

The Efficiency of Entrepreneurship Indicators and Policy Implications in West Africa

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Abstract

This study investigated the efficiency of entrepreneurship at macro level in anglophone and francophone West African, using selected indicators across countries. The study made use of data envelopment analysis (DEA) approach to evaluate the performance. From the efficiency analysis on the Anglophone countries, there was an improvement in scale efficiency which implies that the countries within embraced technology and as well improved on their managerial allocative efficiency, and therefore optimizing their DMUs (countries) economies of scale. All the DMUs were constant under pure technical efficiency change (PECH) and scale efficiency change (SECH) except in Sierra Leone. While the efficiency analysis on the Francophone countries revealed a sharp decrease on average productivity but Mali, Benin and Burkina Faso experienced increase in productivity except in Ivory Coast where the productivity and technical efficiency was regressed. However, the general inefficiency/short-fall in all the countries examined was from their technical inefficiency in terms of managerial skills deficit required to optimally increase the return on outputs from the given set of inputs. Cumulatively, the findings revealed that PECH is less than SECH across the West African countries. It was however recommended that public policies should be more focused on engendering technical efficiencies of entrepreneurship pursuit in the Region.

Keywords: Entrepreneurship, Efficiency, Anglophone, Francophone, West Africa

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1. Introduction

This study reports on an application of data envelopment analysis (DEA) to assess the performance of entrepreneurship indicators in selected anglophone and francophone countries of West Africa. The performance assessment aims at determining efficiency which in a broader sense refers to policy implications that allow countries to better utilize its resources towards promoting entrepreneurship. The need to ascertain the performance of entrepreneurship has spawned a remarkable re-engineering of policies to achieve its numerous advantages in the economy. According to Alan and Stuart (1999), government institutions such as the central banks all over the world stimulate market conditions through policies. However, the amount of entrepreneurial outcomes generated from a given amount of economic inputs depends primarily on the rules of the game, or policies, under which entrepreneurs operate. Recently, ECOWAS adopted a monitoring and evaluation mechanism for monitoring and executing Vision 2020 agenda, which is focus on poverty alleviation. This strategy is based on the consolidation of achievements, as well as the development and harmonization of sectoral policies. However, economic changes due to the dynamics of each individual country such as globalization, technological changes, politics and colonial antecedent are reasons why their macroeconomic policy stance and objectives differ. For instance, Anglophone countries in West Africa are known to operate independent macroeconomic regulatory institutions i.e. central banks in respective countries. The existence of the market could either have positive or adverse effects on entrepreneurship performances, when compared with Anglophone countries. Empirical studies on stock markets in West Africa have found that: it has an unidirectional causality from finance to growth (Enisan & Olufisayo (2009); that it has a positive significant relationship with domestic private investment; but has a negative and non-significant impact on foreign private investment (Ezeoha, Ogamba & Onyiuke, 2009); that long-run relationship exist between stock market and development and growth (N'zue, 2006); that the overall stock market development has a significant impact on economic growth (Adjasi & Biekpe, 2006); and that there were significant positive relationship between stock market and overall financial development (Beck & Levine, 2004). Indeed, the emergence of stock markets in West Africa calls for an assessment to inform policy makers on how to promote entrepreneurship through macroeconomic policies.

However, the macro environment, often used interchangeably with external environment encompasses variables that are not within the control of the entrepreneur. Entrepreneurship scholars have identified several of these external variables. Principal among the factors identified are the influences of regulations and polices (Baumol, 1990). These factors are of paramount importance to entrepreneurship because the assessment of the efficiency of policies helps the entrepreneur to identify conditions that may impede the progress of business and therefore, plan ahead to forestall such occurrence. This is necessary because in the evolution of public policy and governance, entrepreneurship is increasingly recognised as a crucial element in fostering economic development

and growth, especially at the regional level. According to Huggins, Morgan and Williams (2015), regional entrepreneurship differentials emerged due to the spatial and place-based nature of three underlying factors: first, the nature of markets; second, the nature of innovation systems; and third, the nature of place-based cultures, communities and the institutions they establish. However, ECOWAS's Vision 2020 strategy aims to develop the region by harmonising sectoral policies across countries.

Coming to terms with the context of entrepreneurship indicators, the definitions of entrepreneurship are not exactly the same because it has been viewed from different perspectives. Taking a cue from an institutional attempt, the UNDP (2010) defined entrepreneurship as the process of using certain initiatives to transform a business concept into a new venture or to grow and diversify an existing venture or enterprise with high growth potential. Entrepreneurship is however often linked to economic growth. Likewise, Schumpeter, (1934) recognized the role of entrepreneurship in economic development. However, entrepreneurship is a global phenomenon that is central to economies across the world and has gained rapid attention of policy makers because of its abilities to create wealth, generate income, output and employment (OECD, 2011). The recognition of entrepreneurship as a driver of economic growth has led policy analyst, researchers and economic theoreticians to improve on the measurement of entrepreneurship at country level. In this context, the study derived a measure of entrepreneurship across countries from previous studies by the Global Entrepreneurship Monitor (GEM), measures and drivers of knowledge economy, reports of the technology and innovation foundation, Bergmann *et al.*, (2013): Murdock (2009), Saisana and Munda (2008), Atkinson & Correa (2007), Allen (2001). However, we adopt the selected entrepreneurship indicators at macro level based on the previous studies as: economic growth, revenue from export, domestic private investment and equity portfolio/stocks which explains the entrepreneurship activities in countries.

1.1 Problem statement

Poor public policy undermines entrepreneurial behaviour and reduces public welfare (McCaffrey, 2015). While entrepreneurship is a central aspect of economic development and public policy concern in most countries, scholarly research about their entrepreneurial activities is comparatively scarce. Nevertheless, entrepreneurship and public policy touches on a variety of underlying issues that require addressing before policy formulations can be suggested in countries. An overlook of this fact may lead to policy failure, or unforeseen effects of public policies (Parker 2007). For instance, the relationship between the composition of government spending and entrepreneurship activity has been woefully under-researched (Islam, 2015). Entrepreneurship activities have been found all over the world to be capable of making positive impacts on the economy of a nation and the quality of life of the people. Yet, they are often hampered by the conditions in their business environment in most developing countries (Ncube, 2015). Many countries face the problem of inefficient utilization of various inputs or resources. According to Leibenstein (1987) the most significant attribute of entrepreneurship is gap filling. Entrepreneurship performance measurement is about checking for the inefficiencies in the utilization of various resources through unique ways. It is the duty of researchers and policy analyst to provide knowledge on the gap or deficiencies that exist in entrepreneurship activities. However, the deficiencies in production function arise because all the inputs in the production function cannot be put to adequate use. For instance some input are imprecise and their output is indeterminate. However, entrepreneurship is involved in the process of organizing all the inputs to achieve efficiency in an economy. Thus, entrepreneurship is a function of input completing and gap filling.

2. Literature review

The study adopts the financial capital/liquidity theory of Keynes (1936) which explains how liquidity scarcity is one relevant impediment to entrepreneurship activities and how entrepreneurs play an important role in the economy. In this sense, Keynes (1930, 1936) and Schumpeter (1934) approaches can be used as complementary to explain the liquidity situation and to provide adequate measure to eliminate it and reduce its negative effects in an economy. The theory implies that there must be enough funds to satisfy the investment necessities and this involve the functions of central banks to act as lenders of last resorts, so that monetary policies can accommodate such necessities while fiscal policies favours the disposable income status of citizens, corporations and entrepreneurs alike, in order to avoid financial problems. The theory is premised on the entrepreneurs' belief that financial capital is an economic resource measured in terms of money and used for productive purposes within the economy that their activities are based. Studies show that access to finance makes the establishment of new firms possible (Evans & Jovanovic, 1989; Holtz-Eakin *et al.*, 1994 and Blanchflower *et al.*, 2001). This theory implies that the availability of financial capital made available by policies empowers people to acquire resources and to exploit entrepreneurial opportunities effectively (Clausen, 2006). It further explains that having access to capital at the beginning of an enterprise is a condition for predicting whether a new enterprise will grow but not necessarily important for the founding of a new venture (Hurst & Lusardi, 2004). The importance of this theory is that the availability of finance promotes entrepreneurship activities in countries. Alege (2009) and Orisadare (2012), in their empirical study conclude that appropriate and suitable macroeconomic policies would be required for sustainable growth. However, despite the key place the policies occupy in economic theory, empirical evidence is

minimal on their effects on entrepreneurship in West Africa.

3. Research methodology

As a follow up to the objectives of the study, we consider efficiency as a measure of performance. However, various perspectives can be used and several internal and external factors can affect their outcomes while using the data envelopment analysis (DEA). Simon (1997) explains efficiency as fitness or power to accomplish or success in accomplishing the purpose intended. Later, efficiency acquired a second meaning of the ratio of inputs to outputs, between effort and results, expenditure and income and cost and the resulting pleasure (Ejiofor 1987).

3.1. Efficiency methodology

The limitations encountered by ration and regression methods brought about more advanced methods for measuring efficiency (Paradi & Zhu, 2013). Not less than five major methods ranging from the non-parametric to a parametric approach have been used in literatures to measure efficiency (Banker et al., 1989; Bauer, 1990; Seiford and Thrall, 1990; Aly and Seiford, 1993; Greene, 1993; Grosskopf, 1993; Lovell, 1993; Charnes et al., 1994). Methods such as data envelopment analysis (DEA), free disposal Hull (FDH), stochastic frontier approach (SFA), distribution-free approach (DFA) and the thick frontier approach (TFA) However, these methods differ in specifications and assumptions (Thanassoullis *et al.*, 1996). However, Bauer *et al.*, (1998) exhaustively estimated the available methods and found the non parametric DEA to be consistent with other parametric methods in terms of efficiency distribution, and ranking order. As a corollary, Banker and Natarajan (2008) and Banker (1993) affirms that the DEA estimators have adequate statistical qualities to measure the effects of variables on performance. The efficiency of the entrepreneurship indicators is measured in selected Anglophone and Francophone countries in West Africa using DEA. It is generally understood that efficiency is influenced by an extensive range of factors, and the observed findings depend upon both the methodological approach utilized and the geographical area investigated. However, this differs across countries. These approaches differ in the assumptions imposed on the specifications of the inefficiencies and random error (Berger & Humphrey, 1997; Thanassoullis, et al., 1996). The DEA approach developed by Charnes, Cooper and Rhodes (1978) is intended as a method for performance evaluation and benchmarking against best-practice. The DEA model is able to include multiple inputs and outputs, and because it has the potential to provide information to policy makers to improve the productive efficiency in countries.

3.2. Model specification

From literature on efficiency measurement, efficiency in this study was estimated using CCR (Charnes, Cooper & Rhodes, 1978) and BCC (Baker, Charnes & Cooper, 1984) models. These models incorporate the variable return to scale (VRS), the constant returns to scale (CRS) and scale efficiency in order to capture efficiency scores. The CCR model is expressed as:

$$\text{Virtual input} = v_1x_1 + \dots + v_ix_i = \sum_{i=1}^m v_ix_i$$

$$\text{while the Virtual output} = u_1y_1 + \dots + u_ry_r = \sum_{r=1}^s u_ry_r \quad \text{in order to specify the model to}$$

measure entrepreneurship indicator efficiency, we have ten (n) DMUs using (m) input to produce (s) outputs. The technical efficiency (TE) is represented using the input orientation CCR model to give estimates of efficiency under the return to scale presented as:

$$TE = \frac{\sum_{r=1}^s (U_r Y_{ro})}{\sum_{i=1}^m (V_i Y_{io})}$$

$$\text{Efficiency} = \frac{\text{Virtual output}}{\text{Virtual input}} = \frac{\sum_{r=1}^s u_r y_r}{\sum_{i=1}^m v_i x_i} \leq 1 \quad v_r, x_i \geq 0, i=1, \dots, m, j=1, \dots, n, r=1, \dots, s$$

However, efficiency is attained by any DMU if and only if, none of its inputs or outputs can be improved without negatively affecting other inputs or outputs (Koopmans, 1951). The equation will be used for DEA by inculcating as a constraint.

3.3. Variable specification

Not many studies have investigated the relationship between macroeconomic policies and entrepreneurship at cross country level. However, the few that exist regress a measure of entrepreneurship on policy instruments along with other control variables. The recognition of entrepreneurship as a driver of economic growth has led policy analyst, researchers and economic theoreticians to improve on the measurement of entrepreneurship at national level. For instance, at an international level, programs by the World Bank, Eurostat and private organisations such as GEM have developed an internationally comparable data (Ahmad and Hoffman, 2007). Therefore, the entrepreneurial activities in countries was adopted as our dependent variable measured by the entrepreneurship indicators as measured by the GEM minus innovation measures and given the peculiarities of availability of data. This is because it is impossible to adopt the full indicators of entrepreneurship activities as measured previous studies, GEM and the knowledge economy indicators. However, we adopt specific entrepreneurship indicators for the study using OECD indicators in Ahmad and Hoffman (2007) along with some indicators of GEM and knowledge economy. The selected entrepreneurship indicators used in this study is explained as follows:

Revenue from export: this is the income realized from the exportation of creativity and innovativeness within the economy. According to Adesoji and Sotubo (2013) exportation is required by any economy to enhance revenue and usher in economic growth and development. Export is a catalyst necessary for the overall development of an economy (Abou-Strait, 2005). An increase of this variable in countries is an indication that the economy is entrepreneurial

Domestic private investment: there is a growing literature on the link between private investment and economic growth in developing countries due, largely, to the fact that developing countries are fond of formulating sound investment friendly policies to attract foreign investment studies by Khan and Reinhart (1990), Harigan and Mosely (1991), Greenway and Morrissey (1992), Serven and Salimano (1992), Gunning (1994), Collier (1995), Akinyosoye, Akande, Akpokodje, and Mbanefoh (1998), Dehn (2000), Lemi and Asefa (2001), Mamatzakis (2001), Rashid (2005), Tawiri (2010). This variable is represented by the Gross fixed capital formation of the, private sector in countries.

Equity portfolio/stocks: due to the emerging trend of the region stock exchange markets in West Africa, we deem it fit as a variable for measuring entrepreneurship. More so capital markets contribute to economic growth in studies (Enisan and Olufisayo (2009), Ezeoha *et al.* (2009), N'zue (2006), Adjasi and Biekpe (2006), Beck and Levine (2004)). This is because liquidity is the means by which entrepreneurship activities are financed. More liquid markets channel more savings and also encourage investment in long-term projects that potentially have higher returns. Therefore, using lagged values of total value traded as a percentage of GDP, we expect liquidity to be positively correlated with the measure of stock market development.

Economic growth: this variable is measured by GDP per capital which is the total output of a country that takes the gross domestic product and divides it by the number of people in the country. We use real GDP per capita instead of real GDP to measure domestic income in our model. According to literature, high growth in real GDP per capita signifies increased entrepreneurship outcomes.

3.4. Study population

The population for the study comprises of five countries within both Anglophone and Francophone countries in West Africa. The ten countries namely; the Gambia, Ghana, Liberia, Nigeria, Sierra Leone, Code I'voire, Mali, Burkina Faso, Senegal and Benin. These countries were purposively selected into the divides based on the hierarchy of their GDP performance.

3.5. Data sources

Cross-country Panel data will be used to analyze the phenomenon in West Africa. The study derived annual data from ten selected countries from 2000 to 2014 period based on the secondary data from the World Bank Development Indicators.

4. Presentation and analysis of results

4.1. The Efficiencies in Anglophone West African Countries

During the period under review, the following observations were made on the: Total Factor Productivity Change (TFPCH); Technical Efficiency Change (EFFCH); Technological Change (TECHCH); Pure Technical Efficiency Change (PECH) and Scale Efficiency Change (SECH) of entrepreneurship indicators in Anglophone West African countries using a Data enveloping analysis (DEA).

2000-2001: on the average, there was high productivity retrogression by 20.4% in the period while technical efficiency change was progressed by 1.5%. Given the value of technological change of 0.784, it could be deduced that productivity gains are more likely to be as a result of improvements inefficiency in the period. The source of inefficiency is PECH (+0.3%) which is success in adopting correct managerial decisions concerning input and output quantities but the value is less than SECH (+1.2%). It means that it is highly likely that an improvement in

scale efficiency has generated the resulting efficiency change. The DMUs are the countries used in this instance. All the DMUs are operating at productivity regress but Sierra Leone needs to be emulated because she has high technical efficiency change of 7.9% in the period and as well efficient as a result of PECH and SECH values of 1.7% and 6.2% respectively.

2001 – 2002: Despite the fact that average productivity growth was higher than the previous period, productivity is still regressed by 19.7%. The technical efficiency change (EFFCH) is constant while technological change was decreased by 19.7%. The source of inefficiency which is pure technical efficiency change (PECH) was constant and SECH was as well constant in the period. Except Sierra Leone, all other DMUs are operating at a productivity regress. Technical change was increased by 15.3% in Sierra Leone likewise the productivity growth (15.3%). The source of inefficiency and scale efficiency change were constant in the period.

2002 – 2003: The productivity at this period was progressed by 1% on the average. The technical efficiency change with the source of inefficiency (PECH) and scale efficiency change were all constant in the period. The technological change (TCHCH) was 1% progressed. It was observed in the period that Ghana, Liberia and Nigeria experienced productivity growth of 3.7%, 14.7% and 50% respectively in the period. And the same results were observed under technological change for each country (DMUs). The technical efficiency change, PECH and SECH were constant in the period.

2003 – 2004: There was a relative regress in the productivity by 1.3% while the EFFCH, PECH and SECH were constant on the average in the period. Liberia and Sierra Leone experienced productivity regress by 23% and 24% respectively in the period while The Gambia, Ghana and Nigeria experienced productivity progress by 5.6%, 43.4% and 5.7% respectively in the period. The technological change (TECHCH) follows the same trend with the TFPCH in the period. Again, since the value of technical efficiency change (EFFCH) is greater than the value of TECHCH, the productivity gains are more likely to be as a result of improvements in efficiency but none of the DMUs could emulate one another in order to be efficient.

2004 – 2005: On the average, the productivity was total regressed and technological change was zero. Other indices were constant in the period. Despite the average results, The Gambia, Liberia and Sierra Leone were experiencing productivity progress at 62.1%, 10.7% and 5.3% respectively in the period.

Table 4.1.1: Showing the statistics of entrepreneurship indicators in countries (2000 - 2014)

Country	Statistics	EGR	ROE	DPI	EPS
The Gambia	Mean	469.3627	21.9667	21.1907	1.0000
	Minimum	1.00	1.00	4.56	1.00
	Maximum	637.10	31.80	31.70	1.00
	Std. Deviation	149.93194	7.91262	8.77653	.00000
Ghana	Mean	969.6687	35.9667	25.0387	36845215.6667
	Minimum	264.70	24.50	19.70	1.00
	Maximum	1827.16	48.80	31.78	534537111.00
	Std. Deviation	558.12115	7.73699	3.53031	137761562.69379
Liberia	Mean	263.7827	19.6320	19.9520	1.0000
	Minimum	133.15	7.90	7.50	1.00
	Maximum	457.85	44.56	26.10	1.00
	Std. Deviation	115.74192	10.97717	4.22356	.00000
Nigeria	Mean	1448.9300	34.3467	10.7967	1784141183.7333
	Minimum	351.26	18.00	5.47	1.00
	Maximum	3213.29	51.70	17.29	9959155144.00
	Std. Deviation	1019.63107	8.99610	3.99780	2692867779.7287
Sierra Leone	Mean	424.6833	292.4100	6.9704	388368.4480
	Minimum	156.59	7.90	1.00	1.00
	Maximum	783.11	4133.00	29.96	5636491.37
	Std. Deviation	180.91796	1062.50697	7.03097	1452272.34233
POOL	Mean	715.2855	80.8644	16.7897	364274953.9696
	Minimum	1.00	1.00	1.00	1.00
	Maximum	3213.29	4133.00	31.78	9959155144.00
	Std. Deviation	679.35250	474.36549	8.90239	1373507964.0252

2006 – 2007: About 4.7% progress in productivity was observed in this period on the average and productivity gains were also observed among the DMUs except The Gambia, where Ghana, Liberia, Nigeria and Sierra Leone experienced a productivity gain of 4.3%, 29.8%, 4% and 27.6% respectively. Since TECHCH is greater than EFFCH, productivity gains are more likely as a result of technological progress.

2007 – 2008: The average productivity was highly regressed by 25% in the period. Except The Gambia and Ghana that experienced productivity gains of 4.7% and 6.7% respectively, all other DMUs experienced

productivity retrogression in the period. The technical efficiency change, source of inefficiency and scale efficiency change were all constant in the period. It means that PECH and SECH are operating at the same rate. But one can still deduce that the productivity gain in this period is attributable to improvements in efficiency.

2008 – 2009: This period was better than the previous period where the average productivity gains were 42.4% and technological change was improved by 42.4% in the period. The TECHCH was greater than EFFCH, and this implies that productivity gains are mostly attributed to technological progress. Except Nigeria, about 9.2%, 81.9%, 48.6% and 18.5% productivity gains were experienced in the period. The average value of TECHCH was greater than EFFCH, meaning that the productivity gains are more likely as a result on the improvements on technological advancement.

2009 – 2010: Average productivity lost of 13.4% was observed in this period while the value of EFFCH was greater than TECHCH value, meaning that productivity lost is due to failure in efficiency in the period. Only Nigeria and Sierra Leone experienced productivity gains of 128.1% and 3.7% respectively and their productivity gains are mostly likely attributed to technological progress in the period.

2010 – 2011: On the average, there was productivity progress of 10.4% with technological improvements of 10.4% in the period. Since the value of TECHCH was greater than EFFCH value, the productivity gains are as a result of technological change. Only The Gambia and Nigeria experienced productivity gains of 111.7% and 47.5% respectively while their source of inefficiency and scale efficiency are constant in the period.

2011 – 2012: A very high average productivity gain was experienced in this period with 103.1% and same was observed for technological change. The value of TECHCH was 10.4% higher than EFFCH value, which implies that most of the productivity gains were attributable to technological improvements in the period. PECH and SECH values are 1, meaning that the pure technical efficiency and scale efficiency changes are constant returns to scale in the production function. Across the DMUs, except The Gambia that experienced productivity loss, Ghana, Liberia, Nigeria and Sierra Leone experienced a high productivity growth of 9.2%, 68.7%, 51.4% and 47.4% respectively.

2012 – 2013: The average productivity loss was 4.1% in the period. The technological change failed by 4.1% in the period. Since EFFCH is greater than TECHCH, the productivity loss is most likely attributable to technological depression. All the DMUs experienced productivity loss except Nigeria that experienced a productivity progress of 9.9% in the period. The source of inefficiency and scale efficiency are constant in the period.

2013 – 2014: A very high average productivity gain (412.1%) was observed in this period and likewise the technological improvements. The technical efficiency was constant, and PECH and SECH were also constant. The productivity loss could be attributable to technical efficiency failure since TECHCH value is greater than EFFCH value while the productivity gain was as a result of technological progress. According to the DMUs behaviour, it was observed that all the countries experienced productivity gain in the period. The source of inefficiency (PECH) and scale efficiency change were constant in the period.

According to Table 4.1.2, the average TFPCH of 0.642 implies an average productivity regress of 35.8% annually with the study. The period of 2001 – 2002 experienced productivity increase of 0.7% and further increased in 2002 – 2003 by 20.7%. The period 2003 – 2004 experienced productivity regress of 2.3% and later reduced to 0% in 2004 – 2005. About 23.7% productivity progress was observed in 2005 – 2006 but later decreased by 19% and 19.7% in the subsequent periods of 2006 – 2007 and 2007 – 2008 respectively. A very high productivity gain of 57.4% was further observed in 2008 – 2009 but regressed in 2009 – 2010 by 55.8%. Period 2010 – 2011 experienced productivity progress of 23.8% and further progressed by 92.7% in 2011 – 2012. A productivity loss of 107.2% was experienced in 2002 – 2013 period but 2013 – 2014 experienced very high productivity progress of 416.2% in the period. The technical efficiency change (EFFCH) progress by 0.1% annually while the technological change (TECHCH) regressed by 35.9% annually. From the Table, it can be deduced that productivity gains are more likely to be as a result of improvements in efficiency in the years under the study. The source of inefficiency (PECH) was constant while the scale efficiency (+0.1%) as the DMUs are trying to get closer to the optimal size to realize the economies of scale although it is very weak and small. Therefore, since PECH is less than SECH value, it is highly likely that an improvement in scale efficiency has generated the resulting efficiency change. It was also observed that only period 2000 – 2001 slightly experienced to be efficient given the value of PECH (0.3%) and SECH (1.2%), and this implies that they are embracing technology and as well improving their managerial allocative efficiency, and therefore optimizing their DMUs economies of scale.

Table 4.1.2: Showing average efficiencies from 2000 – 2014

Year	EFFCH	TECHCH	PECH	SECH	TFPCH
2000 – 2001	1.015	0.784	1.003	1.012	0.796
2001 – 2002	1	0.803	1	1	0.803
2002 – 2003	1	1.01	1	1	1.01
2003 – 2004	1	0.987	1	1	0.987
2004 – 2005	1	0	1	1	0
2005 – 2006	1	1.237	1	1	1.237
2006 – 2007	1	1.047	1	1	1.047
2007 – 2008	1	0.85	1	1	0.85
2008 – 2009	1	1.424	1	1	1.424
2009 – 2010	1	0.866	1	1	0.866
2010 – 2011	1	1.104	1	1	1.104
2011 – 2012	1	2.031	1	1	2.031
2012 – 2013	1	0.959	1	1	0.959
2013 – 2014	1	5.121	1	1	5.121
Mean	1.001	0.641	1	1.001	0.642

The productivity changes of individual DMUs were presented in Table 4.3 and this attempts to find out the best performers and what can be learnt from one another to improve efficiency over time. It was observed that The Gambia, Ghana, Liberia and Sierra Leone have productivity progress of 8%, 19%, 8.3% and 25.2% respectively annually. Only Nigeria has productivity regress of 93.8% annually in the study. The value of EFFCH suggests that technical efficiency change progress by 0.1% annually while TECHCH regress by 35.9% annually. Since the PECH value is less than SECH value, one can conclude that it is highly likely that an improvement in scale efficiency has generated the resulting efficiency changes.

All the DMUs are constant under PECH and SECH except in Sierra Leone where the source of inefficiency is PECH (0.1%) which implies a slight success in adopting correct managerial decisions concerning inputs and output quantities while the scale inefficiency (0.4%) indicated that Sierra Leone is getting closer to the optimal size to realize the economies of scale. Therefore, the other DMUs can learn something from Sierra Leone being the best of the DMUs' class performer to enhance their productivity.

Table 4.1.3: Showing productivity changes of individual DMUs

COUNTRY	EFFCH	TECHCH	PECH	SECH	TFPCH
The Gambia	1	1.08	1	1	1.08
Ghana	1	1.19	1	1	1.19
Liberia	1	1.083	1	1	1.083
Nigeria	1	0.062	1	1	0.062
Sierra Leone	1.005	1.245	1.001	1.004	1.252
Mean	1.001	0.641	1	1.001	0.642

4.2 The Efficiencies in Francophone West African Countries

In 2000 – 2001, there was high productivity decrease of 34.7%. All the DMUs experienced decrease in productivity growth. The EFFCH suggests a small regress of 0.5% while TECHCH experiences high technological change decrease of 34.3%. The source of inefficiency is PECH and it indicates stagnation in adopting correct managerial decisions concerning inputs and outputs quantities. The scale inefficiency (SECH) of -0.5% indicated that the countries failed to get closer to the optimal size to realize the economies of scale.

2001- 2002: The average TFPCH value of 0.013 implies an average productivity regress of 1.3% in the year. It was observed that Ivory Coast, Mali and Burkina Faso experienced productivity progress by 11.4%, 3.4% and 50.8% respectively in the year. The value of technical efficiency change (EFFCH) implies 0.5% improvement in the productivity. Mali was the only country that has improvement on technological efficiency change in the period given the value of 2.5% while TECHCH of 1.7% indicated an improvement on the average. Ivory Coast, Mali and Burkina Faso experienced technical change improvement of 11.4%, 0.8% and 50.8% respectively. The average source of inefficiency (PECH) was stagnant and likewise among the countries. The scale inefficiency (0.5%) is progressing at a small rate to get closer to the optimal size realize the economies of scales. Other DMUs should emulate Mali in this period.

2002 – 2003: The mean TFPCH indicates a positive productivity growth by 33.7% in the period. Except Burkina Faso and Ivory Coast, all of them experience productivity progress. EFCH was stagnant in the period. The Technological Change (TECHCH) was progressed by 33.7% and it cut across the whole countries except Ivory Coast and Burkina Faso. The source of inefficiency is PTECH and SECH were stagnant in the period.

2003-2004: The average TFPCH (13.9%) implies a productivity regress while all the countries experienced productivity regress except Ivory Coast which experienced a productivity progress of 33.7%. EFFCH was stagnant while TECHCH showed a regress in technical efficiency change by 34.3%. The PECH was stagnant while SECH (-0.5%) indicated a failure to get closer to the optimal size to realize the economies of scale.

Table 4.2.1: Showing the statistics of entrepreneurship indicators in countries (2000 - 2014)

Country	Statistics	EGR	ROE	DPI	EPS
Ivory Coast	Mean	1070.2247	46.9933	474541578.7497	4872043.9503
	Minimum	648.80	40.70	5.62	-4906444.30
	Maximum	1545.90	53.80	7118123578.00	30443161.41
	Std. Deviation	277.89997	4.15958	1837891603.01854	8766261.21797
Mali	Mean	496.8827	33.9067	10.9996	627634.3186
	Minimum	240.37	22.80	8.53	-6405618.15
	Maximum	704.50	52.40	12.81	13539534.00
	Std. Deviation	163.04726	11.68653	1.32188	4990541.54216
Senegal	Mean	846.9560	26.4467	37.5153	-5548034.8418
	Minimum	474.57	24.30	17.18	-92607220.40
	Maximum	1094.57	28.70	225.50	23348549.39
	Std. Deviation	230.47306	1.45743	52.16706	26438604.73545
Benin	Mean	12441.9013	22.4067	15.0814	1595574.1241
	Minimum	369.70	18.50	11.24	-2905629.60
	Maximum	90346.00	36.10	20.12	8981624.59
	Std. Deviation	31208.98406	4.53675	2.54616	3023600.54077
Burkina Faso	Mean	479.1400	15.1333	11.8783	-20784300.7525
	Minimum	226.80	8.70	8.98	-193630055.80
	Maximum	713.06	28.90	17.61	65580540.82
	Std. Deviation	172.09628	7.49206	3.20574	71158571.14744
POOL	Mean	3067.0209	28.9773	94908330.8449	-3847416.6402
	Minimum	226.80	8.70	5.62	-193630055.80
	Maximum	90346.00	53.80	7118123578.00	65580540.82
	Std. Deviation	14374.44539	12.79233	821930110.8489	34574555.06523

2004-2005: On average, a productivity regress was experienced by 20.7%. The EFCH was stagnant while TECHCH showed a productivity decrease of 20.7%. The sources of inefficiencies by PECH and SECH were stagnant in the period.

2005-2006: The DMUs experienced very high productivity growth with an average of 108.7% progress. The EFFCH and their inefficiency sources (PECH and SECH) were stagnant. The technical change experienced 108.7% productivity increase.

2006-2007: The average TFPCH showed a productivity regress of 9.3% and the same was experienced by technical change (TECHCH). Across the DMUs, only Ivory Coast and Burkina Faso experienced productivity improvement by 6.4% and 33.2% respectively.

2007-2008: All the countries experienced a productivity regress of 46.0% on the average and the result was observed on the technical change. EFFCH, PECH, and SECH were stagnant in the period.

2009-2010: Despite an increase in productivity growth in Ivory Coast, Mali and Senegal by 6.4%, 42.5% and 1.8% respectively, the average TFPCH still indicated a productivity regress 28.1%. The average EFFCH indicated productivity retrogressive with a technological change of 27.9% regress.

2008-2009: Despite a great or high increase (167.6%) on productivity growth, EFFCH, SECH and PECH were stagnant in the period. All the DMUs had very high productivity growth.

2010-2011: There was great retrogression in the productivity in this period on the average but Benin experienced a productivity progress of 21.6%.

2011-2012: There was high productivity decrease in this period while the technological change increase by 2.5%. The PECH was 2.5% efficient on the average.

2012-2013: Despite a sharp decrease on average productivity, Mali, Benin and Burkina Faso experienced a high increase in productivity by 23%, 787.6% and 29.4% respectively. The EFFCH decreased in productivity by 0.2% while the scale inefficiency was -0.2%.

2013-2014: All the DMUs experienced productivity progress except Ivory Coast and technical efficiency change was regressed by 3.6% with inefficiency source of -3.6%.

From Table 4.2.2, the average TFPCH of 0.674 implies a productivity regress of 32.6% over the years. 2000-2001 experienced a high productivity decrease of 34.7%. 2001-2002 experienced productivity increase by 33.4%;

2002-2003 experienced productivity increase by 35.0%. It was decreased sharply by 47.6% in 2003-2004 periods. 2004-2005 experienced further productivity decrease 6.8%, but a significant increase in productivity was experienced in 2005-2006 by 129.4% while a sharp and significant productivity decrease was experienced in 2006-2007 by 118%.

2007-2008 experienced productivity decrease of 36.7% but 2008-2009 experienced super increase of 213.6% but decrease by 195.7% in 2009-2010. No productivity was experienced from 2010-2011 to 2013-2014 periods. There is technical efficiency change regress by 0.3% annually while technical change decreases by 32.4%.

The sources of inefficiency PECH was stagnancy over the years while scale efficiency was inefficient by -0.3%.

Table 4.2.2: Showing average efficiencies from 2000 – 2014

Year	EFFCH	TECHCH	PECH	SECH	TFPCH
2000- 2001	0.995	0.657	1	0.995	0.653
2001 – 2002	1.005	0.983	1	1.005	0.987
2002 – 2003	1	1.337	1	1	1.337
2003 – 2004	1	0.861	1	1	0.861
2004 – 2005	1	0.793	1	1	0.793
2005 – 2006	1	2.087	1	1	2.087
2006 – 2007	1	0.907	1	1	0.907
2007 – 2008	1	0.54	1	1	0.54
2008 – 2009	1	2.676	1	1	2.676
2009 – 2010	0.997	0.721	1	0.997	0.719
2010 – 2011	0.978	0	1	0.978	0
2011 – 2012	1.025	1	1.025	-	-
2012 – 2013	0.998	0	1	0.998	0
2013 – 2014	0.964	1	0.964	-	-
Mean	0.997	0.676	1.000	0.997	0.674

From Table 5, Ivory Coast experienced a high productivity decrease/regress of 92.8%; Mali experienced a small productivity regress of 5.2% and Burkina Faso experienced a small productivity regress of 3.8% annually. Senegal and Benin experienced productivity progress of 60.8% and 31.6% respectively annually. The average TFPCH of 0.674 implies an average productivity regress of 32.6% annually with the study period.

The technical efficiency change (EFFCH) was regressed by 0.3% annually while technological change (TECHCH) was also regressed by 32.4% annually. The value of PECH was equal to 1 in all the DMUs which indicate stagnation in the efficiency while SECH was equal to 1 in all the countries except Mali which experienced inefficiency of 1.3%.

This showed that the inefficiency/short-fall is coming from technical inefficiency in terms of managerial skills deficit required to optimally increase the return on outputs from the given set of inputs.

Table 4.2.3: Showing productivity changes of individual DMUs

Country	EFFCH	TECHCH	PECH	SECH	TFPCH
Ivory Coast	1	0.072	1	1	0.072
Mali	0.987	0.961	1	0.987	0.948
Senegal	1	1.608	1	1	1.608
Benin	1	1.316	1	1	1.316
Burkina Faso	1	0.962	1	1	0.962
Mean	0.997	0.676	1	0.997	0.674

5. Conclusion

In this paper, the efficiencies of selected entrepreneurship indicators at macro level in both Anglophone and Francophone West African countries were examined. The study found that cumulatively, the Anglo West African countries were entrepreneurship enhancing while the francophone countries are entrepreneurship inhibiting. Of interest to us, was the question of whether the dependence of central bank and the emerging stock exchange market has either made or mar entrepreneurship in the region. However, despite the fact that the emerging capital market operating in the francophone divide remains relatively small and illiquid, the performance of the stock market variable was slight higher than in the Anglophone countries.

From the efficiency analysis on the Anglophone divide, the Pure Technical Efficiency Change (PECH) is less than the Scale Efficiency Change (SECH) value, it is highly likely that an improvement in scale efficiency has generated the resulting efficiency change. It was also observed that only period 2000 – 2001 slightly experienced to be efficient given the value of PECH (0.3%) and SECH (1.2%), and this implies that the countries in the divide are embracing technology and as well improving their managerial allocative efficiency, and therefore optimizing

their DMUs (countries) economies of scale. It is highly likely that an improvement in scale efficiency has generated the resulting efficiency changes. All the DMUs (countries) are constant under PECH and SECH except in Sierra Leone where the source of inefficiency is PECH (0.1%) which implies a slight success in adopting correct managerial decisions concerning inputs and output quantities while the scale inefficiency (0.4%) indicated that Sierra Leone is getting closer to the optimal size to realize the economies of scale. Therefore, the other DMUs can learn something from Sierra Leone being the best of the DMUs' class performer to enhance their productivity. While the efficiency analysis on the Francophone divide revealed that there was a sharp decrease on average productivity, but Mali, Benin and Burkina Faso experienced a high increase in productivity. All the DMUs (countries) experienced productivity progress except Ivory Coast and technical efficiency change was also regressed. This could be as a result of scoring low in the constant election variable during the period under review. However, the general inefficiency/short-fall is coming from technical inefficiency in terms of managerial skills deficit required to optimally increase the return on outputs from the given set of inputs. It was however recommended that public policies should be more focused on engendering technical efficiencies of entrepreneurship pursuit in the Region.

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