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The impact of government's fundings and tax incentives on industrial R&D investments—Empirical evidences from industrial sectors in Shanghai

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Abstract

This paper is an empirical assessment of the impact of government's direct fundings and tax incentives on R&D investments of industrial sectors in Shanghai. The analysis is based on a panel consisting of 32 industrial sectors for the period 1993–2002.

The general finding is that both government's direct fundings as an incentive stimulating policy instrument and industrial sectors' own fundings in science and technology activities have positive effects on the industrial R&D investment. The stability of the policy further enhances the positive effect. However, the effect of the tax incentives is not straightforward. We observe that the enterprises in the industrial sectors tend to switch to more general and less costly science and technology activities, which can be regarded as a less desirable effect of the tax incentives.

JEL classification: L52; O32; O38
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1. Introduction

As reported in the latest edition of the OECD's Science, Technology and Industry Scoreboard in 2003,[1] the expenditure in Research and Experimental Development (R&D) in China has grown rapidly from 0.6% of GDP in 1996 to 1.1% in 2002. It has reached almost US$60 billion in current purchasing power parity in 2001 and ranked the third in the world, behind only the U.S. ($282 billion) and Japan ($104 billion).[2] In terms of human capital, China has also the second highest number of researchers in the world with 743,000, behind the 1.3 million in the U.S. but ahead of Japan with 648,000. Internationally, the new growth strategy and the policy orientation towards the development of science and technology have also received attention and recognition. In 2002, for the first time, China was invited by the OECD to participate as an observer in the Committee for Science and Technological Policy (CSTP).

The reform of the Science and Technology (S&T) management system since 1985 and the policy orientation formulated in 1995 to adopt a national system of innovation, under which central government, enterprises and research institutes all make efforts to foster R&D, have indeed achieved some progress.[3] However, there are still many daunting challenges ahead. First, despite its increasing importance, the S&T that is contributable to China's economic growth is still relatively limited in terms of both quantity and quality. Second, with China's accession to the WTO, the domestic industries will face even more intensive competition. The reorganisation of the Chinese industrial structure has to be made in order to ensure that domestic firms have the size, technology, and managerial skill needed to compete in the global economy. Finally, the disadvantages in the institutional infrastructure such as immature financial markets and lack of intellectual property protection are also serious obstacles in the development of an innovation system.

Despite the widely held view that S&T and R&D are the driving forces behind a long-run and sustainable economic growth, the application and development of these resources need to be carefully managed. In other words, continuing government commitments are required and the S&T policy instruments must be well-managed and improved to accelerate the progress of innovation. The economic reform and the progress of the economic development in China have been extensively investigated in a large body of literature. However, the S&T policy has not received much attention. Moreover, the empirical evidence in this area is very scarce. To the best of our knowledge, this is the first paper that empirically investigates the S&T policy issues related to China.

As a well-known fact, the large heterogeneities in historical, cultural, social, and economic aspects in China make it difficult to draw a generalized conclusion to the development of the country as a whole. The development of science and technology is not an exception. We choose Shanghai in our investigation due to both the unique data availability and the salient characteristics of Shanghai's economic and industrial

[1] STI Scoreboard: Creation and Diffusion of Knowledge.

[2] It is important to bear in mind that this ranking depends on an inflation of China's nominal R&D expenditure through the purchasing power parity (PPP). However, in nominal terms, China spent less than 5% of the US total.

[3] More detailed information of the reforms in Science and Technology Policy can be found in "A decade of Reform—Science and Technology Policy in China", IDRC (1997).