The impact of quality of institutions on firm performance: A global analysis

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A R T I C L E   I N F O

A B S T R A C T

This study contributes to the literature as few studies discuss how different aspects of institutional quality influence firm performance. We use 133,945 observed values for 16,523 firms in 41 countries to examine whether better institutions can help increase corporate value by improving enterprises' total factor productivity (TFP). Empirical findings indicate that enhanced institutional quality can increase TFP and firm value, and political institutional quality has the highest positive impact on firm value and technological progress. Moreover, good institutional quality can promote firm value by improving enterprises' TFP. To increase firm productivity and value, governments must build better institutions to help create a better investment environment, strengthen resource allocation efficiency, and reduce corruption.

1. Introduction

As one of the rules of the game in society, the quality of institutions is an important determinant of economic performance, and facilitates productive activities, investments, and growth of new technologies. A good understanding of the influence of institutional quality on corporate technological progress not only helps in developing future government policies but also serves as a reference for firms in formulating international business strategies and financial management policies. However, scholars have focused on explaining how institutional quality positively affects national economic growth and helps to increase efficiency, and not much attention has been given to its impact on firm-level performance. This study analyzes the types of quality of institutions and investigate how they affect firm-level performance and total factor productivity (TFP).

Institutional quality comprises legal institutional quality, economic institutional quality, and political-institutional quality, and the impacts of each may be different. According to North (1981), institutions can be defined as a suite of measures that reduce the degree of uncertainty and increase personal utility, and economic rules that govern social, political, and economic behaviors. North (1990) indicates that institutions are rules of the game in society (e.g., norms on any type of interpersonal interaction), and when established, determine the opportunities and costs of various activities. The core function of institutions is to establish a stable structure for interpersonal interaction, thereby reducing the degree of uncertainty.

Previous studies have explored the impact of institutional quality on investment, economic growth rate, and TFP from a macro-economic perspective; they agree that good institutional quality helps to increase economic growth rate (Acemoglu, Johnson, & Robinson, 2002; Ehrlich & Lui, 1999; Hall & Jones, 1999; Mauro, 1995; Shleifer & Vishny, 1993), investment (Knack & Keefer, 1995;

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Mauro, 1995; Mo, 2001), and TFP (Lambsdorff, 2003a; Rodrik, Subramanian, & Trebbi, 2004). Some studies also find that institutional quality can promote economic growth through increased investment (Mauro, 1995; Pellegrini & Gerlagh, 2004). Mauro (1995) suggests that good national governance facilitates a favorable capital market and investment environment, thereby encouraging economic growth. Besley and Ghatak (2009) and Hsieh and Klenow (2009) argue that a powerful mechanism can promote economic development through resource allocation, while Lasagni, Nifo, and Vecchione (2015) indicate that good institutional quality can improve productivity.

Research has shown that institutional quality significantly influences firm performance (Baumöhl, Iwasaki, & Kočenda, 2019; Boubakri, Ghoul, & Saffar, 2015; Faruq & Weidner, 2018; Ghoul, Guedhami, & Kim, 2017; Yasar, Paul, & Ward, 2011). With regard to firm survival, Baumöhl et al. (2019) show that institutional quality, an important factor for firm survival, exhibits diminishing returns, as the greatest effect is seen in countries with low institutional quality, while countries with high institutional quality are the least affected. According to Kočenda and Hanousek (2012), state control is related to lower firm performance. Additionally, they point out, small businesses are significantly negatively affected by state ownership in firm survival compared to larger companies, and this effect is particularly strong in the construction sector. Demir and Hu (2020) examine the interaction between institutional quality and firm productivity and how it affects the dynamics of entry, initial sales, firm survival, and post-entry growth for firms. Their results suggest that, in regions with better institutions, Chinese firms have a higher chance of entering and surviving. Iwasaki, Kočenda, and Shida (2022) investigate the factors affecting the survival of 94,401 small enterprises in 17 European emerging markets from 2007 to 2017. Their findings demonstrate that institutional quality is a key component that positively influences firm survival, but its impact on smaller firms is less obvious. Finally, according to Baumöhl and Kočenda (2022) analysis of the empirical evidence on corporate survival and its determinants in European developing markets, institutional quality is an important preventive factor for business survival in all sectors of the economy. Additionally, firms in countries with the weakest institutions would gain the most from strengthening their institutional quality. Faruq and Weidner (2018) suggest that, while institutions matter for firm performance, institutions are, in turn, influenced by different cultural attributes. Ghoul et al. (2017) provide evidence for a stronger positive correlation between corporate social responsibility and firm value in countries with relatively weak market institutions. Boubakri et al. (2015) find that firms from countries with sound political institutions exhibit higher growth rates, while Yasar et al. (2011) show that the quality of property rights institutions has an impact on firm performance and competitiveness.

In addition, North (1994) suggests that institutional quality is the incentive structure of society, and provides the basis for economic performance. According to Hall and Jones (1999), social infrastructure includes mechanisms and government policies that affect economic activities; it not only promotes productivity, investment, and development of new technologies, but also brings about such predatory behaviors as corruption and rent seeking. Hall and Jones (1999) find that tangible capital and human capital can only partly explain per-capita productivity, whereas the most important explanatory factor is a Solow residual, and that social infrastructure is an important influencing factor of productivity.

Furthermore, the efficiency of resource allocation has a critical impact on economic development and TFP. Poor institutional quality leads to resource allocation inefficiencies, restricting technological advancement of enterprises. From the perspective of enterprise heterogeneity, Restuccia and Rogerson (2008) point out that if an economy comprises two technologically equivalent enterprises, one state-owned and the other, private, the former can obtain funds at low interest rates, whereas the latter faces various financing restrictions. In this case, the marginal product of capital (MPC) is different for the two enterprises. Specifically, the MPC of the state-owned enterprise is lower than that of the private enterprise; therefore, the gross domestic product is lower than that created when resources are allowed to move freely. Tanzi and Davoodi (1997) and Mauro (1998) suggest that corruption can result in inefficiency of resource allocation, negatively affecting economic growth. Augier, Dovis, and Gasiorek (2012) explore the impact of enterprise credit and institutional environment on TFP; they find that owing to misallocation of financial resources in Morocco, enterprise loans made a significant negative impact on TFP—the higher the enterprise loans, the lower their TFP. Ngendakuriyo (2013) points out that a good mechanism makes the economic environment more efficient. These studies show institutional quality impacts technological advancement, uncertainty, investment, and transaction costs of enterprises.

Many scholars have discussed the impact of institutional quality at the country or firm level for a specific industry or group. At the intense country margin, Saikia (2022) investigates how institutional quality affects FDI from Indian companies. The results demonstrate that institutional quality has a large impact on FDI in the intensive country. The results indicate an increase in the average FDI from Indian companies as a result of improved institutional quality. Lehkonen and Heimonen (2015) examine the effects of democracy and political risk on the stock market using panel data from 49 emerging markets. They discovered that, from 2000 to 2012, a country's degree of democracy had an interactional impact on stock market returns with political risk. In addition, some scholars have examined the impact of institutional quality on financing of firms. Çam and Özer (2021) discover that in countries with higher institutional quality, lower risk, and less asymmetric information, companies tend to rely relatively heavily on long-term debt financing. Firms can acquire outside financing easily because of the institutions' legal framework and rules. Furthermore, Yano and Shiraishi (2020) explore the sources in China that effectively finance corporate innovation activities, as well as how funding source effectiveness responds to institutional quality. They found that internal funding is essential in supporting firm innovation activities when property rights are better secured by the government against the possibility of expropriation. Finally, some scholars have examined the influence of a country's quality of institutions on firms' survival. Baumöhl et al. (2019) used the Cox Proportional Hazards model to examine the impact of institutional quality on firm survival in a large sample of 79,591 businesses from 15 Central and Eastern European (CEE) countries between 2006 and 2015. Their findings suggest that institutions, high-quality ones in particular, play a significant role as a preventive factor in assisting enterprises in increasing their chances of survival. However, less emphasis has been given in the literature to the effect of institutional quality on firm performance.

Few studies investigate the impact of different types of institutional quality on firm performance. Therefore, in this study, we

analyze how three different types of institutional quality—legal, economic, and political—impact firm performance and TFP. We use the principal component analysis to examine the impact of these institutional variables on different aspects. Additionally, we include the transmission mechanism by considering the interaction terms between the quality of institutions and firm characteristics. Finally, we separately investigate the impact of different institutional qualities on firm performance in developed and developing markets.

In this study, we consider a sample of 16,523 firms across 41 countries, with 133,945 observed values over 28 years from 1990 to 2017, to examine whether better institutions can increase enterprise value by improving enterprises' TFP. We divided our sampled countries into developed and developing economies. To obtain more precise results, we also consider six country-level macroeconomic variables. First, we collected the proxy variables of legal institutional quality, economic institutional quality, and political institutional quality, and used the principal component analysis (PCA) approach to develop a single composite institutional quality index. Then, we conducted PCA for the variables of legal, economic, and political institutional qualities, thereby developing different types of institutional quality indices, and examined the impact of the variables of institutional quality in different aspects.

The study yields three main findings: (1) enhanced institutional quality promotes enterprise technological advancement and increased firm value; (2) good institutional quality can increase corporate value by helping to improve enterprises' TFP; and, (3) political institutional quality has the most significant and greater positive influence on firm value and enterprises' TFP. In addition, we use the two-stage instrumental variable analysis approach to control the endogeneity problem and obtain robust results. Our findings imply that governments should ensure better legal, economic, and political institutional qualities by, for instance, establishing strict and fair laws to protect stakeholders, reducing investment restrictions and increase freedom for business, finance, and capital controls, and alleviating issues of corruption, bureaucracy, and autocracy. Such policies can create a better investment environment, strengthen the efficiency of resource allocation, and reduce corruption, increasing firms' productivity and value.

The remainder of this paper is organized as follows. Section 2 provides a literature review and hypotheses, Section 3 describes the study sample and empirical approach, Section 4 discusses the empirical results of the study, and Section 5 considers the endogeneity problem. Section 6 presents some additional analyses and Section 7 concludes.

2. Literature review and hypotheses

Institutional quality has a key role in defining a country's long-term development potential, with proxy variables in terms of legal, economic, and political aspects. Wallis and North (1986) point out that institutions are intended to reduce transaction costs and improve transactional efficiency, and are the key influencing factor of economic performance. North (1990) suggests good institutional quality can increase transactions and reduce transaction costs, while Ngendakuriyo (2013) argues for governments to play an important role in reducing transaction costs, for example, by developing laws and regulations, building traffic and transportation infrastructure, providing education opportunities, and so on. Therefore, good institutional quality enhances corporate performance by reducing transaction costs.

Hsieh and Klenow (2009) point out that if China and India acquire the same efficiency of resource allocation as the US, China's TFP will increase by 30%–50% and India's TFP will increase by 40%–60%. Park, Li, and Tse (2006) found that market liberalization caused by institutional changes during economic reforms in China had a significant effect on firm performance. Bykova and Coates (2020) investigated about 1096 firms in the Russian region from 2004 to 2014 and found that the greater the economic freedom of a region, the higher the performance of their firms, proving that the firms performed better in the regions with good-quality institutions. Hence, from a macroeconomic perspective, enhanced institutional quality is beneficial to boosting firms' technological progress and, in turn, performance.

Enhanced institutional quality is beneficial not only in improving the efficiency of resource allocation but also in reducing the degree of corruption, thereby improving TFP. Shleifer and Vishny (1993), Mauro (1995), Ades and Di Tella (1999), Wei (2000), Olson, Sarna, and Swamy (2000), Habib and Zurawicki (2002), Lambsdorff (2003a), Sanyal and Samanta (2008), and Halkos and Tzeremes (2010) find that corruption has a negative impact on investment and economic growth. Salinas-Jiménez and Salinas-Jiménez (2011) find that corruption has a negative impact on efficiency and TFP. Tanzi and Davoodi (1997) and Mauro (1998) argue that corruption can result in inefficiency of resource allocation, negatively affecting economic growth. Some studies discuss the impact of corruption on corporate performance from a corporate perspective. Murphy, Shleifer, and Vishny (1991, 1993) point out that corruption results in social losses because it precludes labor, resources, and technologies from being allocated efficiently, causing enterprise inefficiency. Dal Bó and Rossi's (2007) findings support this argument that corruption is closely correlated with enterprise inefficiency. Fisman and Svensson (2007) point out that bribery will hinder corporate development and reduce corporate growth, while Randrianarisoa, Bolduc, Choo, Oum, and Yan (2015) find that corruption has a negative impact on the operational efficiency of airports. Yan and Oum (2014) and Dal Bó and Rossi (2007) find corruption is negatively correlated with corporate productivity. Svensson (2005) states that corruption leads to a misuse of social resources for private benefits, and is the primary cause of economic inefficiency. Fisman (2001), Svesson (2003), Clarke and Xu (2004), Khwaja and Mian (2005), Dal Bó and Rossi (2007), and Cai, Fang, and Xu (2011) argue that corruption leads enterprises to refocus resource allocation from productive activities to the establishment of government-business relationship. Notably, Lambsdorff (2003a) points out that the negative impact of corruption on capital productivity can be ascribed to the correlation between corruption and bad bureaucracy. Wren-Lewis (2013) indicates that an independent regulatory agency is beneficial in reducing the correlation between corruption and efficiency. Using labor productivity as a proxy for firm performance, Jibir, Abdu, Bello, and Garba (2019) investigate the role of institutions in influencing the firm's performance for 23 countries in SubSaharan Africa (SSA). Even SSA countries are different from developed countries, in that they face greater constraints and challenges, but still show a significant positive relationship between institutional quality and firm performance. Thus, controlling corruption, improving government effectiveness, and strengthening the rule of law can significantly improve corporate performance

through improving labor productivity. In addition, Ojeka et al. (2019) argue that both weak institutions and corruption will harm a firm's market value and diminish its performance. Finally, Karmani and Boussaada (2021) argue that the corruption caused by poor institutional quality will significantly decrease the firm performance. Therefore, good-quality institutions are vital to reduction of corruption and enhance corporate performance.

Regarding institutional quality and TFP, Chanda and Dalgaard (2008) reveal a significant relationship between them. Augier et al. (2012) find that bureaucracy has a negative impact on corporate productivity through misallocation of resources and impact on firm productivity while Alexandrakis and Livanis (2013) find that economic freedom has a significant positive impact on TFP. Ng and Yu (2014) shows how fragile protection of property rights hinders the progress of Chinese enterprise productivity. In addition, legal institutions also play a critical role in shaping economic growth and firm performance. Shirokova, Morris, Laskovaia, and Micelotta (2021) argue that a weaker and unstable legal environment may enable firms to face higher uncertainty with regard to misappropriation of intellectual property, unfair competition, and also the possibility that the contracts might not be observed by customers and suppliers. In such conditions, it would be more difficult for the firms to predict and control the firm's costs.

Thus, good institutional quality is beneficial to not only alleviating the inefficiency of resource allocation, corruption, and rent-seeking, but also to boosting enterprises' productivity, investment, and development of new technologies, thereby improving their TFP. Moreover, good institutional quality also helps to increase corporate value by improving the efficiency of resource allocation. Therefore, we propose the following hypotheses.

H1. Good institutional quality helps to increase firm value.

H2. Good institutional quality helps to improve firms' TFP.

Based on the related literature (Alexandrakis & Livanis, 2013; Bah & Fang, 2015; Bekaert, Harvey, & Lundblad, 2005; Chanda & Dalgaard, 2008; Djankov et al., 2003, 2007, 2008; Easterly & Levine, 2003; Fabro & Aixalá, 2009; Glaeser, La Porta, Lopez-de-Silanes, & Shleifer, 2004; Knack & Keefer, 1995; Kunčič, 2014; La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 1998, 1999; Lambsdorff, 2003a; Mauro, 1995; Olson et al., 2000; Pellegrini & Gerlagh, 2004; Qi, Roth, & Wald, 2010; Randrianarisoa et al., 2015; Rodrik et al., 2004), institutional quality can be separated into legal, economic, and political, each of whose impact may differ. However, the literature has not examined the influence of these aspects on firm performance. Therefore, we propose the following hypotheses.

H3. Different aspects of institutional quality variables (e.g., legal, economic, and political) have a varying degree of impact on firm value.

H4. Different aspects of institutional quality variables (e.g., legal, economic, and political) have a varying degree of impact on firms' TFP.

In addition, North (1990) points out that the ideal institutional quality should be so efficient as to facilitate transactions and reduce transaction costs, as bad bureaucracy slows down technological advances; for example, a slow procedure for examination and approval of business licenses will further delay a firm's technological progress. Hall and Jones (1999) find that enhanced institutional quality promotes productivity, investment, and development of new technologies. In other words, bad institutional quality reduces corporate competitiveness, thus worsening corporate performance. Accordingly, this study presumes that good institutional quality can increase firm value by promoting enterprises' technological advancement, giving us our final hypothesis:

H5. Good institutional quality can increase corporate value by improving enterprises' TFP.

3. Data and methodology

3.1. Data

We collected the data on enterprises worldwide contained in the international financial database. The main independent variables institutional quality variables were obtained from websites, literature, and databases such as Banks (2005), Djankov et al. (2003), Djankov et al. (2007), Djankov et al. (2008), Fraser Institute, Freedom House, Glaeser et al. (2004), Heritage Foundation, International Country Risk Guide (ICRG), La Porta et al. (1998, 1999), Polity IV, Transparency International, Wejnert (2007), and World Bank's Worldwide Governance Indicators.

The data relating to publicly listed firms for 41 countries and data on stock return and enterprise market values were collected from Datastream, while the financial statement data for related empirical variables and enterprise output, labor input, and capital input required for calculating TFP were extracted from Worldscope. The study period covers 28 years from 1990 to 2017. We use 41 countries, both developed and developing, and 16,523 public listed firms, along with 133,945 observed values, to examine whether good-quality institutions can increase corporate value by improving enterprises' total factor productivity (TFP).

Under the sample screening criteria, the sampled companies with incomplete variable data were excluded first. Then, the sampled companies are classified under different industries in the SIC Code. Considering legal restrictions on the public utility industry and financial industry and the significant difference between them and other industries, the financial industry with SIC codes 6000 to 6999 and the public utility industry with SIC codes 4900 to 4999 were excluded. To mitigate the effects of outliers and errors in the data, we omit the top and bottom one percentiles of all regression variables and firms with negative total assets, liabilities, and operating revenue account balances.

3.2. Study design and empirical model

3.2.1. Principal components analysis

Based on the literature (Alexandrakis & Livanis, 2013; Bah & Fang, 2015; Bekaert et al., 2005; Chanda & Dalgaard, 2008; Djankov et al., 2003, 2007, 2008; Easterly & Levine, 2003; Fabro & Aixalá, 2009; Glaeser et al., 2004; Knack & Keefer, 1995; Kunčič, 2014; La Porta et al., 1998, 1999; Lambsdorff, 2003a; Mauro, 1995; Olson et al., 2000; Pellegrini & Gerlagh, 2004; Qi et al., 2010; Randrianarisoa et al., 2015; Rodrik et al., 2004), legal institutional quality variables selected were: judicial independence total estimated in calendar days (*JI*), impartial courts (*IC*), protection of property rights (*PP*), law & order (*LAWORDER*), and property rights (*PR*). The economic institutional quality variables were: freedom to own foreign currency bank accounts (*FA*), capital controls (*CC*), creditor rights (*CR*), legal rights index (*LR*), business regulations (*BR*), and investment profile (*IP*). The political institutional quality variables were: democratic accountability (*DEMACC*), corruption (*CORRUP*), bureaucracy quality (*BQ*), internal conflict (*INTCON*), military in politics (*MILIPOL*), difference between institutionalized democracy and institutionalized autocracy (*POLITY*), and political rights (*POLITICALR*). Appendix A1 defines the institutional quality variables and presents their data sources. Based on the literature (Boone, Field, Karpoff, & Raheja, 2007; Gnocchi, Lagerborg, & Pappa, 2015; Siddiqui & Ahmed, 2013; Iwasaki et al., 2022; Magbondé & Konté, 2022), this study conducts PCA, in which the numerous proxy variables of institutional quality are identified and integrated into a single composite institutional quality index (*PCQI*) by estimating the first principal component to explore related issues as follows.[1]

$$
\begin{aligned}
PCQI_{jt} = &\ \beta_1 JI_{jt} + \beta_2 IC_{jt} + \beta_3 PP_{jt} + \beta_4 LAWORDER_{jt} + \beta_5 PR_{jt} + \\
&\ \beta_5 FA_{jt} + \beta_6 CC_{jt} + \beta_7 CR_{jt} + \beta_8 LR_{jt} + \beta_{10} BR_{jt} + \beta_{11} IP_{jt} + \\
&\ \beta_{12} DEMACC_{jt} + \beta_{13} CORRUP_{jt} + \beta_{14} BQ_{jt} + \beta_{15} INTCON_{jt} + \\
&\ \beta_{16} MILIPOL_{jt} + \beta_{17} POLITY_{jt} + \beta_{18} POLITICALR_{jt}
\end{aligned}
\tag{1}
$$

3.2.2. Empirical model

(1) The impact of institutional quality on firm value

To verify whether enhanced institutional quality helps to increase corporate value, this study uses pooled ordinary least squares (OLS) regression:

$$
Tobin's Q_{ijt} = \alpha_j + \beta_1 PCQI_{ijt-1} + \sum_{k=1}^{K} \theta_k CV_{kijt-1} + \eta_t + \varepsilon_{ijt}
\tag{2}
$$

where subscripts *i*, *j*, and *t* indicate a sampled company, a country, and current year, respectively. Tobin's Q is the ratio of the market value of equity added to the book value of debt, divided by the book value of the total assets and *Tobin's Q$_{ijt}$* indicates the Tobin's Q ratio of the *i*-th sampled company of country *j* in year *t*. $PCQI_{ijt-1}$ indicates the composite institutional quality variable of the *i*-th sampled company of country *j* in year *t*-1. In Equation (2), CV_{kijt-1} indicates the numerical value of the *k*-th control variable of the *i*-th sampled company of country *j* in year *t*-1. We include the lagged values of the independent variables in Equation (2) to control for endogeneity.

Referring to Cho (1998), Core, Guay, and Rusticus (2006), Lie (2005), Kim (2005) and Lskavyan and Spatareanu (2006), we use firm size, capital expenditure ratio, dividend payout ratio, leverage, R&D expenditure ratio, and industry dummy variables as control variables. Among these variables, firm size (*SIZE*) is defined as the natural logarithm of the market value of equity; capital expenditure ratio (*CAPEXP*) is the ratio of capital expenditure to total assets; payout ratio (*DIV*) is the ratio of dividends divided by the operating revenues.; leverage (*LEV*) is total debt divided by total assets; R&D expenditure ratio (*RDR*) is R&D expenses divided by total assets; and industry dummy variables are classified based on the SIC code and Fama and French (1997).

Given country heterogeneity and temporal trends, we add the specific effects of countries to Equation (2), namely α_j[2] and time trend η_t. Following Petersen (2009), Newey–West (1987) estimates are used to correct possible autocorrelation and heteroskedasticity in the panel data.

We calculate Tobin's Q ratio for industrial adjustment (*IndAdjTobin's Q*), instead of *Tobin's Q* ratio for robustness test. Specifically, *IndAdjTobin's Q* is equal to the Tobin's Q ratio of a sampled company minus the median of the Tobin's Q ratio of the associated industry. We use panel data regression with fixed effects, and obtain similar results.

(2) Impact of institutional quality on TFP

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[1] In this study, when an institutional quality variable lacks annual data in a specific year during the sampling period, its annual data in the recent year are used instead. Note that the related ICRG data only cover the period from 1990 to 2011. To strengthen the robustness of results through increased sample size, the data on the related ICRG variables from 2012 to 2017 are replaced with the respective values of such ICRG variables in 2011. To obtain robust results, we test all institutional quality variables for the sampling period from 1990 to 2011, and obtain consistent empirical results. Extracting the related institutional quality variables from the ICRG database, we use all institutional quality variables from 1990 to 2017 to create different types of institutional quality indices, and obtain robust empirical results.

[2] Hausman test results reveal that the empirical models are all fixed effects models.

To verify whether enhanced institutional quality helps to increase TFP, this study uses pooled OLS[3]:

$$TFP_{ijt} = \alpha_j + \beta_1 PCQI_{ijt-1} + \sum_{n=1}^{N} \gamma_n CV_{nijt-1} + \eta_t + \varepsilon_{ijt} \qquad (3)$$

where subscripts i, j, and t indicate a sampled company, a country, and current year, respectively. Specifically, TFP_{ijt} indicates the TFP of the i-th sampled company of country j in year t; $PCQI_{ijt-1}$ indicates the composite institutional quality variable of the i-th sampled company of country j in year t-1. In Equation (3), CV_{nijt-1} indicates the numerical value of the n-th control variable of the i-th sampled company of country j in year t-1. We include the lagged values of the independent variables in Equation (3) to control for endogeneity.

We use the Cobb–Douglas production function to obtain the TFP of each sample firm, referring to the estimation methods of relevant studies.[4] The measurement models are expressed as follows:

$$Y_{ijt} = A_{ijt} \times L_{ijt}^{\eta_L} \times K_{ijt}^{\eta_K} \qquad (4)$$

$$y_{ijt} = a_{ijt} + \eta_L l_{ijt} + \eta_K k_{ijt} \qquad (5)$$

where i, j, and t refer to the firm, country, and year, respectively; Y refers to firm output; L refers to labor input; K refers to capital investment; η_L refers to the labor output share; and η_K refers to the capital output share. Equation (5) can be formulated using the natural logarithm of the measurements in Equation (4). In Equation (5), α_{ijt} is the natural logarithm of A_{ijt}, the part of firm output that cannot be explained by production factor investment, namely TFP. This term can be used for evaluating technological progress and production efficiency. In the following sections, we use TFP_{ijt} to substitute α_{ijt} for clearer representation. According to Field and Mkrtchyan (2017), the TFP of a sample firm is computed as the residual from a regression of sales on labor, fixed assets, materials (proxied by cost of goods sold), industry, and year fixed effects in each country.

Referring to Sheu and Yang (2005), Fernandes (2007), Chiang and Lin (2007), Topalova and Khandelwal (2011), Tian and Twite (2011), and Sharma (2012), we use firm size, leverage, return on assets, market-to-book ratio, dependent variable of previous period, and industry dummy variables as control variables. Among these variables, firm size (*SIZE*) is defined as the natural logarithm of the market value of equity; leverage (*LEV*) is the ratio of the total debt divided by the total assets; return on assets (*ROA*) denotes the ratio of net income divided by total assets; market-to-book ratio (*MB*) denotes the ratio of the market value of equity divided by the book value of equity. TFP_{t-1} is *TFP* in year t-1; and industry dummy variables are classified based on the SIC code and Fama and French (1997).

Given country heterogeneity and temporal trends, we also add the specific effects of countries to Equation (5), namely α_j[5] and time trend η_t. Following Petersen (2009), Newey–West (1987) estimates are used to revise possible autocorrelation and heteroskedasticity possibly in the panel data.

In addition, we calculate the industrial adjustment TFP (*IndAdjTFP*) instead of *TFP* for robustness test. *IndAdjTFP* is equal to the TFP of a sampled company minus the median of the TFP of the associated industry. We also use panel data regression with fixed effects and obtain similar results.

(3) Impact of legal, economic, and political institutional qualities on firm value and TFP

PCA is used on the three types of institutional quality to form three composite indicators. We use PCA to isolate the common component and form a composite index that captures the common component from our institutional quality variables as explained in Section 3.2.1, and create the indices *LegalQI, EconomicQI*, and *PoliticalQI* using PCA as follows:

$$LegalQI_{jt} = \gamma_1 JI_{jt} + \gamma_2 IC_{jt} + \gamma_3 PP_{jt} + \gamma_4 LAWORDER_{jt} + \gamma_5 PR_{jt} \qquad (6)$$

$$EconomicQI_{jt} = \lambda_1 FA_{jt} + \lambda_2 FICC_{jt} + \lambda_3 CR_{jt} + \lambda_4 LR_{jt} + \lambda_5 BR_{jt} + \lambda_6 IP_{jt} \qquad (7)$$

$$PoliticalQI_{jt} = \delta_1 DEMACC_{jt} + \delta_2 CORRUP_{jt} + \delta_3 BQ_{jt} + \delta_4 INTCON_{jt} + \\ \delta_5 MILIPOL_{jt} + \delta_6 POLITY_{jt} + \delta_7 POLITICALR_{jt} \qquad (8)$$

(4) Transmission mechanism

To explore whether a country with good institutional quality can increase corporate value by improving enterprises' TFP, the following simultaneous equation model is built using three-stage least squares:

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[3] We also use panel data regression with fixed effects, and obtain similar results.
[4] Palia and Lichtenberg (1999), Schoar (2002), Barth, Gulbrandsen, and Schone (2005), Sheu and Yang (2005), Chiang and Lin (2007), Tian and Twite (2011), Wilson, Wright, Siegel, and Scholes (2012), and Field and Mkrtchyan (2017).
[5] Hausman test results reveal that the empirical models are all fixed effects models.

$$Tobin'sQ_{ijt} = \alpha_j + \delta_1 TFP_{ijt-1} + \sum_{k=1}^{K} \theta_k CV_{kijt-1} + \eta_t + \varepsilon_{ijt} \tag{9}$$

$$TFP_{ijt} = \alpha_j + \beta_1 PCQI_{ijt-1} + \sum_{n=1}^{N} \gamma_n CV_{nijt-1} + \eta_t + \varepsilon_{ijt} \tag{10}$$

The variable symbols in Equation (10) have been described in the preceding section. In Equation (9), *Tobin'sQ* indicates the variable of firm value, *CV* indicates a control variable (e.g., firm size, capital expenditure ratio, dividend payout ratio, leverage, research and development expenditure ratio, and industry dummy variables), and the meanings of other symbols are the same as described in the preceding section. In addition, we also calculate the Tobin's Q ratio for industrial adjustment (*IndAdjTobin's Q*) and TFP for industrial adjustment (*IndAdjTFP*), instead of *Tobin's Q* ratio and *TFP*, respectively, for robustness test.

4. Analysis of empirical results

4.1. Sample distribution in different countries and industries

Table 1 presents the sample distribution in different countries in different economies as well as their institutional quality, TFP, and firm value. Regarding the number of sampled companies, the top three countries are the US, Japan, and China, with 4,036 (24.427%), 2,368 (14.332%), and 1,992 (12.056%) companies, respectively. In terms of number of observed values, the US ranks first (33,930 observed values; 25.331%), followed by Japan (22.219%), and Taiwan (10.108%). In legal institutional quality, the top five countries are Finland, New Zealand, the Netherlands, Sweden, and Denmark. In economic institutional quality, the top five countries are Singapore, New Zealand, Canada, the US, and Australia. In political institutional quality, the top five are Finland, New Zealand, Switzerland, the Netherlands, and Norway. Regarding the composite institutional quality index, the top five countries are Finland, New Zealand, Sweden, Switzerland, and Denmark; their *PCQI* values are 1.758, 1.733, 1.586, 1.585, and 1.578, respectively, and far higher than the average (0.793). For all sampled companies, the average *TFP* and average *IndAdjTFP* are 0.102 and 0.032, respectively. The US's *TFP* and *IndAdjTFP* are 0.387 and 0.281, respectively, the highest among all sampled countries, meaning that it has the highest productive efficiency. For all sampled countries, the average *Tobin's Q* ratio and average *IndAdjTobin's Q* are respectively 1.322 and 0.988. For the US with the highest *TFP*, *Tobin's Q* ratio and *IndAdjTobin's Q* are 1.679 and 1.78, respectively, and *IndAdjTobin's Q* ranks fourth among all sampled countries.

For the sample distribution in different industries, institutional quality, TFP, and firm value,[6] the sampled companies are classified under 43 industries according to the related industrial classification standard (Fama & French, 1997). The business service industry has the largest number of sampled companies (1,943; 11.759%), followed by the electronic equipment industry (9.145%) and the machinery industry (6.452%). Regarding the number of observed values, the top three industries are electronic equipment, business service, and machinery, with 14,357 (10.719%), 12,374 (9.238%), and 10,661 (7.959%), respectively.

4.2. Analysis of the difference in mean and median TFP and firm value under high and low composite institutional quality

Table 2 provides an analysis of mean and median TFP and firm value under high and low composite institutional quality. Under high composite institutional quality (indicated by the variable "composite institutions"), the average values of *TFP*, *IndAdjTFP*, *Tobin's Q* ratio, and *IndAdjTobin's Q* are 0.167, 0.082, 1.334, and 0.999, respectively. Under low composite institutional quality, the average values of *TFP*, *IndAdjTFP*, *Tobin's Q* ratio, and *IndAdjTobin's Q* are 0.009, −0.040, 1.256, and 0.970, respectively. The differences between these two groups are 0.158, 0.122, 0.078, and 0.028 respectively, and the test results all reach the 1% significance level. The empirical results imply that firms in countries with higher quality of institutions will achieve higher TFP and firm value than those with low-quality institutions. Moreover, the media-based test results also support these results.

4.3. Impact of composite institutional quality on firm value

The empirical results in Column (1) and (2) of Table 3 show that composite institutional quality has a positive impact on firm value. In the pooled OLS regression model and panel data regression with fixed effects, the regression coefficients are 0.327 and 0.159, respectively, both reaching the 1% significance level. Specifically, the coefficient of composite institutions in Column (1) and (2) of Table 3 indicates that a one standard deviation increase in the composite institutions variable (*PCQI*) is associated with a 0.219 (0.327 × 0.670) and 0.107 (0.159 × 0.670) increase in firm value, which are 16.566% and 8.094% of its mean (0.219/1.322 and 0.107/ 1.322). In other words, good institutional quality helps to increase corporate value. The finding is in line with those of Baumöhl et al. (2019), Faruq and Weidner (2018), and Ghoul et al. (2017), who found institutional quality to have a significant positive impact on firm performance. This empirical result is consistent with Hypothesis 1. Column (3) and (4) describes the impact of composite institutional quality on *IndAdjTobin's Q*. The robustness results reveal that the composite institutional quality variable has a significant

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[6] To save space, we do not provide the sample distribution in different industries, institutional quality, TFP, and corporate value, but the data are available in the Online Appendix.

Table 1
Sample distribution in different countries, institutional quality TFP, and firm value.

Country	Number of firms	Percentage	Number of firm-years	Percentage	Legal Institutions	Economic Institutions	Political Institutions	Composite Institutions	TFP	IndAdjTFP	Tobin's Q	IndAdjTobin's Q
Argentina	11	0.067%	115	0.086%	−1.363	−0.991	0.459	−0.756	0.065	−0.204	0.961	0.884
Australia	432	2.615%	2,989	2.232%	1.404	1.320	1.452	1.453	0.105	−0.072	1.899	1.066
Austria	32	0.194%	316	0.236%	1.388	0.761	1.478	1.375	−0.208	−0.301	0.909	0.873
Belgium	39	0.236%	366	0.273%	0.837	0.788	1.453	1.113	0.075	0.012	1.181	1.000
Brazil	40	0.242%	289	0.216%	−0.497	−1.553	0.344	−0.571	0.292	0.104	1.017	0.929
Canada	386	2.336%	2,345	1.751%	1.487	1.525	1.513	1.567	0.194	−0.010	1.633	1.065
Switzerland	399	2.415%	2,502	1.868%	1.559	1.288	1.554	1.585	0.031	−0.076	1.560	1.059
Chile	38	0.230%	182	0.136%	0.753	0.770	0.597	0.664	0.099	0.035	0.900	0.916
China	1,992	12.056%	8,171	6.100%	−0.387	−0.830	−1.198	−1.102	−0.001	−0.028	2.190	1.029
Germany	303	1.834%	3,191	2.382%	1.441	0.551	1.470	1.370	0.026	−0.046	1.084	0.987
Denmark	52	0.315%	544	0.406%	1.585	1.314	1.525	1.578	0.042	−0.089	1.874	1.125
Spain	47	0.284%	372	0.278%	0.320	0.470	0.984	0.553	0.171	0.028	1.227	1.004
Finland	87	0.527%	1,134	0.847%	1.759	1.166	1.674	1.758	0.092	0.036	1.182	0.944
France	268	1.622%	2,361	1.763%	0.854	0.621	1.128	0.897	0.100	−0.002	1.196	1.024
United Kingdom	415	2.512%	4,213	3.145%	1.453	1.029	1.322	1.328	0.042	−0.054	1.555	1.078
Greece	80	0.484%	514	0.384%	−0.306	−0.379	0.698	−0.020	−0.004	−0.071	0.824	0.933
Indonesia	45	0.272%	163	0.122%	−0.771	−0.455	−0.106	−0.706	−0.010	−0.102	0.869	0.986
India	648	3.922%	3,955	2.953%	0.050	−0.772	0.389	−0.222	0.037	−0.028	1.535	0.935
Israel	29	0.176%	135	0.101%	0.742	0.543	0.760	0.628	0.304	0.168	2.839	1.127
Italy	93	0.563%	829	0.619%	−0.278	0.331	0.841	0.172	0.013	−0.080	0.959	0.984
Jordan	26	0.157%	103	0.077%	0.235	1.064	−0.566	−0.143	0.083	0.018	1.280	1.139
Japan	2,368	14.332%	29,761	22.219%	0.950	0.959	1.161	1.020	−0.017	−0.056	0.832	0.902
Korea	1,516	9.175%	12,343	9.215%	0.209	0.477	0.745	0.412	−0.066	−0.104	0.945	0.950
Sri Lanka	21	0.127%	155	0.116%	−0.331	−0.799	−0.482	−0.787	0.065	−0.042	0.979	0.959
Mexico	36	0.218%	153	0.114%	−0.699	0.078	0.477	−0.245	−0.102	−0.110	1.142	0.835
Malaysia	532	3.220%	1,588	1.186%	0.391	0.292	0.214	0.136	0.023	−0.020	0.970	0.895
Netherlands	45	0.272%	558	0.417%	1.644	1.045	1.533	1.563	−0.019	−0.158	1.092	0.951
Norway	55	0.333%	358	0.267%	1.561	1.009	1.533	1.554	0.110	−0.034	1.903	1.026
New Zealand	34	0.206%	230	0.172%	1.646	1.625	1.626	1.733	0.101	0.028	1.994	1.035
Pakistan	47	0.284%	318	0.237%	−0.817	−0.977	−0.944	−1.302	0.111	−0.019	1.183	0.919
Peru	61	0.369%	380	0.284%	−1.005	0.307	0.267	−0.481	0.010	−0.124	1.113	0.951
Philippines	70	0.424%	347	0.259%	−0.896	0.260	0.178	−0.468	0.027	−0.151	1.018	0.920
Poland	71	0.430%	199	0.149%	−0.104	0.611	0.965	0.363	0.039	−0.040	1.159	0.938
Taiwan	1,397	8.455%	13,539	10.108%	0.625	0.734	0.752	0.669	−0.020	−0.045	1.160	0.943
Russia	59	0.357%	183	0.137%	−1.129	−0.034	−0.796	−1.097	0.119	0.052	0.658	0.833
Singapore	127	0.769%	731	0.546%	1.444	1.837	0.200	1.025	0.200	0.136	0.887	0.902
Sweden	147	0.890%	1,521	1.136%	1.595	1.223	1.512	1.586	−0.012	−0.078	1.712	1.036
Thailand	177	1.071%	612	0.457%	−0.133	−0.418	−0.042	−0.381	0.004	−0.006	1.175	0.950
Turkey	184	1.114%	1,593	1.189%	−0.276	−0.241	−0.153	−0.449	0.009	−0.020	0.972	0.825
United States	4,036	24.427%	33,930	25.331%	1.024	1.394	1.211	1.156	0.387	0.281	1.679	1.078
South Africa	78	0.472%	657	0.490%	0.289	0.276	0.474	0.201	0.059	−0.047	1.724	0.910
Sum	16,523	100.000%	133,945	100.000%								
Mean					0.771	0.801	0.929	0.793	0.102	0.032	1.322	0.988
Standard Deviation					0.590	0.704	0.620	0.670	0.614	0.594	1.331	0.322

Institutional quality variable includes legal institutional quality (indicated by the variable "legal institutions"), economic institutional quality (indicated by the variable "economic institutions"), political institutional quality (indicated by the variable "political institutions"), and composite institutional quality (indicated by the variable "composite institutions"). There are many proxy variables can represent the institutional quality of legal, economic, and political, thus we use the PCA approach to develop a single composite institutional quality index, respectively. Composite institutions include legal institutions, economic institutions and political institutions and we use the PCA approach to develop a single composite institutional quality index to represent the overall institutional quality of the country. *TFP* is measured by Cobb-Douglas production function; *IndAdjTFP* is equal to the TFP of a sampled company minus the median of the TFP of the associated industry; *Tobin's Q* is the ratio of the market value of equity added to the book value of debt, divided by the book value of the total assets; *IndAdjTobin's Q* is equal to the *Tobin's Q* ratio of a sampled company minus the median of the *Tobin's Q* ratio of the associated industry.

Table 2
Analysis of the difference in mean and median of TFP and firm value under high and low institutional quality.

Panel A. Mean Test				
	High	Low	Difference	P-value
TFP	0.167	0.009	0.158***	<0.0001
IndAdjTFP	0.082	−0.040	0.122***	<0.0001
Tobin's Q	1.334	1.256	0.078***	<0.0001
IndAdjTobin's Q	0.999	0.970	0.028***	<0.0001
Panel B. Median Test				
	High	Low	Difference	P-value
TFP	0.099	−0.010	0.109***	<0.0001
IndAdjTFP	0.040	−0.041	0.081***	<0.0001
Tobin's Q	0.910	0.901	0.009**	0.019
IndAdjTobin's Q	0.927	0.906	0.021***	<0.0001

We distinguish samples by median of institutional quality variables. The difference in mean is assessed using a *t*-test. The difference in median is assessed using Wilcoxon matched-pairs signed-rank test. Institutional quality variable is the composite institutional quality (indicated by the variable "composite institutions"). Composite institutions include the variables of legal, economic, and political institutional quality, using the PCA approach to develop a single composite institutional quality index to represent the overall institutional quality of the country. *TFP* is measured by Cobb-Douglas production function; *IndAdjTFP* is equal to the TFP of a sampled company minus the median of the *TFP* of the associated industry; *Tobin's Q* is the ratio of the market value of equity added to the book value of debt, divided by the book value of the total assets; *IndAdjTobin's Q* is equal to the *Tobin's Q* ratio of a sampled company minus the median of the *Tobin's Q* ratio of the associated industry. ***, **, and * represent 1%, 5%, and 10% significance levels, respectively.

positive impact on *IndAdjTobin's Q*. Thus, Hypothesis 1 is supported.

4.4. Impact of composite institutional quality on TFP

The results in Column (5) and (6) of Table 3 reveal that composite institutional quality has a significant positive impact on *TFP*. In the pooled OLS regression model and panel data regression with fixed effects, the regression coefficient regarding the impact of composite institutional quality variables on *TFP* are 0.058 and 0.076, respectively, both reaching the 1% significance level. The co-efficient of composite institutions in Column (5) and (6) of Table 3 indicates that a one standard deviation increase in the composite institutional quality variable (*PCQI*) is associated with a 0.039 (0.058 × 0.670) and 0.051 (0.076 × 0.670) increase in firms' TFP, which are 38.098% and 49.922% of its mean (0.039/0.102 and 0.051/0.102). This empirical finding is consistent with H2, namely, good institutional quality helps to improve enterprises' TFP. Column (7) and (8) of Table 3 also shows the impact of institutional quality on *IndAdjTFP*. The robustness test results reveal that the composite institutional quality variable has a significantly positive impact on *IndAdjTFP*. This is also consistent with Hypothesis 2, that is, enhanced institutional quality helps to reduce the inefficiency of resource allocation and promote enterprises' technological advancement, and in line with that of Salinas-Jiménez and Salinas-Jiménez (2011), in that corruption caused by poor institutional quality had a significantly negative impact on TFP growth.

4.5. Impact of legal, economic, and political institutional qualities on firm value and TFP

4.5.1. Analysis of the difference in mean and median TFP and firm value under high and low legal, economic, or political institutional qualities

Table 4 provides an analysis of mean and median TFP and firm value under high and low institutional quality. Under high legal institutional quality (indicated by the variable "legal institutions" in Panel A of Table 4), the average values of *TFP*, *IndAdjTFP*, *Tobin's Q* ratio, and *IndAdjTobin's Q* are 0.168, 0.083, 1.340, and 1.003, respectively. Under low legal institutional quality, the average values of *TFP*, *IndAdjTFP*, *Tobin's Q* ratio, and *IndAdjTobin's Q* are 0.007, −0.041, 1.247, and 0.964, respectively. The differences between these two groups are 0.161, 0.124, 0.094, and 0.039 respectively, and the test results all reach the 1% significance level. These results denote that firms located in countries with safe legal systems and strong laws and regulations will reach a higher firm value and better TFP growth than those in countries with poor legal systems. Media-based test results also support our empirical results.

Panel B of Table 4 describes the differences in TFP and firm value under high and low economic institutional quality (indicated by the variable "economic institutions"). We find that *TFP*, *IndAdjTFP*, *Tobin's Q* ratio, and *IndAdjTobin's Q* in countries with high economic institutional quality are significantly higher than those in countries with poor economic institutional quality. Therefore, firms in countries with better economic institutional quality are better placed to make technological progress and improve firm value than those in countries with weaker economic institutional quality.

Panel C of Table 4 shows the differences in the mean and median TFP and firm value under high and low political institutional quality (indicated by the variable "political institutions"). Irrespective of which method is adopted, we got consistent results for all. Based on Panel C of Table 4, *TFP*, *IndAdjTFP*, *Tobin's Q* ratio, and *IndAdjTobin's Q* in higher political institutions are significantly higher than those in weaker political institutions, suggesting that stronger political institutions will help increase corporate value and TFP.

Table 3
Impact of composite institutional quality on firm value and TFP.

	Tobin's Q		IndAdjTobin's Q		TFP		IndAdjTFP	
	Pooled OLS	Fixed effects	Pooled OLS	Fixed effects	Pooled OLS	Fixed effects	Pooled OLS	Fixed effects
Intercept	0.331***	−2.968***	1.295***	0.676***	−0.045***	0.887***	−0.011	0.940***
	(0.034)	(0.064)	(0.007)	(0.010)	(0.009)	(0.027)	(0.010)	(0.027)
$PCQI_{t-1}$	0.327***	0.159***	0.077***	0.039***	0.058***	0.076***	0.035***	0.015*
	(0.013)	(0.021)	(0.003)	(0.003)	(0.003)	(0.008)	(0.004)	(0.008)
$SIZE_{t-1}$	0.080***	0.276***	0.002***	0.017***	0.002***	−0.055***	−0.001**	−0.060***
	(0.002)	(0.004)	(0.000)	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)
LEV_{t-1}	−0.658***	−0.462***	−0.121***	−0.001	−0.055***	−0.156***	−0.010	−0.148***
	(0.025)	(0.027)	(0.005)	(0.004)	(0.007)	(0.011)	(0.007)	(0.011)
$CAPEXP_{t-1}$	0.800***	0.575***	0.003	0.140***				
	(0.086)	(0.075)	(0.018)	(0.011)				
DIV_{t-1}	1.229***	0.198***	0.038**	−0.003				
	(0.443)	(0.049)	(0.018)	(0.008)				
RDR_{t-1}	4.899***	1.021***	0.740***	−0.098***				
	(0.117)	(0.072)	(0.015)	(0.011)				
ROA_{t-1}					−0.067***	0.099***	−0.004	0.091***
					(0.018)	(0.010)	(0.018)	(0.01)
MB_{t-1}					0.014***	0.028***	0.006***	0.027***
					(0.001)	(0.001)	(0.001)	(0.001)
TFP_{t-1}					0.727***	0.283***	0.691***	0.281***
					(0.009)	(0.003)	(0.009)	(0.003)
Firm dummies		Included		Included		Included		Included
Country dummies	Included	Included	Included	Included	Included	Included	Included	Included
Industry dummies	Included		Included		Included		Included	
Year dummies	Included	Included	Included	Included	Included	Included	Included	Included
Adj.R^2	0.230	0.640	0.423	0.870	0.672	0.829	0.628	0.813
F-value	509.990***	16.500***	1,245.600***	59.095***	3,840.430***	43.363***	3,161.470***	38.924***
Observations	133,945	133,945	133,945	133,945	133,945	133,945	133,945	133,945

We use pooled ordinary least squares regression (Pooled OLS) and panel data regression with fixed effects to examine the impact of composite institutional quality on firm value and TFP. The dependent variables are Tobin's Q (*Tobin's Q*), industrial adjustment Tobin's Q (*IndAdjTobin's Q*), total factor productivity (*TFP*), industrial adjustment TFP (*IndAdjTFP*), respectively. *Tobin's Q* is the ratio of the market value of equity added to the book value of debt, divided by the book value of the total assets; *IndAdjTobin's Q* is equal to the Tobin's Q ratio of a sampled company minus the median of the Tobin's Q ratio of the associated industry; *TFP* is measured by Cobb-Douglas production function; *IndAdjTFP* is equal to the TFP of a sampled company minus the median of the TFP of the associated industry. The independent variable *PCQI* indicates the composite institutional quality variable (indicated by the variable "composite institutions"). Composite institutions include the variables of legal, economic, and political institutional quality, using the PCA approach to develop a single composite institutional quality index to represent the overall institutional quality of the country. Firm size (*SIZE*) is defined as the natural logarithm of the market value of equity; capital expenditure ratio (*CAPEXP*) is the ratio of capital expenditure to total assets; dividend payout ratio (*DIV*) is the ratio of dividends divided by the operating revenues; leverage (*LEV*) is the ratio of the total debt divided by the total assets; research and development ratio (*RDR*) is the ratio of the R&D expenses divided by the total assets. All pooled OLS regressions include industry dummies, country dummies, and year dummies; and all fixed effects regressions include firm dummies, country dummies, and year dummies. Newey–West heteroskedasticity and autocorrelation-robust standard errors are reported in parentheses (Newey & West, 1987). ***, **, and * represent 1%, 5%, and 10% significance levels, respectively.

4.5.2. Impact of legal, economic, and political institutional qualities on firm value

The results in Table 5 find that legal, economic, and political institutional qualities have a positive impact on *Tobin's Q*. The regression coefficients of the three variables are respectively 0.263, 0.292, and 0.393, and at the 1% significance level. Specifically, the coefficients of legal, economic and political institutional qualities in Column (1) through (3) of Table 5 indicate that a one standard deviation increase in the legal, economic, and political institutions variables are associated with a 0.155 (0.263 × 0.590), 0.206 (0.292 × 0.704), and 0.244 (0.393 × 0.620) increase in firm value, respectively, which are 11.738% (0.155/1.322), 15.550% (0.206/1.322), and 18.431% (0.244/1.322) of its mean, respectively. This positive relationship reveals that the firms in countries with better quality of institutions exhibit an increase in corporate value. This empirical result is consistent with H1, which is, good quality of institutions helps to increase firm value. For more accurate and precise results, we include adjusted value for Tobin's Q. Column (4) through (6) of Table 5 describe the impact of institutional quality on *IndAdjTobin's Q* and this is consistent with previous results. The robustness results reveal that the institutional quality variables in legal, economic, and political aspects have a significant positive impact on *IndAdjTobin's Q*. Thus, we can conclude that enhancing the country's institutional quality is beneficial to improving its enterprise value, supporting H1.

Following Gujarati (2003), we further conduct a Student's t-test for the difference of regression coefficients between regression models based on the results in Table 5 to explore whether the institutional quality variables have a varying degree of impact on firm value. We find that to be true as (1) political institutional quality has a more significant and greater positive impact (the regression coefficient reaches the 1% significance level) on firm value than legal and economic; (2) there is no significant difference in regression coefficients regarding the impact of legal and economic institutional qualities on firm value. Thus, Hypothesis 3 is supported.

Table 4

Analysis of the difference in mean and median of TFP and firm value under high and low legal institutional quality, economic institutional quality, or political institutional quality.

	Mean Test				Median Test				
	High	Low	Difference	P-value		High	Low	Difference	P-value
Panel A legal institutions									
TFP	0.168	0.007	0.161***	<0.0001	*TFP*	0.101	−0.010	0.111***	<0.0001
IndAdjTFP	0.083	−0.041	0.124***	<0.0001	*IndAdjTFP*	0.041	−0.041	0.083***	<0.0001
Tobin's Q	1.340	1.247	0.094***	<0.0001	*Tobin's Q*	0.916	0.892	0.024**	0.029
IndAdjTobin's Q	1.003	0.964	0.039***	<0.0001	*IndAdjTobin's Q*	0.939	0.894	0.045***	<0.0001
Panel B economic institutions									
TFP	0.162	0.019	0.143***	<0.0001	*TFP*	0.091	−0.003	0.094***	<0.0001
IndAdjTFP	0.083	−0.038	0.121***	<0.0001	*IndAdjTFP*	0.039	−0.040	0.079***	<0.0001
Tobin's Q	1.323	1.273	0.050***	<0.0001	*Tobin's Q*	0.905	0.907	−0.001***	0.002
IndAdjTobin's Q	0.998	0.972	0.027***	<0.0001	*IndAdjTobin's Q*	0.942	0.893	0.050***	<0.0001
Panel C political institutions									
TFP	0.166	0.008	0.157***	<0.0001	*TFP*	0.098	−0.011	0.109***	<0.0001
IndAdjTFP	0.081	−0.039	0.120***	<0.0001	*IndAdjTFP*	0.038	−0.040	0.078***	<0.0001
Tobin's Q	1.327	1.265	0.062***	<0.0001	*Tobin's Q*	0.905	0.908	−0.003***	<0.0001
IndAdjTobin's Q	0.997	0.972	0.026***	<0.0001	*IndAdjTobin's Q*	0.926	0.907	0.019***	<0.0001

We distinguish samples by median of institutional quality variables. The difference in mean is assessed using a *t*-test. The difference in median is assessed using Wilcoxon matched-pairs signed-rank test. Institutional quality variable includes legal institutional quality (indicated by the variable "legal institutions"), economic institutional quality (indicated by the variable "economic institutions"), and political institutional quality (indicated by the variable "political institutions"). There are many proxy variables can represent the institutional quality of legal, economic, and political, thus we use the PCA approach to develop a single composite institutional quality index, respectively. The detailed definition of *TFP, IndAdjTFP, Tobin's Q,* and *IndAdjTobin's Q* are defined in Table 3. ***, **, and * represent 1%, 5%, and 10% significance levels, respectively.

4.5.3. Impact of legal, economic, and political institutional qualities on TFP

Column (7) through (9) of Table 5 reveal that legal, economic, and political institutional qualities have a significant positive impact on *TFP*. The regression coefficients regarding the impact of legal, economic, and political institutional quality variables on *TFP* are 0.047, 0.043, and 0.081, respectively. In particular, political institutional quality has the most significant and greater impact on *TFP*. Specifically, the coefficients of legal, economic and political institutional qualities in Column (7) through (9) of Table 5 indicate that a one standard deviation increase in the legal, economic, and political institutions variables are associated with a 0.028 (0.047 × 0.590), 0.030 (0.043 × 0.704), and 0.050 (0.081 × 0.620) increase in firm's TFP, respectively, which are 27.186% (0.028/0.102), 29.678% (0.030/0.102), and 49.235% (0.050/0.102) of its mean, respectively. The findings are consistent with H2: good institutional quality helps to improve enterprises' TFP. Table 5 also shows the impact of institutional quality on *IndAdjTFP*. Robustness test results reveal that the institutional quality variables have a significant positive impact on *IndAdjTFP*, consistent with H2, that is, enhanced institutional quality helps to reduce the inefficiency of resource allocation and promote enterprises' technological advancement.

We use Student's t-test for the difference of regression coefficients between regression models based on the results in Table 5 to explore whether the different types of institutional quality variables have a varying degree of impact on *TFP* (*IndAdjTFP*). We find that (1) political institutional quality has a more significant and greater positive impact (the regression coefficient reaches the 1% significance level) on *TFP* (*IndAdjTFP*) than legal and economic institutional qualities, and (2) there is no significant difference in the regression coefficients regarding the impact of legal and economic institutional qualities on *TFP* (*IndAdjTFP*). Therefore, different types of institutional quality have a varying degree of impact on *TFP* (*IndAdjTFP*) and H4 is supported.

4.6. Interaction between institutional quality, TFP, and firm value

North (1990) finds that poor institutional quality slows down technological advances. Hall and Jones (1999) find that enhanced institutional quality can promote productivity, investment, and development of new technologies. In other words, bad institutional quality reduces corporate competitiveness, thereby worsening corporate performance. Using three-stage least squares, this study further presumes that good institutional quality can also increase firm value by promoting enterprises' technological advances.

Table 6 shows that (1) institutional quality in previous year has a significant positive impact on *TFP,* and (2) *TFP* in previous year has a significant positive impact on firm value. In other words, enhanced institutional quality helps improve enterprise efficiency and promote technological advancement, thereby increasing corporate value; thus, H5 is supported.

5. Endogeneity problem

Is the quality of institutions an exogenous decision? If government policy takes into account firm performance, our results may show endogeneity problem. To avoid the causality runs in the opposite direction in our issue. Following La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1999), we include ethnolinguistic fractionalization, socialist legal origin, French legal origin, German legal

Table 5
Impact of legal institutional quality, economic institutional quality, political institutional quality on firm value and TFP.

	Tobin's Q			IndAdjTobin's Q			TFP			IndAdjTFP		
	Legal Institutions	Economic Institutions	Political Institutions	Legal Institutions	Economic Institutions	Political Institutions	Legal Institutions	Economic Institutions	Political Institutions	Legal Institutions	Economic Institutions	Political Institutions
Intercept	0.433***	0.254***	0.259***	1.321***	1.293***	1.275***	−0.052***	−0.023**	−0.070***	−0.020**	0.005	−0.028***
	(0.035)	(0.034)	(0.034)	(0.007)	(0.007)	(0.007)	(0.010)	(0.009)	(0.009)	(0.010)	(0.010)	(0.010)
$PCQI_{t-1}$	0.263***	0.292***	0.393***	0.060***	0.058***	0.095***	0.047***	0.043***	0.081***	0.031***	0.023***	0.050***
	(0.013)	(0.009)	(0.015)	(0.003)	(0.002)	(0.003)	(0.003)	(0.003)	(0.005)	(0.003)	(0.003)	(0.005)
$SIZE_{t-1}$	0.079***	0.083***	0.079***	0.002***	0.003***	0.002***	0.002***	0.002***	0.002***	−0.001	−0.001**	−0.001**
	(0.002)	(0.002)	(0.002)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
LEV_{t-1}	−0.659***	−0.652***	−0.670***	−0.122***	−0.121***	−0.124***	−0.055***	−0.056***	−0.056***	−0.010	−0.011	−0.011
	(0.025)	(0.025)	(0.025)	(0.005)	(0.005)	(0.005)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
$CAPEXP_{t-1}$	0.777***	0.762***	0.820***	−0.003	−0.007	0.008						
	(0.086)	(0.086)	(0.086)	(0.018)	(0.018)	(0.018)						
DIV_{t-1}	1.213***	1.236***	1.237***	0.034*	0.038**	0.040**						
	(0.437)	(0.445)	(0.446)	(0.017)	(0.018)	(0.019)						
RDR_{t-1}	4.962***	4.905***	4.873***	0.756***	0.747***	0.733***						
	(0.117)	(0.117)	(0.117)	(0.015)	(0.015)	(0.015)						
ROA_{t-1}							−0.070***	−0.069***	−0.063***	−0.005	−0.006	−0.002
							(0.018)	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)
MB_{t-1}							0.014***	0.014***	0.014***	0.006***	0.007***	0.006***
							(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
TFP_{t-1}							0.727***	0.728***	0.726***	0.691***	0.692***	0.690***
							(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
Country dummies	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
Industry dummies	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
Year dummies	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
Coefficient difference tests for $PCQI_{t-1}$ between political institutions and legal institutions	6.549***			8.250***			5.831***			3.258***		
Coefficient difference tests for $PCQI_{t-1}$ between political institutions and economic institutions	5.774***			10.262***			6.517***			4.630***		
Coefficient difference tests for $PCQI_{t-1}$ between economic institutions and legal institutions	1.834*			−0.555			−0.943			−1.886*		
Adj.R²	0.229	0.232	0.230	0.421	0.422	0.423	0.672	0.672	0.672	0.628	0.627	0.628
F-value	504.920***	515.400***	509.610***	1,236.880***	1,245.150***	1,246.290***	3,841.530***	3,834.780***	3,843.960***	3,162.650***	3,159.440***	3,162.950***
Observations	133,945	133,945	133,945	133,945	133,945	133,945	133,945	133,945	133,945	133,945	133,945	133,945

We use pooled ordinary least squares regression (Pooled OLS) to examine the impact of legal institutional quality, economic institutional quality, political institutional quality on firm value and TFP. Dependent variables are Tobin's Q (*Tobin's Q*), industrial adjustment Tobin's Q (*IndAdjTobin's Q*), total factor productivity (*TFP*), industrial adjustment TFP (*IndAdjTFP*), respectively. The independent variable *PCQI* indicates the institutional quality variable, including legal institutional quality (indicated by the variable "legal institutions"), economic institutional quality (indicated by the variable "economic institutions"), and political institutional quality (indicated by the variable "political institutions"). There are many proxy variables can represent the institutional quality of legal, economic, and political, thus we use the PCA approach to develop a single composite institutional quality index, respectively. The detailed definition of *Tobin's Q, IndAdjTobin's Q, TFP, IndAdjTFP, SIZE, CAPEXP, DIV, LEV, RDR, ROA,* and *MB* are defined in Table 3. All regressions include industry dummies, country dummies, and year dummies[1]. Newey–West heteroskedasticity and autocorrelation-robust standard errors are reported in parentheses (Newey & West, 1987). ***, **, and * represent 1%, 5%, and 10% significance levels, respectively.
[1] We also use panel data regression with fixed effects, and obtain consistent results.

Table 6

Interaction between institutional quality, TFP, and firm value.

Panel A. The Dependent Variable: *Tobin's Q/TFP*

	Legal Institutions		Economic Institutions		Political Institutions		Composite Institutions	
	Tobin's Q	*TFP*	*Tobin's Q*	*TFP*	*Tobin's Q*	*TFP*	*Tobin's Q*	*IndAdjTFP*
Intercept	0.711***	−0.007	0.710***	−0.030***	0.698***	−0.047***	0.711***	−0.027***
	(0.026)	(0.008)	(0.026)	(0.009)	(0.025)	(0.009)	(0.026)	(0.009)
TFP_{t-1}	0.177***	0.787***	0.177***	0.786***	0.183***	0.787***	0.177***	0.786***
	(0.006)	(0.002)	(0.006)	(0.002)	(0.006)	(0.002)	(0.006)	(0.002)
$PCQI_{t-1}$		0.034***		0.037***		0.064***		0.048***
		(0.004)		(0.003)		(0.004)		(0.004)
Control variables	Included	Included	Included	Included	Included	Included	Included	Included
Country dummies	Included	Included	Included	Included	Included	Included	Included	Included
Industry dummies	Included	Included	Included	Included	Included	Included	Included	Included
Year dummies	Included	Included	Included	Included	Included	Included	Included	Included
Adj.R^2	0.233	0.716	0.233	0.716	0.231	0.718	0.233	0.716
F-value	516.060***	4,279.460***	516.250***	4,288.690***	492.870***	4,172.940***	516.060***	4,284.230***
Observations	133,945	133,945	133,945	133,945	133,945	133,945	133,945	133,945

Panel B. The Dependent Variable: *IndAdjTobin's Q/IndAdjTFP*

	Legal Institutions		Economic Institutions		Political Institutions		Composite Institutions	
	IndAdjTobin's Q	*IndAdjTFP*	*IndAdjTobin's Q*	*IndAdjTFP*	*IndAdjTobin's Q*	*IndAdjTFP*	*IndAdjTobin's Q*	*IndAdjTFP*
Intercept	−0.674***	0.024***	−0.675***	0.005	−0.675***	0.002	−0.674***	0.011
	(0.026)	(0.009)	(0.026)	(0.009)	(0.025)	(0.009)	(0.026)	(0.009)
$IndAdjTFP_{t-1}$	0.177***	0.747***	0.177***	0.746***	0.182***	0.745***	0.177***	0.746***
	(0.006)	(0.002)	(0.006)	(0.002)	(0.006)	(0.002)	(0.006)	(0.002)
$PCQI_{t-1}$		0.014***		0.021***		0.036***		0.024***
		(0.004)		(0.003)		(0.004)		(0.004)
Control variables	Included	Included	Included	Included	Included	Included	Included	Included
Country dummies	Included	Included	Included	Included	Included	Included	Included	Included
Industry dummies	Included	Included	Included	Included	Included	Included	Included	Included
Year dummies	Included	Included	Included	Included	Included	Included	Included	Included
Adj.R^2	0.168	0.668	0.168	0.668	0.168	0.668	0.168	0.668
F-value	344.640***	3,422.040***	344.770***	3427.310***	330.470***	3295.240***	344.640***	3423.330***
Observations	133,945	133,945	133,945	133,945	133,945	133,945	133,945	133,945

To explore whether a country with good institutional quality can increase firm value by improving enterprises' TFP, the following simultaneous equation models (9a) and (10a), and (9b) and (10b) are built using three-stage least squares, respectively: $Tobin's Q_{ijt} = \alpha_j + \delta_1 TFP_{ijt-1} + \sum_{k=1}^{K}\theta_k CV_{kijt-1} + \eta_t + \varepsilon_{ijt}$ (9a) $TFP_{ijt} = \alpha_j + \beta_1 PCQI_{ijt-1} + \sum_{n=1}^{N}\gamma_n CV_{nijt-1} + \eta_t + \varepsilon_{ijt}$ (10a) $IndAdjTobin's Q_{ijt} = \alpha_j + \delta_1 IndAdjTFP_{ijt-1} + \sum_{k=1}^{K}\theta_k CV_{kijt-1} + \eta_t + \varepsilon_{ijt}$ (9b) $IndAdjTFP_{ijt} = \alpha_j + \beta_1 PCQI_{ijt-1} + \sum_{n=1}^{N}\gamma_n CV_{nijt-1} + \eta_t + \varepsilon_{ijt}$ (10b).

In Equation (9a) and (9b), The dependent variables are Tobin's Q (*Tobin's Q*) and industrial adjustment Tobin's Q (*IndAdjTobin's Q*), respectively. In Equation (10a) and (10b), The dependent variables are *TFP* and industrial adjustment TFP (*IndAdjTFP*), respectively. The independent variable *PCQI* indicates the institutional quality variable, including legal institutional quality (indicated by the variable "legal institutions"), economic institutional quality (indicated by the variable "economic institutions"), political institutional quality (indicated by the variable "political institutions"), and composite institutional quality (indicated by the variable "composite institutions"). There are many proxy variables can represent the institutional quality of legal, economic, and political, thus we use the PCA approach to develop a single composite institutional quality index. Composite institutions include the variables of legal, economic, and political institutional quality, using the PCA approach to develop a single composite institutional quality index to represent the overall institutional quality of the country. The detailed definition of *Tobin's Q, IndAdjTobin's Q, TFP*, and *IndAdjTFP* are defined in Table 3. All regressions include control variables, industry dummies, country dummies, and year dummies[1]. Newey–West heteroskedasticity and autocorrelation-robust standard errors are reported in parentheses (Newey & West, 1987). ***, **, and * represent 1%, 5%, and 10% significance levels, respectively.

[1] To save space, we do not tabulate the results control variables, the completed table will be provided in Online Appendix. Moreover, the regressions also use firm dummies to substitute industry dummies, and obtain consistent results.

Table 7
Instrumental variables estimate of the impact of institutional quality on firm value and TFP.

Panel A. First Stage

	Legal Institutions	Economic Institutions	Political Institutions	Composite Institutions	Legal Institutions	Economic Institutions	Political Institutions	Composite Institutions
Intercept	−2.805***	−4.829***	0.284***	−2.605***	−2.805***	−4.829***	0.284***	−2.605***
	(0.074)	(0.096)	(0.007)	(0.054)	(0.074)	(0.096)	(0.007)	(0.054)
Ethnolinguistic	0.247***	0.314***	0.537***	0.052***	0.247***	0.314***	0.537***	0.052***
	(0.022)	(0.028)	(0.029)	(0.016)	(0.022)	(0.028)	(0.029)	(0.016)
Socialist	−0.078***	0.341***	0.025	−0.227***	−0.078***	0.341***	0.025	−0.227***
	(0.022)	(0.029)	(0.026)	(0.016)	(0.022)	(0.029)	(0.026)	(0.016)
French	−1.640***	−1.980***	−0.010***	−1.803***	−1.640***	−1.980***	−0.010***	−1.803***
	(0.027)	(0.035)	(0.000)	(0.020)	(0.027)	(0.035)	(0.000)	(0.020)
German	0.500***	0.380***	0.699***	0.580***	0.500***	0.380***	0.699***	0.580***
	(0.012)	(0.016)	(0.020)	(0.009)	(0.012)	(0.016)	(0.020)	(0.009)
Scandinavian	1.214***	0.395***	0.085***	0.902***	1.214***	0.395***	0.085***	0.902***
	(0.014)	(0.018)	(0.002)	(0.010)	(0.014)	(0.018)	(0.002)	(0.010)
Catholic	0.169***	0.665***	0.234***	0.534***	0.169***	0.665***	0.234***	0.534***
	(0.057)	(0.074)	(0.004)	(0.042)	(0.057)	(0.074)	(0.004)	(0.042)
Muslim	1.347***	1.998***	0.254***	1.143***	1.347***	1.998***	0.254***	1.143***
	(0.051)	(0.066)	(0.004)	(0.037)	(0.051)	(0.066)	(0.004)	(0.037)
Others	−0.007***	−0.001*	0.279***	−0.008***	−0.007***	−0.001*	0.279***	−0.008***
	(0.0004)	(0.0005)	(0.0035)	(0.0003)	(0.0004)	(0.0005)	(0.0035)	(0.0003)
Latitude	−2.001***	−1.419***	0.344***	−1.042***	−2.001***	−1.419***	0.344***	−1.042***
	(0.041)	(0.052)	(0.003)	(0.029)	(0.041)	(0.052)	(0.003)	(0.029)
PCGDP	0.483***	0.686***	0.353***	0.435***	0.483***	0.686***	0.353***	0.435***
	(0.004)	(0.006)	(0.003)	(0.003)	(0.004)	(0.006)	(0.003)	(0.003)
Country dummies	Included	Included	Included	Included	Included	Included	Included	Included
Year dummies	Included	Included	Included	Included	Included	Included	Included	Included
Adj.R^2	0.905	0.887	0.971	0.956	0.905	0.887	0.971	0.956
F-value	12,645***	10,513***	43,746***	28,757***	12,645***	10,513***	43,746***	28,757***
Observations	89,389	89,389	89,389	89,389	89,389	89,389	89,389	89,389

Panel B. Second Stage–The Dependent Variable: *Tobin's Q/IndAdjTobin's Q*

	Tobin's Q				IndAdjTobin's Q			
	Legal Institutions	Economic Institutions	Political Institutions	Composite Institutions	Legal Institutions	Economic Institutions	Political Institutions	Composite Institutions
Intercept	0.594***	0.535***	0.495***	0.562***	−0.659***	−0.690***	−0.730***	−0.680***
	(0.037)	(0.037)	(0.037)	(0.037)	(0.037)	(0.036)	(0.036)	(0.036)
$PCQI_{t-1}$	0.087***	0.099***	0.164***	0.107***	0.031	0.043***	0.094***	0.048***
	(0.019)	(0.015)	(0.018)	(0.016)	(0.019)	(0.015)	(0.018)	(0.016)
Control variables	Included	Included	Included	Included	Included	Included	Included	Included
Country dummies	Included	Included	Included	Included	Included	Included	Included	Included
Industry dummies	Included	Included	Included	Included	Included	Included	Included	Included
Year dummies	Included	Included	Included	Included	Included	Included	Included	Included
Coefficient difference tests for $PCQI_{t-1}$ between political institutions and legal institutions	2.942***				2.407**			
Coefficient difference tests for $PCQI_{t-1}$ between political institutions and economic institutions	2.774***				2.177**			
Coefficient difference tests for $PCQI_{t-1}$ between economic institutions and legal institutions	0.496				0.496			
Adj.R^2	0.134	0.135	0.136	0.135	0.233	0.233	0.233	0.233
F-value	199.330***	199.640***	202.670***	200.850***	363.340***	363.740***	364.440***	363.780***
Observations	89,389	89,389	89,389	89,389	89,389	89,389	89,389	89,389

Panel C. Second Stage–The Dependent Variable: *TFP/IndAdjTFP*

	TFP				IndAdjTFP			

Table 7 (*continued*)

Panel A. First Stage

	Legal Institutions	Economic Institutions	Political Institutions	Composite Institutions	Legal Institutions	Economic Institutions	Political Institutions	Composite Institutions
	Legal Institutions	Economic Institutions	Political Institutions	Composite Institutions	Legal Institutions	Economic Institutions	Political Institutions	Composite Institutions
Intercept	1.284***	1.222***	1.200***	1.252***	1.172***	1.126***	1.103***	1.147***
	(0.016)	(0.017)	(0.017)	(0.016)	(0.016)	(0.017)	(0.017)	(0.016)
$PCQI_{t-1}$	0.080***	0.096***	0.143***	0.100***	0.052***	0.066***	0.107***	0.070***
	(0.007)	(0.006)	(0.007)	(0.006)	(0.007)	(0.006)	(0.007)	(0.006)
Control variables	Included	Included	Included	Included	Included	Included	Included	Included
Country dummies	Included	Included	Included	Included	Included	Included	Included	Included
Industry dummies	Included	Included	Included	Included	Included	Included	Included	Included
Year dummies	Included	Included	Included	Included	Included	Included	Included	Included
Coefficient difference tests for $PCQI_{t-1}$ between political institutions and legal institutions	6.364***				5.556***			
Coefficient difference tests for $PCQI_{t-1}$ between political institutions and economic institutions	5.098***				4.447***			
Coefficient difference tests for $PCQI_{t-1}$ between economic institutions and legal institutions	1.735*				1.519			
Adj.R^2	0.905	0.887	0.971	0.956	0.512	0.512	0.513	0.512
F-value	12,645***	10,513***	43,746***	28,757***	1,293.370***	1,295.110***	1,297.250***	1,295.080***
Observations	89,389	89,389	89,389	89,389	89,389	89,389	89,389	89,389

To avoid the causality runs in the opposite direction in our issue. Following La Porta et al. (1999), we include ethnolinguistic fractionalization, Socialist legal origin, French legal origin, German legal origin, Scandinavian origin, Catholic religion, Muslim religion, other religions, latitude, and log GNP per capita as instruments. We then conduct the regression analysis in the first stage by setting institutional quality as the dependent variable and the instrumental variables affecting institutional quality as independent variables. After obtaining the fitted value of institutional quality through the regression analysis in the first stage, we then substitute the proxy for institutional quality and conduct the regression analysis in the second stage to alleviate the endogenous problem, and rerun Equations (2) and (3). The dependent variables are Tobin's Q (*Tobin's Q*), industrial adjustment Tobin's Q (*IndAdjTobin's Q*), total factor productivity (*TFP*), industrial adjustment TFP (*IndAdjTFP*), respectively. The detailed definition of *Tobin's Q, IndAdjTobin's Q, TFP,* and *IndAdjTFP* are defined in Table 3, and the detailed explanation for institutional quality variable *PCQI* is presented in Table 6. All regressions include control variables, industry dummies, country dummies, and year dummies[1]. Newey–West heteroskedasticity and autocorrelation-robust standard errors are reported in parentheses (Newey & West, 1987). ***, **, and * represent 1%, 5%, and 10% significance levels, respectively.

1 To save space, we do not tabulate the results control variables, the completed table will be provided in Online Appendix. Besides, the regressions also use firm dummies to substitute industry dummies, and obtain consistent results.

origin, Scandinavian origin, Catholic religion, Muslim religion, other religions, latitude, and log GNP per capita as instruments (Appendix A2 describes the above determinants of institutional quality and their data sources). We then conduct the regression analysis by setting institutional quality as the dependent variable and the instrumental variables affecting institutional quality as independent variables. After obtaining the fitted value of institutional quality through the regression analysis in the first stage, we substitute the proxy for institutional quality and conduct the regression analysis in the second stage to alleviate the endogeneity problem, and rerun Equations (2), (3), (9) and (10).

Tables 7 and 8 show that after accounting for potential endogeneity concerns, the results remain unchanged and support Hypotheses 1–5. Moreover, the result of Durbin-Wu-Hausman test (Durbin, 1954, pp. 23–32; Hausman, 1978; Wu, 1973) indicates that the null hypothesis of variables is exogenous cannot be rejected (p-value for DWH test of Table 7 = 0.5734, 0.3452, 0.4660, and 0.5115), indicating no endogenous problems and confirming the validity of instrumental variables. The second stage results suggest that the coefficients on institutional quality are significantly positive, and that enhanced institutional quality can increase firm value and TFP. The results still support that political institutional quality has the most significant and highest positive influence on firm value and enterprises' TFP.

Table 8

Instrumental variables estimate of the interaction between institutional quality, TFP, and firm value.

Panel A. Second Stage–The Dependent Variable: *Tobin's Q/TFP*

	Legal Institutions		Economic Institutions		Political Institutions		Composite Institutions	
	Tobin's Q	*TFP*	*Tobin's Q*	TFP	*Tobin's Q*	TFP	*Tobin's Q*	TFP
Intercept	0.3319***	1.2876***	0.3320***	1.2339***	0.3322***	1.2016***	0.3321***	1.2571***
	(0.0290)	(0.0148)	(0.0290)	(0.0159)	(0.0290)	(0.0157)	(0.0290)	(0.0149)
TFP_{t-1}	0.2745***	0.7365***	0.2745***	0.7343***	0.2745***	0.7343***	0.2745***	0.7351***
	(0.0051)	(0.0028)	(0.0051)	(0.0028)	(0.0051)	(0.0028)	(0.0051)	(0.0028)
$PCQI_{t-1}$		0.0741***		0.0866***		0.1409***		0.0939***
		(0.0077)		(0.0064)		(0.0080)		(0.0068)
Control variables	Included	Included	Included	Included	Included	Included	Included	Included
Country dummies	Included	Included	Included	Included	Included	Included	Included	Included
Industry dummies	Included	Included	Included	Included	Included	Included	Included	Included
Year dummies	Included	Included	Included	Included	Included	Included	Included	Included
$Adj.R^2$	0.252	0.562	0.252	0.563	0.252	0.563	0.252	0.563
F-value	401.420***	1,529.460***	401.420***	1,532.140***	401.420***	1,536.160***	401.420***	1,532.470***
Observations	89,389	89,389	89,389	89,389	89,389	89,389	89,389	89,389

Panel B. Second Stage–The Dependent Variable: *IndAdjTobin's Q/IndAdjTFP*

	Legal Institutions		Economic Institutions		Political Institutions		Composite Institutions	
	IndAdjTobin's Q	*IndAdjTFP*	*IndAdjTobin's Q*	*IndAdjTFP*	*IndAdjTobin's Q*	*IndAdjTFP*	*IndAdjTobin's Q*	*IndAdjTFP*
Intercept	−0.6231***	1.1860***	−0.6231***	1.147***	−0.6231***	1.114***	−0.6231***	1.161***
	(0.0282)	(0.0149)	(0.0282)	(0.0160)	(0.0282)	(0.0158)	(0.0282)	(0.0150)
TFP_{t-1}	0.1423***	0.7056***	0.1423***	0.704***	0.1422***	0.704***	0.1423***	0.704***
	(0.0063)	(0.0028)	(0.0063)	(0.0028)	(0.0063)	(0.0028)	(0.0063)	(0.0028)
$PCQI_{t-1}$		0.0467***		0.059***		0.106***		0.065***
		(0.0077)		(0.0065)		(0.0080)		(0.0068)
Control variables	Included	Included	Included	Included	Included	Included	Included	Included
Country dummies	Included	Included	Included	Included	Included	Included	Included	Included
Industry dummies	Included	Included	Included	Included	Included	Included	Included	Included
Year dummies	Included	Included	Included	Included	Included	Included	Included	Included
$Adj.R^2$	0.171	0.524	0.171	0.524	0.171	0.525	0.171	0.525
F-value	247.050***	1,313.070***	247.050***	1,314.330***	247.050***	1,316.920***	247.050***	1,314.590***
Observations	89,389	89,389	89,389	89,389	89,389	89,389	89,389	89,389

To avoid the causality runs in the opposite direction in our issue. Following La Porta et al. (1999), we include ethnolinguistic fractionalization, Socialist legal origin, French legal origin, German legal origin, Scandinavian origin, Catholic religion, Muslim religion, other religions, latitude, and log GNP per capita as instruments. We then conduct the regression analysis in the first stage by setting institutional quality as the dependent variable and the instrumental variables affecting institutional quality as independent variables. After obtaining the fitted value of institutional quality through the regression analysis in the first stage, we then substitute the proxy for institutional quality and conduct the regression analysis in the second stage to alleviate the endogenous problem, and rerun Equation (9a) and (10a), and (9b) and (10b), respectively. To explore whether a country with good institutional quality can increase firm value by improving enterprises' TFP, the following simultaneous equation model is built using three-stage least squares: $Tobin'sQ_{ijt} = \alpha_j + \delta_1 TEP_{ijt-1} + \sum_{k=1}^{K}\theta_k CV_{kijt-1} + \eta_t + \varepsilon_{ijt}$ (9a) $TFP_{ijt} = \alpha_j + \beta_1 PCQI_{ijt-1} + \sum_{n=1}^{N}\gamma_n CV_{nijt-1} + \eta_t + \varepsilon_{ijt}$ (10a) $IndAdjTobin'sQ_{ijt} = \alpha_j + \delta_1 IndAdjTFP_{ijt-1} + \sum_{k=1}^{K}\theta_k CV_{kijt-1} + \eta_t + \varepsilon_{ijt}$ (9b) $IndAdjTFP_{ijt} = \alpha_j + \beta_1 PCQI_{ijt-1} + \sum_{n=1}^{N}\gamma_n CV_{nijt-1} + \eta_t + \varepsilon_{ijt}$ (10b)

In Equation (9a) and (9b), The dependent variables are Tobin's Q (*Tobin's Q*) and industrial adjustment Tobin's Q (*IndAdjTobin's Q*), respectively. In Equation (10a) and (10b), The dependent variables are *TFP* and industrial adjustment TFP (*IndAdjTFP*), respectively. The detailed definition of *Tobin's Q, IndAdjTobin's Q, TFP,* and *IndAdjTFP* are defined in Table 3, and the detailed explanation for independent variable *PCQI* is presented in Table 6. All regressions include control variables, industry dummies, country dummies, and year dummies[1] Newey–West heteroskedasticity and autocorrelation-robust standard errors are reported in parentheses (Newey & West, 1987). ***, **, and * represent 1%, 5%, and 10% significance levels, respectively.

[1] To save space, we do not tabulate the results of first stage and control variables, the completed table will be provided in Online Appendix. Moreover, the regressions also use firm dummies to substitute industry dummies, and obtain consistent results.

5.1. Impact of institutional quality on firm value and TFP

5.1.1. Impact of institutional quality on firm value

Panel B of Table 7 (Column (1) to (4)) indicate that legal, economic, and political institutional qualities, and composite institutional quality have a positive impact on firm value. The regression coefficients of the four variables are 0.087, 0.099, 0.164, and 0.107, respectively, reaching 1% significance level.[7] Panel B of Table 7 (Column (5) to (8)) also shows the impact of institutional quality on *IndAdjTobin's Q*. Robustness results reveal that all institutional quality variables have a significant positive impact on *IndAdjTFP*. After accounting for endogeneity problem, the results are consistent with H1. We also use Student's t-test for the difference of regression coefficients between regression models based on the results in Panel B of Table 7. We still find political institutional quality has the most significant and greater positive impact on corporate value, and H3 is supported.[8]

5.1.2. Impact of institutional quality on TFP

Panel C of Table 7 (Column (1) to (8)) show that the regression coefficients regarding the impact of legal, economic, political, and composite institutional quality variables on *TFP* (*IndAdjTFP*) are 0.080 (0.052), 0.096 (0.066), 0.143 (0.107), and 0.100 (0.070), respectively.[9] These finding are consistent with H2, namely, good institutional quality helps to improve enterprises' TFP. Moreover, after Student's t-test for the difference of regression coefficients between regression models (Panel C of Table 7). The results suggest that political institutional quality has a more significant and greater positive impact (the regression coefficient reaches the 1% significance level) on *TFP* (*IndAdjTFP*) than legal and economic, and there is no significant difference in the regression coefficients regarding the impact of legal and economic institutional qualities on *TFP*. Therefore, the result still supports H4.

5.2. Interaction between institutional quality, TFP, and firm value

After accounting for potential endogeneity concerns, Table 8 indicate that institutional quality in the previous year had a significant positive impact on *TFP*, and *TFP* in previous year had a significant positive impact on firm value. Therefore, the government should ensure better legal, political and economic institutional quality by establishing strict and fair laws for investor protection, reducing restrictions on investment, increasing freedom for businesses, and reduce corruption, bad bureaucracy, and autocracy. The high quality of institutions can create a better investment environment, strengthen the efficiency of resource allocation, and decrease corruption, thereby increasing firm productivity and value.

6. Additional analyses

6.1. Pearson correlation analysis

The results of the Pearson correlation analysis in Online Appendix Table A2 indicate that the correlation coefficients between the variables are low. Although there is a high correlation between *ROA* and *MB*, we have separated these variables into two regressions to reduce multicollinearity problems (Table 3). The variables Tobin's Q and TFP contain some overlapping components; for more robust results, we use the industrial adjusted Tobin's Q and TFP. After we use the adjusted values for both variables, we find that the correlation coefficient for industrial adjusted Tobin's Q and TFP is lower than before, which is 0.01. We also use adjusted Tobin's Q to get more robustness results. For example, the correlation coefficient of *IndAdjTFP* and *IndAdjTobin's Q* equals 0.01. The correlation coefficient between the adjusted Tobin's Q and other independent variables are lower than that of Tobin's Q, alleviating doubts that the dependent and independent variables might be correlated. Moreover, we used the variance inflation factors (VIFs) to measure the degree of multicollinearity of each control variable with the others in the regression models. According to Rogerson (2019), "as a rule of thumb, the VIFs greater than 5 indicates potential multicollinearity problem" (p. 304). Furthermore, Wooldridge (2014) and Hair, Black, Babin, and Anderson (2010) also pointed out that VIFs>10, and even 3 suggested by Read and Read (2004), can have the potential problems of multicollinearity. However, our results indicated most VIFs are less than 2.5. Therefore, the correlation between the variables are pretty low, as is the probability of a multicollinearity problem.

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[7] The coefficients of legal, economic, and political institutional qualities and of composite institutional quality in Column (1) through (4) of Panel B in Table 7 indicate that a one standard deviation increase in the legal, economic, and political variables, and the composite institutions variable are associated with a 0.051 (0.087 × 0.590), 0.070 (0.099 × 0.704), 0.102 (0.164 × 0.620), and 0.072 (0.107 × 0.670) increase in firm value, respectively, which are 3.883% (0.051/1.322), 5.272% (0.070/1.322), 7.691% (0.102/1.322), and 5.423% (0.072/1.322) of its mean.

[8] Political institutional quality has a more significant and greater positive impact (the regression coefficient reaches the 1% significance level) on corporate value than legal institutional quality and economic institutional quality, and there is no significant difference in the regression coefficients regarding the impact of legal institutional quality and economic institutional quality on corporate value.

[9] The coefficients of legal, economic, and political institutional qualities and of composite institutional quality in Column (1) through (4) of Panel C in Table 7 indicate that a one standard deviation increase in the legal, economic, political, and composite institutions variables are associated with a 0.047 (0.080 × 0.590), 0.068 (0.096 × 0.704), 0.089 (0.143 × 0.620), and 0.067 (0.100 × 0.670) increase in firm's TFP, which are 46.275% (0.047/0.102), 66.259% (0.068/0.102), 86.922% (0.089/0.102), and 65.686% (0.067/0.102) of its mean.

6.2. Interactions between institutional quality and firm characteristics

Empirical results in online appendix Table A3 show that leverage is negatively related to *Tobin's Q* and *IndAdjTobin's Q* at a 1% significant level. However, the regression coefficient of the interaction term for institutional quality index and leverage (*PCQI_LEV*) exhibits a significant positive relationship, indicating that good-quality institutions can reduce the negative impact of leverage on firm performance. In addition, the interaction term for institutional qualities and R&D (*PCQI_RDR*) indicate that institutional quality increases the positive influence of R&D on firm performance. Furthermore, the interaction term for the institutional qualities index and capital expenditure (*PCQI_CAPEXP*) also shows a positive significant relationship, which means institutional quality strengthens efficiency of resource allocation and promote enterprises' technological advancement. Thus, this empirical result also supports our hypotheses.

6.3. Economic development status

Online appendix Table A4 represents the sample distribution, number of firms, and firm years for both developed and developing economies. Our sample comprises 11,061 firms in 23 developed countries and 5,462 firms in 16 developing countries. Among developed countries, the United States and Japan exhibit the highest and second-highest firm year observations of 33,930 and 29,761respectively. Moreover, in developing countries, China reveals the highest firm year observations of 8,171 and followed by Taiwan, the second-highest, with firm year observations of 13,539.

Online appendix Table A5 reports the comparison results about how these institutional qualities (legal, economic, political, and composite institutions) influence firm value and TFP in both developed and developing countries. Panel A of the regression results show that the variables, Legal Institutions, Economic Institutions, Political Institutions and Composite Institutions, all indicate a significant impact on both industrial adjusted Tobin's Q and TFP. The coefficients of respective institutions on both industrial adjusted Tobin's Q and TFP are significant at 1% significance level. The table also shows similar results for firms located in developing countries. The coefficients for both industrial adjusted Tobin's Q and firm value are all significant at a 1% significance level. The positive relationship suggests that good-quality institutions help firms reach a higher performance in terms of reduction in transaction costs, promote reduction in corruption, and more efficient resource allocation, thereby improving TFP.

6.4. Consideration of macroeconomic variables

Online appendix Table A6 shows that institutional quality exhibits a positive significant relationship with both *Tobin's Q* and *TFP*. For more precise results, we include adjusted values for both Tobin's Q and TFP. However, we still get consistent and significant results on industrial adjusted Tobin's Q and industrial adjusted TFP after adding six country-level macroeconomic variables, namely, *GDPG, INF, DCP, FDI, DGS,* and *SMTV*. In online appendix Tables A7, A8, and A9, we separate the macroeconomic variables to explore their impact on Tobin's Q and TFP. After we included *GDPG* and *INF*, institutional quality still shows a significant positive relationship with *Tobin's Q* and *TFP*. The results are the same after adding *DCP* and *FDI* as well as *DGS* and *SMTV*. Therefore, we conclude that the empirical results including country-level macroeconomics variables support our previous results and thus our main hypotheses.

7. Conclusions

This study analyzes various types of institutional quality—legal, economic, and political—and investigate how they affect firm-level performance and total factor productivity. Our findings are summarized as follows: (1) enhanced institutional quality promotes enterprise technological advancement and increases firm value; (2) good institutional quality can increase firm value by improving enterprises' TFP; and, (3) political institutional quality has the most significant and highest positive influence on firm value and enterprises' TFP. In addition, we use the two-stage instrumental variable analysis approach to control the endogeneity problem, and still obtain robust results. Furthermore, we also test the Pearson correlation analysis and control the multicollinearity problems. We then consider the interaction term between the institutional qualities and firm characteristics as well as control the country-level macroeconomic variables to get more robust results.

The findings contribute to the literature as few studies discuss how different aspects of institutional quality affect firm performance. This study not only fills the gap but also adds referential and practical value to innovation and national policymaking. The results suggest that governments should ensure legally, economically, and politically superior institutional quality. For instance, government can set up strict and fair laws to protect stakeholders, reduce investment restrictions, increase freedom for businesses, reduce finance and capital controls, and alleviate corruption, bad bureaucracy, and autocracy. Those policies can create a better investment environment, strengthen the efficiency of resource allocation, and reduce transaction costs increasing firm productivity and value.

Our paper highlights how the different aspects of institutional quality influence firm performance and total factor productivity. Our main finding could serve as a reference for investors and policymakers. Our empirical results inform investors and government about the importance of the quality of institutions, and help investors to build investment portfolios and invest in different countries with good-quality institutions. The government can enhance institutional quality by launching strict and fair laws to protect stakeholders, reducing investment restrictions, increasing freedom for conducting business, and reducing corruption, excess bureaucracy, and autocracy to create a better investment environment to attract more foreign investors. These measures would lead to improved firm performance and, in turn, total factor productivity. The findings also provide insights for future research, extending to finance-related issues such as investment decisions, capital structure, dividend decisions, and agency problems.

Moreover, the finding of our paper exhibits the following limitation. We use the principal component analysis (PCA) approach to form three composite indicators and create a composite index, further examining the impact of institutional qualities on firm performance and TFP. However, the components of these three dimensions can have their own influence and the impact may differ. Therefore, future researchers can extend to investigate the impact of each specific variable on firm performance.

Author statement

Chong-Chuo Chang: Conceptualization, Methodology, Software, Formal Analysis, Investigation, Data Curation, Writing-Original Draft, Writing–Review & Editing, Visualization, Project Administration, Funding Acquisition.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.iref.2022.10.002.

Appendix Table A1. Definitions of Institutional Quality Variables

Variable	Description	Source
JI	Judicial Independence, this component is from the Global Competitiveness Report question: "Is the judiciary in your country independent from political influences of members of government, citizens, or firms? No—heavily influenced ($= 1$) or Yes—entirely independent ($= 7$)". The question's wording has varied slightly over the years. All variables from the Global Competitiveness Report were converted from the original 1-to-7 scale to a 0-to-10 scale using this formula: $EFWi = ((GCRi-1) \div 6) \times 10$.	Fraser Institute
IC	Impartial courts, this component is from the Global Competitiveness Report question: "The legal framework in your country for private businesses to settle disputes and challenge the legality of government actions and/or regulations is inefficient and subject to manipulation ($= 1$) or is efficient and follows a clear, neutral process ($= 7$)". The question's wording has varied slightly over the years.	Fraser Institute
PP	Protection of property rights, this component is from the Global Competitiveness Report question: "Property rights, including over financial assets, are poorly defined and not protected by law ($= 1$) or are clearly defined and well protected by law ($= 7$)". Note: This replaces a previous question from the Global Competitiveness Report on protection of intellectual property.	Fraser Institute
LAWORDER	Law and order, two measures comprising one risk component. Each sub-component equals half of the total. The "law" sub-component assesses the strength and impartiality of the legal system, and the "order" subcomponent assesses popular observance of the law.	ICRG
PR	Property rights, the property rights component assesses the extent to which a country's legal framework allows individuals to accumulate private property freely, secured by clear laws that the government enforces effectively. Relying on a mix of survey data and independent assessments, it provides a quantifiable measure of the degree to which a country's laws protect private property rights and the extent to which those laws are respected. It also assesses the likelihood that private property will be expropriated by the state.	The Heritage Foundation and WSJ
CR	Credit market regulations, credit market regulations include three components (ownership of banks, private sector credit, and interest rate controls/negative real interest rates). Credit market regulations reflects conditions in the domestic credit market. Sub-component ownership of banks provides evidence on the extent to which the banking industry is privately owned. The final two sub-components indicate the extent to which credit is supplied to the private sector and whether controls on interest rates interfere with the market in credit. Countries that use a private banking system to allocate credit to private parties and refrain from controlling interest rates receive higher ratings for this regulatory component.	Fraser Institute
LR	Labor market regulations, labor market regulations include six components (hiring regulations and minimum wage, hiring and firing regulations, centralized collective bargaining, hours regulations, mandated cost of worker dismissal, and conscription). The labor-market component is designed to measure the extent to which these restraints upon economic freedom are present. In order to earn high marks in the component rating regulation of the labor market, a country must allow market forces to determine wages and establish the conditions of hiring and firing, and refrain from the use of conscription.	Fraser Institute
FA	Freedom to own foreign currency bank accounts, when foreign currency bank accounts were permissible without any restrictions both domestically and abroad, the rating was 10; when these accounts were restricted, the rating was zero. If foreign currency bank accounts were permissible domestically but not abroad (or vice versa), the rating was 5.	Fraser Institute
CC	Capital controls, the International Monetary Fund reports on up to 13 types of international capital controls. The zero-to-10 rating is the percentage of capital controls not levied as a share of the total number of capital controls listed, multiplied by 10.	Fraser Institute
BR	Business regulations, the sub-components of business regulations (includes administrative requirements, bureaucracy costs, starting a business, extra payments/bribes/favoritism, licensing restrictions, and cost of tax compliance) are designed to identify the extent to which regulations and bureaucratic procedures restrain entry and	Fraser Institute

(*continued*)

Variable	Description	Source
	reduce competition. In order to score high in this portion of the index, countries must allow markets to determine prices and refrain from regulatory activities that retard entry into business and increase the cost of producing products. They also must refrain from "playing favorites," that is, from using their power to extract financial payments and reward some businesses at the expense of others.	
IP	Investment profile, a measure of the government's attitude toward inward investment as determined by four components: the risk to operations, taxation, repatriation, and labor costs.	ICRG
DEMACC	Democratic accountability, a measure of, not just whether there are free and fair elections, but how responsive government is to its people. The less responsive it is, the more likely it will fall. Even democratically elected governments can delude themselves into thinking they know what is best for the people, regardless of clear indications to the contrary from the people.	ICRG
CORRUP	Corruption, a measure of corruption within the political system that is a threat to foreign investment by distorting the economic and financial environment, reducing the efficiency of government and business by enabling people to assume positions of power through patronage rather than ability, and introducing inherent instability into the political process.	ICRG
BQ	Bureaucracy quality, institutional strength and quality of the bureaucracy is a shock absorber that tends to minimize revisions of policy when governments change. In low-risk countries, the bureaucracy is somewhat autonomous from political pressure.	ICRG
INTCON	Internal conflict, a measure of political violence and its actual or potential impact on governance, taking into consideration such factors as whether threats exist, whether they have political objectives, the size and strength of support, and the geographic nature of the conflict.	ICRG
MILIPOL	Military in politics, a measure of the military's involvement in politics. Since the military is not elected, involvement, even at a peripheral level, diminishes democratic accountability. Military involvement might stem from an external or internal threat, be symptomatic of underlying difficulties, or be a full-scale military takeover. Over the long term, a system of military government will almost certainly diminish effective governmental functioning, become corrupt, and create an uneasy environment for foreign businesses.	ICRG
POLITY	The difference between polity's institutionalized democracy and institutionalized autocracy, the polity democracy index ranges from zero to ten and is derived from coding the competitiveness of political participation, the openness and competitiveness of executive recruitment, and constraints on the chief executive. The Polity autocracy index also ranges from zero to ten and is constructed in a similar way to the democracy score based on competitiveness of political participation, the regulation of participation, the openness and competitiveness of executive recruitment, and constraints on the chief executive (Acemoglu, Johnson, Robinson, & Yared, 2008; Marshall, Gurr, & Jaggers, 2017).	Polity IV
POLITICALR	Political rights, an index of political rights. Higher ratings indicate countries that come closer "to the ideals'' suggested by questions relating to: there are free and fair elections; those who are elected rule; there are competitive parties or other competitive political groupings; the opposition has an important role and has actual power; and minority groups have reasonable self-government or can participate in the government through informal consensus. The checklist questions are grouped into three subcategories, electoral process (three questions), political pluralism (four questions), and functioning of the government (three questions). For each question, zero to four points are awarded, where zero indicates the smallest degree and four the greatest degree of rights. These scores are then combined to form the political rights index (Freedom House; Qi et al., 2010).	Freedom House

Appendix Table A2. Determinants of Institutional Quality

Variable	Description	Source
Ethnolinguistic fractionalization	Average value of five different indices of ethono-linguistic fractionalization. Its value ranges from 0 to 1. The five component indices are: (1) index of ethnolinguistic fractionalization in 1960, which measures the probability that two randomly selected people from a given country will not belong to the same ethnolinguistic group (the index is based on the number and size of population groups as distinguished by their ethnic and linguistic status); (2) probability of two randomly selected individuals speaking different languages; (3) probability of two randomly selected individuals not speaking the same language; (4) percentage of the population not speaking the official language; and (5) percentage of the population not speaking the most widely used language.	Roberts (1962), Atlas Narodov Mira (1964), Muller (1964), Gunnemark (1991), Easterly and Levine (1997), and La Porta et al. (1999).
Legal origin	Identifies the legal origin of the company law or commercial code of each country. There are five possible origins: (1) English Common Law; (2) French Commercial Code; (3) German Commercial Code; (4) Scandinavian Commercial Code; and (5) Socialist/Communist laws.	Foreign Laws: Current Sources of Basic Legislation in Jurisdictions of the World (1989), CIA World Factbook (1996), La Porta et al. (1998), and La Porta et al. (1999).
Religion	Identifies the percentage of the population of each country that belong to the three most widely spread religions in 1980. For countries of recent formation, the data is available for 1990–1995. The numbers are in percent (scale from 0 to 100). The three religions	Barrett (1982), Worldmark Encyclopedia of United Nations (1995), Statistical Abstract of the World (1995), United Nations (1995), CIA (1996), and La Porta et al. (1999).

(*continued*)

Variable	Description	Source
	identified here are: (1) Roman Catholic; (2) Protestant; and (3) Muslim. The residual is called "other religions".	
Latitude	The absolute value of the latitude of the country, scaled to take values between 0 and 1.	CIA (1996), and La Porta et al. (1999).
Log *GNP* per capita	Logarithm of GNP per capita expressed in current U.S. dollars for the period 1970–1995.	WDI, and La Porta et al. (1999).

Source: La Porta et al. (1999).

References

Acemoglu, D., Johnson, S., & Robinson, J. A. (2002). Reversal of fortune: Geography and institutions in the making of the modern World income distribution. *Quarterly Journal of Economics, 117*, 1231–1294.

Acemoglu, D., Johnson, S., Robinson, J. A., & Yared, P. (2008). Income and democracy. *The American Economic Review, 98*, 808–842.

Ades, A., & Di Tella, R. (1999). Rents, competition and corruption. *The American Economic Review, 89*, 982–993.

Alexandrakis, C., & Livanis, G. (2013). Economic freedom and economic performance in Latin America: A panel data analysis. *Review of Development Economics, 17*, 34–48.

Augier, P., Dovis, M., & Gasiorek, M. (2012). The business environment and Moroccan firm productivity. *The Economics of Transition, 2*, 369–399.

Bah, E., & Fang, L. (2015). Impact of the business environment on output and productivity in Africa. *Journal of Development Economics, 114*, 159–171.

Banks, A. (2005). *Cross-national time-series data archive*. Binghamton, NY: Databanks International.

Barrett, D. B. (1982). *World christian encyclopedia: A comparative study of churches and religions in the modern World, AD 1900–2000*. New York: Oxford University Press.

Barth, E., Gulbrandsen, T., & Schone, P. (2005). Family ownership and productivity: The role of owner-management. *Journal of Corporate Finance, 11*, 107–127.

Baumöhl, E., Iwasaki, I., & Kočenda, E. (2019). Institutions and determinants of firm survival in European emerging markets. *Journal of Corporate Finance, 58*, 431–453.

Baumöhl, E., & Kočenda, E. (2022). How firms survive in European emerging markets: A survey. *Eastern European Economics, 60*, 393–417.

Bekaert, G., Harvey, C. R., & Lundblad, C. (2005). Does financial liberalization spur growth? *Journal of Financial Economics, 77*, 3–55.

Besley, T. J., & Ghatak, M. (2009). Property rights and economic development. In D. Rodrik, & M. Rosenzweig (Eds.), *Handbook of development economics* (Vol. 5, pp. 4525–4595). Amsterdam: North-Holland.

Boone, A., Field, L., Karpoff, J., & Raheja, C. (2007). The determinants of corporate board size and composition: An empirical analysis. *Journal of Financial Economics, 85*, 66–101.

Boubakri, N., Ghoul, S. E., & Saffar, W. (2015). Firm growth and political institutions. *Journal of Multinational Financial Management, 31*, 104–125.

Bykova, A., & Coates, D. (2020). Firm performance and regional economic freedom: The case of Russia. *Post-soviet Affairs, 36*(5–6), 395–415.

Cai, H., Fang, H., & Xu, L. C. (2011). Eat, drink, firms, government: An investigation of corruption from the entertainment and travel costs of Chinese firms. *The Journal of Law and Economics, 54*, 55–78.

Çam, İ., & Özer, G. (2021). Institutional quality and corporate financing decisions around the World. *The North American Journal of Economics and Finance, 57*, Article 101401.

Central Intelligence Agency. (1996). *CIA World factbook* (published online).

Chanda, A., & Dalgaard, C. J. (2008). Dual economies and international total factor productivity differences: Channelling the impact from institutions, trade, and geography. *Economica, 75*, 629–661.

Chiang, M. H., & Lin, J. H. (2007). The relationship between corporate governance and firm productivity: Evidence from taiwan's manufacturing firms. *Corporate Governance: An International Review, 15*, 768–779.

Cho, M. H. (1998). Ownership structure, investment, and the corporate value: An empirical analysis. *Journal of Financial Economics, 47*, 103–121.

Clarke, G. R. G., & Xu, L. C. (2004). Privatization, competition and corruption: How characteristics of bribe takers and payers affect bribes to utilities. *Journal of Public Economics, 88*, 2067–2097.

Core, J. E., Guay, W. R., & Rusticus, T. (2006). Does weak governance cause weak stock returns? An examination of firm operating performance and investors' expectations. *The Journal of Finance, 61*, 655–687.

Dal Bó, E., & Rossi, M. A. (2007). Corruption and inefficiency: Theory and evidence from electric utilities. *Journal of Public Economics, 91*, 939–962.

Demir, F., & Hu, C. (2020). Destination institutions, firm heterogeneity and exporter dynamics: Empirical evidence from China. *Review of World Economics, 156*, 183–217.

Djankov, S., Hart, O., McLiesh, C., & Shleifer, A. (2008). Debt enforcement around the World. *Journal of Political Economy, 116*, 1105–1149.

Djankov, S., La Porta, R., Lopez de-Silanes, F., & Shleifer, A. (2003). Courts. *Quarterly Journal of Economics, 118*, 453–517.

Djankov, S., McLiesh, C., & Shleifer, A. (2007). Private credit in 129 countries. *Journal of Financial Economics, 12*, 77–99.

Durbin, J. (1954). *Errors in variables*. Revue de l'institut International de Statistique.

Easterly, W., & Levine, R. (1997). Africa's growth tragedy: Policies and ethnic divisions. *Quarterly Journal of Economics, 112*, 1203–1250.

Easterly, W., & Levine, R. (2003). Tropics, germs, and crops: How endowments influence economic development. *Journal of Monetary Economics, 50*, 3–39.

Ehrlich, I., & Lui, F. (1999). Bureaucratic corruption and endogenous economic growth. *Journal of Political Economy, 107*, S270–S293.

Fabro, G., & Aixalá, J. (2009). Economic growth and institutional quality: Global and income-level analyses. *Journal of Economic Issues, 43*, 997–1023.

Fama, E., & French, K. (1997). Industry costs of equity. *Journal of Financial Economics, 43*, 153–193.

Faruq, H. A., & Weidner, M. L. (2018). Culture, institutions, and firm performance. *Eastern Economic Journal, 44*, 519–534.

Fernandes, A. M. (2007). Trade policy, trade volumes and plant-level productivity in Colombian manufacturing industries. *Journal of International Economics, 71*, 52–71.

Field, L. C., & Mkrtchyan, A. (2017). The effect of director experience on acquisition performance. *Journal of Financial Economics, 123*, 488–511.

Fisman, R. (2001). Estimating the value of political connections. *The American Economic Review, 91*, 1095–1102.

Fisman, R., & Svensson, J. (2007). Are corruption and taxation really harmful to growth? Firm level evidence. *Journal of Development Economics, 83*, 63–75.

Ghoul, S., Guedhami, O., & Kim, Y. (2017). Country-level institutions, firm value, and the role of corporate social responsibility initiatives. *Journal of International Business Studies, 48*, 360–385.

Glaeser, E. L., La Porta, R., Lopez-de-Silanes, F., & Shleifer, A. (2004). Do institutions cause growth? *Journal of Economic Growth, 9*, 271–303.

Gnocchi, S., Lagerborg, A., & Pappa, E. (2015). Do labor market institutions matter for business cycles? *Journal of Economic Dynamics and Control, 51*, 299–317.

Gujarati, D. N. (2003). *Basic econometrics* (4th ed.). New York: McGraw-Hill.

Gunnemark, E. V. (1991). *Countries," peoples, and their languages: The linguistic handbook*. Gothenburg, Sweden: Lanstryckeriet.

Habib, M., & Zurawicki, L. (2002). Corruption and foreign direct investment. *Journal of International Business Studies, 33*, 291–307.

Hair, J., Black, W., Babin, B., & Anderson, R. (2010). *Multivariate data analysis* (7th ed.). Upper Saddle River, New Jersey: Pearson Education International [Google Scholar].

Halkos, G. E., & Tzeremes, N. G. (2010). Corruption and economic efficiency: Panel data evidence. *Global Economic Review, 39*, 441–454.

Hall, R. E., & Jones, C. I. (1999). Why do some countries produce so much more output per worker than others? *Quarterly Journal of Economics, 114*, 83–116.

Hausman, J. A. (1978). Specification tests in econometrics. Econometrica. *Journal of the Econometric Society*, 1251–1271.

Hsieh, C. T., & Klenow, P. J. (2009). Misallocation and manufacturing TFP in China and India. *Quarterly Journal of Economics, 124*, 1403–1448.

Iwasaki, I., Kočenda, E., & Shida, Y. (2022). Institutions, financial development, and small business survival: Evidence from European emerging markets. *Small Business Economics, 58*, 1261–1283.

Jibir, A., Abdu, M., Bello, F., & Garba, I. (2019). Do institutions promote firm performance? Evidence from sub-saharan Africa. *Review of Market Integration, 11*, 111–137.

Karmani, M., & Boussaada, R. (2021). Corporate social responsibility and firm performance: Does institutional quality matter? *Journal of Applied Accounting Research, 22*, 641–662.

Khwaja, A. I., & Mian, A. (2005). Do lenders favor politically connected firms? Rent provision in an emerging financial market. *Quarterly Journal of Economics, 120*, 1371–1411.

Kim, Y. (2005). Board network characteristics and firm performance in korea. *Corporate Governance: An International Review, 13*, 800–808.

Knack, S., & Keefer, P. (1995). Institutions and economic performance: Cross-country tests using alternative institutional measures. *Economics & Politics, 7*, 207–227.

Kočenda, E., & Hanousek, J. (2012). State ownership and control in the Czech republic. *Economic Change and Restructuring, 45*, 157–191.

Kunčič, A. (2014). Institutional quality dataset. *Journal of Institutional Economics, 10*, 135–161.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. W. (1998). Law and finance. *Journal of Political Economy, 106*, 1113–1155.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. (1999). The quality of government. *Journal of Law, Economics, and Organization, 15*, 222–279.

Lambsdorff, J. G. (2003a). How corruption affects productivity. *Kyklos, 56*, 457–474.

Lasagni, A., Nifo, A., & Vecchione, G. (2015). Firm productivity and institutional quality: Evidence from Italian industry. *Journal of Regional Science, 55*, 774–800.

Lehkonen, H., & Heimonen, K. (2015). Democracy, political risks and stock market performance. *Journal of International Money and Finance, 59*, 77–99.

Lie, E. (2005). Operating performance following dividend decreases and omissions. *Journal of Corporate Finance, 12*, 27–53.

Lskavyan, V., & Spatareanu, M. (2006). Ownership concentration, market monitoring and performance: Evidence from the UK, the Czech republic and Poland. *Journal of Applied Economics, 9*, 91–104.

Magbondé, G. K., & Konté, M. A. (2022). Developing countries' economic fundamentals and FDI inflows: The moderating role of institutions. *Cogent Economics & Finance, 10*, Article 2028976.

Marshall, M. G., Gurr, T. R., & Jaggers, K. (2017). *Polity IV project: Political regime characteristics and transitions, 1800–2016*. Center for Systemic Peace.

Mauro, P. (1995). Corruption and growth. *Quarterly Journal of Economics, 110*, 681–712.

Mauro, P. (1998). Corruption and the composition of government expenditure. *Journal of Public Economics, 69*, 263–279.

Mo, P. H. (2001). Corruption and economic growth. *Journal of Comparative Economics, 29*, 66–79.

Muller, S. H. (1964). *The world's living languages: Basic facts of their structure, kinship, location, and number of speakers*. New York: Ungar.

Murphy, K. M., Shleifer, A., & Vishny, R. W. (1991). The allocation of talent: Implications for growth. *Quarterly Journal of Economics, 106*, 503–530.

Murphy, K. M., Shleifer, A., & Vishny, R. W. (1993). Why is rent-seeking so costly to growth? *American Economic Review Papers and Proceedings, 83*, 409–414.

Newey, W. K., & West, K. D. (1987). A simple positive semi-definite, heteroskedasticity and autocorrelation consistent covariance matrix. *Econometrica, 55*, 703–708.

Ngendakuriyo, F. (2013). Institutional quality and growth. *Journal of Public Economic Theory, 15*, 157–183.

Ng, T., & Yu, L. (2014). Which types of institutions hinder productivity among private manufacturing firms in China? *China Economic Review, 31*, 17–31.

North, D. C. (1981). *Structure and change in economic history*. New York: Norton and Company.

North, D. C. (1990). *Institutions, institutional change and economic performance*. Cambridge: Cambridge University Press.

North, D. C. (1994). Economic performance through time. *The American Economic Review, 84*, 359–368.

Ojeka, S., Adegboye, A., Adegboye, K., Umukoro, O., Dahunsi, O., & Ozordi, E. (2019). Corruption perception, institutional quality and performance of listed companies in Nigeria. *Heliyon, 5*, Article e02569.

Olson, M., Jr., Sarna, N., & Swamy, A. V. (2000). Governance and growth: A simple hypothesis explaining cross-country differences in productivity growth. *Public Choice, 102*, 341–364.

Palia, D., & Lichtenberg, F. (1999). Managerial ownership and firm performance: A reexamination using productivity measurement. *Journal of Corporate Finance, 5*, 323–339.

Park, S. H., Li, S., & Tse, D. K. (2006). Market liberalization and firm performance during China's economic transition. *Journal of International Business Studies, 37*, 127–147.

Pellegrini, L., & Gerlagh, R. (2004). Corruption's effect on growth and its transmission channels. *Kyklos, 57*, 429–456.

Petersen, M. A. (2009). Estimating standard errors in finance panel data sets: Comparing approaches. *Review of Financial Studies, 22*, 435–480.

Qi, Y., Roth, L., & Wald, J. K. (2010). Political rights and the cost of debt. *Journal of Financial Economics, 95*, 202–226.

Randrianarisoa, L. M., Bolduc, D., Choo, Y. Y., Oum, T. H., & Yan, J. (2015). Effects of corruption on efficiency of the European airports. *Transportation Research Part A: Policy and Practice, 79*, 65–83.

Read, D., & Read, N. L. (2004). Time discounting over the lifespan. *Organizational Behavior and Human Decision Processes, 94*, 22–32.

Restuccia, D., & Rogerson, R. (2008). Policy distortions and aggregate productivity with heterogeneous plants. *Review of Economic Dynamics, 11*, 707–720.

Roberts, J. (1962). *"Sociocultural change and communication problems," study of the role of second languages in asia* (Vols. 105–123). Africa, and Latin America.

Rodrik, D., Subramanian, A., & Trebbi, F. (2004). Institutions rule: The primacy of institutions over geography and integration in economic development. *Journal of Economic Growth, 9*, 131–165.

Rogerson, P. A. (2019). *Statistical methods for geography: A Student's Guide*. Sage.

Saikia, M. (2022). Good institutions, more FDI? Evidence from Indian firm-level data. *International Economics and Economic Policy, 19*, 411–436.

Salinas-Jiménez, M. M., & Salinas-Jiménez, J. (2011). Corruption and total factor productivity: Level or growth effects? *Portuguese Economic Journal, 10*, 109–128.

Sanyal, R., & Samanta, S. (2008). Effect of perception of corruption on outward US foreign direct investment. *Global Business and Economics Review, 10*, 123–140.

Schoar, A. (2002). Effects of corporate diversification on productivity. *The Journal of Finance, 57*, 2379–2403.

Sharma, C. (2012). R&D and firm performance: Evidence from the Indian pharmaceutical industry. *Journal of the Asia Pacific Economy, 17*, 332–342.

Sheu, H. J., & Yang, C. Y. (2005). Insider ownership structure and firm performance: A productivity perspective study in taiwan's electronics industry. *Corporate Governance: An International Review, 13*, 326–337.

Shirokova, G., Morris, M. H., Laskovaia, A., & Micelotta, E. (2021). Effectuation and causation, firm performance, and the impact of institutions: A multi-country moderation analysis. *Journal of Business Research, 129*, 169–182.

Shleifer, A., & Vishny, R. (1993). Corruption. *Quarterly Journal of Economics, 108*, 599–617.

Siddiqui, D. A., & Ahmed, Q. M. (2013). The effect of institutions on economic growth: A global analysis based on GMM dynamic panel estimation. *Structural Change and Economic Dynamics, 24*, 18–33.

Statistical abstract of the World. (1995). New York: Gale Research, Inc.

Svensson, J. (2005). Eight questions about corruption. *The Journal of Economic Perspectives, 19*, 19–42.

Svesson, J. (2003). Who must pay bribes and how much? Evidence from a cross section of firms. *Quarterly Journal of Economics, 118*, 207–230.

Tanzi, V., & Davoodi, H. (1997). *Corruption, public investment, and growth," IMF working paper*. International Monetary Fund. WP/97/139.

Tian, G. Y., & Twite, G. (2011). Corporate governance, external market discipline and firm productivity. *Journal of Corporate Finance, 17*, 403–417.

Topalova, P., & Khandelwal, A. (2011). Trade liberalization and firm productivity: The case of India. *The Review of Economics and Statistics, 93*, 995–1009.

United Nations. (1995). *Demographic yearbook*. New York: Department of Economic and Social Affairs, Statistical Office. United Nations.

Wallis, J. J., & North, D. C. (1986). Measuring the transaction sector in the American economy, 1870-1970. In S. L. Engerman, & R. E. Gallman (Eds.), *Long-term factors in American economic growth*. Chicago: University of Chicago Press.

Wei, S. J. (2000). How taxing is corruption on international investors? *The Review of Economics and Statistics, 82*, 1–11.

Wejnert, B. (2007). *"Nations, development, and democracy, 1800–2005*. Inter-university Consortium for Political and Social Research. ICPSR Study No. 20440.

Wilson, N., Wright, M., Siegel, D. S., & Scholes, L. (2012). Private equity portfolio company performance during the global recession. *Journal of Corporate Finance, 18*, 193–205.

Wooldridge, J. M. (2014). *Introduction to econometrics: Europe, Middle East and* (Africa Edition). Cengage Learning.

Worldmark encyclopedia of the nations. (1995) (8th ed.). Detroit: Gale Research.

Wren-Lewis, L. (2013). Do infrastructure reforms reduce the effect of corruption? Theory and evidence from Latin America and the caribbean. *The World Bank Economic Review, 29*, 353–384.

Wu, D.-M. (1973). Alternative tests of independence between stochastic regressors and disturbances. *Econometrica: Journal of the Econometric Society*, 733–750.

Yano, G., & Shiraishi, M. (2020). Finance, institutions, and innovation activities in China. *Economic Systems, 44*, Article 100835.

Yan, J., & Oum, T. H. (2014). The effect of government corruption on the efficiency of US commercial airports. *Journal of Urban Economics, 80*, 119–132.

Yasar, M., Paul, C. J. M., & Ward, M. W. (2011). *Property rights institutions and firm performance: A cross-country analysis* (Vol. 39, pp. 648–661). World Development.