Environmental disclosure vs. environmental performance: Do political connections play a role in developing countries

Abstract

Pressure for firms to behave responsibly toward the environment has grown dramatically worldwide. This paper focuses on private firms from 24 developing countries in Central Asia and Eastern Europe. After controlling for potential endogeneity, we find that politically connected private firms appear to exaggerate their environmental disclosure but perform less in implementation. We also find that when environmental regulations present more obstacles to firms, there is a reduction in the discrepancies between disclosure and environmental performance of politically connected firms. Greater scrutiny and tighter monitoring mechanisms by regulatory bodies may help to control deviation in environmental practices. Regulators should also improve the capacity for law enforcement representatives to weaken the negative influence of informal systems such as political connections on corporate social responsibility.

Key words: Environmental disclosures, environmental performance, political connections, Central Asia and Eastern Europe

1. Introduction

Over the last decade, corporate environmental activities, an integral part of corporate social responsibility (CSR), have attracted immense attention from academia and the popular press (KPMG, 2020; Qian & Chen, 2021; Xiao & Shen, 2022). Since 1972, there has been a dramatic growth in environmental law, with 88 countries adopting a constitutional right to a healthy environment and another 65 countries enshrining environmental protection in their constitutions ("UN Environment Programme," 2019).

Political connections (PCs) play a critical role in developing countries' socialeconomic systems including encating environmental laws and regulations (Faccio, 2010; Qian & Chen, 2021). Although a large body of research exists on the impact of PCs on firm performance (Li, Meng, Wang & Zhou, 2008; Li & Jin, 2021), there is limited understanding around their

effect on corporate environmental disclosure and environmental performance (Qian & Chen, 2021). Yet, analysing the impact of PCs on environmental disclosures and environmental performance is not straightforward because the PCs of firm owners may act as a double-edged sword for environmental matters and the literature linking PCs to environmental disclosure and performance is sparse and unclear, especially for private firms (Qian & Chen, 2021; Zhang, 2017). Therefore, it is imperative to investigate how government officials influence the environmental disclosure and environmental performance of private firms when they are also part of the firm to reconcile the findings in present studies.

Generally implying a relationship between a firm and government officials, PCs are considered prevalent and ubiquitous (Faccio 2006, 2010), which can act as a non-market strategy that gains a competitive advantage for the firm (Gehlbach, Sonin & Zhuravskaya, 2010; Habib et al., 2018). Arguably, the economic benefits that come with political ties enable politically connected firms to enjoy a positive impact with respect to their environmental performance. Politically connected firms, as a result of greater government monitoring and compliance pressures, may be more compelled to adopt environmental protection standards and reduce their environmental pollution (García-Sánchez, Frías-Aceituno, & Rodríguez-Domínguez 2013) in exchange for government support. The opposing argument, align with tunnelling reports that PCs may actually have a negative impact on firm level environmental performance since well-connected firms may exploit their PCs to gain access to vital resources. Further, sheltering channel suggests that PC firms avoid penalties for adverse environmental impacts or disclosure failures (Muttakin, Mihret, & Khan, 2018). When firms are primarily concerned with obtaining legitimacy, environmental disclosures may be more symbolic than impactful (Clarkson, Overell, & Chapple, 2011; K. Zhang, Pan, Janardhanan, & Patel, 2022), which leads to concealment, deception, and

unsubstantiated claims with respect to environmental practices. Conscious of the ongoing need to balance the tension between shareholder demands and stakeholder pressure, firms may provide overstatements of their environmental achievements as part of their disclosure strategies.

This study focuses on the affect of firm level PCs on its environmental disclosure and environmental performance in 24 developing Eastern European and Central Asian countries. As with arguments around sheltering and tunnelling channels in PCs and CSR activities, we explore firm level discrepancy between environmental disclosure and actual environmental performances. Our results indicate that PCs increase firm energy disclosures by 24%, but the IV probit marginal effect indicates that PCs also reduce firm level average environmental performance index and energy efficiency investment by 15% and 26% respectively. PCs may shelter politically connected firms from penalties by authorities, facilitating their limited engagement in firm level environmental performance activities. This also falls in line with arguments about PCs and tunnelling channels, wherein PCs have the effect of reducing the availability of a firm's resources for energy-efficient investments.

This is one of the first studies to empirically analyse the impact of political connection on firm level environmental disclosure and the environmental performance of private firms in developing countries. Owing to their information opaqueness and limited transparency (Habib, Ranasinghe, Muhammadi & Islam, 2018), private firms have minimally featured in empirical literature and policy discourse even though they are an important part of the global economy, and have significant environmental externalities. Additionally, albeit researchers have provided evidence that PCs are more visible and common in private firms than in publicly listed firms (Li & Jin, 2021), there is a current dearth of studies investigating private firms in this matter (Habib et al. 2018), a knowledge gap we seek to address.

Secondly, our study provides more nuanced insights into the green effect of political connections on the CSR of firms. There has been a tendency for prior studies to either assert the positive effect of PCs on environmental performance (Ovtchinnikov, Reza, & Wu, 2020; Shu, Page, Gao, & Jiang, 2012) or highlight their negative effects' mechanisms (Hou, Hu, & Yuan, 2017). We provide evidence of a double-edged sword effect of PCs on firm level environmental performance and, in doing so, offer a fresh perspective in this area.

Thirdly, we measure environmental performance using three alternative proxies: environmental index, energy efficiency, and energy disclosure. Prior studies mainly employed Kinder, Lydenberg, and Domini (KLD) and ASSET4 indices as a proxy for environmental performance (see Giuli & Kostovetsky, 2014; Gupta, 2018); which are at large suitable for large listed firms. Due to private firms playing a dominant role in the economies, it is critical to have environmental performance proxies that adequately capture their environmental performances. Extending current literature, therefore, we provide three firm-level environmental performance proxies, which can be adapted in future studies[1].

The rest of the paper is organised as follows. Section 2 reviews the existing literature from which hypotheses are subsequently developed. Section 3 reports the methodology which is followed by the empirical results in section 4. Section 5 reports therobustness of findings, and we report the conclusion in section 6.

2. Literature Review, Theory and Hypothesis Development

2.1 Theoretical Framework

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[1] Only a handful of studies using the World Bank Enterprise Surveys data have used similar environmental proxies. In their study, Dongyang Zhang (2022) use energy efficiency investment as a proxy for environmental performance, (Dengjun Zhang & Wellalage, 2022) employed energy input, output and disclosure proxies, while (Wellalage, Kumar, Hunjra, & Al-Faryan, 2022) used the PCA method to develop an environmental performance index for private firms.

This study stems from a growing interest in environmental disclosures as an important indicator for firm sustainability. We draw from three main theoretical frameworks: stakeholder theory, resource dependency theory and legitimacy theory, all of which lead to the development of the main hypotheses of this study.

Stakeholder theory focuses mainly on the relationship between the firm and all its actors who are interested in the firm's social and environmental activities (Lu & Abeysekera, 2014). Campbell (2007) states that a firm's sustainability and survival are directly connected with the extent to which stakeholder requirements are satisfied. Pressure from powerful stakeholder groups is the key driving force behind the firm's sustainability (Lu & Abeysekera, 2014). Stakeholder groups have significant control over the firm's activities and make credible threats for costly embargoes (Zhang et al., 2022). In recent times, businesses have focused on adopting and implementing sustainability practices owing to social pressure and/or strategic reasons (Baron, 2000). Firms have begun to disclose social and environmental practices (Lu & Abeysekera, 2014) and employ stakeholder-friendly projects within the firm as an entrenchment strategy (Cespa & Cestone 2007). This strategy serves to enhance the firm's access to resources and funds. Typically, firms will try to build strong ties with politicians to access more resources and overcome the political, social and economic obstacles that often constrain firm performance (Li, Poppo & Zhou, 2008; Yu & Zheng, 2019).

In a similar vein, resource dependency theory asserts that the institutional and social environment are the critical constraints for organisational development due to the interdependency between the organisation and its environment (Pfeffer & Salancik, 1978; Collins, Withers & Hillman, 2009; Joni, Ahmed, & Hamilton 2020). Firms need to expand their boundaries by building relationships with their external environment (Ahmad, Bradbury & Habib, 2022) to co-opt external influences (Provan, 1980; Wu et al., 2012). Pfeffer and

Salancik (1978) emphasise that firms cope with environmental dependency by appointing board members with PCs. According to resource dependency theory, political ties assist firms in lessening the government's control on scarce resources and support firms by providing low tax rates, favourable terms, and preferential tariffs and import licenses (Faccio, 2006; Goldman, Rocholl, & So, 2009; Platikanova, 2017). In addition, government bureaucrats can allocate state-owned projects (Child, 1994) and provide opportunities, protection and favouritism when firms seek to obtain government contracts (Wu et al., 2012).

Legitimacy theory holds that the socially constructed system of values, norms, and beliefs in society do matter for firm behaviours (Suchman 1995). The socially constructed nature of legitimacy requires firms to continuously seek societal approval to legitimately operate (Deegan, 2002; Lu & Abeysekera, 2014) and successful business operations must fall within the bounds of what society determines as socially acceptable behaviour (O'Donovan, 2002). Simply put, legitimacy improves the organisation's stability and compensability of its activities (Wellalage & Thrikawala, 2021). To allay and pre-empt social and political pressures, firms will often disclose their social and environmental practices to gain public support (Zhang et al, 2022; Yang, Nguyen, Nguyen, Nguyen & Cao, 2020; Lu & Abeysekera, 2014).

Drawing on the strands of stakeholder theory, resource dependency theory and legitimacy theory, the following hypotheses are proposed in this study.

2.2 Hypotheses development

Governments have started to make greater efforts to protect the environment as issues of sustainability and conservation have become global concerns (Broadstock, Collins, Hunt & Vergos, 2018). However, such efforts may be undermined if government officials enact

environmental protection regulations in favour of politically connected firms (Xiao & Shen, 2022). Prior empirical studies have produced mixed findings regarding the relationship between PCs and firm environmental disclosure and environmental performance. Most studies suggest that PCs may force connected firms to adopt environmental protection standards and reduce environmental pollution (García-Sánchez et al., 2013; Zhang, 2017; Qian and Chen, 2021.).

Given the economic benefits gained through political ties, one would expect that political connections will positively impact a firm's environmental disclosure and environmental performance. Certainly, a panel dataset of 823 Chinese listed firms in polluting industries from 2008 to 2014 shows that politically connected firms have a significant and positive impact on corporate environmental responsibilities (Zhang, 2017). Aligned with resource dependency theory, these firms receive grants, subsidies and low tax rates as an encouragement to protect the environment and support the government in implementing its environmental policies. Government officials who are concerned about the environment and their reputation may lead politically connected firms to invest more in environmentally responsible projects (Xiao and Shen, 2022).

Extensive PCs may give firms access to the latest environmental regulations, enabling them to make effective decisions on investments in environmental technologies (Zhang, 2017). Using 2015 data, Qian and Chen (2021) confirm that government monitoring and political interventions increased the environmental reporting of companies, which engage in major pollution and which also have politically connected chairs on their boards. Ma and Parish (2006) found that politically connected firms make more charitable donations and other studies show that firms with PCs exhibit more care towards the local environment during election periods (Xiao & Shen, 2022; Li, Song & Wu, 2015). It has been argued that

politicians implement future sustainable developments to obtain voter trust and satisfy their demands in a strategic bid to ensure their re-election (García-Sánchezet al., 2013).

In contrast, other empirical results suggest that a lack of PCs can increase environmental performance. Firms may consider corporate environment responsibilities a vital business strategy for sustainability (Zhang, 2017). After the enactment of Regulation 18 in China, Xiao and Shen (2022) found that firms that lost their PCs showed higher ratings for environmental disclosures. Another study conducted by Wang and Qian (2011) also states that Chinese listed firms which lacked PCs have greater incentive to report more on environmental and social compliances to generate goodwill with the government and society. These greater incentives for environmental disclosures increase firm legitimacy, transparency, productivity and ultimately, financial valuations (Brooks & Oikonomou, 2018; Wang, Lu & Wang, 2014). However, Zhang et al. (2022) and Clarkson, Overell & Chapple, (2011) emphasise that firms that have obtained legitimacy through greenwashing disclose more symbolic environmental information since these disclosures do not bring any premium or extra value to the enterprise.

Some studies show a negative relationship between PCs and environmental disclosures, which may be attributed to the costs incurred when firms invest in environmental-friendly projects (Zhang, 2017). de Villiers, Naiker and Van Staden (2011) discover that risk-averse managers are reluctant to incur expenses from environmental activities as the environmental disclosures do not show immediate financial benefits for the firm. That said, firms with greater political connections can avoid major stakeholder pressures (Muttakin et al, 2018) and may face lower penalties for violating environmental protection laws (Correia, 2014; Wu, Johan & Rui, 2016). It is, therefore, evident that the politically connected firms undermine and escape from the corporate environmental responsibilities and generate negative externality to the environmental cost. On the contrary, some politicians may not connect with

firms that significantly impact the environment (Xiao & Shen, 2022) because of the high public scrutiny.

As denoed above, the empirical results on the relationship between PCs and environmental performance are conflicting and inconsistent, demonstrating that these connections may improve or worsen a firm's environmental disclosure and environmental performance. This leads to our first hypothesis.

H_{1a}: PCs improve firm level environmental performance of private firms.

H_{1b}: PCs improve firm level environmental disclosure of private firms..

2.3 Institutional Environment

Theories on institutional perspective highlight that firm activities and behaviours are greatly sensitive to its institutional settings, such as public and private regulations and the monitoring of government and non-governmental organisations within the country (Campbell, 2007). The strength of formal institutional structures reflect the accepted and documented sets of rules and regulations of a given country. As such, a strong institutional setting in a country helps to protect investors' rights and prevent the unethical behaviours of firms (Abdelsalam, Chantziaras, Ibrahim & Omoteso, 2021). The literature indicates that firms operating in a well-developed formal institutional environment have a stronger platform to interact with the economic actors (Wellalage & Thrikawala, 2021). Wiklund (2006) states that corporate social performance can be influenced by the legal regime and the level of financial market development in which they operate. As noted by Campbell (2007), firms which operate in a strong and well-enforced state regulation system behave differently than firms with no such obligations. How firms care for their stakeholders depends on the strength of the regulatory regimes in the institutional environment in which they operate.

The effect of PCs is more distinct in emerging and/or developing nations as there is less transparency, minimum public scrutiny, more corruption, and low economic development (Qian & Chen, 2021). Using a cross-country comparison, Faccio (2010) states that PCs are much more visible in highly corrupted economies. Firms operating in highly corrupted and less developed countries can benefit more from their PCs. These connections are less popular in economies with more rigorous regulations as they do not create competitive advantages for connected firms. Other studies, however, suggest that firms operating in a regulated environment seek more PCs than firms in a weak regulatory environment, since these connections help the firms to implement regulations and public policies favourable to them (Bunkanwanicha & Wiwattanakantang, 2009; Liu, Du, Zhang, Tian, & Kou, 2021).

Economists emphasise that a weak institutional environment is a severe malaise that is detrimental to the firm's connection with external parties (Ahmad et al., 2022). Firms try to take advantage of their PCs in a weak institutional environment (Muttakin, Monem, Khan & Subramaniam, 2015). Organisations experiencing environmental uncertainty and other constraints will develop unlawful PCs to obtain government funding and resources (Joni et al, 2020). For example, an Indonesian study illustrates that an effective government environment can reduce the benefits of PCs as this negates the effect of PCs serving as security for the firm's sustainability (Harymawan, & Nowland, 2016). In a similar study, Li et al., (2008) find that PCs are more important for firm performance in countries with weak market structures and legal protections. In emerging economies, legal protection and rules for market completion are less predictable than in Western economies. In a weak institutional environment, PCs become a natural mechanism for firms to pursue a high level of information and resources, ultimately reducing uncertainty and adverse effects (Sheng, Zhou & Li, 2011).

The question of the effect of PCs on firm environmental disclosure and environmental performance has been tested in several empirical studies (Zhang, 2017; Zhang et al., 2019; Xiao & Shen, 2022; Qian & Chen, 2021), but none of them utilise the institutional environment as a moderating variable. Given the uncertainty and complexity of the institutional environment of developing economies, an investigation into the effect of significant institutional factors is crucial since they may moderate corporate social responsibilities (Xiao & Shen, 2022; Labelle, Hafsi, Francoeur & Ben Amar, 2018). In this study, we consider the institutional environment to be an important element for firm operations (Labelle et al., 2018) as it moderates the firm's behaviour towards its society (Campbell, 2007). This leads to our next hypothesis:

H_{2a}: Weak institutional environment moderates private firms' PCs and environmental performance.

H_{2b}: Weak institutional environment moderates private firms' PCs and environmental disclosure.

3. Data and Methodology

3.1 Data

Data from the World Bank's 2019/2020 Enterprise Surveys (ES) is used in this study (see http://www.enterprisesurveys.org). The ES offer an extensive array of economic data on the non-agricultural and non-extractive private sector primarily from developing economies.

All standard ES follow standardised questions on firms and business-government relationships. In addition, from 2018 onwards, the Green Economy Module is included in the ES, which is rolled out by the World Bank Group, jointly with the EBRD-EIB. The Green Economy Module reports firm-level environmental practices, performance, and management. The ES employs a stratified random sampling approach to collect the firm level data, where the three strata are size, sector, and location. The ES data have been substantially used in previous studies (Wellalage & Thrikawala, 2021; Wellalage et al., 2022), and its proven data accuracy and quality of information minimises the likelihood of having false positive information.

After deleting missing values, this study sample includes 25880 private firms from 24 developing countries. The sample firms by country, firm size and percentage are reported in Table 1.

<< Insert Table 1 here: Sample >>

3.2 Method

We use the probit model as our main model in this study.

$Y_i = \alpha_i + \beta_1 PC_i + \beta_2 X'_I + u_i$------------------------------(1)

Where Y is the environmental performance dependent binary variable(s) Y can be either above environment index (EI), energy efficiency, or energy disclosure. PCi is the main independent variable which takes the value of one if the firm has the owner, CEO, top manager, or any of the board members ever been elected or appointed to a political position.

α is the constant term; β_2 is a $k \times 1$ vector, X is an $n \times k$ matrix of covariates; u is the error term. However, the given probit model is biased if endogeneity is present. In this case, the correlation between the regressors and the error term is not zero [E (X, u) $\neq$ 0], so the results of the estimation are inconsistent (Wooldridge, 2010).

Hence, we use instrumental variable regression to minimise potential endogeneity issues. The above model can be written in its reduced form:

$$y^* 1i = \beta y2_i + \gamma x1_i + u_i \text{ ------------------(2a)}$$

$$y\, 2i = x1_i\, \gamma1 + x2_i\, \gamma2 + \infty_i \text{ --------------- (2b)}$$

Here y^*1i is the dependent variable for the ith observation (i.e., the answer to one of the questions, "Does this firm's environmental performance index higher than 0?; Does this firm undertake energy efficiency activities? or Does this firm disclose environmental activity?".

In (2a), $y2i$ is a vector of endogenous variables (PC); x1i and x2i are, respectively, a vector of exogenous regressors and variables used as "instruments"; β and γ are vectors of other structural parameters.

In (2b), $\gamma1$ and $\gamma2$ are matrices of parameters. By assumption, (ui, ∞i) $\sim$ N (0, Σ).

Hence, we used instrumental probit regression to minimise endogeneity. Other studies have used panel data and employed lag of potential endogenous variable as an instrumental variable, as lags can offer reliable estimators of the coefficient of interest. However, because we employed cross-sectional data, we employed instruments from outside. Following prior literature, we instrument firm level PCs by the locality and industry sector averages of PCs. Local and sector-level instrumental variables capture the locality's institutional environment,

such as rent extraction behaviours and bureaucratic restrictions, which are factors exogenous to the firm (Wellalage & Thrikawala, 2021). The locality and sector-level protocol connection are orthogonal to the unobservable firm characteristics.

3.2.1 Dependent variables

Since there are no standard measures for evaluating environmental performance (Ameer & Othman, 2012; Capelle-Blancard, Crifo, Diaye, Oueghlissi, & Scholtens, 2019), finding reliable cross-country environmental performance measures is difficult (Dengjun Zhang & Wellalage, 2022). Prior studies have used World Development indicators provided by the World Bank Group (see Capelle-Blancard et al., 2019). Large firms have also used the ASSETS4 database or KDL database scores as firm level environmental performance indicators (Gupta, 2018). More recently, Dengjun Zhang and Wellalage (2022) used firm-level energy-related proxies (energy intensity, energy efficiency and voluntary disclosure of energy consumption) as a proxy for environmental performance.

This study employed three dependent variables.

(i) <u>High environmental performance Index (*High_EPI*)</u>

We create the environmental performance index to measure the firm's environmental performance. Using the principal component analysis (PCA) technique, we create a composite index as a proxy for firm level environmental index. The main advantage of the composite index is that it provides information about the relative value of the environmental performance of the sample firms.

The high environmental performance index (*High_EPI*) variable takes the value of one if the environmental performance index value is greater than zero, and zero otherwise. The environmental performance index is calculated as follows:

$$EIndex_i = \frac{\sum_{k=1}^{j} C_{ki}\sqrt{\gamma_k}}{\sum_{k=1}^{j} \sqrt{\gamma_k}}, i = 1,2,\dots n$$

Where C_{ki} is the component k in i[th] country (and j components are retained, $j \leqslant p$), and γ_k is

the eigenvalue of the component k. In the above equation, $\sqrt{\gamma_k}$ is used as a weighting factor

to calculate the final synthesised coordinate of each country.

Table 2 shows the PCA analysed results of the ten environmental indicators.

Two principal components were retained, and they explained above 50% of the total variance

of the data. Two components are heating and cooling improvement and more climate-friendly

energy generation on site.

<< Insert Table 2 in here>>

(ii) <u>Energy efficiency investment</u>

Following Dengjun Zhang and Wellalage (2022), we create an energy efficiency variable

which takes a value of one (1) if firms adopted measures to enhance energy efficiency over

the last three years, and zero (0) otherwise.

(iii) <u>Energy disclosure</u>

This variable will take the value of one if the firm completed an energy consumption audit

over the last three years, and zero otherwise. In prior studies, environmental disclosure scores

were collected from financial reports, sustainability reports, or firm websites. However, we

directly measure environmental disclosure via energy consumption reports in this study. This

approach provides a more precise and objective assessment of a firm's environmental impact,

as energy consumption data offer concrete evidence of a company's resource usage and

efficiency. By utilizing this direct measure, we aim to enhance the accuracy and reliability of

our analysis, reducing potential biases and discrepancies associated with self-reported or publicly disclosed information.

3.2.2 Independent variables

We measure PCs as follows: PC takes the value of one if the firm answers yes to the question *"Has the owner, CEO, top manager, or any of the board members of the firm ever been elected or appointed to a political position?"* and zero otherwise.

Appendix 1 reports all the variables used in this study.

4. Results

Table 3 reports the summary statistics of this study. Our three dependent variables indicate that approximately 34% of firms have an environmental index that is greater than zero, and only 30% of firms engage in energy efficiency activities. Since there are no regulations around environmental disclosure for private firms, only 13% of our sample firms disclosed their environmental activities. Most sample firms are in the small and micro category (47%), followed by medium (33%) and large firms (20%). Only 22% of firms are sole proprietorships. The average percentage of foreign ownership is 6% which varies between 0 and 100 percent. Approximately 29% of firms have at least one female owner. The average firm age is 23. The sample indicates the low average of bank financing for unlisted firms (10%).

<< Insert Table 3 here>>

4.1 PCs and environmental disclosure and environmental performance

Table 4 reports the regression results for PCs and environmental performance and environmental disclosure. Panel A reports that PCs are negatively and statistically significantly associated with Above EI ($b_{\text{political connection-Above EI}} = -.0.1516, p < .05$). This

indicates that politically connected firms are less engaged with firm level environmental performance activities. This finding falls in line with studies that find that PCs create a sheltering channel with respect to CSR. As one study observes, connections with political parties may hinder inspections against untenable operations (Xiao & Shen, 2022). Additionally, PC firms are safeguarded from the prosecution of rules and regulations designed to enhance shareholder protection (Berkman, Cole, & Fu, 2010) and are typically exposed to lower penalties, sanctions and misconduct costs (Correia, 2014; Wu, Johan, & Rui, 2016). Therefore, firms with PCs may engage less in firm level environmental activities.

Similar to Panel A, Panel B reports that PCs are negatively and statistically significantly associated with energy efficiency investments in private firms ($b_{\text{political connection-Energy\_efficency}} = -0.2596, p < .001$). This finding is supported by arguments about PCs functioning as a tunnelling channel when it comes to CSR (Wang, 2015; Xiao & Shen, 2022). PC firms are engaged in tunnelling-related party transactions (Peng, Wei, & Yang, 2011), which reduce the availability of resources for environmental activities (Xiao & Shen, 2022). Therefore, we argue that PC firms are less engaged in environmental performance activities. Hence, we reject H_{1a}: PCs improve firm level environmental performance of private firms.

Nevertheless, Panel C reports that PCs are positively and statistically significantly associated with energy disclosure ($b_{\text{political connection-Above EI}} = 0.2367, p < .001$). This may be because politically connected firms disclose their environmental activities more to build up their reputation and showcase their commitment to the local environment. Thus, aligning with Qian and Chen (2021), we argue that PCs can positively impact firm level environmental disclosure. Hence, we accept H_{1b}: PCs improve firm level environmental disclosure of private firms. Table 4 indicates that although politically connected firms provide greater environmental disclosure, they are less engaged in firm level environmental activities.

<< **Insert Table 4 here**>>

4.2 Heterogeneity in PC-environmental disclosure and environmental performance nexus

4.2.1 Firm size

In this section, we divide sample into three groups based on firm size: i.e., Small and micro firms, medium firms, and large firms. Small and micro firms are not a "Little big" firm (Xu & Liu, 2019) as they exhibit different characteristics than medium and large firms. Our results show that PCs has significant and positive impact on environmental disclosure on firms of all sizes. However, the positive impact is higher on large firms (β= .3711) followed by medium firms (β= .3237) and small and micro size firms (β= .1408). Next, Table 5 indicates political connections has significant and negative impact on large firms' environmental index (β = -.2740) and energy efficiency (β=-.2922). Overall results indicate that firms with high level of connections with government officials have high quality in environmental reporting (Qian and Chen (2021) and low level of resources to enhance environmental performance (Xiao & Shen, 2022) as these political ties help to escape from the corporate environmental responsibilities. However, the size of coefficients indicates that the discrepancies between disclosure and actual performance increases along firm size.

<< Insert Table 5 here>>

4.3 PCs, environmental performance, and environmental regulations

Table 6A reports the probit regression results of environmental regulations, PCs and their impact on the environmental performance of firms. Environmental regulation is a categorical variable that varies from one (minor obstacle) to four (severe obstacle). Further, Table 6B

reports the marginal effects of the interaction variables, and Figure 1 shows the marginal effect of politically connected and non-politically connected firms.

Figure 1(a) indicates that the environmental activities of firms without PCs are largely stable across the different levels of environmental regulation obstacles. However, Figure 1(a) shows that PCs promote firm level environmental activities when firms experience severe obstacles. Figure 1(b) also shows a similar trend, indicating that PCs promote energy efficiency investments when firms experience severe obstacles. Figure 1(c) also aligns with Figure 1(a), which indicates that firm level environmental performance and environmental disclosure are mutually causal. These results indicate that when environmental regulations are more discouraging to enterprises, politically connected firms engage in more environmental activities compared to their non-politically connected counterparts. Further, overall results point out that when environmental regulations present more obstacles, there is a reduction in the discrepancies between firm level environmental disclosure and environmental performance of politically connected firms.

<< Insert Table 6A and 6B in here>>

<< Insert Figure 1 in here >>

5. Robustness

5.1 Alternative PC measure

We employed gifts and informal payments as an alternative proxy for PCs and rerun the IV probit regression. The gifts and informal payments variable takes the value of one if the *"firm pays informal payments or gifts to public officials to get things done with regards to customs, taxes, licenses, regulations, services etc"*. Table 6 shows that changes in the definition of PCs do not alter our main results.

<< Insert Table 7 here>>

5.2 Propensity score matching method

The Propensity Score Matching method (PSM) controls self-selection biases and causal interferences by placing them into non-random assignments (Rosenbaum & Rubin, 1983). In this study, we are comparing the propensity for environmental performance in firms exposed to no treatment T=0 (PCs) and the propensity for environmental performance in firms exposed to treatment T=1 (no PCs).

Table 7 includes three matching models and shows the ATT is significant and positive for environmental disclosure and negative for environmental index and energy efficiency investment.

Covariate Choice: The covariates chosen for the PSM are similar to the baseline regression.

Overlap and common support: We checked the overlap and common support assumptions between the treatment (politically connected) and compression group (no PCs). Unreported kernel densities of propensity scores show our matching satisfies the overlap and common support assumptions for formal finance innovations.

<< Insert Table 8 here>>

6. Conclusion

Political connections (PCs) are known to have a significant impact on firm performance but, at present, there is limited understanding of how they influence environmental disclosure and environmental performance of firms. Equally, just how PCs impact firm environmental disclosures and their implementation of environmentally friendly initiatives is a question that remains open.

This study explores the effects of PCs on firm environmental disclosure and the implementation of environmentally responsible practices in private firms from developing countries. We find that private firms with political connections tend to exaggerate their

environmental performance during the process of disclosure and fall short at the point of implementation. Our study also finds that rigorous environmental regulations will help to reduce the discrepeancies between environmental disclosure and environmental practices of private firms.

Environmental regulatory enforcement is an area that needs further attention in policy development. Although empirical analyses of disclosure and enforcement of environmental performance have flourished in recent years, more work needs to be done to strengthen environmental regulations in developing countries.

Although this paper performs a series of robustness tests that support our main findings, this study is limited in the range of alternative measures that could be explored in terms of the level of PCs and types of PCs examined.

Table 1:

Summary Statistics

Country	Total firms	Micro+ Small	Percentage (%)	Medium	Percentage (%)	Large	Percentage (%)
Albania	377	167	44.3	110	29.2	100	26.5
Armenia	120	120	100	0	0	0	0
Azerbaijan	225	119	52.9	70	31.1	36	16
Bosnia & Herzegovina	362	136	37.6	135	37.3	91	25.1
Egypt, Arab. Rep.C	3075	1699	55.3	875	28.5	501	16.3
Georgia	581	286	49.2	210	36.1	85	14.6
Jordan	601	367	61.1	164	27.3	70	11.6
Kazakhstan	1409	717	50.9	473	33.6	219	15.5
Kosovo	271	128	47.2	114	42.1	29	10.7
Kyrgyz Republic	360	156	43.3	138	38.3	66	18.3
Lebanon	532	287	53.9	184	34.6	61	11.5
Moldova	360	146	40.6	140	38.9	74	20.6
Mongolia	360	195	54.2	107	29.7	58	16.1
Montenegro	150	67	44.7	46	30.7	37	24.7
Morocco	1096	409	37.3	354	32.3	333	30.4
Macedonia, FYR	360	139	38.6	131	36.4	90	25
Russian Federation	1323	511	38.6	422	31.9	390	29.5
Serbia	361	139	38.5	110	30.5	112	31.0
Tajikistan	352	180	51.1	112	31.8	60	17.0
Tunisia	615	232	37.7	243	39.5	140	22.8
Turkey	1663	687	41.3	594	35.7	382	23
Turkish Cypriot Community	120	64	53.3	44	36.7	12	10
Ukraine	1337	508	38.0	532	39.8	297	22.2

Uzbekistan	1239	612	49.4	408	32.9	219	17.7
Total	25880	12078	46.7	8477	32.8	5325	20.6

Table 2:

Principal components/correlation

Component	Eigenvalue	Difference	Proportion	Cumulative
Heating and cooling improvement	4.0207	2.9609	0.4021	0.4021
More climate-friendly energy generation on site	1.0597	0.2583	0.1060	0.5080
Machinery and equipment upgrades	0.8013	0.0325	0.0801	0.5882
Energy management	0.7688	0.0923	0.0769	0.6651
Waste minimisation, recycling and waste management	0.6764	0.0199	0.0676	0.7327
Air pollution control measure	0.6564	0.1162	0.0656	0.7984
Water management	0.5402	0.1254	0.0540	0.8524
Upgrades of vehicle	0.5277	0.0428	0.0528	0.9052
Improvements to lighting system	0.4848	0.0213	0.0485	0.9536
Other pollution control measures	0.4635		0.0464	1.0000

Table 3:

Descriptive Statistics

Variable	Obs	Mean	Median	Std	Min	Max
Above EI	25,880	.3398	0	.4736	0	1
Energy efficiency	25,337	.2984	0	.4575	0	1
Energy Disclosure	25,337	.1290	0	.3352	0	1

	N	Mean	Median	SD	Min	Max
Political	25,272	.0584	0	.2345	0	1
Firm Size						
Large	25,872	.2058	0	.4043	0	1
Medium	25,872	.3274	0	.4692	0	1
Small & Micro	25,872	.4667	0	.4989	0	1
Legal Ownership						
Company	25,676	.5593	1	.4964	0	1
Partnership	25,676	.2147	0	.4106	0	1
Sole Prop	25,676	.2163	0	.4117	0	1
Other legal ownership	25,676	.0094	0	.0966	0	1
Foreign ownership	25,469	6.068	0	22.15	0	100
Female Ownership	25,637	.2845	0	.4511	0	1
Firm age	25,565	22.82	20	15.40	0 (less than one year)	208
Bank Finance	24,214	10.047	0	19.72	0	100

Table 4:

PC environmental performance and environmental disclosure

	High_EPI Panel A				Energy Efficiency Panel B				Energy Disclosure Panel C			
	Probit	Marginal effect	IV probit	IV probit marginal effect	Probit	Marginal effect	IV probit	IV probit marginal effect	Probit	Marginal effect	IV probit	IV probit marginal effect
Political	**.2031*** (.0365)**	**.0728*** (.0130)**	**-.4359** (.2257)**	**-.1516** (.0796)**	.0392 (.0374)	.0135 (.0128)	**-.7674*** (.2253)**	**-.2596*** (.0787)**	**.3428*** (.0406)**	**.0678*** (.0080)**	**1.1635*** (.2571)**	**.2367*** (.0551)**
Firm Size												
Large	.5249*** (.0244)	.1881*** (.0087)	.5505*** (.0252)	.1915*** (.0090)	.4249*** (.0247)	.1462*** (.0084)	.4574*** (.0254)	.1547*** (.0090)	.5103*** (.0291)	.1009*** (.0057)	.4603*** (.0340)	.0936*** (.0064)
Medium	.2645*** (.0202)	.0948*** (.0072)	.2719*** (.0201)	.0946*** (.0070)	.2137*** (.0205)	.0735*** (.0070)	.2235*** (.0204)	.0756*** (.0069)	.2350*** (.0257)	.0464*** (.0050)	.2170*** (.0263)	.0441*** (.0052)
Small & Micro	-				-							

Legal Ownership

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Company	-.1214	-.0435	-.1481**	-.0515*	-.5598***	-.1927***	-.5856***	-.1980***	-.8225***	-.1626***	-.7707***	-.1568***
	(.0866)	(.0310)	(-.0867)	(.0302)	(.0857)	(.0295)	(.0852)	(.0289)	(.0862)	(.0171)	(.0880)	(.0175)
Partnership	-.2968***	-.1064***	-.3296***	-.1147***	-.7691***	-.2647***	-.8014***	-.2710***	-.9270***	-.1833***	-.8633***	-.1756***
	(.0881)	(.0315)	(.0883)	(.0308)	(.0872)	(.0300)	(.0868)	(.0294)	(.0885)	(.0175)	(.0914)	(.0180)
Sole Prop	-.4473***	-.1603***	-.4786***	-.1665***	-.9286***	-.3196***	-.9582***	-.3241***	-1.126***	-.2228***	-1.059***	-.2156***
	(.0884)	(.0317)	(.0885)	(.0309)	(.0877)	(.0301)	(.0871)	(.0295)	(.0898)	(.0177)	(.0932)	(.0183)
Other legal ownership	-		-									
Foreign ownership	.0022***	.0008***	.0021***	.0007***	.0019***	.0006***	.0017***	.0006***	.0022***	.0004	.0023***	.0004***
	(.0003)	(.0001)	(.0004)	(.0001)	(.0004)	(.0001)	(.0004)	(.0001)	(.0004)	(.0000)	(.0004)	(.0000)
Female Ownership	.1105***	.0396***	.1155***	.0401***	.1251***	.0430***	.1306***	.0441***	.0644***	.0127**	.0547**	.0111**
	(.0193)	(.0006)	(.0192)	(.0067)	(.0195)	(.0067)	(.0194)	(.0065)	(.0236)	(.0046)	(.0036)	(.0047)
Firm age	.0027***	.0009***	.0031***	.0010***	.0052***	.0018***	.0056***	.0019***	.0029***	.0005***	.0024***	.0004***
	(.0005)	(.0002)	(.0005)	(.0002)	(.0005)	(.0002)	(.0005)	(.0001)	(.0006)	(.0001)	(.0006)	(.0001)
Bank Finance	.0035***	.0012***	.0035***	.0012***	.0031***	.0010***	.0032***	.0010***	.0014***	.0002***	.0013***	.0002**
	(.0004)	(.0001)	(.0004)	(.0001)	(.0004)	(.0001)	(.0004)	(.0001)	(.0005)	(.0001)	(.0005)	(.0001)
Cons	-.5824***		-5283***		-.2257***		-.1616**	.0029***	-.5972***		-.6479***	
	(.0880)		(.0901)		(.0870)		(.0884)	(.0006)	(.0881)		(.0882)	

Summary Statistics

Obsverations	23150		23150		23032				23032		23032	
LR Chi2 (10)	1347.13***				1234.97				939.85			
Pseudo R2	.0459				.0438				.0530			
Log liklihood	-13995.9				-13482.6				-8398.56			
Instrumented	No		Yes		No		Yes		No		Yes	
Corr (e.political, e.EI)			.1489				.1884				-.1935	
			(.0517)				(.0518)				(.0603)	
Sd(e.political)			.2275				.2275				.2275	
			(.0010)				(.0010)				(.0010)	
Wald test of exogeneity			8.05***				12.58***				9.77 ***	

Note: This table presents regression results indicating the effects of PC on EPs. Panel A, B and C reports PC effects on the High environmental performance Index (High_EPI), Energy efficiency investment and Energy disclosure respectively. Each panel reports probit regression results, marginal effects, IV probit, and IV probit marginal effects results. The first stage regression results are available upon request. * , **, and *** stand for the significance level of 10%, 5% and 1% respectively. Standard errors are in parentheses.

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Table 5:

PC and environmental performance and environmental disclosure on firm size

	Panel A: Small and micro firms						Panel B: Medium firms						Panel C: Large firms					
	Above EIndex		Energy Efficiency		Energy Disclosure		Above EIndex		Energy Efficiency		Energy Disclosure		Above EIndex		Energy Efficiency		Energy Disclosure	
	IV probit	IV probit marginal effect	IV probit	IV probit marginal effect	IV probit	IV probit marginal effect	IV probit	IV probit marginal effect	IV probit	IV probit marginal effect	IV probit	IV probit marginal effect	IV probit	IV probit marginal effect	IV probit	IV probit marginal effect	IV probit	IV probit marginal effect
Political	-.2345 (.3958)	-.0727 (.1232)	**-1.663*** (.3619)**	**-.5281*** (.1291)**	**.9370** (.4948)**	**.1408** (.0762)**	-.1143 (.3931)	-.0421 (.1452)	.4110 (.3924)	.1456 (.1401)	**1.081** (.3817)**	**.3237** (.1220)**	**-.6938** (.3568)**	**-.2740** (.1479)**	**-.7698** (.3591)**	**-.2966* (.1452)**	**1.642*** (.3997)**	**.3711*** (.1024)**
Legal Ownership																		
Company	.1413 (.1427)	.0438 (.0442)	-.4479*** (.1277)	-.1422*** (.0401)	-.9219*** (.1342)	-.1385*** (.0202)	-.3341** (.1614)	-.1231** (.0596)	-.5487*** (.1630)	-.1944*** (.0573)	-.8672*** (.1675)	-.1959*** (.0359)	-.3215* (.1624)	-.1270** (.0648)	-.7069*** (.1671)	-.2724*** (.0652)	-.4558** (.1644)	-.1364** (.0480)
Partnership	-.0605 (.1446)	-.0187 (.0448)	-.6086*** (.1299)	-.1932*** (.0407)	-.9892*** (.1382)	-.1486*** (0207)	-.4637** (.1639)	-.1710** (.0605)	-.7932*** (.1664)	-.2810*** (.0582)	-1.002*** (.1738)	-.2264*** (.0368)	-.5238** (.1667)	-.2069*** (.0669)	-.9613*** (.1713)	-.3660*** (.0672)	-.4913** (.1723)	-.1470** (.0502)
Sole Prop	-.1093 (.1437)	-.0338 (.0445)	-.7492*** (.1295)	-.2378*** (.0404)	-1.103*** (.1371)	-.1658*** (.0205)	-.7136*** (.1639)	-.2631*** (.0609)	-.9605*** (.1680)	-.3403*** (.0586)	-1.225*** (.1789)	-.2769*** (.0375)	-.9698*** (.1745)	-.3830*** (.0706)	-1.2811*** (.1798)	-.4936*** (.0708)	-.9446*** (.1937)	-.2828*** (.0550)
Other legal ownership	-		-															.0008*** (.000180
Foreign ownership	-.0008 (.0009)	-.0002 (.0003)	-.0002 (.0009)	-.0000 (.0003)	.0013 (.0011)	.0002 (.0001)	.0015** (.0006)	.0005** (.0002)	.0012* (.0006)	.0004** (.0002)	.0021** (.0007)	.0004** (.0001)	.0034*** (.0006)	.0013*** (.0002)	.0031*** (.0006)	.0012*** (.0002)	.0026*** (.0006)	.00015 (.0138)
Female Ownership	.0908** (.0290)	.0281** (.0089)	.1246*** (.0288)	.0395*** (.0090)	.1183** (.0379)	.0177** (.0056)	.1250*** (.0336)	.0461*** (.0124)	.1080** (.0344)	.0382** (.0121)	.0188 (.0401)	.0042 (.0009)	.1446*** (.0416)	.0571*** (.0165)	.1346*** (.0419)	.0519*** (.0162)	.0005 (.0461)	.0016*** (.0003)
Firm age	-.0013 (.0010)	-.0004 (.0003)	.0030** (.0010)	.0009** (.0003)	-.0024* (.0014)	-.0003* (.0002)	.0022** (.0010)	.0008** (.0003)	.0035*** (.0010)	.0012*** (.0003)	.0011 (.0011)	.0002 (.0002)	.0068*** (.0009)	.0027*** (.0003)	.0092*** (.0009)	.0035*** (.0003)	.0055*** (.0010)	.0002 (.0002)
Bank Finance	.0049*** (.0006)	.0015*** (.0002)	.0034*** (.0006)	.0010*** (.0002)	.0016** (.0009)	.0002** (.0001)	.0037*** (.0007)	.0013*** (.0002)	.0028*** (.0007)	.0010*** (.0002)	.0012 (.0008)	.0002 (.0001)	.0006 (.0008)	.0002 (.0003)	.0029*** (.0008)	.0011*** (.0003)	.0010 (.0009)	
Cons	-.7543*** (.1444)		-.2012 (.1284)		-.4518*** (.1366)		-.0805 (.1666)		.0228 (.1671)		-.2711* (.1640)		.1519 (.1759)		.3196* (.0805)		-.56328 (.1714)	
Summary Statistics																		
Observations	11075		11075		10957		7527		7527		7527		4548		4548			
LR Chi2 (10)																		
Pseudo R2																		
Log liklihood	-3553.6		-3300.1		-559.48		-4534.44		-4357.99		-2639.74							
Instrumented	Y		Y		Y		Y		Y		Y		Y		Y			
Corr (e.political, e.EI)	-.0933 (.0772)		.3484 (.0699)		-.1299 (.0976)		.0826 (.0922)		-.0871 (.0925)		-.3122 (.0968)		.2423 (.1030)		.2196 (.1049)		-.2095 (.1142)	
Sd(e.political)	.1929 (.0012)		.1926 (.0013)		.1926 (.0013)		.2324 (.0018)		.2324 (.0018)		.2324 (.0018)		.2877 (.0030)		.2877 (.0030)		.2877 (.0030)	
Wald test of exogeneity	14.5*		20.87***		17.3*		8.0		18.80**		9.06**		5.10**		4.11**		3.17*	

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Note: This table presents regression results indicating the effects of PC on EPs based on firm size. Panel A, B and C reports PC effects on the High environmental performance Index (High_EPI), Energy efficiency investment and Energy disclosure for small and micro firms (Panel A), medium size firms (Panel B) and large size firms (Panel C), respectively. Each panel reports IV probit, and IV probit marginal effects results. * , **, and *** stand for the significance level of 10%, 5% and 1% respectively. Standard errors are in parentheses.

Table 6A:

Environmental regulations, PCs, environmental performance and environmental disclosure

	probit Above EI	probit Energy Efficiency	probit Energy disclosure
Political	.2072*	.2615**	.5838***
	(.1172)	(.1187)	(.1251)
Environmental regulations			
Minor obstacle	-		
Moderate obstacle	-.0220	.0426	.0197
	(.0395)	(.0401)	(.0500)
Major obstacle	.0013	-.0014	.0356
	(.0394)	(.0402)	(.0498)
Severe obstacle	-.0009	.0448	.0638
	(.0394)	(.0401)	(.0497)
Political X Environmental regulations			
Political *X Minor obstacle*	-		
Political *X Moderate obstacle*	-.2057	-.5393**	-.2143
	(.1653)	(.1713)	(.1786)
Political *X Major obstacle*	.0385	-.1910	-.4591**
	(.1748)	(.1773)	(.1969)
Political *X Severe obstacle*	.0651	-.1530	-.1630

	(.1595)	(.1612)	(.1711)
Firm Size			
Large	.5006***	.4344***	.5208***
	(.0375)	(.0379)	(.0450)
Medium	.2420***	.2059***	.2584***
	(.0309)	(.0315)	(.0396)
Small & Micro	-		
Legal Ownership			
Company	-.0359	-.6106***	-.8519***
	(.1380)	(.1361)	(.1361)
Partnership	-.2129	-.8020***	-.9428***
	(.1402)	(.1384)	(.1395)
Sole Prop	-.3648*	-.9614***	-1.2451***
	(.1409)	(.1392)	(.1426)
Other legal ownership	-		
Foreign ownership	.0022***	.0018**	.0024***
	(.0006)	(.0006)	(.0006)
Female Ownership	.1179***	.1291***	.0468
	(.0295)	(.0299)	(.0364)
Firm age	.0026**	.0047***	.0021*
	(.0008)	(.0008)	(.0010)
Bank Finance	.0034***	.0028***	.0012
	(.0006)	(.0006)	(.0008)
Cons	-.6311***	-.1810	-.5797***
	(.1417)	(.1399)	(.1417)
Summary Statistics			
Observations	9760	9715	9715
LR Chi2 (16)	537.23	508.48	447.62
Prob>Chi2	0.000	0.000	0.000
Log liklihood	-5964.1	-5735.5	-3541.4

Table 6B:

Marginal effect of environmental regulations, PCs, and environmental performance

Environmental regulations# Political	Margin	Delta-method Std E	Margin	Delta-method Std E	Margin	Delta-method Std E
	Above EI		Energy_efficency		Environmental_Disclosure	
1 0	.3348	.0100***	.2986	.0093***	.1191	.0069***
1 1	.4096	.0422***	.3904	.0422***	.2663	.0374***
2 0	.3272	.0093***	.3129	.0093***	.1229	.0066***
2 1	.3277	.0392***	.2256	.0346***	.2092	.0337***
3 0	.3353	.0094***	.2981	.0091***	.1260	.0066***
3 1	.4245	.0477***	.3218	.0442***	.1522	.0332***
4 0	.3345	.0094***	.3136	.0093***	.1316	.0068***
4 1	.4336	.0396***	.3513	.0376***	.2362	.0329***

Table 7:

PC and environmental performance using alternative PC proxy

	Above EIindex		Energy Efficiency		Energy Disclosure	
	Panel A		Panel B		Panel C	
	IV probit	IV probit marginal effect	IV probit	IV probit marginal effect	IV probit	IV probit marginal effect
Gift & Informal Payment	**-.2203*****	**-.0779*****	**-.5367*****	**-.1850*****	**1.7173*****	**.6115****
	(.0425)	**(.0152)**	**(.0414)**	**(.0151)**	**(.1952)**	**(.2224)**
Firm Size						
Large	.5620***	.1989***	.4222***	.1456***	.2957***	.1052***
	(.0248)	(.0084)	(.0252)	(.0085)	(.0804)	(.0083)
Medium	.2846***	.1007***	.2208***	.0761***	.1026**	.0365***
	(.0205)	(.0072)	(.0209)	(.0071)	(.0436)	(.0084)
Small & Micro	-				-	
Legal Ownership						
Company	-.2005**	-.0709**	-.6908***	-.2381***	.0751	.0267
	(.0882)	(.0312)	(.0865)	(.0298)	(.1921)	(.0746)
Partnership	-.3316***	-.1174***	-.8199***	-.2826***	-.2080	-.0740
	(.0890)	(.0315)	(.0876)	(.0301)	(.1840)	(.0492)
Sole Prop	-.4357***	-.1542***	-.9942***	-.3428***	-.2546	-.0906
	(.0893)	(.0316)	(.0880)	(.0302)	(.2175)	(.0568)
Other legal ownership	-		-			
Foreign ownership	.0019***	.0006***	.0013***	.0004**	.0024***	.0008***

	(.0004)	(.0001)	(.0004)	(.0001)	(.0003)	(.0002)
Female Ownership	.0952***	.0337***	.0941***	.0324***	.1205***	.0429***
	(.0199)	(.0070)	(.0201)	(.0069)	(.0189)	(.0121)
Firm age	.0031***	.0011***	.0057***	.0019***	.0007	.0002
	(.0058)	(.0002)	(.0005)	(.0002)	(.0008)	(.0002)
Bank Finance	.0036***	.0013***	.0035***	.0012***	-.0006	-.0002
	(.0004)	(.0001)	(.0004)	(.0001)	(.0005)	(.0002)
Cons	-.3979***	-	.1236		-1.4965	
	(.0936)		(.0919)		(.0903)	
Summary Statistics						
Obsverations	21827		21460		21460	
Wald Chi2 (10)	1233.31		1375.05		3868.02	
Log liklihood	-26677		-25571		-23076	
Instrumented	Yes		Yes		Yes	
Corr (e.political, e.EI)	.1568		.2865		-.8194	
	(.0206)		(.0199)		(.1003)	
Sd(e.political)	.4448		.4452		.4888	
	(.0021)		(.0021)		(.0023)	
Wald test of exogeneity	55.90***		184.21***		14.30**	

Note: First-stage regression results are available upon request. * , **, and *** stand for the significance level of 10%, 5% and 1% respectively. Standard errors are in parentheses.

Table 8:

Propensity Score matching

	Nearest Neighbor					Kernel Matching					Stratified Matching				
	n. treat.	n. contr.	ATT	Std. Err.	t	n. treat.	n. contr.	ATT	Std. Err.	t	n. treat.	n. contr.	ATT	Std. Err.	t
Above EI	1476	13222	-0.066	0.016	4.266	322	21800	-0.118	0.009	13.275	1322	22179	-0.075	0.016	4.843
Energy Efficiency	1476	13183	0.001	0.015	0.068	1322	21800	-0.057	0.021	2.672	1322	22179	-0.015	0.014	1.082

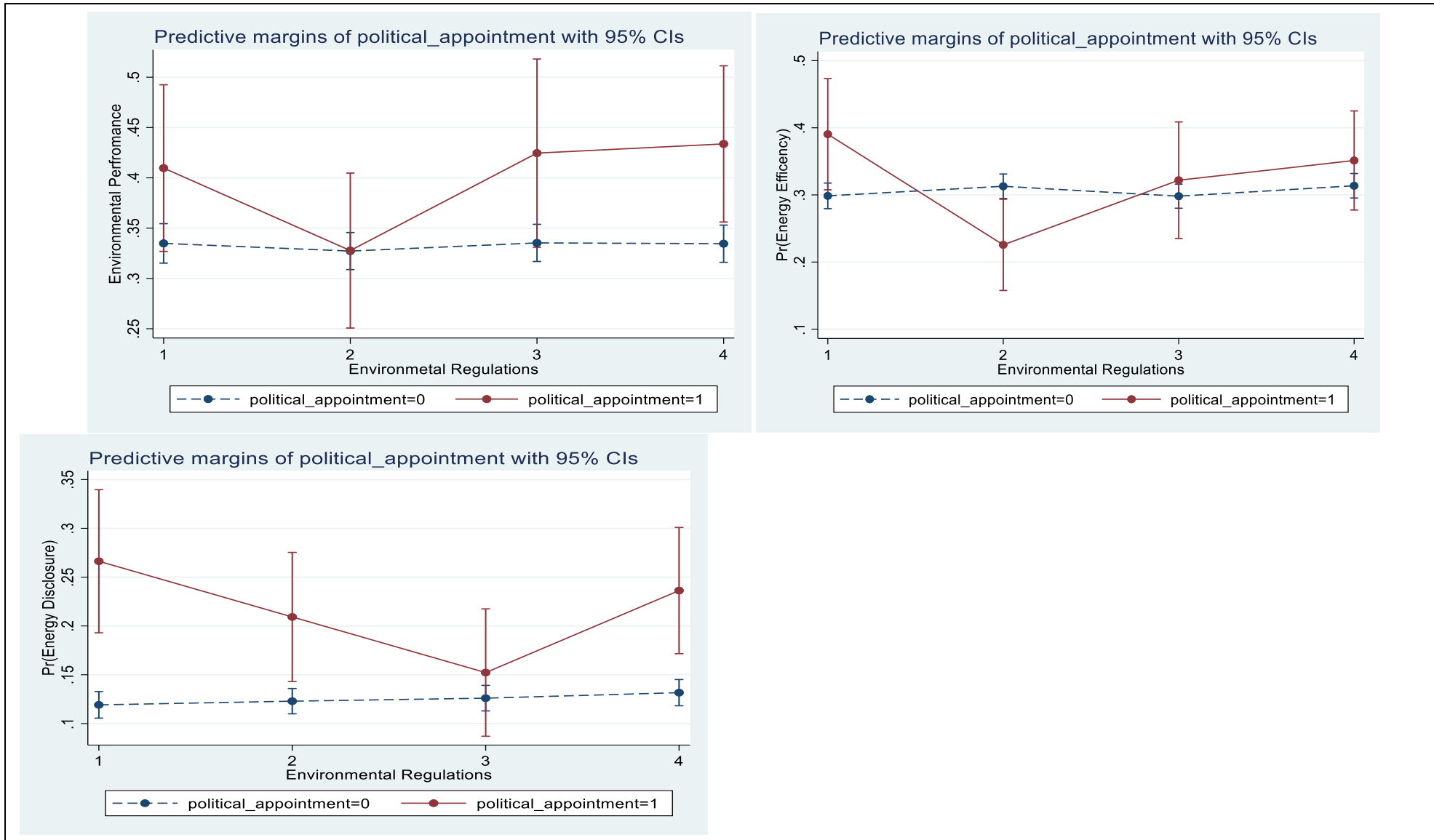|														
Envi Disclosure	1476	13183	0.087	0.013	6.917	1322	21800	0.116	0.009	13.068	1322	22179	0.090	0.016	5.456

Figure 1: Marginal effect of politically connected and non-politically connected firms

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Appendix 1:

Variable description

Variable name	Description
High_EPI	The high environmental performance index (*High_EPI*) variable takes the value of one if the environmental performance index value is greater than zero, and zero otherwise. This index created using PCA technique.
Energy efficiency investment	This variable takes a value of 1 if firm adopt measures to enhance energy efficiency over the last three years, and zero otherwise.
Energy disclosure	This variable will take the value of one if the firm completed an energy consumption audit over the last three years, and zero otherwise.
Political	This variable takes the value of one if the firm answers yes to the question "*has the owner, CEO, top manager, or any of the board members of the firm ever been elected or appointed to a political position?*" and zero otherwise
Large	This variable takes a value of 1 if firm has > 100 employees
Medium	This variable takes a value of 1 if firm has 20 to 99 employees
Small & Micro	This variable takes a value of 1 if firm has <19 employees
Company	This variable takes a value of 1 if firm current legal status is company

Partnership	This variable takes a value of 1 if firm current legal status is partnership
Sole Prop	This variable takes a value of 1 if firm current legal status is sole proprietorship
Other legal ownership	This variable takes a value of 1 if firm select ownership status as other ownership
Foreign ownership	Percentage of foreign ownership
Female ownership	This variable takes a value of 1 if firm has at least one female owner
Firm age	Firm age
Bank Finance	Proportion of working capital borrowing from banks