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Financial deepening and innovation: The role of political institutions ☆

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ABSTRACT

This study investigates the effects of financial deepening on innovation for various democratic levels of political institutions using panel data from 74 countries spanning 1970–2010. Our results show that banking market deepening is associated with increased innovation only when political institutions are sufficiently democratic. In contrast, the enhancing effect of stock market deepening on innovation requires a lower level of political democracy. Further, we find that increasing the state's openness and competitiveness in the executive recruitment of leaders is the main channel through which political democratization promotes the role of banking and stock markets for financing innovation. Our results are robust to the use of the instrumental variable approach; alternative measures for financial deepening, democracy and innovation input; long-differenced variables; and alternative specifications.

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1. Introduction

It is well known that innovation is a catalyst for sustainable economic growth, which is on the development agenda of numerous developed and developing countries (Aghion and Howitt, 1992; Grossman and Helpman, 1991; Romer, 1990). What can governments do to promote innovation? Consistent with the insight of Schumpeter (1911), recent empirical studies have determined that financial development promotes innovation (Ang, 2011; Ayyagari, Demirgc-Kunt, & Maksimovic, 2011; Hsu, Tian, & Xu, 2014). Because countries that have deeper financial systems are better at mobilizing resources, allocating funding and diversifying risks, they can channel more funding to profitable but risky innovation projects. Consequently, financial deepening increases the resources devoted to the research and development (R&D) sector in order to foster innovation (King and Levine, 1993b). Furthermore, recent studies have indicated that political institutions affect cross-country differences in financial development by instituting rules and regulations (Haber, North, & Weingast, 2007). Motivated by these two strands of literature, we examine how financial deepening and political institutions affect innovation.

Political institutions define the rules and policies that shape the interactions (e.g., the contractual relationships) between market participants, which in turn affect the incentives and expectations of investors and innovators. Democratic political institutions limit the power of the state by constraining executive authority and fostering political competition, which better protects investor and innovator gains (Jensen, 2008; Li, 2009).[1] We expect innovators to be more motivated to transform innovation input to innovation output under the influence of more democratic political institutions, indicating a positive relationship between political democracy and innovation output, i.e., the transformation rate from innovation input to innovation output.

While it may seem natural to argue that political democratization promotes innovation, we further examine whether countries

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[1] The former study demonstrates that democratic institutions are associated with lower levels of political risk (measured by the premiums multinationals pay for coverage against government expropriations and contract disputes), which is driven by constraints on the executive branch. The latter study demonstrates that democratic governments are much less likely to expropriate assets from investors (particularly foreign direct investments) because democratic governments generally impose more constraints on their leaders than autocratic regimes.

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with more democratic political institutions can exploit their financial systems more efficiently to generate new ideas. In particular, we argue that the political democracy of a country affects its capacity to allocate its financial resources efficiently in the generation of new ideas. Note that depth and efficiency are two different dimensions of financial development and that a country's financial depth can be measured by the size of its banks and/or stock market as a percentage of GDP. The efficiency of financial markets is harder to measure quantitatively and hence is usually insufficient for empirical research. Therefore, in an attempt to understand how political democracy affects the efficiency of financial markets in financing innovation, we examine the interactive effects of financial depth and political democracy in knowledge production.

First, we hypothesize that political democratization promotes the efficiency of the banking market to finance innovation, which would in turn promote the innovation-enhancing effect of banking market deepening. More democratic countries have lower ownership in their banking system and possess less power to restrict the entry of new financial intermediaries into the marketplace (La Porta, Lopez-de-Silanes, & Shleifer, 2002). Therefore, democratic political institutions limit the power of the state to control and repress the financial system, which reduces the opportunity for both predatory and opportunistic behavior (Sapienza, 2004) and generates a more competitive and more efficient banking system (Haber et al., 2007). A more competitive banking environment, in turn, is more strongly committed to terminating poor investment projects than a monopolistic banking environment. This commitment increases the ability of competitive banking environments to finance risky investments and promote innovation (Huang and Xu, 1999). However, a more competitive banking environment may not promote innovation if it shifts lending toward less risky firms and away from loan products requiring more soft information (Dell'Ariccia and Marquez, 2004) or if it reduces the supply of innovative small firms as targets for mergers (Cornaggia, Mao, Tian, & Wolfe, 2015).

Second, we hypothesize that political democratization would promote the innovation-enhancing effect of stock market deepening. Investors are able to extract the relevant but noisy information from equilibrium prices under rational expectations (Grossman, 1976). This information allows investors to make investment decisions regarding innovation projects. The information contained in equity prices also provides timely information to entrepreneurs about the prospects of their innovations, which in turn improves their investment decisions (Allen and Gale, 1999). We expect that more democratic political institutions that impose greater constraints on governments would be more likely to implement policies that improve information disclosure to investors. For example, Bushman, Piotroski, and Smith (2004) observed greater corporate transparency in countries where the state is less likely to expropriate firms' wealth. As a result, political democratization enhances the efficiency of stock markets for financing innovation because the quality of information produced by the stock market is improved in a more democratic political environment.

To test the above hypotheses regarding the direct and indirect effects of political democracy on innovation through financial deepening, we employ a panel data set encompassing 74 countries over the period 1970–2010; the countries vary greatly in terms of the degree of financial depth and political democracy. We measure each country's innovation output by the number of patents granted by the United States Patent and Trademark Office (USPTO). We employ three measures of financial deepening. The depth of the banking market is measured by the ratio of private credit by banks to gross domestic product (GDP); the depth of the formal financial intermediaries is measured by the ratio of their liquid liabilities to GDP; and the depth of the stock market is measured by the ratio of stock market capitalization to GDP. We operationalize the concept of political democratization at the country level using quantitative measures of institutionalized democracy, i.e., the polity score provided by the Polity IV Project (Marshall and Jaggers, 2011) and the Political Rights (PR) index published by Freedom House (2011).

Our empirical model is derived from a knowledge production function that links a country's innovation output to innovation input and other factors. We estimate our model using lagged explanatory variables as instrumental variables (IVs) in alignment with the general method of moments (GMM) approach (Arellano and Bond, 1991; Blundell and Bond, 1998) to address the potential issue of endogeneity. Furthermore, we incorporate a full set of country and year fixed effects and a set of time-varying control variables, such as R&D inputs measured by the number of R&D researchers per capita, to address the potential issue of omitted variables.

Our empirical analysis leads to several conclusions. First, we find a positive effect of political democratization on innovation. Second, and more importantly, we demonstrate that the deepening of both the banking market and formal financial intermediaries has a positive and significant effect on innovation only when a threshold level of the polity score has been attained. To clarify, the deepening of the banking market and formal financial intermediaries causes innovation input to be allocated more efficiently among innovative projects only when a country has a sufficiently high level of political democracy. Conversely, there is a lower requirement for the polity score to allow stock market deepening, thus promoting innovation. These results are consistent with our hypothesis that political democratization has an indirect effect on innovation through financial deepening.

Third, we find that increasing the state's openness and competitiveness in the executive recruitment of leaders is the main channel through which political democratization promotes the role of banking and stock markets for financing innovation. Finally, our results are robust to the use of alternative measures of financial deepening, political democracy and innovation input, long-differenced variables, and alternative specifications.

Our study extends the growing literature on the relationship between political institutions, financial development, and innovation with cross-country data. Recent studies, such as Huang (2010), show that political democracy promotes financial development. Other studies have concluded that higher quality political institutions promote innovation (Varsakelis, 2006) and that higher levels of financial development promote innovation (Ayyagari et al., 2011; Ang, 2011). Our paper adds to this literature by showing the interactive effect of political democracy and financial development on innovation.

Further, closely related to our work, Hsu et al. (2014) demonstrate that the development of the stock market is more important than that of the banking market for promoting patents filed in the U.S. Our study differs from this study in two aspects. First, we focus on how political democracy affects the financial development of innovation, whereas Hsu et al. (2014) focus on the direct effect of financial development in innovation. Second, we show that bank-based financial systems require a higher level of political democracy than market-based financial systems for promoting innovation. As a result, on average, bank-based financial systems have a weaker positive effect on innovation than market-based financial systems, which reconciles the results reported in Hsu et al. (2014).

The remainder of the paper is organized as follows. Section 2 presents the empirical model, and Section 3 describes the data. Section 4 reports the empirical results with various robustness checks, and Section 5 presents potential channels. The final section concludes.

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