

## Reform Policies, Manufacturing Entrepreneurial Activity and Economic Growth: Empirical and Qualitative Observations on Nigeria

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### Abstract

*Entrepreneurship is essential for the sustenance of economic vitality in today's market economy; and when a greater number of new businesses especially manufacturing enter the market, competition and economic growth are enhanced. We attempted to find a relationship between entrepreneurial activity and economic development on the one hand, and macro-economic reforms and entrepreneurial activity on the other hand, using data specific to Nigeria. Ordinary Least Square (OLS) and correlation analysis were used. Our results show that increase in manufacturing firm entry would impact positively on GDP and that some past policies have given rise to increased entrepreneurial participation in Nigeria. We conclude that greater entrepreneurial activity generally means greater economic growth and that policy reforms targeted at economic revival should not choke entrepreneurship and capacity utilization*

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**Keywords:** entrepreneurial activity; manufacturing; micro-sized firms; economic growth; reforms

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### INTRODUCTION

Entrepreneurship is essential for the sustenance of economic vitality in today's market economy (Klapper et al, 2006); and when a greater number of new businesses enter the market, competition and economic growth are enhanced (Djankov et al, 2002). For instance, the 25,800 currently active companies founded by the alumni of Massachusetts Institute of Technology (MIT) employ about 3.3 million people and generate annual world sales of \$2 trillion, producing the equivalent of the eleventh-largest economy in the world (Roberts and Easley, 2009). Additionally, recent evidence from evolutionary economics indicate that the gap in economic growth between developed and less developed countries can be significantly reduced through greater entrepreneurial activity (Galor and Stelios, 2006). In Canada, for instance, Brander et al (1998) used a longitudinal data set on firm formation to show that economic growth is driven by increased entrepreneurial participation rather than by the growth of existing firms. Klapper's et al (2008) analyses also showed that business entry and density rates are significantly related to country-level indicators of economic development and growth, among others. Tokunbo et al (2005) noted that macroeconomic policies in Nigeria has affected the poor negatively even at an increasing rate especially at the rural areas. Particularly, they demonstrated the importance of policy-related predictors such as the quality of the legal and regulatory environment,

reforms as well as the efficient allocation of inputs and other resources to new venture creation (Jovanovic, 1982, Obadan, 2003). From the foregoing, a reform-entrepreneurship-growth nexus is apparent. This paper attempts to explore the relationship in the context of a large developing economy – Nigeria. Our thesis is that certain macroeconomic reforms that were implemented in the country, mostly in the two decades spanning the '80s to the '00s, could influence the rates of entrepreneurial activities and their contribution to economic growth. We have adopted both qualitative and quantitative methods to find answers to two main questions:

How have the Structural Adjustment Programme (SAP), the Indigenisation Decree and the Small and Medium Enterprise Equity Investment Scheme (SMEEIS) impacted entrepreneurial activity in Nigeria? Is there any noticeable impact of the entrepreneurial activity on economic growth?

The analyses carried out in this paper represent an early attempt and first steps in assessing the collective impact of reform policies on entrepreneurship and manufacturing. This paper makes a contribution to the literature on entrepreneurship in developing economies regarding the impact of reforms and the influence of entrepreneurship on economic development.

### **What is Entrepreneurial Activity?**

The definition of entrepreneurship lacks uniformity (Outcalt, 2000; Davidsson, 2005) but the entrepreneurial process is known to centre on the discovery, creation and profitable exploitation of markets – often referred to as opportunities - for goods and services (Venkataraman, 1997; Shane and Venkataraman, 2000). Therefore, we argue, following Davidsson (2005), that entrepreneurship consists in the competitive behaviours that drive the market process. These behaviors are characterized by: the creation of new enterprises or organisations (Low and MacMillan, 1988; Gartner, 1988); the discovery of entrepreneurial opportunities (Kirzner, 1977); new entry (Lumpkin and Dess, 1996); and the process by which individuals – either on their own or inside organisations – pursue opportunities without regard to the resources they currently control (Stevenson and Jarillo, 1990).

Entrepreneurial activities will then be such that:

- ❖ They provide customers with new alternatives, potentially giving some of those customers more value for their money;
- ❖ They stimulate incumbent actors to improve their market offerings in their turn, which increases efficiency and/or effectiveness of those actors; and if successful, they attract other entrants to the market, thus further increasing competitive pressures towards improved efficiency and effectiveness (Davidsson, 2005).

Particularly for operationalization purposes, entrepreneurship is characterized in this paper simply as the creation of a new enterprise or venture, whether in the formal or informal sector. Our focus is primarily on creation or new entry at which time firms are generally micro-sized and mostly operate in the informal sector, particularly in a developing economy like Nigeria. We have chosen to focus on the manufacturing industry for the reasons discussed in the next section; thus, entrepreneurial activity in the context of our study indicates the creation of a manufacturing enterprise irrespective of whether this is registered in the formal sector or not. Our attention on the informal sector is premised on the important role it plays in national economies. For instance, 10% of official GDP in the United States accrues from the informal sector; and in Nigeria where the informal business sector is a major source of income and employment (Ramachandran, 2002), up to 70% of official GDP is accounted for by the informal sector (Klapper et al, 2008; Schneider and Enste, 2000)

### **Why Focus on Manufacturing?**

It is generally agreed that in any economy, especially in today's globalised world, manufacturing plays a key role in development (Albaladejo, 2003; Chenery et al, 1986). Albaladejo (2003), in assessing Nigeria's industrial competitiveness, put forth the following as

key reasons why the nation – and, indeed any nation - must pay serious attention to developing significant industrial capability:

- ❖ Manufacturing is growing faster than the primary sector in total world trade.
- ❖ Manufacturing is less exposed to external shocks, price fluctuations, climatic conditions and unfair competition policies.
- ❖ Manufacturing is the main vehicle for technology development.
- ❖ Manufacturing drives and diffuses innovation.
- ❖ Manufacturing has a 'pull effect' on the other sectors of the economy.
- ❖ The internationalization of production has spread the benefits of manufacturing.

For the foregoing reasons, stimulating more firm entry in the manufacturing sector should be more attractive to policy-makers. This paper thus seeks to provide evidence that would be useful to support the creation of relevant policies. Providing such evidence is considered to be very beneficial for developing economies like Nigeria where manufacturing is still highly underdeveloped. For instance, as manufacturing continues to outpace primary goods export in total world trade, the manufacturing industry in Nigeria is faced with a myriad of problems ranging from a harsh environment characterized by high import dependency, inappropriate policies, lack of transparent governance to low technological learning and innovation capabilities (Albaladejo, 2003; Egbetokun et al, 2009).

### **Macroeconomic Reforms in Nigeria**

Our discussion here will be limited to the study scope. In an attempt to broaden Nigeria's industrial base from the mono-cultural nature bequeathed by the oil boom of the 70s, the government has invested heavily in joint ventures with private companies since the early 1980s. The largest such project is the integrated steel complex at Ajaokuta, built in 1983 at a cost of \$4 billion. The government has also invested heavily in petroleum refining, petrochemicals, fertilizers, and implements for assembling automobiles and farm equipment. Yet, sometimes harsh government policies and unfavourable macro-economic conditions have hampered industrial development by making it difficult to obtain sufficient raw materials and spare parts (Tokunbo et al, 2005). For instance, the combination of macroeconomic instability, crime and poor security, a weak and politicized financial system, poor infrastructure especially electricity supply and predatory local officials, which have relatively little influence on the productivity and costs of large enterprises, are devastating for small- and medium-scale manufacturing (Oyefuga et al, 2003). Partly as a result, only a fraction of the country's manufacturing capacity is currently utilized with a declining trend

over the years. Average capacity utilization was 42.4% from 1980 to 2003 Anyanwu (1997) and UNCTAD (2006). Besides the 1986 externally packaged Structural Adjustment Programme (SAP) policy with its assorted effects (Anyanwu 1997), in the mid-1990s the government introduced a series of reforms, including an allowance for greater foreign participation in Nigerian industries, a loosening of controls on foreign exchange, and the establishment of an export-processing zone at Calabar (Stock, 2007). Additionally, the Bankers' Committee, an association of all the Managing Directors and Chief Executive Officers (MD/CEOs) of commercial banks in Nigeria, proposed in December 1999 that banks should contribute 10% of their profit before tax (which was later reviewed to the profit after tax) towards equity investment in SMEs. The fund, which was to be deducted by and domiciled with the Central Bank of Nigeria (CBN), formed the basis for the Small and Medium Industries Equity Investment scheme (SMIEIS). The expectation is that through this scheme, banks would assist in jump-starting the real sector of the economy by spear-heading the restructuring and financing of SMEs, many of which have become moribund, owing mainly to poor funding (Oyekanmi, 2003). SMIEIS placed a strong emphasis on the financing of the real sector (Osa-Afiana, 2003), especially small and medium enterprises engaged in those activities belonging to the manufacturing (including agro-allied industries), mining and mineral beneficiation and construction sub-sectors. Investments under the scheme were meant for the establishment of new SMEs or the reactivation, expansion, modernisation or restructuring of existing ones (Sanusi, 2004).

Prior to these, two notable policy reforms had been implemented in the country. First was the indigenization decree which was promulgated in 1977. The decree required that foreign holdings in any company operating in Nigeria be of a minority nature. It also precluded foreigners from operating in certain sectors of the economy. Although the policy had positive effects initially, it soon lost its effectiveness due to poor enforcement. Secondly, the debt crisis of the early 1980s - during which many developing countries were unable to service their external debt to multilateral lending institutions, because of a slowdown in the world economy, high interest rates, a decline in commodity prices, and wide fluctuations in oil prices, among other factors - pressured the country into implementing the structural adjustment programme (SAP) championed by the International Monetary Fund (IMF) and the World Bank. This happened because, as a condition of receiving loans, borrowing countries were required to implement the stringent "structural adjustment programs," which typically included severe cuts in spending for health and education, the elimination of price controls, the liberalization of trade, the

deregulation of the financial sector, and the privatization of state-run enterprises. Although intended to restore economic stability, these programs, which were applied in a large number of countries throughout the developing world, frequently resulted in increased levels of poverty, mounting unemployment, and a spiralling external debt (World Bank, 2009). Taken together, each of these reforms has, on its own and in combination with others, impacted on manufacturing entrepreneurial activity. These are explored in greater detail in the subsequent sections.

## DATA AND METHODS

Data for our empirical analyses was from two sources: the business register maintained by the National Bureau of Statistics (NBS, 2009) and the major economic, financial and banking indicators compiled by the Central Bank of Nigeria (CBN, 2004). The NBS database contains information on over 12,700 manufacturing enterprises in terms of size, location, sector of activity, date of establishment, among others. The CBN indicators contains real sector statistics including aggregate and sectoral GDP and GDP growth rate at 1980 and 1990 constant prices as well as manufacturing capacity utilization, among others.

## Variables and Measure

As measures of entrepreneurial activity, we used the number of manufacturing firms, the number of micro-sized firms and the proportion of micro-sized firms in total manufacturing firms created yearly between 1980 and 2003. As a finer measure of the variation in entrepreneurial activity year-on-year, we captured the trends in firm entry by calculating the difference in firm entry between a given year ( $t$ ) and the previous year ( $t-1$ ). We proxy economic growth by the country's GDP at 1990 constant prices as the endogenous variable, the growth rate of the GDP, the rate of growth of manufacturing contribution to GDP as well as industrial capacity utilization. Our choice of the 1980-2003 periods is informed by the fact that the most notable reforms that potentially influenced manufacturing entrepreneurial activity, as we earlier identified, were implemented during that period. Table 1 details all the variables included in our analysis and their descriptive statistics (See Appendix)

## Method of Estimation

The method of estimation used is the Ordinary Least Square (OLS) preceded by a Multiple Correlation analysis method. We choose the OLS because the response variable (GDP) is continuous and its reaction to the explanatory variables will be well approximated by a linear regression equation. Graphs are also to be used to show the economic dynamics and basis for our qualitative discussion.

### **Reforms and Entrepreneurial Participation: A Nexus**

We first examine how entrepreneurial participation had varied between 1980 and 2003 as indicators of the effects of some macroeconomic changes implemented during the period, with close reference to Figures 1 and 2. We observe first that there was an apparently consistent increase in manufacturing firm entry beginning from the mid-70s. This rise became more pronounced in the 80s (Figure 1). Two major reforms that started around those periods could be noted to have created such effect. First is the indigenisation decree which took effect in 1977. The decree had the effect of encouraging the survival of small and medium-sized firms which otherwise would have died due to intense competition from foreign-owned firms.

Also, government adopted a policy of massive investment in joint venture partnerships that stimulated activities in informal sector manufacturing. The combined effects of these reforms are more visible in the fact that year-on-year firm entry was positive more often than not between 1970 and 1989 (Figure 2). However, rather than sustaining the upward trend, the late 80s and early 90s were characterized by inconsistencies. The observed inconsistencies cannot be completely dissociated from the unfavourable effects of the structural adjustment programme (SAP) implemented in the mid-80s. Following that period, some measure of trade liberalization occurred in the 90s and had effects carried through to the early 00s. For instance, contrary to the spirit of the indigenization policy and SAP respectively, government permitted increased foreign participation in Nigerian industries and loosened controls on foreign exchange to a certain extent. Invariably, firm entry rose to levels above the previous time periods (Figure 1) and the highest year-on-year entry trend was recorded during this period (Figure 2).

However, because most of the problems that hamper firm growth and survival were included, entry rates declined consistently and year on- year trends were mostly negative starting from the early 00s. This was a period when policies were largely unstable and infrastructure decayed consistently. A particularly important private sector-driven reform is the formation of SMEEIS which had the sole aim of providing equity financing to small and medium enterprises (SMEs), including notably those in manufacturing. In an assessment of the effectiveness of the funding initiative by Oyefuga et al (2008), a good number of SME operators admitted that the initiative was beneficial and effective. He however noted the need for a combination of measures implemented together over the medium to long term since no single policy thrust could bring about the much needed development. A particular set of

policies which the Nigerian economy urgently requires are such that would stimulate and sustain necessary institutional and infrastructural changes. Unfortunately, the SMEEIS scheme was discontinued in 2007 even while there was still so much uninvested fund. The fund that formed the basis for the scheme is now made available through micro-finance banks.

Figure 3 (see appendix) suggests positive policy additionality arising from the indigenization decree and possibly other reforms around that time. This suggestion arises from the fact that firm entries during the post-policy periods were consistently higher than the levels predicted based on the data from the pre-policy period. It is equally so to state that the policies have not contributed to the additionality in manufacturing entrepreneurial participation in the long run. This is true considering the fact that both variables trended below the predicted levels beginning from 2005. This period is indeed characterized by instabilities and uncertainties concerning the monitoring and enforcement of most of the reform policies that we consider herein. Finer levels of causal relationships can only be explored using more sophisticated procedures that involve additional data that we do not have at the moment.

For instance, we need data from the entrepreneurs on the important factors that motivated them to start the firms. It is obvious, from the period covered by the data that we report, and the rate of exit (shown in Figure 2), that such data will be hard to come by. It is highly desirable, however, for future studies to embark on this kind of analysis using more manageable time periods for which detailed data might be available. The area between the two line graphs represents the number of manufacturing firms that are larger than 10 employees. As can be seen from the chart, the population of these firms converge to the number of micro-sized firms towards the end of our study period. Why this is so may require further exploration but it is intuitive to conjecture that it will be connected to constraints in the operating environment as well as market failure. Be that as it may, the convergence - coupled with the irregularities in firm entry - suggests problems in maintaining firm entry, and this calls for decisive policy action. Previous studies (e.g. Oyefuga et al, 2008) have shown that problems that hinder the growth and sustainability of small firms include infrastructural constraint, unnecessary high taxation and predatory local officials. Thus, policy actions targeted at sustaining firm entry should take care of these problems.

### **Econometric Results: Impact of Manufacturing Entrepreneurial Activity on Economic Growth**

Table 2 shows the correlation matrix of all the variables included in our analyses, statistical significance being identified with asterisks. These

univariate tests showed first and foremost that GDP is significantly related to nearly all of the measures of entrepreneurial activity that we used, notably micro-sized firm entry. This, alongside the significant correlation of firm entry with industrial capacity utilization, suggests a relationship between manufacturing firm entry and economic growth.

Also interesting is the relationship between GDP growth and Manufacturing Firm Entry (NENTRY). It follows then that as more firms enter the market in a largely resource-based economy like Nigeria, the GDP is likely to experience a higher rate of growth. Whether or not this would remain so in more industrialized settings are still to be seen. From a policy standpoint, therefore, finding the right conditions under which higher entrepreneurial participation will drive GDP begs for more research. The linear regression estimate of the effects of entrepreneurial activity on economic growth approximated by the GDP (Table 3) shows that the proportion of total firms with employment size less than or equal to 10 created in the year, Industrial Capacity Utilization (ICU) and total firm entry (NENTRY) are crucial in explaining most of the variations in GDP. This supports the evolutionary economics thesis that greater entrepreneurial activity leads to greater innovativeness and growth. For Schumpeter, entrepreneurship remained a good description of novelty Becker et al (2002), Reisman (2004). For a developing economy like Nigeria, it would therefore make sense to implement such reforms as would increase entrepreneurial participation and create appropriate conditions that would guarantee that new firm entry impact on the economy.

The results in Table 3 (see Appendix) show that manufacturing entrepreneurial participation (NENTRY) is significantly positively related to GDP growth. From the  $\beta$  value we infer that entrepreneurial participation account for 30% of GDP variations. Similarly, micro-sized firm entry (PN10) as well as the trend of entry (N10TREND) is positively. This shows that small business entry has positive externality on economic growth. This means that small business entry has a lot of positive externality on growth. Surprisingly, Industrial Capacity Utilization (ICU) showed a statistically significant negative relationship with GDP. This is clearly counter-intuitive and we do not seem to have sufficient evidence to explain it. The coefficient of firm entry trend (NTREND) shows a negative relationship with GDP meaning that the economy is trending backwards i.e. retrogressing in micro sized firm (SLT). The firm loses thereby exerting negative effect on growth though this claim is statistically weak. Still, Model (I) explains 72% of GDP with an overall of Nigeria significant f-statistic claim. Durbin Watson statistics of  $d=1.4478$  falls between  $dL=0.925$

and  $dU=1.902$  showing that is the variables in Model (I) are not serially correlation (Gujarati, 2007).

Model (II) is different from Model (I) in that it is autoregressive because the lagged value of the dependent variable (GDP<sub>t-1</sub>) appears as an explanatory variable. The explanatory power of the model increased with the lag by about 20% implying that history matters and favourable initial conditions can predispose the economy towards a better future. Among other things, Model (II) shows that past economic status has a positive statistical significant impact on the present status, and with a reversion of the negative relation of Industrial Capacity Utilization (ICU) on growth observed in Model (I) which is exactly what government policy should be directed at. For the significance of Model (II), the Durbin Watson Statistics cannot be used again because of autoregressive nature of regression (Gujarati 2007). The Durbin h statistics was calculated to account for serial correlation. Using the expression for h statistic (see appendix 1), we estimated h as 1.904. With a rule of thumb that if the calculated h statistic falls between the Upper (DU) and Lower (DL) Durbin table values, there is no correlation except otherwise. While (DU) = 0.925 and (DL) = 1.902, these values implies a slightly autocorrelation since  $|h| > DU$  nullifying our Null Hypothesis of no correlation, since  $|h| > 1.96$ .

## CONCLUSION

In this paper we have made an attempt to find a relationship between entrepreneurial activity and economic development on the one hand, and macroeconomic reforms and entrepreneurial activity on the other hand, using data specific to Nigeria. Our effort represents a very timely attempt at exploring the topic the way we have done and our findings are consistent with current thinking on the subject matter. Empirical results shows that increase in manufacturing firm entry would impact positively on GDP. Whether or not this would be so for other sectors of the economy and in more advanced economies remain to be tested. Our results also show that history matters and initial conditions can predispose better future. Surprisingly, growth in manufacturing GDP is not associated with manufacturing entrepreneurial activity, suggesting that having more manufacturing firms operating in the country does not necessarily lead to higher economic impact. We also note that Industrial Capacity Utilization (ICU) is significantly associated with increasing manufacturing entrepreneurial participation but not with growth in manufacturing GDP. This suggests that though greater firm entry may lead to higher capacity utilization, it does not necessarily mediate between the capacity utilization and growth in manufacturing GDP. Our discussions have also pointed out that past policies notably the Indigenization Decree and the Small and Medium

Enterprise Equity Investment Scheme (SMEEIS)) have given rise to increased entrepreneurial participation in Nigeria. Future reforms should do better to also consider institutional and infrastructural changes. We conclude that greater entrepreneurial activity generally means greater growth and that reforms targeted at economic revival should not choke entrepreneurship.

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## APPENDIX

Table 1: Definitions and summary statistics, Nigeria (1980-2003)

Variable Name	Description	Minimum	Maximum	Mean	Std. Deviation
GDP	GDP at 1990 constant basic prices (billion naira)	31.55	392.76	256	75.07
LAGGDP	GDP at 1990 constant basic prices (billion naira)	29.95	356.28	241	82.55
MANGDPGROWTH	Manufacturing GDP growth rate	-30.9	26.2	1.52	10.53
NENTRY	Total number of firms created in year t (manufacturing entrepreneurial participation)	251	871	530.33	166.05
NSLT10ENTRY	No of firms with employment size less than or equal to 10 (SLT10) created in year t	97	365	219	76.9
PERCENTSLT10ENTRY	Proportion of total firms with employment size less than or equal to 10 created in year t	35.1	46.9	40.77	2.78
NENTRYTREND	Trend in total firm entry represented by the difference between total number of firms in year t and year t-1	-279	305	14.54	159.65
NSLT10ENTRYTREND	Trend in SLT 10 firm entry represented by the difference between total number of firms with employment size less than or equal to 10 in year t and year t-1	-164	138	7.08	79.81
ICU	Manufacturing capacity utilisation	29.3	73.3	42.42	11.57

Table 2: Correlation of reform and economic growth variables, Nigeria (1980 - 2003)

	1	2	3	4	5	6	7	8	9
GDP									
GDPGROWTH	0.372								
ICU	-0.3331	-0.2071							
LAGGDP	0.9835*	0.2025	0.3332						
MANGDPGROWTH	0.1604	0.5652*	0.1045	0.0744					
N10	0.7619*	0.3824	-0.428	0.7371*	0.0108				
N10TREND	-0.0928	0.2311	0.0431	-0.1474	0.208	0.4211			
NENTRY	0.7803*	0.3721	0.4069	0.7587*	0.0673	0.9880*	0.3448		
NTREND	-0.112	0.2492	0.0288	-0.1702	-0.138	0.4136	0.9694*	0.3632	
PN10	0.4731*	0.2874	0.4199	0.4468	-0.277	0.7203*	0.5843*	0.6090*	0.4663*

\* Statistically significant correlated coefficient

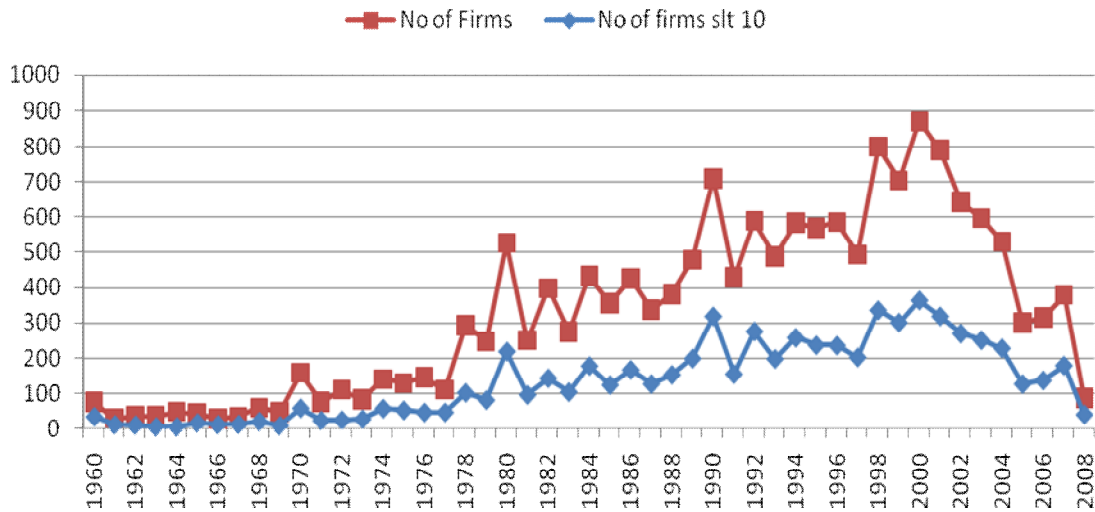
Table 3: Regression of entrepreneurial activity variables on GDP

Dependent Variable: GDP; Sample: 1980-2003

Variable	MODEL I		MODEL II	
	$\beta$	t-Statistic	$\beta$	t-Statistic
C	77.06	0.27	-234.48	-1.76*
NENTRY	0.30	3.10**	0.17	3.18**
PN10	2.86	0.39	5.88	1.79*
NTREND	-0.30	-0.73	-0.03	-0.17
N10TREND	0.02	0.02	-0.26	-0.65
ICU	-2.16	-2.17	1.44	2.28*
GDP(-1)			0.44	3.96**
R-squared	0.72			0.91
Mean dependent	256.00			266.09
Prob(F-statistic)	0.00			0.00
F-statistic	9.24			25.75
DurbinWatsonstat	1.45			1.33
Log likelihood	-123.25			-98.74
Observations:	24			23

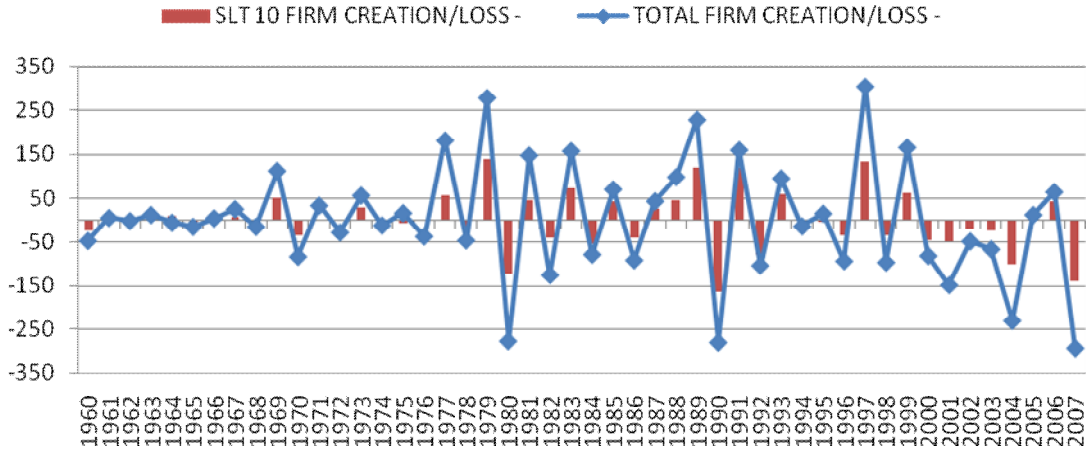
\*\* , \* denotes statistical significant at 1% and 5% level respectively

Source: Compiled by the author 2010

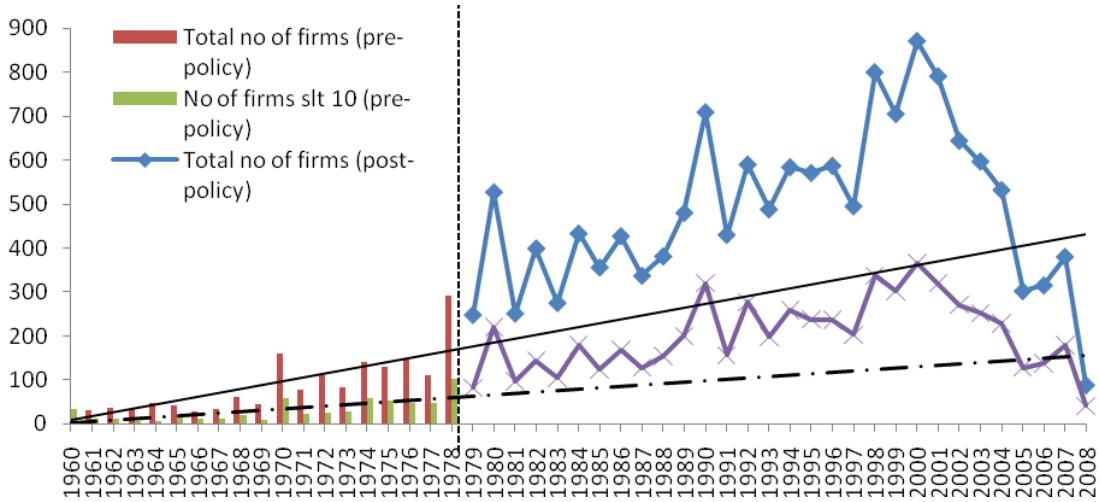


Source: Plotted with figures from NBS (2009)

Figure 1: Manufacturing firm entry (1960-2008)



Source: Plotted with figures from NBS (2009)  
 Figure 2: Year-on-Year Trends in Manufacturing Firm Entry Rates (1960-2007)



Source: Plotted with figures from NBS (2009)  
 Figure 3: Summary Trend of Indigenisation and other Reforms Impact on Firm Entry (1960-2008)

A rule of thumb is if the calculated *h* statistic fall between the Upper (DU) and the Lower (DL) Durbin table values there is no correlation except otherwise.

$$h = \left(1 - \left(\frac{d}{2}\right)\right) \sqrt{\frac{n}{1 - n \left(q^2\right)}} \quad (7.2.1)$$

Where:  
 h= Durbin *h* Statistics  
 d=Durbin Watson Statistics result, 1.3285, from Model (II)  
 n= Number of observations, 23  
 q<sup>2</sup>=Variance of error term of lagged dependent variable (GDPt-1), (0.0124) from Model (II)  
 Therefore *h* = 1.904 answer