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DO POLITICAL CONNECTIONS MATTER FOR FIRM INNOVATION? EVIDENCE FROM EMERGING MARKETS IN CENTRAL ASIA AND EASTERN EUROPE

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ABSTRACT

We posit that the investments in political connections made by a firm in an emerging market will impact differently its propensity to introduce radical and incremental innovations. In addition, we argue that this effect will be moderated by alternate non-market firm strategies, such as bribery. Using a dataset of more than 9,000 firms in 30 emerging economies from Eastern Europe and Central Asia we find that political connections increase the probability of radical innovation but have no significant impact on incremental innovation. Moreover, larger bribing reduces the positive impact of political connections on radical innovation. Our results confirm the importance of political connections for firm activities, but also caution firms on their heterogeneous impact on various types of innovations, and their detrimental interplay with other non-market strategies.

Keywords: *Radical innovation; Incremental innovation; Political connections; Bribery; Non-market strategy.*

1. INTRODUCTION

Innovation remains a vital ingredient for economic progress (Grossman and Helpman, 1991; Basile, 2001) and competitive advantage (Porter, 1990). Given its significance, many studies have investigated the drivers of firm innovative performance, often focusing on new product or process introduction (Crossan and Apaydin, 2010; McCann and Oxley, 2012). These include both internal drivers such as firms' strategic intentions (Markides and Geroski, 2005), industry structure (Acemoğlu et al. 2014) or competition (Ayyagari et al. 2011), as well as external opportunities coming from global value chains (Fortwengel, 2011), inter-firm collaborations (Krammer, 2016), export activities (Cassiman and Golovko, 2011) and innovation ecosystems (Krammer, 2017). While this substantive, yet eclectic, literature provides multiple explanations for what drives firm innovation in well-functioning, developed economies, we are still limited in our understanding of what drives or hinders innovation in emerging and less-developed markets given their idiosyncrasies in these processes (Boubakri et al. 2008; Kotabe et al. 2017). In particular, given the prevalence and importance of non-market strategies in these environments (Atuahene-Gima and Li, 2001; Ahlstrom et al. 2008; Desai and Olofsgard, 2011) we still do not know exactly how they affect innovation across firms, industries, and national boundaries (Baregheh et al. 2009; Kotabe et al. 2017; Snihur and Wiklund, 2018).

We seek to address this question by examining the implications of investing in political connections on firm's radical and incremental innovation performance, as well as the contingencies of this relationship vis-a-vis other non-market strategies. Specifically, we focus on firms' non-monetary efforts to build political connections (e.g., the time spent by managers with governmental officials) as well as their perceived impact (benefit) on the probability of introducing radical and incremental innovation. Moreover, while the overall importance of innovation is ubiquitous, making the distinction between radical and incremental innovation

can help us better understand both its drivers (Baregheh et al. 2009) and the long-term effects for firms (Damanpour, 1996; Drazin and Schoonhoven, 1996; Marzi et al. 2017).

Theoretically, we draw on resource dependence theory (Pfeffer and Salancik, 1978) and institutional theory (North, 1990), thereby emphasizing a firm's dependency on political actors (Hillman, 2005; Dickson, 2007; Shirodkar and Mohr, 2015) as a source of uncertainty and also as a consequence of the institutional landscape[1]. We see political connections potentially having both positive and negative effects on radical (i.e., cutting-edge) innovations. On one hand, political connections may provide a more favorable operational environment (Peng and Luo, 2000), access to additional resources, financing, and information (Ridge et al. 2017; Li et al. 2018), as well as a confidence boost (Li et al. 2008) to pursue risky innovative endeavors (Wang et al. 2018). In contrast, political connections can backfire on firm innovation by triggering organizational inertia and a "resource curse" (You and Du, 2012; Shi and Zhu, 2014; Hou et al. 2018), greater dependency on governmental interventions (Boubakri et al. 2008; Marquis and Qian, 2013; Darendeli and Hill, 2016), and agency problems (Sun et al. 2016; Bertrand et al. 2018). Conversely, we maintain that firms' political connections will be less useful or even detrimental for incremental innovations, since they involve much lower uncertainty, therefore tilting the balance more towards the negative effects discussed above. Finally, we theorize that firms' involvement in other non-market strategies (e.g., bribery) will weaken the effect of political connections, given the increased costs, negative reputation, legitimacy concerns, and large overlap in terms of strategic goals between these non-market alternatives (Andrianova, 2001; Alam et al. 2018).

[1] A good example in this regard is Samsung, the South Korean giant that became a worldwide innovation leader with significant governmental support (Evans, 1995), yet it was also involved in a corruption scandal involving elite politicians.

We test these conjectures using data on more than 9,000 firms across 30 countries from Eastern Europe and Central Asia. While most literature focuses on BRIC countries (Brazil-Russia-India-China) to showcase the idiosyncrasies of emerging markets (Mody, 2004) and innovation in these contexts (Agarwal, Brem and Grotke, 2018; Wan, Williamson and Yin, 2019), this set of countries is of particular relevance for our research. Existing institutional rationales (North, 1981; North, 1990) emphasize how the institutional context surrounding the firm critically determines its behavior in general and innovation in particular (Barasa et al. 2017; Krammer, 2018). As such, Eastern European and Central Asian countries present an ideal setting for testing our hypotheses by sharing a common historical background (i.e., all former communist economies) yet exhibiting large variation in terms of institutional quality (Meyer et al. 2009; Michelson, 2007; Jiménez et al. 2017), non-market strategies (Athanasouli and Goujard, 2015; Krammer, 2019), and overall innovation performance (Krammer, 2009).

With this study we propose several contributions. First, complementing recent findings on the importance of the political environment for various firm strategies (Alcantara and Mitsuhashi, 2012; Jiménez et al. 2013; Jiang et al. 2014; Dikova et al. 2016) we examine an equally important outcome, namely firm innovation. In doing so, we pay special attention to the multi-dimensionality of innovation instead of treating it as a homogenous construct (Baregheh et al. 2009; Manea and Pearce, 2006). Second, we advance the corporate political strategy literature (Hillman, 2003; Hillman and Hitt, 1999; Lawton et al. 2013) by exploring the interplay between firm's investments in various non-market strategies and innovation outcomes. More specifically, we show that the effects of political connections are not necessarily uniform across different types of innovations. Furthermore, we show that there are potential tradeoffs for innovation when firms engage in multiple non-market strategies (i.e., bribery), thus adding to recent research on the interplay between non-market and market strategies (Liedong et al. 2017; Parnell, 2018). Finally, from an empirical standpoint, we focus

our attention on a less-researched context (i.e., Eastern Europe and Central Asia) that provides an auspicious ground for examining non-market strategies at work in emerging and less-developed economies (Ge et al. 2017; Wang et al. 2018).

2. LITERATURE AND THEORY DEVELOPMENT

2.1 Types of innovation in emerging economies

Despite its uncontested prominence in both academic and non-academic circles, what exactly constitutes innovation is still debated in the literature (Crossan and Apaydin, 2010). In essence, any process in which firms focus on opportunities by searching for ideas, implementing and generating value in the market, qualifies as innovation (Bessant and Tidd, 2009). However, capturing the full extent of this process remains difficult (McCann and Oxley, 2012), and therefore one of the most widely accepted ways to capture innovation is to follow the guidelines of the Oslo manual (OECD, 2005). Here, innovation is defined as the implementation of a new or significantly improved product/service, process, new marketing method, or a new organizational method in business practices, workplace, or external relations. While the creation of innovation is obviously a necessary condition, this paradigm shift draws the attention towards the introduction or launching stage of innovation and combines non-technical innovations, such as marketing and management innovation, with the older concepts of technical innovation, which include process and product innovation (Damanpour, 1996).

Given this complexity, it is not surprising that the existing literature has proposed and also validated a large number of explanations as to what makes a certain firm, industry, region, or country more innovative than others. These factors include macro aspects such as geo-political and institutional features (Furman et al. 2002; Krammer, 2009; Sartor and Beamish,

2014), or industrial, and regional characteristics (McCann and Oxley, 2002; Krammer, 2017), but also micro-economic foundations pertaining to firm (Damanpour, 1996; Krammer, 2016) and individual characteristics (Anderson et al. 2004). For instance, in countries where business constraints are less stringent, firms appear to innovate more (Boubakri et al. 2008; Back, Parboteeah and Nam, 2014) and be more entrepreneurial (Ge et al. 2017). In turn, in heavily regulated environments with corrupt bureaucrats, innovators tend to employ bribes strategically to avoid arbitrary penalties and bring new products and services into the market (Krammer, 2019). However, despite several interesting contributions within this body of work, we still lack a deep understanding of the effects of external environment on firm innovation performance, in particular in emerging and transition economies that lag significantly in terms of knowledge and innovation production (Krammer, 2017).

These economies are characterized by a process of technological upgrading with more and more firms adopting new technologies from external (e.g., licensing) or internal (e.g., internal R&D projects) sources (EBRD, 2014). Moreover, these countries have experienced tremendous institutional changes, which have resulted in large differences across this region in terms of institutional quality (Meyer et al. 2009), innovation performance (Krammer, 2009), and pervasiveness of non-market strategies (e.g., bribes) among firms (Krammer, 2019). Yet, given their different antecedents and consequences, it is important to distinguish between incremental and radical types of innovation when seeking to capture more comprehensively the performance of firms in terms of innovation.

Commonly, radical innovation is characterized by an entirely new set of performance features, improvements in known performance of 5% to 10%, and at least a 30% reduction in associated costs (Leifer et al. 2000). Radical innovations are able to transform existing markets or create new ones, hence following more closely the creative destruction process envisioned by Schumpeter and others (Pandit et al. 2018). However, this definition is only able to identify

a radical innovation ex-post. Other studies developed criteria through which the issue of defining radical innovation can be solved ex-ante. Skarzynski and Gibson (2008) argue that an innovation is seen as radical when it is characterized by at least one of the following requirements: it needs to have the power to change (1) customer expectations and behaviors drastically, (2) competitive advantage, and (3) industries. Additionally, radical innovations are higher-order innovations and have a high uncertainty level (Dewar and Dutton, 1986; Koberg et al. 2003).

In contrast, incremental innovation is seen as lower-order innovations that involve reduced levels of uncertainty (OECD, 2005). Incremental product innovation results from an existing product whose performance has been enhanced or upgraded. For example, a product can be improved by enhancing product performance or lowering costs through the use of enhanced features, materials, or technical systems (Johannessen et al. 2001). Subsequently, its usefulness and strategic deployment by firms tends to hinge differently from those related to radical innovations.

2.2 Political connections as a non-market strategy of innovating firms

Corporate political strategy refers to actions that firms take to influence public policy in their favor (Hillman et al. 2004; Sun et al. 2012). The extant literature has identified various potential tactics employed by firms in their relationships with the government aiming to disseminate information, provide financial incentives, and/or build constituency (Hillman and Hitt, 1999). For instance, these political strategies can be shaped as campaign contributions, lobbying, or the cooption of politicians on the board of directors to establish political connections.

Regardless of form, building up and nurturing political connections requires significant time and resource commitments. These non-monetary investments in political connections may bear both positive and negative effects (Alhstrom et al. 2008). On one hand, political

connections are boundary-spanning personal and institutional linkages between firms and constituent agents in the public arena (Faccio et al. 2006; Sun et al. 2012; Cui et al. 2018), and they can be used to change and influence the rules and laws in a firm's favor (Houston et al. 2012). Hence, firms that develop political connections may gain favors that might cause higher rates of profitability and market valuation (Hillman et al. 1999; Hillman, 2005; Ritvala and Salmi, 2009). As a relational asset that is not easily imitable by unconnected rivals (Boubakri et al. 2008; Sun et al. 2012), political connections may be a valuable source of sustained competitive advantage. On the other hand, developing political connections might have a detrimental effect on a firm's wealth as a result of politicians intervening with corporate decisions which can distort incentives and misallocate resources (Shleifer and Vishny, 1994; Sojli and Tham, 2017). Besides, agency-related problems can allow politicians to appropriate rents generated by the firm by reducing the effectiveness of the legal, regulatory and equity market sanctions (Sun et al. 2012; Sun et al. 2016; Bertrand et al. 2018). Overall, these issues question the usefulness and subsequent impact (i.e., post-investment) of political connections for innovating firms in these environments.

2.3 Hypotheses

Innovation is a long-term, risky activity that benefits from any reduction in terms of institutional uncertainties. We maintain that the effect of time investment by firm managers in establishing and nurturing political connections with government officials on the probability of introduction of innovation varies according to the level of uncertainty associated to each type of the innovation (Marzi et al. 2017).

Concerning radical innovation, we can conceptualize both positive and negative effects for political connections. Political connections confer advantages that benefit the whole firm, even if the people investing time in political connections and the people working on innovations

are different. New products are often subject to the approval of a license or permit, safety clarification, taxation, or environmental impact inspections (Krammer, 2019). Therefore, establishing a connection with government officials can facilitate lobbying for favorable decisions (Peng and Luo, 2000). In addition, political connections can speed up the administrative and bureaucratic processes, especially in those countries with low levels of institutional development (Dikova et al. 2016), as a consequence of reciprocity and long-term cooperative interactions for mutual benefit between firms and governments from which the latter anticipate social gains in exchange of facilitating the processes to the former (Frynas et al. 2006; Akbar and Kisilowski, 2015). In a globally competitive market, a shorter time period from generating innovation ideas to actually releasing the product to the market not only reduces costs but also increases the profits and may create first-mover advantages (Zhang et al. 2015).

Furthermore, with few exceptions (most notably China), in most emerging and less-developed markets it can be difficult to get financing in a short period of time compared to developed countries, because despite recent improves and growth, financial institutions are still lacking in efficiency, property right enforcement, or simply enough funding (Ayyagari et al. 2011; Song et al. 2015; PwC, 2016). Therefore, political connections may help firms to gain loans or credit, subsidies, and lighter taxation from the government (Faccio, 2006; Johnson and Mitton, 2003; Song et al. 2015; Ma et al. 2016; Ridge et al. 2017; Li et al. 2018). Political connections have also been shown to increase the access to non-financial resources and information (Faccio, 2006; Zhu and Chung, 2014). Finally, political connections can also increase the confidence of firms (Li et al. 2008). Given the inherently high uncertainty of radical innovation, firms may be initially reluctant to invest in in this kind of activities. However, managers in firms with political connections may be more prone to undertake them, compared to non-connected counterparts, given the lower uncertainty as a consequence of the preferential

treatment and more advantageous conditions they think they can obtain from the government (Liu et al. 2018). We therefore hypothesize that:

Hypothesis 1a: *Firm's investment in political connections will have a positive effect on the introduction of radical innovation.*

In turn, it may also be argued that investing in political connections can negatively affect the introduction of radical innovation. Politically connected firms can have access to attractive projects and contracts or preferential help from governments, facing a lower competitive pressure that leads to organizational inertia. This "resource curse"[2] can make innovation to be constrained as it is easier for managers to get resources via political connections rather than investing in innovation, thus reducing the motivation of firms for innovating and investing in innovation capabilities (You and Du, 2012; Shi and Zhu, 2014; Hou et al. 2018). Additionally, greater political connections may make firms more vulnerable to government control and intervention (Darendeli and Hill, 2016), which in turn may cause distortion of incentives and misallocation of resources (Bertrand et al. 2018), diverting efforts from innovation activities toward other actions aligned with the government's goals (Shleifer and Vishny, 1994; Boubakri et al. 2008; Marquis and Qian, 2013; Sojli and Tham, 2017). Finally, political connections can reduce the effectiveness of legal/regulatory and equity market sanctions to stakeholders who then can engage freely in misappropriation of a firm's rents (Sun et al. 2016; Bertrand et al. 2018). As a result, firms will have not only lower resources to invest in innovation activities, but also lower incentives to do so because of the lower effective return. We therefore have that:

Hypothesis 1b: *Firm's investment in political connections will have a negative effect on the introduction of radical innovation.*

[2] We are grateful to one of the reviewers for suggesting this approach.

However, when a firm seeks more incremental innovations, the impact of time investment in building political connections is likely to be different. For instance, firms pursue incremental innovation whenever they upgrade an existing product, adopt best practices, or improve their production techniques to attain ISO certifications (Coccia, 2017). These types of activities involve lower uncertainty from technological, institutional, or regulatory environments than radical innovations (Lavie et al. 2010), because the upgraded product or service is likely to abide already by the existing regulatory approvals and frameworks (Bouncken et al. 2018). Subsequently, the value of political connections in the light of our previous arguments tends to diminish considerably.

Building on this type of reasoning, we argue that in the case of incremental innovation the overall effect of investments in political connections will be negative. This is due to an imbalance between the additional costs and resources required to maintain these relationships versus the low benefits stemming from them given the lower uncertainty and existing approvals for these types of innovations (Ahlstrom et al. 2008). In the case of incremental innovation, political connections are likely to trigger the "resource curse", fostering organization inertia and lowering a firm´s motivation engage in incremental innovation activities (You and Du, 2012; Shi and Zhu, 2014). In addition, political connections may create agency problems in which governments take advantage of their position to intervene and appropriate or divert resources in order to pursue their own political goals (Sun et al. 2016; Sojli and Tham, 2017; Bertrand et al. 2018). Political connections can therefore increase the vulnerability to government opportunistic interventions (Boubakri et al. 2008; Marquis and Qian, 2013; Darendeli and Hill, 2016), which in turn reduce the resource availability and motivation to engage in incremental innovation activities. Finally, incremental innovation usually mandates a more customer-oriented strategy (Bouncken et al. 2018). Focusing on the non-market environment rather than on customers might distract and reduce the time and efforts available

for incremental innovation (Atuahence-Gima, 2005). As a result, we argue that firm's investment in political connections will have a negative effect on its probability of introducing incremental innovation. Therefore, we propose that:

Hypothesis 2: *Firm's investment in political connections will have a negative effect on the introduction of incremental innovation.*

Corruption is a pervasive phenomenon in the context of emerging markets and transition economies. While the consensus in the literature has been that corruption is detrimental for innovation (Veracierto, 2008; Anokhin and Schulze, 2009; Alam et al. 2018), there are a number of studies which suggest that corruption can equally create new opportunities for economic gains (Asiedu and Freeman, 2009; Krammer 2019). Especially in emerging countries, firms sometimes pay bribes to increase the chances of getting government contracts to gain subsidies, credit, or to reduce taxes. As a result, firms may prevent regulatory blockage to their innovation initiatives, increasing their chances to introduce new products in these markets by greasing the slow and often adverse bureaucratic systems in place (Krammer, 2019).

From our perspective, corruption, just as political connections, can be considered a form of political strategy through which companies seek to connect favorably or shape the relevant political environment (Lawton et al. 2013; Jiménez et al. 2014). We subscribe to these views and consider firm's involvement in corruption (as the amounts of bribes paid) as another way firms use non-market strategies to improve their competitive position, in our case by deploying more radical and incremental innovations. Subsequently, we argue that the effect of firm´s investments in political connections on the introduction of innovation, in particular radical ones, is weakened by firm-bribing activities for several reasons.

First, under certain contingencies (e.g., coordination between corrupt bureaucrats, low variation of local bribe demands) bribery may actually have positive effects on firm's

innovations, especially radical ones (Blackburn and Forgues-Puccio, 2009). Thus, bribery actually may serve as a greasing mechanism for new radical innovations to be introduced in these markets more easily (Krammer, 2019), thereby undermining the effect of political networking with the same objective by making it unnecessary. Second, since bribing already takes away some uncertainty related to overcoming bureaucratic obstacles for innovation (Krammer, 2019), we expect political connections to be less effective in reducing the environmental uncertainty when a firm is already involved in strategic bribing activities. Besides, both corruption and political connections are political strategies that increase the costs for firms (Alam et al. 2018; Bertrand et al. 2018). Firms engaged in bribing activities might find it harder to devote the necessary amount of resources to the establishment and nurturing of political connections to make them effective. Finally, in addition to the extra costs, bribing firms may also suffer from a negative reputation and a lack of legitimacy in these markets (Andrianova, 2001), which may affect negatively their success and effectiveness in connecting with the political elites. Bribery and political connections can therefore be seen as substituting political strategies. As a result of all these arguments, we expect bribes to have a negative moderating effect, reducing the effectiveness of political investments on a firm's propensity to introduce radical innovation.[3] We therefore have that:

Hypothesis 3: *Firm bribery will negatively moderate (i.e., weaken) the effect of investments in political connections on the introduction of radical innovation.*

[3] Because we expect bribes to affect only the positive effects of political connections on uncertainty, we do not hypothesize, ex-ante, any effect on incremental innovation.

3. METHODOLOGY

3.1 Data

To test these hypotheses, we employ firm-level data from the latest (5th wave) Business Environment and Enterprise Performance Survey (BEEPS), which is a joint effort of the European Bank for Reconstruction and Development and the World Bank conducted in the period 2012–2014. BEEPS project collects data on government policies and regulations in Eastern Europe and Central Asia. The major advantage of using BEEPS is that data are collected systematically, following stratified sampling techniques and standardized surveys which ensure both national representativeness and cross-country compatibility. The respondents are business owners or top managers of the enterprise. Overall, BEEPS includes data on more than 15,000 enterprises in 30 countries as follows: Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, FYR Macedonia, Georgia, Hungary, Kazakhstan, Kosovo, Kyrgyz Republic, Latvia, Lithuania, Moldova, Mongolia, Montenegro, Poland, Romania, Russia, Serbia, Slovak Republic, Slovenia, Tajikistan, Turkey, Ukraine, and Uzbekistan.

3.2 Main variables

Dependent variables. Radical innovations are commonly associated with major changes to a firm's products, services, and processes, typically building upon new knowledge. We therefore measure *radical innovation* in terms of whether the firm has introduced any new products or services in the past 3 years, coding the "yes" answers to this question as 1 and "no" as 0 (OECD, 2005; Zhang et al. 2015). While not all new product innovations developed in these markets can be classified as "radical" given their varying degrees of newness which can be market-, firm- or country-specific (Lederman, 2010), we use this measure under the assumption that new and different products vis-à-vis old ones will have a sufficient degree of newness to be deemed

as radical (to the market, firm, or country). Moreover, this operationalization is consistent with recent studies in this literature (Guisado-González et al. 2016; Bellucci and Pennacchio, 2016; Habiyaremye and Raymond, 2018). Finally, in the robustness section, we also employ another similar measure for radical innovation based on *process innovation*.

Incremental innovations usually encompass existing products, services or processes and rely upon refined or improved existing knowledge (Subramaniam and Youndt, 2005). We therefore measure *incremental innovation* in terms of whether in the last 3 years *the firm has introduced an improved product which differs from its predecessor* (OECD, 2005; Zhang et al. 2015). Our underlying assumption here is that upgrades, cosmetic and functional changes to a product fall under the category of incremental rather than radical innovations. Subsequently, we capture several aspects through which a firm can introduce incremental innovations to its products, namely by proposing *new functions, increasing efficiency,* employing *new materials,* developing a *new look,* or simply introducing a product which is *new to the firm.*

Independent variables. Following prior studies (Zhang et al. 2015) we measure firm's non-monetary (i.e., time) investments in political connections using the responses to the question: "In a typical week over the last year what percentage of total senior management time was spent on dealing with requirements of government regulations?" Subsequently, in our robustness checks we employ also a second measure of political connections by examining their perceived impact ("Do private payments/gifts or other benefits to Government officials to affect the content of government decrees?") from 1 (no impact) to 5 (decisive impact).

Our measure of bribes follows recent literature on corruption and firm strategy (Krammer, 2019) and is based on the item: "On average, what percentage of total annual sales, or estimated total annual value, do firms like this one pay in informal payments or gifts to public officials for this purpose?" Given that bribery remains illegal in all these countries, this question

was phrased indirectly, so that respondents do not implicate themselves in any way, thereby increasing the response rate and truthfulness of their responses.

3.3 Controls

To reduce the potential for confounding effects, we include several controls as follows.

Foreign ownership. Foreign ownership is associated with a higher probability of innovating, especially in emerging economies (EBRD, 2014). The numbers of new products or services introduced by foreign-owned firms is significantly higher than locally owned firms (Krammer, 2019). We define majority foreign-owned when foreign investors hold a stake of 50% or more. We code foreign ownership as a dummy variable: domestic-owned firms were coded as 0, whereas majority foreign-owned were coded as 1.

Firm size. Larger firms may have more resources available for their innovation activities (Cohen and Klepper, 1996); therefore, we control for firm size measured as the number of employees. We employ the natural logarithm to correct for skewness.

Firm age. Firm age is also included as control variable as the number of years since the firm's founding. Firm age is also an important factor for the innovation activities of firms. Older firms are expected to be less innovative than younger firms (Lederman, 2010).

Export status. Firms that export are more likely to innovate because of knowledge spillovers (Grossman and Helpman, 2001). Furthermore, firms that export are able to spread their fixed costs of innovation so exporting in this way can stimulate innovation (Golovko and Valentini, 2011). The export status of a firm is a binary variable, export status, and takes the value of 1 when exports represent at least 10% of total sales and 0 otherwise.

Credit availability. Firms that have better access to financial resources have a higher chance of innovating and creating a higher value from their innovations (Ayyagari et al. 2010). We

capture financial accessibility using the question "Does this firm have a loan or credit line from a financial institution?" and code it as a dummy variable that has a value of 0 if the firm has no credit line or loan and 1 otherwise.

3.4 Model

Given the binary nature of our dependent variables, we employ probit models for our estimations following this model for radical innovation:

$$\textbf{Radical innovation}_{FCS} = \varphi\{\alpha_0 + \beta 1\text{political connections} + \beta 2\text{bribes} + \beta 3\text{political connections} * \text{bribes} + \alpha_1 FC + \lambda_C + \eta_S + \varepsilon\} \quad (1)$$

FC includes the control variables of age, size, foreign ownership, exporter, and financial access. λ_C and η_S are the fixed effect dummies controlling for industry sector and the country where the firm operates. F, means firm, s means sector, c means country, and ε is the error term. Φ stands for cumulative standard normal distribution. Similarly, the formal model for incremental innovation is:

$$\textbf{Incremental innovation}_{FCS} = \varphi\{\alpha_0 + \beta 1\text{political connections} + \beta 2\text{bribes} + \beta 2\text{political connections} * \text{bribes} + \alpha_1 FC + \lambda_C + \eta_S + \varepsilon\} \quad (2)$$

4. RESULTS

Table 1 shows the descriptive statistics for our data. The mean of radical product innovation is 0.26, which indicates that 26% of the firms in this region introduced a new product in the last 3 years, and respectively 0.21 for process innovation. In turn, on average, 68% of the firms upgraded their services or products, which counts for incremental innovation. This is further detailed in terms of improvements to appearance/look, efficiency, functions, or use of new

materials. Furthermore, on average, 15.8% of senior management time is spent on building political connections, although the perceived impact of influencing governmental officials remains on average small (1.31). **Table 2** reports the correlations matrix of the main variables of interest. All correlations are within acceptable ranges.

--- Insert Tables 1 and 2 here ---

Table 3 reports the probit models with fixed effects regarding firms' propensity to introduce radical innovation as proxied by new products or services and new processes. Model 1 reports the results of the probit regression with all control variables as our benchmark regression. Most of these controls retain statistical significance and suggest that larger, older, foreign-owned, exporting firms with access to finance have a higher probability of introducing a new product or service, in accordance with prior findings in the innovation literature. Model 2 tests the competing rationales behind Hypothesis 1a (i.e. political connections have a direct positive effect on radical innovation) and Hypothesis 1b (i.e. political connections have a direct negative effect on radical innovation). The coefficient of the political connections measure is positive and significant at the 5% level, thus confirming our H1a. Model 3 adds the direct (non-hypothesized) impact of bribes on radical innovation for consistency. Results show that paying bribes is positively correlated with the introduction of radical innovation and significant at the 1% level, thus increasing the probability of introducing radical innovation, as found also by Krammer (2019). Then, Model 4 tests our third hypothesis. The coefficient of the interaction between bribes and political connections is negative and significant at the 5% level, supporting our third theoretical conjecture, namely that bribery will negatively moderate the relationship between investments in political connections and the introduction of radical innovation. We then test these conjectures (H1a and H1b in Model 5 and H3 in Model 6) using process innovations as a different proxy for firm radical innovations. *Process innovation* equals 1 when

a firm has introduced a new method for production or supply of products or services in the last 3 years. Again, these results support our conjectures.

--- Insert Table 3 here ---

Next, we shift our attention to incremental innovation (**Table 4**). For capturing the different ways in which firms may introduce incremental improvements to their product we examine a variety of aspects from functions to efficiency, materials, and cosmetic improvements. Overall, the results of these analyses suggest that indeed political connections have a weak negative effect (not statistically significant in most cases) on firms' propensity to introduce incremental innovations. Given that this conjecture is supported only by one of the proxies employed (new functions- Model 7) we consider that overall the data does not support our second hypothesis.

--- Insert Table 4 here ---

4.1 Robustness checks

Different proxies for main variables. For further robustness checks we also included other proxies for a firm's political connections and bribes. Thus, in **Table 5** we examine how the perceived impact political connections correlates with a firm's propensity to introduce radical and incremental innovations. Interestingly, we can see some shades of potential non-linearities in the sense that firms who perceive investments in political connections to have minor or moderate impact might be less likely to introduce product and process innovations. However, the statistical power of these coefficients is reduced (Model 12 and 13), which questions their reliability. On the other hand, firms that perceive political connections to have a decisive impact are much more likely to introduce radical innovations, and these relationships are highly statistically significant, thus re-assuring us that indeed the relationship between political

connectivity and innovation is a positive one. Similarly, the results of these analyses using various proxies for incremental innovation suggest that, on average, there is no significant relationship between political connections and firm incremental innovation[4]. We also checked the results for incremental innovation by employing an alternative measure for it namely, whether the firm has any *international certification standards* (i.e., ISO 9000, 9002, 1400 certification). These certifications include international standards and guidelines to provide firms with plans for building quality management systems. Moreover, they have been employed frequently as proxies for innovative improvements in the literature because they facilitate information gathering, development of human resources, and supplier and customer relations with tangible benefits for firm innovation (He and Wong, 2004; Zhang et al. 2015). These results (not reported here for parsimony reasons but available upon request) confirm our baseline conjecture, namely, that there is no negative effect of political connections on a firm's incremental innovation.

Finally, we also tested alternative proxies for our bribery measure using the frequency or pervasiveness of *unofficial payments/gifts/private payments*. The results, available upon request, confirm the direct positive linear effect of political connections on the introduction of radical innovation, but not on the introduction of incremental innovation. Similarly, they also confirm the moderating effect of bribes on the relationship between political connections and the introduction of radical innovation, but not on the one with the introduction of incremental innovation.

Additional controls. In further tests (unreported here but available upon request) we also included additional controls that have been linked by past studies to firm innovation: (1) the

[4] An interesting exception appears to be upgraded products (new functions) for which firms that perceive political connections to have either minor or decisive impact will tend to do better than does with perceptions at moderate levels.

effects of *subsidies,* which are expected to lower the costs of innovation for the firms and increase the chance of engaging in innovation (Habiyaremye and Raymond, 2018); (2) *state ownership,* which is often linked negatively to innovation given the lack of incentives and penalties faced by state-owned firms in comparison to their private counterparts (EBRD, 2014); (3) *access to skilled workers* (measured as the percentage of full-time employees holding a university degree) as a prerequisite for successful innovation (Sorescu et al. 2007); (4) *managerial experience,* which includes technological, organizational, and managerial skills and knowledge (Weterings and Koster, 2007) that is helpful to understand and predict future innovation opportunities; and (5) *the use of external consultants,* which can provide valuable external knowledge and information, which increases innovation potential (EBRD, 2014). We ran additional models including one control at a time and also all of them simultaneously to avoid multicollinearity. Overall, we get confirmation for our prior assertions.

Endogeneity concerns. Given that our measures of political connections and bribery are all subject to firm characteristics, it is plausible that there will be an endogenous relationship between how much a firm spends on dealing with regulations (or how successful it is to invest in political connections at national or regional levels), or greasing the wheels of the system (using bribes), and its success in terms of introducing both radical and incremental types of innovation. In order to entertain these possibilities, we have carried out further analyses using an Instrumental Variable (IV) probit estimator. Following prior studies in the literature innovation (Fisman and Svensson 2007; Krammer, 2019) we use a firm's industry and location averages as instruments for our two potential endogenous variables (i.e., bribery and political connections). The idea behind this is that netting out the firm specific component of both bribery and political connections will yield an exogenous component which then can be related to a firm's propensity to introduce either radical or incremental innovations. The results of these IV probit estimations are reported in **Table 6** and confirm our previous conjectures. Furthermore,

the results of the Wald tests suggest that we cannot reject the null hypotheses of exogeneity for bribery and political connections, which indicates that endogeneity is not an issue in this case.

5. DISCUSSION

5.1 Proposed contributions

In the face of ever-increasing competition globally, innovation is heralded as perennial prerequisite for commercial success (Sawhney et al. 2006). Subsequently, knowing what enables or hinders innovation remains an important question for academics and practitioners alike (Snihur and Wiklund, 2018). In this work, we examine the impact of firms' investment in political connections as a potentially advantageous strategy for firms in emerging or transition economies seeking to promote radical and incremental innovations (Song et al. 2015).

Analyzing a sample of more than 9,000 firms from 30 emerging markets we find that, all else equal, when firms invest in political connections they increase the probability of introducing radical innovation, offsetting other potential downsides in terms of organizational inertia or government control. When firms want to introduce a new product on the market, they need to spend time with government officials, especially in environments that are characterized by time-vague regulations, procedures, and time-consuming bureaucracy (Ayyagari et al. 2010; EBRD, 2014; Krammer, 2019). Thus, particularly in these environments, the consequences of building and relying on political connections for innovating firms deserve deeper investigation.

Our analysis shows that investment in political connections can foster radical innovations by helping firms overcoming obstacles stemming from non-market factors (Frynas et al. 2006; Akbar and Kisilowski, 2015). In contrast, we do not find a significant relationship between incremental innovations and investment in political connections, suggesting that given

that lower uncertainty surrounding incremental innovations, political connections are not really needed to ensure or speed up their deployment. Finally, we show a negative relationship between investments in bribery and political connections in the case of radical innovations. We content that this outcome may simply be the consequence of a mercantile managerial cost-and-benefit analysis, since carrying out both activities at the same time may be very expensive to a firm. Moreover, the objectives of these two non-market strategies may very well overlap, which makes them less efficient, and sometimes even a drag for firm´s overall investments and performance. Alternatively, the negative relationship between bribery and political connections can be also a result of a negative reputation effect due to firm's involvement in illegal activities like bribing. Finally, once again the multi-dimensional nature of innovation reveals itself, because we do not find evidence of this moderation effect on process innovation, which suggests that the usefulness of non-market strategies is stronger for products given the existing external constraints (e.g., approvals, regulations, certifications etc.) on these types of innovation.

Our results advance the existing literature on several fronts. First, we contribute to the literature on innovation management and non-market strategy by offering a fine-grained analysis of the effects of investments in political connections on the introduction of various types of innovation. We depict multiple mechanisms through which these investments can affect the introduction of innovation, such as uncertainty reduction, access to resources, and confidence, but also lack of motivation, organizational inertia, government control, and agency problems. While previous research in this field had found inconclusive results on the effect of political connections on innovation, showing both positive (Mu and Jiang, 2018) and negative effects (Akcigit et al. 2018; Hou et al. 2018), we depart from these studies by pointing to the critical effect that the nature of innovation, notably the level of uncertainty, plays on this relationship. Therefore, we disentangle the contingency of these effects on different types of

innovative activities (i.e., radical versus incremental), recognizing the multifaceted nature of innovation. In addition, we also differ and contribute to this field by analyzing countries located in Eastern European and Central Asia, a heavily under-studied region, whereas the aforementioned papers focus on China or developed economies.

Second, we advance the corporate political strategy literature (Hillman, 2003; Hillman and Hitt, 1999; Lawton et al. 2013) by analyzing the interplay between firm investments in various non-market strategies. Specifically, we show that the effects of political connections on the introduction of innovations are not only contingent on the type of innovation, but also on the involvement in other non-market actions (i.e., bribery). Few studies had previously looked into potential substitution effects between different political strategies such as lobbying and corruption (Campos and Giovannoni, 2007), and we advance this agenda by providing empirical evidence of such an effect happening in the context of firm´s innovation.

Finally, we add to the ongoing debate on the value of political connections in emerging economies. While the value of political connections may decline in the face of institutional reconfigurations (Guthrie, 1999), we show that they can still play a positive and critical role in facilitating a firm's innovation in the Eastern European and Central Asian context.

5.2 Practical implications

Our results bear implications for both firms and governments. Thus, firm managers should be mindful of the usefulness of building up political connections or bribing in relationship with their innovation goals (radical or incremental). Likewise, in terms of macro-policies, governments should be aware that firms employ quite often political connections and bribery as strategic tools. Subsequently, these investments in non-market strategies (either in the form of political connections building or straight-up bribing to avoid certain regulatory bottlenecks) could be brought into the light as a legal form of lobbying or avoided by streamlining the

existing red-tape in this area. Hence, policy-makers should pay attention to both "supply" (i.e., firm incentives) and "demand" (politicians and bureaucrats' incentives) factors for non-market strategies when crafting national strategies for innovation. Recent evidence from Krammer (2019) suggests that while greasing payments (in the form of small bribes) does help some innovators in these countries, it reduces the overall innovative performance of a country. Subsequently, governments interested in spurring the innovative capabilities should implement measures to limit opportunities to bribe by providing both an innovation-friendly less bureaucratic environment and a stronger monitoring and enforcement of anti-corruption laws to curb engagement in these practices by both governmental officials and firm managers. This might especially relevant for the base of the pyramid settings, where, in addition to enhancing firms´ competitive advantage (Porter, 1990), more innovation entails significant benefits in terms of inclusivity and socio-economic development for all segments of the society (Ramani et al. 2012; Foster and Heeks, 2013).

5.3 Limitations and future research

Notwithstanding the robustness of these results, our study is also subject to several important limitations. First and foremost, our main measure of political connections follows prior studies in this literature by focusing on the non-monetary or time allotments for building up political connections (Zhang et al. 2015). In addition, we also use the available information to assess the robustness of these results by examining firms' perceived impact of official payments and gifts to parliamentarians in relation to radical versus incremental innovation. While we have attempted to use the available information in these surveys in order to derive reliable proxies for the extent and intensity of a firm's political connections, our measures are far from perfect. Therefore, future studies, particularly those making use of primary data, may wish to follow even better identification strategies (e.g. measuring campaign contributions or coding specifically the inclusion of former politicians as members of boards of directors) as a way to

establish a causal link between political activities and firm outcomes. Ideally, these efforts will be carried out in a cross-country context as opposed to a single-country setting to advance the status-quo of this literature and allow for greater generalization and validity of results.

Second, while our sample is relatively large in terms of number of firms, geographically it covers only Eastern Europe and Central Asia. Thus, the generalizability of the results to other emerging markets should be made with caution given the different idiosyncrasies existing in many emerging markets (e.g., China, Brazil) and further large cross-country studies should be undertaken.

Third, given the availability of innovation measures in BEEPS, our paper focuses only on the introduction phase of innovation (e.g. new products, processes, etc.). Hence, future studies may want to shift this focus on the commercialization phase (e.g. patent-related metrics) or on the inputs to the innovation process (e.g., R&D spending, R&D employees, etc.), both of which we were unable to cover due to unavailability of this data.

Fourth, our conceptualization of radical and incremental innovation follows prior practice in this literature. Nevertheless, these choices are again constrained by data availability in BEEPS. Therefore, studies which may tap into primary sources of data can also do a better job in tailoring specific questions to tease out superior measurements for radical versus incremental innovations across firms, and possibly showing also more palpable differences in terms of what constitutes "radical" in given country and industry settings.

Fifth, there is a growing evidence in the literature that suggests that there might be differences in terms of how multinational firms employ non-market strategies compared to domestic ones (Sun et al. 2012). Furthermore, future studies may want to examine also how differences in terms of formal and informal institutional environments (Krammer, 2018) affect the strategy and process of building political connections and making grease payments.

Finally, and despite the BEEPS survey being carefully planned and formulated in an indirect fashion (so that self-incrimination is avoided), we cannot rule out completely a potential bias in the survey responses used to measure corruption due to the sensitive nature of the questions regarding bribery. While this bias will be difficult to tackle procedurally, scholars may want to probe deeper by mapping the rationales or incentives that move firms into the adoption of non-market strategies such as bribery or political connections. As such, future studies that focus on primary data and incorporate both a larger number of firms and enjoy an international dimension will have a great opportunity to advance our limited knowledge on these issues. Similarly, future studies with primary data covering additional aspects not available in the BEEPS survey can also study the role of the manager´s personal system of social networks and influential relationships (e.g. *Guanxi* in China, *Blat* in Russia, *Wasta* in Egypt, etc.).

6. CONCLUSIONS

With this study we examine the relationship between political connections and firm innovation as well as its contingencies in the context of Eastern Europe and Central Asia. We develop theoretical arguments as for why political connections will be beneficial for innovators in these environments, drawing on a more favorable operational environment, access to additional resources, financing, and information, and increased confidence. Moreover, we entertain the reverse side of these arguments by examining the alternate effect (i.e., political connection will be negative) as a consequence of organizational inertia, "resource curse", greater dependency on governmental interventions, and agency-related problems. In addition to looking into the direct effects of political activities, we focus on the interplay between them and bribing, another popular non-market strategy employed by firms in these countries. Empirically, we analyze a dataset of more than 9,000 firms in 30 countries covered in the BEEPS survey. Our results suggest that firms pursuing political connections are able to introduce more radical innovations

but that these connections do not affect incremental innovation. Moreover, bribes weaken the effect on the relationship between political connections and radical innovation, suggesting that firms are better off if they select and pursue only one of these non-market strategies. Overall, our study confirms a complex interaction between firms' non-market strategies and various types of innovation calling also for more research on these topics, given their expeditious significance for innovators in emerging and emerging markets.

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Table 1: Descriptive statistics

Variable	Description	Obs.	Mean	Std. Dev
Radical: Prod innov	New product or services introduced in the last 3 years (0/1)	9,232	0.26	0.43
Radical: Proc innov	New methods of production or supply of products or services introduced in last 3 years (0/1)	7,966	0.22	0.41
Incremental: Looks different	Upgraded product looks different for the existing product in the last 3 years (0/1)	1,095	0.72	0.46
Incremental: More efficient	Upgraded product/service is more efficient/easier to use in the last 3 years (0/1)	1,066	0.68	0.46
Incremental: New functions	Added new functions to existing product/service in the last 3 years (0/1)	2,203	0.70	0.46
Incremental: New materials	Upgraded product uses new materials (0/1)	1,098	0.69	0.46
Political connections: time	% of time senior management's time spent on dealing with regulations (0–100)	9,214	15.78	20.56
Political connections: impact	Private payments/gifts/other benefits to Government officials—direct impact (1–5)	8,748	1.31	0.96
Bribes	% of total annual sales paid as informal payment/gift (0–100)	8,820	0.82	4.01
Firm age	Age (2013 minus the year when started operating)	9,232	15.52	11.32
Firm size	Logarithm of number of FT employees	9,225	2.93	1.27
Foreign ownership	Majority (50%) foreign ownership (0/1)	9,232	0.04	0.20
Exporter	Exporting firm (0/1)	9,232	0.17	0.37
Access to finance	Loan/credit from financial institutions (0/1)	9,232	0.37	0.48

Table 2: Correlation matrix of main variables of interest

No	Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Radical: Prod innov	1.00													
2	Radical: Proc innov	0.48	1.00												
3	Incremental: Looks different	.	0.06	1.00											
4	Incremental: More efficient	.	0.09	.	1.00										
5	Incremental: New functions	.	0.07	0.18	0.30	1.00									
6	Incremental: New materials	.	0.07	0.23	.	0.26	1.00								
7	Political connections: time	0.03	0.04	-0.02	-0.04	-0.04	-0.01	1.00							
8	Political connections: impact	0.02	0.01	-0.02	0.01	0.03	0.02	-0.01	1.00						
9	Bribes	0.04	0.02	0.03	0.03	-0.01	0.01	0.08	0.12	1.00					
10	Firm age	0.07	0.05	-0.02	0.01	-0.02	-0.01	0.01	-0.02	-0.01	1.00				
11	Firm size	0.11	0.11	0.04	0.00	-0.02	0.05	0.05	0.01	-0.02	0.32	1.00			
12	Foreign ownership	0.07	0.05	0.01	0.06	-0.02	0.02	-0.01	-0.04	-0.01	0.00	0.15	1.00		
13	Exporter	0.14	0.10	0.00	0.05	-0.03	0.01	0.02	-0.01	-0.01	0.14	0.26	0.15	1.00	
14	Access to finance	0.12	0.10	0.00	-0.05	-0.04	0.01	0.02	0.00	0.01	0.09	0.17	-0.02	0.16	1.00

Table 3: The effect of firm's political connections and bribery on radical innovations (product and process)

Variables / DV	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	Prod innov	*Prod innov*	*Prod innov*	*Prod innov*	*Proc innov*	*Proc innov*
Pol conn		0.002**		0.002***	0.002***	0.003***
		[0.001]		[0.001]	[0.001]	[0.001]
Bribes			0.011***	0.023***		0.011**
			[0.004]	[0.005]		[0.005]
Pol conn * Bribes				-0.000***		-0.000
				[0.000]		[0.000]
Firm age	0.003**	0.003**	0.003**	0.003**	0.002	0.001
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Firm size	0.053***	0.053***	0.055***	0.056***	0.080***	0.086***
	[0.013]	[0.013]	[0.014]	[0.014]	[0.014]	[0.014]
Foreign ownership	0.173**	0.174**	0.161**	0.166**	0.08	0.069
	[0.070]	[0.070]	[0.072]	[0.072]	[0.074]	[0.077]
Access finance	0.249***	0.248***	0.248***	0.246***	0.244***	0.245***
	[0.033]	[0.033]	[0.033]	[0.033]	[0.034]	[0.035]
Exporter	0.263***	0.262***	0.249***	0.248***	0.211***	0.188***
	[0.044]	[0.044]	[0.045]	[0.045]	[0.046]	[0.047]
Constant	-0.914***	-0.939***	-0.931***	-0.964***	-1.370***	-1.388***
	[0.207]	[0.208]	[0.208]	[0.209]	[0.225]	[0.227]
Industry fixed effects	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Country fixed effects	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
N	9,221	9,221	8,810	8,810	9,201	8,791
Log Likelihood	-4,647.58	-4,644.38	-4,441.17	-4,432.91	-4,205.52	-4,025.56
LR Chi Square	1,305.52	1,311.93	1,257.36	1,273.88	1,190.02	1,120.93
AIC	9,429.17	9,424.76	9,018.34	9,005.82	8,545.04	8,189.12
BIC	9,906.83	9,909.55	9,500.02	9,501.67	9,022.55	8,677.74

Note: Standard errors in parentheses; ***p<0.01, **p<0.05, *p<0.1.

Table 4: The effect of firm's political connections and bribery on incremental innovations (various proxies for product upgrades)

Variables / DV	Model 7	Model 8	Model 9	Model 10	Model 11
	Product upgrade				
	New functions	*More efficient*	*New materials*	*Looks different*	*New-to-firm*
Pol conn	-0.003+	0.000	-0.001	-0.002	-0.001
	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]
Bribes	-0.016+	0.004	-0.002	0.000	0.001
	[0.009]	[0.013]	[0.015]	[0.019]	[0.009]
Pol conn * Bribes	0.001	0.000	0.000	0.001	0.000
	[0.000]	[0.001]	[0.001]	[0.001]	[0.000]
Firm age	0.000	0.002	-0.002	-0.003	0.000
	[0.003]	[0.005]	[0.003]	[0.003]	[0.002]
Firm size	0.003	-0.008	0.038	0.069+	0.021
	[0.026]	[0.041]	[0.037]	[0.037]	[0.026]
Foreign ownership	0.016	0.517**	0.183	0.042	0.015
	[0.120]	[0.210]	[0.175]	[0.182]	[0.118]
Access finance	-0.102	-0.142	0.08	0.005	-0.035
	[0.065]	[0.097]	[0.093]	[0.094]	[0.063]
Exporter	0.011	0.160	0.050	0.041	-0.155**
	[0.079]	[0.138]	[0.106]	[0.108]	[0.076]
Constant	0.578	0.736**	0.762	0.070	0.280
	[0.482]	[0.287]	[0.949]	[0.947]	[0.439]
Industry fixed effects	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Country fixed effects	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
N	9,221	9,221	8,810	8,810	9,201
Log Likelihood	-4,647.58	-4,644.38	-4,441.17	-4,432.91	-4,205.52
LR Chi Square	1,305.52	1,311.93	1,257.36	1,273.88	1,190.02
AIC	9,429.17	9,424.76	9,018.34	9,005.82	8,545.04
BIC	9,906.83	9,909.55	9,500.02	9,501.67	9,022.55

Note: Standard errors in parentheses; ***p<0.01, **p<0.05, *p<0.1.

Table 5: The effect of firm's political connections firm innovation – Robustness check using the perceived impact of political connections

Variables / DV	Model 12	Model 13	Model 14	Model 15	Model 16	Model 17
	Radical			Incremental		
	Prod innov	*Proc innov*	*New functions*	*More efficient*	*New materials*	*Looks different*
Pol conn impact†						
1. Minor	-0.103+	-0.070	0.305**	0.094	0.270	0.152
	[0.057]	[0.060]	[0.123]	[0.161]	[0.197]	[0.194]
2. Moderate	-0.081	-0.142**	0.032	-0.136	0.266	0.073
	[0.063]	[0.067]	[0.133]	[0.196]	[0.190]	[0.181]
3. Major	0.100	0.082	0.084	0.173	-0.004	-0.095
	[0.078]	[0.081]	[0.153]	[0.214]	[0.217]	[0.214]
4. Decisive	0.394***	0.330**	0.486+	-0.202	0.457	0.506
	[0.138]	[0.144]	[0.276]	[0.321]	[0.453]	[0.479]
Firm age	0.003+	0.001	-0.001	0.000	-0.003	-0.002
	[0.001]	[0.001]	[0.003]	[0.005]	[0.003]	[0.003]
Firm size	0.055***	0.082***	0.014	-0.003	0.04	0.069+
	[0.014]	[0.014]	[0.027]	[0.041]	[0.038]	[0.038]
Foreign ownership	0.151**	0.081	-0.038	0.264	0.143	0.046
	[0.072]	[0.076]	[0.119]	[0.194]	[0.177]	[0.181]
Access finance	0.238***	0.247***	-0.087	-0.14	0.108	0.039
	[0.033]	[0.035]	[0.065]	[0.095]	[0.095]	[0.095]
Exporter	0.278***	0.223***	0.016	0.151	0.069	0.053
	[0.045]	[0.047]	[0.079]	[0.134]	[0.109]	[0.109]
Constant	-0.827***	-1.340***	0.616	0.853***	1.207	0.369
	[0.218]	[0.238]	[0.508]	[0.271]	[1.023]	[0.981]
Industry fixed effects	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Country fixed effects	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
N	8,738	8,736	2,078	1,017	1,030	1023
Log Likelihood	-4,392.83	-3,986.78	-1,197.64	-578.32	-580.41	-578.185
LR Chi Square	1,268.87	1,122.70	137.69	114.71	95.86	98.668
AIC	8,929.66	8,115.55	2,527.27	1,252.64	1,280.82	1276.369
BIC	9,439.09	8,617.89	2,899.46	1,489.02	1,577.06	1572.199

Note: †The omitted category is "no impact"; Standard errors in parentheses; ***p<0.01, **p<0.05, *p<0.1.

Table 6: The effect of firm's political connections firm innovation – Robustness check using an instrumental variable approach†

Variables / DV	Model 18	Model 19	Model 20	Model 21	Model 22	Model 23
	Radical			Incremental		
	Product	*Process*	*New functions*	*More efficient*	*New materials*	*Looks different*
Pol conn	0.003***	0.003***	-0.002	-0.002	0.001	0.002
	[0.001]	[0.001]	[0.002]	[0.003]	[0.003]	[0.002]
Bribes	0.045**	0.004	0.026	-0.064	0.045	0.191***
	[0.018]	[0.019]	[0.047]	[0.055]	[0.062]	[0.060]
Pol conn * Bribes	-0.001**	0.000	-0.001	0.002	-0.001	-0.004**
	[0.000]	[0.000]	[0.001]	[0.002]	[0.002]	[0.002]
Firm age	0.003**	0.001	0.000	0.003	-0.002	-0.002
	[0.001]	[0.001]	[0.003]	[0.005]	[0.003]	[0.003]
Firm size	0.058***	0.086***	0.007	-0.018	0.044	0.092***
	[0.014]	[0.015]	[0.027]	[0.041]	[0.037]	[0.036]
Foreign ownership	0.170**	0.068	0.021	0.481**	0.175	-0.019
	[0.072]	[0.077]	[0.120]	[0.210]	[0.175]	[0.172]
Access finance	0.242***	0.246***	-0.101	-0.128	0.087	0.011
	[0.034]	[0.035]	[0.065]	[0.097]	[0.093]	[0.089]
Exporter	0.249***	0.189***	0.005	0.167	0.043	0.022
	[0.045]	[0.047]	[0.079]	[0.136]	[0.106]	[0.102]
Constant	-0.985***	-1.381***	0.502	0.824***	0.687	-0.199
	[0.209]	[0.227]	[0.488]	[0.288]	[0.951]	[0.898]
Industry fixed effects	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Country fixed effects	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
N	8,793	8,791	2,091	1,009	1,044	1,023
Wald test Chi-Square	1.08	0.07	1,71	0,15	0,83	1,47
Log Likelihood	-25,456.48	-25,056.9	-6,465.01	-3,229.71	-3,092.78	-2943.42
LR Chi Square	1,099.75	930.37	123.17	111.60	79.38	123.31
AIC	51,196.96	50,393.90	13,190.01	6,651.41	6,421.56	6122.85
BIC	52,202.56	51,385.31	13,923.91	7,123.42	7,005.76	6704.64

Note: † Industry-region averages of political connections and bribery are used as instruments for a firm's political connections and bribery; Standard errors in parentheses; ***p<0.01, **p<0.05, *p<0.1.