

Variation in Transaction Costs and the Propensity to Patent: some Firm-Level Evidence

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Extended Abstract

Do lower transaction costs induce innovation? In this paper, we exploit the variation in cross-country and cross-firm transaction costs to explain the propensity of firms to innovate. Drawing on a large dataset from European Patent Office (EPO) covering over 15,000 firms from 100 countries over the period 1991-2015, we compute the conditional probabilities of individual firms to acquire a valid patent and construct firm-level propensities to innovate, and examine whether lower transaction costs encourage firm-level innovation. Our empirical strategy specifically controls for firm-level idiosyncracies, country-level unobserved effects and common technology shocks that potentially invoke omitted variable bias in the conditional effects of transaction costs on the propensity to patent. Using a large and detailed dataset on the distribution and level of transaction costs across countries, this paper sets to examine the marginal effects of higher transaction costs on the firm-level propensity to patent.

Using factor analysis, we establish four latent indices of transaction costs with high internal consistency that exhibit the maximum common variation across firms and countries. First, administrative transaction costs capture the ease of starting economic activity and the difficulty of dealing with licenses and permits in the contact with government officials. Second, procedural transaction costs capture the strength of contract enforcement and security of property rights. Third, cross-border transaction costs capture the difficulty of international trade. And fourth, information disclosure-related transaction costs capture the extent of information disclosure to the shareholders, quality and transparency of corporate governance, and minority shareholder protection against the corporate boards.

Our investigation suggests higher transaction costs across firms and countries systematically account for the failure of firms to acquire a valid patent. The results reveal that higher transaction costs across firms, between and within countries are associated with a marked drop in the firm-level propensity to patent. The propensity to innovate and acquire a valid patent is significantly more likely to decrease when high procedural and intra-firm transaction costs persist. Firms are systematically less likely to acquire a valid patent at EPO when the procedures to start economic activity and deal with permits and licenses are too complex. On the other hand, shorter duration of business registration procedures, lower costs of dealing with licenses, loose minimum capital requirements and lower costs of firm registration fail to induce firm-level probability to acquire a valid patent and tend to be associated with widespread moral hazard and opportunism as the patent rejection rate tend to increase substantially when these particular transaction costs are reduced.

Lower procedural transaction costs related to contract enforcement and security of property rights are associated with a significant rise in the conditional probability to acquire a valid patent, suggesting the reduction of such costs tends to deter moral hazard and opportunism and is the critical institutional component in inducing innovation. Greater extent of legal rights in getting credit tends to improve the firm-level odds of acquiring a valid patent whereas in-depth credit information requirements can reduce the propensity to patent. In addition, more complex tax legislation and tax payment procedures, and higher costs of cross-border trade, tend to decrease the propensity to acquire a valid patent while greater protection of creditors in the insolvency proceedings and low-cost enforcement of contracts tend to substantially boost the firm-level innovation propensities and explain a greater proportion of the variation in the patenting activities than administrative and cross-border transaction costs combined. Our estimates imply that the proposed estimation strategy correctly predicts between 54 and 60 percent of the patent application outcomes.

Controlling for unobserved heterogeneity across firms and over time, we employ the negative binomial model to examine the contribution of administrative, procedural, cross-border and intra-firm transaction costs to the patenting activity. The results consistently suggest higher administrative transaction costs appear to be associated with persistently higher number of valid patents as such costs tend to address moral hazard, opportunistic behavior and other sources of asymmetric information and deter potential copy-cat imitator firms from entry. On

the other hand, higher costs of contract enforcement, property rights protection and shareholder protection are significantly more likely to prevent firm-level innovation and tend to result in markedly lower number of valid patents which suggests that such costs tend to divert the resources from productive uses in unproductive channels exacerbating large losses. The negative effect of higher transaction costs on the number of valid patents and firm-level propensity to patent is robust against multiple exclusion restrictions and specification checks. It appears to be stable over time, across country-specific subsamples and is sensitive to heterogeneity bias and country-level idiosyncracies. Lastly, the extreme bound analysis is employed to examine the stability of the marginal effects of transaction costs on the propensity to patent by running more than 10 million combinations of regression model specifications and construct the coefficient distributions for clustered and non-clustered indicators of transaction costs. The results confirm the fundamental importance of low-cost contract enforcement, secure property rights and shareholder protection over administrative and cross-border transaction costs in explaining the differential propensities to patent across firms and countries.