Business Environment and Sectoral Productivity in Côte d'Ivoire

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Improving the business environment is a priority for countries seeking to create an attractive framework for private investment and foster private sector competitiveness. This paper investigates the effect of business environment on sectoral productivity in Côte d'Ivoire. We use sectoral Productivity per worker as measure of productivity and the Economic Freedom of the World index of Fraser Institute as measure of business environment in this study. Using data for the period 1991-2018 and the Fully Modified Ordinary Least Square (FMOLS) and Dynamic Ordinary Least Square (DOLS) estimation methods, the results indicate that improvement in the business environment in Cote d'Ivoire has a positive effect on productivity in agricultural, industry and services sectors. However, the effect is much stronger in the services and industrial sectors.

Keywords: business environment, productivity, sector, agriculture, industry, services

INTRODUCTION

Strengthening the attractiveness to investors has become a priority for countries. Since 2012, the government of Côte d'Ivoire has undertaken numerous reforms to improve the business environment. The government of Côte d'Ivoire worked to lower regulatory barriers and implement new policies and procedures that promote the private sector. Thus, these initiatives have enabled the country to be ranked among the 10 most reforming countries worldwide in 2014, 2015 and 2018.

At the same time, foreign direct investment (FDI) flows to Côte d'Ivoire have substantially increased. They increased from $407 million in 2013 to $913 million in 2018 (UNCTAD, 2019). In addition, the government's ambition is to make Côte d'Ivoire an emerging country by accelerating the structural transformation of the economy. The structural transformation of the economy cannot be done without an improvement of the productivity. Since 2012, total factor productivity of Côte d'Ivoire has followed an upward trend. On the same period the country has improved its business environment. This study seeks to determine whether improving the business environment contributes to improving productivity.

Productivity is generally defined as a relationship between a volume measure of output and a volume measure of input used. In this study, we analyze the relationship between labor productivity and the improvement of the business environment in Côte d'Ivoire. Labor productivity in a sector is defined as the ratio of the value added of the sector to the number of workers in the sector.

Several studies have shown that economic institutions and associated measures of the quality of economic governance such as control of corruption, rule of law, regulatory quality, contract enforcement, and, more generally, the investment and business environment are crucial determinants of economic development (Acemoglu et al. (2005), Rodrik et al. (2004), Singh (2015), Ani (2015)). Collier (2000) argues that the poor business environment leads to misallocation of resources and high transaction costs in Africa, particularly affecting manufacturing firms.

On the other hand, for Bost (2002), if the improvement of the business environment is an indispensable prerequisite (lower factor costs, training, infrastructure development, the fight against corruption, etc.), it is no longer sufficient to attract investors and develop new activities.

Generally, the evolution of FDI is used to assess the effect of the improved business environment on the economy. Beyond its effect on private investment, a sound business environment may improve productivity in different sectors of the economy. This is another potential gain from improving the business environment that is not always highlighted. Indeed, new foreign investors often come with new production methods that can help improve productivity in the sector in which they invest. Reforms to improve the environment can provide incentives for workers. This helps improve their productivity.

Moreover, the analysis of the relationship between these two variables is weakly studied at sectoral level. This study will contribute to enrich the literature. In this paper, we attempted to answer the following question: Does improvement in the business environment contribute to improving sectoral productivity in Cote d'Ivoire? The objective of this study is to analyze the relationship between the business environment and productivity across sectors in Côte d'Ivoire.

The paper is organized as follows: the second section gives an overview of the evolution of the business environment and productivity in Côte d'Ivoire. The third section presents the literature review. The methodology is presented in Section 4, followed by the presentation of the empirical results and their discussion in Section 5. Section 6 is devoted to the conclusion.

EVOLUTION OF THE BUSINESS ENVIRONMENT AND PRODUCTIVITY IN CÔTE D'IVOIRE

Côte d'Ivoire has made efforts to improve its business environment. Since 2012, it has initiated important reforms that have enabled the Ivorian economy to perform well and be ranked among the 10 most reforming countries in the world by the World Bank Doing Business, successively in 2014, 2015 and 2018. Its score in the Doing Business ranking has been rising since 2012. Despite this increase, Côte d'Ivoire's score remains lower than the top performers in Africa such as Mauritius, Rwanda, Morocco and Ghana.

According to the Doing Business 2020 report, Côte d'Ivoire's efforts to improve the business environment have enabled the country to score well in the areas of business creation (a score of 93.7 out of 100), access to credit (70 out of 100), facilitation of tax payments through online payments (68 out of 100), access to electricity (59.2 out of 100), and property registration (58.7 out of 100).

FIGURE 1
EVOLUTION OF THE SCORE OF COTE D'IVOIRE AND SOME AFRICAN COUNTRIES IN THE DOING BUSINESS RANKING FROM 2010 TO 2019

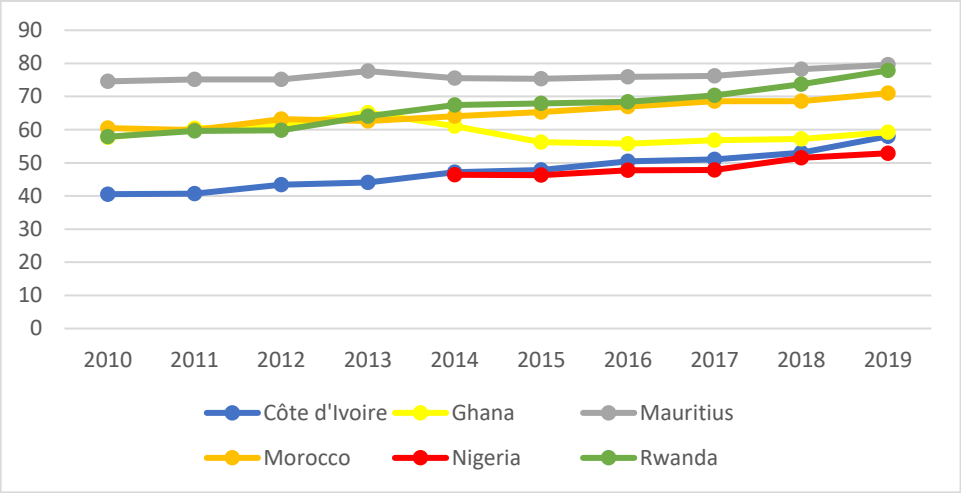
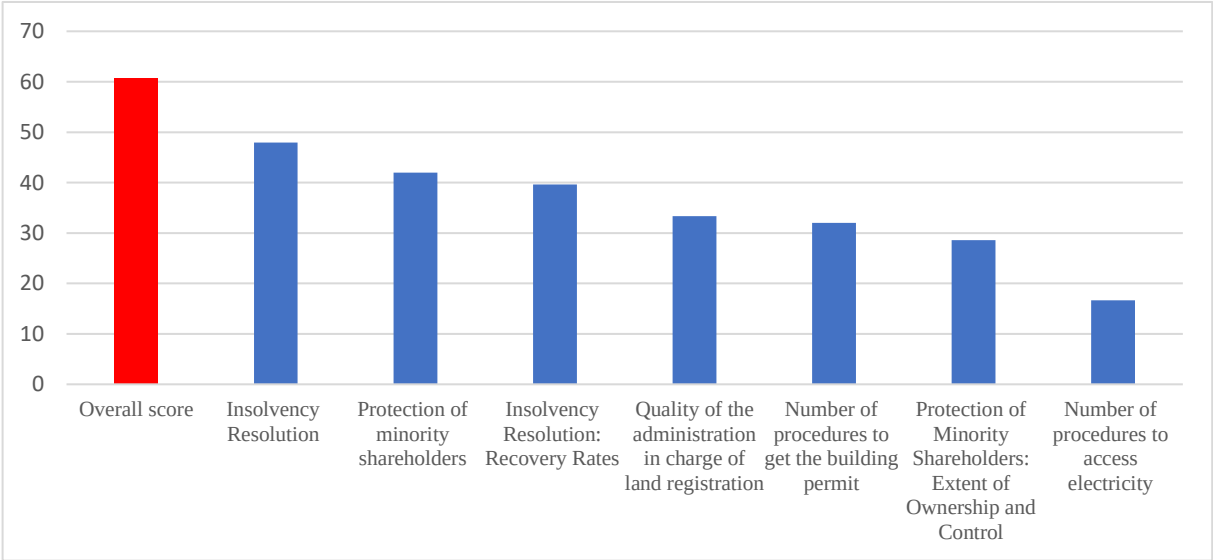


Figure 2 shows the areas where the score is lower than the overall country score of 60.7. There are at least seven (7) areas in which Côte d'Ivoire is lagging. These are: (i) the number of procedures to access electricity; (ii) the protection of minority shareholders: the extent of ownership and control; (iii) the number of procedures to obtain a construction permit; (iv) the quality of the administration in charge of land registration; (v) insolvency resolution: recovery rate; (vi) the protection of minority shareholders; (vii) insolvency resolution. Côte d'Ivoire should make efforts in these areas to improve its business environment.

FIGURE 2
AREAS OF DOING BUSINESS WITH LOW SCORES IN COTE D'IVOIRE IN 2019

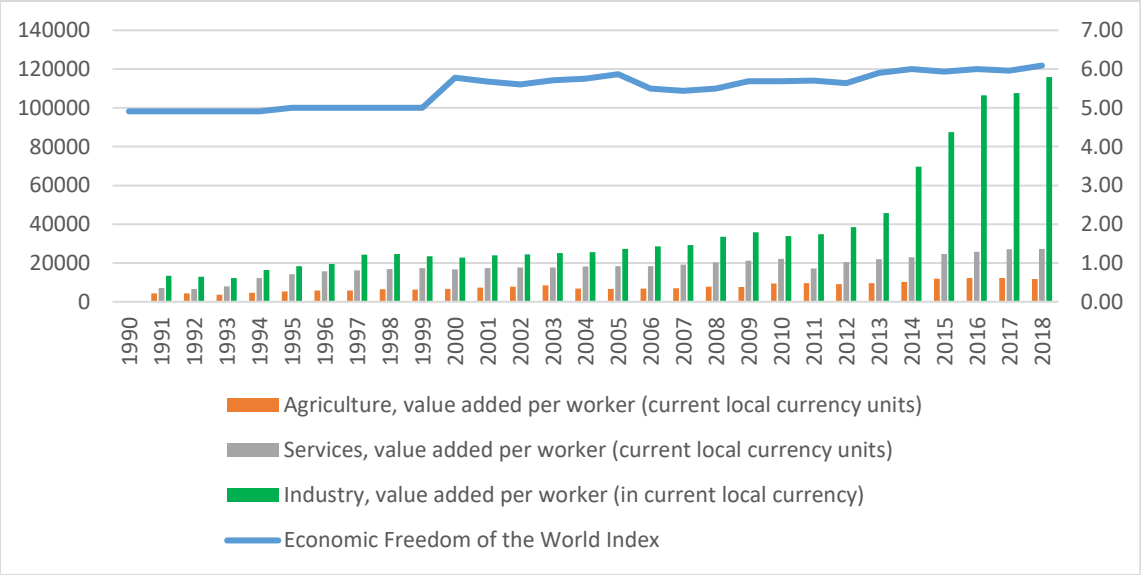


Source: World Bank's doing business data

Figure 3 reflects the evolution of value added per worker by sector and the Economic freedom of the World (EFW) index. It shows that while value added per worker in the industrial sector has increased

sharply since 2014, value added per worker in the agricultural and services sectors has not increased significantly. The industrial sector remains the highest value-added sector. Important investments made in this sector since 2012 have contributed to this result. In addition, the ambition of the country's leaders is to achieve the structural transformation of the economy. Côte d'Ivoire seems to have initiated the structural transformation process of its economy since 2014. This augurs well for sustained inclusive growth and poverty reduction. The industrial sector could have a significant ripple effect on the rest of the Ivorian economy. Reforms to the business environment to improve working conditions and compensation should improve worker productivity. As for the EFW index, it has risen slightly since 2012. Nevertheless, its level is not far from that of the early 2000s.

FIGURE 3
EVOLUTION OF THE VALUE ADDED PER WORKER BY SECTOR AND THE ECONOMIC FREEDOM OF THE WORLD INDEX OF CÔTE D'IVOIRE FROM 1990 TO 2018



LITERATURE REVIEW

A crucial determinant of prosperity and growth is the business environment of a country. The business environment is defined by the World Bank (2005) as the political, institutional and regulatory environment in which firms operate. According to the literature, the business environment affects a particular activity through the incentive to invest. In this section, we review the literature on several dimensions of the business environment and their relationship to output.

From a macroeconomic perspective, many empirical studies have shown the link between governance, institutions, and economic performance (Acemoglu et al. (2005); Hall and Jones (1999); Knack and Keefer (1995) and Rodrik et al. (2004)). Gyimah-Brempong (2002) shows that a one-unit increase in the Transparency International index measuring the perception of corruption reduces GDP per capita's level and growth rate by 0.4 and 0.66 percentage points, respectively. Mauro (1995) finds that a reduction in the corruption index by one standard deviation leads to a five-percentage point increase in the investment/GDP ratio and a half-percentage point increase in the GDP growth rate. Corruption is a rent-seeking activity that affects output through various channels. It distorts incentives and market signals, leading to a misallocation of resources. When talented individuals put their efforts into rent-seeking rather than productive activities, overall efficiency and output decline (Krueger, 1974; Murphy et al., 1991). Rent-seeking also increases production costs and transaction costs because it represents an uncertain and inefficient tax. Restuccia and Rogerson (2008) argue that a country's policies and institutions can create taxes "or subsidies on production

that distort the allocation of resources among firms. Rent-seeking also increases production costs and transaction costs because it represents an uncertain and inefficient tax.

For Benyacoub (2021), international direct investment has grown rapidly in recent decades and its destinations have expanded with globalization and enhanced by the liberalization of capital movements. According to him, the primary objective of each country is to attract FDI and prepare a favorable framework for their establishment because they positively impact growth, improve local management, increase productivity and allow a transfer of technology and financial resources.

A microeconomic approach is adopted by other authors to analyze the relationship between business environment and productivity. In these studies authors use firm data. Drame and Akitan (2022) show that improving productivity is a vital objective that continues to attract growing interest in both public policy and firm-level growth prospects. For them, high productivity has strong implications for economic growth and welfare. Their study examines the drivers of productive efficiency in the manufacturing sector in Senegal. Based on World Bank survey data, the results reveal that wage compensation and managerial experience are two key determinants that positively affect productivity within firms. They suggest that taking into account the salary and the experience in decision-making positions can increase manufacturing productivity.

Fries et al (2004) show that the presence of obstacles in the business environment significantly explains the increase in the costs of doing business, including corruption. They also show a significant correlation between firms engaged in the detour of state services and firms affected by this excessive influence on the formulation of laws and regulations. Their analysis of firm performance concludes that the quality of the business environment in 1999 was conducive to firm investment from 1999 to 2001. Moreover, this analysis showed that the misuse of state services significantly increased investment and growth of firms engaged in this activity, but at the cost of adversely affecting the productivity growth of other enterprises.

Some studies focus on productivity drivers. Labor productivity is key to economic development. Productive employees enjoy better working conditions and earn more. Many business environment factors influence productivity. Alexandrakis and Livanis (2013) examine whether a more liberal policy would lead to higher labor productivity expressed by total factor productivity, human capital, and capital intensity. Such testing was performed using panel analysis in Latin American and Caribbean countries and OECD countries. They concluded that economic freedom expressed by the Fraser Institute chain index would lead to economic growth through total factor productivity in OECD countries and through human capital in Latin American countries.

The productivity drivers were, where possible, assigned to “functional areas” of business environment reforms as described in DCED (2008): (i) simplifying business registration and licensing procedures; (ii) improving tax policies and administration; (iii) enabling better access to finance; (iv) improving labor laws and administration; (v) improving the overall quality of regulatory governance; (vi) improving land titles, registers and administration; (vii) simplifying and speeding up access to commercial courts and to alternative dispute resolution mechanisms; (viii) broadening public-private dialogue processes with a particular focus on including informal operators, especially women; (ix) improving access to market information. The paper of Veganzones-Varoudakis and Nguyen (2018) concludes that improving infrastructure quality, access to financing, use of information and communication technologies, skills and expertise of the labor force, and to a lesser extent, government relations, competition, security and political stability are important factors in firm performance.

According to Charif D'ouazzane and Mialed (2022), simplifying laws and procedures related to business initiatives and promoting financial actors and their tools makes the business climate more fluid and improves the competitiveness of ecosystems, while improving the quality of services to administrations. It also reduces payment delays and speeds up the resolution of disputes. They identify the most relevant factors for improving the competitiveness of entrepreneurial environments in six areas (governance and policy, environment and setting, supports, finance/funding, human capital and market) selected through a comparative study of different ecosystem theories and institutional relationships.

Different methodological approaches are used to analyze the relationship between the business environment and productive activities. Some authors use microeconomics approach and others

macroeconomics approach. Bah and Fang (2015) develop a general equilibrium model to assess the quantitative effects of the business environment, including regulations, crime, corruption, infrastructure, and access to finance, on output and total factor productivity (TFP) in sub-Saharan Africa. They find that the poor business environment is quite damaging for African development. Businesses lose large shares of their sales due to government regulations, poor infrastructure, corruption and crime. The implications of these losses are lower aggregate output and lower TFP.

Different indicators have been developed to measure improvements in the business environment at the aggregate level. Some indicators focus on firm-level microeconomic factors, while others focus on macroeconomic and political factors. Several indicators are used in the literature to measure business environment including the Global Competitiveness Index (GCI) of the World Economic Forum, the Doing Business Ranking of the World Bank, the Economic Freedom Index of the Heritage Foundation or Fraser Institute and the International Country Risk Guide (ICRG) data of the PRS Group. All these indicators intend to measure the business environment, albeit from a different perspective and with a different methodology. The indicators are also presumed to be closely linked to the economic performance of a country.

The Fraser Institute produces the Economic Freedom of the World index. According to this index, individuals enjoy economic freedom when the following conditions are met: (a) their property is acquired without the use of force, fraud or theft and is protected from the physical invasion of others; and (b) they are free to use, exchange or give their property to another, as long as their actions do not violate the equal rights of others. In this paper, we use the Economic Freedom of the World index of Fraser Institute as measure of business environment. Institutions that promote economic freedom are those that increase productivity (Dawson, 1998) and investment opportunities (Besley, 1995). The Index is scaled from zero to ten, zero implying lowest amount of freedom in an economy. Thus, a higher value of the index signifies more freedom in an economy, reflecting better quality of institutions. Government size is proxied by general government final consumption expenditure.

Studies analyzed in the literature review converge that a sound business environment improvement promotes investment and productivity. But the relationship between business environment and productivity is weakly analyzed at sectoral level. This paper focus on the sectoral analysis of the relationship between these two variables. The following section discusses the methodology of this study.

METHODOLOGY

In this section we present the model specification and the estimation method. Sectoral productivity is defined as output of the sector per unit of labor input and may be determined by a number of variables. We discuss the economic theory and empirics behind the relationship between the business environment and sectoral productivity.

SPECIFICATION OF THE MODEL

To analyze the relationship between the business environment and productivity in the three sectors, we follow Dua and Garg (2020). The growth accounting model can also adopt the productivity measurement approach in which a neoclassical production function. The model is specified as follows:

$$Y_t = A_t {K_t}^{\alpha} {L_t}^{1-\alpha} \quad (1)$$

where

Y_t is the output at period t ;
A_t is the level of technology at period t ;
K_t is the capital stock at period t ;
L_t is the labor input at period t ;

Assuming that each sector of an economy has a neoclassical production function with two inputs, capital (K^i) and labor (L^i), a combination of employment (E^i) and skills of the workforce or human capital (HK^i), productivity ($y^i=Y/E^i$) in sector i can be derived as the function of capital ($k^i= K^i/E^i$), workforce skills or human capital ($h^i=HK^i$) and technology (A^i) in sector i. In this study, we consider three sectors (agricultural, industrial and services sectors). Equation (1) becomes:

$$y_t^i = A_t^i {k_t}^{\alpha_i} {h_t}^{1-\alpha_i} \quad (2)$$

Converting equation (1) above in natural log terms, we obtain:

$$\ln(y_t^i) = \ln A^i_t + \alpha_i \ln k^i_t + (1-\alpha_i)\ln h^i_t \quad (3)$$

Thus, on the basis of the literature, we include business environment in the equation (3) as determinant of productivity. We can write productivity of a sector as a function business environment and other explanatory variables as follows:

$$lny_t^i = BUSI\_ENV_t + X_t + \varepsilon_t \quad (4)$$

where y_t^i is the productivity in sector i at period t;

$BUSI\_ENV_t$ is the business environment variable. It is measured by the economic freedom in the world index;

X_t is a set of explanatory variables such as imports, exports, investments and human capital;

ε_t is the error term.

Equation (4) becomes:

$$lnPROD_t^i = a_0 + a_1 INVEST_t + a_2 EXP_t + a_3 IMP_t + a_4 HDI_t + a_5 BUSI\_ENV_t + \varepsilon_t \quad (5)$$

$lnPROD_t^i$ is the logarithm of the value added per worker of sector i at period t. It is calculated with data from the World Bank database. Productivity per worker is equal to the ratio between the value added of the sector and the number of workers per sector (lnPROD_AGRI= value added of the agricultural sector. lnPROD_INDUS = value added of the industrial sector; lnPROD_SERV= value added of the services sector);

$INVEST_t$ is the country's investment as a percentage of GDP at period t. It is approximated by fixed capital formation at date t. The data come from the World Bank database.

EXP_t is the country's exports as a percentage of GDP at period t. The data are from the World Bank database. Trade openness of an economy is widely recognized as an important determinant of productivity of an economy. It is argued that imports of capital goods facilitate adoption of advanced technologies in the host economy, thereby increasing productivity. On the other hand, firms that are export oriented may engage in better competition that in turn makes them more productive. Kramo (2022) concludes that the effect of exports on productivity could differ from that of imports. In this study, we use export and import to capture the effect of trade openness on productivity. Due to luck of data on export and import by sector, we use the total export and import.

IMP_t is the country's imports as a percentage of GDP at period t. The data are from the World Bank database.

HDI_t is the human development index of the country at period t. Data come from the UNDP database. Dua and Garg (2019) find that human capital is a significant determinant of productivity of both developing and developed economies of Asia-Pacific.

$BUSI\_ENV_t$ represents the country's business environment at date t. It is measured by the Fraser Institute's Economic Freedom Index. The choice of this variable is guided by the availability of data and the quality of the methodology used to build this indicator.

The choice of the number of variables included in the model is guided by the number of observations. Indeed, the study period is relatively short due to the lack of data. We cannot include a large number of variables in the model. The data for the period 1991-1994 are considered equal to those for 1990.The study covers the period of 1991 to 2018 inclusive. All the data are sourced from the World Bank, International Labor Organization (ILO) and Fraser Institute databases. Table 1 describes the basic characteristics of the explained and explanatory variables by descriptive statistics.

TABLE 1
DESCRIPTIVE STATISTICS OF DEPENDENT AND INDEPENDENT VARIABLES

	BUSI_ENV	INVEST	IMP	EXP	HDI	lnPROD_AGRI	lnPROD_INDUS	lnPROD_SERV
Mean	5.50	12.95	34.1	40.7	0.45	3.86	4.49	4.23
Median	5.66	11.58	34.2	41.6	0.43	3.85	4.42	4.25
Maximum	6.09	23.66	44.74	53.82	0.53	4.09	5.06	4.43
Minimum	4.91	8.25	22.92	22.64	0.40	3.56	4.09	3.82
Std. Dev.	0.41	4.38	6.57	8.96	0.04	0.143	0.27	0.15

ESTIMATION METHOD

The empirical analysis of the long-run relationship between business environment and sectoral productivity begins with unit root tests. The Augmented Dickey-Fuller and Phillips-Perron tests were used. Phillips and Hansen's (1990) modified least squares (FMOLS) and dynamic least squares (DOLS) methods were used for the estimation of the long-run relationship. The DOLS and FMOLS estimators are generally preferred over the OLS estimator because they take care of small sample size bias and endogeneity bias. Parametric DOLS are preferred to FMOLS when the model contains both level stationary variables (I0) and first order integrated variables (I1). The FMOLS method imposes requirements that all variables be integrated of order 1. In view of the statistical quality of data, modified least squares and double least squares are used for the estimation of the model. According to Kao et Chiang (2001) DOLS is a better estimator than FMOLS.

EMPIRICAL RESULTS AND DISCUSSIONS

In this section we present the unit roots tests, cointegration and equations estimation results.

RESULTS OF THE UNIT ROOT AND COINTEGRATION TESTS

The Augmented Dickey-Fuller and Phillips-Perron tests were used to analyze the stationarity of the variables. The results of the stationarity test are presented in the table 2 below. They indicate that all variables are stationary in first difference.

The cointegration test was performed to ensure the existence of a long-term relationship between the variables. The table 3 below summarizes the results of the cointegration tests. In this study the Johansen cointegration test is used. The results indicate that there is at least one cointegrating relationship for each of the equations. Thus, there is a long-term relationship between the variables.

TABLE 2
RESULTS OF THE STATIONARITY TESTS

	Augmented Dickey-Fuller				**Phillips-Perron**			
	Level			**First difference**	**Level**			
	Constant	Trend & constant	None		Constant	Trend & constant	None	**First difference**
BUSI_ENV	-1,199 (0,65)	-2,70 (0,243)	1,128 (0,928)	-5,55*** (0,0000)	-0,955 (0,754)	-2,746 (0,227)	1,977 (0,98)	-5,55*** (0,0000)
INVEST	-0,942 (0,759)	-1,433 (0,827)	0,6739 (0,85)	-4,37*** (0,0001)	-1,0495 (0,720)	-1,634 (0,752)	0,6058 (0,84)	-4,37*** (0,0001)
EXP	-0,8276 (0,795)	-0,75 (0,958)	-0,467 (0,504)	-4,8*** (0,000)	-1,04 (0,723)	-0,634 (0,968)	-0,47 (0,501)	-4,85*** (0,0000)
IMP	-1,255 (0,635)	-0,976 (0,931)	-0,401 (0,53)	-5,13*** (0,0000)	-1,453 (0,542)	-0,913 (0,939)	-0,409 (0,53)	-5,14*** (0,0000)
HDI	7,069 (1,000)	0,6959 (0,999)	0,6155 (0,842)	-6,25*** (0,0001)	23,496 (0,999)	5,0654 (1,00)	5,552 (1,00)	-6,87*** (0,0000)
lnPROD_AGRI	-0,896 (0,774)	-2,5414 (0,31)	1,9173 (0,984)	-4,69*** (0,0000)	-0,843 (0,79)	-2,541 (0,307)	2,3448 (0,994)	-4,69*** (0,0000)
lnPROD_INDUS	0,866 (0,99)	-1,52 (0,796)	2,164 (0,991)	-2,51*** (0,0143)	0,7996 (0,992)	-1,127 (0,91)	3,074 (0,99)	-2,51*** (0,0143)
lnPROD_SERV	-2,558 (0,113)	-2,487 (0,33)	2,269 (0,99)	-3,58*** (0,0009)	-2,818 (0,069)	-2,538 (0,31)	2,088 (0,99)	-3,59*** (0,0009)

*** stationarity at a 1% level of significance.
Values in parentheses are p-values.

TABLE 3
JOHANSEN COINTEGRATION TEST

Agricultural sector equation results

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.878467	130.4073	95.75366	0.0000
At most 1 *	0.784667	75.61055	69.81889	0.0160
At most 2	0.512863	35.68575	47.85613	0.4123
At most 3	0.354386	16.98631	29.79707	0.6411
At most 4	0.175991	5.609904	15.49471	0.7411
At most 5	0.021947	0.576979	3.841466	0.4475

Industrial sector equation results

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.797991	101.3277	95.75366	0.0196
At most 1	0.614274	59.74221	69.81889	0.2433
At most 2	0.536956	34.97387	47.85613	0.4494
At most 3	0.288450	14.95563	29.79707	0.7830
At most 4	0.169749	6.107592	15.49471	0.6828
At most 5	0.047705	1.270900	3.841466	0.2596

Services sector equation results

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.886930	129.1498	95.75366	0.0000
At most 1 *	0.725014	72.47626	69.81889	0.0302
At most 2	0.479416	38.90938	47.85613	0.2639
At most 3	0.385060	21.93648	29.79707	0.3020
At most 4	0.247736	9.294467	15.49471	0.3389
At most 5	0.070225	1.893117	3.841466	0.1688

EQUATION ESTIMATION RESULTS

We present the results of estimation of the equations for the three sectors from FMOLS and DOLS.

Agricultural Sector Equation Estimation Results

Table 4 summarizes the results of the estimation of the agricultural sector equation. The findings from the FMOLS and DOLS models indicate a positive linkage between business environment and productivity per worker in agricultural sector. Results from the DOLS estimation indicate that improvements in the business environment positively and significantly affect the productivity of the agricultural sector. When the business environment index increases by one unit, productivity per worker in the agricultural sector increases by 29%. Exports also affect positively and significantly the productivity per worker in the agricultural sector. When exports as a percentage of GDP increase by one unit, productivity per worker in the agricultural sector increases by 3.3%. Indeed, Ivorian agriculture is oriented to export. Export opportunities increase the productivity of this sector. On the other hand, imports have a negative and statistically significant effect on the productivity in the agricultural sector. Kramo (2022) concludes that the effect of exports on productivity could differ from that of imports. Investment has a positive and statistically significant effect on the productivity in the agricultural sector. With a rising of the investment as a percentage of GDP by one unit, the productivity per worker in the agricultural sector increases by 3.4%.

TABLE 3
AGRICULTURAL SECTOR EQUATION ESTIMATION RESULTS

	FMOLS results			**DOLS results**		
	Coefficient	t-stat	p-value	Coefficient	t-stat	p-value
BUSI_ENV	0,166***	5.239667	0,0000	0,29***	6,736746	0,0025
INVEST	0,012***	4,115627	0,0005	0,034***	5,867371	0,0042
EXP	0,009***	4,129036	0,0005	0,033***	8,389849	0,0011
IMP	-0,007**	-2,60689	0,0156	-0,032***	-6,94682	0,0023
HDI	1,289***	2,995941	0,0069	0,026	0,032832	0,9754
C	2,094***	19,96695	0,0000	1,543***	6,794311	0,0025
R-squared	0,9225			0,9923		
Adjusted R-squared	0,9040			0,9541		

*** 1% level of significance;
** 5% level of significance.

Industrial Sector Equation Estimation Results

The results of the estimation of the industrial sector equation are presented in Table 5. The findings from the DOLS model indicate a positive linkage between business environment and productivity per worker in industrial sector. Business environment positively and significantly affects the productivity of the industrial sector. According to the DOLS estimation results, when the business environment index increases by one unit, productivity per worker in the industrial sector increases by 44.1%. This result is consistent with those of Fries et al (2004) and Veganzones-Varoudakis and Nguyen (2018). Investment has a positive and statistically significant effect on the productivity of workers in the industrial sector. When investment as a percentage of GDP raises by one unit, productivity per worker in the industrial sector increases by 6%.

TABLE 4
INDUSTRIAL SECTOR EQUATION ESTIMATION RESULTS

	FMOLS results			DOLS results		
	Coefficient	t-stat	p-value	Coefficient	t-stat	p-value
BUSI_ENV	0,180***	4,400760	0,0002	0,441***	13,74224	0,0002
INVEST	0,025***	6,837663	0,0000	0,064***	14,53661	0,0001
EXP	0,005*	1,886070	0,0732	0,006	2,067869	0,1075
IMP	-0,006	-1,655741	0,1126	0,004	1,311176	0,2600
HDI	3,180***	5,703565	0,0000	-0,939	-1,56090	0,1936
C	1,726***	12,70206	0,0000	1,217***	7,116743	0,0021
R-squared	0,9695			0,9987		
Adjusted R-squared	0,9622			0,9922		

*** 1% level of significance;
** 5% level of significance;
* 10% level of significance.

Services Sector Equation Estimation Results

Table 6 presents the results of the estimation of the services sector equation. The findings from the FMOLS and DOLS models indicate a positive linkage between business environment and productivity per worker in services sector. The improvement in business environment positively and significantly affects

services sector's productivity. According to the DOLS estimation results, when the business environment index increases by one unit, productivity per worker in the services sector raises by 44.3%. There is also a positive relationship between exports and productivity per worker in the agricultural sector.

Investment has a positive and statistically significant effect on the productivity per worker in services sector. An increase in investment as a percentage of GDP by one unit leads to an increase in productivity per worker in the services sector of 5.9%. There is a negative and statistically significant relationship between productivity per worker in services sector and the HDI. Lee and McKibbin (2018) find a similar result for Asian economies. This affirms the relatively low productivity growth in the services sector.

TABLE 5
SERVICES SECTOR EQUATION ESTIMATION RESULTS

	FMOLS results			DOLS results		
	Coefficient	t-stat	p-value	Coefficient	t-stat	p-value
BUSI_ENV	0,227***	4,902000	0,0001	0,443***	8,080305	0,0013
INVEST	0,028***	6,784228	0,0000	0,059***	7,917266	0,0014
EXP	0,010***	3,317836	0,0033	0,018**	3,485726	0,0252
IMP	-0,001	-0,410897	0,6853	-0,003	-0,54439	0,6151
HDI	-0,491	-0,778980	0,4447	-5,255***	-5,11729	0,0069
C	2,46***	16,00559	0,0000	2,630***	9,007485	0,0008
R-squared	0,8417			0,9878		
Adjusted R-squared	0,8040			0,9272		

*** 1% level of significance;
** 5% level of significance;
* 10% level of significance.

Comparing results from the estimation of the equations of the three sectors, it appears that the effect of business environment on productivity is more important in the industrial and services sectors. Productivity per worker in the industrial sector has increased the most in recent years compared to the other two sectors. In most countries, output in industry and services consists of a large fraction of output from the formal economy. Labor market reforms help explain the positive relationship between an improved business environment and productivity in Côte d'Ivoire. Indeed, the labor code was reformed in 2015 in Côte d'Ivoire. The minimum wage has been increased by 60% in 2013.

In addition, the Ivorian agricultural sector is still dominated by small producers (family farms) operating in the informal sector. The majority of Ivorian farmers use rudimentary means and method of production. They are therefore unable to take full advantage of improvements in the business environment. Initially, the economies of Sub-Saharan Africa like Côte d'Ivoire are often viewed as primarily based on agriculture. But agricultural value-added share in the Ivorian economy is declining.

CONCLUSION

The Ivorian government was committed to a process of constant improvement of the business environment. This study aimed to analyze the relationship between the business environment and productivity across sectors in Côte d'Ivoire. The results of the analysis indicate a positive and significant relationship between the business environment and productivity per worker in all the three sectors. However, the effect is much stronger in the services and industrial sectors.

In light of these results, the government should encourage actors in the agricultural sector to formalize and modernize their activities to take full advantage of the improved business environment. The government should also continue its initiatives to improve the business environment, especially in areas where the

country scores are low in the Doing Business report such as (i) the number of procedures to access electricity; (ii) the protection of minority shareholders: extent of ownership and control; (iii) the number of procedures to obtain a construction permit; (iv) the quality of the administration in charge of land registration; (v) insolvency resolution: recovery rate; (vi) the protection of minority shareholders; (vii) insolvency resolution.

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