

Thorsten Block  
MERIT  
[t.block@merit.unimaas.nl](mailto:t.block@merit.unimaas.nl)

Paper proposal:

## **FINANCIAL SYSTEMS, INNOVATION AND GROWTH**

Although Schumpeter's work has spurred a large literature in the economics of innovation and growth his insight that finance is a crucial determinant of the entrepreneurial ability to develop new products and processes has received much less attention. In particular, the national system of innovation approach (Nelson, ed., 1993) has little to say about how country's financial system affects the speed and character of technical change. Following a short overview of the relevant finance and innovation literature this paper will provide a synthetic view of the finance-innovation link. It will be argued that national financial systems have an impact on growth through their differing abilities to promote sector-specific innovation. A cross-country, cross-sector investigation into the links between the financial system and its ability to promote innovative activity is conducted to find empirical patterns in the data which can guide analytical models.

### **THEORY**

The new finance literature has abandoned the world of perfect financial markets and instead has identified a number of imperfections such as asymmetric information or incomplete contracts which leave room for different institutional solutions. A large body of literature has convincingly shown that financial systems including ownership structures (La Porta, Lopez-de-Silanes and Shleifer, 1998) and corporate governance systems (Allen and Gale, 2000) do indeed differ markedly across countries. Furthermore, a number of theoretical models have identified links between the different nature of financial systems and the promotion of specific activities. Allen and Gale (2000), for example, argue that stock markets are superior to banks in promoting sectors characterized by high technology and management risk because markets are better at collecting and aggregating diverse opinions on these high-risk sectors thereby raising the number of innovative projects financed. In Huang and Xu's (1998) model multi-bank systems prefer to end projects that need additional financing due to conflicts over information sharing. In a sector with high uncertainty about future earnings and therefore a high number of bad projects (ex post) this commitment to terminate is valuable and leads to relatively high investment levels. In contrast, in activities that are characterized by low uncertainty concentrated banking systems are likely to have collected more information with which to make ex ante investment decisions thereby raising investment levels.

This new view is an advance over traditional approaches to finance because it assigns a role for both markets and institutions and can therefore account for the persistence and success of different national systems. Furthermore, it is able to link this more realistic view of financial structure to economic activities that are characterized by risk and uncertainty going beyond the assumption of perfect foresight in traditional economic theory. However, the literature still suffers from a one-dimensional view of the process of innovation. In Allen and Gale's model, for example, new innovative industries are characterized solely by their high level of uncertainty

(compared to established sectors), which creates disagreement about what the best projects are. Market-based systems can handle diversity of opinion and are able to keep a larger number of projects alive therefore raising the chances of the best (ex post) projects to survive. But the process of innovation itself remains largely a black box. Innovation seems to result from individual bursts of creativity, which are only subsequently evaluated by the financial system but not affected by it.

An exception is Mayer (1996) who differs from these simplistic perspectives on innovation because he implicitly assumes that innovation requires the collective effort of different agents within the firm. Activities that require a high company-specific level of irreversible investment by workers or suppliers benefit from concentrated ownership patterns provided by the stability of insider-dominated financial systems because they encourage stakeholders' commitment. However, activities where rapid technological change necessarily imposes costs on stakeholders are likely to benefit from liquid, dispersed ownership found in outsider systems (see also Porter, 1992). Hence the nature of the financial system, in particular ownership structure, has an impact on the innovative activity itself because it creates incentives and disincentives for stakeholders to participate and commit. The way a firm decides on how to allocate resources is dependent on the nature of its relation with financial markets and institutions. The financial system becomes an integral part of a nation's system of innovation and not just a detached project evaluator and selector.

The literature on the economics of innovation has made great progress in providing an even more elaborate analysis of how innovation is generated. According to this school, innovation is the result of a learning process that is uncertain and organizational (Freeman and Soete, 1997). Firstly, innovation is uncertain because the resources invested are irreversible and the level and timing of future returns is simply unknown. There is also uncertainty about the amount of resources needed to successfully complete the project as well as the danger of complete failure. This is the case because innovation is an open-ended learning process, which has to constantly overcome hurdles along the way that cannot be known ex ante. Schumpeter therefore argued that entrepreneurs and their financiers require some form of optimistic irrationality.

Secondly, understanding the business firm plays a crucial role since it is the organization undertaking the majority of innovations. The process not only involves the combination of physical and human inputs but also requires an interactive learning process among individuals or departments of a firm. This is the case because innovations are generally not conducted by individuals acting in solitude but by complex organizations involving different groups of people. The way they interact determines the way knowledge is generated, transformed and diffused. The focus here is on the process of learning and the behavior guiding participation in innovation rather than on allocating scarce resources to a set of equally uncertain projects.

Thirdly, the process of innovation takes different forms in different industrial activities (Pavitt, 1984). Breschi, Malerba and Orsenigo (2000) differentiate between technological learning regimes which are characterized by particular combinations of technological opportunities, levels of appropriability, cumulateness of technology and properties of the knowledge base. The empirical evidence suggests that the organization of innovative activities differs markedly across sectors but is relatively stable across countries which indicates that the differences are related to