Corruption and Economic Growth in Chile

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Introduction

This thesis looks at corruption and analyzes how corruption affects economic growth in Chile.

Corruption has recently captured a lot of attention around the world, and several empirical studies have demonstrated that this phenomenon is detrimental to the economic performance of the countries. Specifically, the studies show that corruption reduces the rate of growth in the economy, private and foreign investments, divert the composition of government expenditure, and increases poverty and inequality. The severe consequences of corruption have increased the public interest in understand its causes, and particularly, to develop anti-corrupt policies to reduce its prevalence.

In recent years, Chile has faced a set of accusations of corruption. The majority of these transgressions have entailed the participation of relevant civil servants, including politicians, deputies, the parliament and even, family members of the president, Michelle Bachelet. The accusations of corruption thus have harmed the social capital of Chile, the trust in the institutions and the civic participation, and it has led political scientists to presume that Chile is in the middle of an institutional crisis.

In spite of this, indices and rankings with focus on corruption have continuously situated Chile among the least corrupt countries in Latin America. For example, Transparency International’s Corruption Perception Index (CPI) located Chile in 2\textsuperscript{nd} place in Latin America and 24\textsuperscript{th} among 176 states in the global ranking in 2016 (1\textsuperscript{st} place being the least corrupt country).

This thesis hypothesizes that corruption in Chile does not correspond to bribery, but instead to forms of corruption that are more intricate and hence that international indices of corruption underestimate the extent of this phenomenon in the country.

In order to examine this hypothesis, this thesis gives account of the most prominent cases of corruption that have taken place in Chile the last decade.

The analysis of the features of corruption in Chile will enhance our understanding of this phenomenon and its potential consequences to the economy, especially how it affects economic growth.

Also, since it seems that corruption has contributed to institutional weaknesses, it is presumed that it may affect economic growth in Chile also via this channel.
In order to examine the economic consequences of corruption in Chile, this thesis relies on both an exploratory and quantitative analysis. The former consist of detailed graphs that show the trajectory of corruption and the rate of GDP growth in Chile in the period 1996-2016.

Besides, as this thesis presume that corruption may be detrimental to growth in Chile through the institutions, the exploratory analysis examines the progress of the quality of legal, political and economic institutions of Chile, and its relationship with economic growth.

With regard to the quantitative analysis, this consist of estimating the effect of corruption on economic growth empirically using time series for the period 1996-2016, and with focus on capture both the direct effect of corruption on economic growth, and its indirect effect via the institutional environment of Chile.

The thesis contributes to describe the type of corruption taking place in Chile, which is essential to determine the regulations and control needed to avoid that this phenomenon continues to develop. Also, the thesis may serve as input to organization and institutions focusing on the fight against corruption in Latin America. To the knowledge of the author, it was not found previous studies with focus solely on analyze corruption in Chile and its relationship with economic growth.

The thesis is organized as follows: Chapter 1 introduces the concept of corruption, summarizes the measurements of corruption existence, and review the literature on the impact of corruption on economic development and growth. Chapter 2 present the positions obtained by Chile in different indices and rankings of corruption, describe the most prominent cases of corruption in Chile and its characteristics. Chapter 3 presents the theoretical framework, data and sources of information, and the results of the exploratory analysis of the economics consequences of corruption on economic growth in Chile. Finally, Chapter 4, present the empirical specification, and results of the times series estimation.
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CHAPTER 1: LITERATURE REVIEW

This chapter introduces the reader to the concept of corruption and describes the measures of corruption that are used with emphasis on those that are applied in empirical studies. Also, this chapter presents a review of the literature on corruption and its relationship with macroeconomic and political variables.

1.1. CONCEPTUAL FRAMEWORK

The attempt to define corruption face difficulties derived from cultural variation in the values, laws, and regulations guiding individual actions. These normative standards are variable, and thus, the definition of corrupt behavior depends on the social context and the system of values in each nation. However, according to Amundsen (1999), most definitions have a general feature which is that corruption involves a state-society relationship.

The most popular definition of corruption with a focus on state officials is that from the World Bank and the International Monetary Fund (IMF), which defines corruption as "the abuse of public office for private gains." This definition assumes a relationship in which the power of the money influences civil service. In this way, state officials breach the norms to favor those who give them an economic benefit, including any form of reward not directly measurable in money.

Also, Transparency International (TI) defines corruption as "the abuse of entrusted power for private gain," including both the public and the private sector.

Moreover, Werlin (1973) defines corruption as the deviation of public funds towards private purposes. Banfield (1974), describes corruption as a principal-agent relationship in which the state (agent), who accept the obligation to act in representation of the society (principal), sacrifices the interest of the latter to its own or the benefit of its family and political allies. In contrast, LaPalombara (1994) defines corruption as a deviation from public servant's duties because of reasons of personal gain, and more recently, Soto (2003) describes corruption as a shortcoming in the institutional structure of the society and its capacity of governability.

Most concepts of corruption in the literature accounts for the existence of a corrupt public official, a corrupter willing to pay for the crime, and the principal corresponding to the society whose interest is sacrificed.
Although the definition of corruption focuses mainly on the responsibility of public officials, it is important to notice that corruption is not a phenomenon exclusive of the public sector. Nevertheless, corrupt practices involving the public sector represent a more serious problem due to its documented consequences on the economy, and in the institutional environment of the nations.

The concept of corruption embraces several actions that are considered unethical. Bribery is the most explicit form of corruption and alludes to the payment that is given or taken in a corrupt relationship. However, there are other types of corruption such as embezzlement, fraud, extortion, and corruption in the form of patronage including, favoritism, nepotism or clientelism.

The literature, normally, differentiates fraudulent acts according to its scale and frequency. In this way, regarding its level, scholars distinguish between Grand and Petty corruption.

Grand corruption involves high-level political actors (political elite), who abused, ignored or tailored regulations and laws to their interest. Petty corruption refers to low-level fraudulent acts that people experience daily in public administration and services like hospitals, schools, local licensing authorities, police, taxing bodies and so on.

Regarding frequency of fraudulent acts, corruption varies from sporadic to systematic. While occasional corruption occurs irregularly, systematic corruption antagonistically represents an integrated aspect of the economic, social and political system and hence, the primary institutions and processes of the state are dominated and used by corrupt individuals.

To summarize, despite of there being no general consensus in the literature regarding the definition of corruption, most concepts associate it with the abuse of power by public agents to promote its benefits. Therefore, the analysis of corruption in Chile in subsequent chapters will concentrate on transgressions involving public officers, especially those implying the abuse of power at the decision-making level.

1.2. MEASURING CORRUPTION

The number of indices that attempt to measure corruption has grown exponentially over the last decade because of the global concern of corruption and its deterring effects on economic development. However, because of the illegal nature of corruption, there are no official objective records of the incidence of corruption, hence its prevalence relies mostly on perception-based indicators.
Perception-based measures of corruption rest on the opinion and perception of the business community and ordinary citizens in a given country. The most prominent among the indices are the Transparency International's Corruption Perception Index (CPI) and the Control of Corruption Indicator (CC), which is one of the six dimensions of the quality of governance assessed by the World Bank to erect the Worldwide Governance Indicators (WGI).

The CPI and CC are both composite measurement of corruption. They aggregate and synthesize indicators of corruption generated by various third-party data sources, including surveys of companies, public opinion polls, and expert assessment, to build up a single index.

Although empirical studies have widely used composite indicators to measure the effects of corruption on economic development and growth, their use has not been exempted from criticisms.

Firstly, composite measures of corruption, like CPI and CC may make it challenging to precisely identify what is being assessed as corruption. As stated by United Nations Development Programme (UNDP) in 2008, composite indices, in general, rely on data from a variety of sources who frequently measure slightly different issues and hence, they can be less efficient in providing operational data.

Secondly, some scholars have emphasized that these indices do not provide reliable comparisons over time. Since the composition of the samples used to construct the indices varies from year-to-year, the movement (up or down) of the score of a country may not reveal a real significant change in corruption level but rather be a result of adding or dropping a source. On the other hand, the standardization procedure needed to subsume different indicators on a standard scale may exclude the ability of the indices to detect changes over time (UNDP, 2008).

Thirdly, there is a belief that aggregated indices may skew toward the perceptions of the elite business community and may not always align with the views of non-business people and ordinary citizens which can make indicators susceptible to misuse.

Even though these arguments have valid points, perception-based and composite indicators are still found to be advantageous given the secrecy in which corrupt practices are carried out.

In addition, aggregate measures of corruption are useful because they can limit the influence of measurement error in individual indicators, and can potentially increase the accuracy of measuring a concept as broad as corruption.
Perception-based measures may also reflect realities of life better than objective measures. Lambsdorff (1999) argued that it is reasonable to assume that people's perceptions closely relate to the actual extent of the problem.

Besides, the methods used to build the indices of corruption, especially the Control of Corruption indicator by the World Bank, generate margins of error for the estimates in each country, which then more readily lends itself to comparisons over time (Kaufmann et al., 2005).

The controversy around perception-based and composite indicators being reliable measures of corruption have given rise to different measurement tools based on experience, single-data and the use of proxy indicators (UNDP, 2008).

Experience-based indicators measure citizens’ or firms’ experience with corruption. Indicators based on a single data source gather their data without appealing to third-party, and proxy indicators try to measure corruption by measuring the opposite; namely anti-corruption, good governance and public accountability mechanisms. Nevertheless, in the corruption realm, composite indicators and perception-based indicators remain the most widely used measurement tools because of their near-global coverage.

Regarding the indicators of corruption with a focus on Latin America, the most common are those from Transparency International including Corruption Perception Index (CPI), Global Corruption Barometer (GCB), and the Bribe Payers Index (BPI). Indicators produced by the World Bank including Country Policy and Institutional Assessment (CPIA), and the Worldwide Governance Indicators (WGI) are also common.

Other sources include the Competitiveness Index (World Economic Forum), the Index of Transformation (Bertelsmann Foundation), Latino Barometer (Latino Barometer Corporation), Index of Global Integrity (Global Integrity), Index of Economic Freedom (Heritage Foundation), and International Country Risk Guide (Political Risk Services Group).

These indicators differ regarding the type of corruption they measure and the sample of countries that they assess. However, all of them have proven to be useful to make comparison among countries, helping to establish causality relationships between corruption and socio-economic variables (Cardenas et al. 2016).

Unfortunately, not all of the indicators measuring corruption in Latin America present available data for Chile, which is the primary interest of this thesis. The analysis of corruption in Chile thus, is often carried out based on the indices widely utilized in the literature, namely CPI and CC, and to a lesser extent, measures of corruption included in the Index of Economic Freedom, Latino Barometer, and the Competitiveness Index.
Particularly, the analysis of corruption in Chile considers the information feasible in all the above mentioned sources, but with main focus on the measures of corruption by Transparency International and the World Bank.

To illustrative effects, this thesis relies also on the index of corruption elaborated by the Institute Libertad y Desarrollo (Freedom and Development, LYD), corresponding to a local measure of corruption based on the perceptions and experiences of the business community and executives of Chile, which are regularly in contact with the public sector to obtain licenses and procurement contracts.

1.3. CORRUPTION AND ECONOMIC GROWTH

The literature diverges on whether the economic consequences of corruption are positive or negative. Whereas some highlight the redeeming value of corruption (e.g., Leff, 1964; Lui, 1985; Braguinsky, 1996), others concentrate on the costs of corruption (e.g., Myrdal, 1968; Rose-Ackerman, 1978; Banerjee, 1997).

The underlying reasoning of the virtues of corruption relies on its efficiency-enhancing features. Those who emphasize the positive effects of corruption argue that it can foster economic efficiency by getting things done quickly, overcoming bureaucratic regulations which impede investment and hence, growth. As stated by Huntington (1968) "regarding economic growth, the only thing worse than a society with a rigid, overcentralized, and dishonest bureaucracy, is one with a rigid, overcentralized, and honest bureaucracy."

Several scholars have endorsed to the "wheels-greasing" argument. For instance, Lui (1985) demonstrated the offsetting value of corruption, using a queuing model that associate the cost of time of different individuals to the size of their bribe. He shows that those who’s time is most valuable offer bribes to public servants to be allowed to economize on time. In this way, bribes reduce the inefficiency in public administration.

Beck and Maher (1986), and Lien (1986) showed that corruption is favorable for attaining allocation-efficiency because it allows supply and demand to operate. So, the market assigns public projects to the most efficient firms, which also have the lowest costs.

More recently, Braguinsky (1996) demonstrated that corruption also promotes welfare-enhancement, due to its influence to speed knowledge spillovers. Braguinsky argued that new technologies generate intramarginal returns, which can be subject to rent-seeking when emulating firms attempt to bribe the innovating company. In this way, corruption may be favorable because it helps innovations to become common knowledge sooner.
On the other hand, scholars who see corruption as an obstacle to growth, or the "wheels-sanding" view, oppose the arguments in support of the goodness of corruption in many ways.

For instance, Murphy et al. (1991) asserted that the allocation-efficiency hypothesis is not necessarily real as highest-bribes-payers may not be the most economically efficient, but the most successful at rent-seeking. He shows that those who pay the highest bribes figurate that bribes are an investment with a high rate of return, enabling them to expropriate a substantial part of the prolific output.

Bardhan (1997) claimed that corruption as efficiency-enhancing rest on the crucial assumption that rigidities and rules are exogenous and hence, the theory is partial and may not hold in general equilibrium. In the words of Bardhan: "corruption is not exogenous but inherent to corrupt practices of a patron-client system."

Likewise, Borner et al. (1992), Banerjee (1996), and Kauffman (1997) argued that this positive view of corruption ignores that many politicians and bureaucrats in corrupt societies can be highly arbitrary. Fraudulent acts can become thus the fuel for excessive and discretionary regulations rather than "speed money."

These two opposite lines of thought gave rise to plenty of empirical studies focused on demonstrating the impact of corruption on economic development and growth (e.g., Mauro, 1995; Mauro, 1997; Knack and Keefer, 1996; Tanzi, 1998; Freckleton et al., 2012).

The first empirical analysis of corruption is that by Mauro (1995). He estimated the effect of corruption and bureaucracy efficiency on investment and economic growth, and found that both corruption and bureaucracy inefficiency reduced investments and the rate of growth.

The work by Mauro is essential not only because it is the first study in providing factual evidence of the contrary relationship corruption-growth, and so supporting the "wheels-sanding" view, but also because it demonstrates that the institutional setting is essential for the economic development in the countries.

Corruption can have devastating effects on governance measures such as political stability, government effectiveness and the rule of law, and consequently, it may harm the path of growth of the economies. Along the same line, Murphy et al. (1991) stated that "institutions and government policies make up the economic environment within individuals and firms invest. Hence, the political incentives may determine the economic performance of a country by whether encouraging socially productive activities or rent-seeking".
Other empirical studies also highlight the importance of the quality of the institutions in economic results are, for example, Knack and Keefer (1995) who demonstrated the importance of protecting property right to incentivize investment and growth.

Alesina et al. (1996) analyzed the relationship between political stability and economic growth and find that higher political instability, primarily when non-constitutional events trigger it, lower the rate of growth. Moreover, Hall and Jones (1998) estimated the effect of government policies on long-run economic performance and conclude that good governance promotes accumulation of capital in the manner of educational attainment and productivity, and thereby, it fosters economic growth.

Scholars have also focused on the effects of corruption on growth through other transmission channels, namely government expenditure, capital accumulation and inequality. In this context, Wei (1997) explored the impact of taxations and corruption on Foreign Direct Investments. He finds that an increase in either the tax rate or corruption will reduce inward investments. Likewise, Mauro (1997) found that corruption harms the composition of public spending by diverting investments towards unproductive projects, and consequently, affecting the rate of growth.

Gupta et al. (1998) estimated the effects of corruption on income inequality and poverty. They demonstrate that corruption slows the rate of poverty reduction because it reduces growth, and it also leads to fraud and tax exemptions that disproportionately favor the wealthy population groups. In this way, corruption fosters inequality.

Most of the empirical works reviewed above is based on a cross-country setting. However, there have also been attempts to estimate the effect of corruption on the economic performance over time within a group of countries (e.g., Mo, 2001; Pellegrini and Gerlagh, 2004); and the effects of corruption on economic growth for a specific country (e.g., Aliyu and Elijah, 2008; Egunjobi, 2013).

In this context, the work by Mo (2001) is important, not only because he based the estimations on panel data, but also because he introduced a new perspective to estimate the effect of corruption on growth, based on the relative importance of the transmission channels. Mo concludes that the most important channel through which corruption affects growth is political instability. The other channels included in the analysis are the level of human capital and the share of private investment.

Pellegrini and Gerlagh (2004), used a similar approach to estimate the effect of corruption on growth via its impact on investment, schooling, trade policy, and political
stability. The findings suggest that corruption reduce economic growth, primarily due to its adverse effects on investments and trade policies.

Aliyu and Elijah (2008), and more recently, Egunjobi (2013), estimated the effects of corruption on economic growth in Nigeria using times series. Both studies suggest non-optimistic growth scenarios for countries affected by pervasive corruption.

To summarize, even though theoretical studies reaches no agreement regarding the economic consequences of corruption, most empirical analysis demonstrate that corruption is inversely related to macroeconomic and institutional variables.
CHAPTER 2: CORRUPTON IN CHILE

This chapter analyzes corruption in Chile. The analysis begins examining what global indices say about Chile, and how well these measures of corruption reflect the opinion of Chilean society. Also, it is given account of the most prominent cases of corruption which have taken place in Chile in the last decade. This help to understand the type of corruption that take place in Chile. The last section of this chapter it is dedicated to analyze corruption in Chile.

2.1. CHILE IN THE INDICES OF CORRUPTION

The CPI has regularly situated Chile among the least corrupt countries in Latin America. This index measures perception of corruption in the public sector and rank countries on a scale of 0 (highly corrupt) to 100 (very clean). Figure 1 shows then that scores in Chile have been over the average scores of Latin America for the entire period between 1996-2016.

Chile has displayed scores of approximately 70 out of 100 for the whole period which has left it in favorable positions in the index relative to other nations within the region. These
results remain strong when the comparison is limited to Latin American’ countries who exhibits a level of per capita GDP similar to Chile; 22,000 – 24,000 U.S. dollars. Figure 2 shows the scores in CPI for Chile, Argentina, Uruguay, and Panama, following the classification of Latin American’ countries by per capita GDP based on Purchasing Power Parity (PPP) by the IMF in 2014.

Figure 2: CPI scores for Chile, Argentina, Uruguay, and Panama.

Source: Transparency International. The graph considers the years in which CPI is available for all countries. Note: left axis show the scores in CPI for Chile, Argentina, Panama, and Uruguay on a scale of 0-100, where higher values indicate less corruption.

The graph depicts that Chile and Uruguay have reached higher scores in the CPI over time (about 50 and 70 points of 100), relative to Argentina and Panama (about 30 and 40 points of 100). Except for Chile, all the other countries in the graph show an upward tendency in CPI scores, which means that perceptions of corruption in these countries have decreased over time, especially for Uruguay whose CPI’ scores have constantly increased since 2001. Chile showed the highest scores in the index until 2007. After that, the picture is less clear due to Uruguay and Chile continuously competing for the first place in the index among countries in Latin America.

According to the results of the last Corruption Perception Index in 2016, Uruguay appears the cleanest country in Latin America with a score of 71 out of 100, followed by Chile with a score of 66 out of 100, and Argentina and Panama are far behind with scores of
36 out of 100 and 38 out of 100, respectively. Then, as demonstrated by this index, Chile stands out as an example of transparency and probity in the region of Latin America.

Nevertheless, recalling the description of CPI in the previous section, this index was primarily created to facilitate comparison of perceived corruption across countries and thereby, changes in its scores cannot necessarily be interpreted as Chile doing better or worse regarding corruption. To have a more accurate description of the tendency of perceived corruption in Chile over time, it is analyzed the CC indicator by the World Bank.

According to Ryland et al. (2008) due to the methodology used to construct the WGI, this measure of corruption is better aimed to make comparisons of changes in perceived corruption over time, especially on timeframes such as decade. Figure 3 shows the scores and ranks for Chile in CC throughout 1996-2016.

The CC captures perceptions of the extent to which public power exercises for private gain, including both petty and grand forms of corruption, as well as state capture by private. World Bank reports this measure in two manners: in standard units ranging from -2.5 – 2.5, and in percentile rank on a scale from 0 to 100. In both cases, higher values correspond to better performance in control of corruption.

Figure 3: CC scores and percentile rank for Chile (1996-2016)

Source: WGI by World Bank. Note: Left axis shows the score on a scale -2.5-2.5, and the right axis show the percentile rank on a scale of 0 to 100. Higher scores and percentile mean better performance.
In this way, while the ranking allows observing corruption in a country relative to other nations, the scores in standard units reflect changes in the perceived corruption of a country relative to itself over time.

Figure 3 reveals that Chile has shown a good performance in corruption control relative to other countries, illustrated by an average percentile rank of 90 between 1996-2016, implying that about 90 percent of all countries in the sample have scored worse than Chile during this period. The view that Chile is one of the least corrupt countries in Latin America remains unchangeable independently of the measure of corruption employed.

Analyzing scores on standard units, however, indicates that perceived control of corruption in Chile has decreased over time, especially after 2012. Figure 3 depicts the scores have decreased continuously during the past four years, reaching its lowest level in 2016 with a score of 1.11.

Further, the results by CC are in line with those corresponding to the measure of corruption of the Institute LYD, which is, as stated earlier, a local index based on perceptions and experiences of the business community and the executives of Chile. Figure 4, shows the results from this measure of corruption throughout 2002-2015.

Figure 4: Measure of corruption by the LYD (2000-2015)

Source: Institute Libertad y Desarrollo (LYD). Note: Respondents of the survey are asked to evaluate the level of perceived corruption on a scale 0-10.

The results by LYD are on a scale of 0-10, with 10 being the highest level of perceived corruption. The average score for the whole period is 4.9 with a minimum of 3.8 in 2012 and maximums of 5.6-5.5 in 2002 and 2015, respectively. Hence, according to the executives and
business community of Chile, corruption has increased since 2012 and is per 2015 at levels as higher as those exhibited at the beginning of the period.

Also, the results of the last survey of LYD in 2015 indicates that political parties, the parliament, the judiciary system, and state-owned companies in general, together the institutions are more affected by corruption.

To summarize, there seem to be two views regarding corruption in Chile. While global indices classify Chile among the least corrupt countries in Latin America, absolute measures of perceived corruption show an upward tendency of perceived corruption over time, with sharper increase after 2012. Moreover, this phenomenon seems to be affecting primarily political and public institutions, according to the opinion of the business community and executives of Chile.

The latter is in accordance with the fact that Chile is facing a set of accusations of fraudulent activities involving politicians from both the left and right wings, the parliament and even, the president Michelle Bachelet’s son. Despite that, however, global measurements of corruption continue to consider Chile as an example of probity and transparency within the region of Latin America.

In this context, it is interesting to explore the drivers of Chile’s positive performance in the indices of corruption. Is it because corruption in Chile is insignificant relative to other countries? Or is that global indices are aimed to capture a type of corruption that is not necessarily represented in the characteristics of the type of corruption in Chile?

The next section will summarize the most prominent cases of corruption that have taken place in Chile during the last decade in order to understand the type of corruption existent in Chile, as well as the actors involved in the fraudulent activities.

2.2. CHARACTERISTIC OF THE CORRUPTION IN CHILE

Hereunder it is described, in chronological order, the most prominent cases of corruption that have taken place in Chile during the last decade, chosen according to their impact in the media, and social repercussions due to the amount of money defrauded and the involvement of relevant authorities.

Despite the fact that Eduardo Frei created the Committee of Public Ethic to fight corruption, his government was not exempted from fraudulent activities. Some of the cases of corruption in this period include CODELCO, and Casa de Moneda (Gold House).

- **CODELCO**: the director of CODELCO, which is the largest state-owned copper company of Chile, was charged with defrauding the state for about 200 U.S. million dollars due to speculative investments of copper, gold, and silver in the foreign exchange market.

- **Casa de Moneda**: Casa de Moneda was the state-owned enterprise responsible for producing bills and coins. Its director, appointed by the president, was the owner of a printer’s enterprise who collaborated in the political campaign of Eduardo Frei and was later accused of misuse of public funds to pay for personal expenditures and the misuse of public vehicles.

**2000-2006: Ricardo Lagos administrations. Center-left Coalition of Parties for Democracy.**

According to Orellana (2004), several corruption cases found place under the administration of Ricardo Lagos. During his time in office, corruption involving the public sector and private businesses came into light.

- **MOP-GATE**: is one of the more significant cases of corruption that took place. The case involved a large number of people, including the participation of members of the Public Works Ministry (MOP). Functionaries of MOP and the consulting firm Gestion Administrativa y Territorial (Administrative and Territorial Management, GATE) were charged with the crime of defrauding the State, misuse of public resources and triangulation of money. Contractors got paid for non-executed and overpriced works while the money was deviated for GATE to 129 clerks of the MOP as “complementary wages.”

- **Inverlink**: Inverlink was a “ghost” enterprise created to divert resources of the public institution CORFO, which is in charge of administrating public companies. Functionaries of CORFO, who were members of Inverlink, stole time deposits of CORFO to be used by Inverlink as a guarantee to obtain bank loans.

- **PROCHILE**: PROCHILE is the institution responsible for promoting exportations in the world. During the administration of Ricardo Lagos, its Secretary of State Soledad Alvear, designated her friend, Gabriela Riutort, as director of PROCHILE, evading the educational requirements needed for this position. In turn, Riutort, designated 15
friends and family members to important positions in PROCHILE. Later, she was accused of payments of illegal “complementary wages,” estimated of about 1,500 U.S. dollars monthly.

2006-2010, Michelle Bachelet’s first administration. Center-left Coalition of Parties for Democracy.
- **Publicam:** At the end of 2006, the Senator Guido Girardi, belonging to the Party for Democracy, was accused of using fake invoices to justify campaign expenses to the National Tax System (SII¹). The invoices belonged to the fictitious company Publicam.

2010-2014, Sebastian Pinera administration, Center-Right National Renewal Party (RN)
- **Cascada:** The cascada case (cascade) was revealed in 2013. It involved illegal trading of shares in companies linked to the Sociedad Química y Minera de Chile (Chemical and Mining Society of Chile), Soquimich. Its most prominent shareholder controlled 20% and 7% of Soquimich through two groups of cascade companies: the first one is Norte Grande – Oro Blanco – Pampa Calichera, and the second cascade Norte Grande – Nitratos de Chile – Potasios de Chile. Cascade companies’ shares were sold at a price below the market price to other businesses related to the directory of the cascade companies, whom in turn re-bought the shares at overvalued prices. This modus operandi harmed minority shareholder, including the Pension Fund System who trade in the stock market the money of the citizenship.
- **Corpesca:** Almost simultaneously as the Cascade case the Corpesca case came into light. This is one of the most specific cases of bribery known to the public, involving the economic and political elites. The industrial fishing firm Corpesca is accused of paying bribes to several members of the parliament in exchange for a favorable vote on the fishing law, which divides almost the entire fishing quota (92%) to seven families in perpetuity. These families (Angelini, Lecaros, Yaconi – Santa Cruz, Sarquis, Stengel, Fernandez, and Izquierdo) belong to the wealthiest families in Chile according to Forbes (2015). The bill was approved in January 2013.
- **Pentagate:** The Pentagate case is disclosed only one year after the Corpesca case. This case is significant because of the proven relationship between private businesses,
politics, and the privileges. The Pentagate case began as a case of tax fraud by the biggest financial holding company in Chile, Penta Group. The holding company was initially accused of paying bribes to the accountant of the SII to diminish its tax base. However, in the following days, revelations of illegal contribution to political campaigns gave rise to new investigations implicating political and business actors. Penta Group was charged with avoiding taxes through the emission of fake invoices, which were used to fund several politicians to the center-right wing. However, this sudden wave of scandals affecting the political elite does not spare the left-wing party, expanding the case of illegal campaign funding to a sub-case involving Soquimich. The mining company was charged with using the same techniques as Penta, fake invoices to illegally fund politicians.

2014-2017, Michelle Bachelet’s second administration.

- **Caval:** in 2015 the president’s son was accused of using his influence to secure a bank loan for his wife’s company. This is known as the Caval case. The loan was approved only three days after Michelle Bachelet became the new president of Chile and it was processed personally by the Vice-President of the Bank of Chile and founder of the Luksic Group, which is the corporate consortium with the largest fortune in the country according to Forbes (2015).

- **Milicogate:** refers to a case of fraud and diversion of public funds involving the Army of Chile in 2015. Police officers and the commander in Chief were accused of emitting fake invoices to purchase offensive material (non-existent), appealing on the grounds of the Reserved Law of Cooper. Reformed during the military regimen, this law awarded 10% of the total sale of copper extraction to the Army.

- **Longueira:** it came to light in 2016, but refers to transgressions occurring in 2010 under Sebastian Pinera administration. The senator Pablo Longueira who was the Minister of Economy at the time, was accused with taking money from Soquimich at the time when the Royalty Law was being discussed in the parliament. The ex-Minister of Economy shared privileged information with the Soquimich’s General Manager in exchange for the illegal payments.
2.3. ANALYSIS OF THE CORRUPTION IN CHILE

The cases of corruption described above provides insight to understand that corruption in Chile does not necessarily refer to bribery but to forms of corruption more intricate and characterized by the misuse of the economic and political power for private gain.

Notably, after 2012 political figures and the economic elite have repeatedly been involved in cases of tax fraud, misuse of resources, influence peddling and illegal contributions to electoral campaigns, worsening the perceptions of corruption in Chile.

Cases of fraud like Pentagate and Caval became so scandalous and extensively covered by the mass media. For instance, Foreign Affairs in an article published on April 12 of 2015 wrote “Chile in crisis,” referring to corrupt acts involving both right- and left-wing parties and president Michelle Bachelet’s son. Also, PanamPost stated “Chile hit with massive campaign corruption scandals,” and the New York Times wrote “Graft cases in Chile multiply,” both in April 2016.

Further, the disclosure of fraudulent activities such as Caval and Corpesca not only led to evidence of the tight relationship between political figures and the business community but more importantly, they revealed the privileges to which economic elites have access. It might explain the increase in the perceived corruption measured by the local measure of corruption, which appears more critical than those given by international indicators.

Specifically, the CPI and CC indicator do not reflect “domestic” corruption which refers mainly to influence peddling and illegal contributions to political campaigns, and which thereby, do not affect international business necessarily. In the words of Orellana (2004) “integrity in foreign trade and investments where corruption has never been significant is what drives the tradition of probity in Chile.”

The preceding may explain the different opinions of corruption in Chile between experts and business community worldwide on the one side, and the citizenship and the executives of Chile on the other side.

According to the literature, the existence of this type of corruption, namely “domestic”, ascribed to the irregularities that took place during the military regime (1973-1989).

Orellana (2007) stated “corruption became popular in the public sector since the dictatorship, and it remained and continued developing with the return to democracy in 1990”.

Orellana bases his argument on that at the time the more profitable state-owned companies (e.g., electricity and telephone companies), were sold to private investors for
undervalued prices, and the buyers were the same who sold them, primarily allies of the military regime and family members of the dictator. For example, Soquimich was sold to Pinochet’s son-in-law who was the majority shareholder and president of the directory of Soquimich until the Cascada case came to light.

Also, during this period Chile normalized the payment of unfounded compensation to public officials, and it was proclaimed the “Ley de Amarre” (morning law). This law stipulated that public officials, supporters of the military regime, could not be dismissed and thus, new positions needed to be created to incorporate functionaries, supporters of the current administration.

The wave of privatizations and the guaranteed power to politicians of the right-wing determined the basis for the linkages between the political and economic elites. It also created a political system of consensus between the government and the opposition, in which decisions are made in the form of a lobby, neutralizing the population.

Nevertheless, despite the fact that the origin of the corrupt relationship between the public sector and private businesses was during the military regime, it has continued developing under democratic governments.

With the return to democracy in 1990, politicians who occupied executive positions in the bureaucracy adapted immediately to this structure of power and enjoying certain privileges. Then, rather than change the course of these tailor-made regulations and laws, they opted for legalizing such guarantees. A clear example of this is that by the ex-president, Ricardo Lagos (2000-2004) who legalized the payment of “complementary wages” to political parties in 2003, under the premise that this policy would make the democracy stronger, strengthen the political parties and modernize the state.

Martini (2010) claimed that the popular democracy of Chile before the military regime was replaced by an authoritarian regime and after that, into a democracy controlled by the most powerful economic and political groups.

The new plutocracy has taken control, subordinating, in one way or another, the public interest to the private interest of public officials and since there is not a clear difference between them, it has opened a door for corruption.

Other factors supporting this kind of corruption in Chile are the mildness of the sanctions of fraudulent activities and the fact that Chile is a constitutional democracy with the guaranteed rule of law.

The penalties given to the actors involved in corrupt practices regularly consist of monitored release, payments of fines, prohibition to occupy public positions in the future, and
exceptionally prison. According to a report by the Centro de Investigacion Periodistica (Journalistic Research Center, CIPER) in February 2013, only 12.2% of the cases of political corruption investigated between 2010-2012 were condemned.

Chile considers a crime only by what is explicitly stipulated in the legislation. Despite the fact that Chile’s criminal law condemn the misappropriation of funds, bribery, influence peddling, fraud, the abuse of power (expressed as nepotism), the use of privileged information, and the illicit enrichment of public servants (Cardenas et al., 2016), many cases of corruption remain unpunished. According to Orellana (2007) the reason is that the technical complexity of the cases of corruption in Chile requires specializing treatment and years of investigation, resulting in that the public opinion forgets the corruption case being investigated and therefore, transgressions prescribed.

The wave of corruption scandals revealed in the past years have had adverse consequences to the degree of confidence and legitimacy of the institutions, especially after the revelations of the cases Penta, Corpesca and Caval which brought into light the privileges the political and economic elites have access to.

In particular, the Caval case have undermined the legitimacy of the government and the president, Michele Bachelet, who according to a public opinion poll carried out by the consulting firm CADEM in March 2017, showed an approval rating of about 20%.

Also, because of corruption accusations of illegal political contributions have mounted over left-wing and right-wing parties indistinctly, it also has undermined the trust in the political parties and political sphere in general, as illustrated by the results provided by Latino Barometer in 2015. According to this source, about 80% of the respondents of the survey declared to have little to no confidence in political parties, 72% have little to no confidence in the judiciary system, 71% do not trust in the parliament, and 53% declared to have little to no confidence in the current government.

The use of fake invoices to obtain monetary contributions from private businesses to electoral campaigns has become part of the political culture in Chile. It was called “the ideology of corruption” after some politicians belonging to the center-right wing asserted that this form of funding was natural and a common practice among politicians to become publicly known and elected. The problem associated with this kind of procedures is not the money in politics because as stated by Transparency International “money is a necessary element for democracies and parties to run smoothly.” However, in the case of Chile, where the funding is not transparent, it is in conflict with the democratic principles, which start to lose credibility. Also, because of its feature of secrecy, it has impeded citizenry to know the source of funding.
to finance political campaigns, preventing them to determine if a donor company is being favored after the elections.

Moreover, this lack of trust in the institutions is not only an issue affecting the public sector but also, the private sector. According to the results from Latino Barometer in 2015, 64% of the respondents of the survey declared having little and non-confidence in private firms because of the alignment of both the public and private elites for their interest.

The lack of faith in institutions and the political system have also harmed the civic electoral participation and the feeling of being represented by the government and political parties among the citizenry.

According to the report Auditoria de la Democracia 2016 (Democracy Audit) by the UNDP\(^2\), participation in elections has decreased by about 36 percentage points between 1990-2016. This fall became sharper in 2012 after the suffrage ceased to be compulsory. Also, the results from Latino Barometer’s survey in 2015 indicate that 62% of the respondents do not feel represented by either the government nor by the interests of political parties. Moreover, results from the same survey show that there is a common feeling that the country is ruled to favor a few (76% of the respondents), which is also the most economically powerful.

The preceding has brought some political scientists to state that Chile is in the middle of an institutional crisis, based on the idea that people can recognize whenever institutions are acting correctly or not and thereby, one indicator of the institution's performance is the trust in them.

This is important not only because if the country is in an institutional crisis it can undermine its political and social development, but also because a weak institutional framework can be detrimental to the country’s economic development.

Economists have long recognized that the economic activity in a society is intimately related to the human and physical capital and the technology that workers and firms have access to, but also, to the quality of the institutions. According to North (1990), institutions are the rules of the game in a society which determinates the constraints and incentives that shape economic, political and social interactions. Hence, in order for economic development to exist it requires that the institutional environment create the right incentives to invest and innovate.

The next section will look at the relationship between corruption, the economic activity of Chile and the quality of its institutions to examine whether these fraudulent activities have

\(^2\) PNUD in Spanish
extended to the point of becoming harmful to the country’s institutional environment and economic development.
CHAPTER 3: CORRUPTION, INSTITUTIONS AND ECONOMIC GROWTH

This chapter presents the theoretical framework by Ebben and Vaal (2009), which is used in this research to analyze the economic consequences of corruption in Chile. This model accounts for both the direct impact of corruption on economic development and the indirect effects of corruption via institutions. The chapter also describes the variables and sources of the data that were used to carry out the analysis of the relationship between corruption, growth, and institutions in Chile. Finally, this chapter presents the results of the exploratory analysis regarding the aforementioned relationships of interest.

3.1. THEORETICAL FRAMEWORK

A growing body of literature has emphasized institutions and governance as crucial factors in fostering economic development and growth. For instance, North (1990) highlighted the need for strong institutions to defend property rights and reduce transaction costs for incentivizing economic actors to invest and innovate. Acemoglu et al. (2005), on the other hand, considered differences in the quality of institutions as the cause of income disparities across countries because of the influence of institutions on competitiveness, investments, production, and how benefits are distributed to society.

In a broader notion, institutions are defined as formal and informal rules or forms of conduct that have been created with the intention to reduce uncertainty and lower transaction costs. Since they are collective choices of society, institutions can thus be manipulated by those with the political power to affect these rules, and such players often do so to favor their own interests rather than promote economic development (Acemoglu and Robinson, 2010).

In this context, Heckelmann and Powell (2010) have stated that the effect of corruption on economic activity depends on how institutions have been crafted. Namely, in the presence of functional institutions that have been created to foster economic activity and a fair distribution of benefits across different individuals and social groups, corruption is likely to be harmful to development. Conversely, when institutions are weak, corruption can drive positive economic outcomes.

The model developed by Ebben and Vaal (2009), which follows the reasoning of Barro (1990), accounts for the effect of corruption on economic activity with consideration for the
indirect economic consequences that corruption may produce through the institutional environment. Specifically, this model consists of two layers. The first layers account for the effect of corruption on the economy when institutions are not incorporated, a so-called direct effect. Meanwhile, the second layer explicitly includes institutional features that account for the economic consequences of corruption, such as its effect on the quality of the institution, also known as the indirect effect.

3.2. MODEL SPECIFICATION

Ebben and Vaal’s model is grounded in the idea that public goods, provided by the government, act as inputs for private production but also create room for corruption. Economic agents attempt to use some public goods for their own benefit through the process of rent-seeking, and thus corruption is treated as a distortion that hampers economic development.

The foregoing information means that economic agents devote less time to productive work, hence fewer public goods reach the production process as productive input. Formally, the first stage in the model is expressed by:

\[ Y = K^{1-\alpha}L^\alpha [G(1 - S)]^\beta \]  

where K is private physical capital, L is labor input, G public sector input, S is stealing or corruption, \( \alpha \) is the share of output per worker, \( 1-\alpha \) is the contribution of capital to the aggregate output, and \( \beta \) is the contribution of the public sector to the aggregate output. This equation represents the direct impact of corruption on economic activities.

The second layer of the model extends the first equation (1) to incorporate institutional features, and it thus accounts for the indirect effects of corruption on growth through the quality of the institutions. Formally,

\[ Y = K^{1-\alpha}L^\alpha [G(1 - S)]^\beta * [\text{institutional feature}] \]  

According to Ebben and Vaal (2009), the interactions vary with the particular institutional feature that is considered, and therefore each institutional variable (political stability, property rights, and the political system) is modeled separately to allow for a precise
analysis of the effect that institutions exert on the corruption-output relationship. In other words, the effect corruption has on output depends on the initial quality of the institutions.

For instance, in a situation of political stability, there is a certain amount of trust and confidence that facilitates investment and production, and as such, corruption is detrimental to both political stability and economic activity. However, in a situation of political instability, production is much lower and the situation is more liable to result in anarchy or physical aggression; in this scenario, corruption serves to enhance production.

Moreover, regarding property rights, without a proper system of both formal and informal rules, the economic system becomes uncertain such that economic growth is also reduced. In such situations, corruption can positively affect production by replacing formal rules of discrentional power for bureaucrats who allow businesses to operate in return for bribes, thereby facilitating production. However, if a system of property rights is sufficiently established, corruption negatively affects production by discouraging incentives to invest and innovate because uncertainty in the rules of the system arises.

Finally, the effects of corruption on economic growth differ across political systems. In a democratic system, individuals have the opportunity to vote so that they may be represented by politicians who share their preferences. In such systems, corruption is expected to reduce economic growth as it acts as to distort the of misuse of resources. Contrarily, in a totalitarian system where economic and political freedoms are limited, the effect of corruption on growth depends on whether the former is centralized or decentralized.\(^3\)

When corruption is decentralized, an economic agent is never certain whether bribery is effective. When an agent bribes a government official to achieve a goal, this does not preclude the possibility that also the next official may also demand a bribe for to enact a public good or service. In this way, decentralized corruption leads to greater uncertainty and reduced economic growth. On the other hand, centralized corruption removes these uncertainties as the regime has implemented institutionalized corruption to serve a clear common goal.

Vaal and Ebben’s framework is used to achieve the objective of this thesis because it offers the theoretical and analytical tools to analyze whether perceptions of increasing corruption in Chile may affect its economic activities not only directly but also by means of its impact on social capital, which includes trust in institutions. Accordingly, one could presume that if Chile is facing an institutional crisis, as a result of the fraudulent activities

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\(^3\) Shleifer and Vishny (1993) refers to this as a situation in where there is a single monopoly or independent monopolists.
revealed in recent years, then corruption is likely to be detrimental to Chile’s economic development.

The next section describes the data and sources used to examine the relationship between corruption, institutions, and the economic performance of Chile.

3.3. DATA AND SOURCES OF INFORMATION

Corruption and economic development

To examine the relationship between corruption and economic activity in Chile, this analysis relies on the CC indicator and the gross domestic product (GDP) of the World Development Indicators (WDI), both elaborated by the World Bank.

Since CC does not exhibit data for 1997, 1999, and 2001, so observations for these years were estimated using linear interpolation. Scores are on a scale from -2.5 to 2.5 with higher values corresponding to better CC performance, or equivalently less corruption. With respect to GDP, the analysis is based on the annual rate of its growth.

Institutional variables

The institutional environment of Chile is operationalized using measurements of the quality of legal, political, and economic institutions from the Institutional Quality Dataset composed by Kunkic (2014)⁴. These are aggregate variables, so they thus combine institutional variables from third-party sources that are widely used in the literature with a focus on institutional features; for example, property rights by the Heritage Foundation, the rule of law by the WGI, and economic freedom variables by the Fraser Institute, among others⁵.

The dataset by Kunkic provides measures of the quality of legal, political, and economic institutions in two manners: a relative measure of institutional quality for every country and institutional group, the so-called World Institutional Quality Ranking (WIQR), and an indicative, absolute measure of the quality of each institutional group for every country. In this way, while WIQR allows the evaluation of how a specific country progresses in regard to institutional quality and relative to other countries in the world, the absolute measure accounts

⁴ This database is freely available on the author’s webpage http://sites.google.com/site/aljazkuncic/.
⁵ See Table A in the appendix for a description of the sources of information and variables used by the author to construct the aggregate measures of the quality of legal, political, and economic institutions.
for changes in the institutional environment of a country over time, relative to itself (Kunkic, 2014).

The timeframe in the analysis of the relationship between corruption and economic activity in Chile is the period between 1996 to 2016, which was defined through the availability of data, mainly of the indicator of corruption. However, the variables for institutional quality are available from 1990 to 2010, which thus required extending the timeframe of the target variables in the dataset by Kunkic to have full scores until 2016.

In particular, missing scores in the absolute measures of the quality of legal, political, and economic institutions for each year between 2011 and 2016 were calculated. These calculations were conducted using as reference the scores attributed to Chile for the indicators of voice and accountability, the rule of law, government effectiveness, and the regulatory quality of WGI.

Scores in each of these four dimensions of governance were averaged each year to attain a single measure of governance for Chile in the period of 1996-2016; henceforth referred to as “wgi.”

The reasoning behind the use of these dimensions of governance is, on one hand, the rule of law and regulatory quality are some of the institutional proxies grouped by Kunkic to create the compounded measures of legal and institutional quality, respectively. In this way, it can be assumed that the scores for these dimensions of governance are a fair estimate of the missing values in the quality of institutions dataset.

On the other hand, according to Kunkic (2014), political institutions involve political rights and the protection of democratic principles. In this way, voice and accountability, and government effectiveness indicators seem to be valuable proxies for capturing the quality of this last institutional group.

The scores of these four dimensions were averaged because, according to Kunkic (2014), measures of the quality of legal, political, and economic institutions are likely to be correlated. Indeed, for the particular case of Chile, raw scores from between 1990-2010 for legal and economic institutions have a coefficient of correlation of 0.66, scores for legal and political institutional quality have a coefficient of correlation of 0.74, and political and economic institutional quality have a coefficient of correlation of 0.82.

It is important to mention that, like the CC indicator, all other dimensions of governance in the WGI did not exhibit data for the years 1997, 1999, and 2001. For this reason, these values were imputed by linear interpolation before the estimation of wgi.
After having estimated the variable of reference, wgi, this was used to calculate the missing values in the three groups of institutions (legal, political, and economic) as follows:

- First, the ratio between the scores of each institutional group and wgi were calculated for each year in which both variables had data; this is the period from 1996-2010.
- Second, the average ratio between 1996-2010 for each institutional group was estimated.
- Third, missing scores for each institutional group were estimated as the product of the averaged ratio of the particular institution (legal, political, and economic) and the score in wgi to every year from 2011 to 2016.

The analysis in the subsequent pages considers, thus, a timeframe that spans from 1996-2016, using the CC indicator as a proxy for corruption, GDP as a proxy for economic development, and absolute measures of the quality of legal, political, and economic institutions as proxies for the institutional environment of Chile.

### 3.4. ECONOMIC CONSEQUENCES OF CORRUPTION IN CHILE

#### 3.4.1. Corruption and economic growth

To examine whether there exists a relationship between corruption and the economic activity of Chile, the dynamics of the rate of growth of the GDP and the CC indicator in the period from 1996-2016 were analyzed. The results of this analysis are shown in Figure 5.
Figure 5: GDP growth and CC indicator (1996-2016)

Source: WDI and WGI by the World Bank. Note: scores in CC indicator are on a scale of -2.5–2.5, with higher values corresponding to higher performance in corruption control, or equivalently less corruption.

The period between 1985-1997 is known in the literature as Chile’s Golden Period due to its unprecedented economic growth, which reached an average growth rate of 7.1% per year. After that, the economy slowed down primarily due to an external adverse scenario that originated from the Asian crisis, although Chile’s economy recovered to reach growth rates of about 3 to 6% between 2000-2003.

This positive scenario extended until 2008 due to the increase in the prices of commodities in international markets in 2003, which promoted economic growth in Chile through the expansion of its copper exports (Di Gregorio, 2004). However, the rate of growth decreased at the end of 2008 as a consequence of the global financial crisis.

According to a report by the Comision Chilena del Cobre (Cochilco) in 2010, the price of copper, which at the time represented around 50% of all Chilean exports, declined from US$3.2 per lb. to $1.5 per lb. This drop, together with the crisis faced by Chile’s major trading partners, resulted in a decrease in its rate of growth to about -1.5% in 2009.

The global financial crisis required adjustments to macroeconomic policies in order to overcome external adverse scenarios. Such adjustments allowed the Chilean economy to recover and revert back to its path of growth between 2010-2012, when it reached rates of growth of about 5 to 6%. Nevertheless, another drop in copper prices began in 2013, and combined with the recession in China, which is the primary importer of Chilean copper, these
alterations affected investments in the mining sector and thus caused a deceleration of the rate of growth in Chile over the past years.

Considering the dynamics of the growth rate and the measure of CC displayed in the graph in Figure 5, these variables seem to be positively correlated. Specifically, higher CC scores, or less corruption, are accompanied by higher rates of economic growth through the whole period of analysis. Furthermore, the relationship between these variables seems to be non-linear, which means that an increase in the value of one variable today is followed by an increase in the value of another in subsequent years, and vice versa.

Although it is not possible to state a causal relationship between these variables nor determine a direction of causality, whether it is from corruption to growth or the other way around, Figure 6 provides evidence that, first, corruption and economic growth in Chile are inversely related, and second, there is a lead-lag effect in which growth is correlated with corruption at later times, and vice versa.

There is no agreement in the literature regarding the main relationship of causality between corruption and growth. However, the predominate belief is that this relationship operates from corruption to economic activities. For instance, the World Bank and International Monetary Fund (IMF) presume that corruption has a significantly adverse effect on economic growth because it distorts the rule of law and weakens the institutional foundation on which economic growth depends. Additionally, the majority of empirical works have demonstrated that the correlation between corruption and growth is negative (i.e., Mauro, 1995; Mauro, 1997; Mo, 2001; Lambsdorff, 2007).

Regarding the timeframe in which this interaction is most prominent, several studies have revealed that it is more significant in middle and long term. Lučić et al. (2016) have explored the causality between corruption and economic development using panel data on a sample of 40 countries during the period from 1995 to 2011. Results were split into three time zones: zone 1, which covers the first five years (short-term impact); zone 2, which covers the next five years (mid-term impact); and finally, zone 3, which covers the last five years (long-term impact). They found that the most active causality between these two factors occurs in zone 2 or the mid-term framework.

With the above in mind, it can be presumed that the correlation between corruption and economic growth in Chile as depicted in Figure 5 is more likely to operate from corruption to GDP and that the effect of corruption would not be visible immediately; rather, it would produce mid- and long-term effects.
Moreover, based on the model of Ebben and Vaal (2009), the relationship described by the graph would correspond to the direct effect that corruption exerts on economic output; in the case of Chile, this effect is negative. Nevertheless, as was claimed at the start of this chapter, the analysis of the correlation between corruption and measures of economic performance do not necessarily establish a direct causal relationship.

In general, measurements of corruption interact with other institutional factors and thereby it is possible to arrive at incorrect conclusions if relevant indicators are not included in the analysis. Indeed, this notion may explain why experimental works with a focus on the effect of corruption on growth across countries are unable to conclude whether corruption is beneficial or harmful to economies. In most cases, such works do not control for institutional features, or when they do, institutional variables are incorporated as exogenous variables.

The preceding explanation is the rationale underlying the second layer of the model by Ebben and Vaal. Specifically, by adding institutional variables to the production function, the authors account for the impact that corruption may have on economic output through its interaction with the state of institutions.

In this way, to analyze the so-called indirect effect of corruption on the economic development in Chile, this thesis will first examine the state of the institutions of Chile, and second, the relationship between these institutions and the rate of economic growth.

### 3.4.2. Corruption, economic growth and the institutions

Chile has a long tradition of strong institutions, as confirmed by many evaluations and rankings including the Global Competitiveness Index (World Economic Forum) and the Economic Freedom Index (Heritage Foundation) in which Chile has consistently achieved top marks among developing countries.

To illustrate this, Figure 6 presents the results from the WIQR elaborated by Kunkic (2014). These results describe the quality of the legal, political, and economic institutions of Chile relative to other countries in the world. It is notable that the graph was created using the original timeframe of the dataset, the period from 1990-2010.
Regarding the trends in the rankings for legal, political, and economic institutions, it can be observed that the quality of the institutions in Chile has improved relative to those of other countries. This notion is illustrated by the downward trend of all three rankings, which implies that the country has scaled up to top positions for these rankings during the given year(s). Specifically, Chile passed from 30th, 37th, and 29th place in the legal, political, and economic institutional rankings in 1990, respectively, to the 21st, 18th, and 16th positions, respectively, in 2010.

Nevertheless, the analysis of this ranking does not allow for examination into whether the country has performed better or worse relative to itself because changes in the rankings may be determined more by movements, up or down, of other countries. For this reason, the next analysis focuses on the absolute measures of the quality of the three groups of institutions using the variables that were extended in the base of the scores for wgi.

Figure 7 shows the dynamic of the absolute measures of the quality of the legal, political, and economic institutions of Chile in the period of 1996-2016.
In relation to the quality tendencies of the three institutional groups, the graph in Figure 7 shows that overall, the institutional environment of Chile has progressed over time. However, this positive dynamic seems to have been affected at least two times, as illustrated by the downward trend of the quality of legal, political, and economic institutions in both 2000 and 2012. Regarding this trend, it can be argued that the decrease in the quality of Chilean institutions accompany increased perceptions of corruption.

As described in Chapter 2, during the administration of Ricardo Lagos (2000-2006), some of the most significant cases of corruption in Chile became publicly known, primarily due to the amount of money involved and the participation of political figures, public institutions, and private agents. Similarly, many fraudulent activities were revealed after 2012, leaving uncovered a view of the network of privileges associated with political and economic elites.

It can be argued that the decrease in the quality of Chilean institutions goes along with higher perceptions of corruption such that corruption is likely to be detrimental to the economic development of Chile through this channel.

To examine this notion, hereunder is an analysis of the dynamics of the quality of legal, political, and economic institutions combined with the rate of economic growth in Chile.
during the period between 1996-2016. Figure 8 shows the relationship between legal institutional quality and growth rate of the GDP.

Figure 8: Legal Institutional Quality and GDP growth

Source: Institutional Quality Dataset (Kunkic, 2014), and WDI by the World Bank. Note: the left axis shows the rate of GDP growth, and the right axis show the absolute scores corresponding to the quality of legal institutions. The higher the score, the higher the quality of legal institutions.

Considering the dynamics of these variables jointly, Figure 8 shows that GDP growth and the quality of legal institutions are inversely related. Specifically, the higher the quality of legal institutions, the lower the rate of economic growth. For this reason, based on the model by Ebben and Vaal (2009), corruption seems to be beneficial to the economic activity of Chile through its interaction with legal institutions.

Kunkic (2014) has stated that legal institutions involve the rule of law, the legal system, and enforcement of legislation. In this context, the legal institutions of Chile are considered reliable, relative to other countries, because the laws exist, are publicized, and protect fundamental rights to a large extent. However, this evaluation does not imply that laws and regulations are applied evenly or that they are just.

On the one hand, since corruption in Chile is characterized by the link between public officials and private actors who follow a chain of favors in which both parties benefit, it can be presumed that rules and laws are administrated arbitrarily; rules “adapt” to situations, which thus may facilitate the creation of business and investments.
On the other hand, the quality of legal institutions also depends on the independence of the judiciary system. A proper legal environment involves a competent judiciary system that delivers timely and neutral decisions. However, the conventional belief in Chile is that justice is not impartial and instances of corruption mostly go unpunished.

Figure 9 expresses perceptions of the impartiality of the Chilean court system since the year 2000. This measure is one of the sub-components in the Economic Freedom of the World index elaborated by the Fraser Institute.

![Figure 9: Impartiality of the courts in Chile](image)

Source: Economic Freedom of the World by Fraser Institute. Note: Scores are on a scale of 0-10 with higher values corresponding to more impartial courts.

The graph shows a downward trend in perceptions of the impartiality of courts, and its dynamic seems to follow the changes in the levels of perceived corruption. In general, the sanctions applied to actors, both public and private, who were involved in fraudulent activities were generally mild in relation to the amounts of money that were defrauded.

This trend remains true only in the cases in which those transgressions were punished. The corrupt activities in Chile are characterized as being technically complicated and, in most cases, exerted in such a way that they exist in a gray area between legal and illegal.

For this reason, in most cases, the judiciary system requires specific people and lengthy investigations to arrive at conclusions, which helps transgressions to be ascribed no
punishment, thereby facilitating the development of the chain of favors and privileges associated with the country’s political and economic elites.

To analyze the effect of corruption on economic growth through its impact on political institutions, Figure 10 shows the dynamics of the interaction between the rate of GDP growth and the quality of political institutions.

Figure 10: Political Institutional Quality and GDP growth

Source: Institutional Quality Dataset by Kunkic (2014), and WDI by the World Bank. Note: the left axis shows the rate of GDP growth, and the right axis show the absolute scores corresponding to the quality of political institutions. The higher the score, the higher the quality of political institutions.

As shown in the graph, the relationship between these variables is positive. Specifically, a higher quality of political institutions is associated with higher rates of growth, and thus corruption is likely to be detrimental to the economic activity of Chile through its interaction with political institutions.

According to Kunkic (2014), this institutional group involves electoral rules, political parties, and the limits and constraints of politicians and the government. In this way, corruption may affect the quality of political institutions and, though them, economic development; through, for example, promoting discrentional changes in policies.

To illustrate this idea, the results of the Political Constraints Index V are presented as elaborated by Henisz (2000).
The index measures the extent to which a change in the preference of any one political actor may lead to a change in government policy, on a scale from 0 to 1 in which higher values indicate more political constraints and thus less feasibility of policy changes.

In terms of the index for Chile, the values range from 0.7 to 0.8, which implies that politicians and executives are quite limited. However, the trend of the index shows that these constraints have generally decreased over time.

Moreover, regarding the dynamics of the index over time, its movements down coincide with periods in which corruption has been perceived to be higher. Consequently, corruption may be detrimental to growth through its interaction with political institutions because it may open opportunities for governmental policies to be chosen or adapted to the benefit of a few, rather than the development of the entire economy.

Finally, the relationship between GDP growth and the quality of economic institutions is analyzed. Figure 12 shows the dynamic of GDP growth and the measure of quality for this group of institutions between 1996-2016.
Considering the dynamic of these variables, they seem to be positively correlated, which indicates that the higher the quality of economic institutions, the higher the rate of economic growth. In this way, following the framework in Ebben and Vaal’s model, corruption is likely to be harmful to the economic development of Chile through its interaction with economic institutions. According to Kunkic (2014), economic institutions involve market regulations, trade freedom, as well as the security of property rights.

Rankings developed by, for example, the Heritage Foundation and the Fraser Institute with a focus on economic freedom show that market regulations and the economic environment of Chile generally incentivize private investment. For this reason, corruption may drive adverse economic reactions if it affects the ability of the government to formulate sound policies.

Along this line, the analysis of the regulatory quality indicator for Chile, which is one of the six dimensions of governance in the WGI elaborated by the World Bank, shows a slight downward tendency over time, as illustrated in Figure 13.
Figure 13: Regulatory Quality indicator, Chile.

Figure 13: Regulatory Quality indicator, Chile. 

Provided the satisfactory economic institutional setting of Chile, it can be presumed that corruption is likely to hinder economic activity in Chile by increasing uncertainty regarding the quality of its economic institutions, which, in turn, is harmful for the creation of businesses and private investments.

The preceding analysis is important because it allows for an understanding of the potential effects that corruption may have on economic activities in Chile, both directly and indirectly. However, this analysis is only exploratory and consequently does not allow for the assertion of a causal relationship between the variables and nor does it permit the quantification of the economic consequences of corruption in Chile.

The next chapter of this thesis is therefore dedicated to describing the estimation of these effects using a times series approach for the period of analysis, which is 1996-2016.
CHAPTER 4: ESTIMATING THE EFFECT OF CORRUPTION ON ECONOMIC GROWTH

In this chapter, the effects of corruption on the economic growth of Chile are empirically estimated. These estimations rely on a time series setting in which both the direct effect of corruption on economic output and its indirect impacts via institutions are calculated for the period 1996-2016. The method of estimation includes a test for stationarity of all of the series independently; it also addresses co-integration to ensure that the results of the regressions are not spurious. Finally, the specified models are estimated using the error corrector model (ECM).

4.1. EMPIRICAL SPECIFICATION

In line with above specifications of Ebben and Vaal’s model in equations (1) and (2), the regression form of the model can be written as:

\[ Y_t = \alpha_0 + \alpha_1 K_t + \alpha_2 H_t + \alpha_3 L_t + \alpha_4 C_t + \mu_t \]  (1’)

\[ Y_t = \alpha_0 + \alpha_1 K_t + \alpha_2 H_t + \alpha_3 L_t + \alpha_4 I_t + \alpha_5 (C_t \ast I_t) + \mu_t \]  (2’)

where:

\[ Y_t \] is Gross Domestic Growth (GDP) at time t;
\[ K_t \] is physical capital at time t;
\[ H_t \] is human capital at time t;
\[ L_t \] is labor force at time t;
\[ C_t \] is corruption at time t;
\[ I_t \] is quality of institution (legal, political, or economic) at time t.

These equations were formulated following Egunjobi (2013), who estimated the direct effect of corruption on economic growth in Nigeria and its indirect effect via its interaction corruption with government capital expenditure, foreign private investment, and education expenditure.

Accordingly, equation (1’) captures the direct effect of corruption on economic growth in Chile, and equation (2’) is formulated to account for the indirect effect of corruption on
growth through its interaction with the institutional quality of Chile, which is operationalized by the interaction term \((C_t \ast I_t)\). Both equations are estimated for the period 1996-2016.

4.2. SOURCES AND MEASUREMENT OF VARIABLES

Corruption and economic development

The variables used to measure corruption and economic product in Chile are the CC indicator and GDP in constant 2010 U.S. dollars.

Regarding CC, it was converted using the procedure in Dzhumashev (2008) to facilitate its interpretation. Explicitly, CC is normalized as \(\overline{CC} = \frac{CC}{\max (CC)}\), and thus the measure of corruption becomes \((1 - \overline{CC})\), with higher values indicating more corruption. Additionally, GDP is converted into a natural logarithm.

Institutional environment

As in the descriptive analysis, the institutional environment of Chile is operationalized using the absolute measures of the quality of legal (Leg), political (Pol), and economic institutions (Econ), from the Institutional Quality Dataset.

Physical Capital

The factor of physical capital is operationalized using gross fixed capital formation from the WDI. According to the definition provided by the World Bank, this variable includes land improvements, plans, machinery, and equipment purchases in addition to the construction of roads, railways, schools, offices, hospitals, and commercial and industrial buildings. Data are in constant 2010 U.S. dollars, and physical capital is also converted into a natural logarithm.

Human Capital

Human capital is operationalized using government education expenditures (EDUC), expressed as a percentage of the GDP. This variable does not exhibit data from 2001 and 2016, so missing values were estimated by linear interpolation-extrapolation as a function of total GDP; EDUC is converted into natural logarithm.
**Labor Force**

The factor of labor is operationalized using total labor force (LAB) from the WDI. It comprises people ages 15 and older who are economically active. Data are converted into a natural logarithm.

Table B in the Appendix summarizes the set of variables included in this analysis.

### 4.3. METHOD OF ESTIMATION

This section describes the quantitative tools of data analysis. First, a Dickey-Fuller test (Dickey and Fuller, 1979) was conducted to test for the unit root of the data collected on GDP; gross capital formation (GCF); government education expenditures (EDUC); labor force (LAB); the CC indicator; measurements of the quality of legal (Leg), political (Pol), and economic (Econ) institutions; and the interactions that account for the indirect effect of corruption on the economic activities of Chile via legal (CCxLeg), political (CCxPol), and economic (CCxEcon) institutions. This test is important because when times series data is characterized by a unit root (non-stationary), regressions analyses conducted using conventional methods of estimation can yield spurious regression results.

In addition, the variables were tested for co-integration using the Engle-Granger two-step method (Engle and Granger, 1987). Co-integration exists if several nonstationary time series tend to move together over time, which implies a long-run equilibrium between the dependent and independent variable. For this reason, the first step of the Engle-Granger method consists of estimating the static regressions in (1’) and (2’)$^6$ by the traditional ordinary least squares technique. In the second step, the lagged residuals obtained from the static regressions in step one are tested for stationarity. Stationarity on residuals implies co-integration.

Stationarity and co-integration are two important features of times series data, and thus whether the series are stationary and co-integrated determine the mechanism to estimate equations (1’) and (2’):

- If the time series are all stationary, this is integrated by order zero, I(0), conventional estimation techniques can be used to estimate equations (1’) and (2’).
- If time series are nonstationary and not co-integrated, the estimation of equations (1’) and (2’) produce spurious results.

---

$^6$ Equation (2’) is estimated including the quality of legal, political and economic institutions separately.
If time series are nonstationary in their respective levels but co-integrated, it is possible to estimate the short-run interaction among the variables in equations (1’) and (2’) using an ECM, which is an extension of the Engle-Granger method. Accordingly, equations (1’) and (2’) are estimated on the first-differenced variables through adding the lagged residuals obtained from the co-integration equation on the list of regressors. In this way, the residuals are the adjustment variable that show how the system adjusts to the long-run equilibrium implied by the co-integration equation (Aliyu and Elijah, 2008).

4.4. ESTIMATIONS RESULTS

4.4.1. Testing for unit root

The results of the Dickey-Fuller test applied to all of the variables included in the specified models is presented in the table below.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Lags =0</th>
<th>Lags=1</th>
<th>Lags=3</th>
</tr>
</thead>
<tbody>
<tr>
<td>ln(GDP)</td>
<td>0.7147</td>
<td>0.8836</td>
<td>0.6204</td>
</tr>
<tr>
<td>ln(GCF)</td>
<td>0.8457</td>
<td>0.8925</td>
<td>0.5428</td>
</tr>
<tr>
<td>ln(EDUC)</td>
<td>0.7051</td>
<td>0.5326</td>
<td>0.9178</td>
</tr>
<tr>
<td>ln(LAB)</td>
<td>0.9705</td>
<td>0.9592</td>
<td>0.9211</td>
</tr>
<tr>
<td>CC</td>
<td>0.5628</td>
<td>0.1191</td>
<td>0.2607</td>
</tr>
<tr>
<td>Leg</td>
<td>0.5883</td>
<td>0.3771</td>
<td>0.4723</td>
</tr>
<tr>
<td>Pol</td>
<td>0.6790</td>
<td>0.5107</td>
<td>0.3471</td>
</tr>
<tr>
<td>Econ</td>
<td>0.5956</td>
<td>0.1776</td>
<td>0.0809</td>
</tr>
<tr>
<td>CC*Leg</td>
<td>0.4624</td>
<td>0.0962</td>
<td>0.2480</td>
</tr>
<tr>
<td>CC*Pol</td>
<td>0.5096</td>
<td>0.1259</td>
<td>0.3060</td>
</tr>
<tr>
<td>CC*Econ</td>
<td>0.4859</td>
<td>0.1056</td>
<td>0.2985</td>
</tr>
</tbody>
</table>

Mackinnon approximate p-values

Source: Own elaboration based on results of Dickey-Fuller Test. Note: the null hypothesis is that the time series has a unit root. The null is rejected whenever the p-values <0.05.

The null hypothesis is that the time series has a unit root (non-stationary), and it is rejected whenever the p-value is lower than 0.05, at 95% significance level. The table shows the results of Dickey-Fuller tests applied without lag and with one and three lags. Accordingly, empirical findings reveal that all of the series are non-stationary in their respective levels. However, stationarity was obtained after taking their first difference, see Table 2.
Table 2: Unit root test on first differenced variables

<table>
<thead>
<tr>
<th>First Differenced Variables</th>
<th>Dickey Fuller t-statistic</th>
<th>Order of Integration</th>
</tr>
</thead>
<tbody>
<tr>
<td>D.In(GDP)</td>
<td>3.783***</td>
<td>I(0)</td>
</tr>
<tr>
<td>D.In(GCF)</td>
<td>4.157***</td>
<td>I(0)</td>
</tr>
<tr>
<td>D.In(EDUC)</td>
<td>2.767*</td>
<td>I(0)</td>
</tr>
<tr>
<td>D.In(LAB)</td>
<td>3.159**</td>
<td>I(0)</td>
</tr>
<tr>
<td>D.CC</td>
<td>3.453**</td>
<td>I(0)</td>
</tr>
<tr>
<td>D.Leg</td>
<td>3.379**</td>
<td>I(0)</td>
</tr>
<tr>
<td>D.Pol</td>
<td>2.790*</td>
<td>I(0)</td>
</tr>
<tr>
<td>D.Econ</td>
<td>2.711*</td>
<td>I(0)</td>
</tr>
<tr>
<td>D.CC*Leg</td>
<td>3.637**</td>
<td>I(0)</td>
</tr>
<tr>
<td>D.CC*Pol</td>
<td>3.588**</td>
<td>I(0)</td>
</tr>
<tr>
<td>D.CC*Econ</td>
<td>3.585**</td>
<td>I(0)</td>
</tr>
</tbody>
</table>

Source: Own elaboration based on results of Dickey-Fuller test. Note: the null hypothesis of unit root is rejected if t-statistics is greater, in absolute values, to Mackinnon critical values. Thus, (***), (**), and (*) indicate significance at 1%, 5%, and 10%, respectively.

The null hypothesis of the presence of unit root is rejected for all the variables at different significance levels.

4.4.2. Testing for co-integration

With none of the variables reported to be stationary at their respective levels, the next step is to apply the Engel-Granger two-step method to check for the presence of co-integration among the variables in the models specified. Specifically, the procedure consists of estimating the static equations (1’) and (2’) using OLS and then testing for the presence of unit root on the obtained residuals. Table 3 reports the results of the stationarity test applied on the lagged values of the residuals that were obtained by the estimation of equations (1’), and (2’a), (2’b), and (2’c) corresponding to the estimation of equation (2’) when the variable I measures the quality of legal, political, and economic institutions, respectively.

---

7 Results of these estimations are presented in Table C in the Appendix.
The decision criteria state that the null hypothesis of nonstationary is rejected if the t-statistic is lower, in absolute terms, than critical values. For this reason, using the critical values in Engle and Yoo (1987)\textsuperscript{8}, the tests result in the table above show that the null hypothesis is rejected for all four equations, which implies that the time series are co-integrated and thus there exists a long-run equilibrium among variables in the models specified.

After testing the time series for both stationarity and co-integration, the empirical findings reveal that variables in the models specified are nonstationary at their respective levels, but they tend to move together in the long run. In this way, the short-run interaction and adjustment to the long-run equilibrium between the variables can be obtained through the ECM (Engle and Granger, 1987).

Formally, the error-correction representation for variables in equation (1’) becomes:

$$\Delta \log Y_t = \alpha_0 + \sum_{i=1}^{n} \alpha_1 \Delta \log K_t \cdot i + \sum_{i=1}^{n} \alpha_2 \Delta \log H_t \cdot i + \sum_{i=1}^{n} \alpha_3 \Delta \log L_t \cdot i + \sum_{i=1}^{n} \alpha_4 \Delta \log C_t \cdot i + \alpha_5 ECT_{t-1} + \mu_t$$

where $\Delta$ implies that the equation is estimated on the first differenced variables and $ECT$ is the error corrector term or the lagged residuals obtained from the co-integrating equation, which is incorporated on the list of regressors. Additionally, $i$ corresponds to the optimal lag of the right-hand variables, which in this case was chosen using the general-to-specific method of eliminating insignificant lags.

\textsuperscript{8} Test statistic based on the estimated residuals does not follow the standard DF distribution under the null of co-integration and thereby, the decision criteria is based on critical values by Engel and Yoo (1987), Table 2, page 157.
Specifically, the equation above was initially estimated with four lagged differences in the explanatory variables, one constant term, and the lagged residuals. Then, the model was reduced to a parsimonious ECM specification, excluding the statistically insignificant lags.

Likewise, the error-correction representation for variables in equation (2') is:

\[
\Delta \log Y_t = \alpha_0 + \sum_{i=1}^{n} \alpha_1 \Delta \log K_{t-i} + \sum_{i=1}^{n} \alpha_2 \Delta \log L_{t-i} + \sum_{i=1}^{n} \alpha_3 \Delta \log H_{t-i} + \sum_{i=1}^{n} \alpha_4 \Delta I_{t-i} + \sum_{i=1}^{n} \alpha_5 \Delta (C \ast I)_{t-i} + \alpha_6 ECT_{t-1} + \mu_t
\]

where \(I\) captures the effect of the legal, political, or institutional quality, and the interaction term captures the effect of corruption on the economic output via the quality of the corresponding institutions. The same procedure is carried out to determine the optimal lag.

### 4.4.3. Results of Error Correction Model

The results of the short-run dynamic models are presented below.
Table 4: Effect of corruption on economic growth in Chile.

<table>
<thead>
<tr>
<th></th>
<th>(1')</th>
<th>(2'a)</th>
<th>(2'b)</th>
<th>(2'c)</th>
</tr>
</thead>
<tbody>
<tr>
<td>constant</td>
<td>0.0254**</td>
<td>0.0249**</td>
<td>0.0254**</td>
<td>0.0246**</td>
</tr>
<tr>
<td></td>
<td>(0.002)</td>
<td>(0.003)</td>
<td>(0.003)</td>
<td>(0.003)</td>
</tr>
<tr>
<td>D.ln(GCF)</td>
<td>0.1617**</td>
<td>0.1589**</td>
<td>0.1528**</td>
<td>0.1531**</td>
</tr>
<tr>
<td></td>
<td>(0.02)</td>
<td>(0.02)</td>
<td>(0.01)</td>
<td>(0.02)</td>
</tr>
<tr>
<td>D.ln(EDUC)</td>
<td>-0.1527**</td>
<td>-0.1512**</td>
<td>-0.148**</td>
<td>-0.1534**</td>
</tr>
<tr>
<td></td>
<td>(0.02)</td>
<td>(0.02)</td>
<td>(0.02)</td>
<td>(0.02)</td>
</tr>
<tr>
<td>D.ln(LAB(-2))</td>
<td>0.2855**</td>
<td>0.2954**</td>
<td>0.2855**</td>
<td>0.3292**</td>
</tr>
<tr>
<td></td>
<td>(0.12)</td>
<td>(0.11)</td>
<td>(0.12)</td>
<td>(0.12)</td>
</tr>
<tr>
<td>D.CC(-2)</td>
<td>-0.1076**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.02)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D.Leg(-2)</td>
<td></td>
<td>0.1063</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.05)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D.CC*Leg(-2)</td>
<td></td>
<td>-0.1485**</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.03)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D.Pol</td>
<td></td>
<td></td>
<td>0.0565</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(0.05)</td>
<td></td>
</tr>
<tr>
<td>D.CC*Pol(-2)</td>
<td></td>
<td></td>
<td>-0.1634**</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(0.03)</td>
<td></td>
</tr>
<tr>
<td>D.Econ</td>
<td></td>
<td></td>
<td></td>
<td>0.0097</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.06)</td>
</tr>
<tr>
<td>D.CC*Econ(-2)</td>
<td></td>
<td></td>
<td></td>
<td>-0.1505**</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.03)</td>
</tr>
<tr>
<td>L.residuals</td>
<td>-0.0569</td>
<td>-0.0392</td>
<td>-0.0172</td>
<td>-0.0242</td>
</tr>
<tr>
<td></td>
<td>(0.06)</td>
<td>(0.06)</td>
<td>(0.07)</td>
<td>(0.07)</td>
</tr>
<tr>
<td>N</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>Adjusted R-Squared</td>
<td>0.95</td>
<td>0.96</td>
<td>0.95</td>
<td>0.95</td>
</tr>
<tr>
<td>Durbin Watson statistic</td>
<td>1.89</td>
<td>1.69</td>
<td>1.93</td>
<td>1.81</td>
</tr>
</tbody>
</table>

Note: own calculations using Stata.

Table 4 shows that, overall, the specified models are very robust as illustrated by the coefficients of multiple determination of about 0.95.

Additionally, Durbin-Watson statistics\(^9\), which range between 1.7 and 1.9, dismiss the possibility of a spurious relationship between the dependent and exploratory variables.

---

\(^9\) Durbin Watson Statistic take values between 0 and 4, with values closer to 2 indicating no serial correlation, statistics approaching to 0 indicate positive serial correlation, and statistic approaching to 4 mean negative serial correlation.
Regarding equation (1’), the results show that all variables in the specified model are significant at a 5% significance level, and except for education expenditures, all other factors present the expected sign. For this reason, an increase in physical capital and the labor force would generate an increase in economic growth, while an increase in education spending and corruption would reduce the rate of growth.

The coefficient of education may be explained by the incorporation of corruption in the regression equation. One can presumed that a more educated population may hinder potential growth because people are then better trained and therefore more aware of governmental policies. In the presence of corruption, thus, highly educated people may confront investment projects that, despite being economically profitable, may not necessarily produce benefits for society.

Additionally, the model does not capture the efficiency of the labor market. Increases in spending on education should accompany increases in the capacity of absorption of the labor market to include the new better-educated population. Otherwise, the increase in the highly educated population may produce an increase in the rate of unemployment and a resulting decrease in growth.

Regarding the coefficient of corruption, it reveals that there is a negative relationship between economic growth and corruption, which is in line with previous studies by Mauro (1995), Mo (2001), and Egunjobi (2013), among others. The value of the coefficient of corruption suggests that a unit rise in corruption in Chile leads to about a 10% decrease in the rate of economic growth. This corresponds to the short-run causality.

With respect to the coefficient of the lagged residuals, it is negative and not significant. The value of this coefficient shows the speed of adjustment to long-run equilibrium, and its sign and significance permit to verify if there exist a long-run causality between the variables in the model specified. Since the coefficient is negative but not significant, the results suggest that there is not long-run causality between the explanatory and dependent variable.

Regression (2’a) shows the effect of corruption on economic growth via the quality of legal institutions. The signs and values of the coefficients of the productive factors, capital formation, education expenditures, and labor force remain the same as in the previous case and are all statistically significant at 5%. Regarding the coefficient of the quality of legal institutions, it is positive as expected, but it is not significant. Importantly, the coefficient of the interaction term between corruption and the quality of legal institutions reveals that corruption reduces the effect of legal institution on economic growth by about 14%, and this effect is statistically significant at 5%.
Furthermore, the results of regressions (2’b) and (2’c), which capture the effect of corruption on economic output via the quality of political and economic institutions, respectively, show similar results. Specifically, the coefficients associated to the quality of political and economic institutions are positive but not significant, and the coefficients of the interaction terms are negative and significant at 5%, which indicates that corruption reduces the potential effect of political and economic institutions on economic growth. Consequently, these findings are also in accordance with the patterns observed in the descriptive analysis.

To summarize, the results from the estimations shows that corruption in Chile would be detrimental to economic growth, not only directly but also via its impact on Chile’s institutional environment. In this way, these findings are in agreement with the effects suggested by Ebben and Vaal (2009), particularly considering that institutions in Chile have been consistently described as strong. Hence, corruption will reduce its effectiveness.
Concluding remarks

Throughout the analysis of the cases of corruption revealed in the last decade, it has been demonstrated that corruption in Chile is characterized by the link between the public sector and private businesses in pursuit of private gain. Specifically, these sectors relate to each other through a chain of favors in which both sides benefit in manners that would otherwise be more difficult to acquire.

The interaction between the government and economic elites has arisen mainly as a result of the wave of privatization during the military regime. Since then, public institutions have been a major source of corruption because they have been used to benefit particular groups and political parties.

In addition, most of the transgressions occur in forms more complex forms than bribery, including the payment of non-taxable complementary wages, the use of fake invoices to support political campaigns, influence peddling, nepotism, and the use of privileged information for private benefits. In this way, this makes it difficult for a global measurement of corruption to accurately capture the extent of this phenomenon in Chile.

Some of these fraudulent activities have been culturally normalized and in some cases legalized, as in the case of complementary wages to political parties under the premise that these policies strengthen the nation’s democracy and modernize the state. This sort of “domestic” corruption has important consequences for society but not necessarily for international business, which may also be an explanation for the divergence in perceptions of corruption between the Chilean society and global indices.

Regarding consequences of corruption, it was demonstrated that corruption have undermined social capital, especially the trust in public institutions and the willingness of citizens to participate in elections. Consequently, low civic participation reinforces the structure of privileges of those who hold public office and facilitates the continuity of its linkage with economic elites.

In addition, the analysis of the economic consequences of corruption in Chile showed that it is detrimental to economic growth not only directly, but also via the institutional environment. Specifically, estimations reveal that in the short-run corruption can reduce potential growth by about 10%. Additionally, corruption reduces the potential effect of legal, political, and economic institutions on growth by about 15%.
To conclude, this thesis has added to current understandings of the type of corruption in Chile and its effect on the economy. The results are important because they may serve as input to define strategies to avoid the continual development of this phenomenon. In particular, one could argue that policies must be directed to create better mechanisms of control that can be carried out by autonomous institutions that are independent of the government. Laws and regulations exist, but there is currently no control regarding their discretionary use.
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## Appendix

Table A: Institutional proxies used by Kunkic (2014) to construct the aggregate measures of the Quality of Legal, Political and Economic institutions.

<table>
<thead>
<tr>
<th>Institutional group and measure</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Legal institutions</strong></td>
<td></td>
</tr>
<tr>
<td>Index of Economic Freedom:Property rights</td>
<td>Heritage Foundation and WSJ</td>
</tr>
<tr>
<td>Freedom of the Press: Legal Environment</td>
<td>Freedom House</td>
</tr>
<tr>
<td>Freedom in the World: Civil liberties</td>
<td>Freedom House</td>
</tr>
<tr>
<td>EFW Index: Judicial independence</td>
<td>Fraser Institute</td>
</tr>
<tr>
<td>EFW Index: Impartial courts</td>
<td>Fraser Institute</td>
</tr>
<tr>
<td>EFW Index: Protection of property rights</td>
<td>Fraser Institute</td>
</tr>
<tr>
<td>Law and order</td>
<td>International Country Risk Guide</td>
</tr>
<tr>
<td>Religion in Politics</td>
<td>International Country Risk Guide</td>
</tr>
<tr>
<td>Rule of Law</td>
<td>Worldwide Governance Indicators</td>
</tr>
<tr>
<td><strong>Political institutions</strong></td>
<td></td>
</tr>
<tr>
<td>Freedom of the Press: Political environment</td>
<td>Freedom House</td>
</tr>
<tr>
<td>Freedom in the World: Political Rights</td>
<td>Freedom House</td>
</tr>
<tr>
<td>Institutionalized Democracy - Institutionalized Autocracy</td>
<td>Polity IV</td>
</tr>
<tr>
<td>Checks and balances</td>
<td>World Bank</td>
</tr>
<tr>
<td>Democratic accountability</td>
<td>International Country Risk Guide</td>
</tr>
<tr>
<td>Corruption</td>
<td>International Country Risk Guide</td>
</tr>
<tr>
<td>Bureaucratic quality</td>
<td>International Country Risk Guide</td>
</tr>
<tr>
<td>Internal conflict</td>
<td>International Country Risk Guide</td>
</tr>
<tr>
<td>Military in politics</td>
<td>International Country Risk Guide</td>
</tr>
<tr>
<td>Control of Corruption</td>
<td>Worldwide Governance Indicators</td>
</tr>
<tr>
<td>Corruption perceptions index</td>
<td>Transparency International</td>
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<td>Political terror scale</td>
<td>Political terror scale</td>
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<tr>
<td><strong>Economic institutions</strong></td>
<td></td>
</tr>
<tr>
<td>Index of Economic Freedom: Financial Freedom</td>
<td>Heritage Foundation and WSJ</td>
</tr>
<tr>
<td>Index of Economic Freedom: Business Freedom</td>
<td>Heritage Foundation and WSJ</td>
</tr>
<tr>
<td>Regulatory Quality</td>
<td>Worldwide Governance Indicators</td>
</tr>
<tr>
<td>Freedom of the Press: Economic environment</td>
<td>Freedom House</td>
</tr>
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<td>EFW Index: Freedom to own foreign currency bank accounts</td>
<td>Fraser Institute</td>
</tr>
<tr>
<td>EFW Index: Regulation of Credit, labor, and Business: Credit market regulations</td>
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</tr>
<tr>
<td>EFW Index: Regulation of Credit, Labor, and Business: Labor market regulations</td>
<td>Fraser Institute</td>
</tr>
<tr>
<td>EFW Index: Regulation of Credit, Labor, and Business: Business Regulations</td>
<td>Fraser Institute</td>
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<td>EFW Index: Foreign ownership/investment restrictions</td>
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<td>EFW Index: Capital controls</td>
<td>Fraser Institute</td>
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<td>Investment profile</td>
<td>International Country Risk Guide</td>
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*Source: Kunkic (2014)*
Table B: Summary of the variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>Observations</th>
<th>Mean</th>
<th>SD</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross Domestic Product (GDP)</td>
<td>21</td>
<td>1.93e+11</td>
<td>4.83e+10</td>
<td>1.23e+11</td>
<td>2.69e+11</td>
</tr>
<tr>
<td>Control of Corruption Indicator (CC)</td>
<td>21</td>
<td>0.098751</td>
<td>0.0735882</td>
<td>0</td>
<td>0.29432</td>
</tr>
<tr>
<td>Gross Capital Formation (GCF)</td>
<td>21</td>
<td>3.85e+10</td>
<td>1.61e+10</td>
<td>1.95e+10</td>
<td>6.29e+10</td>
</tr>
<tr>
<td>Expenditure on education (EDUC)</td>
<td>21</td>
<td>3.895438</td>
<td>0.6331446</td>
<td>2.88348</td>
<td>5.048116</td>
</tr>
<tr>
<td>Labor Force (LAB)</td>
<td>21</td>
<td>7126102</td>
<td>1106300</td>
<td>5655872</td>
<td>8884652</td>
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<tr>
<td>Legal Institutional Quality (Leg)</td>
<td>21</td>
<td>0.7975953</td>
<td>0.0334202</td>
<td>0.7312257</td>
<td>0.8556659</td>
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<tr>
<td>Political Institutional Quality (Pol)</td>
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<td>0.7097894</td>
<td>0.0458672</td>
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<tr>
<td>Economic Institutional Quality (Econ)</td>
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<td>0.7368748</td>
<td>0.0452582</td>
<td>0.6456274</td>
<td>0.7892421</td>
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</table>

Table C: Results of the regression on the static equations.

<table>
<thead>
<tr>
<th>Dependent variable: ln(GDP)</th>
<th>(1')</th>
<th>(2'a)</th>
<th>(2'b)</th>
<th>(2'c)</th>
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<tbody>
<tr>
<td>constant</td>
<td>3.6699</td>
<td>5.8592</td>
<td>4.5794</td>
<td>1.4561</td>
</tr>
<tr>
<td>(3.77)</td>
<td>(3.74)</td>
<td>(2.76)</td>
<td>(3.01)</td>
<td></td>
</tr>
<tr>
<td>ln(GCF)</td>
<td>0.1881</td>
<td>0.3075</td>
<td>0.0995</td>
<td>0.0163</td>
</tr>
<tr>
<td>(0.13)</td>
<td>(0.14)</td>
<td>(0.10)</td>
<td>(0.12)</td>
<td></td>
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<tr>
<td>ln(EDUC)</td>
<td>-0.0183</td>
<td>0.0037</td>
<td>0.0774</td>
<td>0.0101</td>
</tr>
<tr>
<td>(0.11)</td>
<td>(0.10)</td>
<td>(0.08)</td>
<td>(0.09)</td>
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<tr>
<td>ln(LAB)</td>
<td>1.1244</td>
<td>0.8289</td>
<td>1.1604</td>
<td>1.4963</td>
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<tr>
<td>(0.45)</td>
<td>(0.45)</td>
<td>(0.33)</td>
<td>(0.37)</td>
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<tr>
<td>CC</td>
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<td>CC*Leg</td>
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<td>CC*Pol</td>
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<tr>
<td>Econ</td>
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<td>0.6429</td>
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<tr>
<td>(0.19)</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>CC*Econ</td>
<td></td>
<td></td>
<td></td>
<td>0.2667</td>
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<tr>
<td>(0.12)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>21</td>
<td>21</td>
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<td>21</td>
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<tr>
<td>Adjusted R-Squared</td>
<td>0.98</td>
<td>0.98</td>
<td>0.99</td>
<td>0.99</td>
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</tbody>
</table>

Note: regression (1') correspond to the estimation of the static equation (1'), which describe the direct effect of corruption on economic output. Regression (2'a), correspond to the estimation of the static equation (2') when the quality of legal institutions and its interaction with corruption are incorporated as regressors. Likewise, regressions (2'b) and (2'c), correspond to the estimation of the static equation (2') when the quality of political and economic institutions are incorporated as regressor, respectively.