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The Technological Innovation and Tax Incentives of Private Enterprise*

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Abstract: Preferential tax is the main policy tools for the world to incentives its enterprise to increase its investment in the research and development, and it’s also the government to change its way of support and encouragement to the innovation of science and technology of the private enterprise. How to measure the incentive effect of the tax on the scientific and technological innovation of the private enterprise, the paper use the statistical analysis, hypothesis test and statistics data validation, etc to demonstrate that: Appropriately designed system exerts a positive and significant effect on R&D investment, which can effectively reduce the company's development costs and risks.

Key words: private enterprise; scientific and technological innovation; Tax incentive

1. INTRODUCTION

China's private enterprise is developing along with the process of reform and opening up. During the 20 years’ development, the private enterprise created a large number of employment opportunities, to a degree, it easing the heavy pressure of employment our country. It handed a large amount of tax to the country and created a lot of social wealth, which makes positive contribution to the local and national economy. There are now the private enterprises, state-owned enterprises, foreign enterprises. They form the three models, to support the economic development in China. Although the private enterprise has made the significant progress, the overall situation of the private enterprise is still not optimistic, of which the low level of scientific and technological innovation has become the main restriction of the development. From the external environment of the private enterprise's innovation we can see that the private enterprise has more financing difficulties than the state-owned enterprises; next, the implementation of the government's various support policies does not reach the designated result. From the internal environment of the medium-sized and small enterprises' scientific and technological innovation we can see that, firstly, China's private enterprises don’t form a systemic understanding for the innovation and they are even unable to choose the correct innovation strategy; secondly, the private enterprises are lack of effective means to attract and retain talents of science and technology. Therefore, the study of the innovation and taxes incentive of the private enterprise has realistic meanings to promote the development of the private economy.

2. THE DEFINITION OF NEW SCIENTIFIC AND TECHNOLOGICAL INNOVATION

The concept, “innovation”, was first introduced by Joseph A. Schumpeter, an Austrian-Hungarian-American economist, in The Theory of Economic Development in 1912. In his theory, innovation is identified as a kind of production functions, i.e. innovation can bring in the new combination of production factors and production conditions to the production field. In 1928, he referred to innovation as a concept of process in his first English article, The Instability of Capitalism, however, he did not give a strict definition of scientific and technological innovation.

After Joseph A. Schumpeter, the concept of scientific and technological innovation drew more people’s attention. S.C.Solo, J.L.Enos G Lym, E. Mansfield, J.M.Utterback, C.Freeman etc, these famous scholars also did some research to the theory of scientific and technological innovation, and gave different definitions about the concept. In Invention and Innovation in the Petroleum Refining Industry, J.L.Enos defined innovation as an integrated result of invention choices, capital investment guarantee, build the organization, make a plan, etc. E.
Mansfield focused on the process from the product innovation, especially the conception of new products to the exchange of products, when he gave his definition of scientific and technological innovation. C.Freeman considered scientific and technological innovation as the whole process of technique, technology, and commercialization, which could make new products own their use value.

According to various main ideas and statements about the concept of scientific and technological innovation, R. Mueser did systematical reorganization analysis in the mid-eighties and almost three-quarters of his theses was about scientific and technological innovation as follows: when a kind of scientific and technological activity which is discontinuous and innovative developed to the practical and successfully applied procedure. That is the scientific and technological innovation. Based on this, R.Mueser redefined it as a meaningful and discontinuous event with the characteristics of unique ideas and successful realization. This definition highlights two special meanings: first, the unconventionality of activity includes novelty and discontinuousness; second, the activity must obtain the final successful realization. It tersely reflects the nature and attribute of scientific and technological innovation. Yet up to now, there have been no strict and received definition of scientific and technological innovation.

In my view, scientific and technological innovation is the process where an activity grows out of nothing under the guide of market, which brings economic benefits to the enterprise. This paper will analyze the degree of enterprises’ scientific and technological innovation from the enterprises’ R&D (research and development).

R&D refers to the systematical and creative activity in science and technology field to increase the amount of knowledge including the amount of human civilization and social knowledge, and then use this information to create new application. It includes three kinds of activities, basic research, applied research and experiment development.

3. THE RELATIONSHIP OF SCIENTIFIC AND TECHNOLOGICAL INNOVATION AND TAX INCENTIVE

Jorgenson Model introduces the effect of tax policy on scientific and technological innovation which should be considered from the point of income tax. Enterprise income tax affects the enterprise’s investment decisions from two aspects: first, to levy marginal revenue of the investment so that it makes the marginal revenue of the investment reduced and prevent the investment behavior; second, to allow the deduction of some capital cost items, develop the effect of tax saving, and encourage the investment behavior. Consequentially, in the case of others condition unchanged, any tax policies that aim to improve the use cost of the capital will restrain the increase of investment; on the contrary, any tax polities that aim to reduce the use cost of the capital will stimulate the increase of investment.

The relationship between innovation activity and tax incentives includes two parts. Firstly, it is the indispensability of the innovation activity. Because scientific and technical innovation is on the basis of certain considerable scale, for those enterprises which are not qualified for certain scale are not capable of carry outing scientific and technical innovation activity. That condition not only imposes restrictions on the enterprises’ scientific and technical innovation activity in a large scale, but also leads to the shortage of the enterprises’ technical innovation activity. However, the emergence of tax incentive policies exactly downscales enterprises’ innovation activity in a disguised form and enhances the enterprises’ scientific and technical innovation activity. The second part is the asymmetry of the innovation activity. The first of that is mainly the asymmetry of the information. It means the asymmetry of the information existing between the implementors of the scientific and technical innovation and funds supplier. The success and the profit of the scientific and technical innovation lie in the technical confidence. While releasing significant information is demanded for raising funds for technical innovation and therefore the trust and support is achieved. On account of the asymmetry of information, many
promising programs are terminated for lack of funds. The second asymmetry is the asymmetry of the profit. It mainly means the private benefit of the innovation subject is less than that of the social. Thanks to the appearance of the tax incentive policies, the scientific and technical innovation is provided an information platform which makes it easier for the combination of program and funds and that results in a complementary relationship between scientific and technical innovation and tax incentive.

4. EMPIRICAL ANALYSIS OF SCIENTIFIC AND TECHNICAL INNOVATION AND TECHNICAL INNOVATION AND TAX INCENTIVE

4.1 Analysis of tax incentive policies.

The nation has issued the document “The notice about tax policies of encouraging the development of software industry and the integrated circuit industry”. According to the document, the scientific research institution is entitled to engaging in technical transformation, the technological development and the related technical consultation and service and obtaining the profit of that. According to the 273 document—1999 issued by the Treasury Department and the State Administration of Taxation “About the notice of tax problems ‘About implementing the decision of The Party Central Committee and the State Council : Strengthening technical innovation, the development of high-tech and realizing industrialization’”, that is supported by each province. Such as the 312 document—1999, 52 document—2000 releases by the state tax bureau of Henan province. The document manly talks about the incentive of the enterprises’ scientific and technological innovation from the following aspects:

(1) As to the value-added tax, taxpayers who sale the self-development products are allowed to refund the duty after paying the tax or paying the tax in a certain small proportion.

(2) As to the business tax, the units and individuals (foreign-investment enterprise and the research and development centers established by them, foreign enterprises and foreign individuals are included) those obtain profit through engaging in technical transformation, the technological development and the related technical consultation and service are exempt from sales tax.

(3) As to income tax, the social forces, enterprises (foreign-investment enterprise and foreign enterprises are excluded), institutions, public organizations, individuals and privately or individually-owned businesses, research and development funds for financing unrelated scientific research institutions and developing new products, new technologies and new process by institutions of higher education are allowed to pay the income tax and subsidized expenditure can be deducted from income tax fully in the current year, confirmed by the competent tax authorities. Be not worth in the current year touch those who buckle, after can not be in, tax year carry forward is touched buckle. Gross payroll released virtually by the research centre is allowed to be deducted when calculating the taxable income amount.

4.2 Research theory assumption.

Suppose that tax incentive policy was offered in t year (t represents the time factor related to R & D) and R & D investment in the next year or the after years have a significant change, then this tax incentive policy has a great influence on R & D investment. Y indicates actual R & D investment, and Y’ indicates the predicated R & D investment according to equation. It puts forward the following hypothesis.

H0: if Y’ - Y>0, and both the standard deviation chi-square have notable difference, then the tax incentive policy has significantly incentive effect on R&D (i.e., science and scientific and technological innovation).

H1: if Y’ - Y≤0, then the tax incentive policy has significantly obstructive effect or no incentive effect on science and scientific and technological innovation of the enterprise.
4.3 Data Selection.

Because the time node of tax incentive policy document in this research is around 1999-2000, this article will use the R&D funds data of the private enterprise whose scale is more than that in 1995-2004 in China statistical yearbook as the sample panel data. Specific data as follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>R&amp;D funds</th>
<th>R&amp;D item</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Foundation research</td>
</tr>
<tr>
<td>1995</td>
<td>348.7</td>
<td>18.1</td>
</tr>
<tr>
<td>1996</td>
<td>404.5</td>
<td>20.2</td>
</tr>
<tr>
<td>1997</td>
<td>509.2</td>
<td>27.4</td>
</tr>
<tr>
<td>1998</td>
<td>551.1</td>
<td>29</td>
</tr>
<tr>
<td>1999</td>
<td>678.9</td>
<td>33.9</td>
</tr>
<tr>
<td>2000</td>
<td>895.7</td>
<td>46.7</td>
</tr>
<tr>
<td>2001</td>
<td>1042.5</td>
<td>55.6</td>
</tr>
<tr>
<td>2002</td>
<td>1287.6</td>
<td>73.8</td>
</tr>
<tr>
<td>2003</td>
<td>1539.6</td>
<td>87.7</td>
</tr>
<tr>
<td>2004</td>
<td>1966.3</td>
<td>117.2</td>
</tr>
</tbody>
</table>

(Data source: China statistical yearbook)

4.4 Build model.

This article adopt exponential model, since \( Y = A \times T^B \) can show the different relationship between variables. In the model, \( Y \) stands for the R&D input, \( A \) and \( B \) stand for constants and \( t \) stands for the time factor as the effect of implementation of the tax incentive policy to the R&D. In order to eliminate the differences between data statistics, we should take logarithm on both sides of the model. Here is the model:

\[
\log(Y) = \log(A) + B \log(T)
\]

Make \( Y_1 = \log(Y) \), \( p. A_1 = \log(A) \), \( T_1 = \log(T) \), and equation turns into \( Y_1 = A_1 + B \times T_1 \). The estimates of the model adopt Eviews 3.1.

3.5 Results analysis and conclusion

Using Eviews 3.1 processing the data, we can get the following results:

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>0.678434</td>
<td>0.092545</td>
<td>7.330846</td>
<td>0.0002</td>
</tr>
<tr>
<td>C</td>
<td>2.436088</td>
<td>0.063334</td>
<td>38.46393</td>
<td>0.0000</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.884757</td>
<td>Mean dependent var</td>
<td>2.855191</td>
<td></td>
</tr>
<tr>
<td>Adjusted R-squared</td>
<td>0.868294</td>
<td>S.D. dependent var</td>
<td>0.225303</td>
<td></td>
</tr>
<tr>
<td>S.E. of regression</td>
<td>0.081765</td>
<td>Akaike info criterion</td>
<td>-1.976793</td>
<td></td>
</tr>
<tr>
<td>Sum squared resid</td>
<td>0.046799</td>
<td>Schwarz criterion</td>
<td>-1.932966</td>
<td></td>
</tr>
<tr>
<td>Log likelihood</td>
<td>10.89557</td>
<td>F-statistic</td>
<td>53.74130</td>
<td></td>
</tr>
<tr>
<td>Durbin-Watson stat</td>
<td>0.694821</td>
<td>Prob(F-statistic)</td>
<td>0.000159</td>
<td></td>
</tr>
</tbody>
</table>

Get the regression equation \( Y = 0.678 \times T + 2.436 \)

According to this, we can get that as time goes on, the growth of the R&D will appear as linear relation. Therefore, we can infer that R&D expenses in 2004 namely \( X = 10 \) is 130.172 billion yuan, while the actual
R&D expenses in 2004 is 196.63 billion yuan. To actual R&D expenses in 2001 to 2004 and the recursive R&D expenses in 2001 to 2004 according to the linear growth of R&D expenses in 1995 to 2000, both of the standard deviation get chi-square test, and the result is remarkable. In this research, the actual R&D expenses in 2004 is 66.458 billion yuan more than the normal growth according to the linear growth, and its major reason is because the tax incentive policy promotes since and scientific and technological innovation of the enterprise.

Therefore, in the current society with the increasingly fierce competition, science and scientific and technological innovations is a very important means to improve the international position of a country. Through empirical data results, it is known that the tax incentive policy has a very significant incentive effect on since and scientific and technological innovation. Therefore, the government should work to perfect the tax incentives policy and systems and improve the tax policy's incentive effect on business innovation.

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