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Corporate innovation and economic freedom: Cross-country comparisons[☆]

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ABSTRACT

This paper studies the impact of a country's integrated economic freedom on corporations undertaking innovative activities. Using 5809 firms from 29 countries filed and granted U.S. patents over the 1984–2006 period, we find strong and robust evidence of a positive relationship between corporate innovation and the cross-country differences in economic freedom. This finding suggests that firms domiciled in a country with a sound regulatory system, limited government, regulation efficiency, and open markets facilitate corporations undertaking innovative activities. Specifically, we find that the positive relationship is more pronounced through the channel of labor freedom. This is consistent with the notion that more economic freedom enhances innovation competence in the global market.

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1. Introduction

It is widely believed that innovation is one of the most important factors for national and firm level competitiveness, for example, promoting a country's economic development (Westwood & Low, 2003) and facilitating operational effectiveness (Mumford, 2000). As Porter (1992) points out, "To compete effectively in international markets, a nation's businesses must continuously innovate and upgrade their competitive advantages." Therefore, innovation is of particular interest when attempting to identify factors that encourage or impede competitiveness or growth. Growing research has focused on the influence of financial market development (Hsu, Tian, & Xu, 2014), wrongful discharge laws (Acharya, Baghai, & Subramanian, 2014), national cultures (Herbig & Dunphy, 1998), and social institutions (Nam, Parboteeah, Cullen, & Johnson, 2014) on corporate innovation. However, as stated in Gwartney

and Lawson (2006), "the enormous benefits of the market network cannot be achieved without a sound legal system."

It is notable that granted patents are under the protection of a country's regulatory system. As Hall, Jaffe, and Trajtenberg (2005) suggest, patents not only can stem growth in corporate innovation by prohibiting the use of techniques by other firms, but also can motivate companies to work harder to either create new products through innovation or adopt more efficient ways to reduce the cost of existing products. As a result, patenting facilitates the prevention of companies replicating inventions and ensures that patent owners obtain sufficient compensation for the use of their inventions. On the other hand, the index of economic freedom measures the overall effectiveness of a country's regulatory system, limitation of government intervention, and openness of labor markets, product markets, and financial markets. As stated by The Heritage Foundation,¹ "In economically free societies, governments allow labor, capital, and goods to move freely, and refrain from coercion or constraint of liberty beyond the extent necessary to protect and maintain liberty itself." This is an important feature allowing us to extend the link between a sound regulatory system and innovative achievements to economic freedom.

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¹ <http://www.heritage.org/index/about>.

In this paper, we extend the literature by investigating the relationship between cross-national economic differences and corporation innovation. We use a representative sample of 32,832 firm-year observations from 29 countries over the 1984–2006 period obtained from the latest version of the National Bureau of Economic Research (NBER) Patent Citation database.

We first examine the effect of a country's integrated economic freedom on corporate innovation. We find that the economic freedom index is positively associated with the number of citations per patent, patents, originality, and generality. This positive association between economic freedom and corporate innovation holds even after controlling for additional country level variables, using subsamples and various estimation approaches, and alternative patent and citation database. This finding suggests that a country's integrated economic freedom is likely to promote corporations undertaking innovative activities. This is in line with the notion that more economic freedom is associated with better developed financial markets (Hafer, 2013), which in turn motivates corporate innovation outcomes (Hsu et al., 2014).

In addition, the index of economic freedom is an integrated measure of a country's regulatory system and market openness, consisting of ten equal-weighted factors. The ten components are property rights, freedom from corruption, fiscal freedom, government spending, business freedom, labor freedom, monetary freedom, trade freedom, investment freedom, and financial freedom. To identify the mechanisms through which economic freedom would promote corporate innovation, we test each of ten economic freedom components individually and examine all ten components together on a basis of the horse-race regression. We find a positive relationship between corporate innovation and freedom from corruption, fiscal freedom, government spending, labor freedom, trade freedom, or financial freedom. In particular, freedom from corruption measures the level of corruption across countries. Both fiscal freedom and government spending fall into limited government category and are based on the level of tax and government expenditures as a percentage of GDP, respectively. Labor freedom is a composite measure of a country's various regulations in labor market. Trade freedom quantifies a country's trade policy system in terms of tariff and non-tariff barriers. Financial freedom considers efficient banking system and independent financial institutions from government interference. The results suggest that firms domiciled in a country with less corruption, limited government, labor freedom, less tariff barriers in international trade, and efficiency and independence of banking and financing system are associated with more innovative activities. Moreover, the horse-race estimation results suggest that a country's economic freedom is positively associated with corporate innovation through the labor freedom and trade freedom channels. The robustness tests by using the European Patent Office Patent Statistics Database further support strong evidence that economic freedom is likely to spur corporate innovation through the channel of labor freedom. This is consistent with McMullen, Bagby, and Palich (2008)'s view that labor freedom from wage and price controls lowers opportunity and transaction costs, which is likely to have motivational impacts on entrepreneurial innovative activities.

Overall, our study suggests that a country's integrated economic freedom with a sound legal environment, regulatory efficiency, restricted government, and open markets is likely to promote corporations undertaking innovative activities. This is consistent with the notion that enhanced economic freedom improves the innovative competence in the global market.

The remainder of the paper is organized as follows. Section 2 reviews the related studies and develops hypotheses. Section 3 presents the sample selection and research design. The empirical results and robustness checks are provided in Sections 4 and 5. Section 6 concludes the paper.

2. Literature review and hypothesis development

2.1. Innovation

It is notable that corporate innovation is an essential key of corporate sustainable growth. A growing number of studies attempts to analyses factors which can be used to explain why corporations wish to undertake innovative activities. Extant empirical studies have related corporate innovation to firm level factors, such as stock liquidity (Fang, Tian, & Tice, 2014), financial analyst coverage (He & Tian, 2013), venture capital risk tolerance (Tian & Wang, 2014), banking competition (Cornaggia, Mao, Tian, & Wolfe, 2015), going public or remaining private (Bernstein, 2012; Ferreira, Manso, & Silva, 2014), and overconfident management (Hirshleifer, Low, & Teoh, 2012). For example, Cornaggia et al. (2015) shows that competition between banks has a significantly negative impact on the advancement of patents and their respective citations by public corporations, but levels the playing field for smaller companies. In contrast, Bena and Li (2014) argue that smaller companies innovate not only for efficiency, but also to be taken over by the larger and less innovative firms who have more physical capital. Likewise, Chemmanur, Loutskina, and Tian (2014) find that smaller firms backed with corporate venture capital are less profitable but more innovative, when compared against those that are backed with independent venture capital. Using a survey of Spanish manufacturing firms, Gonzales, Miles-Touya, and Pazo (2015) argue that investments in both R&D and worker on-job training have the enhancement and complementary impacts on firm innovation.

In addition, utilizing firms' importing and exporting as an international sourcing of R&D play an important role in corporate innovation. For instance, exploiting a sample of Spanish manufacturing firms surveyed by the Fundacion Empresa Publica over the period of 1990–1997, Saloman and Shaver (2005) show a positive relationship between export volume and innovation. On the other hand, Boler, Moxnes, and Ulltveit-Moe (2015) propose a theoretical model of R&D and endogenous productivity with imported products. Using a panel of Norwegian manufacturing biennial survey for the period of 1997–2005, they find that a positive relationship between importing volume and R&D investments, suggesting that better access to imported products spurs corporate innovative activities.

The literature also discusses various aspects of the cross-country differences that enhance or impede corporate innovation. For instance, Hsu et al. (2014) demonstrate that better developed equity markets encourage innovation while the development of credit markets are likely to discourage innovation. Nam et al. (2014) find that social institutions such as education and political stability moderate the relationship between culture and innovation. Acharya et al. (2014) find that wrongful discharge laws – laws that protect employees against unjust dismissal – motivate innovation. Additionally, Huang and Yu (2012) show that cross-regional patenting signals enhancement of innovation, therefore, is more likely to increase a firm's global market performance. In the same vein, D'Agostino and Santangelo (2012) suggest that overseas R&D laboratories contribute on home country innovative activities.

Furthermore, prior studies show a cointegrating relationship between the stock of knowledge and innovation. For instance, using a panel of OECD countries over the period 1973–1999, Bottazzi and Peri (2007) document dynamic effects among the domestic stock of knowledge, employment in R&D, and the international stock of knowledge. This finding of knowledge spillovers is further supported by Bottasso, Castagnetti, and Conti (2015) through using different estimation approaches (e.g., Bai & Ng, 2004; Bai, Kao, & Ng, 2009; Gengenbach, Palm, & Urbain, 2006).

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