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Do Government Funding Affect Productivity of SMEs?

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ABSTRACT

Development of Small and Medium Scale Enterprises (SMEs) is gaining prominence in the twenty first century. Given the scientific evidences of its meaningful contribution towards the progress of an economy hence provision of financial supports is mostly pointed as a major determinant of attaining the desired progress. In this study, Propensity Score Matching (PSM) method was used to compare the performance (productivity) between two groups of firms: those which receive government financing and those that do not. Findings revealed that the receipt of government financial support boosted productivity in both medium and small firms. This study therefore recommends that funding schemes should be made available based on the prior needs

and in addition policy implementation should be more stable and translate the goals and objectives of a policy into an action.

1.   Introduction

The A major gap in developing countries' development process over the years has been the wants of a virile Micro, Small and Medium Scale Enterprises (MSMEs) sub-sector even as MSMEs accounts for the largest share of the domestic private sector economy (Onodugo, Nwonye, Anowor & Ofoegbu, 2019). Small and Medium Scale Enterprises (SMEs) are globally identified as the major drivers of economic growth and by extension economic development particularly through their positive spillover effects in reducing poverty and unemployment (Kachembere, 2011; Onodugo, Obi, Anowor, Nwonye, & Ofoegbu, 2017; John-Akamelu, & Muogbo, 2018). SMEs though has been useful in creating employment opportunities, reducing unemployment and poverty is also identified by scholars to have been contributing in raising income/output per capita, gross domestic output, narrowing the inequality gap, enhancing regional balance via industrial dispersion, promoting efficient and effective utilization of resources (see: Bonaccorsi di Patti & Gobbi, 2001; Takats, 2004; Barbosa & Moraes, 2004; Anowor, Ukwueni & Ezekwem, 2013; Toby, 2011; Andree & Kallberg, 2008).

It has become obvious that SMEs operators cannot make meaningful contribution to the growth of any economy without sufficient access to finance thus it becomes critical that they rely on financial institutions for investment funding. Notwithstanding the location, the progress of SMEs is inhibited by some factors like inadequate infrastructure, unfriendly economic environment, lack of managerial skills and inadequate funding but none of the factors mentioned above has been recognized as stifling the progress of SMEs than access to finance and inadequate financing mainly because financial institutions tend to be risk averse mostly towards financing SMEs (see: (Beck, Demirgue-Kunt & Levine, 2003; Kumar *et al,* 2006; Collier, 2009; Haltiwanger, Jarmin & Miranda; 2010; Anowor & Okorie, 2016). In response to the above and on account of the intersectoral linkage nature, multivariate contribution and potentials of SMEs, various governments in Nigeria adopted policies and guidelines including establishing micro-finance institutions specifically for financing SMEs in expectations of desirable outcomes. In addition, financial institutions in developing economies as noted by Aladekomo (2003) initiated improved facilities for profitability lending to SMEs such that SMEs could have better access to investible funds and other financial products that can enhance their productivity.

Informed by the above, this study sets to ascertain the extent to which SMEs funding have affected productivity with particular reference to Nigeria. This becomes necessary as there are dichotomous presentation of firms that formed SMEs in Nigeria: those who were able to access government's SMEs support fund; and those that are yet to access government's SMEs support fund. The arguments have been that those that are yet to access government's SMEs support fund would have done better if they have had access to government's

SMEs support fund; while those that were able to access government's SMEs support fund complained that the funding was inadequate and some other factors like infrastructure, unfriendly economic environment and policies among others contributed to make it appear as though they never access government's SMEs support fund.

The crux of this study therefore centers on determining and comparing the performance as regards to productivity between the two groups of firms within the definition of SMEs. This becomes pertinent because the aggregate contribution of SMEs in Nigeria to the gross domestic product from available statistics is relatively marginal. This could be as a result of the dominance of the petroleum sector as pointed by Onodugo, Ikpe and Anowor (2013) over other sectors or could be other reasons including the former. The bulk of the firms within the SMEs complained that the borrowing requirements are mostly cumbersome and problematic and more so the terms and conditions are often inflexible which make compliance considerably difficult.

Considering the General System Theory (GST), a system is a unified collection of inter-dependent and inter-related fractions that is either natural or man-made. A typical system is demarcated by its spatial and frontiers, surrounded and affected by its immediate environment, portrayed by its structure and purpose or nature and expressed in its role. A system can be more than the summation of its parts if it articulates cooperation or promising behaviour. Some system however function to essentially support others by assisting in the maintenance of other systems to avoid setback.

2. Material and method

In this study, Propensity Score Matching (PSM) method was used to compare the performance between two groups of firms; those which receive government financing (treated group), and those that do not (non-treated or control group), with the understanding, however, that the firms were not randomly assigned the treatment. The propensity score is therefore defined as the conditional probability that a firm will become a government financing beneficiary, given the values of a set of observed variables **X**, which is expressed as:

$$P(x) = Prob(Govfin = 1) = E(Govfin/x)$$
(1)

Where **X** is a vector of individual characteristics or variables of the firm, and its environment and $Govfin_i$ is a categorical variable that takes the value 1 if a firm received government financing 0 if otherwise

$$Govfin = \begin{cases} 1 \ if \ a \ firm \ is \ beneficiary \\ 0, otherwise \end{cases}$$
(2)

To compare the performances or potential outcomes (Y) for individual firms that benefited from government financing and those that did not benefit, consider the model below.

$$\delta_i = Y_{1i} - Y_{0i}$$
(3)

where Y is split into a pair of potential outcome; performances of firms that received government financing (Y_{1i}) and firms that did not received government financing (Y_{0i}) and δ_i is the difference between them. Y is a vector for the index of firms i performance, represented by the indicator "productivity". Taking the averages of all individual firms are taken, we get the average treatment effect (ATE), given as

$$ATE = E(\delta) = E(Y_1 - Y_0)$$
$$= E(Y_1/Govfin = 1)$$
$$- E(Y_1/Govfin = 0) \qquad (4)$$

ATE is useful in estimating the effect of government financing on firms if the individual firms in the population were randomly assigned into that treated group. However, for the observational study, an alternative measure, average treatment effect on the treated (ATT) is applied. This captures the impact of the government financing on those firms who actually received the financing, and it is shown as below;

$$ATT = E(Y_1 - Y_0/Govfin = 1)$$
(5)

Since the parameters in (5) are not observable, we applied the fact that average of a difference is equal difference of the averages and rewrote equation (5) as;

$$ATT = E(Y_1/Govfin = 1) - E(Y_0/Govfin = 1)$$
(6)

Note that we cannot observe $E(Y_0/Govfin = 1)$, *which is the* performance firms that received government financing would have had if they did not receive government financing; but can observe $E(Y_0/Govfin = 0)$, which the performance by firms that did not receive government financing. On the other hand, a measure of the impact of government financing would have had on the firms that did not benefit from the financing program known as the average treatment on the untreated (ATU), can also be computed

The difference between firms that received government financing and firms that did not can be captured by the equation below;

$$\Delta = E(Y_1/Govfin = 1) - E(Y_0/Govfin = 0)$$
(7)

Subtracting and adding $E(Y_0/Govfin = 1)$ *from and* to both sides of (7) gives that

$$\Delta = E(Y_1/Govfin = 1) - E(Y_0/Govfin = 1) + E(Y_0/Govfin = 1) - E(Y_0/Govfin = 0) \quad (8)$$

$$\Delta = ATT + E(Y_0/Govfin = 1) - E(Y_0/Govfin = 0) \qquad = \text{ATT+SB}$$
(9)

SB as shown in equation 9 is known as the selection bias; the difference between the counterfactual for the firms that benefited from government financing and the performance of a firm that did not benefit. For observational data the bias is most often not zero, because observed group does not appropriately represent the counterfactual (Urama, Nwosu, Yuni and Aguegboh, 2016). However, with zero selection bias, ATT can be estimated by ATE as below. On the other hand, with nonzero bias, the PSM can be applied

$$\widehat{ATE} = E(Y_1/Govfin = 1) - E(Y_1/Govfin = 0)$$
(10)

Underlying Assumptions for Applying PSM Technique
1) The conditional independent assumption (CIA) of confoundedness. This means that after controlling a set of X covariates, the potential outcomes are independent of the treatment
$$(Y_1, Y_0) \perp Govfin/\boldsymbol{X} \qquad (11)$$
2) Common support or overlap condition. This means that the probability of assignment is bounded away from zero and one
$$0 < Prob(Govfin = 1/\boldsymbol{X} < 1 \qquad (12)$$
The empirical analysis is based on the Enterprise Surveys Data at firm level collected in Nigeria between April 2014 and February 2015 under an initiative of the World Bank. In Nigeria, 2014 Enterprise Surveys Data Set is the most current and hence was used for this study. The Enterprise Surveys currently cover over 130,000 firms in 135 countries, but specifically data from establishments selected from 19 states using stratified random sampling was used to select the 2,676 surveyed businesses in Nigeria. The standard Enterprise Survey topics include among other things firm characteristics, gender participation, access to finance, annual sales etc.
The Outcome variable (Productivity) was calculated as the firm's total annual sales for all products and services as a ratio of all the permanent employee
3. Analysis, Interpretation and Discussion

Estimation of the propensity score and Testing for confounding assumption
The objective of these tests is to verify that treatment is independent of unit characteristics after conditioning on observed characteristics. This is done using paired t-test to determine whether the difference between treated group is significant or not. A significant t-test indicates that balance has not been achieved and hence after controlling a set of X covariates, the potential

outcome is still not independent of the treatment. However, non-significant t-test means that the potential outcomes are independent of the treatment. The result appears similar that for the performance indicator (productivity) that treatment is independent of firm characteristics after conditioning on observed characteristics. The reported results based on the productivity show the t-statistics is not significant, showing no difference between treated and control groups.

4.   Conditional independence assumption

For the calculation of the propensity score, the technique of logit model was used in estimating the probability of a firm benefiting from government financing controlling for some firm characteristics. Based on the existing empirical evidences, the characteristics of firms that likely influence the probability of receiving financial support from the government includes; age of firm, whether a firm is open for public audit, legal status of the firm (whether registered or not), whether the firm engages in financing research, percentage of total annual sales reported for tax purposes, firm Size and sector.

Logistic Regression Used for Calculation of the Propensity Score

To determine the effect of receiving government financing on the performance of firms, the study applied three matching methods: *nearest neighbour*, *kernel* and *radius matching*. The table below in particular is an estimate of the difference in the level of labour productivity of firms that received government financing and level of labour productivity of firms supposed such firm did not receive financing from government. The analysis was done for the entire sample that is combined small and medium-sized firms (SMEs) and sub-groups of small-sized firms and medium sized firms. In the table, the nearest neighbor, radius and kernel matching method indicate that for SMEs, the treated value of 1922925.03, 96311199.2 and 114068924 Naira respectively show the average value of output per worker in a firm that received government financial assistance, while the control value of 1154102, 646887 and 531210 naira for the respective matching methods show the average value of output per worker that would have been produced if the firm had not received government financial assistance. The difference in value of 768823.51, 95664311.8 and 113537714.3 with a t-statistic of 0.54, 0.3 and 0.35 for the respective matching methods are not statistically significant even at the 10 per cent level. Based on this, the study concludes that in general, there is significant difference in productivity for those firms that received government financing supports and those that did not

 However, for medium-sized firms, using the nearest neighbor, radius and kernel matching methods, the treated value of 1207500.01, 57385015 and 73349827.3 Naira respectively show the average value of output per worker in a firm that received government financial assistance, while the control value of 521212, 143215 and 105855 Naira for respective matching methods show the average value of output per worker that would have been produced if the firm had not received government financial assistance. The difference in value of

57241800.24 and 73243972 with a t-statistic of 7.13 and 7.32 for radius and kernel matching methods are significant while nearest neighbor matching method with difference of 686287.877 is statistically significant even at the 10 per cent level. This shows that in general, there is significant difference in productivity; meaning that the receipt of government financial support boosted productivity for medium-sized firms.

ATT RESULT

Description	Outcome Variable	Matching	Treated	Control	Difference	t-Stat
Whole sample	Productivity	Nearest Neigh.	1922925.03	1154102	768823.51	0.54
		Radius	96311199.2	646887	95664311.8	0.3
		Kernel	114068924	531210	113537714.3	0.35
Medium	Productivity	Nearest Neigh.	1207500.01	521212	686287.877	0.48
		Radius	57385015	143215	57241800.24	7.13
		Kernel	73349827.3	105855	73243972	7.32
Small	Productivity	Nearest Neigh.	1408998.07	805845	603152.709	0.29
		Radius	80628828.3	1047839	79580989.31	0.12
		Kernel	87639659.5	1047839	86591820.51	0.17

In the case of small-sized firms, the nearest neighbor, radius and kernel matching methods, have the treated value of 1408998.07, 80628828.3 and 87639659.5 Naira respectively showing the average value of output per worker in a firm that received government financial assistance, while the control value of 805845, 1047839 and 1047839 Naira for respective matching methods show the average value of output per worker that would have been produced if the firm had not received government financial assistance. The difference in value of 603152.70,79580989.31 and 86591820.51 with a t-statistic of 0.29, 0.12 and 0.17 for nearest neighbor, radius and kernel matching methods are not significant at the 10 per cent level. This shows that in general, there is significant difference in productivity; meaning that the receipt of government financial support boosted productivity in the case of small-sized firms.

5. Conclusion and Recommendations

The primary purpose of this study is to appraise the effect of government funding on small and medium enterprise in Nigeria. The study specifically geared to towards assessing the extent government funding to SMEs affected on productivity of firms in Nigeria.

In summary: the difference in value of 57241800.24 and 73243972 with a t-statistic of 7.13 and 7.32 for radius and kernel matching methods are significant while nearest neighbor matching method with difference of 686287.877is not statistically significant even at the 10 per cent level. This shows that in general, there is significant difference in productivity; meaning that the receipt of government financial support boosted productivity.

The study concludes that the receipt of government financial support boosted productivity in both medium and small firms.

This study therefore recommends that governments should make available funding schemes based on the prior needs and in addition SMEs should be given some training in form of seminars through trade organizations. Policy implementation should be more stable and translate the goals and objectives of a policy into an action. Without good policies it will be difficult to provide guidance to research and innovation systems. Policy implementation reflects a complex change process where government decisions are transformed into programs, procedures, regulations, or practices aimed at social betterment.

References

Aladekomo, F.O. (2003). The Small and Medium Enterprises (SME) landscape: Environment, government policies, Programmes, and institutional support, a paper delivered at the two-day workshop on "strategies for operationalizing Small and Medium Industries Equity Investment Scheme (SMIES) in Nigeria" on 23-24 August, 2003, at WEMA Bank Training School, Oba Akran Avenue, Ikeja, Lagos, Nigeria. OECD, (2005). OECD SME and entrepreneurship outlook:, OECD Paris, 17.

Andree, C. and C. Kallberg, (2008). The capital structure of SMEs: Evidence from the Swedish security industry. Retrieved from: http://www.student.se/uppsok

Anowor, O. F. & Okorie, G. C. (2016). A Reassessment of the Impact of Monetary Policy on Economic Growth: Study of Nigeria. International Journal of Developing and Emerging Economies, 4(1), 82-90.

Anowor, O. F., Ukwueni, N. O. & Ezekwem, S. O. (2013). Agricultural Productivity and Poverty Alleviation: An Econometric Analysis. American Journal of Sustainable Cities & Society. 2 (1), 109–129.

Barbosa, G. and C. Moraes (2004). Determinants of the firm's capital structure: The case of the very small enterprises. Retrieved from http://econpa.wustl.edu.8089/eps/fin/papers 0302/0302001.pdf

Baumol, W. J. (1982). Contestable Markets: An Uprising in Theory of industry structure. The American Economics Review. 72(1), 1-15

Beck, Demirgue-Kunt, L. and Levine, K. (2005). SMEs, growth, and poverty. National Bureau of Economic Research Working paper 11224, Cambridge.

Bonaccorsi di Patti, E. and G. Gobbi (2001). The Changing Structure of Local Credit Markets: Are Small Business Special? Journal of Banking and Finance 25(12), 2209-2237

Collier, P. M. (2009). Fundamentals of Risk Management for Accountants and Managers. Butterworth- Heinemann, London

Haltiwanger, J., Jarmin, R. and Miranda, J. (2010). Who creates jobs? Small vs. large vs. young. NBER Working Paper No. 16300.

John-Akamelu, C.R.& Muogbo, U.S.(2018). Role of small & medium enterprises in poverty eradication in Nigeria. European Journal of Research and Reflection in Management Sciences 6(2): 33-48.

Kachembere, J. (2011). SMEs hold key to economic growth. Available at http://www.thestandard.co.zw/business/32203-smes-hold-key-to-economicgrowth.html (accessed 11th June, 2020).

Kumar, M., Antony, J., Singh, R. K., Tiwari, M. K. and Perry, D. (2006). Implementing the Lean sigma framework in an Indian SME: a case study. Production Planning and Control, 17(4), 407-423

Onodugo, V. A., Ikpe, M. & Anowor, O. F. (2013). Non-Oil Export and Economic Growth in Nigeria: A Time Series Econometric Model. International Journal of Business Management & Research. 3 (2), 115-124.

Onodugo, V. A., Obi, K. O., Anowor, O. F., Nwonye, N. G., & Ofoegbu, G. N. (2017). Does public spending affect unemployment in an emerging market? Risk governance & control: Financial markets & institutions, 7(1), 32-40. http://dx.doi.org/10.22495/rgcv7i1art4

Onodugo, V. A.; Nwonye, N. G.; Anowor, O. F. & Ofoegbu, G. N. (2019). Attaining Inclusive Growth in a Developing Economy on the Wings of Micro, Small and Medium Scale Enterprises, Amazonia Investiga, 8(24), 239 – 252. https://www.amazoniainvestiga.info/index.php/amazonia/article/view/977

Takats, E. (2004). Banking Consolidation and Small Business Lending. European Central Bank Working Paper Series, No 407.

Toby, A. J. (2011), Modelling Bank Management, Rural Lending and Small Business Finance in Nigeria. Global Journal of Management And Business Research, [S.l.], v. 11, n. 7, july 2011. ISSN 2249-4588. Available at: <https://journalofbusiness.org/index.php/GJMBR/article/view/543>. Date accessed: 11 june 2020.