

# Corporate governance reforms and investment efficiency: evidence from an emerging economy

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**Abstract:** This study examines the effect of reforms in corporate governance code on investment efficiency in the emerging economy. The study uses quarterly financial data of non-financial firms listed on the Pakistan Stock Exchange. This study finds that reforms in corporate governance code improve investment efficiency by mitigating agency problems. In addition, corporate governance reforms are more helpful in curbing overinvestment than underinvestment. The study further divides the sample into politically connected and non-political connected firms for additional analysis and finds that corporate governance reforms have no role in improving the investment efficiency for politically connected firms. The study also finds that corporate governance reforms effectively mitigate overinvestment for non-political connected firms than politically connected firms. Overall, these findings imply that increasing the monitoring role by corporate governance mechanisms can reduce agency conflicts and improve corporate investment decisions. Further, Legal restrictions are required on political connections as overinvestment is not good for the economy.

**Keywords:** corporate governance reforms; investment efficiency; political connection; overinvestment; underinvestment

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## Introduction

The financial crises, corporate frauds, and organizational collapse resulting in resignations, court cases, and bankruptcies made corporate governance a hot topic to discuss for scholars and professionals (Francesca Cuomo et al., 2016). Many of these scandals' common cause are is the corporate-level management's unethical practices, forcing countries to initiate mandatory guidelines to strengthen the corporate governance framework. In the past, the firms do not necessarily require compliance to good governance. Many corporate governance standards, i.e., codes, formal regulations, and guidelines, are established to improve corporate governance practices. Prior literature documents that better corporate governance practices increase the firm's access to external financing, reduce corporate failures, promote a better relationship among stakeholders and ensure efficient resource allocation (Claessens and Yurtoglu, 2013). These better practices also help firms to make sound decision-making (Shivani et al., 2017). The Cadbury Committee report in 1992 and Sarbanes Oxley Act 2002 is an important development in corporate governance, which drives the rest of the countries to follow similar codes. From the last couple of decades, codes encourage firms to increase accountability and

transparency (Mallin, 2013). Corporations in both emerging and developed markets have made changes in their governance mechanisms where required. In line with such needs, following global developments, Pakistan has also established a series of such reforms in corporate governance, but the findings of (Yan Wang et al., 2019) and (Javed Khan and Shafiq Ur Rehman, 2020) doubted the effectiveness of recent 2017 CG reforms in making better corporate governance practices in Pakistan. The growing need and policymakers' keen interest in improving corporate governance practices in Pakistan makes it necessary to examine their effectiveness in mitigating the agency cost. However, it would be tick-in-the-box only unless it probes to what extent corporate decision-making responds and results in recent reforms.

Emerging literature finds that corporate governance reforms (CG reforms) increase firm value (Fauver et al., 2017), decrease tax avoidance (Li et al., 2019), and see a significant reduction in crash risk with the enactment of CG reforms (Hu et al., 2020). Reforms in corporate governance improve financial reporting quality (Ahmed Husseinali et al., 2016). Studies suggest that improving financial reporting quality helps transparent information environment and reduces agency conflicts (Biddle et al., 2009; Cheng et al., 2013; Chen et al., 2011). Theoretically, conflicts of interest between shareholders and managers due to information asymmetry lead a firm to investment inefficiency (Jensen and Meckling, 1976). Literature also suggests that two kinds of inefficient investments exist; first, the firms investing in unprofitable projects with negative net present value, known as overinvestment. Second, the firms passing up investment opportunities in profitable projects with positive net value are known as underinvestment (Biddle et al., 2009). Reforms in corporate governance are more beneficial for emerging economies as they make corporate mechanisms more effective, increase investor confidence and compete with multinational firms (Reed, 2002). (Gill et al., 2012) found that firms require good corporate governance to make profitable investment decisions to prosper in markets domestically and globally. In recent times, corporate governance's role in achieving economic goals has become the subject of research. Earlier studies conclude that corporate governance mechanisms are crucial to investment decisions (Singh et al., 2012). Insufficient and excessive investment in the investment sector is widespread, which seriously hinders the company's progress.

Investment inefficiency leads to frustrating outcomes, negative company value, reputation, and performance, resulting in overinvestment and underinvestment. However, various factors influence such deviation levels, and one of the elements is the firm's political connections. These Connections with firms prevail, especially in emerging economies with poor institutional quality and legal rights protections. (Khwaja and Mian, 2005) confirms that Pakistani businesses are famous for their friendly relationships with politicians. Many studies have documented that those business relationships with politicians give companies valuable resources, with more relationship-based contracts and easier access to external financing, influencing investment decisions of the firms (Houston et al., 2014; Lang et al., 1996; Piotroski and Zhang, 2014). Political ties solve the underinvestment problem by increasing the capital for investment activities and reducing financial constraints (Xu et al., 2011). However, the ingress of more outside money in the firm from political ties can make firms prone to sub-optimal investments. Political connections also result in more significant government interference and disrupt companies' future goals. Political ties will force companies to invest in government-favored projects without focusing on companies' plans and the project's net present value, resulting in the firm's investment inefficiency (Chen et al., 2011). The impact of political connections depends on institutional settings and the country's economic growth (Faccio, 2006; Lee & Wang, 2017; Muttakin et al., 2015). Some studies report that political connections decrease firm value (Jackowicz et al., 2014), and an increased likelihood of expropriation firms assets for political use (Bertrand et al., 2007)

In the Pakistan context, fragile political governance and easy access to bank financing encourage firms with political connections to do business. According to (Pan and Tian, 2018), a high level of corruption in country officials, heavily interventionist government, and low property rights protection facilitates firms' easy access to finance. Moreover, from an agency theory perspective, Political connections negatively affect a firm's performance (Wu, Wu, Zhou, & Wu, 2012)

and damage the corporate board's controlling functions (You & Du, 2012). Despite the inconsistency in political connections' outcomes, researchers ignored how the corporate investment policy of politically connected firms' reacts to CG reforms. To cope with this gap, we assume that good corporate governance practices will increase monitoring by shareholders and outsiders, resulting in weakening the strength of political connections, which will help to maintain optimal investment levels in firms.

This study seeks to examine CG reforms' influence in shaping firms' investment efficiency and, more significantly, in firms having connections with politicians. This study will investigate the research question:

"Does reforms in corporate governance code influence firm investment efficiency?"

We postulate this research question because poor corporate governance practices lead firms to deviations from optimal investment levels, and these poor practices mostly persist in politically connected firms (Faccio, 2010). Regulators worldwide continuously improve corporate governance practices to safeguard shareholders' interests, corporate frauds, and organization failures, subsequently impacting investment efficiency.

### 1.1. The recent shifts in corporate governance codes of Pakistan:

Over recent years, Pakistan is actively following up CG reforms like other countries. In 2002, the Securities Exchange Commission of Pakistan (SECP) established the first corporate governance code that was enforced for all Pakistani listed firms to comply. The CG reforms' core objective is to give investors' confidence and handle the problems associated with emerging economies, that is, tax evasions and non-payment of dividends to shareholders (Ashraf and Ghani, 2005). In the beginning, the 2002 code's implementation was a challenge for regulators because firms did not understand the code's regulations. This resulted in the firm's defaulters and de-listed due to non-compliance with the code. Then the code was revised in 2012, which made directors more accountable (Awan, 2014). However, the changes were made by SECP according to the need for better corporate governance practices, and revised CG 2017 was introduced with some differences compared to an earlier one. Previous 2012 CG reforms recommend that the board should have one independent director. However, the revised 2017 CG reform requires that at least two independent directors must be on board. Similarly, 2012 CG reforms recommend female directors on board, while revised code 2017 states that at least one female director must be on board. These changes are due to trends and settings in corporate governance mechanisms around the world. Luxemburg and Austria both countries recommended gender diversity on board (European commission, 2016). The 2017 CG reforms have reduced the maximum number of directorships held by a director simultaneously in listed companies from seven to five. Further, the 2017 CG reforms have also included alternate directorship in this limit, not in the 2012 CG reforms. For CEO duality, the requirement in code 2017 has been continued, previously in code 2012, the Exemption was granted to companies, but in code 2017, the Exemption is removed. The comparison and changes made between CG reform 2012 and revised CG reforms 2017 are presented in Table 1.

**Table 1: A Comparison of the CG reforms 2012 and the revised CG reforms 2017**

CG provisions	CG reforms 2012	CG reforms 2017
<b>Independent Director</b>	At least one	At least Two
<b>Gender Diversity</b>	Gender Diversity recommended	At least one female director
<b>Board Busyness</b>	A director can be on the board of 7 listed companies.	Number of possible simultaneous directorships reduced from 7 to 5.
<b>CEO Duality</b>	Exemption for some companies on request	Fully enforced, Exemption removed

This study includes 165 non-financial firms of Pakistan with quarterly financial data from Q1 2016 to Q3 2020 and 2473 firm-quarterly observations. Findings show that a CG reform is negatively associated with investment inefficiency. Hence, a CG reform reduces agency issues and enhances investment efficiency. The CG reforms also reduce overinvestment in firms but have no significant impact in mitigating underinvestment. In contrast, to the study of (Ullah et al., 2020), the main cause of inefficiency is not underinvestment but overinvestment. We find that CG reforms effectively improve investment levels in non-political connected firms' than politically connected firms. The results also show that CG reforms reduce overinvestment in non-political connected firms compare to politically connected firms, while no significant effect is found on underinvestment. Our findings extend the literature on corporate governance mechanism and corporate decision making (Bilel Bzeouich et al., 2019; Samridhi Suman and Shveta Singh 2020; Xin Chen, 2015; Zhong-qin Su et al., 2013). These findings also extends the literature on reforms in corporate governance (C. José García Martín and Begoña Herrero 2018; Javed Khan and Shafiq Ur Rehman; 2020 Yan Wang et al., 2019). Our findings for politically connected firms' investment efficiency are consistent with (Su et al., 2013). Legal restrictions are required on political connections as overinvestment is not good for the economy.

This study aims to make several novel contributions and to extend corporate governance literature. Our study is the first to examine the effect of the recently implemented 2017 CG reforms on investment efficiency in Pakistan, where country governance structure, organizational settings, and investor protection are deficient compared to developed countries (Akhtar et al., 2018; Ghosh, 2006; Wang et al., 2019). Second, CG reforms' role in improving governance practices depends on their effectiveness. According to (Yan Wang et al., 2019) and (Javed Khan and Shafiq Ur Rehman, 2020), the previous 2012 CG reforms was not effective in improving corporate governance practices of the firms in Pakistan; this argument provides a fertile field to study how the new 2017 CG reforms influence the investment decisions in Pakistani firms. Third, our study also extends the literature on the relationship between political connection and investment efficiency. Earlier researchers examined the relationship between political connections and investment efficiency (Nur Imamah et al., 2019; Xiaofei Pan & G tian 2018; Xu et al., 2011), but our study theoretically contributes by proposing that this relationship may be changed by additional exogenous factors such as CG reforms. The thesis also empirical contributes to the literature by linking the constructs that hasn't been investigated before. Fourth, according to the Security Exchange Commission of Pakistan (SECP), firms must evaluate their performance after two years of implementing CG reforms 2017. So, we offer up-to-date evidence by investigating whether a change in CG reforms enhances investment efficiency by using 165 non-financial firms listed on the Pakistan Stock Exchange from 10 different sectors. Fifth, to the best of our insight, this is the first study using quarterly financial data in Pakistan for analysis; we argue that producing quarterly data improve results. For example, (Wiedman 2007) found that interims play a significant role in equity markets. (Rahman and Ismail, 2008) states that interims increase the comparability of financial results and provide timely information on companies' development (Mc Ewen and Schwartz, 1992). Finally, we used an alternative proxy for investment efficiency and econometric models to deal with endogeneity issues. We also divide our sample into subsamples to examine whether reforms in the CG reforms deal with this over and under-investment problem. These objectives will highlight the importance of changes in corporate governance regulation for firms in emerging economies.

## **2. Literature review and hypothesis development:**

### **2.1 Corporate governance and Investment efficiency:**

The promoters of good corporate governance practices argue that reforms in corporate governance effectively improve board oversight and monitoring, helping firms reduce agency issues (Jensen and Meckling, 1976). These practices should make companies more accountable and more comfortable to monitor by shareholders and outsiders. It also helps companies build trust in investors and the community. Consequently, corporate governance contributes to financial sustainability by providing market participants with a long-term investment. This leads to higher corporate value

decisions and eventually better or more efficient investment (Bushman & Smith, 2003; Jensen & Meckling, 1976). Corporate governance mechanisms are designed to safeguard shareholders' interests and assure them of earning a profit on their investments (Becht et al., 2002; Shleifer & Vishny, 1997). Corporate governance structure and company investments are vital measures to evaluate and monitor an organization's management, financial strength, and future direction. Literature suggests that good corporate governance practices help mitigate agency issues' (Anh Huu Nguyen et al. 2020), which allow firms maintain optimal investment level in the firms and encourage managers to perform their duties properly. (M. Sadiq and M. Abbas, 2019) suggests that good governance practices increase investment levels. A better corporate governance mechanism also allows firms to deal with overinvestment and underinvestment. (Richardson 2006) discovers good corporate governance practices reduce the overinvestment problem in firms caused by an elevated free cash flow level. Supporting the previous argument (Huang et al., 2015) also mentions that corporate governance mechanisms improve the firm's investment level by reducing over-investment. The absence of proper monitoring can cause overinvestment, but this may also result in a high rise in the rate of returns required by shareholders' which can cause underinvestment in firms. Although corporate governance has been extensively researched but focusing on numerous changes in laws and regulations worldwide, evidence of its effectiveness in reducing over and under investment is still limited. However, introducing various corporate governance mechanisms can help deal with these problems to minimize agency issues (Chen et al., 2009).

## **2.2 Reforms in Corporate governance attributes and investment efficiency:**

Literature suggests that independent directors on board are the solution for solving agency issues in the firm. Corporate boards with a higher ratio of independent directors increase the effectiveness of corporate governance practices, minimize corporate frauds and stop managers from confiscating and exploit organizational resources (Baesley, 1996; Khanchel, 2007; Niu, 2006). Independent directors with no familial or business relationship with management can protect shareholder's interests (Knyazeva et al., 2013), making independent directors stronger to challenge management decisions (Klein 2002) and increase firm performance with better corporate decisions making (Kim et al., 2014). Furthermore, independent directors help control inside self-dealing and enhance investment efficiency (Liu et al., 2015). (Richardson 2006) suggests that independent directors onboard prevent managerial opportunism and restrain them from deterioration of profits due to underinvestment and overinvestment. In contrast, (Nor et al., 2017) discovered no significant association between independent directors and investment efficiency. Nevertheless, (Bzeouich et al., 2019) observed a positive effect of independent directors on firm investment. Most recently, (Ben Kwame Agyei-Mensah, 2021) finds that independent directors on board help firms to curb overinvestment and enhance investment efficiency.

For the last couple of decades, women's are joining men's clubs by putting an end to male dominance in corporate boards. The literature on gender diversity demonstrates that women bring various characteristics to the board. (Pfeffer and Gerald, 1978) documents that female directors' representation on board improves corporate decision-making and monitoring roles. Similarly, (Zhu et al., 2012) found that females are more risk-averse than men and constrain firms' investment. Female directors' presence on board improves corporate governance practices and increases firm value (Ullah et al., 2020). Agency theory argues that a corporate board with gender diversity improves monitoring roles as board members belong to various backgrounds (Carter et al., 2003; Ullah et al., 2020). Furthermore, boards with gender diversity help firms lessen asymmetric information, agency issues and improve firm reputation (Abad et al., 2017; Gul et al., 2011). From resource dependence theory, the presence of females on board helps management focus on future long-term goals, enhance strategic decision-making, and achieve the firm's objective by providing better customer insight (Matsa and Miller, 2013; Nielsen and Huse, 2010; Wang and Kelan 2013). However, (Nguyen and Dong, 2013) observed no relation between board gender diversity and firm investment decisions. The studies show that male dominate firms are more prone to overinvestment (Lückerath-Rovers 2013). In contrast, prior studies documents that a competitive environment reduces the overinvestment problem (Stoughton et al., 2017). Females find to be less

overconfident than men, which helps the firm curb overinvestment issues (Huang and Kisgen, 2013). Similarly, (Sultan Sikandar Mirza et al., 2019) documents that those female directors help firms curtail overinvestment but cannot reduce underinvestment.

Agency theory suggests that the board members are responsible for protecting shareholders' rights and interests with monitoring management issues (Phan & Yoshikawa, 2000). But the conflict of interests arises when managers tend to pursue their own interests. These interests could be holding multiple directorship positions in firms by the board of directors. The quantity of holding various positions by directors is a controversial corporate governance matter in the world. Existing literature possesses mix theoretical opinions on "busyness." (Ferris et al., 2003) used the word "Busyness" for directors with multiple appointments as director. Studies argue that multiple appointments can make directors less passionate, which compromises their commitment towards the welfare of shareholders' interests, affecting firm value (Fich and Shivdasani, 2006), lead to high remuneration of CEO's (Core et al., 1999), and results in increasing corporate frauds (Beasley, 1996). On the other hand, (Fama and Jensen, 1983; Fama 1980) documents that in the presence of a competitive market, the number of multiple directorships may result in higher director's quality. Moreover, a larger number of directorships result in more networks that give the firm benefits in the shape of easy and excess needed resources, customers to the company, and suppliers (Booth and Deli, 1995; Pfeffer, 1972). Studies report that multiple directorships improve firm performance by earning higher returns from acquisitions (Harris and Shimizu, 2004). Nevertheless, (Vu Quang Trinh et al., 2020) documents that the busy directors may encourage the board to follow the optimal investment policy by making sufficient internal resources, helping firms reduce the underinvestment problem. Agency theory explains that managers commit to managerial opportunism to pursue their own benefits by deteriorating shareholders' interests. Based on this argument, CEO duality is unfavorable because it shifts decision power to a single person resulting in weaker board monitoring and decreasing firm value (Dalton et al., 1998; Krause et al., 2014). Prior studies show that high inside director ownership, entrenched management, and CEO duality result in the firm's weekend board monitoring function (Shleifer and Vishny, 1989; Ashbaugh-Skaife et al., 2006; Bebchuk et al., 2009). These arguments are widely discussed and supported by the practitioners that CEO duality weakens the Governance mechanism (Lublin, 2009; Iannelli, 2013; Krause, 2017). Nevertheless, (Wafa Masmoudi Ayadi and Younes Boujelbène 2015) observe that CEO duality negatively affects accounting earnings' value relevance. (Nihat Aktas et al., 2017) documented that CEO duality weakens investment decisions and firms makes inefficient investment by investing in low growth opportunities. To sum up the above arguments, from an agency theory perspective, CEO duality weakens board oversight and increases managerial dominance, and theory suggests that to avoid managerial entrenchment, board members must be independent of management, consistent with (Fama and Jensen, 1983; Eisenhardt, 1989). Following agency theory, we assume that increasing the monitoring role by corporate governance mechanisms will improve corporate investment decisions. Based on this discussion, we assume the reforms in the CG code will enhance investment efficiency.

## **H1**

Reforms in the corporate governance code help firms to improve Investment Efficiency.

## **H2**

Reforms in the corporate governance code are negatively associated with overinvestment (underinvestment).

### **2.3 Corporate Governance, Political Connections, and Investment Efficiency:**

A political connection is a common phenomenon globally, whether in a developed or emerging country. Earlier studies found that these political connections add various benefits to the firm's such as government subsidies, lighter tax, valuable inside information, long-term debt, and low-interest rates contracts (Goldman et al., 2011; Faccio, 2010; Khwaja & Mian, 2005; Li et al., 2008). To enjoy those benefits, firms take full advantage of political connections to pursue their objectives. The exploitation through political connections varies; Such as managerial overconfidence (He et al., 2018), bank loans (Yeh et al., 2013), earning quality (Harymawan & Nowland, 2016), firm performance (Wong & Hooy, 2018), and investment efficiency (Ling et al., 2016). Numerous studies have found the linkage between political connections and other factors, but the link between political connection, corporate governance, and investment efficiency is found to be very rare and specific in terms of corporate governance characteristics, such as (Nur Imamah et al., 2019). The role of political connections with a change in corporate governance practice and investment efficiency is a relatively new topic, especially in the context of Pakistan. We argue that this relationship may be different in Pakistan, where the weak rule of law, poor legal protection, and a high level of corruption exists. For instance, (Su et al., 2013) reports that firms connected with high-profile government officials positively affect a firm's overinvestment. He also mentioned that Chinese companies' growth and economic expectation are based on a relationship called *guanxi*, where government policies highly control investment. These results may not be valid in Pakistan due to different political setups compare to china. Political ties are more visible in high corruption levels and less developed countries (Faccio, 2006; 2010). Moreover, the political connections are more active in jurisdictions due to the higher level of corruption (Chen et al., 2010). Supporting the previous argument, (Boubakri et al., 2012) also found that firms having political ties in countries with weaker democracy and a higher level of corruption will have lower capital costs.

During the last decade, three prime ministers were sentenced to jail against corruption charges; this shows the level of corruption in Pakistan, which will impact firm investment decisions. Additionally, the government has no restrictions on political connections in Pakistan's private sectors (Rehman, 2006). These weak institutional environments compromise the effectiveness of governance mechanisms (Javid, 2010). We argue that Pakistan's economy is fertile to discover the impact of double-edged sword political connections. According to the agency theory perspective (Stein, 2003) reported that conflicts of interests between stakeholders result in investment inefficiency. He also mentions that these agency issues promote over-investment in the firms. These agency issues include career motives, overconfidence, empire-building, and short-termism (E.g., Bebchuk & Stole, 1993; Holmström, 1999; Jensen, 1986). Prior studies suggest that poor governance mechanisms are the cause of agency issues in the firms. Political connections benefit firms with easy access to external financing, which causes over-investment. We argue that the CG reforms help to straighten transparency and monitor firms' role by the country's economic development. This may also help reduce the impact of political connections and bring the investment to an optimal level. Based on the 2017 CG reforms changes, we hypothesize that CG reforms will improve investment efficiency.

### **H3**

Reforms in corporate governance code negatively affect investment inefficiency in politically connected firms.

### **H4**

Reforms in corporate governance code are negatively associated with overinvestment (underinvestment) for Political Connected firms.

### 3. Research Design & Methodology:

#### 3.1 Research Sample & Data:

This study intends to investigate whether reforms in the CG reforms influence investment efficiency in Pakistani listed firms. For obtaining the required objective, listed firms on the Pakistan Stock Exchange were considered for empirical analyses. There were about 540 listed companies in 34 different sectors. We excluded financial firms from our sample because of their different investment modes (Biddle et al., 2009); because financial firms mostly invest in industrial and consumer loans. While non-financial firms mainly invest in capital expenditures. As we focus on in-depth quarterly analysis, 206 firms were excluded due to data's non-availability on variables for consecutive quarters. Finally, this study used the complete most recent available data of 165 non-financial firms over the period of Q1 (September 2016) to Q3 (March 2020). We collect quarterly financial data 6 quarters before to 9 quarters after reforms in the CG reforms were made. We have 15 quarterly observations for each firm and more than 2400 firm-quarterly observation. The firms are selected from eleven major non-financial sectors of the Pakistan Stock Exchange, and the financial data are hand-collected from quarterly financial statements of the chosen firms. Data for Political connections are collected from quarterly reports of selected firms.

#### 3.2. Model Specification:

To be consistent with the literature (e.g., Biddle et al. 2009; Chen et al., 2011; Xu et al., 2013) the Hypothesis developed to examine CG reforms' effect on investment inefficiency. We will follow panel regression with Ordinary least Square (OLS) to test our hypothesis.

H1:

$$IE_{i,t} = \alpha + \beta_1 CGC_{it} + \beta_2 Lev_{i,t-1} + \beta_3 Size_{i,t-1} + \beta_4 ROA_{i,t-1} + \beta_5 FirmAge_{i,t-1} + \beta_6 Cash\ flow_{i,t-1} + \beta_7 Div_{i,t-1} + \beta_8 CAPEX_{i,t-1} + \beta_9 Indep_{i,t-1} + \beta_{10} Sales\ Growth_{i,t-1} + Industry + Quarter + \epsilon_{i,t} \quad (1)$$

H2:

$$OI_{it} = \alpha + \beta_1 CGC_{it} + \beta_2 Lev_{i,t-1} + \beta_3 Size_{i,t-1} + \beta_4 ROA_{i,t-1} + \beta_5 FirmAge_{i,t-1} + \beta_6 Cash\ flow_{i,t-1} + \beta_7 Div_{i,t-1} + \beta_8 CAPEX_{i,t-1} + \beta_9 Indep_{i,t-1} + \beta_{10} Sales\ Growth_{i,t-1} + Industry + Quarter + \epsilon_{i,t} \quad (2)$$

$$UI_{it} = \alpha + \beta_1 CGC_{it} + \beta_2 Lev_{i,t-1} + \beta_3 Size_{i,t-1} + \beta_4 ROA_{i,t-1} + \beta_5 FirmAge_{i,t-1} + \beta_6 Cash\ flow_{i,t-1} + \beta_7 Div_{i,t-1} + \beta_8 CAPEX_{i,t-1} + \beta_9 Indep_{i,t-1} + \beta_{10} Sales\ Growth_{i,t-1} + Industry + Quarter + \epsilon_{i,t} \quad (3)$$

For testing hypothesis three and four, we develop following model to examine CG reforms' effect on politically connected firms' investment inefficiency.

H3:

$$IE_{i,t} = \alpha + \beta_1 CGC_{it} + \beta_2 Lev_{i,t-1} + \beta_3 Size_{i,t-1} + \beta_4 ROA_{i,t-1} + \beta_5 FirmAge_{i,t-1} + \beta_6 Cash\ flow_{i,t-1} + \beta_7 Div_{i,t-1} + \beta_8 CAPEX_{i,t-1} + \beta_9 Indep_{i,t-1} + \beta_{10} Sales\ Growth_{i,t-1} + \beta_{11} PC_{i,t-1} + Industry + Quarter + \epsilon_{i,t} \quad (4)$$

H4:

$$OI_{it} = \alpha + \beta_1 CGC_{it} + \beta_2 Lev_{i,t-1} + \beta_3 Size_{i,t-1} + \beta_4 ROA_{i,t-1} + \beta_5 FirmAge_{i,t-1} + \beta_6 Cash\ flow_{i,t-1} + \beta_7 Div_{i,t-1} + \beta_8 CAPEX_{i,t-1} + \beta_9 Indep_{i,t-1} + \beta_{10} Sales\ Growth_{i,t-1} + \beta_{11} PC_{i,t-1} + Industry + Quarter + \epsilon_{i,t} \quad (5)$$

$$UI_{it} = \alpha + \beta_1 CGC_{it} + \beta_2 Lev_{i,t-1} + \beta_3 Size_{i,t-1} + \beta_4 ROA_{i,t-1} + \beta_5 FirmAge_{i,t-1} + \beta_6 Cash\ flow_{i,t-1} + \beta_7 Div_{i,t-1} + \beta_8 CAPEX_{i,t-1} + \beta_9 Indep_{i,t-1} + \beta_{10} Sales\ Growth_{i,t-1} + \beta_{11} PC_{i,t-1} + Industry + Quarter + \epsilon_{i,t} \quad (6)$$

Where  $IE_{i,t}$  refer to investment efficiency,  $OI_{it}$  is overinvestment, and  $UI_{it}$  is underinvestment.  $CGC_{it}$  indicates CG reforms, a binary variable that equals one for a period of enforced CG reforms and zero otherwise. In our estimation, we use several control variables by following (Biddle et al., 2009; Majeed et al., 2018; Ullah et al., 2020). We use  $PC_{i,t-1}$  as a binary variable that takes value one for a firm having a connection with a politician otherwise zero. We also control for  $Size_{i,t-1}$  as a log of total assets,  $Lev_{i,t-1}$  calculates as debt to equity ratio, and  $ROA_{i,t-1}$  is the proxy for return on assets, computed as net profit over total assets.  $FirmAge_{i,t-1}$ , firm years of incorporation, and  $Cash\ flow_{i,t-1}$  measured as Net profit plus depreciation over total assets in the current quarter following (Xiaofei Pan & Gary Gang Tian 2017).  $Indep_{i,t-1}$  shows a number of independent directors on the corporate board.  $CAPEX_{i,t-1}$  is the current quarters capital spending's to total assets. While,  $Sales\ Growth_{i,t-1}$  is the difference between Sales in Quarter  $t$  and Quarter  $t-1$ , over Quarter  $t-1$ . Industry effects and quarter effects are also taken into account.

### 3.3. Measurement of variables:

#### 3.3.1 Investment Efficiency:

Theoretically, investment efficiency means investing the money in a project having positive net present value. When the investment is at the optimal level, it is considered an efficient investment. However, when a firm invests more than its optimal level, it leads the firm to over-investment. In contrast, firms passing up an investment opportunity in profitable projects are known as under-investment. We use (Biddle et al., 2009) as a proxy for measuring investment efficiency. Firstly, we obtain the measure of (Biddle et al., 2009) by developing the below-mentioned model. They predict that investment is related to growth opportunities, which are calculated as:

$$Investment_{i,t+1} = \beta_0 + \beta_1 * Sales\ Growth_{i,t} + \varepsilon_{i,t} \tag{7}$$

$Investment_{i,t+1}$  is the total investment of firm  $i$  in the year  $t$ . Investment is measured as the capital expenditure ratio (purchase of long-lived assets and intangible assets subtract selling these assets) divided by total assets (Xiaofei Pan & Gary Gang Tian 2017).  $SalesGrowth_{i,t}$  represents investment opportunities measured as the difference between sales in quarter  $t$  and quarter  $t-1$ , divided by Sales in quarter  $t-1$ . The Growth in sales higher than the expected level means positive residual results in overinvestment, whereas a lower sales than expected level means negative, resulting in underinvestment. Therefore, IE's dependent and test variable which shows the absolute value of residuals multiplied by  $-1$ , representing an efficient investment.

First, to evaluate the optimal corporate investment level, we followed Biddle (2009) using the model (3). The evaluated optimal investment is then subtracted from the actual investment to find investment inefficiency, which shows overinvestment and underinvestment in firms. If investment inefficiency is greater than zero, it is considered as overinvestment, denoted by OI. If investment inefficiency is lower than zero, it is regarded as underinvestment, characterized by UI. The absolute value of investment inefficiency is also used, which is denoted by IE. A higher IE indicates lower investment efficiency. Table 2 shows definitions of all of the variables used in models.

#### 3.3.2. Measurement of political connection:

We follow prior literature to define political connections as the firm is considered connected when it has politicians' at the board of directors (Boubakri et al., 2013; Faccio 2006; Lee and Wang 2017; Nur Imamah et al., 2019). According to (Faccio et al., 2006) the firm could be politically connected in two ways, i.e., direct connections and indirect connections. First, direct connection refers to when a board of directors stands as a candidate in national and provisional elections. We collected data for politicians of contested candidates of elections 2013 and 2018 from the Pakistan Election Commission. The data set contains detailed information, including candidate name, political party affiliation, the number of votes polled for each candidate, and electoral result. Each politician is recognized by a set of first and last

names. Generally, in Pakistan, the first name refers' both given and middle name, where the last name shows the caste. Such as, Muhammad Hassan Awan, the first name is Muhammad Hassan, which refers; to the given and middle name, and Awan shows the caste. It is very uncommon and rare that a politician has the same first and last name. However, we checked and didn't found any anomalies. Second, the firm can be indirectly connected with politicians in two ways. First, the firm can be classified as indirectly associated with a politician "when relatives with same last names are politicians', head of state or ministers (Faccio et al., 2006). Or a firm is considered to be indirectly connected when a large shareholder or top official having close relations such as a friendship with a Member of Parliament or government official described by the Fortune, Forbes, or Economist (Faccio et al., 2006). Detailed information of the Board of Directors is extracted from quarterly reports of the selected companies. Finally, the complete names of board members are matched with the names of the politicians. If we found an accurate match, so the firm is identified as a politically connected firm. During the process, we found 57 firms connected to the politicians.

### 3.3.2. Control Variables:

We Follow (Biddle et al., 2009; Irfan Ullah et al., 2020) to use various control variables, which includes; Size because firm affects agency issues (Jensen and Meckling, 1976). Sales Growth (SG) is measured as the percentage change in quarterly sales. More growth opportunities lead the firm to higher liquid assets (Kim et al., 1998) for profitable financing opportunities at the time of costly external funding and low inflow of cash (Opler et al., 1999). More inflow of funds leads firms to discretionary use of funds, resulting in underinvestment and overinvestment (Gul, 1999). (Firmage) plays a role in investment decisions because it shows how long a firm shares are quoted on a Stock Exchange (Richardson, 2006) and may positively associate with investment. Return on assets (ROA) is used to measure profitability by calculating net profit to total assets. We predict a positive association with investment efficiency (Wang et al., 2016). Cash flow (OCF) is used as a control variable because it will show the effect of cash on investment efficiency following (Sánchez Ballesta & Cutillas Gomariz, 2014). We use Independent directors (Bind) because it plays a vital role in reducing agency issues in firms, following Fama and Jensen (1983). We also use Debt to Equity (Lev) as a Leverage control variable following (Agrawal and Knoeber, 1996) because agency risk reduces debt financing, which also curtails overinvestment (Jensen, 1986). CAPEX is the level of capital investment expenditure. High-level investment spending reduces agency conflicts (Modigliani and Miller 1958), so a positive association is expected between CAPEX and investment efficiency. We also used dividend (Div) because dividend payment shows the welfare of shareholders' interests, reducing agency problems (Jensen and Mackling 1976). For Variables definitions, see Table 2.

Before heading towards the main results, some calculations for variables must be noted. We follow (Xiaofei Pan & Gary Gang Tian, 2017) for calculating quarterly financial data. The financial data extracted from the profit and loss statement and cash flow statement of firms' cash transactions are recorded from the beginning of the current year. To ascertain a particular quarter's actual cash transaction, we compute the difference between two consecutive quarterly observations in the same year; for example, investing activities at the end of 2017Q2 and 2017Q3 represent investing activities for the first two and three quarters of 2017. The difference (2017Q3-2017Q2) is the actual investing activities for the third quarter of 2017. Variables from the Income statement and Cash flow statement includes; capital investment expenditure, cash flow, and sales level.

## Table 2

This Table lists variable symbols and corresponding definition

Variable	Definitions
<u>Dependent variable</u>	
Investment ( <i>I</i> )	Capital expenditure minus sale of long-lived assets divided by total assets in the current quarter
Biddle_2009	the absolute values of the residuals, for measuring investment efficiency
Chen_11	the absolute values of the residuals, for measuring investment efficiency
OI	Overinvestment, if the residual is more than 0
UI	Underinvestment, if the residual is less than 0
<u>Independent variable</u>	
CG reforms ( <i>CGC</i> )	Dummy variable takes a value of 1 for the period when the reforms in CG reforms applied, and 0 for otherwise
Political Connected Firm ( <i>PC</i> )	The dummy variable takes a value of 1 for the politically connected firm and 0 for otherwise.
CAPEX	Capital expenditure to total assets in the current quarter
Independent Director ( <i>Indep</i> )	Numbers of Independent directors to Boards.
Sales Growth	The difference between Sales in Quarter <i>t</i> and Quarter <i>t-1</i> , divided by Sales in Quarter <i>t-1</i>
<u>Control variable</u>	
ROA	Net profit to total assets
Firm Age	Logarithm of the number of years of firms' incorporation.
Firm Size	Log of total assets in the current quarter
Leverage ( <i>Lev</i> )	The ratio of total debt to total equity in the current quarter
Dividend Paid ( <i>DP</i> )	Dummy variable one if the company paid a dividend during the study period
Cash flow	Net profit plus depreciation over total assets in the current quarter

## 4. Empirical findings

### 4.1. Descriptive Statistics

Descriptive statistics in Table 3 presents all the variables used in our sample period, Q1, 2016 – Q3, 2020. The investment efficiency *Biddle\_IE* mean is 0.075; maximum 1.123 and minimum 0.000 indicate that listed companies' investment efficiency is entirely different. The sample with regression residuals less than 0 is 1,022, and greater than 0 is 1,451. According to Table 3, the *Biddle\_UI* underinvested sample is 1,021, *Biddle\_OI* overinvested sample is 1,450. *CGC* (CG reforms) has a mean of 0.600, which means 60% of the period is focused on after the CG reforms. *OCF* mean value is 0.024; its positive sign shows that most firms' have positive cash flow from their operations. *PC* has 0.345,

which indicates that the study sample contains 34% of politically connected firms. *Lev* has a mean of 2.004, which is high indicating that most of the firms are getting more of their financing by borrowing money. *DIV* with 0.662 means indicates that more than half of the firms pay a dividend during the study period. Independent directors on board are 0.213, which does not comply with the recommendation of the code 2017 that is to be one-third of the total membership. Moreover, the minimum value of *Bind* is 0 also indicates that the compliance to the recommendation of the 2017 CG reforms to board independence is voluntary in firms.

**Table 3**  
**Descriptive Statistics**

Variables	Obs	Mean	Std.Dev.	Min	Max	p1	p99
Biddle_IE	2,473	0.075	0.149	0.000	1.123	0.000	1.123
Biddle_UI	1,022	-0.048	0.070	-1.605	0.000	-0.228	0.000
Biddle_OI	1,451	0.103	0.236	0.001	1.704	0.001	1.704
CGC	2,473	0.600	0.490	0.000	1.000	0.000	1.000
PC	2,473	0.345	0.475	0.000	1.000	0.000	1.000
Size	2,473	22.97	1.926	-0.018	27.457	17.507	26.946
Lev	2,473	2.004	6.445	-58.876	108.301	-4.453	28.242
SalesGrowth	2,473	0.194	1.076	-0.954	8.119	-0.954	8.119
OCF	2,473	0.024	0.029	-0.056	0.164	-0.056	0.164
Div	2,473	0.622	0.485	0.000	1.000	0.000	1.000
CAPEX	2,473	0.015	0.022	-0.009	0.128	-0.009	0.128
FirmAge	2,473	3.530	0.443	2.197	4.234	2.197	4.234
ROA	2,473	0.022	0.050	-0.687	1.277	-0.063	0.141
Bind	2,473	0.213	0.123	0.000	0.571	0.000	0.571

**Note:** Summary statistics of all variables used in our analysis are reported in table 3 above. Biddle is the absolute value of residuals of investment model presented in Biddle et al. (2009) multiplied by  $\_1$ ; CGC is dummy variable which takes value 1 for the period when the reforms in CG reforms applied, and 0 for otherwise; PC is dummy variable takes a value of 1 for the politically connected firm and 0 for otherwise; Lev is the ratio of total debt to total equity in the current quarter; Size is the natural logarithm of total assets in the current quarter; SalesGrowth the difference between Sales in Quarter  $t$  and Quarter  $t-1$ , divided by Sales in Quarter  $t-1$ ; OCF is net profit plus depreciation to total assets in the current quarter; Div is dummy variable one if the company pays a dividend; CAPEX is capital expenditure

to total assets in the current quarter; Firmage is log of the number of years since firm incorporation; ROA is net profit to total assets; Bind is numbers of Independent directors on Board. Table 2 provides definition for variables.

#### 4.1 Correlation matrix

Table 4 presents the results in Pearson correlation for variables used in this study. We didn't find any multicollinearity issue in Pearson correlation and clearly shows that the coefficient value for any two variables does not exceed 0.80 (Gujarati, 2009). Table 4 shows that the correlation measure is negative and significant at a 5 percent level between CGC and investment efficiency variable, according to our expectations. CGC finds to improve investment efficiency.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
1) Biddle	1											
2) CGC	-0.023**	1										
3) PC	-0.028**	0.001	1									
4) SIZE	-0.049**	0.061***	0.072***	1								
5) Lev	-0.017	-0.034*	0.103***	0.016	1							
6) Sales-Growth	0.120***	-0.053***	0.012	-0.017	-0.003	1						
7) OCF	-0.043**	-0.082***	0.083***	0.097***	-0.107***	0.083***	1					
8) Div	-0.055***	-0.084***	-0.002	0.032	-0.001	0.015	0.033*	1				
9) CAPEX	-0.022	-0.027	-0.060***	0.102***	-0.016	0.053***	0.082***	-0.037*	1			
10) FirmAge	0.010	0.063***	0.039*	-0.055***	0.029	0.006	-0.042**	0.097***	-0.007	1		
11) ROA	-0.051**	-0.044**	0.001	0.092***	-0.030	0.066***	0.414***	0.049**	0.011	0.016	1	
12) Bind	0.020	0.275***	0.099***	0.132***	0.015	-0.013	-0.008	0.060***	-0.019	-0.001	0.070***	1

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

#### 4.1. CG reforms and Investment Efficiency

Table 5 reports OLS regression results for Hypothesis one by equation (1) using Biddle et al. (2009) as baseline estimation of Investment Efficiency measure. The results of Hypothesis one in column (1) show that the coefficient of CGC is negative and significant at a 5% level, indicating that CG reforms are effective and negatively significantly correlated to investment inefficiency. Hypothesis one shows that recent reforms in CG reforms 2017 effectively improve investment efficiency in Pakistan firms. Therefore, H1 is supported. The results can create effective corporate governance mechanisms in lowering agency conflicts. This finding supports the agency theory (Chen et al., 2011; Biddle and Hilary, 2006). The estimated coefficient of control variables shows that Investment efficiency increases with Sales growth and decreases with Lev, Div, CAPEX, and ROA. A negative and insignificant relationship exists between independent directors and investment efficiency. While Size, OCF, and FirmAge find no impact on investment efficiency.

#### 4.2. CG reforms and under and overinvestment:

We split our sample into two different forms of inefficient investments, known as overinvestment (positive residual) and underinvestment (negative residual), respectively shown in the efficient investment models. Table 5 also shows the results of equations (2) and (3) for underinvestment in column (2) and overinvestment in column (3). CGC is significantly negative at a 5% level in overinvestment, which means a CG reform reduces investment inefficiency. Hence CG reforms reduce overinvestment. This will benefit firms because a decrease in overinvestment can enhance firm performance and increase dividend payments (Lang and Litzenberger 1989). (Titman et al. 2004) reports negative effect of equity returns on an investment, indicating that investors perceive higher investments as a major issue in decreasing investment efficiency. However, in the underinvestment scenario, CGC has no significant impact on investment efficiency. Therefore, CGC does not effectively reduce underinvestment. Among control variables, CAPEX finds positive with underinvestment, and Sales growth helps to lower overinvestment.

#### 4.3. CG reforms, Political Connection, and Investment efficiency:

Table 6 reports OLS regression results for hypothesis three by equation (4) using Biddle et al. (2009) as baseline estimation of investment efficiency measure. The result of Hypothesis three in column (1) shows that the coefficient of (reforms) CG reforms is negative and insignificant for politically connected firms but is negative and significant 1% level for Non-political connected firms. This indicates that CG reforms are more effective and negatively correlated to investment inefficiency for Non-Political Connected firms than politically connected firms. There might be some reasons why, like firstly, only 34% of firms are politically connected in our sample. Second, the effect of CGC may gradually improve investment efficiency for politically connected firms. Third strong political ties between political parties, corruption, and change in the political landscape may help to maintain political ties in connected firms.

We divide the sample into two kinds of inefficiencies of politically connected and non-political connected firms, which show underinvestment and overinvestment, by positive and negative residual in the efficient investment models. Table 6 also shows the results of hypothesis four by equations (5) and (6) for Political connected firms in Panel (A) and in Panel (B) for Non-Political Connected firms. The result shows that CGC is negative and significant at a 5% level for non-political connected firms in overinvestment. That Means CGC has more effect on non-political connected firms to reduce overinvestment than under-investment. The impact of CG reforms in politically connected firms exists, but it's not significant. These results do not support H4.

**Table 5****Corporate Governance Codes, Investment Efficiency, Under and Over-investment**

The table reports OLS regression results with robust standard errors clustered at firm. The *t*- values are reported in parenthesis.

\*\*\*, \*\*, and \* denote  $p < 1\%$ ,  $5\%$ , and  $10\%$ . Refer to Appendix A for variable definitions

COLUMN	(1)	(2)	(3)
	Hypothesis One	Hypothesis Two	
VARIABLES	Biddle	Biddle_UI	Biddle_OI
CGC	-0.0518**	-0.0117	-0.0989**
	(-2.5196)	(-1.1253)	(-2.2140)
Size	0.0024	-0.0004	0.0066*
	(1.4780)	(-0.5996)	(1.7891)
Lev	0.0004*	0.0003*	0.0006*
	(1.8323)	(1.8150)	(1.6932)
SalesGrowth	-0.0179***	-0.0035**	-0.0410***
	(-3.2206)	(-2.4125)	(-2.8670)
OCF	0.1675	0.1161**	0.2717
	(1.4254)	(2.2568)	(1.0381)
Div	0.0172***	0.0052	0.0190
	(2.7766)	(1.1835)	(1.5449)
CAPEX	0.2174**	0.1409*	0.4307**
	(2.1314)	(1.6927)	(2.4788)
FirmAge	-0.0020	0.0045	-0.0080
	(-0.2684)	(1.1672)	(-0.5244)
ROA	0.1372**	0.0234	0.2842
	(2.1081)	(1.0763)	(1.5290)
Bind	-0.0250	0.0080	-0.0299
	(-0.8984)	(0.2371)	(-0.5596)
Quarter Effect	Yes	Yes	Yes
Industry Effect	Yes	Yes	Yes
Intercept	-0.1277**	-0.0645***	-0.2283*
	(-2.4810)	(-2.7098)	(-1.8613)
No. of Obs	2,471	1,021	1,450
R <sup>2</sup>	0.0361	0.0231	0.0554

**Table 6**  
**Corporate Governance Code and investment efficiency, underinvestment, and overinvestment: Politically Connected Firms vs Non-Politically connect Firms**

The table reports OLS regression results with robust standard errors clustered at firm. The *t*- values are reported in parenthesis. \*\*\*, \*\*, and \* denote *p*< 1%, 5%, and 10%. Refer to Appendix A for variable definitions

	Panel A: Politically Connected Firms			Panel B: Non-Political Connected Firms		
COLUMN	(1)	(2)	(3)	(4)	(5)	(6)
	H3	H4	H4	H3	H4	H4
VARIABLES	Biddle	Biddle_UI	Biddle_OI	Biddle	Biddle_UI	Biddle_OI
CGC	0.0086	0.0210	-0.0433	-0.0696***	-0.0037	-0.1370**
	(0.2346)	(1.2317)	(-0.6489)	(-2.8817)	(-0.3788)	(-2.3826)
Size	0.0045*	-0.0007	-0.0137***	0.0024	0.0005	0.0057
	(1.6691)	(-0.7283)	(-2.7726)	(1.1641)	(0.4724)	(1.0333)
Lev	0.0010***	0.0003*	-0.0024***	-0.0009	0.0001	-0.0022
	(3.9389)	(1.8344)	(-3.1396)	(-0.9534)	(0.2471)	(-1.0821)
SalesGrowth	-0.0104*	-0.0048*	0.0124	-0.0212***	-0.0037**	-0.0589***
	(-1.6482)	(-1.8113)	(1.0598)	(-2.7611)	(-2.2199)	(-2.7697)
OCF	0.0989	0.0068	-0.1128	0.1734	0.1130*	0.4364
	(0.5493)	(0.0779)	(-0.3343)	(1.0726)	(1.8464)	(1.1257)
Div	0.0321***	0.0087*	-0.0476**	0.0135*	0.0066*	0.0126
	(2.6522)	(1.6827)	(-2.0149)	(1.8718)	(1.8010)	(0.8635)
CAPEX	0.5262**	0.3506**	-0.9705***	0.1055	0.0144	0.2634
	(2.5492)	(2.5613)	(-2.7526)	(0.8783)	(0.1610)	(1.2011)
FirmAge	-0.0115	0.0044	0.0281	0.0045	0.0025	0.0080
	(-0.8956)	(0.7849)	(1.0763)	(0.4892)	(0.6275)	(0.3823)
ROA	0.3417**	0.1651**	-0.4643	0.1251*	0.0196	0.2196
	(2.0242)	(2.0552)	(-1.4649)	(1.7903)	(1.2324)	(0.9646)
Bind	-0.0260	-0.0165	0.0699	-0.0492	-0.0382**	-0.0432
	(-0.4919)	(-0.8307)	(0.6368)	(-1.6113)	(-2.2513)	(-0.7851)
Quarter Effect	Yes	Yes	Yes	Yes	Yes	Yes
Industry Effect	Yes	Yes	Yes	Yes	Yes	Yes
Intercept	-0.1750**	-0.0637*	0.3679**	-0.1382*	-0.0635**	-0.2464
	(-2.3993)	(-1.8681)	(2.5571)	(-1.8961)	(-2.0904)	(-1.2949)
N	852	372	480	1,619	649	970
R <sup>2</sup>	0.0475	0.1177	0.0697	0.0591	0.0376	0.0953

## 5. Robustness Tests:

### 5.1 Alternative measure for investment efficiency

We used an alternative measure of investment efficiency, following Chen et al. (2011).

$$Invest_{i,t} = \alpha_0 + \alpha_1 NEG_{i,t-1} + \alpha_2 \%RevGrowth_{i,t-1} + \alpha_3 NEG * \%RevGrowth_{i,t-1} + \varepsilon_{i,t} \quad (8)$$

Variables in the above model are already discussed. While  $NEG_{i,t-1}$ , refers to negative revenue growth, which takes value one otherwise zero. We used the residual as a proxy for investment efficiency. In order to estimate inefficient investment we multiply the residuals ( $\varepsilon$ ) by negative one, following (Biddle et al. 2009). Positive or negative residual means overinvestment or underinvestment, respectively. Residual with higher value indicates higher investment efficiency. Table 7 shows the findings of equation (1), (2) and (3) by using alternative proxy are identical to reported earlier in the Table (5) and (6). To focus on the coefficient of interest, the results show reforms in CG reforms improve investment efficiency. For overinvestment, reforms in the CG reforms reduce overinvestment. On the other hand, for underinvestment, the CG reform has no significant effect. Using an alternative proxy of investment efficiency, Table 8 reports findings of equations (4), (5) and (6) shows similar results previously reported in Table 6.

**Table 7**

**Corporate Governance Codes, Investment Efficiency, Under and Over-investment (Using alternative proxy of investment efficiency)**

The table reports OLS regression results with robust standard errors clustered at firm. The t- values are reported in parenthesis.

\*\*\*, \*\*, and \* denote  $p < 1\%$ ,  $5\%$ , and  $10\%$ . Refer to Appendix A for variable definitions

	(1)	(2)	(3)	
	Hypothesis One		Hypothesis Two	
VARIABLES	Chen11	Chen11_UI	Chen11_OI	
CGC	-0.0107*** (-3.0022)	-0.0015 (-0.9046)	-0.0612*** (-3.1831)	
Size	-0.0005** (-2.2572)	0.0003** (2.2172)	-0.0021 (-1.2488)	
Lev	0.0000 (0.7191)	0.0000 (0.6471)	-0.0001 (-0.1052)	
SalesGrowth	-0.0014* (-1.7126)	-0.0015*** (-2.8912)	-0.0025 (-0.7047)	
OCF	-0.0207 (-0.7417)	0.0035 (0.3297)	0.0299 (0.2445)	
Div	0.0011 (0.8848)	0.0009 (1.0597)	-0.0036 (-0.5655)	
CAPEX	-0.1242*** (-3.4223)	0.0660*** (3.4866)	-0.0109 (-0.0825)	
FirmAge	0.0006 (0.4726)	-0.0004 (-0.5761)	-0.0019 (-0.2731)	
ROA	0.0105 (0.9244)	0.0054 (0.7494)	0.0295 (0.4609)	
Bind	0.0060 (1.1207)	0.0050* (1.7449)	0.0125 (0.4670)	
Quarter Effect	Yes	Yes	Yes	

<i>Industry Effect</i>	Yes	Yes	Yes
<i>Intercept</i>	-0.0066	-0.0189***	0.0314
	(-0.8914)	(-3.9246)	(0.6560)
<i>N</i>	2,306	952	1,353
<i>R</i> <sup>2</sup>	0.0345	0.0543	0.0226

**Table 8**  
**Corporate Governance Code and investment efficiency, underinvestment, and overinvestment: Politically Connected Firms vs Non-Politically connect Firms**

The table reports OLS regression results with robust standard errors clustered at firm. The *t*- values are reported in parenthesis. \*\*\*, \*\*, and \* denote *p* < 1%, 5%, and 10%. Refer to Appendix A for variable definitions

VARIABLES	Panel A: Politically Connected Firms			Panel B: Non-Political Connected Firms		
	(1)	(2)	(3)	(4)	(5)	(6)
	H3	H4	H4	H3	H4	H4
	Chen11	Chen11_UI	Chen11_OI	Chen11	Chen11_UI	Chen11_OI
<i>CGC</i>	-0.0002	0.0007	-0.0018	-	-0.0015	-0.0213**
	(-0.0440)	(0.2742)	(-0.2119)	(-3.1576)	(-0.8034)	(-2.2256)
<i>Size</i>	-0.0000	0.0004*	0.0008	-	0.0003	-0.0037
	(-0.0189)	(1.9436)	(0.9886)	(-2.4517)	(1.1185)	(-1.6141)
<i>Lev</i>	0.0001	0.0000	0.0001	0.0000	0.0001	-0.0004
	(1.3841)	(1.1372)	(0.6121)	(0.2697)	(0.4991)	(-0.6492)
<i>SalesGrowth</i>	-0.0009	-0.0006*	-0.0012	-0.0013	-0.0018**	-0.0023
	(-1.1421)	(-1.7788)	(-0.7619)	(-1.1744)	(-2.5768)	(-0.2707)
<i>OCF</i>	0.0025	0.0209	-0.0410	-0.0588	-0.0235	0.0003
	(0.0686)	(1.4773)	(-0.4841)	(-1.3809)	(-1.2603)	(0.0025)
<i>Div</i>	0.0029	-0.0006	0.0052	0.0007	0.0017	-0.0071
	(1.4550)	(-0.6183)	(0.9989)	(0.4201)	(1.3892)	(-0.9075)
<i>CAPEX</i>	-0.1192*	0.0713***	-0.2549	-	-0.0683**	-0.0227**
	(-1.7127)	(3.0742)	(-1.4247)	(-2.5491)	(-2.4932)	(-2.2168)
<i>FirmAge</i>	-0.0001	0.0010	-0.0009	0.0004	-0.0021*	-0.0227**
	(-0.0709)	(1.0403)	(-0.1773)	(0.2617)	(-1.9183)	(-2.2168)
<i>ROA</i>	0.0485*	0.0187	0.0709	0.0098	0.0060	0.0477
	(1.6863)	(1.4826)	(1.1928)	(0.7944)	(0.6450)	(0.9952)
<i>Bind</i>	-0.0037	0.0060*	-0.0001	0.0076	0.0049	-0.0037

	(-0.4635)	(1.6515)	(-0.0041)	(1.0157)	(1.0263)	(-0.1388)
<i>Quarter Effect</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>Industry Effect</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>Intercept</i>	-0.0166*	-0.0263***	-0.0371	0.0017	-0.0119	0.0737
	(-1.6684)	(-4.0722)	(-1.6432)	(0.1502)	(-1.4867)	(1.1986)
<i>N</i>	795	342	453	1,511	610	900
<i>R<sup>2</sup></i>	0.0415	0.1365	0.0572	0.0479	0.0693	0.0344

**5.1 Alternative Methodology (Endogeneity problem):**

In earlier sections, we investigated whether reforms in the CG reforms negatively affect investment inefficiency. However, this association may be affected by endogeneity issues. We chose four different methods to handle the endogeneity problem. First, we use “CGC” as lagged independent variable. Literature documents that corporate governance studies often have serious endogeneity issues that can be dealt with using Lag of independent variable (Wintoki et al., 2012; Bennouri et al., 2018 and Ullah et al., 2019). The results reported in Table (9) and (10) remain identical to those reported earlier. Second, we also use a generalized method of moments (GMM) to check thoroughly and re-examine our analysis (Sheikh, 2018; Khan et al., 2020). GMM helps to describe and handle unobserved heterogeneity, which needs to be addressed to cease the endogeneity problem (Wintoki et al., 2012). Researchers argue that GMM estimation recommends the existing governance variables may be affected by earlier performances. This shows that the GMM technique outperforms the ordinary least square (OLS). The findings in Table (11) and (12) of GMM remain consistent with previously reported results. Third, we also apply the 2SLS technique to deal with the endogeneity problem. The issue in using this technique is the formation of an instrumental variable (IV) that should not have a direct (or indirect) relationship with the exogenous variable (dependent variable). We use third Lag as an instrumental variable for our analysis. In the first stage analysis, we regress our instrumental variable with the dependent variable, i.e., investment efficiency. Table 13 reports the results of 2SLS technique which are in line with the results reported earlier. We find a significant effect of CG reforms on investment efficiency. It means that CG reforms enhance investment efficiency. Fourth, Table 14 compares the investment efficiency (using different proxies) for the before and after the CG reforms periods that have been matched via propensity score matching method with the former. First, we estimate the probability for a period when the reforms in the CG reforms were applied. Probability is the propensity score, which predicts the logit model's value using the same control variables used in Eq. (1). Table 14 also presents the results for logistic regression reported in column (1) of Panel A. The pseudo R2 value for the regression is high, with a value of 0.0825. Thus, as expected, the CG reforms implementation is positively associated to investment efficiency (measured by Biddle et al. 2009).

Further, we employ the nearest neighbors approach to ensure that the matched periods, before CG reforms periods (the control group) and CG reforms period (i.e., treatment group) are identical with each other. Specifically, we compared each period during the CG reforms with more than one period within the treatment group. We keep the pair for which the difference between the PSM of the two periods is the smallest. Further, we require that the maximal difference of propensity score between each period during CG reforms and matching periods does not exceed 0.1 in absolute value. We also run two diagnostic tests to confirm that companies in the treatment and control groups are inseparable in terms of observable features. For the first post-match sample test, we re-evaluate the logit model. Table 14 reports the results in column (2) of panel A. None of the coefficient estimates are statistically significant; this indicates no distinct trends in investment efficiency. Moreover, in column (2), the coefficients are much smaller in magnitude compared to column (1); this suggests that the results in column (2) are not merely an artifact of a decrease in the degree of freedom in the

restricted sample. Finally, we document that PSM eliminates all observable differences except the differences during CG reforms. The pseudo R2 drops significantly from 0.0825 for the pre-match sample to 0.0016 for the post-match sample. The second test examines the difference for each observable features between matched control periods and the treatment periods. The results are presented in Panel B of Table 14. Again, no statistically significant difference is found in observable characteristics between the treatment and control firms. To sum up, the diagnostic test finding shows that PSM eliminates all observable differences except the differences during CG reforms period. Thus, this indicates that any investment efficiency difference between the two groups is due to CG reforms. Finally, based on these matched samples, we re-run the regression model of Table 5 using CGC as a main interest variable. The Panel C results of Table 14 show a positive and significant association between CG reforms (t-value < 1%) and investment efficiency. Overall, the PSM results demonstrate that during CG reforms, periods have a strong negative relationship with the investment efficiency, lending further support to the results obtained in Table 5.

**Table 9**

**Corporate Governance Codes, Investment Efficiency, Under and Over-investment: (Using Lag of Independent Variables)**

The table reports OLS regression results with robust standard errors clustered at firm. The t- values are reported in parenthesis. \*\*\*, \*\*, and \* denote  $p < 1\%$ ,  $5\%$ , and  $10\%$ . Refer to Appendix A for variable definitions

	(1)	(2)	(3)	
	Hypothesis One		Hypothesis Two	
VARIABLES	Biddle	Biddle_UI	Biddle_OI	
LCGC	-0.0588*** (-3.1666)	-0.0052 (-0.5743)	-0.1052*** (-2.8715)	
Size	0.0023 (1.4430)	-0.0002 (-0.2952)	0.0059 (1.6116)	
Lev	0.0004* (1.7228)	0.0002 (1.2365)	0.0008 (1.4578)	
SalesGrowth	-0.0200*** (-3.1083)	-0.0027* (-1.7187)	-0.0503*** (-3.0220)	
OCF	0.0383** (2.5639)	0.0870* (1.7222)	0.2818 (1.0581)	
Div	0.0152** (2.3885)	0.0044 (0.9396)	0.0135 (1.0929)	
CAPEX	0.2110** (2.0114)	0.0811*** (2.7281)	0.4131** (2.3049)	
FirmAge	-0.0028 (-0.3585)	0.0020 (0.5022)	-0.0080 (-0.4948)	
ROA	0.1469** (2.1859)	0.0199 (0.9523)	0.3311* (1.7414)	
Bind	-0.0276 (-0.9569)	0.0049 (0.1362)	-0.0317 (-0.5684)	
Quarter Effect	Yes	Yes	yes	
Year Effect	Yes	Yes	Yes	

<i>Intercept</i>	-0.1143**	-0.0522**	-0.2024*
	(-2.2233)	(-2.2709)	(-1.7163)
<i>N</i>	2,308	945	1,363
<i>R</i> <sup>2</sup>	0.0376	0.0173	0.0629

**Table 10**  
**Corporate Governance Code and investment efficiency, underinvestment, and overinvestment: Politically Connected Firms vs. Non-Politically connect Firms (Using Lag of independent variables)**

The table reports OLS regression results with robust standard errors clustered at firm. The t- values are reported in parenthesis.

\*\*\*, \*\*, and \* denote  $p < 1\%$ ,  $5\%$ , and  $10\%$ . Refer to Appendix A for variable definitions

VARIABLES	Panel A: Politically Connected Firms			Panel B: Non-Political Connected Firms		
	(1)	(2)	(3)	(4)	(5)	(6)
	<b>Biddle</b>	<b>Biddle_UI</b>	<b>Biddle_OI</b>	<b>Biddle</b>	<b>Biddle_UI</b>	<b>Biddle_OI</b>
<i>LCGC</i>	-0.0125 (-0.3685)	0.0037 (0.2740)	-0.0161 (-0.2725)	-0.0725*** (-3.3825)	-0.0005 (-0.0514)	-0.1389*** (-3.0612)
<i>Size</i>	0.0051* (1.8470)	-0.0008 (-0.7939)	- 0.0152*** (-3.0423)	0.0019 (0.8828)	0.0006 (0.5415)	0.0031 (0.5783)
<i>DE</i>	0.0011*** (3.6518)	0.0002 (1.2376)	- 0.0026*** (-3.2592)	-0.0009 (-0.8841)	-0.0001 (-0.1555)	-0.0016 (-0.7886)
<i>SalesGrowth</i>	-0.0132* (-1.7005)	-0.0022 (-0.7215)	0.0179 (1.3038)	-0.0229*** (-2.6515)	-0.0038** (-2.1481)	-0.0715*** (-2.9297)
<i>OCF</i>	0.0897 (0.4843)	0.0064 (0.0728)	-0.1112 (-0.3203)	0.1654 (1.0023)	0.0960 (1.5322)	0.4738 (1.1815)
<i>Div</i>	0.0313** (2.4980)	0.0065 (1.2387)	-0.0472* (-1.9201)	0.0111 (1.5162)	0.0075* (1.9089)	0.0048 (0.3365)
<i>CAPEX</i>	0.5648*** (2.5984)	0.3383** (2.4581)	- 1.0424*** (-2.7160)	0.0906 (0.7393)	0.0285 (0.3087)	0.2646 (1.1824)
<i>FirmAge</i>	-0.0134 (-0.9709)	0.0026 (0.4671)	0.0288 (1.0389)	0.0041 (0.4147)	0.0019 (0.4563)	0.0089 (0.4065)
<i>ROA</i>	0.3773** (2.2245)	0.1465* (1.8250)	-0.5436* (-1.6698)	0.1327* (1.8576)	0.0221 (1.3547)	0.2623 (1.1472)
<i>Bind</i>	-0.0331 (-0.6060)	-0.0154 (-0.7705)	0.0884 (0.7704)	-0.0512 (-1.6071)	-0.0412** (-2.3333)	-0.0413 (-0.7162)
<i>Quarter Effect</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>Industry Effect</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>Intercept</i>	-0.1584** (-2.0607)	-0.0376 (-1.2213)	0.3673** (2.3431)	-0.1180* (-1.6467)	-0.0670** (-2.0362)	-0.1865 (-1.0534)
<i>N</i>	797	347	450	1,511	598	913
<i>R<sup>2</sup></i>	0.0515	0.1088	0.0772	0.0605	0.0392	0.1075

**Table 11****Corporate Governance Codes, Investment Efficiency, Under and Over-investment (Using GMM)**

The table reports GMM regression results with robust standard errors clustered at firm. The t- values are reported in parenthesis.

\*\*\*, \*\*, and \* denote  $p < 1\%$ ,  $5\%$ , and  $10\%$ . Refer to Appendix A for variable definitions

	(1)	(2)	(3)	
	Hypothesis One		Hypothesis Two	
VARIABLES	Biddle	Biddle_UI	Biddle_OI	
<i>L*Biddle</i>	0.0769***			
	(7.7003)			
<i>L*Biddle_UI</i>		0.0068		
		(1.2389)		
<i>L*Biddle_OI</i>			0.0504***	
			(6.2519)	
<i>CGC</i>	-0.0135*	-0.0014	-0.0306**	
	(-1.9487)	(-0.2534)	(-2.4403)	
<i>Size</i>	-0.0039	0.0027**	-0.0027	
	(-1.3374)	(2.2261)	(-0.6549)	
<i>Lev</i>	0.0003	0.0002*	-0.0006	
	(0.8087)	(1.8185)	(-0.5216)	
<i>SalesGrowth</i>	-0.0076***	-0.0030***	0.0115***	
	(-5.1147)	(-7.5481)	(6.7407)	
<i>OCF</i>	-0.0634	0.1034***	0.2451*	
	(-0.7508)	(2.8050)	(1.6782)	
<i>Div</i>	0.0115	0.0075*	-0.0109	
	(1.0492)	(1.8531)	(-0.7786)	
<i>CAPEX</i>	0.0995	-0.0394	-0.2345**	
	(1.2657)	(-0.4618)	(-1.9647)	
<i>FirmAge</i>	-0.1352***	0.0498***	0.1118***	
	(-5.3450)	(12.5938)	(3.5035)	
<i>ROA</i>	0.1182***	0.0181	-0.1500	
	(4.3563)	(0.9335)	(-1.1806)	
<i>Bind</i>	0.3124***	-0.1769***	0.4255***	
	(4.2401)	(-3.9355)	(4.5174)	
<i>Quarter Effect</i>	Yes	Yes	Yes	
<i>Industry Effect</i>	Yes	Yes	Yes	
<i>Intercept</i>	0.4410***	-0.2513***	-0.3142*	
	(3.9493)	(-8.4857)	(-1.8810)	
<b>Diagnostic Tests</b>				
<i>Ar(1)</i>	-5.28***	-2.64***	-2.25**	
<i>Ar(2)</i>	-0.27	-0.60	-0.94	
<i>Hansen Test</i>	47.26	48.40	44.30	

N	2,308			412		817
<b>Table 12</b>						
<b>Corporate Governance Code and investment efficiency, underinvestment, and overinvestment: Politically Connected Firms vs. Non-Politically connect Firms (Using GMM)</b>						
<i>The table reports GMM regression results with robust standard errors clustered at firm. The t- values are reported in parenthesis. ***, **, and * denote p &lt; 1%, 5%, and 10%. Refer to Appendix A for variable definitions</i>						
	Panel A: Politically Connected Firms			Panel B: Non-Political Connected Firms		
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Biddle	Biddle_UI	Biddle_OI	Biddle	Biddle_UI	Biddle_OI
<i>L*Biddle</i>	0.1320***			0.1075***		
	(17.5329)			(15.5193)		
<i>L*Biddle_UI</i>		0.4965*			-0.2666***	
		(1.9377)			(-3.6920)	
<i>L*Biddle_OI</i>			0.2287***			0.0559***
			(26.2973)			(13.2657)
<i>CGC</i>	0.0260	0.0172	0.0117	-0.0154**	0.0094	-0.0153***
	(0.4293)	(0.4428)	(0.5029)	(-2.0656)	(1.3862)	(-3.1148)
<i>Size</i>	0.0006	-0.0001	0.0325***	-0.0083**	0.0011***	-0.0001
	(0.2180)	(-0.0104)	(15.2562)	(-2.4274)	(0.4817)	(-0.0588)
<i>Lev</i>	0.0006***	0.0003	0.0011*	-0.0014*	-0.0002	-0.0024***
	(2.6030)	(0.5158)	(1.8970)	(-1.6919)	(-0.2905)	(-4.0472)
<i>SalesGrowth</i>	0.0032***	-0.0060	0.0334***	-0.0132***	-0.0042***	-0.0635***
	(4.1244)	(-1.5385)	(38.4023)	(-10.4349)	(-3.1982)	(-7.3513)
<i>OCF</i>	0.3089***	-0.0297	-1.1150***	-0.0788	0.2168**	0.4577***
	(3.5577)	(-0.2901)	(-5.5197)	(-1.0594)	(2.3637)	(5.0316)
<i>Div</i>	0.0250**	0.0393	0.4362***	0.0133	0.0172**	-0.0103*
	(2.4951)	(0.4529)	(15.7020)	(1.1078)	(2.2462)	(-1.7655)
<i>CAPEX</i>	-0.1135	0.1415	2.9114***	0.2973***	-0.0677	-0.0240
	(-1.1065)	(0.1785)	(16.5057)	(3.5470)	(-0.4314)	(-0.3608)
<i>FirmAge</i>	-	-0.0327	-0.2991***	-0.1561***	-0.0608***	0.0055
	0.0679***					
	(-4.7395)	(-0.2561)	(-29.0416)	(-6.3441)	(-4.3645)	(0.6916)
<i>ROA</i>	0.0383	0.0336	-0.0022	0.1142***	0.0574***	0.0215
	(0.5680)	(0.2236)	(-0.0110)	(4.6847)	(3.3932)	(0.2414)
<i>Bind</i>	0.3472***	0.0390	-0.3051***	0.3105***	-0.0725	-0.0990***
	(5.2779)	(0.1951)	(-5.6191)	(3.4577)	(-1.0548)	(-3.3162)
<i>Intercept</i>	0.0117	0.0433	0.5272***	0.6141***	0.1259	-0.0517
	(0.3712)	(0.1748)	(11.1121)	(5.3802)	(1.6057)	(-1.0321)
Diagnostic Tests						
<i>Ar(1)</i>	-3.50***	-1.69*	-1.70*	-4.07***	-2.06**	-2.75***
<i>Ar(2)</i>	-0.22	1.40	-0.77	0.14	-0.85	-0.86
<i>Hansen Test</i>	31.08	8.81	5.32	44.74	19.10	45.51

N	797	147	245	1,511	265	572
<b>Table 13</b>						
<b>Corporate Governance Code and investment efficiency: Using 2SLS</b>						
<i>The table reports OLS regression results with robust standard errors clustered at firm. The t-values are reported in parenthesis. ***, **, and * denote p &lt; 1%, 5%, and 10%. Refer to Appendix A for variable definitions</i>						
	<b>(1)</b>	<b>(2)</b>	<b>(3)</b>	<b>(4)</b>		
	<b>Stage One</b>	<b>Stage Two</b>				
		<b>Hypothesis One</b>	<b>Hypothesis Two</b>			
<b>VARIABLES</b>	<b>CGC</b>	<b>Biddle</b>	<b>Biddle_UI</b>	<b>Biddle_OI</b>		
CGC		-0.0264*	0.0074	-0.0558*		
		(-1.7096)	(1.0439)	(-1.8332)		
Size	0.0052	-0.0028	-0.0001	-0.0082**		
	(1.2832)	(-1.5190)	(-0.1357)	(-2.0466)		
Lev	-0.0013	-0.0006**	0.0003	-0.0012**		
	(-0.7806)	(-2.0378)	(1.5725)	(-2.2501)		
SalesGrowth	-0.0076	0.0245***	-0.0041**	0.0543***		
	(-0.8141)	(3.0384)	(-2.3226)	(2.8749)		
OCF	-0.1394	-0.2281	0.0508	-0.4169		
	(-0.4671)	(-1.6362)	(0.9597)	(-1.4468)		
Div	-0.0365**	-0.0168**	0.0046	-0.0196		
	(-2.2466)	(-2.2891)	(1.3633)	(-1.3966)		
CAPEX	-0.2328	-0.2547**	0.0668	-0.5086***		
	(-0.5842)	(-2.2692)	(0.7946)	(-2.6111)		
FirmAge	0.0221	0.0045	0.0025	0.0088		
	(1.1672)	(0.5123)	(0.6112)	(0.4967)		
ROA	0.0969	-0.1277*	0.0309*	-0.2811		
	(0.5998)	(-1.8293)	(1.6790)	(-1.4702)		
Bind	0.2363***	0.0494	-0.0212	0.0857		
	(3.5462)	(1.4990)	(-1.5967)	(1.4050)		
Instrument	-0.4794***					
	(-28.9872)					
Quarter Effect	Yes	Yes	Yes	Yes		
Year Effect	Yes	Yes	Yes	Yes		
Constant	0.2908**	0.1542**	-0.0586***	0.3208**		
	(2.5187)	(2.5657)	(-2.6295)	(2.4264)		
N	1,978	1,978	801			
R <sup>2</sup>	0.3401	0.0336	0.0195			

**Table 14: Propensity Score Matching**

<b>Panel A: Pre-match PSM and post-match diagnostic regression (Hypothesis One)</b>				
Dependent variable: Dummy 1 for CGC and 0 otherwise				
CGC	Pre-match (1)		Post-match (2)	
Intercept	-2.7499***	(-4.08)	-0.0186	(-0.02)
SIZE	0.0586***	(2.39)	-0.0005	(-0.02)
Lev	-0.0178***	(-2.48)	0.0037	(0.37)
SalesGrowth	-0.0808*	(-1.99)	-0.0280	(-0.48)
OCF	-4.7576***	(-2.87)	-0.2242	(-0.10)
Div	-0.4831	(-5.30)	-0.0582	(-0.46)
CAPEX	-2.4157***	(-1.25)	-0.0994	(-0.04)
FirmAge	0.3606***	(3.58)	0.0574	(0.43)
ROA	-1.6389*	(-1.17)	0.1440	(-0.12)
Bind	5.3277***	(13.18)	-0.6378	(-1.22)
N	2,471		1,136	
Pseudo R <sup>2</sup>	0.0825		0.0016	
<b>Panel B: Firm Characteristics differences</b>				
	Firm-year Observations. With CGC (986)	Firm-year Observations. Without CGC (1,485)	Difference	t-test
SIZE	23.036	23.168	-0.132	-2.07**
Lev	1.843	2.089	-0.246	-1.16
SalesGrowth	0.146	0.134	0.012	0.35
OCF	0.021	0.025	-0.004	-3.86***
Div	0.594	0.651	-0.057	-3.16
CAPEX	0.014	0.041	0.000	0.22
FirmAge	3.553	3.516	0.037	2.15**
ROA	0.020	0.025	-0.005	-3.03
Bind	0.237	0.249	-0.012	-2.55***
Panel C: PSM estimator				
Variable	Firm-year Observations. With CGC (N = 986)	Firm-year Observations. Without CGC (N = 1,485)	Difference	t-test
Biddle	0.1011	0.0661	0.0349*	1.80
<b>Panel D: Corporate Governance Code (CGC) and investment efficiency: Matched Sample</b>				
CGC	-0.1247***		(-2.87)	
Size	0.0007		(0.19)	
Lev	0.0004		(0.57)	
SalesGrowth	-0.0182***		(-2.89)	

<i>OCF</i>	-0.0274	(-0.10)
<i>Div</i>	-0.0174	(-1.27)
<i>CAPEX</i>	0.0784**	(2.01)
<i>FirmAge</i>	0.0171	(1.10)
<i>ROA</i>	-0.0883**	(-2.43)
<i>Bind</i>	-0.0009	(-0.02)
<i>Intercept</i>	-0.1147	(-1.04)
<i>R</i> <sup>2</sup>	0.0750	

**Notes:** Propensity score matching estimation results are reported in the above table. Panel A determines the propensity score by using parameter form the logit model. The dependent variables are set to one for CGC otherwise 0. Independent variable includes, Size, Lev, Salesgrowth, OCF, div, CAPEX, FirmAge, ROA and Bind (Table 2 reports the details of variables). Panel B presents the firms' characteristics between firms with CGC univariate comparisons. Panel C reports the average treatment effects estimation. The dependent variable includes measure of investment efficiency following (Biddle et al. 2009).

## 6. Conclusion:

In line with the agency theory perspective, our study intends to investigate the influence of corporate governance reforms on investment efficiency in an emerging market. We use a sample of listed non-financial firms on the Pakistan Stock Exchange form from Quarter 1, 2016 to Quarter 3, 2020. Earlier studies conclude that corporate governance mechanisms are crucial to investment decisions. Overall, our findings show that reforms in CG reforms have a negative and significant effect on Pakistan's non-financial firms' investment inefficiency. Hence, the 2017 CG reforms improve investment efficiency in Pakistan. The results of two main investment inefficiencies indicate that the CG reforms' influence is more pronounced in mitigating overinvestment problems than underinvestment problems. At the same time, no significant effect was found for mitigating the underinvestment problem. Our findings also show that CG reforms negatively and significantly improve non-political connected firms' investment efficiency compared to politically connected firms. Further, we find that the CG reforms' effect on reducing the over-investment problem is more pronounced for non-political connected firms than politically connected firms. However, no significant impact was found for mitigating the underinvestment problem. Independent directors' role was weaker because of their negative but insignificant effect on investment efficiency.

Effective boards help in minimizing agency problems in the firms (Jensen and Mackling, 1976). The lower agency conflicts result in reducing moral hazards, lead to higher investment efficiency. Our finding supports the argument that good corporate governance mechanisms help to reduce information asymmetry, leading firms to optimal investment decisions. Our results help to enhance the understanding of how corporate governance changes for improving practices improve corporate decision-making. Finally, we study the effects of CG reforms in politically connected firms of an emerging economy. Emerging economies don't have developed capital markets, enough investor protection, and high corruption, resulting in more firms' political connections. Thus, the Political ties persist even with the CG reforms implementation. Therefore, the results of CG reforms in politically connected firms are understandable.

### 6.1 Practical Implications & Recommendations:

We suggest some practical implications for Professionals, regulators, policymakers, and investors. Notably, the findings suggest that compliance to the CG reforms employs more females, more independent directors, fewer directors' multiple directorships, and separate CEO duality improves corporate investment policy. First, our results provide policy implications to fully comply with independent directors' representation onboard to improve corporate governance practices. Second, our study found no impact of CG reforms in curbing underinvestment in firms. This may

be because of the debt overhang, which cause passing up profitable projects to invest, infecting all earnings, and paying debt instead of new investments. Managers need to avoid the large level of debt financing. Third, Political connections are considered a double-edged sword, but they negatively affect firms and the country's economy. From one end to gain unfair advantages results in distortion of a right of others. From the other end, firms connected to politicians show poor accounting performance than non-connected firms (Faccio 2010). Legal restrictions are required on firm's political connections in an emerging country like Pakistan to curb deterioration of shareholder rights and country economic growth. Our study has some recommendations for further researches. A similar study can be done on a much larger sample when data is available. We only find the effect of reforms CG reforms the researchers in future can use the corporate governance aspects like different attributes of directors. Researches can increase the sample size for politically connected firms by finding connections to politicians. Finally, a similar study can be done in other countries because governance mechanisms vary, and reforms in CG reforms are continuously changing across the countries.

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