TOTAL FACTOR PRODUCTIVITY AND THE LEVEL ENTREPRENEURSHIP DEVELOPMENT IN CAMEROON

Andrew Wujung Vukenkeng ✉

Department of Economics, Faculty of Economics and Management Sciences,

The University of Bamenda, Bambili, Cameroon

akumpaulo@gmail.com

Paul Akumbom

Department of Agribusiness Technology, The University of Bamenda, Bambili, Cameroon

akumpaulo@gmail.com

Abstract

This study was set out to examine the effect of total factor productivity on the level of entrepreneurship development in Cameroon. Data covered a 39 years period running from 1980 to 2018 and was collected from the Worldwide Governance Indicator (2018), World Bank Data (2018) and International Monetary Fund (2018). Results from the Three Stages Least Squares (3SLS) indicated that total factor productivity enhances significantly entrepreneurship development in Cameroon. Further results reveal that there is a positive but insignificant effect of entrepreneurship development on technological progress. The result further revealed a significantly positive relationship between economic growth and entrepreneurship development in Cameroon. More results revealed a positive and statistically significant effect of government spending on entrepreneurship development. No significant relationship could be established between domestic credit to the private sector and entrepreneurship development in Cameroon though the coefficient is positive as expected. Results from the 3SLS analysis also indicated that personal remittances received from abroad exert a positive and significant effect on entrepreneurship development in Cameroon. Gross domestic savings was found to have a significant positive effect on entrepreneurship development in Cameroon. It is therefore recommended that; the government should improve on the evolution of total factor productivity

which is a key determinant of long run economic growth through the labour and capital market. Economic growth and entrepreneurship development are both agents of national growth and development thus the entrepreneurship development through subsidies and low lending rates. There is need for the government to reduce exchange rates, import rates and in so doing encouraging remittances. The Cameroon government should encourage savings of household sector, private corporate sector, and public sector by increasing interest on savings.
Keywords: Total Factor Productivity, Entrepreneurship Development, Cameroon

INTRODUCTION

Cameroon pursued an interventionist approach to industrialization and economic growth shortly after independence in 1960. Its trade policies held import rates strong, and its tax scheme was riddled with inequality. Cameroon experienced rapid economic development during this time frame. Real GDP was rising at a rate of 4.6% per year, putting the equilibrium of trade terms and the rapid growth of agricultural exports in jeopardy. Private spending as a percentage of GDP increased from 11% in 1963 to about 19% in 1977; however, public and private investment as a percentage of GDP stayed very low at 2% during the same time span; government receipts accounted for around 18% of GDP during this time period, and the annual total budget deficit was low at around 1% of GDP (Fambon et al., 2014). The beginning of oil exploration and exportation coincided with the end of this sub-period.

The third sub-period, 1987–1993, was characterized by a severe economic recession, which resulted in a 40% drop in real GDP. The continued and concomitant collapse of the US dollar and the prices of export commodities such as oil, cocoa, coffee, and cotton, as well as the appreciation of the effective real exchange rate of the US dollar, all contributed to the worsening of Cameroon's economic and financial situation during this sub-period (Ghura, 1997).

The global downturn had a huge effect on the number of unemployed citizens, who created a variety of subsistence economic practices to sustain themselves. The private sector began to emerge across the country at this time. Following the crisis, the Cameroon government implemented a number of policies to encourage private investment. The introduction of the investment code in 2002 placed a focus on the attributes of acquisitions and owners, including certain tax benefits for private investment in some types of businesses. Recent changes include the establishment of a business registration center (one-stop shop) in 2010 to simplify the official processes for obtaining all licenses required by entrepreneurs in order to acquire a legal statute. In 2010, the government established the Cameroon Business Forum to strengthen negotiations between the public and private sectors. In 2013, the

government established the Small and Medium Size Bank, the National Agency for SMEs Promotion, and the Agricultural Bank to aid economic activities. Despite the government's efforts to encourage entrepreneurship, the country's entrepreneurial practices are still in their infancy. Furthermore, entrepreneurship practices are mostly developed in the major cities (Yaoundé and Douala), with small towns and rural areas receiving fewer coverage in terms of entrepreneurial growth (Maurice & Pelagie, 2015).

The use of Cameroon's trained labor force would determine the country's potential success. Because of the opportunities for creativity and the best use of expertise, entrepreneurship is regarded as a significant positive driver for economic development (Dejardin, 2000). If qualified migrants are drawn to self-employment for positive reasons, the economy and culture of Cameroon will benefit. The forces that drive professional migrants to become entrepreneurs can offer valuable insight into why they want to work for themselves. This research would reveal whether the migrants' motivations for starting their own business is positive or negative.

According to studies, family enterprises account for about 66 percent of newly generated positions worldwide (Ayyagari et al., 2011). Similarly, Dyer and Whetten (2006) found that small and medium-sized companies (SMEs) account for 90 percent to 95 percent of firms in Cameroon, with family businesses accounting for 49.7% of jobs. Most African countries have implemented structural and financial reforms to achieve macroeconomic stability and strengthen economic governance since the mid-1980s. In certain nations, these changes are unsatisfactory in terms of fiscal and monetary control. In many developing countries, including Cameroon, family companies, the majority of which are small and medium-sized enterprises (SMEs), are at the heart of such development. They are seen as job creators, alleviators of injustice, and promoters of equality (Ayyagari et al., 2011). Family-owned and operated companies in Cameroon and around the world, like many other businesses, face a variety of obstacles, ranging from their conception to management and, as a result, lifetime.

These difficulties undoubtedly give rise to a number of concerns about entrepreneurship's long-term viability in general, as well as reasons that lead to its non-viability in particular. The preceding literature review provides a summary of Cameroon's entrepreneurship growth. As previously said, this reality mostly affected entrepreneurs from two major cities (Yaoundé and Douala), with entrepreneurs from other cities in general and events from eastern Cameroon in particular being unknown or under-known. This research examines the characteristics of entrepreneurial actors, the styles of entrepreneurial practices, the structure of local organizations, and their relation to the advancement of entrepreneurship in this area and economic growth in general in order to propose some suggestions that will strengthen the

business spirit found in the local context. The effect of demographic development, population density, population age structure, immigration, income level and unemployment, income gap and taxes, or both, on business opportunities has been studied from different viewpoints, showing substantial disparities not only between the rate of participation of men and women in business, but also between the impact of population growth, population density, population age structure, immigration, income level and unemployment, income disparity and taxes, or both, on business opportunities. The following inquiry is considered appropriate on these grounds. In light of this, the aim of this paper is to investigate the impact of total factor productivity on the level of entrepreneurship growth in Cameroon, as well as to see whether there is a bidirectional connection between technology and entrepreneurship development in Cameroon.

LITERATURE REVIEW

Theoretical Literature

Barro endogenous growth model with the public sector

This model as an endogenous growth model integrates public expenditures to explain economic growth. To Barro (1990), growth in productive and unproductive spending impacts on economic growth in varied ways. He insinuated a growth model wherein, growth in output depends on public expenditures which is either productive or unproductive. The original model is stated as:

$$Y = f(k,g) = Ak^{1-\alpha} g^{\alpha} \tag{1}$$

Where y stands for national income, A is the total factor productivity (TFP), k is the capital and g is the total government expenditures which can be productive and unproductive. Output is subject to diminishing returns with respect to capital, government sector is assumed to be fixed and the production function experiences constant returns to scale. Given the above assumptions and the production function above, then:

$$\frac{dy}{dg} = \alpha Ak^{1-\alpha} g^{\alpha-1} \tag{2}$$

The equation 2 above is called the marginal product of government expenditure (MPG). It is positive, implying that an increase in public spending promotes economic growth as held by Keynes. Following Kimaro (2018),

$$\frac{g*dy}{y*dg} = \alpha \tag{3}$$

The equation 3 above defines the elasticity of output with respect to government expenditures. Assuming that the planner satisfaction requires that MPG = 1, it implies that government is expected to use her resources to produce public and merit goods up to the point where MPG = 1.

After a series of mathematical and theoretical considerations as in Kimaro (2018), one can postulate that:

$$\frac{g}{y} = \alpha \qquad\qquad (4)$$

Assuming that $\frac{y}{g}$ is the TFP, then the equation above denotes the reciprocal of the TFP. If one compares equation 3 and 4, it means that government expenditures are allocated to meet the planner satisfaction. Thus TFP equals to the reciprocal of the elasticity of output with respect to government expenditures (Mhhe, 2005).

The Schumpeterian Theory of Entrepreneurship

According to Schumpeter (1976), growth entails the execution of new combinations. These new combinations can range from the introduction of a new good or a new quality of good that consumers are not yet familiar with; the introduction of a new method of production, that is, one that has not yet been tested by experience in the branch of manufacture in question, which does not have to be based on a scientifically new discovery, and can also exist in a new way of handling a product.

According to the Schumpeter (1976) effect, there is an inverse association between unemployment and entrepreneurship. He clarified that as the rate of unemployment rises, so does the rate of entrepreneurship. This is because people just don't have enough money to feed themselves while unemployed, let alone save. During this time, the degree of entrepreneurship falls, resulting in a drop in economic growth.

Other writers, such as Schumpeter (1976), envisioned a private empire to conquer and, inevitably, the thrill of having stuff done as motivators for creative entrepreneurs to pursue new ideas. According to Nafziger (1978), Schumpeter's (1976) hypothesis is only applicable in industrial societies prior to the emergence of massive companies. In less developed economies, this theory is only partially applicable. Furthermore, this hypothesis cannot be empirically checked since the people who conduct entrepreneurial tasks are difficult to identify. Kilby (1971) points out that the majority of Schumpeter's (1976) study is concerned with the economic system's reactions rather than entrepreneurship. Despite these flaws, it must be acknowledged that Schumpeter (1976) has solidified the entrepreneur hypothesis by making the entrepreneur a central functionary of economic growth.

Peter Kilby Theory of Entrepreneurship

Kilby (1971) claims that researchers face the issue of identity, which is common in supply and demand analysis. How will it be determined if a boost in entrepreneurial success is

due to a shift in the production of entrepreneurial effort or an increase in the economic climate where a change in entrepreneurial output is observed? There have also been a lot of cases where these two sets of supply and demand variables have been mixed together, posing a recognition challenge. In addition to Hagen's (1962) and Kasdan's (1965) contrasting entrepreneurial supply theories, it's likely that changes in the external world are important influences in understanding entrepreneurship's blossoming. As a result, when economists diagnose weak entrepreneurial results, they recommend solutions such as adequate monetary, economic, and trade strategies, market imperfections reduction, supply provision, and technical assistance to industry. According to Kilby (1971), the above model describes entrepreneurial role in a limited way. The model is based on the unrealistic premise that an underdeveloped economy is a well-functioning one with a reasonably high degree of input mobility and homogeneous output; that manufacturers, customers, and resource owners have complete awareness of all options available to them; and that there are no substantial indivisibilities. However, if these criteria are not fulfilled, the entrepreneurial purpose becomes much more complicated, and the entrepreneurial position becomes much more important. It's also important to understand the sociopolitical context that can help or hinder entrepreneurial activity. However, Kilby (1971)'s formulation has a significant flaw in that it primarily ignores technical entrepreneurship, which needs a more thorough treatment as a topic of entrepreneurship in emerging economies such as Cameroon.

Empirical Literature

The effects of transparency, trade orientation, and human capital on total factor efficiency were studied by Miller and Upadhyay (2000). They used a pooled sample of evidence from developed and developing countries to investigate the impact of transparency, trade orientation, and human capital on total factor productivity. A sparse definition of the aggregate output mechanism resulted in total factor productivity. Openness, exchange focus, and human resources were all potential determinants of total factor efficiency. Increased transparency boosts overall factor efficiency. Over and beyond the beneficial impact of transparency, outward-oriented countries experienced higher overall factor efficiency. Human capital contributed favorably to overall factor output in most cases. Human capital, on the other hand, combines with transparency to have a constructive impact in developing countries.

Complete factor productivity and the function of entrepreneurship were investigated by Erken, Donselaar, and Thurik (2018). The paper discussed the lack of evidence in the scholarly literature for a long-term relationship between entrepreneurship and economic development, which was at odds with the value of entrepreneurship as a policy criterion, by integrating

entrepreneurship using four separate models that explained total factor productivity in twenty OECD countries using data from 1969 to 2010. They found that entrepreneurship plays a major role in all models, including a collective one, although the remaining results are essentially unchanged. The company ownership rate (number of business owners per workforce) was corrected for the degree of economic growth to determine entrepreneurship (GDP per capita).

Entrepreneurship culture, total factor productivity rise, and technical progress: Patterns of convergence towards the technological frontier were investigated by Colino, Benito-Osorio, and Rueda-Armengot (2014). Total factor efficiency is concerned with technological advancement and accounts for the majority of disparities over time and between nations. They looked at the factors that influenced total factor productivity growth in 26 OECD countries from 1965 to 2010, categorizing them as improvements in technical performance and technological shifts over time. Different trends of productivity growth arise between world technology leaders and countries with poor initial levels of productivity, using the United States as the technology frontier. In the other hand, in technologically based economies, increases in productivity tend to be the primary outcome of the evolution of the stock of expertise, implying that less developed economies will benefit from their relative underdevelopment. Domestic innovation effort has emerged as a relevant consideration for technology leaders.

The effect of economic independence and entrepreneurship on total factor efficiency was studied by Bjrnskov and Foss (2010). Countries expand not only by deploying higher levels of inputs to output, but also by better allocating whatever capital they have at their disposal and by implementing productivity-enhancing technologies, according to the economics of development. They make the following reasons for whether and how entrepreneurship and liberty structures (i.e., economic independence, including the rule of law, simple legislation, low taxation, and reduced government intervention in the economy) benefit total factor productivity (TFP): Entrepreneurial experimenting with a variety of variables was possible thanks to the establishments' low transaction costs. The theories were put to the test using a special panel data set drawn from Compendia, World Bank data, and the Fraser Institute's data on economic freedom. They discovered that while entrepreneurship has a positive effect on TFP, its marginal contribution to TFP is strongest in economies with significant government intervention.

Productivity and Entrepreneurial Characteristics of New Japanese Firms were studied by Harada (2004). They estimated the output function of new companies in this paper and looked at how human capital and the gender of entrepreneurs influenced total factor efficiency. The assumption of output roles in several previous findings on entrepreneurship was confirmed by empirical results, which showed diminishing returns to size of production. Furthermore, the entrepreneur's age was shown to have a substantial negative impact on competitiveness, with

the effect increasing after 60 years of age. While prior similar business experience had a major positive impact before starting a business, the magnitude was small and could not outweigh the negative effect of age. The results revealed the value of beginning a business while still young, preferably before the age of 60.

Kakhkharov (2019) investigated the possibility of households using remittances to start small businesses. Small companies is critical to the development of jobs and economic growth. This discovery showed that incoming remittances were only invested in family business projects when the inflow was accompanied by ample revenue or savings. As a result, financial limitations were critical for a small business enterprise, and they could be particularly difficult to resolve in rural areas. The study found evidence that remittance senders put their money and capital into specific business ventures.

In Swedish manufacturing, openness and total factor productivity are related (Andersson, 2001). The impact of transparency on TFP growth was investigated in this article. The article found that industrialized sectors are more involved in research and development and have more entry and exit operation than other industries, based on data from industry-level for Swedish manufacturing (1980-1995). The findings revealed that the strength of domestic research and development has little bearing on the rate of TFP growth. Instead, access to foreign markets, which aids technological spillovers, is a critical consideration. There was proof that suppliers who left the market were less profitable, meaning that such exits would boost the industry's overall productivity.

Xu, Lai, and Qi (2008) Data from China on openness, human resources, and total factor efficiency. The factors of China's growth were investigated in this article. It based on three sources of technological know-how spillovers in particular: human resources, economic transparency, and foreign direct investment. The study's specific features included the use of the most recent understandable panel data from thirty-nine provinces from 1994 to 2006, as well as unit root and cointegration checks in the panel data system. Human resources, commerce, and FDI were found to be the most important determinants of total factor production, but their importance varied depending on the province's technical level.

Bruce and Mohsin (2006) conducted research on tax policy and entrepreneurship using new time series data. They used more recent data and modern econometric methods to determine the impact of federal wages, payroll, capital gains, corporate income, and estate taxes on self-employment rates, extending the time series literature on the subject. Taxes had a major but minor impact on self-employment behavior, according to regression results. Taxes had important impacts on entrepreneurship, but they were unlikely to be successful instruments

for inducing meaningful improvements in entrepreneurial behavior, according to cointegration and causality analyses.

In a wide community of European countries, Baliamoune-Lutz and Garello (2014) investigated the impact of taxes and tax progressivity on entrepreneurship. They tackled two major issues. First, they looked at whether tax increases deter creative projects, with an emphasis on new businesses. They also looked at the impact of tax progressivity on investment, dwelling on new business opportunities once more. They discovered that tax progressivity has a significant indirect impact on modern entrepreneurship at higher-than-average income levels.

In Germany, Smyth (1995) studied inflation and total factor efficiency. In Germany, this article discovered a significant and significant indirect relationship between inflation and growth. As a result, inflation in Germany is significantly lower than the rate of productivity and export growth. Low inflation rates were emphasized by German policymakers, especially the Bundesbank, and inflation in Germany was lower than in most OECD countries. As a result, Germany has reaped the benefits of increasingly high economic growth rates.

Khan (2005) conducted research in Pakistan on macro factors affecting total factor productivity. This study calculated Pakistan's Total Factor Productivity (TFP) and identified its macro factors using a traditional growth system. The findings, which covered the period 1960 to 2003, indicated that macroeconomic stability, foreign direct investment, and financial sector creation all play important roles in the growth of TFP. Surprisingly, school spending seems to be insignificant.

Isaksson (2007) investigated total factor efficiency variables. This study identified multiple factors that influence TFP growth based on micro, sectoral, and macro findings. Geographical conditions, housing, wellness, transparency, competitiveness, schooling, institutions, imports, financial growth, and absorptive capability tend to be the most significant of these factors. Whereas the majority of the previous publications discussed have established statistical relationships with no causal direction, any policy debate may only be indicative rather than directive. Nonetheless, these considerations point to potential policy fields.

Malaysia's total factor productivity growth rate from 1971 to 2004 was studied, as well as the factors that influence total factor productivity growth (Jajri, 2007). The transition in the production frontier was studied using data envelopment analysis (DEA). Complete factor productivity was decomposed into technology change and technical quality change using the Malmquist productivity index. The indirect contribution from technological efficiency did not motivate total factor productivity growth for Malaysians over the entire test period, according to empirical findings. The findings demonstrated that new innovations could trigger changes in the

economy's own frontier. The economy needs to improve its productivity-based catch-up capabilities, especially productive human resources in the labor market, expand the number of trained employees who can operate more advanced technologies, and introduce modern technology. The results of the total factor productivity growth model revealed that the major donors of total factor productivity growth were openness to international companies and the global market, reconstruction of the economy through a transfer of capital between sectors, and the participation of foreign companies in Malaysia.

Total Factor Productivity, Technological Change, and Efficiency Differences Among States were investigated by Domazlicky and Weber (1998). There were significant variations in total factor productivity (TFP) growth rates between nations. The causes of differences in TFP development, technical transition, and average efficiency levels for states from 1977 to 1986 have been discovered. According to the findings, policies aimed at attracting manufacturing industries and private capital would boost TFP growth, owing to increased technological change. States with lower levels of production productivity will get closer to their production frontiers by improving the quality of their workforce (for example, by education), attracting private investments, and, in the case of states with big metropolitan regions, promoting economic decentralization.

Absolute factor productivity (TFP) macroeconomic and institutional influences in the MINT (Mexico, Indonesia, Nigeria, and Turkey) countries from 1980 to 2014. (Olomola and Osinubi, 2018). The data for this analysis spans the years 1980 to 2014. The World Bank's World Development Indicators provided data on labor force, actual gross domestic product, foreign direct investment, human resources, gross fixed capital growth, and inflation. The International Country Risk Guide also included information on government unity, corruption, and law and order. The model was examined using the panel autoregressive distributed lag (PARDL) estimation technique. According to the findings, TFP growth rates in Mexico and Turkey decreased on average by 1.4 percent and 1.8 percent, respectively, while productivity growth in Indonesia and Nigeria remained flat. In the long term, government peace and human resources had positive significant effects on TFP, while corruption and FDI had inverse significant effects on TFP, according to the findings. There was a major negative association between TFP and inflation in the short term. Human capital and corruption, on the other hand, had strong and important impacts on TFP. In the long and short term, human capital and corruption were primary drivers of TFP in MINT countries, according to the report.

In Cameroon, the impact of financial growth on private enterprise is calculated by private capital creation (Vukenkeng & Fonchamnyo, 2016). The information for this analysis came from the World Bank database, and it was calculated using a two-stage least square regression

methodology. Financial growth (domestic credit and savings mobilization) had a positive significant impact on private entrepreneurship in Cameroon, according to the findings. In addition, domestic demand for goods and services by households boosted private entrepreneurship.

Foreign assistance and long-term domestic production were studied by Herzer and Morrissey (2013). The key point of this article was that the impact of assistance on GDP is dependent on a country-specific trade-off. Help has a positive impact on infrastructure finance, but had a negative impact on marginal production, which can be negative if aid exacerbates growth-slowing determinants like poor governance. To assess the trade-off and demonstrate the heterogeneous aspect of the relationship between assistance and export, data for fifty-nine less developing countries were estimated from 1971 to 2003. They discovered a cointegrated relationship between production, assistance, and expenditure, and derived country-specific estimates of the long-run relationship between aid and output. These negative aid-output coefficients are less than the positive investment-output coefficients on average. They also discovered that disparities in law and order, religious divisions, and government size clarified the majority of cross-country differences in the studied long run aid-output coefficients.

The macroeconomic effects of public spending were studied by the ADB, Furceri, and the IMF in 2016, using data from advanced economies. This study added to the body of knowledge about the macroeconomic effects of public spending in emerging economies. The author discovered that increased public spending increases productivity both in the short and long term, crowds of private investment, and reduces unemployment by using public investment prediction errors to define the causal impact of government expenditure as well as model simulations.

A study on dynamic entrepreneurship and technology-based creativity was performed by Audretsch, Kuratko, and Link (2016). The aim of this paper was to differentiate between dynamic and stagnant entrepreneurship. They characterized dynamic entrepreneurship in terms of Schumpeterian innovativeness, and then proposed a hypothesis that human capital is conducive to such behavior. A lack of intellectual resources, on the other hand, is more favorable to stagnant entrepreneurship (defined in terms of organizational or ownership status). Based on a large data collection of entrepreneurs that have received research grants from the US government. According to our findings from the Small Business Innovation Research (SBIR) initiative, academic-based human capital is positively associated with complex activity, while business-based human capital and previous business experience are not.

Many scholars have studied total factor competitiveness and the extent of entrepreneurship, but in Cameroon, little or nothing has been achieved. With the aid of a three

Stages Least Squares (3SLS) as the estimation technique, this research work aims to create a bidirectional relationship that exists between total factor productivity and the degree of entrepreneurship in Cameroon.

RESEARCH METHODOLOGY

The information for this report came from secondary sources. Because of the time span of the sample and the vast population size of the study area, secondary data was favoured over primary data for this study. Worldwide Governance Indicator (2019), World Bank (2019), and International Monetary Fund (2019) provided the data for this report (2019). Time series data is a collection of observations obtained through repeated measurements over time. Plot the points on a graph, and one of your axes would always be time. Time series data is everywhere, since time is a constituent of everything that is observable. As our world gets increasingly instrumented, sensors and systems are constantly emitting a relentless stream of time series data. The time frame from 1980 to 2018 is used because it is statistically representative and can present a statistical evolution of the variables overtime.

Because of the unaccounted association between the endogenous dependent variables and the equations' error terms, ordinary least squares estimation (OLS) and SURE to yield skewed and inaccurate parameter estimates. The 3SLS method will account for these flaws and provide more accurate parameter estimates. Though Wooldridge (2001) found that GMM performs better in the presence of unexplained heteroskedasticity, 3SLS also tackles heteroscedastic disturbances and can involve nonlinear functions of the latent variables (Bollen 1996). To that end, the following is the 3SLS model for the three pavement condition indicators:

$$\begin{cases} TFP_t = \pi_0 + \pi_1 ENT_t + \pi_2 GOV_t + \pi_3 GDP_t + \pi_4 OPEN_t + \pi_5 DCPS_t + \pi_6 INV_t + \pi_7 HC_t + \pi_8 FAID_t + \omega_1 \\ ENT_t = \rho_0 + \rho_1 TFP_t + \rho_2 GOV_t + \rho_3 GDP_t + \rho_4 OPEN_{it} + \rho_5 INF_{it} + \rho_6 DCPS_t + \rho_7 TAX_t + \rho_8 REMI_t + \rho_9 GDS_t + \omega_2 \end{cases}$$

Where TFP is Total factor productivity, ENT is entrepreneurship development, GOV is government spending, GDP is economic growth measured by gross Domestic Product, OPEN is trade openness, DCPS is domestic credit to the private sector, INV is domestic investment, HC is human capital, FAID is foreign aid, INF is inflation, TAX is taxation as a percentage of GDP, REMI is remittances and GDS is gross domestic savings.

RESULTS AND DISCUSSION

The study uses the Three Stage Least Squares regression method using Stata 14 to allow for potential simultaneity between entrepreneurship growth and technological advancement. Since 3SLS is statistically more effective than two-stage least square, it was chosen over two-stage least square. This advantage grows with the strength of the interrelations

among the error words. Table 2 summarizes the 3SLS findings prior to the results, while Table 1 shows the model suit test after the 3SLS.

Table 1: Model fittest after Three Stages Least Squares

Equation	Obs	Parms	RMSE	"R-sq"	chi2	P
D_lent	38	9	0.0099955	0.9553	806.90	0.0000
Tfp	38	8	0.1943691	0.3533	33.09	0.0001

The model fit of the two equations calculated in the analyses as seen in the table above. The entrepreneurship growth equation (LENT) was the first, and the technology equation was the second. Both calculations were calculated with the assumption that each component was endogenous to the other. The R-Squares for the two models, as well as the Chi square goodness of fit of the over model, are calculated using the coefficients from Table.

The R-square value shows how often deviations in LENT are captured by changes in the model's variables. The R-square value of 0.9553 indicates that the shifts (variations) in the variables used in the model account for 95.53 percent of the variance in entrepreneurship growth captured by gross value added, while 4.47 percent of the variation in LENT remains unknown by the model. The Chi square test statistics suggest that the model is well suited in terms of total fit, provided that the overall entrepreneurship model is statistically relevant at 1%.

The R-square value for the total factor productivity equation is 0.3533, meaning that improvements (or variations) in the variables included in the model account for 35.33 percent of the variance in total factor productivity (a proxy for technology), while variables not included in the model account for 64.67 percent of the variation in TFP. This suggests that the variables in the model have a minor impact on the variance in TECH. However, at the 1% level of importance, the overall model is statistically important.

Table 2: Three Stages Least Squares Results

	(1)	(2)
VARIABLES	D.LENT	TFP
TFP	0.0823**	
	(0.0328)	
D.LGOV	0.121***	-0.444***
	(0.0367)	(0.128)
D.LGDP	0.846***	-0.126
	(0.0453)	(1.029)
D.LOPEN	-0.0212	0.00421
	(0.0138)	(0.0523)

INF	0.000308		Table 2…
	(0.000265)		
D.LDCPS	0.00845	0.132***	
	(0.00993)	(0.0380)	
D.LTAX	0.0127*		
	(0.00682)		
D.LREMI	0.0121***		
	(0.00430)		
LGDS	0.0266***		
	(0.00772)		
D.LENT		0.0882	
		(1.061)	
D.LINV		0.476***	
		(0.0943)	
D.LHC		-0.160**	
		(0.0682)	
LFAID		-0.0267	
		(0.0228)	
Constant	1.055**	1.804	
	(0.454)	(2.034)	
Observations	39	39	
R-squared	0.999	0.967	

Note: Standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

The values in brackets are standard errors

The Three Stages Least Squares (3SLS) results show that technology improves entrepreneurship growth in Cameroon dramatically. This result is consistent with a priori expectations, allowing the researcher to dismiss the study's first hypothesis. Total factor efficiency enables current and aspiring entrepreneurs to properly combine output factors in order to maximize value and minimize costs. Total factor efficiency will then serve as a pull factor for the growth of entrepreneurship. This conclusion is consistent with Tang and Yeo's (1995) findings, which showed that techno entrepreneurship aided the Singaporean economy's expansion of entrepreneurial activities. This finding supports Alderete (2017)'s finding that mobile technology has a positive effect on entrepreneurship growth in 58 countries.

The table shows that human capital has a negative impact on total factor production. The findings differ from those of Miller and Upadhyay (2000), who observed that human capital contributes positively to total factor production in most cases. However, this result is statistically important. Our a priori expectation was confirmed by Harada (2004), who found that an entrepreneur's age has a substantial negative impact on productivity. The findings contradict those of Xu, Lai, and Qi (2008), who found that human resources, trade, and FDI are important

determinants of total factor production, but their value varies depending on provinces' technical levels. According to Jajri (2007), the economy was able to trigger changes in their own frontier as a result of progress. The economy requires a boost in productivity-based catch-up capabilities, especially in terms of productive human resources in the labor market, a rise in the number of skilled employees capable of operating increasingly advanced technologies, and the introduction of new technology. Also, according to Domazlicky and Weber (1998), policies aimed at attracting manufacturing industries and private capital would boost TFP growth, owing to increased technological change.

Further findings show that entrepreneurship growth has a favorable yet marginal impact on total factor productivity. This finding can be explained by the fact that Cameroonian entrepreneurs are users of current total factor productivity, with little to no effort or capital dedicated to science and creativity, which might have boosted total factor productivity. As a result, their contribution to increasing total factor efficiency is negligible. Despite the fact that the sign of the coefficient is consistent with a priori expectations, we are unable to refute the study's second hypothesis, which states that there is no significant reverse causality between entrepreneurship and total factor productivity. This contradicts the findings of Siegel and Phan (2005), who found that administrative incentives and operational practices are critical in improving the efficacy of technology transfer. This observation is consistent with Audretsch, Kuratko, and Link (2016), who found that under the Small Business Innovation Research (SBIR) scheme, academic-based human capital is positively associated with dynamic activity, while business-based human capital and previous business experience are not. The findings are also in line with those of Bjrnskov and Foss (2010), who discovered that while entrepreneurship has a positive effect on TFP, the marginal contribution of entrepreneurship to TFP is highest in economies with a lot of government intervention.

A important positive association between economic development and entrepreneurship was also discovered as a part of the study. This finding backs up the findings of Lesotlho (2006) and Odada & Mumangeni (2000), who observed a long-run causal impact of GDP on private investment. The multiplier-accelerator theorem, which ties GDP growth to private investment growth, is also supported by this result. An rise in an economy's GDP, everything else being equivalent, would result in an increase in buying power, which will stimulate more entrepreneurial activity. This outcome is consistent with theoretical predictions.

Further data analysis reveals that government spending has a strong and statistically important impact on entrepreneurship growth. This finding backs up the Keynesian argument for government interference in the economy. In effect, if government investment is high-quality and well-planned, the competitiveness of entrepreneurial operations will rise. This is accomplished

by government spending in infrastructure construction, which makes it easier to start and run a company. This result is consistent with findings from Lesotho (2006), the ADB, Furceri, and the IMF (2016), all of which found a positive impact of public spending on private entrepreneurship. It does, however, counter Reungsri (2010)'s assertion that public spending has a negative impact on private investment. It's also consistent with economic literature on crowding.

Cameroon's total factor competitiveness was found to have a favorable but negligible impact on trade openness. The results contradict those of Andersson (2001), who found that integrated industries invest in more R&D and have more entry and exit operation than other industries. The findings revealed that domestic R&D strength has no bearing on the rate of TFP development. Instead, access to foreign markets, which aids technological spillovers, is a critical consideration. There's also proof that farmers who leave the market are less efficient, meaning that such exits would boost the industry's overall productivity. The findings are consistent with those of Xu, Lai, and Qi (2008), who found that human resources, trade, and FDI are important determinants of total factor production, but their value varies depending on provinces' technical levels. The findings are also consistent with Hwang and Wang (2004), who found that although trade expansion had a minor and unclear impact on TFP growth, a scale effect of export growth may have influenced the growth of Japanese manufacturing industries from 1973 to 1998. Furthermore, Abizadeh and Pandey (2009) discovered that transparency has a positive impact on TFP growth for the economy as a whole, owing to the positive interaction between the two variables in the services sector. Using the autoregressive distributed lag (ARDL) process, Haider, Ganaie, and Kamaiah (2019) discovered that exchange transparency was cointegrated with TFP. Education, health, housing, imports, institutions, transparency, competitiveness, financial growth, geographical predicaments, and absorptive capability (including capital intensity) tend to be the most significant, according to Isaksson (2007). Furthermore, Jajri (2007) found that the total factor productivity growth model revealed openness to foreign companies and the global economy, reconstructing the economy through a transfer of capital between sectors, and the role of foreign companies in Malaysia was thought to be the major contributor to total factor productivity growth.

In Cameroon, there was also an important positive relationship between tax and the level of entrepreneurship growth. At 10%, the result was statistically meaningful. This conclusion is consistent with Bruce and Mohsin's (2006) findings, which found that the majority of these taxes have a substantial but minor impact on self-employment behavior. Tax progressivity at higher-than-average wages has a robust negative impact on burgeoning entrepreneurship, according to Baliamoune-Lutz and Garello (2014).

Although the coefficient is positive, there is no substantial association between domestic credit to the private sector (DCPS) and entrepreneurship growth in Cameroon. If the sign of the coefficient matches a priori assumptions, it should be remembered that this result contradicts Vukenkeng and Fonchamnyo's findings (2016). The allocative inefficiency of capital in Cameroon may be one explanation for the above finding. Even if credit growth is accomplished at the aggregate stage, credit will not be assigned to profitable fields of investment, such as production, in this situation. If this credit is used to fund risky or low-quality investments like real estate, it would have a marginal effect on long-term private investment. More credit also means higher interest rates, which leads to increased firm distress and a decrease in spending.

According to the findings of the 3SLS report, personal remittances from abroad have a positive and important impact on entrepreneurship growth in Cameroon. This outcome is consistent with theoretical predictions. In effect, remittances are complementary funding for aspiring entrepreneurs who do not have enough money to launch or grow their businesses. Herzer and Morrissey (2013), Gyimah-Brempong (1992), and Herzer and Grimm (2013) all came to similar conclusions (2012). In the opposite, it contradicts Munemo (2011)'s findings, which found a long-term detrimental connection. The finding adds to the theoretical proof in the assistance literature that money flows fund domestic spending in capital-scarce countries. Since the formal sector's conditions for granting loans are too strict in Cameroon, private investors must rely on alternative foreign funding to finance their investments. In an economy where obtaining a loan is difficult due to difficulty in obtaining suitable collateral and credit rationing, many aspiring entrepreneurs look to relatives and associates in other countries for money. The findings are consistent with those of Devkota (2016), who found that the most important factor driving entrepreneurship is overseas saving, accompanied by migrants' qualifications, returned time frame, and family size. Learning skills in another country does not explicitly lead to entrepreneurship. According to Kshetri, Rojas-Torres, and Acevedo (2015), the main takeaway from the entrepreneurially active activities of certain economies is that diaspora policies should concentrate on using different sources of non-economic remittances to stimulate the quantity and efficiency of entrepreneurial enterprise. Financial restrictions are critical for a small company, according to Kakhkharov (2019), and they can be particularly difficult to resolve in rural areas.

In the Cameroonian sense, gross domestic savings was found to have a substantial positive impact on entrepreneurship growth. This supports common neoclassical growth models, as well as the Harrod-Domar model, which emphasizes savings as a primary source of investment. This finding is consistent with Vukenkeng and Fonchamnyo (2016), who used a

two-stage least square estimation methodology to find a favorable and meaningful association between gross domestic savings and private entrepreneurship.

CONCLUSION AND POLICY IMPLICATIONS

It is worth remembering that technology and entrepreneurship are critical areas for every country's economic development. For certain economic conditions, researchers have found no important association between technology and entrepreneurship. In the course of the research, a variety of conclusions were reached, leading to the following recommendations: The government should improve on the evolution of total factor productivity, which is a key determinant of long run economic growth through the labor and capital markets, according to the Three Stages Least Squares (3SLS) results. Total factor productivity enhances dramatically entrepreneurship production in Cameroon, and the government should improve on the evolution of total factor productivity, which is a key determinant of long run economic growth through the labor and capital markets. The findings have showed a substantial positive relationship between economic growth and private investment, both of which are drivers of national growth and development, with private investment being subsidized and financed at low interest rates. Further data analysis reveals that government investment has a strong and statistically important impact on entrepreneurship growth, which is an inspiring sector of the economy. The 3SLS study also found that personal remittances from abroad have a favorable and important impact on entrepreneurship growth in Cameroon, indicating that the government should lower exchange rates and import rates to encourage remittances. In the Cameroonian sense, gross domestic savings are found to have a substantial positive impact on entrepreneurship growth. As a result, the Cameroonian government could promote household, private corporate, and public sector savings by rising interest rates on savings.

It is worth noting that given that this study was the outcome of a human effort, it could not be void of some limitations, this therefore acts as a basis for further studies so as to add to the existing stock of knowledge in this field of study. It is noted that Total Factor Productivity and the level of Entrepreneurship Development in Cameroon is a bidirectional model, Total Factor Productivity affects Entrepreneurship Development and on its own part also affect the entire nation. However this study concentrated on just both sides of this relationship. We therefore suggest that subsequent studies on this topic be made as independent separate studies to compare the outcomes.

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