The Dark Side of International Governance Reforms: Evidence from Corporate Innovation*

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Abstract: This study examines the impact of governance reforms on corporate innovation across 58 countries. We find that both the quantity and quality of innovation decline after board reforms, especially in explorative patents, suggesting that, in the context of these reforms, firms are more likely to focus on existing knowledge rather than exploring new ideas. The decline is stronger in countries with rule-based reforms, competitive industries, or high operational uncertainty. This supports the idea that stricter governance can lead to short-term thinking, which limits risky, long-term innovation. Our findings highlight the potential negative effects of international governance reforms on innovation.

Keywords: International Governance Reform; Corporate Innovation; Managerial Myopia
JEL Classification: G18; G34; O31

1 Introduction

Corporate governance has regained significant attention in both public and academic spheres following recent "governance crises."**. In response, many countries have implemented board reforms aimed at reducing agency costs. However, their impact on corporate performance remains unclear. This uncertainty stems from three factors: (1) Pre-reform board structures are endogenously chosen by firms as constrained optimal responses to governance issues***; (2) The complexity of corporate activities limits the efficacy of uniform reforms; and (3) Substantial heterogeneity across firms and countries complicates the evaluation of reform impacts (Hermalin and Weisbach, 2003; Adams et al., 2010).

Innovation is a critical driver of firm performance and national competitiveness, yet the effect of corporate government on innovation remains debated. Some studies argue that increased managerial oversight, such as greater institutional investor involvement, enhances innovation (Zhang et al., 2023; Xu et al., 2023; Luong et al., 2017; Aghion et al., 2013). Others suggest that greater scrutiny, such as shareholder litigation and analyst oversight, limits managerial flexibility, discourages risk-

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** "Governance crises" is an expression taken from Bebchuk and Weisbach (2010), which include the well-publicized scandals of Enron and WorldCom in 2012.
*** Theoretically, whether observed board structures can be interpreted as equilibrium or out-of-equilibrium phenomenon will lead to contrasting policy suggestions. Implementing regulations that impose restrictions on boards that are otherwise constrained optimal can be useless or even counterproductive in resolving corporate governance issues (Hermalin and Weisbach, 1998).

taking, and inhibits innovation (Chen et al., 2021; He and Tian, 2013). These conflicting findings may arise from differences in sample selection, time periods, or the trade-off between exploiting existing knowledge and exploring new technologies. For instance, firms tend to innovate more in familiar areas but remain cautious in high-risk exploratory fields (Balsmeier et al., 2017). To address these issues, a broader cross-country dataset and multidimensional innovation indicators are essential.

This study examines the impact of board reforms across 58 countries from 2000 to 2015, matching these reforms with the patent histories and financial data of publicly listed firms. We apply staggered difference-in-differences (DID) method, controlling for firm-specific and country-level characteristics. To address potential endogeneity, we conduct dynamic effects analysis to confirm the absence of pre-reform trends, and robustness checks using the stacked DID model yield consistent results. We also perform a parallel trend test to validate the results' validity. To capture various dimensions of innovation, we construct five patent-based indicators.

Our findings are as follows: (1) Board reforms led to a significant decline in both the quantity and quality of corporate innovation. Patent counts dropped by 18%, while patent citations and citations per patent fell by 26% and 15%, respectively. (2) The reforms dampened managerial incentives to explore new technologies, as evidenced by a smaller decline in exploitative patents compared to a 17% drop in explorative patents. (3) Rule-based reforms had more pronounced negative effects than “comply-or-explain” reforms. These effects were especially evident in competitive industries or firms facing operational uncertainty.

2 Related literature

The impact of board reforms on corporate innovation is complex and multifaceted. On one hand, traditional agency theory suggests that changes in board structure can improve oversight of management, reduce shirking, and limit self-interested behavior (Shleifer and Vishny, 1997; Fama and Jensen, 1983). This, in turn, can encourage managers to prioritize long-term projects, such as innovation, that benefit shareholders (Huang et al., 2023). On the other hand, innovation often involves long R&D cycles, high uncertainty, and significant risk of failure (Holmstrom, 1989). Recent studies suggest that stricter board governance may lead to short-term managerial behavior, reducing investment in innovation or promoting passive decision-making, which ultimately hinders innovation (Sierra-Morán et al., 2024; Islam and Rahman, 2023; Yuan et al.,2023; Faleye et al., 2011).

Countries adopt different board reform approaches, each with distinct impacts. Rule-based reforms, which impose mandatory governance structure, provide clear guidelines and can enhance corporate value (Liao, 2022; Fauver et al., 2017). However, their lack of flexibility may not be suitable for all industries or firms (Huang and Li, 2021). In contrast, "comply-or- explain" reforms offer flexibility, but may lead to selective compliance, weakening governance effectiveness (Orihara and Eshraghi, 2022). During crises, these reforms may reduce transparency and harm shareholder value (Ahmad and Akbar, 2023). Despite these insights, the effect of board reforms on corporate innovation remains unclear and underexplored in the existing literature.

3 Research design

3.1 Sample selection

We examine the impact of board reforms on corporate innovation using a sample of listed

companies from 58 countries between 2000 and 2015. To address potential outlier issues, we winsorize all continuous variables at the top and bottom 1% of the distribution. The variable sources, definitions, and construction details are described in Appendix A. Detailed information on board reforms across countries is given in Appendix B. Our sample includes 90,262 firm-year observations for 12,548 public firms.

3.2 Definition of variables

3.2.1 Dependent variable

Innovation: We collect patent data from the Worldwide Patent Statistical Database (PATSTAT), managed by the European Patent Office (EPO), and the OrbisIP database from Bureau van Dijk (BvD), a subsidiary of Moody's[****]. To avoid multiple recordings of the same invention, we identify only the first patent granted for each unique invention. We construct five firm-level patent indicators to measure the quantity and quality of innovation: Patent Count, Citations, Cit/Pat, Exploitative Patents, and Explorative Patents. Exploitative Patents reflect the extent to which a company's innovations build on its existing research directions, while Explorative Patents assess the degree to which a firm generates innovations using new information beyond its current knowledge base. Although explorative patents are generally riskier, they offer greater potential for advancing technological frontiers.

3.2.2 Independent variables

International Board Reforms: We developed a database of board reforms covering 58 countries, drawing information from sources such as Kim and Lu (2013), Fauver et al. (2017), the World Bank, European Bank for Reconstruction and Development (EBRD), and the European Corporate Governance Institute (ECGI). For each country, we recorded the year of the first reform and excluded countries without reforms. We then examined whether the reforms were rule-based and adhered to the "comply-or-explain" principle.

3.3 Model

We estimate the effect of board reform on corporate innovation using a staggered difference-in-differences approach following Bertrand and Mullainathan (2003). The baseline model is as follows:

$$Innovation_{i,j,\,c,t+1} = \alpha + \beta Post_{t-1} + \gamma X_{i,t-1} + \delta Z_{c,t-1} + \varphi_i + \varphi_{j,t} + \varepsilon_{i,j,c,t} \quad (1)$$

where $Innovation_{i,j,\,c,t+1}$ is one of the five measures of innovation defined above, and i, c, j, t indexes firm, country, industry, and year, respectively. We collect and use the information based on the first board reform adopted by a country, as it shall reflect a considerably sharp change in the corporate governance environment of the country for the first time. Postt−1 is equal to one for the years after a country has adopted the board reform, and zero otherwise. $X_{i,t-1}$ and $Z_{c,t-1}$are firm- and country-level variables, respectively. The firm-level controls are: Firm Size, Leverage, Profitability and Age. The country-level controls are: GDP, GDP per capita, and stock and credit market development. All of these country-year-level variables come from the Word Development Indicator (WDI) database via the World Bank. Detailed definitions of all the variables are presented in Appendix A. To mitigate unobserved time-invariant firm characteristics and time-varying industry heterogeneous features that might confound our results, we also introduce firm (φ_i) and industry-year ($\varphi_{j,t}$) fixed effects. Moreover, we cluster the error term at the country level.

3.4 Summary Statistics

Table 1 presents the summary statistics for our main variables. All patent-based variables are displayed in the natural logarithm form given

**** Prior studies on cross-country innovation tend to use R&D data or patent information from a single or a few largest patent offices, which may misrepresent certain key attributes (e.g., timing) of the innovation outcome.

they then to be right-skewed. In terms of the raw value, a firm on average develops 5 eventually-granted patents in a year, and receive 86 forward citations over the entire life of these patents, where each patent on average receives 5 forward citations. Moreover, the median size of a firm in our sample is about US$0.11 million. They have a leverage ratio of 0.15 and profitability ratio of 0.8% on average. Their median age since establishment is 19 years. Variables definition and construction are given in Appendix A.

Table 1 Summary Statistics

This table contains the summary statistics of the variables used in the main analysis. It shows the pooled statistics at firm-year level.

Variable	N	Mean	P10	P50	P90	Std. Dev.
Innovation Measures						
Patent Count	90262	0.6342	0	0	2.0794	1.0560
Citation	90262	1.0540	0	0	4.3960	2.0140
Cit/Pat	90262	0.6493	0	0	2.7760	1.2180
Exploitive Patent	90262	0.1098	0	0	0	0.4386
Explorative Patent	90262	0.5099	0	0	1.7918	0.9444
Firm characteristics						
Firm Size	90262	11.6785	8.9872	11.6073	14.5563	2.1943
Leverage	90262	0.1468	0.0030	0.0914	0.3658	0.1629
Profitability	90262	0.0082	-0.1429	0.0411	0.1637	0.2218
Age	90262	3.0083	1.7918	2.9444	4.2767	0.9677
Country characteristics						
GDP per capita	90262	9.8876	8.4151	10.0525	10.7007	0.8917
Credit/GDP (%)	90262	158.0111	79.3	143.6	332	78.2072
Stock/GDP (%)	90262	71.2522	34.5	66.7	110.5	34.2062

4 Empirical results

4.1 Validity

It is essential to ensure that the governance reforms are not adopted for reasons associated with corporate innovation activities so that the comparative exogeneity of the reforms hold with respect to our construct of interest. Specifically, we use the following specification to examine whether pre-reform innovative activities in a country may predict the reforms to be initiated on the board.

$$Reform_{c,t} = \alpha_0 + \beta \times \text{Innovation}_{c,t\text{-}1} + \gamma X'_{c,t-1} + \delta_c + \delta_t + \varepsilon_{c,t} \quad (2)$$

We use a lag of one year for all patent-based measures at the country level, which is aggregated based on the average patent-

based metrics at the firm level. Reformc,t is an indicator variable set equal to one if a country c has already passed the board reform as of year t. We add the same set of country attributes which are used in baseline model to control for time-varying economic and financial conditions. These characteristics are GDP per capita, and stock market and credit market development. We also control for country fixed effects and year fixed effects to eliminate the impact of unobserved firm heterogeneity and macro shocks in the same year.

Table 2 shows that all innovation metrics are statistically insignificant, indicating no systematic differences in innovation trends between reforming and non-reforming countries before the reform.

Table 2 Pre-exiting Innovation Activities and Board Reform

This table shows the estimated effect of innovation activities prior to the first board reforms on the initiation of the reforms. Patent Count, Citation, Cit/Pat, Exploitive Patent and Explorative Patent are one-year lagged patent-based measures of innovation aggregated at country level. Reform is an indicator variable equal to one if the first board reform has been initiated as of a certain year. Control variables include GDP per capita, Credit/GDP and Stock/GDP, all measured with one-year lag. Country fixed effects and year fixed effects are included in the regressions. Robust standard errors clustered at the country level are reported in parentheses.

Dependent Var.	**Reform**				
	(1)	(2)	(3)	(4)	(5)
Patent Count	-0.0227				
	(0.043)				
Citation		-0.0161			
		(0.011)			
Cit/Pat			-0.0204		
			(0.013)		
Exploitive Patent				-0.0494	
				(0.072)	
Explorative Patent					-0.0164
					(0.044)
Country Control	Y	Y	Y	Y	Y
Country FE	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
Observations	593	593	593	593	593
Adjusted R-squared	0.566	0.569	0.568	0.566	0.565

Notes: The t-statistics are provided in parentheses. The symbols *, **, and *** denote significance levels of 10%, 5%, and 1%, respectively.

4.2 Baseline regression

Table 3 shows the baseline results. After the implementation of board reforms, both the quantity and quality of innovation decline significantly. In terms of innovation strategies, the number of explorative patents decreases by about 17%, while exploitative patents remain mostly unchanged. This suggests that board reforms tend to hinder firms' abilities to conduct innovation that relies more on the exploration of new knowledge. Overall, the results indicate that increased oversight of executives' performance induces managers to focus more on short-term gains, reducing investment in long-term, high-risk innovation projects.

Table 3 Board Reform and Corporate Innovation

This table presents the baseline results on the effect of the first board reforms on the innovative activities measured at firm level. Post is the key explanatory variable, which is equal to one after a country passes the first board reform, and zero otherwise. The dependent variable is one of the five patent-based measures of innovation, namely, Patent Count, Citation, Cit/Pat, Exploitive Patent and Explorative Patent, all measured as the natural logarithm of one plus the raw measure. All Control variables enter the regressions with a one-year lag. We include firm and industry-by-year fixed effects. Robust standard errors clustered at the country level are reported in parentheses.

Dependent Var	Patent Count	Citation	Cit/Pat	Exploitive Patent	Explorative Patent
	(1)	(2)	(3)	(4)	(5)
Post	-0.1804***	-0.2648***	-0.1450***	-0.0117	-0.1692**
	(0.056)	(0.080)	(0.044)	(0.014)	(0.071)
Firm Size	0.0625***	0.0754***	0.0349**	0.0155***	0.0531***
	(0.021)	(0.027)	(0.014)	(0.003)	(0.018)
Leverage	-0.0564***	-0.0759**	-0.0247	-0.0067	-0.0411*
	(0.016)	(0.036)	(0.026)	(0.007)	(0.021)
Profitability	0.0639	0.1182**	0.0637**	0.0038	0.0659*
	(0.041)	(0.059)	(0.031)	(0.009)	(0.034)
Age	0.0423	-0.0021	-0.0383	0.0134	0.0127
	(0.040)	(0.060)	(0.027)	(0.014)	(0.035)
GDP per capita	0.3997***	0.9347***	0.4976***	0.1712***	1.1029***
	(0.146)	(0.175)	(0.109)	(0.035)	(0.075)
Credit/GDP	-0.0029**	-0.0052**	-0.0031**	-0.0005	-0.0029**
	(0.001)	(0.002)	(0.001)	(0.000)	(0.001)
Stock/GDP	0.0008	-0.0014	-0.0007	-0.0002	-0.0002
	(0.001)	(0.002)	(0.001)	(0.000)	(0.001)

Dependent Var	Patent Count	Citation	Cit/Pat	Exploitive Patent	Explorative Patent
Firm FE	Y	Y	Y	Y	Y
Industry-Year FE	Y	Y	Y	Y	Y
Observations	90,262	90,262	90,262	90,262	90,262
Adjusted R-squared	0.730	0.598	0.452	0.743	0.689

Notes: The t-statistics are provided in parentheses. The symbols *, **, and *** denote significance levels of 10%, 5%, and 1%, respectively.

Recently, the conventional staggered DID approach has been criticized for potential biases caused by time-varying and heterogeneous treatment effects (Baker et al., 2022). To address this issue, we adopt the method of Cengiz et al. (2019), constructing a stacked sample at the firm-year level. Each treated country undergoing a board reform is matched with control countries that have not yet implemented a board reform within the [-8, +8] years around each reform. These matched observations form a single cohort, and we apply a stacked DID model to estimate the effects. The stacked DID results align with the baseline model, supporting the robustness of our conclusions. Detailed results are provided in Appendix C.

4.3.Dynamic Analysis

By tracing the changes of innovation around the reforms over time, we can assess whether there are any systematic differences between corporate innovative activities of the firms in the years prior to the reforms, and whether omitted variables other than the board reforms could have influenced subsequent innovation. Thus, we conduct a dynamic analysis by introducing a battery of year dummies into the baseline model. The dynamic analysis equation is as follows:

$$Innovation_{i,c,t+1} = \alpha_0 + \alpha_1^{\tau} \sum_{\tau=-4}^{4} D_{c,t}^{\tau} + \gamma X_{i,t-1} + \delta Z_{c,t-1} + \delta_i + \delta_{j,t} + \varepsilon_{c,t} \quad (3)$$

where $Innovation_{i,c,t+1}$ is one of the five patent-based proxies for innovation measured one year ahead, and i, c, j, t indexes firm, country, industry, and year, respectively. Dc,tτ is the collection of time dummies defined around the year of board reform. It is set equal to one in a year if a country adopted the board τ years ago (τ>0) or will adopt the reform in τ years (τ<0), and zero otherwise. $D_{c,t}^{0}$ is equal to one in the year of the reform. $D_{c,t}^{4}$ is equal to one if a country has adopted the board reform for four or more years. We add the full set of control variables of the baseline model to control the characteristics at firm-level and country-level over time. We also control the time-invariant country attributes, and potential industry trends or contemporaneous changes of global industry environment using country and industry-year fixed effects, respectively. Again, we cluster the standard errors at the country level to address the concern that innovations within a country might be intercorrelated under the same regime.

Table 4 shows a significant decline in innovation starting in the second year after the reform, with no upward trend observed before the reform. This suggests that our results are unlikely driven by pre-reform innovation trends or unobserved factors, mitigating reverse causality concerns.

Table 4 Board Reform and Corporate Innovation: Dynamic Changes

This table presents the dynamic changes in innovative activities at firm-year level around the initiation of the first board reforms. We focus on four years prior to and five years after the reforms. Post is equal to one

after a country passes the first board reform. The dependent variable is one of the five patent-based measures of innovation, namely, Patent Count, Citation, Cit/Pat, Exploitive Patent and Explorative Patent, all measured as the natural logarithm of one plus the raw measure. Firm controls include Firm Size, Leverage, Profitability and Age. Country controls include GDP per capita, Credit/GDP and Stock/GDP. All Control variables enter the regressions with a one-year lag. We include firm and industry-by-year fixed effects. Robust standard errors clustered at the country level are reported in parentheses.

Dependent Var	Patent Count	Citation	Cit/Pat	Exploitive Patent	Explorative Patent
	(1)	(2)	(3)	(4)	(5)
D_4	-0.0286	0.0992	0.0865	0.0025	0.0294
	(0.065)	(0.125)	(0.081)	(0.020)	(0.065)
D_3	-0.0365	0.0116	0.0106	0.0144	-0.0159
	(0.084)	(0.113)	(0.068)	(0.018)	(0.085)
D_2	-0.0473	-0.1182	-0.0958	-0.0004	-0.0477
	(0.090)	(0.130)	(0.069)	(0.022)	(0.102)
D_1	-0.1457	-0.1787	-0.1164	-0.0232	-0.1219
	(0.113)	(0.159)	(0.080)	(0.026)	(0.124)
D0	-0.1982	-0.2325	-0.1333	-0.0464	-0.1636
	(0.123)	(0.173)	(0.092)	(0.028)	(0.143)
D1	-0.2680*	-0.3597*	-0.2178**	-0.0315	-0.2278
	(0.135)	(0.187)	(0.093)	(0.032)	(0.161)
D2	-0.3643**	-0.4849**	-0.2760***	-0.0571	-0.3336*
	(0.153)	(0.202)	(0.097)	(0.034)	(0.183)
D3	-0.4548***	-0.6010***	-0.3307***	-0.0543	-0.4014**
	(0.164)	(0.223)	(0.108)	(0.040)	(0.198)
D4	-0.4377**	-0.5414**	-0.3136**	-0.0591	-0.3814*
	(0.179)	(0.258)	(0.125)	(0.046)	(0.211)
Firm Control	Y	Y	Y	Y	Y
Country Control	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y
Industry-Year FE	Y	Y	Y	Y	Y
Observations	90,262	90,262	90,262	90,262	90,262
Adjusted R-squared	0.730	0.598	0.452	0.744	0.689

Notes: The symbols *, **, and *** denote significance levels of 10%, 5%, and 1%, respectively.

4.4 Heterogeneous test

Board reforms often increase short-term performance pressures on management. We hypothesize that mandatory reforms have a stronger negative impact on innovation compared to the “comply-or-explain” approach. As shown

in Table 5 (column 1, 3, 5, and 7), there is a negative correlation between innovation activity and rule-based board reforms.

Table 5 Board Reform Approaches and Corporate Innovation

This table presents the effect of the first board reform on corporate innovation, differentiated by the reform approaches, namely, rule-based and comply-or-explain. Post is equal to one after a country passes the first board reform. The dependent variable is one of the four patent-based measures of innovation, namely, Patent Count, Citation, Cit/Pat, and Explorative Patent, all measured as the natural logarithm of one plus the raw measure. Firm controls include Firm Size, Leverage, Profitability and Age. Country controls include GDP per capita, Credit/GDP and Stock/GDP. All Control variables enter the regressions with a one-year lag. We include firm and industry-by-year fixed effects. Robust standard errors clustered at the country level are reported in parentheses.

Dependent Var	Patent		Citation		Cit/Pat		Explorative Patent	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Rule-based	Comply-or-Explain	Rule-based	Comply-or-Explain	Rule-based	Comply-or-Explain	Rule-based	Comply-or-Explain
Post	-0.2700***	0.0188	-0.4158***	0.0299	-0.2280***	0.0043	-0.1755*	0.0250
	(0.073)	(0.035)	(0.089)	(0.099)	(0.045)	(0.072)	(0.089)	(0.033)
Firm Control	Y	Y	Y	Y	Y	Y	Y	Y
Country Control	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y
Industry-Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Observations	66,368	23,894	66,368	23,894	66,368	23,894	66,368	23,894
Adjusted R-squared	0.713	0.789	0.577	0.672	0.421	0.537	0.674	0.772
p-value on difference	0.000		0.001		0.007		0.035	

Notes: The symbols *, **, and *** denote significance levels of 10%, 5%, and 1%, respectively. The last row is the SUR-estimated p-value for the difference in firm innovation between the two groups.

In highly competitive industries, where profit margins are squeezed, executives are more likely to adopt short-sighted behavior (Raith, 2003). Managers in these environments tend to become more risk-averse (Scharfstein, 1988). Consistent with this, the results in Table 6 show that the negative impact of board reforms on innovation is more pronounced in highly competitive industries.

Table 6 Board Reform and Corporate Innovation: Differentiated by Market Competition

This table presents the heterogenous results of the major board reforms on corporate innovation based on varying degrees of market competition. We measure country-industry specific competition based on the HHI of sales. Post is equal to one after a country passes the first board reform. The dependent variable is one of the four patent-based measures of innovation, namely, Patent Count, Citation, Cit/Pat, and Explorative Patent, all

measured as the natural logarithm of one plus the raw measure. Firm controls include Firm Size, Leverage, Profitability and Age. Country controls include GDP per capita, Credit/GDP and Stock/GDP. All Control variables enter the regressions with a one-year lag. We include firm and industry-by-year fixed effects. Robust standard errors clustered at the country level are reported in parentheses.

Dependent Var	**Patent**		**Citation**		**Cit/Pat**		**Explorative Patent**	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	High	Low	High	Low	High	Low	High	Low
Post	-0.2065***	-0.0927**	-0.2895***	-0.1435*	-0.1499***	-0.0879*	-0.2692***	-0.0391
	(0.055)	(0.039)	(0.077)	(0.075)	(0.044)	(0.049)	(0.077)	(0.059)
Firm Control	Y	Y	Y	Y	Y	Y	Y	Y
Country Control	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y
Industry-Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Observations	46,874	43,001	46,874	43,001	46,874	43,001	46,874	43,001
Adjusted R-squared	0.681	0.779	0.564	0.626	0.414	0.485	0.636	0.743
p-value on difference	(0.02)**		(0.07)*		(0.19)		(0.01)***	

Notes: The symbols *, **, and *** denote significance levels of 10%, 5%, and 1%, respectively. The last row is the SUR-estimated p-value for the difference in firm innovation between the two groups.

Excessive pressure from board reforms may lead management to prioritize short-term performance over long-term innovation, particularly in firms with high operational uncertainty. Table 7 supports this hypothesis, as all coefficients for patent-based measures in the high-uncertainty group are significantly negative. Moreover, the negative effect is more substantial in the high-uncertainty group compared to the low-uncertainty group.

Table 7 Board Reform and Corporate Innovation: Differentiated by Operational Uncertainty

This table presents the heterogeneous effect of the first board reform on corporate innovation based on the extent of operational uncertainty facing each firm. We measure operational uncertainty using average sales volatility of a firm. Post is the key explanatory variable, which is equal to one after a country passes the first board reform, and zero otherwise. The dependent variable is one of the four patent-based measures of innovation, namely, Patent Count, Citation, Cit/Pat, and Explorative Patent, all measured as the natural logarithm of one plus the raw measure. Firm controls include Firm Size, Leverage, Profitability and Age. Country controls include GDP per capita, Credit/GDP and Stock/GDP. All Control variables enter the regressions with a one-year lag. We include firm and industry-by-year fixed effects. Robust standard errors clustered at the country level are reported in parentheses.

Dependent Var	Patent		Citation		Cit/Pat		Explorative Patent	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	High	Low	High	Low	High	Low	High	Low
Post	-0.2065***	-0.0927**	-0.2895***	-0.1435*	-0.1499***	-0.0879*	-0.2692***	-0.0391
	(0.055)	(0.039)	(0.077)	(0.075)	(0.044)	(0.049)	(0.077)	(0.059)
Firm Control	Y	Y	Y	Y	Y	Y	Y	Y
Country Control	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y
Industry-Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Observations	46,874	43,001	46,874	43,001	46,874	43,001	46,874	43,001
Adjusted R-squared	0.681	0.779	0.564	0.626	0.414	0.485	0.636	0.743
p-value on difference	(0.02)**		(0.07)*		(0.19)		(0.01)***	

Notes: The t-statistics are provided in parentheses. The symbols *, **, and *** denote significance levels of 10%, 5%, and 1%, respectively. The last row is the SUR-estimated p-value for the difference in firm innovation between the two groups.

5 Conclusion

This paper examines the impact of board reforms on innovation outcomes using firm-level data from 58 countries between 2000 and 2015. The results show that board reforms significantly reduce both the quantity and quality of corporate innovation. Specifically, the reforms lead firms to focus more on exploitative innovation rather than explorative innovation. This suggests that stricter board governance fosters managerial short-sightedness, which undermines long-term, high-risk innovation.

This paper makes two key contributions. First, it enhances the literature on corporate innovation by providing a global perspective on the effects of governance mechanisms, addressing inconsistencies in previous studies based on single-country data (mainly from the U.S.). Our findings highlight that stronger board governance negatively affects innovation. Second, this paper contributes to the policy debate on board reforms, illustrating that rigid, one-size-fits-all reforms, as noted by Fauver et al. (2017), are less effective than flexible governance structure in fostering innovation.

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