

THE EFFECT OF GOVERNMENT R&D SUBSIDY ON CORPORATE PERFORMANCE: EVIDENCE FROM



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Abstract

Despite the wide belief that the high social rates of returns to R&D investment justify government subsidy policy in advanced countries, there are only limited studies about whether government R&D subsidy affect corporate performance. This paper empirically examines the effect of government R&D subsidy on corporate performance using a unique data from the subsidy re-empowerment programme committee in Nigeria. The paper employs a regression and correlation analysis to determine the effect of government R&D subsidy on corporate performance using statistical package for social sciences (SPSS V.20). Our empirical results show that there is significant relationship between government R&D subsidies on corporate performance. These results suggest that government subsidies could help to overcome the barriers of R&D projects through sharing R&D failure risk with government and by reducing costs to undertake new technology development projects.

Keywords: Government R&D subsidy, Corporate performance, Sure-p,

1.0 INTRODUCTION

The importance of Research and Development (R&D) as one of the main ingredients that stimulate sustainable growth in advanced economies is undisputed among researchers, especially in the context of the modern knowledge-based economies. The implication of this is that Government support for R&D activities is widely accepted which is in contrast to public support in the areas of investment, production or commercial protection (García-Quevedo, 2004; Giebe et al., 2006; Heijs, 2003). The government for R&D is rooted in the existence of market failures (Arrow, 1962), which create a gap between the private individual/firms and social benefits derivable from R&D activities. This gap implies that private resources dedicated to R&D activities will always be below the social optimum (Klette et al., 2000)..

The issue of Petroleum Subsidy is familiar to Nigerians. Over the years, subsidy on Petroleum Products (Diesel, Petrol and Kerosene) have been subjected to progressive subsidy reduction as a matter of socio-economic necessity, whereby the price of Diesel (AGO) is completely deregulated to zero subsidy level. However, Premium Motor Spirit (PMS-petrol) and Household Kerosene (HHK) are still being subsidized despite its un sustainability and eminent threat to the socio-economic health of the country. The Federal Government of Nigeria (FGN) is therefore desirous of discontinuing subsidies on prices of petroleum products because this poses a huge financial burden on the government, disproportionately benefits the wealthy, is inefficient and diverts resources away from potential investments in critical infrastructure.

The total projected subsidy reinvestible funds per annum is US\$90 per barrel. Out of this N478.49 billion accrues to Federal Government, N411.03 billion to State Governments, N203.23 billion to Local Governments, N9.86 billion to the Federal Capital Territory (FCT) and N31.37 billion as Transfers to Derivation and Ecology, Development of Natural Resources and Stabilization Funds. This programme is focused on utilization of Federal Government's share of the subsidy. Every State and Local Government is expected to design its own and Local Government is expected to design its own programmes utilizing its portion of the subsidy reinvestment funds. The subsidy reinvestment funds from the discontinuation of the fuel subsidy will be used for the implementation of the programme and to reduce our borrowing needs.

The subsidy Re-empowerment programme SURE-P is aimed at investing in the development of vocational and technical education in Nigeria with a goal to reduce unemployment by empowering young Nigerians with adequate skills to take up existing job vacancies in both private and public sectors and/ or become entrepreneur of labour themselves. The scheme has the mandate to equip young Nigerians with skills in three broad areas: vocational/technical skills, life skills and entrepreneurship. It is targeted at bridging the demand gaps in eight industry areas: ICT/Telecoms, Creative (e.g. movies, music, fashion, etc), Hospitality and Tourism, Agribusiness, Mass Housing/Construction Artisans, Marine, Oil and Gas, and Mechanical Fabrication/Woodwork. The training has been classified into two focus areas: Client-based and Citizen-based trainings.

Moreover, the difficult problem for government agencies is, however, to identify projects which are beneficial for society but need additional funds to be executed as private returns are too low. Klette et al. (2000) and Lerner (1999) argue that political influence and distorted incentives for decision makers may lead to subsidies for the “wrong” R&D projects. Governments commonly use both informational campaigns and price subsidies in attempts to increase the use of health products and other socially beneficial technologies in developing countries (Hecht and Shah, 2006; Nugent and Knaul, 2006). The optimal deployment of these policy instruments depends on the way they interact in the policy maker’s production function; if providing households with information about a product changes the demand function, it may also affect the policy maker’s optimal level of a price subsidy. Information about a product can impact demand in two broad ways. First, providing information can affect the overall level of demand. For instance, information can increase demand by allowing consumers to purchase more appropriate products (Tadelis and Zettelmeyer, 2011). Or, if the quality of the product does not match consumers’ exact expectations, providing information can change the average perception of quality (Caswell and Mojduszka, 1996). Therefore, this study investigates empirically, the nature of the effect of the Government R&D subsidy on the corporate performance of selected Nigerian youths that benefitted from the subsidy re-investment programme (SURE-P)

The rest of the paper is organized as follows: Section 2 discusses the concept of government R&D subsidy to corporate performance in some detail, focusing on different dimensions and peculiarities of this specific evaluation approach. Section 3 describes the methodological approach specifying the data used and the construction of the dependent and independent variables. Section 4 presents the estimation results, while Section 5 closes with a summary of the main results and some concluding remarks and ideas and section 6 shows the limitation for future research agenda.

2.0 Literature Review

2.0 2.1 EFFECTS OF GOVERNMENT R&D SUBSIDIES FOR CORPORATE PERFORMANCE

Government subsidies have been offered for several decades in most industrialized countries, either in the form of indirect support such as tax incentives or by direct interventions for specific initiatives. Numerous studies justify government intervention in technological innovation in response to under investment of R&D in private firms for market incentives (Sanz-Menéndez, 1995; Heijs, 2003). This fact is historically linked to the conceptual structure of market failure, meaning that the government has an interest in stimulating private R&D because such stimulation can generate social benefits ultimately that go beyond the simple underinvestment (Luukkonen, 1998). R&D is one of the external factors that influence innovation. These factors in turn are framed within the legal and regulatory framework, implemented by public authorities, directly or indirectly governing these activities. In this sense, subsidies, like the rest of factors which include the use of industrial property, staffing, research centres, universities and tax may not have received the same attention in the literature compared with internal factors which may arise for the effects of changing a firm’s strategy, encouraging it to enter a new market, to engage in more collaboration, or to improve their management (Luukkonen, 2000; Georghiou et al., 2004; Hsu et al., 2009). The arguments of the authors who have analyzed the influence of subsidies for R&D have been based in the allocation of financial resources, and the results are not conclusive. While authors such as Busom (1991) and Fernández et al., (1995) found a positive relationship between subsidies and innovation Griliches (1986) and Lichtenberg (1987) found a negative relationship.

2.2 PUBLIC SELECTION OF R&D PROJECTS

Several studies have focused on evaluating the effectiveness of R&D programmes (Meyer-Krahmer and Montigny, 1989; Ormala, 1989; Roessner, 1989) and their influence on private R&D efforts (David et al., 2000; Klette et al., 2000). However, few works have examined the criteria used by government evaluators to select projects (Hsu et al., 2003; Lee and Om, 1996, 1997). Knowledge of these criteria is crucial for two reasons: first they reflect the real objectives of policy makers and, second they determine the characteristics of those projects that are actually implemented or developed and, consequently, the results obtained. Also, they can affect not only responses to future calls, but also the definition and content of project proposals. In the context of R&D project selection in a private firm, top management is obliged to resolve the crucial problem of adopting a proper selection method to identify those projects that fit with organizational goals (Lee and Om, 1997). This has led to the hundreds of methods and techniques available in the literature for R&D project selection (Hsu et al., 2003). These approaches tend to be either qualitative or quantitative, and range from unstructured peer review to sophisticated mathematical programming (Henriksen and Traynor, 1999; Hsu et al., 2003). In the process of R&D project selection, whatever method is used, one of the most important steps is to calculate technical and market risks (Taggart and Blaxter, 1992), a rather infrequent practice in the public sector (Bozeman and Rogers, 2001). So why is it so difficult for the public sector to apply a systematic and strategic R&D project management bearing in mind the magnitude of its government funding decisions? One plausible explanation is offered by Hsu et al. (2003) who point to two major differences between public and private sponsored projects. Firstly, public funding of R&D projects generally involves strategic and long-term investment, thus, conventional financial justification approaches are probably inadequate. Secondly, the allocation of R&D resources in the public sector may be influenced by political factors and a variety of interest groups. Similarly, Bozeman and Rogers (2001) indicate that systematic and strategic R&D programme management is difficult to accomplish in the public sector for several reasons: i) government funded R&D generally does not have commercial products and processes as its short term objective; ii) public agencies are subject to annual budget cycles; iii) the various goals of different government agencies often conflict; and iv) time horizons are different.

2.3 ENHANCING R&D SUBSIDIES THROUGH FIRMS

It is widely accepted that in absence of government policy intervention in R&D markets, the social rate of return to R&D expenditure exceeds the private rate, leading to a socially suboptimal rate of investment in R&D (David and Toole, 2000). The issue whether public R&D spending or government subsidy is complementary and simply additional to private spending or it substitutes for and tends to crowd out private R&D has been discussed in many studies. However, theoretical development remains conflicting, and empirical evidences on the effectiveness of public R&D policies are still limited and mixed. The central rationale for government subsidies for new technology development is to correct the market failure, which may arise from the incomplete private appropriability of returns on private investment in scientific and technological knowledge. Firms tend to under-provide R&D investment due to high failure risk and uncertain nature of R&D and its beneficiaries as well. R&D subsidies to the firm could help overcome barriers to technology-enhancing but risky R&D projects either by lowering failure risk associated with the underlying R&D projects or by reducing capital costs to

undertake the R&D projects. The R&D projects typically require large fixed costs, and these costs are generally sunk costs in many cases. That's why firms with large sales can invest sufficient amount of money into the R&D projects, but the firm has difficulties in launching and operating R&D activities.

In addition, small and medium sized firms cannot depend on external finance due to the imperfection of capital markets (Guellec and Pottelsberghe, 2001). Thus, the government has introduced R&D policy in order to support the corporate R&D activity as well as to share the financial risk related to the R&D projects of SMEs. In this context, the direct R&D subsidies given to the SMEs would facilitate risk management by sharing with government the risk nature of the R&D projects and thus reducing failure risk against the development of new products and their commercialization. Government subsidies to individuals and corporate performance can positively affect judgment of external investors by lowering cognitive biases that stem from the reliance on judgmental heuristics of investors. The reliance on heuristics and the prevalence of biases are not restricted to investors and policymakers.² Experienced researchers are also prone to the same biases (Tversky and Kahneman, 2003). If the subjective judgments which are a major component in risk assessment of R&D projects are faulty, efforts at right decision making are likely to be misdirected. R&D subsidies to the SMEs can induce more external investment through reducing biases of investors from subjective judgment and from heuristics of R&D investments (Tversky and Kahneman, 2003). The market alone cannot create the necessary incentives in the private investment to the extent that social return exceeds private return on R&D investment. Since ideas and invention can be reused at a lower cost than incurred to discover them, the original inventor is unable fully to appropriate the returns to the invention. Government subsidy for new technology development may raise the private rate of return on R&D investment through reducing the effective cost of R&D so that the subsidy increases the private R&D investment up to the socially optimum level. Financing R&D investment is subject to market failure owing to a combination of asymmetric information and moral hazard under uncertainty. Financial supports such as subsidies, fiscal incentive and direct loan are the principal policy instruments for stimulating industrial R&D and they have been actively used even in most developed countries. The following hypotheses were then proposed:

H₀₁: Government R&D subsidy has no significant relationship between corporate R&D performances

H₀₂: Government R&D has no significant effect on corporate performance.

On the one hand, the public R&D may enhance economic performance through directly affecting innovation and thus industrial productivity. On the other, government-financed R&D may have an indirect influence on productivity by increasing the amount of private R&D investment above what it would be in the absence of the government subsidy. Government funding of private R&D projects can increase R&D effort if the subsidies cause firms to undertake the risky projects that would otherwise be profitable. The government R&D spending is a substitute for and therefore displaces private R&D investment, or is a complement to and therefore increases company-financed R&D spending because of externalities and restrictions on the appropriability of innovations.

3. Methodology/Design

The research methodology of this study is a positivist approach which examines the relationship that exists between government R&D subsidy and corporate performance in Nigeria. A cross

sectional survey design was adopted to examine the relationships that exist between government R&D subsidy and corporate performance in Nigeria. This study also follows an ANOVA research strategy and helps in predicting behavior, thus justifying the use of survey research. (Bordens and Abbott, 2002). It also examines whether or not a relationship exists between the variables of study (Kerlinger, 1973). Data was generated from young entrepreneurs benefited from the subsidy re-empowerment programme (SURE-P) on a wide basis relating to the effect of government R&D subsidy on corporate performance in Nigeria. The population adopted for this was young entrepreneurs benefited from SURE-P, while the population sample was restricted to Lagos State.

The field research assistants helped in administering the questionnaire to the respondents. Lagos State constitutes the sample frame which was considered as a representative of the population from which the sample was drawn. The questionnaire targeted young entrepreneurs that benefited from the subsidy re-empowerment programme SURE-P. The respondents were approached and persuaded to fill the questionnaire. Individuals that did not participate were uninterested or hesitant to release information to the researcher. A total of 200 copies of the questionnaire were distributed. 167 were completely filled and returned, thus representing a 83.5% response rate. A five-point Likert scale instrument was used ranging from SA to SD. The adoption of primary data method was justified as it is the quickest and simplest of the tools to use, if publication is the aim (Bain, 1995). This research made use of a linear regression model as well as correlation to test and make a decision about the effect of government R&D subsidy on corporate performance.

4 EMPIRICAL RESULTS

4.1 VARIABLES AND MEASURES

4.1.1 GOVERNMENT R&D SUBSIDY

This study initiated four items using a five-point Likert scale which ranged from strongly agree to strongly disagree to assess questions on government subsidy. The results of the respondents rating on the five items were looked into, added up and averaged to generate the mean of variable. Government subsidy is considered high if the index is equal to or greater than 5.0 while it is considered low if less than 5.0. The Cronbach alpha of the items was calculated to be 0.82 suggesting that the items are reliable.

4.1.2 CORPORATE R&D PERFORMANCE

A five-point Likert scale of 4 items was also generated. The scales ranged from strongly agree to strongly disagree. The results of the items were added and averaged to determine the mean index. Corporate R&D performance is considered high if the index is equal to or greater than 5.0 while it is considered low if less than 5.0. The Cronbach alpha of the items was calculated to be 0.72 suggesting that the items are reliable.

4.2 ANALYTICAL TOOLS AND HYPOTHESES TESTS AND RESULTS

To study the intentions of this study, and develop an important connotation to the data generated, the data gathered were analyzed using statistical package for social sciences (SPSS) as well as

the following descriptive and inferential statistical techniques. These statistics however were not meant to tackle the research hypothesis, but rather to summarize the characteristics of the sample size Simon (2002). In testing the relationship between government R&D subsidy and corporate performance, Analysis of variance was employed

Table 1
Descriptive statistics.

Construct	Mean	Variance	S.D	Skewness	kurtosis
Government Subsidy	4.502	.037	1.078	-.576	-.254
Corporate performance	4.378	0.938	-.598	-.598	-.396

Source: Researcher's Survey 2013

ANOVA

Table 2

Model	R	R Square	Adjusted R Square	Std. Error of the	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.808 ^a	.653	.650	.98426	.653	218.339	1	116	.000

Dependent Variable: Entrepreneur performance

p < 0.05

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	.069	.269		.257	.798	-.464	.602
	OC3	.922	.062	.808	14.776	.000	.799	1.046

Hypothesis (Ho1) was tested through correlations coefficient test. Pearson's product moment correlations coefficient (0.808) indicates that there is significant relationship between government R&D subsidy and corporate performance. Therefore, the null hypothesis of no significant relationship is rejected. Thus, there is a significant relationship between government R&D subsidy and corporate performance. Hypothesis (Ho2) was tested by a means of a Regression Analysis. The results of the regression of the relationship between government R&D subsidy and corporate performance are shown in Table 2. Table 2 shows the analysis of variance of the fitted regression equation in significant with F value of 218.339 and R square of (0.653). This is an indication that the model is a good one. It shows a statistically significant relationship between the variables at 95% confidence level. Therefore, the null hypothesis of no significant impacted is rejected

4. DISCUSSION AND MANAGERIAL IMPLICATIONS

In this article we analyze the relationship between government R&D subsidies on corporate performance. Our empirical result shows that government R&D subsidy increase corporate performance. Therefore, the null hypothesis of no significant rejected and the alternate hypotheses is accepted This finding implies that government intervention can enhance corporate investment in innovation process in all sectors of the Nigeria economy. The positive effects of government R&D subsidy on corporate performance can improve new technology development and transfer which imply that the R&D subsidy can help to overcome barriers to innovation and technology development either by lowering technical risk associated with the underlying R&D or by reducing capital costs to undertake the risky R&D projects. The government subsidies to individuals, firms and organization can alleviate poverty through critical infrastructure and safety net projects, in the power, roads, transportation, water and downstream petroleum sectors of the Nigeria economy.

6 LIMITATIONS FOR FUTURE RESEARCH

This research has a number of limitations inherent in such exploratory research, but this provides areas for future research. The main limitation concerns the external validity of the work. First among the limitation is the constraint of time which delineates the comprehensive analysis of the research work. Another major problem is the lack of adequate and reliable data from the respondents which could affect delay in the comprehensive analysis of the research work.

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