were also introduced to modernize public administration. To that end, a competitive test was organized for public civil servants, which has contributed to reduce their number and the public sector wage bill. On the political front, the period 1987-97 was also marked by significant reforms. A new constitution was approved in a referendum held on December 23, 1990; political parties were legalized in 1992 in preparation of upcoming elections, and the first multi-party presidential election held since independence was conducted on December 19, 1993. The decentralization process was also introduced with the creation of rural development communities in the early 1990s. The objective was to promote the involvement of the population in the management of the country's affairs, by reducing the state's role in the conduct of economic activities, redefining the role of the state in the management of economic policy and promoting private sector development. These reforms contributed to higher GDP growth rate over the period 1987-97, and Guinea's peak of GDP growth rate (6.3 percent) was achieved in 1988.

³ President Ahmed Sékou Touré, Guinea's Head of state since independence, died on March 26, 1984. Prime Minister Louis Lansana Beavogui was named interim president, pending elections to be held within 45 days. On 3 April, however, hours before the PDG (Sékou Touré's party) was to choose a new leader, Conté led a military coup d'État.

Figure 1. Guinea: Trends of GDP and per capita GDP growth rates



Source: Author's calculations based on data retrieved from the 2017 World Development Indicators.

Unlike the first growth episode, the second episode was marked by significant political and economic instability, with a loss of momentum for reforms. In the early 2000s, the size of the public sector started growing again with the increased number of civil servants, which was estimated at 94,422 employees in 2009, leading to the increase in the public sector wage bill from 3.5 to 5 percent of GDP between 2007 and 2009. Likewise, the share of the army in total wages and salaries has increased from 18 to 27.3 percent over the period 2007-09. On the political front, unexpected constitutional reforms were introduced, which have tightened the socio-political situation of the country. A referendum organized in 2001 lifted presidential term limits and extended the term in office from five to seven years. President Conté won a third presidential election held on December 21, 2003 with 95.6 percent of the vote; however, the opposition protested against the result. In addition to a challenging domestic environment, international increases in commodity and food prices further complicated the situation, as illustrated by the 2006 riots in Conakry over the prices of rice and fuel. In January 2007, a general nationwide strike was held, protesting President Conté's continued leadership of the country. The strike ended following an agreement between Conté and labor unions, according to which a new Prime Minister would be appointed as head of government. Conté also agreed to lower rice and fuel prices. While facing social and political protests, President Conté had been in declining health, and his ability to run the country was reduced, leading to mismanagement and increased corruption.

After Conté's death (on December 22, 2008), Guinea went through a military transition regime, which further increased the fragility of the country's political, economic and social situation. The military regime that took power in December 2008 was led by Dadis Camara, and abandoned fiscal control. There were no approved budgets in 2009 and 2010. Revenues stagnated but both current and capital expenditures were sharply raised. The overall fiscal deficit rose to a cumulative 21 percent of GDP over the period 2009-10, which was mostly financed by central bank and commercial bank credit, while the government also incurred external debt arrears. Due to the large monetary expansion, inflation increased, international reserves fell, and the exchange rate

depreciated rapidly. On September 28, 2009, opposition party members demonstrated in Conakry, demanding that Dadis Camara step down. The opposition's demonstration was repressed, claiming the lives of about 157 people. In response to the incident, regional and international organizations imposed sanctions on Guinea, which further isolated the country and contributed to the weak economic performance observed during the period 1997-2009.

The third growth episode was a period of hope, and was marked by the first democratic presidential election in 2010 since the country's independence, as well as important economic reforms. The 2010 election was seen as a chance to change decades of authoritarian rule, as well as to bring stability and foreign investment in Guinea. Following the 2010 election, President Condé was elected for a five-year term. Several economic reforms were introduced by Condé's regime, including the adoption of a new mining code in 2011, which clarified the rules of the game in the mining sector, contributing to the attractiveness of foreign investments in Guinea. Macroeconomic reforms were also undertaken, under the IMF ECF program, which was launched early 2012, and the country reached the HIPC completion point in September 2012, which led to significant reductions of the country's external debt level and services. Likewise, following the HIPC completion point, Guinea has started receiving budget support from its development partners. Condé's regime also undertook reforms to boost the infrastructure and agricultural sectors. The construction of a new hydropower dam (Kaléta) was completed in 2015, new roads were built across the country and a new investment program for subsidized agricultural inputs was also initiated. Coincidentally with those reforms, GDP has steadily increased from a negative growth rate (-0.3 percent) in 2009 to almost 4 percent in 2012.

However, several events and negative shocks disturbed Guinea's new economic dynamics. First, political unrest in the context of legislative elections contributed to the decline of GDP growth from almost 4 percent in 2012 to just 2.3 percent in 2013. Second, the outbreak of Ebola in early 2014 further contributed to GDP contraction. Third, the decline of commodity prices, including the prices of Guinea's main exports (bauxite, gold) aggravated the negative effect of Ebola on the economy. Consequently, from 2013, the GDP growth rate has steadily declined, and was stagnant in 2015.

3. What are the binding constraints to Guinea's economic growth?

The analysis of economic growth trends shows that Guinea is a country with slow growth rates despite large potential. The question then is what is keeping economic growth low in Guinea? To answer that question, this paper uses the HRV approach. The approach assumes that investment is the key driver of economic growth, and follows three steps: growth inquiry, hypotheses and validation. The first step reviews the existing literature and data on growth, identifies potential constraints to growth, and groups them under three types of binding constraints: (a) low social returns to production factors due to low human capital, lack of technical know-how, poor infrastructure; (b) poor private appropriability of investment return due to high taxation, poor property rights, or poor learning and coordination externalities; and (c) high financing constraints due to low savings, poor intermediation in domestic financial markets, or poor integration with external financial markets. The second step proposes at least three hypotheses about the interrelation on the binding constraints to growth, and finishes with the drafting of at least three storylines on these binding constraints. In order to achieve full formulation and refine implications,

it is essential to develop in-country consultations with officials, key economic agents, and academicians. The third step examines each hypothesis in more rigorous detail with data to determine its validity as a binding constraint. Once the diagnostic is achieved, it is possible to discuss potential policy actions to alleviate constraints identified in step three. The HRV approach is based on a decision tree, graphically summarized in Box 1 (see appendix).

Following the three steps described above, the application of the HRV approach to Guinea leads to the identification of three binding constraints to private sector-led growth: (i) lack of good infrastructure (roads and electricity), (ii) low access to finance, and (iii) poor governance. The validation of the three identified binding constraints has been tested during in-country SCD consultations, involving government officials, private sector, civil society organizations and development partners in Conakry and in the interior of the country. Several data also confirm the analysis. Indeed, of 140 countries, the *2015-16 Global Competitiveness Report* ranked Guinea the least performing country in terms of quality of infrastructure. Guinea is also poorly ranked for its quality of governance, with lower performance than the SSA average for control of corruption and property rights protection, according to the Worldwide Governance Indicators. Domestic savings is low, the financial sector is of modest size and Guinea has a limited access to international finance. More details on the analysis are provided in sub-sections below.

3.1 Does low access to finance constrain Guinea's economic growth?

Guinea's financial sector is of modest size, which limits access to finance for private investment in the country. Guinea's formal financial sector comprises 14 active commercial banks, 6 insurance companies and 17 microfinance institutions (MFIs), all of them regulated by the Central Bank of Guinea (BCRG). The majority of the commercial banks are owned by foreign private investors. In 2013, the 14 commercial banks had 109 branches, and total assets of GNF11,469 billion (US\$1.65 billion), an increase from GNF9,957 billion in 2012. Three banks (Ecobank, SGBG, BICIGUI) dominate the sector with about 73 percent of total assets. Five institutions dominate the microfinance sector: Credit Rural de Guinee (CRG), Pride, Yete Mali, CAFODEC Finances and Finadev which account for about 98 percent of loans (CRG and Yete Mali also account for around 88 percent of deposits). Aside from the five dominant MFIs, the remaining 12 entities have small membership and relatively weak institutional structures. In terms of depth and resource mobilization, private deposits provide about 82 percent of the banks' deposits, while 9 percent is equity. Most recent data (2014) suggest that the proportion of adults with a bank account in formal financial institutions is 8.5 percent for men and 3.8 percent for women. Most banking activities are concentrated in Conakry, with a few branches outside the capital. Long-term financing is virtually unavailable in the country.

In addition to a low level of financial sector development, available macroeconomic and microeconomic data also suggest that there is a limited access to finance for private investment in Guinea. A low level of domestic savings and limited access to international finance illustrate the difficulties for mobilizing financial resources for investment. Guinea's domestic savings has declined from 5.7 to -9.7 percent of GDP between 2008 and 2015. Though the recent outbreak of Ebola may have contributed to savings contraction; however, even before the Ebola crisis, Guinea's domestic savings was low and declining. Indeed, Guinea's domestic savings declined from 5.7 percent of GDP in 2008 to 1.7 percent in 2009 and further declined to -5.9 percent of

GDP in 2011. High dependency ratio, low economic growth, low deposit rate and limited job opportunities are some of the factors that contribute to the low level of domestic savings.

Not only Guinea's domestic savings is low, but the country also faces difficulties accessing international finance. Over the past years, Guinea's current balance has been in deficit. Guinea's current deficit has increased by 15.5 percent points of GDP between 2008 and 2012, when the country's current account hit a peak equivalent to 26 percent of GDP. After that, Guinea's current account deficit declined to 17.6 percent of GDP in 2014 before increasing again to 20.2 percent of GDP in 2015 in the wake of the Ebola outbreak and declining mine prices.

Along the same vein of limited access to international finance for private investment, the level of Foreign Direct Investment (FDI) inflows is also low in Guinea. FDI data show that between 1973 and 2004, Guinea has received annually less than US\$100 million of FDI. The country's FDI inflows reached the mark of \$100 million for the first time in 2005, and hit a peak of US\$956 million in 2011. Following the 2011 peak, Guinea's FDI inflows sharply declined and were estimated at US\$85 million in 2015. Compared to West African and Sub-Saharan African (SSA) countries, Guinea's FDI inflows are far below. While from 2000, most SSA countries have significantly improved their attractiveness to FDI, Guinea has not succeeded in doing so. Available data show that so far, Guinea has never attracted the equivalent of US\$1 billion of FDI per year. Thus, despite its rich endowment in natural resources, Guinea has not succeeded in attracting significant FDI flows, which limits investment in the country. A number of factors may have contributed to Guinea's low level of FDI inflows. Though in the early 1970s, the country's socialist regime had opened-up some mining projects, later on, the regime did not adopt a more positive attitude for private sector development, including for FDI. There have been several changes in the rules of the game in the mining sector, until the adoption of the new mining code in 2011, a situation which was not attractive for foreign investors. At the end of Sekou Touré's regime, Guinea went through military regimes, with several episodes of violence and instability, which are deterrent factors for FDI. Moreover, as it will be illustrated later, Guinea significantly lacks good infrastructure, which also negatively affects the country's attractiveness to FDI.⁴

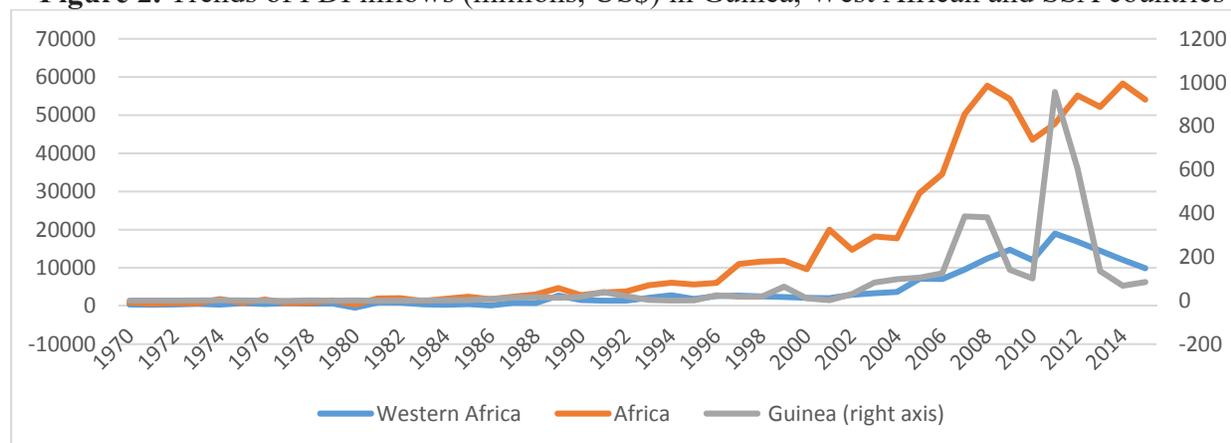
The cost of finance, as measured by the interest rate is also another macroeconomic indicator that illustrates the difficulties of having access to finance for private investors. When the interest rate is high, it becomes more expensive for investors to invest, which reduces the return to investment and limits economic growth. Available data suggest that the cost of finance, as measured by the interest rate is higher in Guinea than in comparator countries. For instance, while the average lending interest rate is 22 percent in Guinea, it is about 7 percent in WAEMU countries.

In addition to the evidence highlighted by macroeconomic data, available microeconomic data also confirm inadequate level of access to finance in Guinea. According to the *Global Competitiveness Report 2015-16* (henceforth, *GCR*), when respondents were asked from a list of factors to select the five most problematic for doing business in their country and to rank them between 1 and 5 (from most to less problematic), Guinean respondents ranked access to finance as the most problematic factor. Likewise, the *2016 World Enterprise Survey* (henceforth, *WES*) data provide several pieces of evidence, which illustrate the difficulties of having access to finance for firms in

⁴ Several studies have found that lack of infrastructure, political and policy instability, among other factors, negatively affect FDI inflows in Africa (Asiedu, 2006; Kinda, 2010; and Mijiyawa, 2015).

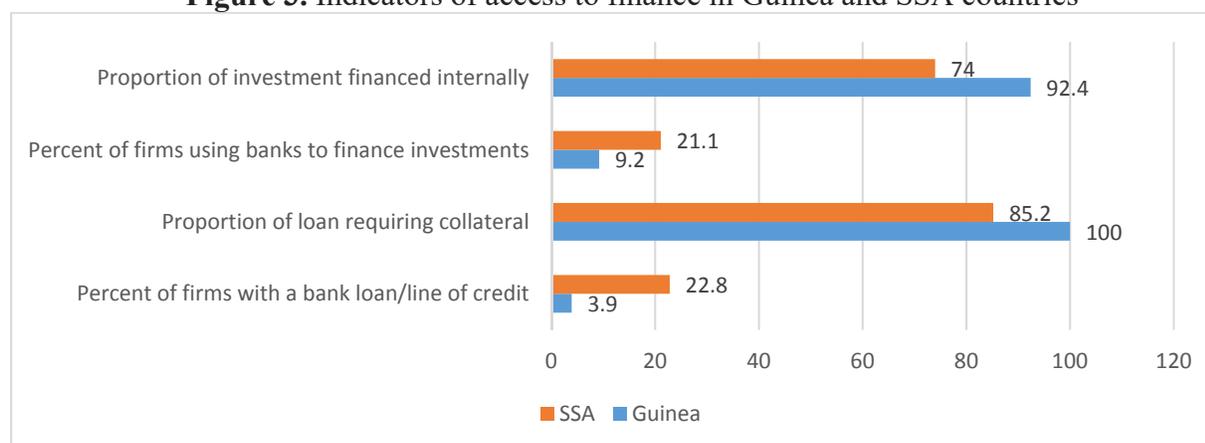
Guinea. For instance, compared to SSA countries, in Guinea, fewer firms have a bank loan/credit line (3.9 percent of firms in Guinea compared to 22.8 percent in SSA), while Guinea's firms are requested collateral for 100 percent of loans, on average, in SSA countries, a collateral is requested for only 85 percent of loans. The use of bank loans for working capital and investment is lower in Guinea, consequently the proportion of investment internally financed is higher in Guinea (92 percent) than in SSA (74 percent).

Figure 2. Trends of FDI inflows (millions, US\$) in Guinea, West African and SSA countries



Source: Author's calculations based on data retrieved from UNCTAD database.

Figure 3. Indicators of access to finance in Guinea and SSA countries



Source: Retrieved from the World Enterprise Survey data (most recent available data).

Guinea's firms face difficulties for having access to finance, while there is indication that they need finance to expand their activities. According to a survey conducted by the World Bank, about 95 percent of Micro, Small and Medium Enterprises (MSMEs) in Guinea have plans to expand their business activities in the coming years. The most common vision for growth elaborated by these businesses involved the purchase of more inventory and as such, and for 60 percent of MSMEs, their greatest financing need is working capital. Another 18 percent of MSMEs mention the desire to add a new line of business. Microfinance institutions (MFIs) are one the channels through which MSMEs could have access to finance in Guinea. However, MFIs face several challenges, including the increased number of non-performing loans, especially in the wake of the

Ebola crisis; governance and regulation issues. Consequently, MFIs serve only a small fraction of the demand for services, and offer few microfinance products.

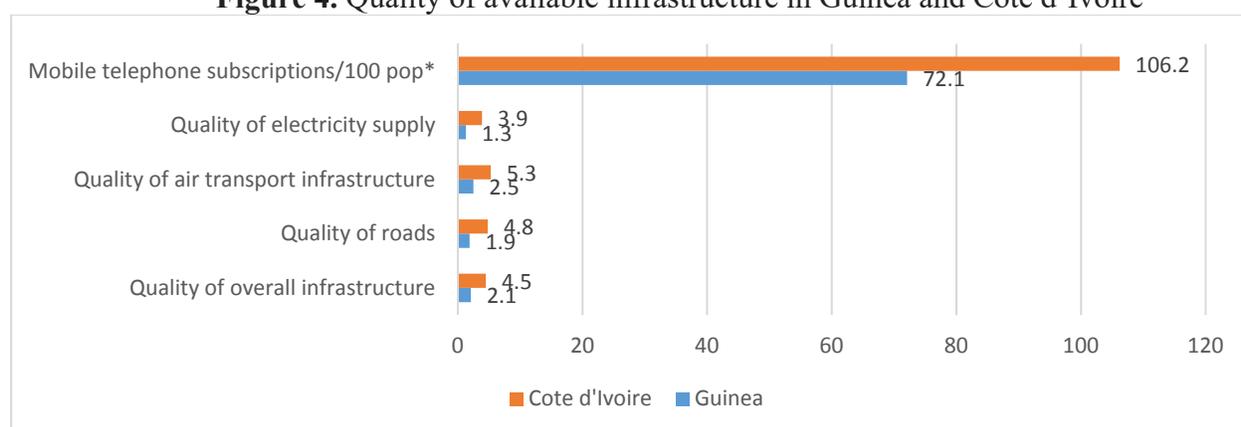
3.2 Does low return to investment contribute to Guinea’s poor growth performance?

When firms or individuals invest, they consider the amount of profit that they could make out of their investments. However, the return to investment depends not only on the scarcity of capital, but also on the availability of good infrastructure and human capital.⁵

3.2.1 Lack of good infrastructure

Several available data suggest that lack of good infrastructure constrains investment and economic growth in Guinea. First, inadequate supply of infrastructure has been identified as the third most problematic factor for doing business in Guinea according to the *GCR*. Out of 140 countries, the *GCR* ranked Guinea the least performing country in terms of overall quality of infrastructure. Guinea’s most important weaknesses for the quality of infrastructure stand in three areas: (i) quality of roads, (ii) quality of electricity supply, and (iii) quality of air transport infrastructure. This is well illustrated by comparing Guinea to Côte d’Ivoire for the quality of infrastructure.

Figure 4. Quality of available infrastructure in Guinea and Côte d’Ivoire



Source: *World Competitiveness Report 2015-16*.

Note: Values are on a 1-to-7 scale unless otherwise annotated with an asterisk (*).

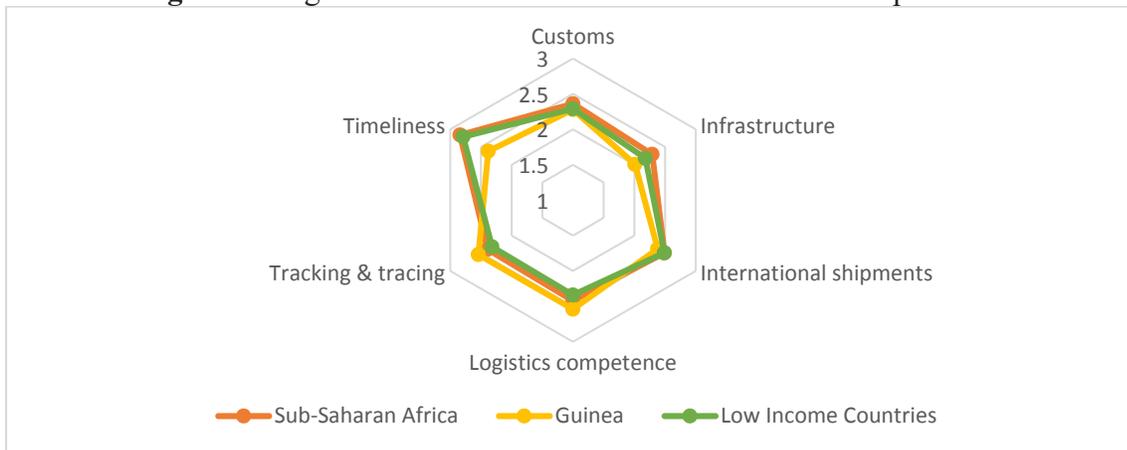
Second, other existing data confirm the conclusion drawn from the *GCR*, as far as Guinea’s poor quality of infrastructure is concerned. Indeed, according to the *WES*, while 37 percent of Guinean firms identified transportation as a major constraint to business, only 25 percent firms did so across SSA. Likewise, in 2016, Guinea’s overall score for the Logistics Performance Index (LPI) was 2.36 and the country was ranked 129th out of 160 countries.⁶ According to the LPI, lack of good

⁵ In the same vein, Lucas (1990) showed that capital scarcity is not enough to explain capital flows across countries, because capital does not move from developed to developing countries, where the return of investment is supposed to be higher due to capital scarcity. Such paradox is explained by differences in human capital quality and externalities.

⁶ The LPI is a summary indicator of logistics sector performance, combining data on six core performance components into a single aggregate measure, ranging between 1 and 5 (low to high performance). More information on the LPI can be found at: <http://lpi.worldbank.org>.

infrastructure is the weakest area for Guinea, and the country's overall score was lower than that of SSA and low-income countries.

Figure 5. Logistics Performance Index in Guinea and Comparator Countries



Source: Author's calculations based on data retrieved from the LPI database.

3.2.1.1 Few roads exist and their quality is deteriorating in Guinea

Guinea's road network is estimated at 45,360 km, including: 7,637 km national roads, 15,878 km prefectural roads, 19,845 km community roads and about 2,000 km urban roads.⁷ Guinea's national roads density is estimated at 3.1 km per 100 km², which is lower than the average in Africa (6.84 km per 100 km²), Ghana (6.2 km per 100 km²), and Côte d'Ivoire (5.1 km per 100 km²). Out of 7,637 km national roads, only 2,261 (29.6 percent) are paved, while national roads bear 80 percent of traffic, thus a large share of traffic is carried out on unpaved roads in Guinea.

Guinea's roads condition has been deteriorating over time. In 2004, 35 percent of Guinea's national paved roads were in a good shape, this share has declined to 25 percent in 2012 and further declined to 16 percent in 2014. As for national unpaved roads, in 2004, only 5 percent of them were in good shape, and this share has declined to 1 percent in 2012, but improved to 14 percent in 2014. Overall, available data suggest that only 30 percent of roads (paved and unpaved national roads) are in good shape in Guinea.

Guinea's bad road condition causes huge damage to the country's economy and limits the development of private sector activities. According to one estimate, about 20 percent of agricultural products are lost in Guinea due to lack of appropriate transport means.⁸ Likewise, due to poor quality of roads, it is generally admitted that employees spend about 4 hours per day in traffic from home to their work places in Conakry, and vice versa. Consequently, labor productivity is negatively affected either because workers reach their work places tired or they have to leave office earlier to avoid traffic. More generally, huge traffic in Conakry due to bad roads condition negatively affects Guinea's image for potential investors.

⁷ 2014 Guinea's Transports Year Book, Ministry of Transport. National roads connect prefectures and regions, prefectural roads connect prefectures and sub-prefectures, which are connected to municipalities by community roads.

⁸ Estimate of an organization of employers in road transport services. However, lack of refrigerated trucks and warehouses with adequate controlled temperature also contribute to the loss of 20% of agricultural products in Guinea.

Table 1. Guinea: Conditions of National Roads

Condition	2004	2012	2014
Paved roads (%)			
Good	35	25	16
Average	34	27	33
Bad	31	48	51
Unpaved roads (%)			
Good	5	1	13
Average	28	15	32
Bad	67	84	54

Source: Guinea's Ministry of Public Works.

Several factors contribute to the deterioration of road conditions in Guinea. Lack of discipline and weak enforcement of the rules regarding axle load are one of the reasons for the deterioration of the quality of roads in Guinea. According to the estimates of the Ministry of Public Works, about the equivalent of 7,300 km of roads are damaged due to road crossing works (trenches for electric cables, internet, drain pipes and water taps) in Conakry, and most road crossing works are carried out without complying with existing regulations. The economic cost of damaged roads due to road crossing works is significant as the reparation of 1 km road is estimated at about GNF8 billion (about \$800,000). Likewise, axle load regulations are not fully enforced, consequently, trucks are overloaded, causing damages to roads. Poor managerial system, weak capacity and limited number of qualified staff as well as lack of use of modern equipment also limit effective roads maintenance and contribute to the deterioration of roads quality in Guinea. There are few qualified staff in charge of road maintenance activities, most of them are aging and use less or have less access to modern equipment. Likewise, lack of clarity of responsibilities of several actors or institutions involved in infrastructure issues creates overlapping and lack of effective coordination; consequently, road maintenance activities cannot be properly planned and effectively executed. The ineffective public procurement system, poor monitoring system and inappropriate funding also limit road maintenance activities and contribute to the deterioration of roads quality in Guinea. There are long delays of public procurement for road maintenance activities, while their monitoring and evaluation is not effective. Financing roads maintenance is also an issue. The annual cost for roads maintenance is estimated at GNF800 billion, while Guinea mobilizes only GNF200 billion through the road maintenance fund.

3.2.1.2 Access to electricity remains a challenge despite some recent improvements in Guinea

Guinea is blessed with huge energy resources including more than 6,000 MW of hydropower potential. Despite those resources, access to energy is an issue in the country. In 2012, the average energy access rate in Guinea was estimated at 17.5 percent, which was far below the 31.6 percent average for SSA countries. Not only the electricity access rate is low, but also its distribution is uneven. Access to electricity is concentrated in Conakry and urban areas, while access to electricity

in rural area (where the majority of Guineans live) is estimated at 1.1 percent. Low access to electricity has been negative for business development in Guinea, as firms have to own generators for electricity production, which is more expensive. According to the *WES*, while 57 percent of firms own or share a generator for electricity production in Guinea, only 51 percent of firms are in a similar situation in SSA countries.

However, recently, there have been some major achievements to meet the country's 3 percent annual increase in electricity demand. The electricity service has improved as a result of the operationalization in September 2015 of the Kaléta dam, which added 240 MW generation capacity into the grid. In addition to Kaléta, which is a run-of-the river type of hydropower plant and therefore prone to seasonality, 175 MW of thermal power capacity was commissioned in early 2016, essentially to sustain electricity supply during the dry season. The commissioning of those additional plants increased the installed capacity in the country to 550 MW, with a peak demand of approximately 350 MW, leaving a comfortable reserve margin that highly depends on the seasonality of the hydropower generation. This also allowed the decommissioning of the expensive diesel fired Aggreko emergency rental units as a step to reduce the cost of electricity supply. The government is also expected to complete Souapiti (hydropower dam of about 540 MW capacity) in 2021. Despite recent improvements, however, there are remaining key challenges that need to be addressed in Guinea's energy sector, including: high technical and commercial losses (around 40 percent), low revenues collection (around 70 percent) and inadequate electricity tariffs (around US\$0.20/kWh for production while the average electricity tariff is \$0.09/kWh).

3.2.2 Lack of human capital(?)

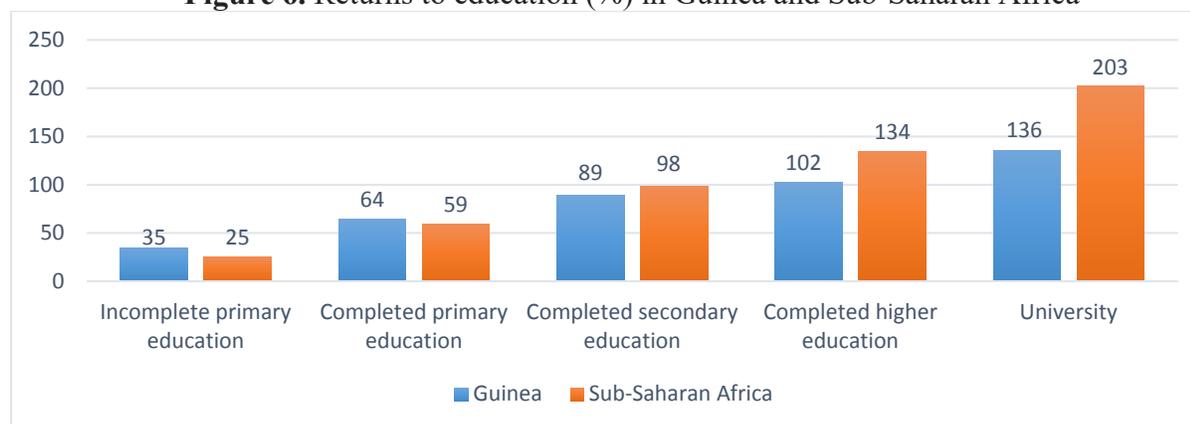
Does lack of human capital constrain economic growth in Guinea? One way to answer this question is to look at the trend of supply of educated people. Primary education completion rate is used as a proxy for supply of educated people that may be available for joining the job market.⁹ WDI data suggest that since 1998, there has been a steady increase in the primary education completion rate in Guinea. In 1998, 24 percent of Guinean pupils completed primary education, this number has increased to 58 percent in 2010. Likewise, Guinea has reduced its gap *vis-à-vis* the ECOWAS sub-region in terms of primary education completion rate: while in 1998, ECOWAS' average primary education completion rate was almost the double of that of Guinea, in 2010, Guinea has reduced its gap *vis-à-vis* the ECOWAS to only eight percentage points.

Another way to assess whether education is a binding constraint to economic growth is to measure the shadow price of education in Guinea. Shadow price is indicative of the willingness of society to pay for scarce resources. If education were a constraint to economic growth, one would expect high returns to the few people who get educated. In other words, Guinean society should be willing to pay higher salaries for more educated people. Available data show a mixed result for the return to education in Guinea. Though more educated people earn more, the return to education does not steadily increase with the level of education. For instance, compared to those who have not completed primary education, people who have completed primary education earn 29 percent more. But, compared to those who have completed primary education, those who have completed secondary education earn just 24 percent more.

⁹ An alternative proxy would have been the literacy rate, which considers the level of education of elder people. However, as in many African countries, the literacy rate variable is not available over a long period for Guinea.

The return to education as well as its increase rate are lower in Guinea than in SSA countries, especially for higher levels of education. For instance, while in Guinea those who have completed university earn 23 percent more than those who have completed higher education, in SSA, the earnings difference between those with university and high education degrees is 46 percent. Overall, the data show a larger difference of earnings at lower levels of education and non-steady increase of returns to education with educational levels in Guinea, suggesting a low willingness of Guinean society to pay for more educated people. This is another indication that education is not a binding constraint to economic growth in Guinea.

Figure 6. Returns to education (%) in Guinea and Sub-Saharan Africa



Source: Adapted from Guinea's 2015 education Public Expenditure Review.

Contrary to most views about weak capacity in Guinea, available data suggest that education may not be a binding constraint to the country's economic growth. However, such finding may reveal other phenomena related to education. Indeed, firms may be reluctant to pay high salaries for highly educated people because of low quality of education. Available data confirm that the quality of education is an issue, as illustrated by Guinea's poor rankings in the *GCR* as far as the quality of education is concerned. Along the same vein, the Guinea's first education plan for the period 1984-87 highlighted the need to improve the quality of education in the country. The same objective of improving the quality of education has been expressed in the series of educational reforms that the Government of Guinea announced in 2007. Low returns to education may also reflect the inadequacy between employment and the level of qualifications and education. Indeed, an employment survey conducted by the World Bank in urban enterprises in 2012, revealed that most Guinean employees occupy a job that does not match their level of education and qualification. For instance, most Guinean civil servants hold a vocational and technical diploma, while this type of qualification is much more adapted and valued in the construction and industrial sectors. Likewise, the distribution of positions within enterprises does not match the level of qualifications and education.

3.3 Does low appropriability explain Guinea's poor growth performance?

When firms or individuals do not expect to appropriate a significant proportion of the profits of their investments, they invest less, which in turn negatively affects the country's economic growth. Appropriability issues can emerge from many fronts, that can be grouped into three major areas. The first issue that limits appropriability is weak institutions. If the level of corruption is high, and

the quality of property rights protection is low, investors may bear high transaction costs to deal with problems posed by inefficient institutions, which may render investment unattractive. The second limit to appropriability is macroeconomic instability. Unstable macroeconomic environment, illustrated by unsustainable fiscal deficit, high inflation rate, high country risk, creates uncertainty and reduces investment as investors are not sure of the amount of profit they could make as well as the proportion of that profit they could appropriate. The third issue is high tax rates. Actual or expected high tax rates reduce private returns as well as the incentive to invest. The sub-sections below examine to what extent each of the appropriability aspects may limit investment and Guinea's economic growth.¹⁰

3.3.1 Concerns about corruption, contract enforcement and property rights protection

Available data suggest that corruption and weak property rights protection are sources of concern in Guinea. The Worldwide Governance Indicators (WGI)¹¹ show that the rule of law and control of corruption indexes -proxies for the quality of property rights protection and level of corruption, respectively- are lower in Guinea than the average in ECOWAS and SSA countries. Unsurprisingly, the *GCR* cited corruption as the second most problematic factor for doing business in Guinea. The same report also highlights the weakness of Guinea's judiciary system, and consequently, weakness in ensuring appropriate protection of property rights in Guinea. Indeed, the *GCR* ranked Guinea 136th out of 140 countries for judicial independence and efficiency of legal framework in settling disputes.

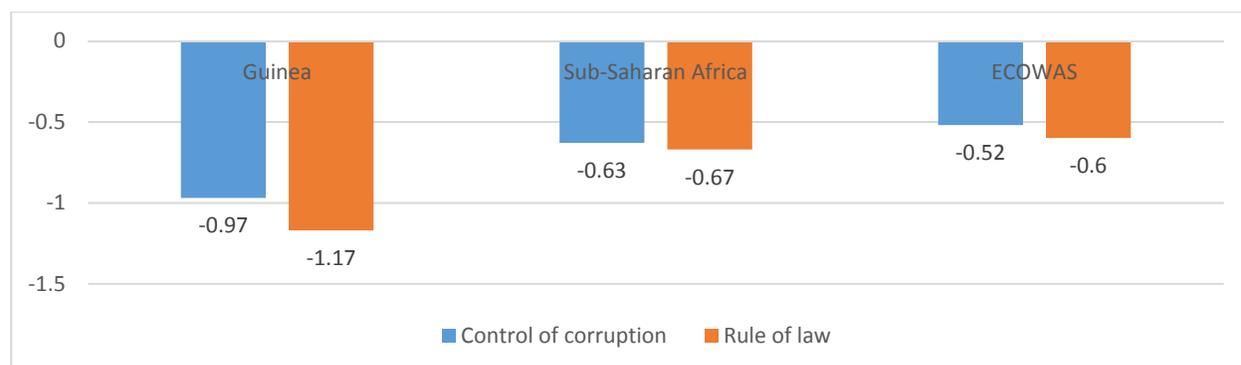
Other data corroborate the high level of corruption in Guinea. For instance, in 2015, the Transparency International ranked Guinea 139th out of 167 countries for its performance in terms of controlling corruption. Guinea's national sources also confirm the high level of corruption in the country. According to a report prepared by the country's Commission for National Reconciliation, 86 percent of Guineans recognize the existence of practices of corruption, bribery and related offenses in the country. Likewise, according to a recent survey conducted by Guinea's National Agency of Fight Against Corruption, 93 percent of the respondents confirm the existence of corruption in Guinea. All forms of corruption are occurring in the country, active corruption as well as passive bribery. The phenomenon affects all sectors of the public administration with a greater extent in the financial and economic services (customs, tax administration, public procurement), urban planning and housing, justice, education and health sector.

However, the WGI data suggest that, since 2010, there have been improvements of property rights protection and control of corruption in Guinea. This may be related to key reforms in Guinea's

¹⁰ Along the same vein, Knack and Keefer (1995) showed that property rights institutions positively and directly affect economic growth, and indirectly via an increase in the volume and the productivity of private investment. Fischer (1993) found that macroeconomic instability, as measured by the inflation rate negatively affects economic growth directly or indirectly via its effect on investment. In a cross-section of countries, Djankov et al. (2010) found that the effective corporate tax rate has a large adverse impact on aggregate investment, FDI, and entrepreneurial activity.

¹¹ The WGI is developed by the World Bank. It is based on 31 underlying data sources reporting the perceptions of governance of a large number of survey respondents and expert assessments worldwide. All the aggregate indicators from the WGI lie between -2.5 and 2.5; the higher the value of the index, the better the quality of governance. More information on the WGI can be found at: <http://info.worldbank.org/governance/wgi/>

Figure 7. Rule of law and control of corruption in Guinea and comparator countries in 2015



Source: Author's calculations based on data from the 2016 Worldwide Governance Indicators Database.

judiciary system, including: (i) the establishment of the OHADA National Commission,¹² (ii) the establishment of the Constitutional Court, (iii) the adoption of the Statute of the Magistracy and the establishment of the Superior Council of Magistracy, and (iv) the signing and effective enforcement of the Decree establishing the remuneration system for magistrates. For the first time in Guinea, the Council of magistrates was seized of complaints against magistrates, and out of 20 complaints received, 9 sanctions were pronounced, including one striking off.

Despite recent improvements, efforts are still needed for an effective judiciary system in Guinea. More specifically, the following constraints need to be tackled. The first issue to tackle is inappropriate justice conditions, including inadequacy of some legal texts, their misapplication or violation, lack of transparency and corruption in the judiciary system, interference of authorities and impunity. The second issue that needs attention is weak capacity and accountability of the judiciary system, including the low quality of judicial personnel resulting from the systematic lack of competitive recruitment, weak budgetary allocations and poor budgetary management, inadequate dissemination of legal texts leading to their lack of enforcement. The third issue is poor performance of the judiciary system, resulting from the interference of authorities in the judiciary system, which undermines the confidence of citizens, and causes mistrust of the judiciary system.

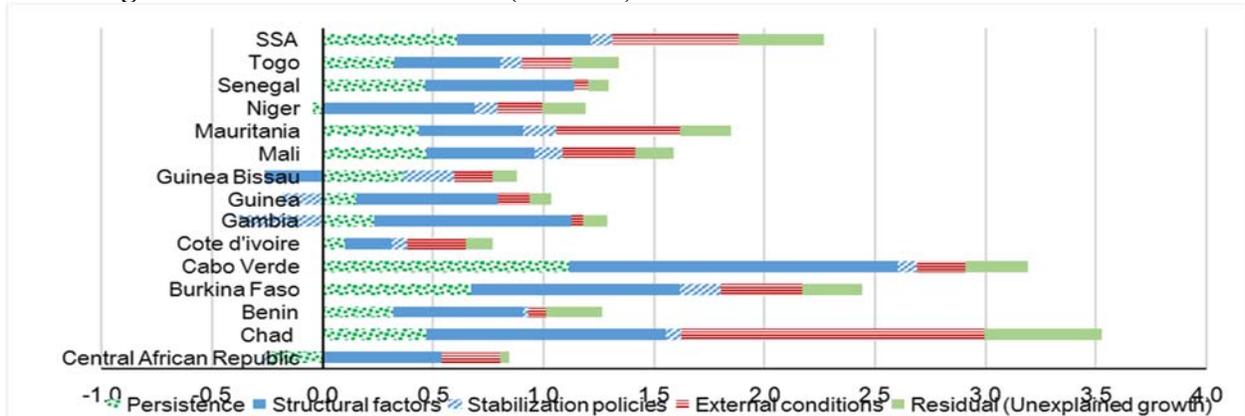
3.3.2 Concerns about macroeconomic stability

Guinea has come out of a long period of political instability, which led to economic mismanagement, making macroeconomic stability a source of concern despite recent significant improvements. Indeed, Guinea is one of the two countries in West Africa where weak stabilization policies reduced economic growth during the period 2000-10. Furthermore, in 2010, after two years of military transition, Guinea's inflation rate was 20.8 percent, international reserves were equivalent of less than one month of the country's imports, debt stock and debt service ratios to GDP were 67 and 32 percent, respectively. Broad money has increased by 74.4 percent, and the black market premium widened to 17.2 percent for the dollar, and 14.5 percent for the euro in 2010.

¹² OHADA is a system of business laws and implementing institutions adopted by 17 West and Central African nations on October 17, 1993 in Port Louis, Mauritius.

Following the 2010 Presidential election, Guinean authorities had undertaken a number of reforms to address macroeconomic instability. Fiscal policy has improved by making efforts for better revenue collection and control of expenditure, and monetary policy focused on inflation control,

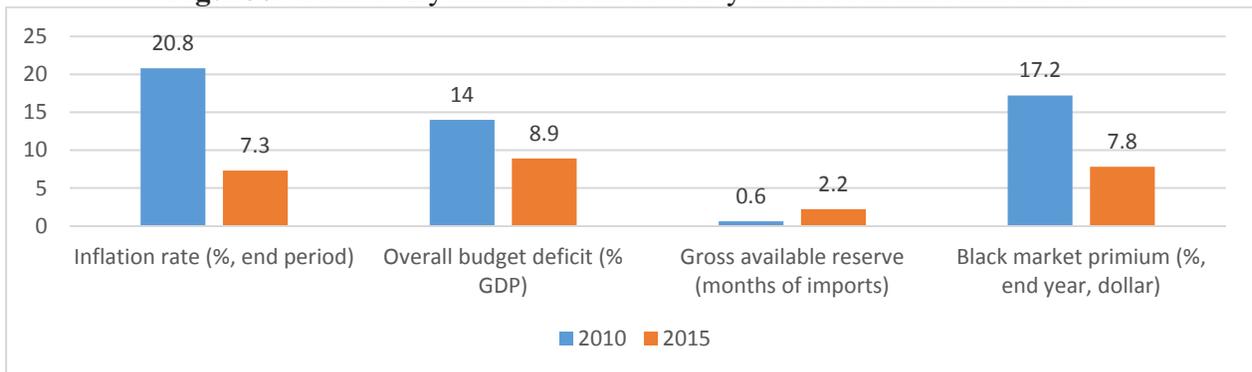
Figure 8. Growth Determinants (2000-15) in Guinea and selected African countries



Source: World Bank staff estimates.

reconstitution of the country’s international reserves and improved confidence in the country’s currency. In their effort to stabilize the macroeconomic situation, Guinean authorities were supported by development partners, including the IMF and the World Bank. Thus, for the first time in the country’s history, Guinea has successfully concluded an ECF program with the IMF in October 2016. As a result of the reforms undertaken over the past years, a number of Guinea’s key macroeconomic indicators have significantly improved.

Figure 9. Guinea: Dynamics of selective key macroeconomic indicators



Source: Guinean authorities and IMF staff estimations.

Guinea’s macroeconomic performance would have been better had it not been for fiscal slippages that occurred in 2015 in the wake of Ebola and the Presidential election. In 2015, Guinea was involved in a guarantees scheme, where the country’s Central Bank issued guarantees to cover private companies’ investment spending for the construction of infrastructure. Due to significant increase in public expenditure, the fiscal deficit went up. Moreover, most of the Central Bank’s guarantees were issued in foreign currencies (dollar and euro), which negatively impacted the country’s international reserves and exchange rate. The guarantees issue was addressed thanks to measures undertaken by Guinean authorities in the context of policy dialogue with the IMF and

the World Bank. Lack of a track record and recent fiscal slippages contribute to a low international ranking of Guinea for macroeconomic management despite some progress over the past years. With a score of 3.5 (on a 1-7 scale), the *GCR* ranked Guinea 129th out of 140 countries for macroeconomic environment. The same report ranked Guinea 139th out of 140 countries for credit rating, with a score of 10.8, for a credit rating index ranging between 0 and 100 (best country credit rating). Thus, despite some progress over the past years, macroeconomic stability remains a source of concern and the challenge for Guinean authorities is to sustain hard won good macroeconomic management outcomes. In the same vein, discussions are ongoing for a new IMF program.

3.3.3 Concerns about excessively high taxation

Is high taxation a source of concern and a possible binding constraint to growth in Guinea? Available data suggest a puzzling result. Based on data reported in the *Paying Taxes 2016* report¹³, taxes and mandatory contributions¹⁴ that a medium-size company must pay in a given year, represent 68.3 percent of profit, placing Guinea at the 48th position out of 52 African countries. And the average tax rate in Africa is 46.9 percent, which is far below the level of that of Guinea. Based on these data, it is possible to argue that high taxation is an issue and may constrain

Table 2. Tax rate (% of profits) and its perception as the most problematic factor for doing business in Guinea and selected West African countries

	Tax rate and country rankings (in bracket)	Ranking (out of 16) of tax rate as the most problematic factor for doing business
Sierra Leone	31 (9 th)	4 th
Senegal	47.3 (33 rd)	2 nd
Cote d'Ivoire	51.9 (41 th)	2 nd
Benin	63.3 (45 th)	3 rd
Gambia	63.3 (46 th)	2 nd
Guinea	68.3 (48 th)	16 th

Source: *Paying taxes 2016, 10th edition and the 2015-16 Global Competitiveness Report*.

economic growth in Guinea. However, other evidence may contradict this argument. When asking to cite the most problematic factor for doing business, Guinean respondents mention tax rate at the bottom of a list of 16 potential most problematic factors for doing business in the country. Moreover, contrary to Guinea, in other West African countries, where profit taxation is lower, the tax rate is highly ranked as the most problematic factor for doing business.

¹³ The report is jointly prepared by the World Bank and PwC UK teams. It provides insight into how governments around the world tax companies operating in their jurisdictions and the mechanisms by which these taxes are levied.

¹⁴ Taxes and mandatory contributions include corporate income tax, turnover tax and all labor taxes and contributions paid by companies.

Thus, despite high taxation, as provided by various existing texts, apparently in practice, firms seem not to complain about the tax rate in Guinea. This is probably a symptom of inefficiencies in Guinea's tax system. The evidence above reveals a low level of compliance of companies with tax payments. Indeed, if companies really paid the amount of tax that they were supposed to pay, given the proportion of profit that it represents, very likely, the tax rate would have been cited as one of the top binding factors for doing business in Guinea. Along the same vein, according to the 2016 World Bank Public Expenditure Review, Guinea's effort in improving domestic revenue mobilization has been meager. Although the revenue to GDP ratio has increased by 2.3 percentage points of GDP during 2010-15; this increase was driven by fuel taxes, especially reflecting the decline in import prices in 2013-15 while domestic pump prices were kept unchanged until early-2015. A key development has been the structural decline in tax receipts from the mining sector, while the revenue effort from VAT—the second largest revenue category—remained flat. Low compliance of companies for tax payment may reflect other symptoms, such as a large number of taxes, a few number of tax payers, high tax rates for specific goods and services as well as inefficiency of tax administration. However, Guinean authorities have recently taken several initiatives to improve the efficiency of the tax system, including measures to improve the performance of the tax and customs administrations, more rigorous monitoring of tax compliance as well as the introduction of two new taxes on telecommunications since 2015.

3.4 Does lack of structural transformation constrain Guinea's economic growth?

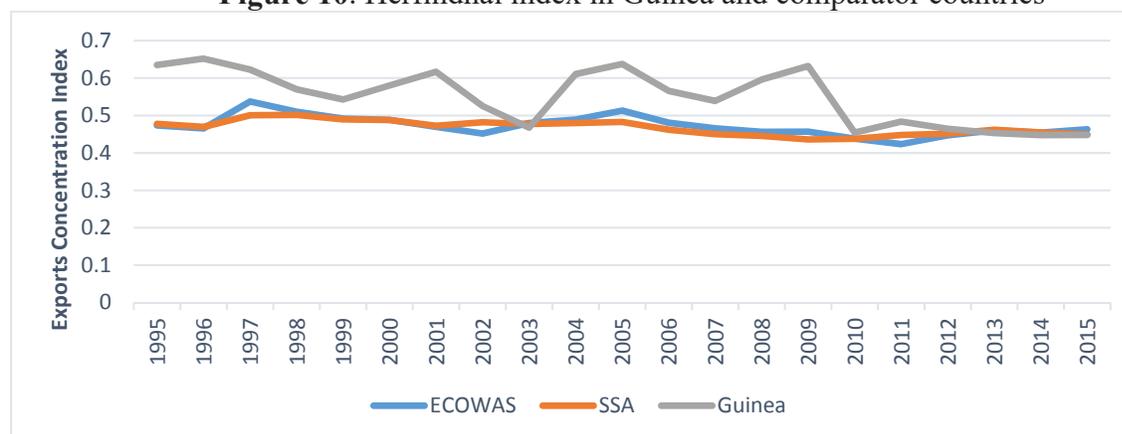
Structural transformation entails a shift of the economy from producing low-productivity, low-skilled goods to producing high-productivity, high-skilled goods by technology and learning from fast-growing countries. Structural transformation can be analyzed from labor, production and export perspectives. For instance, Hausmann et al. (2007) use an export perspective for the analysis of structural transformation and show that what a country exports matters for its growth dynamics, and countries that export more sophisticated products are more likely to grow faster. Thus, in this paper, Guinea's structural transformation analysis is based on an export perspective.

Several indicators point to Guinea's slow structural transformation, and this may have contributed to the country's slow economic growth. First, Guinea's exports are highly concentrated. To assess a country's level of exports diversification, generally, the Herfindhal Index (HI) is used in the literature. The HI ranges from 0 to 1, with lower values indicating greater diversification of export earnings. In the case of Guinea, the HI ranges from 0.4 to 0.6, suggesting a high concentration of the country's exports. Guinea's exports concentration is higher than the average of SSA and West African country. Second, Guinea's exports are dominated by a few primary goods. In 1995, Guinea's top-5 exports were all primary products (mines, minerals, and agricultural products) and represent 90 percent of the country's total exports. Twenty years later, the situation has not changed significantly: in 2015, Guinea's top-5 exports were all primary goods and they represented 86 percent of the country's exports (see appendix).

Third and more worrisome, Guinea's exports sophistication has declined over time. Available data on structural composition of exports reveal that Guinea has lost ground in terms of manufactured product exports, while the country's primary product exports have increased over time. Indeed, while in the period 1995-99, manufactured products represented 82 percent of Guinea's total exports, during the period 2010-14, this share has declined to only 48 percent. On the other hand, between the period 1995-99 and 2010-14, the share of primary products in Guinea's total exports

has increased from 15 to 40 percent (see appendix). Along the same vein, according to the Economic Complexity Index (ECI), Guinea's sophistication of exports has declined over time. In 1995, Guinea was ranked 111th out of 121 countries for a value of -1.33 of the ECI. In 2014, Guinea was 121st out of 124 countries for a value of -1.733 of the ECI.¹⁵

Figure 10. Herfindhal index in Guinea and comparator countries



Source: Author's calculations using data retrieved from UNCTAD trade database.

Thus, instead of improving, Guinea's structural transformation has been deteriorating. Such underperformance could be the result of several factors, including inappropriate policies. Indeed, a relatively high level of exports sophistication in the 1980s and 1990s, could have been the result of high public subsidies to manufacturing production, which were not sustainable over time. Further investigations are needed for a better understanding of the driving factors of the declining level of Guinea's level of exports sophistication, but this is beyond the scope of the current paper.

4. What would it take to accelerate economic growth in Guinea?

4.1 Application of the long-term growth model to Guinea

After a number of years of disappointing economic growth rates - marked by the Ebola crisis and declining commodity prices - growth needs to accelerate to reduce poverty and improve living standards in Guinea. This section applies the DEC-MFM Long Term Growth Model to answer two main questions: (1) What combination of growth drivers, such as investment and productivity, would be required to achieve target growth rates in Guinea given trends in historical growth fundamentals? (2) What are the implications of different growth paths for poverty rates? The Long Term Growth Model (LTGM)¹⁶ is based on the celebrated Solow-Swan growth model, and so captures the growth-investment link, given the growth rate of TFP and other growth fundamentals that are important for developing and emerging economies. The model also keeps track of the income distribution so that as economic growth increases incomes above the poverty line, the poverty rate falls.

¹⁵ The ECI ranks how diversified and complex a country's export basket is. The higher the value of the ECI, the more complex an economy is. An economy is considered 'complex' if it exports not only highly complex products, but also a large number of different products. More information on the ECI can be found at: <http://atlas.cid.harvard.edu/>

¹⁶ See Pennings (2017) for more information or Hevia and Loayza (2012) for an early application.

Scenario Analysis

Model simulations calculate investment rates required to achieve 5 or 7 percent headline GDP growth rates by 2020 and onwards, given different paths for TFP growth. For each category of simulations, a baseline and two alternative scenarios are considered, depending on the growth rate of TFP. Across all alternative scenarios within each simulation category, the paths of the poverty rate are identical because the assumed GDP growth rates are identical.¹⁷ For all simulations, the human capital growth rate is assumed constant at 1 percent (see main assumptions below).

Table 3. Main assumptions of GDP growth simulations

GDP Growth Trajectories (from 2020 onwards)		
	5% headline GDP growth	7% headline GDP growth
Baseline scenario: TFP stagnation	0% TFP growth rate	
Alternative scenarios		
Low TFP growth	1% TFP growth rate (by 2020)	
High TFP growth	2% TFP growth rate (by 2020)	
Human capital growth rate	1% (constant)	

Note: The assumed initial TFP growth rate is 0% in 2014, which is assumed to increase at 1% or 2% by 2020. Likewise, the initial GDP growth rate is 1.1%, Guinea’s estimated GDP growth rate in 2014, which is assumed to accelerate to 5% or 7% by 2020. Moreover, the model assumes 6% capital depreciation rate and a 40% labor share.

Assuming 5 percent GDP growth is consistent with the recent trajectory of the Guinean economy, and an acceleration to at least 7 percent growth is the goal of government’s 2016-20 development plan. Indeed, in 2016, in the aftermath of Ebola, the Guinean economy recovered at 5.2 percent from a growth stagnation in 2015. Thus, the first category of simulations is run under the assumption of maintaining the same GDP growth rate as the one that Guinea experienced in the aftermath of the Ebola crisis. The second category of simulations assumes a growth acceleration to 7 percent, which is a very high growth rate given Guinea’s historical economic growth rates, but consistent with the ambition of the Guinean authorities for high growth rates as expressed in the country’s new five-year development plan (*Plan National de Développement Économique et Social, PNDES 2016-20*). Reference is made to 2020 for the analysis of simulation results because this year marks the end of the country’s new development plan.

Growth accounting suggests that historical TFP growth in Guinea has been volatile, sometimes negative, and never more than 1 percent –with 2 percent TFP growth being optimistic. For low income countries such as Guinea, TFP growth rates on average are close to 1 percent. However, in the case of Guinea, available data indicate that since 2000, the country has experienced negative growth rates of TFP. These are likely partly a consequence of a series of negative shocks that the country has experienced, and so the worst scenario is to assume over a longer period, TFP

¹⁷ Low and high TFP growth rates generate the same paths for poverty as far as the achieved GDP growth rate is the same. However, the required investment rate for achieving a target GDP growth rate differs depending on TFP growth.

stagnation for the Guinean economy. Available data also show that Guinea has achieved its highest growth rate of TFP, 0.96 percent, during the period 1996-2000 (see appendix). Thus, assuming a stagnation of TFP in the baseline scenarios, and a 1 percent growth rate of TFP in one of the alternative scenarios is consistent with performance of the Guinean economy. However, a 2 percent growth rate of TFP is a very optimistic scenario, which is the double of the best performance of TFP growth rate that Guinea has achieved so far.

4.2 Results

Simulation results suggest the need for productivity growth to maintain either 5 or 7 percent of GDP growth rate over the medium-term. More specifically, with stagnant TFP, achieving 5 percent of GDP growth would require an investment to GDP ratio of 0.23 by 2020. Moreover, maintaining 5 percent growth rate with stagnant TFP requires increasing investment rate approaching 30 percent of GDP by 2040.¹⁸ Historically, investment in Guinea has averaged around 14-18 percent of GDP over the past decade, and has not been above 20 percent of GDP in the last quarter century, according to WDI data. This suggests an acceleration of investment to 25-30 percent of GDP is unlikely. The required investment is even higher to achieve 7 percent growth without productivity growth: with stagnant TFP, the investment rate would need to increase above 30 percent by 2020 and would approach 50 percent by 2040, which clearly is unrealistic. In contrast, with improved productivity growth, achieving 5 percent GDP growth is realistic and even 7 percent economic growth is possible. With 1 percent TFP growth, Guinea can maintain 5 percent GDP growth with investment at 16-19 percent of GDP – similar to that it experienced in the last decade. With 2 percent TFP growth, 7 percent GDP growth can be achieved with investment around 17-21 percent of GDP, which is only marginally higher than the country's recent experience.

Productivity improvements also make growth more sustainable by reducing investment requirements in the long run – which may be appropriate given Guinea's low level of domestic savings. For instance, 5 percent GDP growth rate with 2 percent TFP growth requires 8 percent points less investment rate in 2020 than what would be required to achieve the same growth rate with stagnant TFP – but by 2040 the gap in required investment would increase to almost 20 percent points of GDP. The savings is even larger - 30 percent points less investment rate in 2040 - with 7 percent GDP growth rate and 2 percent TFP growth rate. Given limited domestic savings and possible reluctance of private sector to substantially increase investment, a growth strategy with lower investment requirements may better suit Guinea's needs.

The model suggests that extreme poverty (defined at US\$1.9 per day, 2011 PPP) would fall from around 35 percent in 2015 to 20 percent by 2030 with 5 percent GDP growth rate, but would further fall to 10 percent with 7 percent growth. Faster economic growth reduces poverty quickly in Guinea because of relatively low levels of inequality (a Gini coefficient similar to that of France). Here, simulations assume no change in inequality. Due to a phase in period for the assumed growth profiles, the rate of poverty reduction is smaller in the near term: a fall in poverty around 6 percent points by 2020 with 7 percent economic growth as compared to 2.5 percent points poverty reduction with 5 percent GDP growth.

¹⁸ Meeting a fixed target GDP growth rate with only investment would generate a faster growth of capital stock than output, leading the capital-to-output ratio and (marginal) ICOR to increase, which makes investment less and less effective in boosting economic growth.

Figure 11. Required investment to achieve 5 percent GDP growth

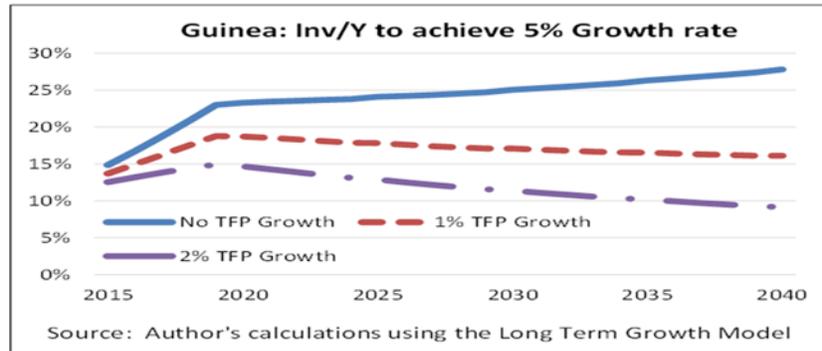


Figure 12. Required investment to achieve 7 percent GDP growth

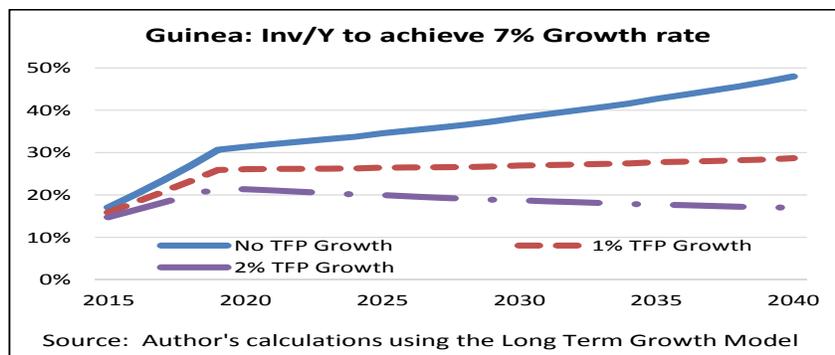
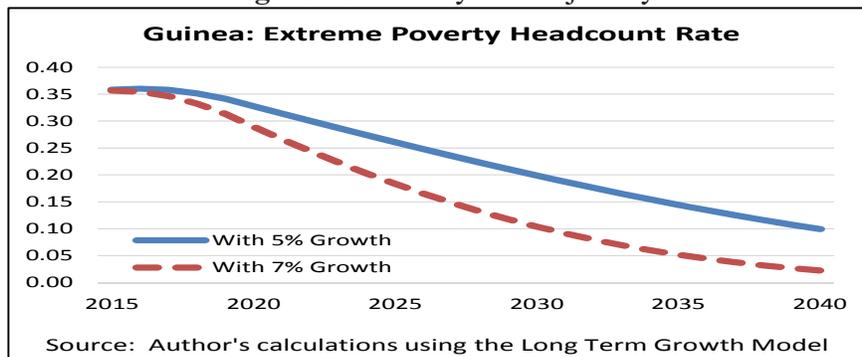


Figure 13. Poverty rate trajectory



Given the situation of the Guinean economy, the most plausible scenario is one in which 5 percent GDP growth is achieved, with required investment rates below 20 percent of GDP and 1 percent TFP growth. By 2020, Guinean authorities are planning to undertake several infrastructure projects that would generate on average about 15 percent of annual public investment rate by 2020 if fully implemented (Chary et al., 2016). The government has prioritized the electricity sector and discussions with China for the construction of the Souapiti hydropower dam (450 MW) are well advanced, and the dam is expected to be delivered in 2021.

The construction of the Souapiti dam would support economic growth and allow exporting electricity to neighbor countries. In addition to electricity projects, over the next three years, the

government envisions also large investments in the agriculture sector, and the construction as well as rehabilitation of roads. If properly executed, the envisioned increases in infrastructure would contribute to TFP growth as well as to private investment as some of the investments will be financed through PPPs (Public-Private Partnerships).

5. Possibility of TFP Growth in Guinea: A Policy-oriented approach

5.1 Methodology of analysis

The analysis in section 4 suggests that maintaining 5 or 7 percent economic growth with reasonable investment rates over the medium-term requires increased TFP growth rate. Given Guinea's past performance, this raises the question about the possibility for the country to experience an increase in TFP growth rate. To examine such question, this section adopts a policy-oriented approach by analyzing the dynamics of some of the factors that have been identified in the literature to positively or negatively affect TFP growth in Guinea. More specifically, this section examines the dynamics of the determinants of TFP growth by comparing their average annual growth rates during the period when Guinea experienced the highest TFP growth rate with the period that follows after; the former being the reference period. The effects of such dynamics in terms of TFP growth rate are also examined. The identification of the reference period and the variables to consider are based on existing studies.

Existing growth accounting exercise has identified the period 1996-2000 as the one during which Guinea experienced the highest growth rate of TFP. Thus, the period 1996-2000 is the reference period, i.e. the period relative to which to compare the dynamics of the determinants of TFP growth. Therefore, the methodology consists of comparing the average annual growth rates of a selected number of the determinants of TFP growth between the period 1996-2000 and the period 2001-15. By doing so, it's possible to find out whether or not Guinea is on a good trajectory for increasing productivity, depending on the dynamics of the determinants of TFP growth. For instance, a finding that shows that most of the determinants of TFP growth are not in good dynamics compared to the period 1996-2000 would be worrisome, while positive dynamics of the determinants of TFP growth would be reassuring. This is a simple and transparent approach, with the aim to inform needed policy reforms to boost productivity growth in Guinea.

The identification of the determinants of TFP growth to consider is based on the findings of Guinea's Development Policy Review (DPR), prepared by the World Bank in 2008. According to the econometric analysis carried out in the context of the DPR, variables that affect Guinea's TFP growth can be grouped in four categories. These include: (i) External shocks, (ii) macroeconomic factors, (iii) resources reallocation, and (iv) innovation and technology.¹⁹ The results of the econometric analysis are reported in the appendix.

¹⁹ In the same vein, in his literature review, Isaksson (2007) grouped the determinants of TFP into four categories. The grouping of the determinants of TFP growth is based on the works of endogenous growth theorists, including Romer (1986, 1990), Barro (1990), Grossman and Helpman (1991), and Aghion and Howitt (1992).

5.2 Analysis of TFP growth rate and its determinants

5.2.1 Overview of theoretical arguments and empirical findings on the determinants of TFP growth in Guinea

External Shocks. Generally, the Terms of Trade (TOT) are used to analyze the effect of external shocks on TFP growth. Two possible channels are identified for the TOT effect on TFP growth. High TOT tends to increase profits for the private sector, but also more revenue for government, which can contribute to boost public investment, such as infrastructure, and through this channel it has an indirect positive effect on TFP. In addition, there are also spillover effects of the TOT, through the input-output matrix, from the tradable to non-tradable sector that also induces TFP growth in the whole economy. Thus, theoretically, it's expected that increased TOT would contribute to TFP growth. In the case of Guinea however, it has been found a negative effect of the TOT on TFP growth. According to the findings of the DPR, a one percentage point increase in the TOT growth would decrease TFP growth rate by 0.05 percentage point, because of the crowding-out effect of FDI resulting from the TOT growth. An increase in the TOT increases domestic savings and therefore resources for investment. However, since the investment rate does not change much, the increase in the TOT would induce a change in the composition of investment, with less share for FDI which is generally more productive than domestic investment, thereby, leading to declined TFP growth rate.

Macroeconomic factors. The exchange rate and inflation rate are generally considered for the analysis of the link between macroeconomic factors and TFP growth. High inflation rate is a sign of macroeconomic instability and a source of uncertainty in a country. By creating an uncertain environment, high inflation rate makes it difficult for economic agents to extract correct signals from relative prices (Barro, 1976, 1980). And high inflation rate may reduce the expected return to investment and so the volume of investment, which in turn, is detrimental to TFP growth. Thus, theoretically, a negative link is expected between inflation and TFP growth rate, and such a prediction has been confirmed in the case of Guinea. More specifically, a one percent point increase in the inflation rate would reduce Guinea's TFP growth rate by 0.005 percent point (World Bank, 2008). The theoretical analysis of the relationship between the exchange rate and productivity suggests that both positive and negative effects are possible. Three main mechanisms explain the positive effect of exchange rate appreciation on productivity. First, exchange rate appreciation reduces the relative price of imported capital, leading to higher technological progress and productivity growth. Second, exchange rate appreciation increases the real remuneration of labor, which involves an increase of labor productivity (Leibenstein, 1966; Harris, 2001). Third, exchange rate appreciation could push firms to improve their technical efficiency in a context of monopoly or collusive oligopoly (Krugman, 1989). On the other hand, exchange rate appreciation can also hamper productivity growth, by reducing economic competitiveness and slowing down export expansion. By slowing down export expansion, exchange rate appreciation reduces the means and incentive for investing in efficiency and technology; thereby, contributing to slow TFP growth. In the case of Guinea, it has been found that exchange rate depreciation negatively and significantly affects TFP growth (World Bank, 2008). According to the study, a one percent point depreciation of the exchange rate would reduce TFP growth rate by 0.04 percent point, because the depreciation of the exchange rate reduces the GDP share of more productive industrial sector in favor of less productive agricultural sector due to higher cost of imported capital goods much needed in the industrial sector.

Resources reallocation. It is about the movement of production factors from a low-productivity sector (e.g. agriculture) to a high-productivity sector (e.g. industry). According to Denison (1967), such movement of production factors would raise aggregate productivity, even if the productivity growth rates in the two economic sectors remained unchanged. Along the same vein, McMillan et al. (2014) emphasized that labor flows from low-productivity to high-productivity activities are a key driver of economic development, because such movement of labor force contributes to productivity growth in the whole economy. In the case of Guinea, the test of the effect of resources reallocation on TFP growth suggests that the growth rate of the service sector as a share of GDP (a proxy for inter-sectoral resources reallocation) is negatively and significantly linked to the growth rate of TFP, while the share of manufactured exports in the value added of the industrial sector (a proxy for intra-sectoral resources reallocation) positively and significantly affects TFP growth rate (World Bank, 2008). The negative effect of the GDP share of the service sector on TFP growth rate reflects the low productive service sector that characterizes many African countries, including Guinea.

Innovation and technology. They can lead to TFP growth by facilitating invention of new products and inducing new ways of producing existing products. A new process of producing existing goods or services is superior, if it economizes labor and/or capital or intermediate inputs and therefore enhances productivity. The invention of new products raises productivity by shifting labor and capital from the production of old products to new ones. Using the import of capital goods as a proxy variable for access to technology, it has been found to have a positive and significant effect of that variable on the TFP growth rate in Guinea (World Bank, 2008). According to the authors, such finding suggests that Guinea imports technology from abroad through capital goods, which is good for TFP growth.

5.2.2 Dynamics of the determinants of TFP growth in Guinea: Empirical investigations and findings

5.2.2.1 The choice of proxy variables

For the empirical analysis, proxy variable(s) for each of the four identified categories of the determinants of TFP growth have been used. The index of net barter terms of trade is used as the proxy for external shocks and it is calculated as the percentage ratio of the export unit value indexes to the import unit value indexes, measured relative to the base year 2000. The nominal exchange rate and the inflation rate are the two proxy variables for macroeconomic factors. The nominal exchange rate is measured as the amount of local currency that is needed for one dollar, thus a higher amount means a depreciation of the national currency *vis-à-vis* the dollar. The inflation rate is measured as the annual variation of the consumer price index. As in the case of the DPR, the share of the service sector in GDP and the share of manufactured exports in the value added of the industrial sector are the two proxy variables for resource reallocation. The share of capital goods in total imports is the proxy for innovation and technology. The proxy for capital goods imports is the imports of machinery and transport equipment.

The share of capital goods in total imports is computed using data retrieved from the UNCTAD database. The rest of the proxy variables are directly collected or computed using data from the World Bank's 2017 WDI.

5.2.2.2 Results

The data show that compared to the period 1996-2000, during the period 2001-15, the dynamics of external shocks, as illustrated by the variation of the TOT was favorable to TFP growth in Guinea. The average annual growth rate of the TOT index over the period 1996-2000 was 6.3 percent and it decreased to -0.3 percent during the period 2001-15, implying -6.6 percent points decrease in the TOT growth rate. Based on the findings of World Bank (2008), such dynamics of the TOT would induce 0.33 percent point increase in the TFP growth rate.

Figure 14. Guinea: Dynamics of the determinants of TFP growth rate



Source: Author's computations based on data collected from various sources as explained in the text.

The dynamics of macroeconomic factors is also favorable to TFP growth, as shown by the variations of the inflation and exchange rate. Indeed, during the period 1996-2000, the average annual growth of the inflation rate was 22.2 percent, which decreased to 2.9 percent during the period 2001-15. The decrease in the growth of the inflation rate would induce 9.6 percent points increase in the TFP growth rate, given the results of existing econometric analysis. As for the nominal exchange rate, the pace of its depreciation has reduced over time, which should also contribute to TFP growth. Indeed, during the period 1996-2000, the average annual growth of the nominal exchange rate was 14.8 percent, which decreased to 10 percent during the period 2001-15. Such reduction in the pace of the nominal exchange rate depreciation would facilitate capital goods import and induce 15.8 percent points increase in the TFP growth rate.

The results show that the dynamics of the two proxy variables for resources reallocation has negative effects on TFP growth. The GDP share of the services sector has increased over time, which should negatively affect TFP growth, because of low productivity in that sector. During the period 1996-2000, the average annual growth of the GDP share of the services sector was -3.6 percent. But in the period 2001-15, the share of the services sector in the Guinean economy has increased at 0.1 percent annually. Based on the findings of World Bank (2008), the increase in the growth rate of the GDP share of the services sector should reduce the TFP growth rate by 24 percent points. On the other hand, the average annual growth rate of the share of the manufactured exports in the industrial sector value added has declined by 5.7 percent points between the period 1996-2000 and 2001-15 (from 2.5 to -3.2 percent). Such dynamics of the manufactured exports reduces exposure to international market as well as the possibility for profit; thus, it should reduce the TFP growth rate by 3.4 percent points.

According to the results, the dynamics of technology transfer is not favorable to TFP growth in Guinea. Indeed, the average annual growth rate of the share of capital goods in total imports has declined from 6.5 to 0.5 percent between the period 1996-2000 and 2001-15, reducing the possibility for Guinea to import technology from abroad over the period of analysis. Such dynamics of capital goods would induce an 18.9 percent points decrease in the TFP growth rate. Overall, the results of the analysis of the dynamics of the determinants of TFP growth rate suggest positive as well as negative dynamics. Specifically, using the coefficients of existing econometric analysis and average annual growth rates, the dynamics of the determinants of TFP growth suggest 12 percent points increase in TFP growth rate during the period 2001-15 as compared to the period 1996-2000 (see appendix).

6. Conclusion and policy implications

This paper carries out a growth diagnostic and examines prospects for Guinea's economic growth. The analysis of the long-term growth trend shows that since independence, Guinea has experienced slow economic growth rates. Indeed, despite large potential in terms of mining resources (bauxite, gold, diamonds and iron ore) agricultural, and hydropower resources, so far, the highest economic growth rate achieved by the Guinean economy is 6.3 percent and this growth peak was reached in 1988. In an effort to understand the factors behind Guinea's slow growth rates, this paper applies the HRV approach to Guinea and reaches the conclusion that three binding constraints limit private-sector led growth in the country. These three factors include: (i) lack of infrastructure (roads and energy), (ii) low access to finance, and (iii) poor governance.

The paper also examines prospects for Guinea's economic growth by applying to the country's context, the long-term growth model developed by the World Bank. The model captures the growth-investment-poverty link, and allows identifying the required investment rate to achieve a target GDP growth, given the growth rate of Total Factor Productivity (TFP) and other growth fundamentals. The model also allows estimating the trajectory of the poverty rate, given economic growth rate. One of the key findings of the application of the long-term growth model to Guinea is the need for 1-2 percent TFP growth to maintain 5-7 percent GDP growth, with 16-21 investment rate by 2020. The results also suggest that the extreme poverty rate (defined at US\$1.9 per day, 2011 PPP) would fall from around 35 percent in 2015 to 20 percent by 2030 with a 5 percent GDP growth rate, but would fall to 10 percent with 7 percent growth.

The possibility for Guinea to achieve an increased TFP growth rate is also examined in this paper by adopting a policy-oriented approach. More specifically, based on the results of existing studies, the paper examines the dynamics of a number of the determinants of TFP growth in Guinea, by comparing their average annual growth rates between the periods 1996-2000 and 2001-15; the former being the period during which Guinea experienced the highest TFP growth. The rationale behind such approach is to try to understand how the determinants of TFP growth have evolved since the period that Guinea reached its peak TFP growth rate. The results show a mixed picture with macroeconomic and external shock variables in good dynamics, while the dynamics of technology and resource reallocation variables is not favorable to productivity growth. Overall, such dynamics of the determinants of TFP growth would induce 12 percent points increase in TFP growth rate during the period 2001-15, as compared to the period 1996-2000.

The results of the growth diagnostic suggest that Guinean authorities should strive to tackle the three binding constraints to private sector-led growth, identified in this paper. More specifically, Guinean authorities should tackle the issue of lack of infrastructure by investing adequately in that sector. This implies improving fiscal management for further mobilization of domestic revenue, and improving public investment management for efficient and effective infrastructure investment. Moreover, the increase of infrastructure investment should be done without jeopardizing macroeconomic stability, which implies the need for concessional resources and Public-Private Partnerships for financing infrastructure investment. Guinean authorities should also seek solutions for lack of finance for private investment in the country. To do so, there is a need for structural reforms, including the creation of credit bureaus that would allow collecting the right information on potential borrowers, and the development of mobile banking for which Guinea is lagging behind comparator countries. Structural reforms for improving access to finance should also entail measures to increase domestic savings by controlling the public deficit, stimulating private savings by applying an appropriate deposit interest rate, as currently, the average deposit interest rate is lower than the inflation rate. Likewise, there is a need to reduce the cost of finance by appropriately reducing lending interest rates. To boost private investment and growth, Guinean authorities should also improve the quality of governance by specifically addressing the issues of corruption and weak property rights protection. To do so, there is a need for e-payments at tax and customs administrations, strengthening accountability, reducing interference in the judiciary system, while ensuring effective enforcement of laws.

The analysis of growth prospects suggests that increasing TFP growth is necessary for maintaining higher economic growth rates over the medium-term in Guinea. To do so, Guinean authorities should consolidate positive dynamics, while pursuing efforts for reversing negative dynamics of some of the determinants of TFP growth. Lower inflation rate and stable nominal exchange rate are the two positive dynamics related to macroeconomic variables that need to be strengthened for higher TFP growth in Guinea. Two negative dynamics that policy makers can shape in order to stimulate TFP growth are related to the imports of capital goods and manufactured exports. Both imports of capital goods and manufactured exports have declined over time, which is not good for TFP growth. Thus, there is a need to support the imports of capital goods as well as the exports of manufactured products. Investing in the development of agricultural value chains is one option for Guinea to increase its manufactured exports, and given the country's rich endowment in horticultural products, such an option is possible. Some measures should also be taken to facilitate the imports of capital goods, including possibly, revising tariff rates applied to them, and developing a leasing system for machines and equipment. The increase in the services sector share of GDP has been found to be unfavorable to TFP growth because of low productivity in that sector. Thus, there is a need to invest in education and create conditions for a more productive service sector, through the creation of more productive jobs in the formal and informal sectors.

The above recommendations for promoting economic growth and TFP growth are interlinked. Thus, there is a need for a comprehensive and integrated approach to tackle both the binding constraints to economic growth and to boost TFP growth. This is a key prerequisite for high and sustained economic growth rates and poverty reduction in Guinea.

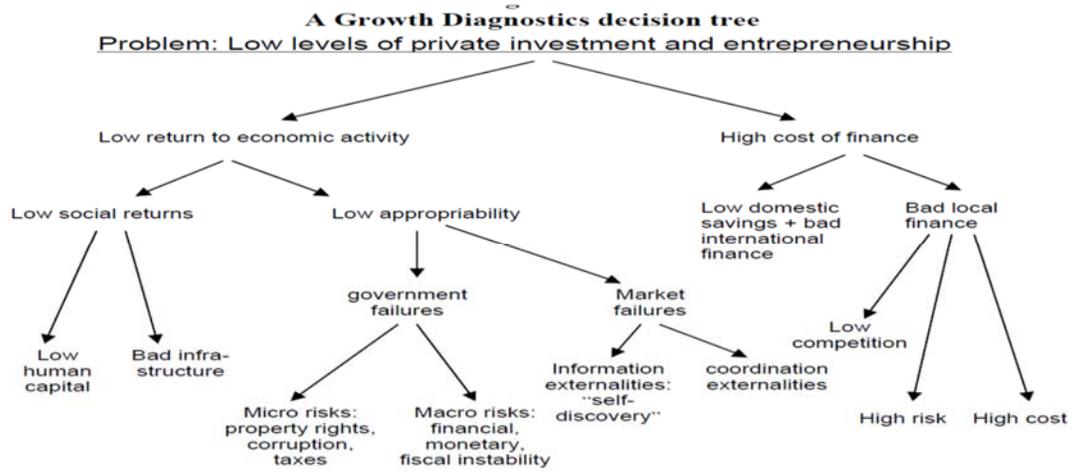
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Appendix

Box 1: HRV Framework



Source: Hausmann et al. (2008).

Table A1. Guinea: Values and Shares of Top-5 Exports

	1995		2005		2015			
	Value ('000 US\$)	Share of total exports	Value ('000 US\$)	Share of total exports	Value ('000 US\$)	Share of total exports (%)		
Aluminum ores and concentrates (incl. alumina)	454335.4	64.7	Aluminum ores and concentrates (incl. alumina)	518670.0	65.2	Aluminum ores and concentrates (incl. alumina)	780818.9	37.9
Pearls, precious & semi-precious stones	63959.84	9.1	Copper ores and concentrates; copper mattes, cemen	57456.5	7.2	Petroleum oils, oils from bitumin. materials, crude	479174.1	23.3
Inorganic chemical elements, oxides & halogen salts	51773.04	7.4	Petroleum oils, oils from bitumin. materials, crude	49829.2	6.3	Gold, non-monetary (excluding gold ores and concentrates)	367708.1	17.9
Coffee and coffee substitutes	47065.02	6.7	Pearls, precious & semi-precious stones	36674.8	4.6	Natural gas, whether or not liquefied	98300.14	4.8
Fish, fresh (live or dead), chilled or frozen	16939.93	2.4	Fish, fresh (live or dead), chilled or frozen	26580.0	3.3	Fish, fresh (live or dead), chilled or frozen	53747.71	2.6
Total	634073.2	90.3		689210.6	86.6		1779749	86.4
	701860.8	100		795731.6	100		2059262	100

Source: Author's calculations using data retrieved from UNCTAD trade database.

Note: Petroleum oils are in the list of Guinea's top-5 exports; however, this should represent re-exports as Guinea is not an oil producing country.

Table A2. Guinea: Exports structural composition

	1995-99	2000-04	2005-09	2010-14
Primary product exports (% of total exports)	14.9	13.9	26.5	39.8
Manufactured product exports (% of total exports)	82.0	78.2	70.3	47.8
Resources-based manufacture exports	80.3	77.5	69.1	46.8
Low technology manufacture exports	0.5	0.3	0.2	0.3
Medium technology manufacture exports	0.8	0.2	0.2	0.3
High technology manufacture exports	0.5	0.2	0.7	0.3
Unclassified (% of total exports)	3.1	8.0	3.2	13.3
Total (%)	100	100	100	100

Source: Author's calculations based on data retrieved from UNCTAD trade database.

Note: This table presents the shares of merchandise trade by product groups, based on three-digit level SITC Revision 3 commodity classification (Lall classification). Primary product exports represent raw commodity exports; resources-based manufacture exports represent a combination of agro-based (transformation of agricultural products) and other resources-based manufacture exports (basic transformation of minerals); low technology manufacture exports represent a combination of textile, garment, footwear and other low technology manufacture exports; medium technology manufacture exports represent a combination of automotive, process and engineering export products; high technology manufacture exports represent a combination of electronic and electrical exports and other high technology exports.

Table A3. Guinea's Sources of Growth (Growth Accounting)

	Output	Capital	Labor	TFP
1981-1985	1.99	0.57	1.39	0.04
1986-1990	4.12	1.29	2.09	0.73
1991-1995	3.62	1.23	3.56	-1.17
1996-2000	3.84	1.09	1.78	0.96
2001-2005	3.03	1.86	1.58	-0.42
2006-2010	2.12	3.03	2.14	-3.05
2011-2014	2.80	3.11	3.70	-4.01

Source: Pen World Tables (v.9), World Bank, Fund staff estimates.

Table A4. Guinea: The role of endogenous policy variables in TFP growth

Equation	Regression (1) g(TFP)	Regression (2) g(TFP1)	Regression (3) g(TFP2)	Regression (4) g(GDPL)
Growth of Terms of trade	-0.050 (-4.10)	0.053 (-4.39)	-0.049 (-4.03)	-0.056 (-4.19)
Growth of Inflation	-0.005 (-4.17)	(-0.005 (-4.27)	-0.005 (-3.98)	-0.005 (-3.60)
Growth of the share of Services VA in GDP	-0.065 (-2.09)	-0.058 (-1.86)	-0.060 (-1.94)	-0.062 (-1.85)
Growth of the share of Manufacture Export in Industry VA	0.006 (4.77)	0.006 (4.82)	0.006 (4.74)	0.006 (4.05)
Growth of Taxes on international trade as a share of current revenue	-0.034 (-3.25)	-0.037 (-3.57)	-0.038 (-3.65)	-0.036 (-3.17)
Growth of Import of capital goods	0.027 (2.94)	0.029 (3.15)	0.028 (3.10)	0.027 (2.70)
Growth of Official exchange rate	-0.033 (-2.02)	-0.034 (-2.11)	-0.039 (-2.41)	-0.038 (-2.17)
Constant	0.021 (9.48)	0.023 (10.32)	0.020 (8.95)	0.019 (7.56)
Adj R sq	0.87	0.88	0.87	0.85
Obs	18	18	18	18
Prob (F-statistic)	0.0000	0.0000	0.0000	0.0001
DW	1.95	1.92	2.01	1.79
dL	0.35	0.35	0.35	0.35
dU	2.23	2.23	2.23	2.23
d*	0.93	0.93	0.93	0.93

T-statistics are in brackets.

dL, dU are the 1 percent Durbin-Watson critical values from the Savin-White (1977) tables.

d* is the estimated true critical value of the Durbin-Watson Statistic.

Source: Staff calculation.

Source: World Bank (2008). "Guinea: Development Policy Review." Report No. 40054-GN. World Bank: Washington, D.C.

Table A5. Dynamics and effects of the determinants of TFP growth

Variable	Dynamics (2)	Regression* coefficients (3)	Effect on TFP growth rate (2x3)
Terms of trade index	-6.6	-0.050	0.330
Inflation rate	-19.2	-0.005	0.096
Official nominal exchange rate	-4.8	-0.033	0.158
Services sector (share of GDP)	3.7	-0.065	-0.240
Manufactured exports (share of industry VA)	-5.7	0.006	-0.034
Import of capital goods (share of total imports)	-7	0.027	-0.189
Total			0.12

Note: * stand for the coefficients associated with each variable as reported in column (1) of Table A4.
“Dynamics” stand for the variation of average annual growth rate of each variable between the period 1996-2000 and 2001-15, as explained in section 5.