

Do Specific Growth Drivers Exist for Firms? A Regional Analysis of Start-ups and Industrial Growth

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Abstract: - The study of start-ups, have remained largely a micro economic issue. Firms are the key drivers of industrial sector GDP (or enterprise growth) in countries across regions. Few studies have tried to examine the consequence of start-ups in the broad macroeconomics terms on enterprise growth in general with special emphasis on industrial sector output. This study provides a macroeconomic study of the effect of start-ups on industrial sector growth for countries in some specific geographical regions of the world. Panel data is utilized due to its obvious advantages such as its ability to utilize a panel of short time frames and its suitability for controlling for omitted variable bias and unobservable heterogeneity across regions. The results show that start-ups remain an intrinsic variable for enterprise growth and industrial sector output discussion in general.

Keywords: Political Economy, Quantitative Economics, Start-Ups, Entrepreneurship, Industrial Economics

JEL Classification: C23, O31

1 Background of Study

-Angel investors- and -Venture capitalist- are often what –entrepreneurs- venturing to -start new firms- need-, in their quest for -start-up funds-. -Validated business models- are also not likely to break new grounds as much as those that are un-validated with un-validated business model having higher innovation probability and unique success. There is also the question of floating highly scalable business models with high throughput for success. A scalable business model is one in which revenue will exceed cost of operation in no distant time from start-up. Business registration and economic growth are also likely to be connected. Till date little studies have tried to link the effect of start-ups and industrial growth in a quantitative manner as done in this study. Some channels through which start-ups can affect industrial growth include through new product introduction, payment of taxes by registered new firms thereby increasing the revenue base of the economy (through new revenue) as well as the job creation process. The attempt adopted in this study, is to explore if regional specific differences are responsible for the extent to which start-ups affect growth or if they do not count in the relationship between new business registrations the measure of start-up in this study and economic growth. In conducting this study panel data is utilized which allows for the control of unobservable effects as well as omitted variable bias in the econometric panel regression carried out in the study. The study utilizes data from six regional divide of the World which include the European Union, Latin American, East Asia Pacific, the United States to represent North America, Middle East and North Africa and finally Sub-Saharan Africa. The estimation techniques used in the study are the quantile regression and the generalized method of moment estimation techniques. Their choice stems from the attractive superior arguments, of overcoming the issues of choosing a suitable functional form as well as providing heteroscedastic robust standard errors. The rest of the paper is divided into the empirical analysis and data sections, the results, the relationship between start-ups and enterprise growth and the concluding sections.

2 The Scope and Objectives of the Study

In this section the scope and objective of the study is stated. The study investigates the effect of start-ups on regional industrial growth (or aggregate enterprise growth proxied, using industrial GDP growth) in six regions mentioned earlier in the study. The extent to which new business registration affect economic growth is becoming a source of concern for many policy makers as well as investigators of new business registration and their effect on business growth particularly for the private sector, since new market entry increases competition across in markets. The specific objectives that the study attempts to answer include:
Are start-ups driving industrial growth (aggregate enterprise growth) across regions?

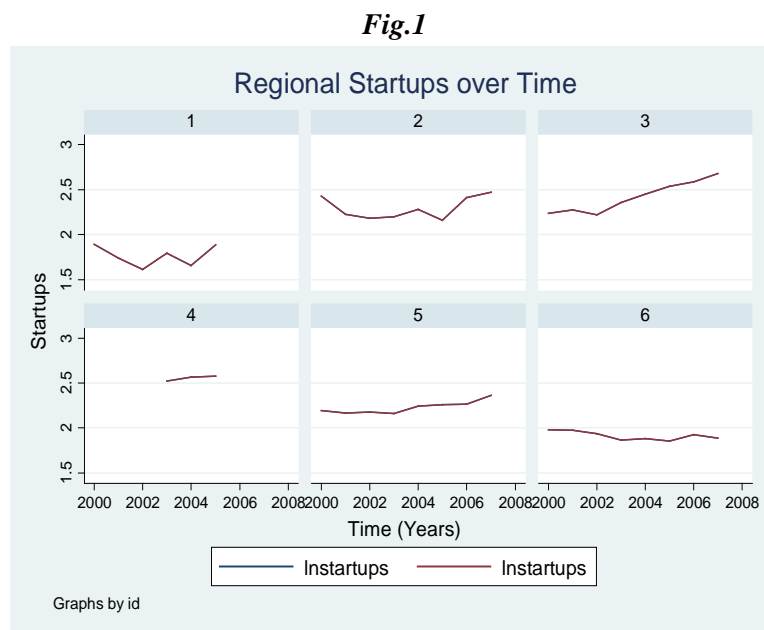
And secondly do regional specific differences influence the effect of start-ups on driving industrial growth (aggregate enterprise growth) across regions?

3 Empirical Analysis and Data

In this section the empirical arguments and the data utilized in the study is presented. The first intuitive question the study asks is if start-ups can drive industrial growth (specifically enterprise growth) across regions? Secondly does the measure of new business registration capture the amount of new start-ups across regions and if regional difference count in industrial growth? While many start-ups might not be scalable business ventures, it will be important to know if new business registration has any impetus for private sector growth. New business registration seems to be a suitable measure for start-ups in the absence of any other quantitative data, since it captures new start-ups and firms who wish to set up new divisions that have some level of autonomy in their larger organization. Viable start-ups can attract venture funding. Venture capitalists are investors with huge clot of capital wishing to invest in a business model that are risky and have the likelihood to be scalable. Such investors have strong capabilities to drive growth in new firms with bright future prospects which are scalable. The question of what exactly is scalable is left for the investor and the start-up manager to decide, while investors might find it suitable to invest in risky ventures, where the probability of success slightly outweighs the probability of failure, Angel investors on the other hand are those investors that are willing to invest in a start-up firm because they share the vision of the start-up firm. Therefore the scalability of the venture is not often one of paramount concern at the initial stage of the business life cycle as they may wish to move or change the method of achieving their goals on the long run.

3.1 What Are the Trends in Start-ups Across Regions?

In this subsection we study the trends in new business registration (start-ups) across the regions involved in the study. Fig.1 below depicts the trends in new business registrations across regions represented in panel line plots. The regions in order of representation in the graph below are Sub Saharan Africa (SSA), Middle East and North Africa (MENA), East Asia Pacific (EAPC), the United States to represent North America region (NA), the European Union (EU) and Latin America (LA) respectively. The trends reveal that new business registrations are on the increase in all regions except in Latin America (see id 6 Fig. 1).



Note: The figure above show trends in new business registration for the six regions considered in the study. The regions in order of representation in the graph below are Sub Saharan Africa (SSA), Middle East and North Africa (MENA), East Asia Pacific (EAPC), the United States to represent North America region (NA), the European Union (EU) and Latin America (LA) respectively. The trends reveal that new business registrations are on the increase in all regions.

This depicts that start-up numbers are on the rise. However the limitation of the study is that the data used do not depict how many of such businesses make it through the full business cycle (that is to maturity

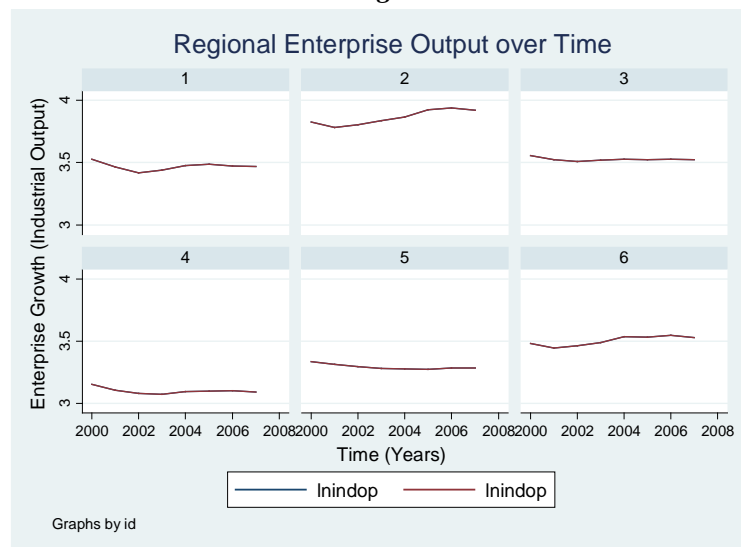
stage). There are also noticeable higher trends for the United States (see id 4) and the East Asia Pacific region (see id 3). This depicts the business friendliness of the region in the East Asia Pacific region (some countries in this area include Mainland China, Japan, Malaysia, Singapore etc.).

Africa and Latin America continue to witness the lowest number of startups among the regions utilized in the study. Some of the reasons for this include a.) The riskiness of the immediate business environment. b.) Uncertainty in the country specific economic policies in the two regions in question, this is attributable to poor stability of their political systems leading to sudden and unforeseeable change in government accompanied by drastic economic policies shifts. Inclusive is the current poor level of innovation and adaptation of technology, poverty and disease and the particularly high unemployed young population composition in many of the countries in these two regions e.g., Haiti, Burundi and Sudan for example (World Bank Statistics 2013) .c.) Poor flow of knowledge and investment in research and development also limits new business start-ups. There is suggestive evidence that poor countries are likely to utilize a sizeable amount of their GDP on consumption and welfare needs as against capacity building particularly to boost trade and technology Ojeaga (2015). The implication of the trends in regional startups is that regions with poor startups trends are likely to lag behind both economically and technological due to un-favourable climate for business activities. There will also be cases where industrial output for these regions will be poor compared to other regions of the world. Investing in innovating capacities such as new technology acquisition, manpower training as well as improving access to starting capital are likely paths, through which countries in Africa and Latin America can boost business growth.

3.2 What Are The Trends in Enterprise Output Across Regions?

In this subsection trends in regional enterprise output (using firm industrial output in constant United States Dollars) are explained. The measure (or proxy) of enterprise output utilized in the study is industrial output from regions.

Fig.2



Note: The above graph represent industrial output from regions. The regions in order of representation in the graph below are Sub Saharan Africa (SSA), Middle East and North Africa (MENA), East Asia Pacific (EAPC), the United States to represent North America region (NA), the European Union (EU) and Latin America (LA) respectively.

Regional industrial growth attributable to enterprise output could have meaningful implications for global growth. Regions have also been experiencing average growth over the years of 3 to 3.5 % as at 2010 to 2013 (World Bank Statistics 2013). Growths in many developed countries have peaked with countries in the European Union experiencing average growth of 1.4% (IMF statistics 2013). However growth still appear to be high for regions with higher concentration of developing countries see id 1,2 and 4 for Sub Saharan Africa, Middle East and North Africa and Latin America respectively. Sectorial composition in countries across regions is also a major contributive effect to overall growth from countries across regions. Diversification of

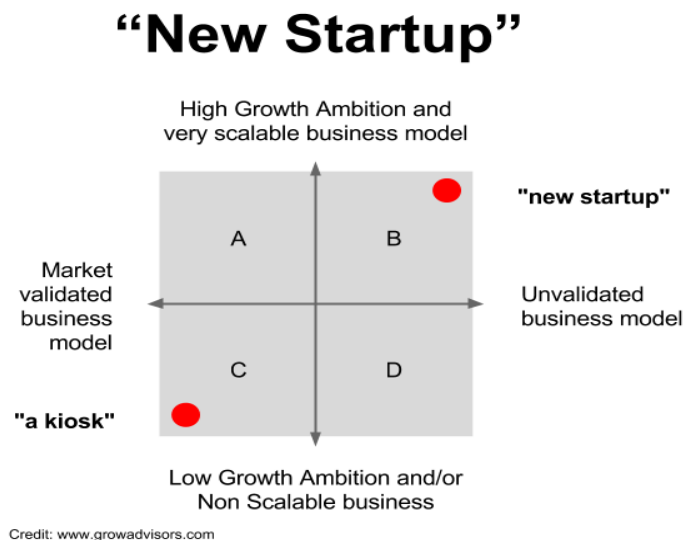
country specific economies across regions could improve individual country output which could affect overall regional output particularly for many mineral dependent developing countries like Nigeria and Saudi Arabia.

The level sectorial economic diversification for many developed countries is already quite high, yielding strong results for those regions and insulating countries in such regions from global shocks. Therefore the growth in many developed regions are likely to be more sustainable than those from developing regions like Sub Saharan Africa, and North Africa and the Middle East. Innovation and technical ability to drive growth is also missing in many developing countries in Latin America, Sub Saharan Africa and Middle East and North African countries. This can be largely responsible for instability in growth for these regions due to dependence on global commodities export. The sectors that drive growth for regions are also different while for the developing countries of Latin America, Sub Saharan Africa and Middle East and North Africa these include firms and enterprises in the primary and the secondary sectors with the primary playing a more significant role. Growth from developed countries will be mainly from the tertiary and the services sector (World Bank Statistics 2013).

3.3 Un-validated Models and Scalable Start-ups, do High Ambition Count?

In this subsection we discuss un-validated business models, scalable start-ups and investor and business manager's high ambition. Validated models are less risky ventures that have been embarked upon by firms in the past. They are validated because other firms or small businesses have adopted them and have pulled through, meaning they are scalable and less risky. The problems with such models are that they are typically conventional business ventures that are common, and many are already scalable. Another problem is that there will exist, many competitors and return on investment will likely be low due to dwindling demand over an area.

Fig.3 Scalable and Non Scalable Business Models



Source: Obtained from “Credit” Available on www.growadvisors.com.

Note: The above depicts that ambitious growth desires is the key driver of new start-ups. This is fueled by the desire for high profit (making such models to be highly scalable). With high profit levels also comes a high risk.

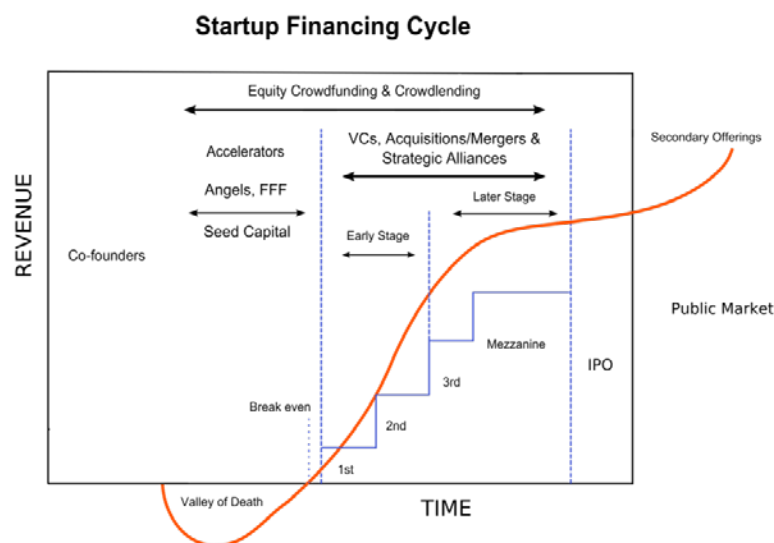
Fig. 3 depicts a new startup model and differentiates two new firms into those with validated business models (termed a kiosk in the figure below) and a new startup (termed as those with an un-validated business model). It depicts that validated business models are usually characterized by low growth, low ambition and therefore can be characterized as a quite low scalable business. On the other hand un-validated business models have high growth ambition and are very scalable models although the scalability has not been proven.

The depiction shows that ambitious growth desires is the key driver of new start-ups. This is fueled by the desire for high profit (making such startup models to be highly scalable). With high profit levels also comes a high risk. Therefore it is not expected that investors will easily invest in new startups driven by ambition with the likelihood of great success without some sufficient conviction.

3.4 Seed Capital, Angel Funding, Venture Capital and the Valley of Death. Reviewing the Start-up Funding Debate

In this section we present the startup lifecycle. Few startup firms are likely to avoid slipping into the valley of death i.e. not eventually breaking even. This can lead to serious consequences for their founders, who could go bankrupt, lose their reputation and lose their seed funds. In stating the startup financial cycle debate we define seed funds. Seed funds are initial working capital that managers of new startup firms often have at their disposal to fund the new firm. Angel investors are investors who believe in the vision of a new firm (startup). Seed funds being initial funding capital, as depicted below in fig.4 and angel investment, are probably the only two types of funding a new startup company is likely to find until it breaks even and begins to make profit. Venture capitalists are also risk takers seeking to maximize profit in the face of intense risks. They are often attracted to the startup company in the early stages (first stage) after the company just breaks even. They are typically investors with enormous capital to directly acquire part or the entire firm or merge with the existing firm to cut cost in some factors of production in their own existing firms. Firms are also qualified for IPO's fund raising to expand their business at this stage see Fig 4 at the break even stage.

Fig.4 Start- Up Financing Cycle



Source: Obtained from "Credit" Growth Advisors online

Note: The above depicts that startup financing cycle. The figure above show that before the break even stage in the early life of a firm it receives just seed capital and angel funds and as soon as the firm breaks even it receives venture funds and later stages receives funds through IPO and other secondary offerings.

In the later periods of the break even stage the firms are likely to seek investment in the public market through secondary offerings. At this stage the firm is considered to be viable and profitable and can access public money for further expansion. The debate in the startup funding cycle is at what point is the startup firm termed profitable? It is at the point at which its revenue just exceeds its total cost. Other pundits also specify that a firm is successful when the firm has established itself as a formidable competitor in the market through having a sizeable amount of market share.

Finally a firm that avoids the valley of death will experience two types of funding they include: a.) Crowd funding and b.) Crowd lending. Crowd funding will come from venture capitalist while crowd lending will come from IPO's and other secondary offerings.

3.5 Data and Sources

In this subsection the data used in the study and their sources are defined clearly. All data were obtained from WDI data of the World Bank through the data market of Iceland, for the period of 2000 to 2008 (Nine Years). The study utilized six regions namely the European Union, Latin American, East Asia Pacific, the United States to represent North America, Middle East and North Africa and finally Sub-Saharan Africa. Panel data is utilized due to the short time span for the six regions. The advantages of panel data are that it allows for the elongation of the number of observation and control for unobservable effects (e.g. omitted variable bias) in the model specification. The dependent variable used in the study is enterprise growth which is

the proxy used to capture industrial output from regions. Other explanatory variables include new business registration (the measure of startup) even though we recognize that some of these firms are not likely to be scalable, technology (measured using the total number of phone lines both fixed and wireless), innovation (measured using the total number of phone lines both fixed and wireless X population) gross capital formation (total capital available in banks and the real sector in constant United States Dollars), inflation rate which depicts the riskiness of the business environment across regions (annual variation in percentages in prices of goods and services) institutional quality measured using length of paved roads across regions in kilometers.

3.6 Theory and Methodology

In this section the theory and methodology used in the study is presented. The theoretical section reviews some previous theories in the area while the methodological sections reviews some past methodologies used in the area of study.

Theory

In this sub-section the theory is introduced. Past studies have identified labour inputs as having strong consequences for private sector growth in the United States Griliches (1960). Labour indexes have also been developed using labour compensation hour weights Griliches (1963) to study the effects of labour cost of firm productivity finding a relationship between the two. Other studies have also studied the effect of input substitution of labour and capital on firm productivity Solow (1957). Jorgenson, Ho, and Stiroh (2005, Chapter 6, pp. 201-290) also study the implicative effect of capital price on firm productivity utilizing different types of capital mix, they find a relation between capital mix and firm growth. Jorgenson (1966) also introduced the production possibility frontier allowing for the replacement of the traditional production function with the production possibility frontier in the embodiment hypothesis allowing for the joint production of consumption and investment goods from capital and labour services.

Jovanovic (1982), first stated the two start-ups model, stating that firms start and end with zero employees and the number of employees that firms retain at their peak of production and growth is often the maximum they employ in their history. Firms also have the capability of hiring and laying-off staff during periods of decline and growth respectively meeting their specific organizational needs. The theory relied on in the study is that of Jovanovic (1982) where firms rely on innovative human capital for growth which is extended for the purpose of this study.

Methodology

In this section we present the methodology and model specification utilized in the studies. Past studies Haltiwanger, John, Ron S. Jarmin, and Javier Miranda, (2008) have studied the relationship between firm and job creation for US firms using time series data, finding that firm age matter for job creation. This study employs time series data and studies the relationship between new business registration and enterprise output using industrial GDP as measure of overall output from the private sector which represents private enterprise growth in this study. This study utilizes a combination of estimation techniques which include the median regression and the dynamic panel estimation techniques, both which produce heteroscedastic robust standard errors. The dynamic panel method includes the lag of the dependent variable (industrial production) in the model specification. Past studies that have use time series and studied the innovation related subjects include the study by Aghion P. and Howitt P. (2004) which studied the effect of quality innovation with growth enhancing capabilities on economic growth, Ojeaga P., Odejimi D., George O. and Azuh D. (2014) also argue that innovative and modern utilization of renewable energy production plants can drive economic growth using panel data and generalized method of moment estimation technique, Ojeaga P., Odejimi D. O., Okhiku J. and Ojeaga D. (2013) also study the effect of commercial lending on growth utilization time series data and non-parametric estimation techniques (with special emphasis on quantile regression by Silva et al 2013) finding strong relationship between lending and economic growth which is negative for Nigeria etc. Other studies Ojeaga P., Odejimi D. and Ikpefan O. (2014) have also utilized quantile regression and time series data to study the relationship between deposit and fraud finding strong relationship between the two variables. The study, by Ojeaga P. (2014), also finds that foreign inflow also affects exporting capabilities utilizing panel data. Institutional factors utilized in the study will capture firm ability to hire and fire, while technology and level of innovation will affect the firm level of transformation of inputs business riskiness and the macroeconomic factor that affect enterprise activity will be included in the model (using inflation rate) and finally access to capital for production will also be included. In this study aggregate growth for firms (the measure of enterprise growth) in general is utilized. Specific drivers of firm growth identified to affect growth in the study include: gross capital formation, inflation, technology, innovation and new business registration. Therefore Firm Growth will be a function of the above variables expressed below as *Firm Growth* $f(gcf, inf, techuse, inno, nbr)$. Gross

capital captures access to capital for firms, while inflation will depict the riskiness of the business environment for trade, technology will measure the access to technology and innovation will gauge the quality of labour and the ability of firms to utilize advance technology. Firms output will also be a function of past and current entry of other firms which will measure the level of completion across sectors. The above allow for the inclusion of all basic variables in the endogenous growth theory, which are technology, human capital, labour quality and access to capital. The model to be estimated now becomes

$$\text{indop}_{it} = \alpha_0 + \text{nbr}_{it} + \text{innov}_{it} + \text{techuse}_{it} + \text{gcf}_{it} + \text{inf}_{it} + \varepsilon_{it} \dots \dots \text{Eqn. 1}$$

Where indop_{it} , is industrial output for firms, α_0 is a constant, nbr_{it} represents business registration, innov_{it} represents innovation, techuse_{it} represents technology use, represents gcf_{it} gross capital formation capturing capital access, and inf_{it} represents inflation. The use of panel data is to overcome model miss-specification issues such as omitted variable bias and to control for unobservable heterogeneity across regions and time that will affect the regression results.

3.7 Arguments

The argument put forward in this study include: 1.) The number of startups, across countries will have significant effect on enterprise growth. 2.) Innovation use will have significant effect on industrial Output. 3.) Gross capital formation will have significant effect on industrial growth (and hence private firm growth). 4.) The nature of the business environment (the riskiness of investment) will have significant on enterprise growth depending on the nature of the immediate business environment on businesses. 5.) And finally regional specific characteristics will matter for regional industrial growth and development. Therefore startups will have positive effects on enterprise growth in general stimulating competition and bringing on board new methods and ideas in conducting business in general. Innovation will be a prominent factor that will affect enterprise growth in general. Also access to capital will also either limit or increase business development depending on its availability. Country specific business environment and regional specific characteristics such as institutional conditions, trade policies, macroeconomic factors etc., will affect enterprise growth in general.

3.8. Results

In this section the results of the study are presented below in Tables 1 and 2. The results show that institutional factors, business environment conduciveness and access to capital appears to be having positive significant effect on industrial growth (specifically enterprise driven growth) for regions included in the study see also Appendix 1 and 11 for the STATA 13 result output. It was also found that new business registration (startups) and innovation (Ininnv) have negative significant effect on enterprise growth (indop) using both the median regression (quantile estimation) and dynamic panel estimation techniques. In both cases the year controls are included by including the year dummies in the regression which appeared to be largely significant, showing that regional differences in policies and characteristics over time, do not affect the effect of new business registration (the measure of startups) on enterprise growth. The results where regions controls are included are shown in the Appendix (III and IV).

Table 1. Regression of Startups on Enterprise Output Using Median Regression

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Median regression
R-squared = .84409839
Number of obs = 36
Objective function = 1.0244994

Heteroskedasticity robust standard errors

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indop	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
lnstib	56.83319	23.31341	2.44	0.023	8.716677 104.9497
startups	-6.660215	3.361413	-1.98	0.059	-13.59783 -.2774008
lninnv	-62.50004	23.62484	-2.65	0.014	-111.2593 -13.74078
inf	.8721812	.4183414	2.08	0.048	.0087669 1.735595
gcf	1.531094	.5403611	2.83	0.009	.4158439 2.646345
_lyear_2002	3.071045	1.72327	1.78	0.087	-.4856087 6.627699
_lyear_2003	2.367355	1.954605	1.21	0.238	-1.666752 6.401462
_lyear_2004	3.107331	2.920322	1.06	0.298	-2.919917 9.13458
_lyear_2005	5.726212	3.156237	1.81	0.082	-.7879401 12.24036
_lyear_2006	7.839444	3.274875	2.39	0.025	1.080435 14.59845
_lyear_2007	6.404045	2.528095	2.53	0.018	1.186313 11.62178
_cons	37.41104	27.70976	1.35	0.190	-19.77909 94.60117

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Machado-Santos Silva test for heteroskedasticity
Ho: Constant variance
Variables: Fitted values of indop and its squares

chi2(2) = 0.075
Prob > chi2 = 0.963

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Many of these firms will therefore likely lose their seeds and angel funds before reaching the startup middle life cycle. However many startup firms who have crossed this threshold, will be expected to contribute to overall industrial GDP. The implications of the results are that many startups do not pull through and that there exist specific growth drivers for firms they include institutional environment, capital access and stable macroeconomic factors. Special policies to promote new business growth such as access to low interest loans and improvement of knowledge sharing platforms and access to such platform are some key factors that countries across regions need to address to make new businesses drive growth on the long-run.

4 Conclusion and Recommendations

In this section the study is concluded. The study investigates the effect of startups (in this case new business registration) on industrial growth (in this case industrial sector GDP or strictly referred to as enterprise growth) in some selected regions which include the European Union, Latin American, East Asia Pacific, the United States to represent North America, Middle East and North Africa and finally Sub-Saharan Africa. The specific question the study seeks to answer is if there exist some specific drivers for firm growth. It was found that innovation use was also having negative effect on industrial growth depicting that innovation was probably not at optimal levels in firms across regions. This was because many new firms hardly make it through to the middle stages of the startup life cycle and many regions still lack viable and cheap knowledge sharing platforms making innovation not to positively drive industrial and aggregate enterprise growth in general. It was also found that startups do not have a positive significant effect on industrial output for regions. However other factors such as capital access and macroeconomic factors seem to have positive significant effect on industrial growth for firms. Therefore many new businesses do not have a viable scalable model.

It is recommended that since many startups are less likely to make it through to their middle life cycle, government should promote special policies to help cushion the problems many startup firms can have in the initial stage of their development, some policy solutions include access to special low interest loans, tax holidays during firm incubation period and finally maintain consistent macroeconomic policy that can reduce the riskiness of the business environment by for instance controlling interest rates in general. Innovative capacity should be boosted across regions by increasing capacity for knowledge sharing platforms as this could increase the use of cutting edge technologies in firms and reduce cost of accessing such knowledge platforms for firms in their nascent stages.

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Appendix

Appendix I

VARIABLES	(1) (Dynamic Regression) Industrial Output	Panel (2) (Median Regression) Industrial Output
Lag of Industrial Output	0.876*** (0.0376)	
Institutional quality	5.962*** (1.880)	63.70*** (15.24)
Start-ups	-0.509** (0.245)	-7.971*** (1.695)
Level of Innovation	-7.027*** (1.942)	-69.32*** (15.50)
Inflation rate	0.311*** (0.0235)	1.157*** (0.324)
Gross Capital Formation	0.324*** (0.115)	1.898*** (0.308)
Year Controls	Yes	Yes
Constant	6.138** (2.569)	33.45* (18.53)
Observations	36	36
Number of id	6	6

Robust standard errors in parentheses*** p<0.01, ** p<0.05, * p<0.1

Appendix II

Variables	(1) (Dynamic Regression) Industrial Output	Panel (2) (Dynamic Regression) Industrial Output	(3) (Median Regression) Industrial Output
One period lag of Industrial Output	0.464** (0.214)	0.876*** (0.0502)	0.876*** (0.0376)

Two period lag of Industrial Output	-0.0850 (0.175)		
Institutional Quality	-3.734 (5.951)	5.962 (5.633)	5.962*** (1.880)
Firm Start-ups	0.408 (0.612)	-0.509 (0.592)	-0.509** (0.245)
Level of Innovation	5.707 (6.878)	-7.027 (5.790)	-7.027*** (1.942)
Inflation Rate	0.253*** (0.0847)	0.311*** (0.0784)	0.311*** (0.0235)
Gross Capital Formation	0.154 (0.225)	0.324 (0.201)	0.324*** (0.115)
Year Controls	No	Yes	Yes
Constant	-17.38 (17.22)	6.138 (7.973)	6.138** (2.569)
Observations	25	36	36
Number of id	6	6	6

Standard errors in parentheses*** p<0.01, ** p<0.05, * p<0.1

Appendix III

Variables	(1)	(2)
	(Dynamic Regression) Industrial Output	Panel (Dynamic Regression) Industrial Output
Institutional Quality		-2.940 (5.394)
Firm Start-ups	-0.288* (0.159)	-0.0753 (0.429)
Level of Innovation	0.999 (1.229)	4.157 (6.260)
Inflation Rate	0.394** (0.151)	0.366** (0.161)
Gross Capital Formation	0.222 (0.402)	0.186 (0.382)
Region Controls	Yes	Yes
Constant	9.349 (19.52)	10.76 (15.04)
Observations	36	36
R-squared	0.991	0.991

Standard errors in parentheses*** p<0.01, ** p<0.05, * p<0.1

Appendix IV

VARIABLES	(1)	(2)	(3)
	(Dynamic Regression) Industrial Output	Panel (Dynamic Regression) Industrial	(Median Regression) Industrial Output

		Output	
One period lag of Industrial Output	0.753*** (0.261)	0.445*** (0.0970)	0.445*** (0.0594)
Two period lag of Industrial Output	-0.194 (0.189)		
Institutional Quality	2.536 (5.971)	1.258 (4.901)	1.258 (1.860)
Firm Start-ups	-0.353 (0.552)	-0.289 (0.487)	-0.289* (0.149)
Level of Innovation	-2.422 (6.405)	-0.262 (4.933)	-0.262 (2.335)
Inflation Rate	0.226** (0.105)	0.264*** (0.0734)	0.264*** (0.0791)
Gross Capital Formation	0.0894 (0.250)	-0.0412 (0.167)	-0.0412 (0.168)
Region Controls		Yes	Yes
Constant	7.496 (11.35)	0.753 (7.972)	0.753 (8.128)
Observations	25	36	36
Number of id	6	6	6

Standard errors in parentheses*** p<0.01, ** p<0.05, * p<0.1

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About the Author

Dr. Paul Ojeaga is currently a community developer and a youth coach. He is also a member of faculty of Federal University of Agriculture Abeokuta where he teaches in the department of Entrepreneurial Studies. He is also currently the interim college representative of the Book and Publications Committee.