

Financial Incentives for Innovation in Emerging Economies

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ABSTRACT

Research and development, resulting in technological innovation, is a key to economic and social development. Such research and development depends considerably on general state of affairs in the economy, public governance, standard of education, and level of infrastructure. Robustness in this framework is particularly challenging in developing economies, but the adoption of proactive and reformative policies improve technological competence and the quality of their business environment. This paper focuses on various fiscal incentives, adopted by various public policies of the diverse economies of the developing world. The study is developed on empirical assumption and makes a comparative study of the financial incentives in practice in various countries. The study finds out that the financial incentives are being increasingly adopted by the emerging economies as an effective measure to impact the growth of innovation in the country. However, increased R&D activity in one economy does not necessarily bring any impetus in international innovation in case it is only moved from some other economy.

Index Terms: Development Economics, Financial Incentives, Emerging Economies, Fiscal Policies

1. INTRODUCTION

Over the decades, research and development (R&D) resulting in innovation has not only led to manufacturing of new products and increased efficiency of production methods, but also stimulated fiscal growth and overall productivity of economies worldwide. Due to this, it holds equal importance to developed as well as emerging economies.

However, for emerging economies, R&D leading to innovations particularly helps in finding solutions for many daunting challenges. Firstly, the current global slowdown of productivity growth is a prime concern for emerging economies as they are the ones that depend heavily on the import of the technical knowledge from developed economies. On the other hand, this can also be a good opportunity for emerging economies as they can take advantage by creating technological advancements to relaunch as well as recreate economic activities across the developed world. Secondly, the world currently is faced by predominant environmental challenges. The emerging economies can get equipped to the advent of technology that can transform the patterns of production and consumption worldwide. Thirdly, the international technical arrangement is undertaking a comprehensive change on the basis of information technology.

Governments across the world understand that though not every firm that innovates carries out research and development, an economy's overall investment in R&D undoubtedly does facilitate technology oriented innovations which introduce new and considerably upgraded goods and services in the market.

In this background, it becomes imperative for the economies of the developing world to develop and adopt policies which incorporate financial incentives for activities, public as well as private, which result in innovation. Needless to say, most of the emerging economies have started witnessing, though slow yet, an improvement in their standard of living as well as economic growth.

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This paper presents an analysis of various fiscal incentives provided under public policies and trends in the field of research, development and innovation in the developing world. Section II provides a brief review of the theoretical studies undertaken to discuss existing literature on the subject. Section III explains the methodology adopted in this research. Section IV discusses the validations for public policy incentives, unconventional innovation policies, and policy design deliberations for R&D in a diversified business environment. Section V exhibits the results of the study and Section VI concludes the paper.

2. LITERATURE REVIEW

The economists did not even acknowledge the importance of innovation for economic growth until technical innovation was gradually considered as an additional factor to capital and labor amounting to increased output and economic growth. Towards late 20th century, economists started searching the determinants and stimulators for this technical innovation.

It was only around a few decades ago, when the specialized research on finding out relationship between the financing the research and development and thus innovation began. Himmelberg and Peterson (1994) showed a large and statistically important relationship between internal finance and R&D investment. Further studies claimed positive relationship between the levels and modes of innovative and entrepreneurial activity and the surrounding institutions (Licht, Siegel 2006, Busenitz, Gomez, Spencer 2000).

Wallsten (2000) scrutinizes the question of whether public contract-based R&D funding boosts or crowds-out private R&D. Fazzari and Petersen (2009), proved that young, high-tech, publicly-traded firms fund their R&D investment almost entirely through internal cash flow and external equity markets.

Bozkaya and Kerr (2014) suggest that economies with more rigorous employment protection laws are less likely to attract venture capital investment, particularly in volatile sectors associated with extremely radical innovations. Studies also show that in economies which having a large number of R&D tax policy reversals have lower impact of R&D tax credits on private R&D expenditures (Westmore, 2013).

The tax rates that mattered were personal income tax rates of the inventors, and those who were employed by MNEs were more likely to take advantage of personal income tax differentials (Akcigit and Stantcheva, 2015). A recent study finds the pharmaceutical industry has the lowest R&D economic depreciation rate and longest useful life, which may reflect the fact that R&D resources in pharmaceuticals are more appropriable than in other industries due to effective patent protection and other entry barriers (Li, 2012). Analyses show that income-based tax incentives push firms to focus on development to the detriment of research, since the incentive (Akcigit, Hanley, and Serrano-Velarde, 2014).

Acharya et al. (2013) suggest that lenient bankruptcy laws stimulate innovation, indicative of an increased inclination to take on uncertain projects with robust downside security. Similarly, income-based incentives associated with patent registration may push firms to focus on innovations leading to products vulnerable to protection by patents (Akcigit, Hanley and Serrano-Velarde, 2014).

Understandably, there is scope of more research to determine the magnitude to which R&D financial incentives in an economy increase overall R&D, the quality of such R&D, and its constructive impact to other sectors of that as well as other economies.

3. METHODOLOGY

The paper relies on the empirical methodology employed and the data used.

3.1. Empirical Methodology

To develop the assumption that research and development resulting in innovation is an essential factor for economic growth. Equation 1 specifies this relationship in the functional form.

$$Y = f(K, L, T) \quad (1)$$

where Y denotes national income and is the function of capital, labor and technological innovation.

3.2. Comparative Study of Policy Measures

The most exhaustive part of the research includes the comparative study of the fiscal incentives being provided under policies of the governments of various emerging economies and analyze their structure, advantages and disadvantages.

4. DISCUSSION

Governments promote technological advancement, sometimes by directly supporting R&D for innovation in technologies such as in the field of national security and sometimes indirectly by building an environment promising innovation by introducing various incentives or laws.

Consequently, the governments provide an aid to this process by

- providing support to innovators through suitable incentives and mechanisms,
- eliminating impediments to smoothen innovative initiatives,
- instituting receptive research organizational system, and
- establishing a creative and receptive education systems.

4.1. General Structure

State sponsored incentives for business R&D aim at encouraging the organizations to enhance the investment towards the production of innovative products and processes for the welfare of the society. Table 1 encapsulates the incentives and mechanisms used by the governments, with their respective advantages and disadvantages.

Usually, the governments aid firms with the objective to correct market failure, including:

- Problems by businesses to completely appropriate the returns on investment because in most of the cases, companies do not invest optimally in R&D.

Table 1
Direct Government Support for Business Sector Research and Development

<i>Instrument</i>	<i>Advantages</i>	<i>Disadvantages</i>
Tax incentives	<ul style="list-style-type: none"> • Provides functional intervention, • More automatic • Generally requires less bureaucracy 	<ul style="list-style-type: none"> • Unclear fiscal costs • Not very relevant for start-up firms • Cannot target specific firms
Grants for R&D Projects	<ul style="list-style-type: none"> • Allows specific targeting • Can control amount of subsidy • Can be structured 	<ul style="list-style-type: none"> • Requires large bureaucracy to administer • May not select the best project
Accelerated depreciation for R&D equipment	<ul style="list-style-type: none"> • Reduces the capital costs of R&D projects 	<ul style="list-style-type: none"> • Does not provide incentive for noncapital costs
Duty exemption on imported inputs into R&D	<ul style="list-style-type: none"> • Reduces cost of world-class inputs if country otherwise has high import duties 	<ul style="list-style-type: none"> • Results in loss of tariff revenue • Is distortionary to the extent that it favors R&D over other activities
Venture capital to facilitate commercialization of research results	<ul style="list-style-type: none"> • Helps overcome financial market failure in making capital available to start-ups with no collateral or track record 	<ul style="list-style-type: none"> • Requires detailed knowledge of sectors to evaluate technical and commercial prospects • Is often not successful

Source. World Bank Data; Dahman and Ahuja

- Problems in availing external finance, especially for small or new businesses because generally, capital for R&D is available at only a very high a cost or is altogether absent. .

Public funding for corporate R&D is characteristically reasonable as a means of disabling these market failures. Additionally, the governments use support processes to invite the R&D undertakings and investments of multinational corporations (MNCs). For instance, in Ireland, Belgium and Israel, greater than 60 per cent of corporate R&D is derived from the associates of foreign enterprises.

4.2. Unconventional R&D and Innovation Policies

Though there are many obstacles and impediments to innovation, there are numerous reasons for which the governments encourage R&D and innovation. Policy makers very often consider unconventional policy measures through which the governments add value and involve with other agents to encourage for investment in R&D resulting in innovation.

There is also substantial diversification across various categories of financial incentives. As discussed in Table 1, financial incentives include various methods such as tax incentives, grants, public procurement, loans, guarantees, etc.

Inside tax system of an economy, various kinds of incentives are designed including open input incentives, such as tax credits and superior and faster tax depreciation allowances, as well as indirect output incentives, such as income-based IP or knowledge boxes and positive capital gain tax rates. Incentives are designed in various combinations ranging from being particular to general and short-term to permanent.

Any funding or credit program can be deliberated in norm as a tax incentive. There are 2 design structures particularly of tax incentives provided in emerging economies. Firstly, they are usually open-ended prerogatives that do not need a yearly outlay authorisation and are generally boundless in terms of the magnitude of qualifying action taken by the firm. Secondly, they diminish the possibility for optional selection of distinct organisations or projects because there is generally a lack of pre-approval process.

The funding of R&D for innovation also takes place in a multitude of methods. Equity and debt both are significant, where capital is arranged by founders, angel investors and venture capitalists, but at the same time, is also arranged by going ahead for initial public offerings.

Governments also try to replace one incentive with the other and develop unconventional hybrids of financial incentives for innovation. One such example is Mexico where despite the absence of any tax incentive for R&D, government owned National Council of Science and Technology (CONACYT) gives grants and funds for R&D activities resulting in innovation.

5. RESULTS

As discussed in Section IV, innovation flourishes in a wide-ranging business environment which promotes investment, risk-taking and experimentation. Emerging economies make their tax system conducive for a robust business environment by designing the system as a well-structured hybrid of low and broad tax rates to minimise inefficiencies.

General tax rules can play significant role in attracting or discouraging the risk-taking innovators and their firms. Tax loss limitation rules and choice of business entity also impact the overall business tax environment and the worth of specifically targeted R&D tax incentives.

It becomes also important to see if the incentive is associated with the present expenditure or on the future income of the R&D; if it is volume-based or incremental; if it is restricted to value added or is unstinting; and if it is corporate income tax-based or arranged by other taxes, for example personal income or payroll taxes. Most of the emerging economies are adopting income-based R&D tax incentives, usually

along with the expenditure-based R&D tax incentives. They permit the firms to have an instant deduction of employee compensation and capital purchases for R&D, despite the long term return on the underlying R&D investment. BRICS economies practice the policy of providing enhanced depreciation so that the taxpayers can recover more than their complete cost of the R&D expenditures.

Income-based and expenditure-based tax incentives are being planned to offer as high amount of tax incentive for innovative firms. The former, usually termed as patent, IP or knowledge boxes, though are facing doubts related to their effectiveness because of the intensely mobile nature of IP assets, such as patents, copyrights, trademarks, and brands. Such incentives though are favourable to incumbent firms having diversified set of R&D activities, they may also push these companies to pursue patent protection for innovations to gain benefits from tax incentives.

A very significant point to note is that despite a seemingly positive impact of IP boxes on patent registrations, it cannot be denied that a part of this growth may be only the result of a re-labelling and not any R&D. In this scenario, calculating the income eligible for R&D tax incentives is becoming increasingly complex for emerging economies because of two reasons. These economies are highly in need of R&D resulting in innovative products and services. On the other hand, identifying the stream of income generated by a single patent when multiple patents – often granted at different points in time is not possible.

Further, there is a vast difference in the way various economies make use of volume-based R&D tax credits and incremental-based tax credits. While the former apply to all qualified R&D expenditures, the latter take into account only the additional value of R&D expenditures above a certain limit. Though the volume-based approach are advantageous to the firms due to their simplicity and predictability, they prove expensive to the governments. On the other hand, the incremental R&D incentives reduce the amount of “subsidised” R&D but they are complex to design and use. Thus the emerging economies are adopting hybrid systems which are a combination of both of these.

The amount of tax incentives gets substantially dropped in the economies where benefits are delayed pertaining to deficiency of taxable income. Now because the availability of funds is an important requisite for new firms making or planning R&D investments, the delay in tax benefits prove to be a deterrent in innovative activities.

Tax policy design of emerging economies, thus, could make provisions for firms to sell their tax incentives, even if at less than full amount, to an unrelated firm that can directly use the benefit. This approach has worked for developed economies and can be helpful to compensate for the weakness in the tax incentive designs.

In nearly all of the developing economies, direct subsidies are generally targeted at long-term research, whereas R&D tax schemes are more conducive to short-term applied research and increase incremental innovation instead of contributing to drastic leap-forwards.

The abovementioned tax incentives usually apply to business entities and income taxation. Some countries additionally provide R&D tax incentives benefitting other stakeholders. For instance, exclusion on payroll withholding taxes for competent R&D workers; personal wage tax discounts for foreign researchers and key staff; wealth tax exclusion for business angels; lesser tax rates on capital gains for qualified R&D investments; and encouraging tax treatment of employee stock options for R&D researchers and managers. Countries such as Belgium and the Netherlands also extend the tax relief from consumption taxes, land and property taxes.

It should be remembered that activities, for instance, financial and other service activities, are geographically portable and it is not difficult for the multinational enterprises to shift these activities from one country to another in order to reap the benefits of financial incentives.

6. CONCLUSION

Policy makers in emerging economies are increasingly recognizing that, for efficient and effective incentives, the heterogeneity and fragmentation of not only different types of businesses, but different types of economic activity and alternative policies, need to be considered. An activity or scheme that is appropriate for one country may be totally a misfit in another. While increasing the volume of R&D activities is the primary objective of R&D tax incentives, Governments, particularly in emerging economies usually expect effects on the competitiveness of the industry, and use financial incentives as an instrument to improve the global appeal of their country as a preferred location for innovative firms.

Pertaining to the discussions and the results, it can be concluded that

- Government of every country tries to support the innovators by providing them financial incentives. This agenda is more important for the emerging economies as the investment in knowledge is resulting in innovations that are transforming markets and society.
- Fiscal incentives being provided in the emerging economies are targeted at particular obstacles for research and development among other innovation activities and enable innovation across these economies.
- Favorable tax policy is a progressive as well as significant element of financial incentives. The most common incentives are tax credits or favorable tax deductions for R&D expenditures. However, there are other incentives also which are designed to provide benefits to some specific types of R&D activities, and are, sometimes, provided directly to R&D researchers.
- The emerging economies providing innovation tax incentives focus on decreasing the cost and boosting the investment on R&D resulting in innovation. This results in designing schemes such as those offering credits against income or payroll taxes for expenditures on wages or further still, capital investments for R&D. Some governments also incorporate accelerated depreciation, in order to allow rapid return on investment to topple the effect of depreciation of the long-lived asset.
- Almost all emerging economies have either already adopted, or are under the process of adopting income-based tax incentives in combination with expenditure-based incentives.
- The resources are exceedingly movable, hence, can get located geographically away from the location of policy incentive which produced the assets and income.
- To sidestep damaging tax practices preferential tax regimes should be adopted..

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