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Faculty of Business and Economics

Corruption and Income Inequality

Bachelor Thesis

Supervisor:

Ing. Miroslav Radiměřský   Tereza Káčerková

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Acknowledgment

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Abstract

Káčerková, T. Corruption and Income Inequality. Bachelor thesis. Brno: Mendel University in Brno, 2017.
The purpose of this bachelor thesis is to examine the relationship between corruption and income inequality in chosen countries of South America that obtains an adequate amount of data of the Corruption Perception Index and the Gini index, which are needed to estimate econometric model. The work characterises indexes as well. The thesis provides a literature overview of corruption and income inequality in order to provide the background and development of them and afterwards it identifies the relationship between these variables in given countries so this work founds out what extent the income inequality affects corruption.

Keywords

Corruption, income inequality, Corruption Perception Index, Gini index

Abstrakt

Káčerková, T. Korupce a Příjmová Nerovnost. Bakalářská práce. Brno: Mendelova univerzita v Brně, 2017.
Cílem této bakalářské práce je prozkoumat vztah mezi korupcí a příjmovou nerovností ve vybraných státech Jižní Ameriky, které mají dostatečný počet hodnot Indexu vnímání korupce a Gini indexu, které jsou potřebné pro ekonometrický model. Uvedené použité indexy jsou v práci také popsány. Bakalářská práce poskytuje literární rešerši korupce a příjmové nerovnosti a dále hlouběji analyzuje vztah těchto proměnných v daných státech. Jinými slovy nachází vztah mezi těmito proměnnými a zjišťuje do jaké míry příjmová nerovnost působí na korupci.

Klíčová slova

Korupce, příjmová nerovnost, Index vnímání korupce, Gini index

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1 Introduction and objectives

1.1 Introduction

Corruption as more and more discussed theme is very resistant all around the world. According to Bracking (2007) corruption is considered to be harmful to the society and adverse in general so evidently, it is not acceptable by the population. Moreover the World Bank Group President Jim Yong Kim (2013) named the corruption as the biggest enemy in developing countries and pointed out that fighting with corruptions can lead to better lives. Most countries have conceded existence of it and in the media this topic is very favoured one. Nowadays is noticeable pressure to make rapid progress in this field in order to implement anticorruption measures. Corruption obviously has an effect on states, companies and individuals as well.

Several specialists have analysed the relationships between corruption and elements like economic growth or foreign direct investment to conclude if the corruption is in some way beneficial. In these cases they are not very united, there are basically two groups. For example, Leff (1964) claims that higher level of corruption gets higher level of economic growth too because entrepreneurs thanks to corruption are able to avoid rigid regulations, which leads to better results. Podobnik (2008) also finds the positive relationship between these two. On the other hand, Tanzi (1998), who has worked afterwards speaks about the fact that corruption contributes to poor results as well as Mo (2001) in his study confirms that increased corruption level reduces the growth rate. These outcomes, of course, differ because of ways of resources, methods and other. But in general, is concluded that corruption has to be controlled and punished.

There are other factors that are linked to the corruption like income inequality. In this case there are two approaches how we can investigate their relationship. The first one is interested in income inequality as a consequence of corruption and the second approach sees it as one of the factors which influences corruption. This thesis is mainly focused on the second case used on data of states of South America because each country is unique in the region and has specific wealth, they are as well known for their corruption problems and different levels of income inequality so they suit perfectly for exploration.

The bachelor thesis is basically divided into several parts. The first part is focused on specification and study of two essential terms corruption and income inequality in order to introduce causes, forms, and consequences. The second part describes the indexes of both. Afterwards, there is a part about methodology and used data and analysis that reveals the relationship between the corruption and income inequality in chosen countries of South America. The current situation in states of

South America of corruption and income inequality is also described there. The last parts of the bachelor thesis are discussion and conclusion.

1.2 Objectives

The main aim of the bachelor thesis is to describe and examine the relationship between corruption and income inequality by using data of chosen states of South America. I am going to study whether or not the income inequality in certain countries affects the level of corruption using Corruption Perception Index and Gini index. The main aim is fulfilled by means of partial aims, which are to summarize the theme due to expertise related to the topic and empirical study that shows the concrete result to what extent the income inequality affects corruption.

2 Theoretical backgrounds

2.1 Corruption

Define the core of corruption is not that easy, in literature we can find more than few definitions. It is caused by the existence of corruption in disciplines such as economics, political science and sociology. Kotlanová (2012) confirms this statement due to nearly every single international organization uses various definitions of this word.

However, there are some of them that are applied more often. According to Ryska (2015), the most used definition is "the corruption is the abuse of entrusted power for private gain". However this explanation is simplified. It is applied to public administration. In addition, some organizations such as the Council of Europe and The Organization for Economic Cooperation and Development (OECD) do not define the word but set up the scope of corruption behaviour. The Council of Europe Convention formed it in the manner of bribing the officials and using influence in trading (OECD, 2008).

There are features of corruption that may define it. These features are exchanged relation between at least two subjects; it brings benefits for them and acts against the proprieties whenever it is an acceptation, realization (Chmelík et al., 2003).

It is good to mention a shadow economy. Shadow economy is the phenomenon as well. Like corruption have countless definitions. One of them is that the shadow economy is a very problematic blurry area that includes those economic activities and the income hidden from government regulation or taxation. A large share of it is undeclared work, which refers to the wages that workers do not declare to avoid taxes and other regulations (Schneider and Kearney, 2013). Some authors believe that corruption and shadow economy are substitutes; others are in support of the complementary relationship. The result is influenced by mechanisms scientists use. Different forms of corruption behaviour interact differently with the shadow economy so there are variables, which have to be taking into consideration (Buehn and Schneider, 2012).

2.1.1 Causes of corruption

Chmelík and Tomica (2011) claim that a fundamental cause of corruption is a desire for profit and a success by people, which exist in every culture. The extent of corruption depends on opportunities, which are given to human such as given power to the administrative officer in decision-making. In general, is said, the more regulations and administrative processes exist in a state that affects citizens, the more likely there will be corruption actions due to accomplish wanted situation and personal success. This is also connected with a size of a government. There are

two approaches. The first see a larger government as a contributor of bureaucracy that could lead to illegal acting such as corruption like is described above (Rose-Ackerman, 1999). The second approach sees a larger government as stronger checks, a better oversight so in this case the corruption actually does not have space to occur (La Porta et al., 1999). Rose-Ackerman (1996) points out that democracy can influence corruption too. The democratic election makes open and transparent government on the other hand in nondemocratic states corruption may occur however this differentiation is strict. Chmelík et al. (2003) speak about corruption climate thanks to that people apologize own corruption actions because others do it too. Corruption climate can be described as behaviour based on illusions and unwritten norms of corruption made and used by society. Furthermore, knowing right people at right posts smooth the whole process.

Billger and Goel (2009) add that urbanization in a nation affects corruption. The concentration of population in urban areas affects the level of corruption because in urban areas there is greater opportunity for interaction between bribe takers and bribe givers so they have greater chances to make an illegal deal.

Tanzi (1998) says that corruption is strongly connected with the activities of the state. So he points out factors that are a fertile ground for corruption and are linked to states activities. He divides these factors into two groups. The first group is called direct factors including regulations and authorizations, taxation, spending decision, provisions for good and services at below market prices, other discretionary decisions and financing of parties. Another group is indirect factors, which are the quality of the bureaucracy, the level of public sector wages, penalty systems, institutional controls, transparency of rules, laws and processes, examples by leadership.

Melé (2014) sums up some possible causes of corruption but understands that there are causes, which are not listed, relevant to just some states, influenced by cultural and environmental environment and so on. The first one he names is personal greed. Like was written above is the common cause, it is an inner human desire to own money, power, goods. The second one is a decline of personal ethical sensitivity, which is driven by lack of ethical education, experiences. The third one is low awareness or lack of courage to denounce corrupt behaviour, it contains all the problems such as staying quiet when we are aware of corruption or when we think that it is not our thing to solve and deal with it. Also, no sense of service when working in public or private institutions is the cause. The position is used for selfish interests, not for public and common needs. Another is a cultural environment that condones corruption, rationalizing false arguments with no moral basis. People often excuse their behaviour. Next one is a downplaying or reacting mildly to corruption charges. The weak power of sanctions does not prevent corruption. Also, regulations and inefficient controls cause corruption, when the processes are complicated and not flexible, it is not very sufficient to control and prevent corrup-

tion. Another is a slow judicial process. The slow system of processes contributes to higher level of corruption. Furthermore lack of transparency, especially at the institutional level cause more corruption. When all kinds of institutions are not transparent enough there tends to be higher level of corruption. Also, lack of transparency like banking secrecy may be the cause of corruption. And the last one but not least is a lack of moral criteria in promotions, it should be easy to determine if the person is skilled or if the real reason for promotion is just loyalty to those who chose them.

Graeff and Mehlkop (2003) focus on a strong relationship between economic freedom and corruption. They imply the economic freedom as a deterrent to corruption. They also speak about an education level. In poor countries with high level of illiteracy people do not know what government should do so they are more likely give something to governments just to be sure to obtain a good decision, so it may be taken as a part of their culture.

Samadi and Farahmandpour (2013) suggest the relationship between unemployment and corruption. They expect that people without jobs who have to cover the living costs are more likely to get involved in illegal activities such as bribery in order to get new opportunities to work.

There are also several specialists such as Glaeser, Scheinkman, and Shleifer (2003), Alam (1995) and they consider that income inequality influences corruption because the ability to corrupt depends on the incomes so they conclude that income inequality also causes corruption. This issue is more in detail described in part of income inequality.

2.1.2   Forms of corruption

Corruption appears in different developing and also developed states, sectors, and cultures. In some states what is seen as corruption does not necessary mean that in another it is felt the same way. So the actual corruption, the actual bribe differs culture by culture, environment by environment. Various forms influence and complement each other. Bardhan (2006) divides corruption into two forms. Centralized and decentralized corruptions depend on the level of control used by higher level of politicians over the lower level of officials.

Volejníková (2007) determines criterions of intensity, extent, a severity of corruption actions, which may be used to define the forms of corruption. Also, there can be used the forms based on the occurrence, kinds of benefits or source rewards. Volejníková (2007) and others such as Rose-Ackerman (1999) divine corruption into two basic grand and petty corruptions. The grand corruption mainly exists in higher levels of governments, involves large amounts of money and influences state. In these cases it is not so easy to detect it because persons involved in it are very organized and are part of higher levels. The impact on the state is much big-

ger than in a cause of petty corruption. On the other hand, petty corruption is seen in smaller business, low level officers and brings smaller amounts of money in more routine payments. The typical example is earlier appointment due to bribe of doctor. Transparency International (2016) adds to these two the third form political corruption. It appears where politicians and government agents entrusted with enforcing laws are themselves corrupt.

Robinson (1988) identifies three forms. The first one is incidental. It is a very rare form that is confined to crime on the part of the individual. Institutional corruption refers to institutions due to the absence of controls. The third form is systematic corruption that means corruption that has the roofs deeply rooted in society.

Myint (2000) talks about corruption according to its incidence. There are three types. The first one is rare. The rare corruption is relatively easy to detect and isolate and it is possible to prevent it from becoming spread. The second one is widespread type. It is harder to control and limit it. The most difficult type to control and isolate is systematic corruption. It happens when corruption affects behaviour of people, institutions and rules. It is very hard to get rid of it and has usually huge effect on the economy.

2.1.3 Consequences of corruption

The consequences of corruption are wide and have affection on our society in many different ways; they even influence companies and people who have never experienced in person the corruption. Like it was mentioned above some of the specialists mainly in earlier times believed that corruption brought some benefits such as lowering governmental failures because corrupt officers are more likely work harder and quicker and afterwards economic active individuals can reach potential profits earlier. But nowadays is more and more proclaimed and tested the negative influence of the consequences (Aidt, 2009). Gupta et al. (2000) found out that corruption influences child mortality and primary school dropouts. When the level of corruption increases the level of children mortality increases as well and also the number of students who do not complete their education is higher.

Mauro (1998) points out that corruption has a negative relationship with the economic growth and investments. Also, the study finds out that corruption affects government expenditures too. Due to corrupt officers and politicians and their bribery choice of expenditure leads to decreased economic performance of the state. Wei (2000) confirms that higher level of corruption causes lower level of foreign investments because higher risk of corruption discourage investments so the point is that corrupting in the state leads to an outflow of money.

According to Transparency International (2016), corruption has four costs, in another words corruption affects political, economic, social and environmental fields. It is obvious that corruption is not welcomed in democratic systems where every-

thing should be in the matters of law and no corrupt private behaviour should be privileged. Corruption does not support national wealth tool. The higher-level corrupt government spends state money on the projects that are best for them not for the country. So they do not solve urge and most important projects. Furthermore, they rather choose the candidate on the basis of the benefits, which bring them then an actual best candidate. Socially, corruption weakens the trust of citizens in the government, political system, and state as a whole. Last but not least there are environmental consequences of corruption. The intentional circumvent environmental regulations and legislation leads to spare usage of precious natural resources and actually entire ecological system suffered.

Mo (2000) claims that corruption behaviour impedes new ideas and people on the market. New innovative people have no option how to get into projects because an existing people in the market already have strongly corrupted relation with the officers. At this point the innovators do not seek for new opportunities anymore. They just start to find way how to get into actual situation. They are so called rent-seekers. These rent-seekers do not make something new; they seek for a job with salary, people with talent are allocated to rent-seeking activities no more productive investments. This kind of disparity of opportunities may lead to socio-political instability.

Like was written above there is one approach that income inequality is a consequence of corruption. Some economists claim that corruption tends to preserve or even widen inequalities in the distribution of income. Gupta et al. (2002) provide a finding of the causality from corruption to inequality and provide empirical results, which show that high, and rising corruption increases income inequality. They identify several mechanisms due to corruption influences income inequality. Corruption increases income inequality by reducing economic growth, the formation of human capital, the progressivity of tax system, level of effectiveness of social spending. So for instance, a biased tax system, which favours the wealthy, reduces effective tax base, undermines redistribution from rich to poor and so increases income inequality. Or another example of the mechanism is linked to the formation of human capital like education. Corruption has an effect on the structure of the public expenditures in a way that share of education is decreasing. So lower provisions of public education effects ability of the poor to invest in their human capital comparing with the rich who can invest in their human capital.

Due to fact that corruption has a major influence on the public, there are organizations that focus their attentions on prevention or do something about actual ones. To be mention there are Transparency International, The International Anti-Corruption Academy, The European Partners against Corruption, Organisation for Economic Cooperation and Development, Global Organization of Parliaments Against Corruption and others.

2.2 Income inequality

Rousseau (1984) distinguishes between natural and unnatural types of inequalities. The natural inequality is the result of differences in physical matters such as strength, an age of the body. The unnatural inequality results by the different privileges, domination over other people made by laws and property. This type is according to Rousseau morally wrong and must be eliminated. Income inequality can be found in the second group because Sutter (2013) references income inequality to how income is distributed in a society. Many scientists like Pickett stresses that income inequality is associated with a variety of bad things such as violence, obesity, poverty and inability to recover from recession. Lynch et al. (2000) say that income inequality is associated with differences in health that goes hand in hand with different conditions of life. Also, high income inequality threatens political stability of the countries because more dissatisfied people make it harder to reach political consensus among population with higher and lower incomes and so a political instability increases the risk of investing in a country and undermines its own development potential. But other believes that income inequality is good for innovation, hard work and competition.

Just to be clear, there are main three types of economic inequalities. Inequality of income is all the money received through employment, investments such as an interest on savings accounts and dividends, savings, benefits, pensions and rent and their unequal distribution. On the other hand, pay is a payment only from the employment, so pay inequality is the difference between people's pay. And there is also wealth inequality that refers to total amount of assets like bonds, stocks, property and their unequal distribution in a group of people (The Equality Trust, 2015).

2.2.1 Causes of income inequality

Different studies propose many factors that influence income inequality in various levels. The strength and direction of these factors are often unclear. Generally speaking these influences work together and depend on the economic system and level of development the particular state has, which affects whether the factor causes higher or lower income inequality. Kuznets (1955) says that inequality is related to the economic growth of the state. In various levels of development of the country inequality reacts differently. At the initial stages of the development process inequality raises with economic growth, at later stages with further expansion of the economy inequality starts to decrease. Barro (2000) says that Kuznets's statement is a clear empirical study so it is not able to explain all variations across all countries and time. Cornia and Kiiski (2001) claim that rise and equalisation in the education bring decline of income inequality. They also say that increasing trade openness can cause a decrease in income inequality because low-priced labour is needed. Nielsen and Alderson (1995) show a link between income inequality and employment in agriculture, more people working in agriculture leads to

lower income inequality. Bjørnskov (2010) reveals that foreign aid and democracy in the recipient country is positively associated with income inequality. Guerin (2013) adds that increasing ageing population effects income inequality in a way that higher level of ageing population brings higher level of income inequality too.

So Kaasa (2003) sums up the factors that affect income inequality into five groups. The first group is macroeconomic factors like inflation, the size of government's expenditure, foreign reserves, unemployment, changes in exchange rate and so on. For instance, high unemployment leads to higher level of income inequality. Factors related to foreign economy and their effects are not so clear because depends on their compositions. The second one is historical, cultural and environmental factors include distribution of land ownership, shadow economy, an availability of natural resources. With more natural resources there is more income inequality thanks to available technology and no need for unskilled labour. The third group of causes is an economic growth and overall development level of a country. The next group includes causes demographic factors like age structure of population, demographic development, level of education, health condition and an urbanisation. And the last one but not least are a political factors include level of taxes, share of public sector and public sector, openness of the country, trade openness, social policy.

2.2.2   Consequences of income inequality

Many reputable economists say that relationship between income inequality and economic prosperity goes both directions, from inequality to prosperity and vice versa. They also add that increasing inequality has a negative long-term effect on economic growth and its sustainability. Income inequality can diminish education opportunities for the poorer thanks to tuition fees so it keeps a human capital and specialization low too. Income inequality may increase the level of bank loans. Income inequality places people in a hierarchy that increases competition and causes stress that leads to poor health (Rowlingson, 2011).

Dabla-Norris (2015) adds that income inequality hampers poverty reduction. Higher inequality makes more people vulnerable to poverty. The growth is not so efficient in lowering poverty, what is more policies that deal with income inequality may hurt growth. It can lead to rapid passionate public choices like no support of globalization, market-oriented reforms, and liberalization. Income inequality dampens investment by fuelling financial, economic and political instability. Rising influence of the rich and no change of incomes of the poor have an effect on crises so it hurts growth. Income inequality may damage trust and support social problems and all of it is associated with conflicts. By widening income inequality are feelings of dominance and submission enhanced so it has an impact on our psychology and social relations. They link income inequality with the health. While reducing income inequality there is improvement of population health, wellbeing (Pickett; Wilkinson, 2015). One study shows that the loss of life from income inequality was equivalent to the combined loss of life due to lung cancer, diabetes, and

suicide in the USA in 1990 (Lynch et al., 1998). Lynch et al. (2001) found the link between income inequality and child health outcomes including mortality, low birth weight and others and also confirm the link between income inequality and homicide and violent crime.

2.2.3 Income inequality as a factor of corruption

Begović (2006) says the economic research into relations between and economic inequality and corruption is young discipline and an exploration of the relationship between them has been poorly theoretically explained but there are still authors that conclude some facts. This thesis mainly focuses on the approach that income inequality is one of the factors of corruption but also taking account that there may be a reverse causation that increased corruption due to the inequality can produce additional inequality.

However the level of income inequality does not show any information on income level so for the instance, even relatively poor people can have enough income for the action because average income level is high enough, on the other hand even relatively rich people do not have enough money for corruption thanks to the low average income.

Glaeser, Scheinkman, and Shleifer (2003) argue that economic inequality enables the rich to subvert the political, regulatory and legal institutions for their benefits. So if the courts are corruptible then the legal system will favour the one that is able to corrupt more, to a richer one.

Uslaner (2005) says that there is a relation between inequality and corruption. The way from inequality to corruption may be indirect through trust that could be the key why in some societies are more corrupted than others. He argues that when people distrust strangers their compunctions against corrupt behaviour become less strict and on the other hand when people trust people they are more willing to treat them honestly without any immoral actions like corruption. So from the inequality to low trust to corruption and back again to low trust to greater inequality. To sum it up the inequality that reduces trust in a society leads to the lack of the trust and so generates corruption.

Jong-Sung and Khagram (2005) say that inequality increases the level of corruption through normative and material mechanisms. The normative mechanism is an increase in inequality that affects social norms about corruption and beliefs about the legitimacy of rules and institutions, so people easily tolerate corruption as acceptable normal behaviour. The material mechanism is that rich have opportunities and motivations to involve in corruption and the poor are not able to hold the rich and powerful accountable. Their results are that power of inequality is at least as important and effective as causes of economic development on corruption and sum it up those societies often fall into vicious circles of inequality and corruption.

Another research was made by Alesina and Angeletos (2005) that used dynamic model and find out that redistribute and regulatory policies that are intent to re-duce inequality may bring even more opportunities for corruption. So public spending toward the poor is often mistargeted and creates more corruption.

3   Measurement of corruption and income inequality

3.1   Measuring corruption

In order to observe corruption it is needed to measure its course but corruption, as illegal is very difficult to measure because all participants make efforts to conceal the true situation. Moreover, due to the fact of many definitions mentioned above, it is difficult to generalize and measure levels of corruption. Uslaner (2008) even adds that corruption cannot be measured since it is not transparent, he describes in the meaning of what is invisible cannot be measured. And when corruption is measure indicates always has flaws. Treisman (2000) says that researches must rely on surveys of corruption's victims, but the accuracy is often difficult to assess. Tanzi (1998) claims that if corruption could be measured it would be eliminated. There still exist official police statistics that expose the number of clarified crimes and judicial statistics which of them were punished. Unfortunately, these data are not sufficient, as a majority of crimes are not discovered. So it is appropriate use data, which are taken as attitudes and opinions by citizens, experts so they show the overall situation of the state however there is a thought that some of them are fallible.

The OECD (2013) mentions that the best-known organizations that measure and collect these data is the Transparency International (TI) and its index is called as Corruption Perception Index (CPI), the Word Bank and its Control of Corruption Indicator (CCI) and the International Country Risk Guide (ICRG) by Political Risk Services Group that is private company providing consultations. Kalnins (2005) also adds that Corruption Perception Index is the most quoted and used corruption measurement in the word, which has been collected and published annually.

Transparency International was established in 1993 and since beginning fights corruption in many ways. The organization has more than hundred offices in different states all over the word and their aim is freeing the word from corruption. The Transparency International due to fact that actual level of corruption is hard to measure they measure the perceived level of corruption. Corruption Perception Index is a compilation of data from a number of researches by independent organizations, experts, businesspeople and analysts, for instance, Freedom House Nations in Transit, World Justice Project Rule of Law Index, World Bank, African Development Bank Governance Ratings, to mention a few. In order to be part of it, every single country must be present at least at three of the total number of surveys. TI chooses only superfine organizations that take the data so the number of datasets changes every year so each year samples and methodology are changed because each organization uses different questions and viewpoints what are used in the particular time period. CPI is very general measure so for the targeting anti-

corruption policies is limited. However, there is a strength that makes this index very well used. Corporation Perception Index is a combination of multiple data sources that increases the reliability. The highest score is 100 points, which points out countries with no corruption. Transparency International presents other ways of measuring like Global Corruption Barometer (GCB) and Bribe Payers Index (BPI) too. GCB is not so broader as CPI and quite new. Global Corruption Barometer measures people's perceptions and experiences of corruption. BPI is more focused on the supply side, shows how willing business sector is disposed to offer bribery when operating abroad (Transparency International, 2016).

Control of Corruption Indicator reflects how public power is exercised for private gain. This index has existed since 1996; it shows petty and grand forms of the corruption, the higher score the better result (World Bank, 2016).

Corruption Perception Index and Control of Corruption Indicator correlate highly. The correlation between the Global Corruption Barometer data and the CPI or CCI is quite strong. Such high correlation confirms that the perceived measures of the corruption reflect the actual levels of corruption experienced (You, 2015). Also Thompson and Shah (2005) say Transparency International believe that all of its corruption indices are correlated.

The Political Risk Services Group is another provider of a corruption index that is assembled by 22 indicators updated monthly and covers 140 countries. There are three main categories on which they focus. It is economic, political and financial areas. Each of these areas has index by itself and higher score means better result so lowers corruption. Users of ICRG are mainly companies, banks and investors for future decisions (PRS Group, 2016).

The alternative measures of corruption are Word Bank Institute's Households Governance and Corruption Diagnostic Surveys (GCDS), Public Integrity Index (PII) is also based on experts' opinions, Index of Economic Freedom (IEF) measures economic freedom of states based on four areas by The Fraser Institute and The Heritage Foundation etc.

3.2   Measuring income inequality

Like in the case of corruption there is a need for an objective lens in which to measure income inequality. There are various ways of measuring it. The most common measures of income inequality are the Gini index, the Hoover index, and last bust not least the Atkinson index.

Gini index has several advantages over the others so that is the reason why it is well known and commonly used by economists in their studies related to income inequality. This metric uses zero to one scale to illustrate deviance from perfect

income equality, the one means a perfect distribution of capital. Gini index allows study any scientific area connected to income distribution. The Gini index can be expressed as a ratio value but also by the Lorenz curve.
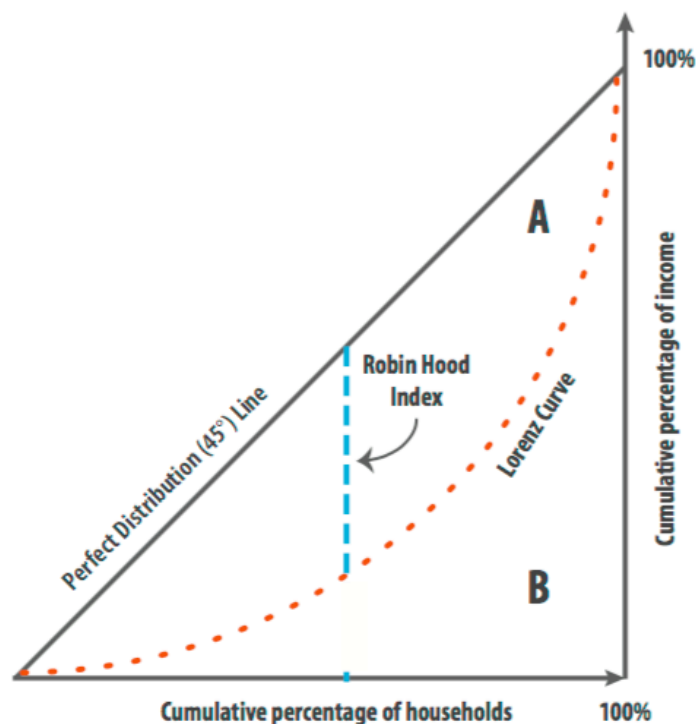

Fig. 1   Lorenz curve
Source: Development Policy and Analysis Division 2015.

Lorenz curve consists of a ratio plotted in an x-axis and y-axis graph. The x-axis is ranged from 0 to 100 percentage of income recipients from poorest individual or household; y-axis is labelled 0 to 100 percentage of total income. The Lorenz curve shows the percentage of income owned by x percent of the population. It is shown in relation to a 45-degree line. It is a line of equality, as closer the Lorenz curve is the equality line, as more the income is equally distributed. For the instance, if the Lorenz curve is parallel with the 45-degree line of equality, in this situation total equality happens. Gini index is computed as the ratio between the two curves mentioned above. In the Fig. 1, it is equal to A/(A+B). A lower Gini index represents more equal distribution. It is important to mention that states may have same Gini index but it is not necessary means they have the same amount of wealth, ignores life cycle effects and it is not easy decomposable or additive. However, it allows comparison of income distributions across countries (have to be aware of different benefits systems like various forms of benefits) and easy interpretation. Another benefits are simple to calculate, shows how the distribution has changed within country over a period of time. For all these features are the reasons for using it in this thesis (Development Policy and Analysis Division, 2015).

The Hoover index also known, as Robin Hood index is the proportion of total in-come that would need to be redistributed from upper half in income distribution to the lower one in aim of achieving maximum distribution equality. The value is from zero to one, zero means perfect equality whereas one is maximum income inequality. Hoover index can be also shown in Lorenz graph as the longest line be-tween 45-degree line of equality and the Lorenz curve that is shown in Fig. 1 (De Maio, 2007).

The Atkinson index is the welfare-based measure of inequality, which depends on the degree of the society aversion to inequality. Higher value means greater social willingness by individuals to accept smaller incomes for a more equal distribution, so bigger aversion to inequality (Bellù, 2006).

Also there are studies about the correlation between the indices. One of them says that Gini index; Atkinson and Hoover inequality indices show high and statistically significant correlation among themselves (Vasilescu, Serebrenik, Van Den Brand, 2011).

There are several others, which can be mentioned such as the Theil index, Ratio measures, Coefficient of variation, and Palma ratio. The Theil index is used for the economic inequality. The benefit of this measure is that can be transformed into other inequality measures such as the Atkinson index (Development Policy and Analysis Division, 2015).

4 Methodology

4.1 Model

This part of the thesis provides an insight into methods and procedures that help to obtain and analysed the gathered data. Econometric methods are applied in the accordance to the previous studies and econometric literature. So to reach the aim of the thesis is used the panel model inspired by the model of Billger and Goel (2009) who use variables such as a country's level of prosperity, democracy, economic freedom, government size and the degree of urbanization on the corruption so formally the estimated equation takes the form Corruption = ʃ (Economic prosperity, Democracy, Economic freedom, Government size, Urbanization). The variables have been already used together or separately in another studies however the effects of some determinants are still unclear, for example the government size like was also mentioned in previous part. From the model were removed variables democracy and economic freedom thanks to the fact that their methodologies include counting with corruption. In order to study whether the level of corruption is affected by income inequality it is needed to add to the model. Moreover, to the model was added another variable the unemployment rate, which was used in another works connected to the corruption, for the instance Samadi and Farahmandpour (2013). In order to avoid multicollinearity that was proved by the testing of the model, there was an excision of country's level of prosperity and the degree of urbanization. Formally, the estimated equation takes the following form Corruption = ʃ (Income inequality, Government size, Unemployment rate).

The panel model was used in previous studies and has some particular advantages such as greater capacity for capturing the complexity of human behaviour than single cross-section or time series data, uncovering dynamic relationships, also providing micro foundations for aggregate data analysis so that are the reasons why it was used in this thesis via Gretl (Hsiao, 2006).

There have to be chosen the right kind of the model. So fixed effects approach is suitable for an estimation of the panel regressions based on quite stable units over the time so the model has a form of $\text{cpi}_{it} = \alpha_i + \beta_1 \text{gini}_{it} + \beta_2 \text{g\_exp}_{it} + \beta_3 \text{une\_rate}_{it} + u_{it}$ where i = 1, 2...N and t = 1,2...T. In order to confirm that estimated coefficients are stable there is an econometric model with first differences too. Also econometric and statistical verification has to be done. In the model heteroscedasticity, autocorrelation and multicollinearity may occur so in that case they have to be fixed. To test the occurrence of heteroscedasticity in panel data is chosen Wald test. The null hypothesis says that the units have a common error variance if the null hypothesis is rejected there is a heteroscedasticity that is not wanted. For testing the autocorrelation is used Durbin-Watson test, if the value is close to the number 2 there is no autocorrelation. Another problem is multicollinearity that is checked by correla-

tion matrix inspection. In the statistical verification is used F-test, which tests the statistical significance of the model. Also, t-test is used to test the statistical significance of the individual variables.

4.2   Data

For the testing the relationship of the corruption and income inequality are only used data of the states of the South America that have a sufficient number of the needed data. So Guyana and Suriname, which have only one measurement of income inequality each, were removed. The time line was chosen based on the year of the first measurements of corruption to the latest that was found, so to be clear the Corruption Perception Index was firstly issued in 1995 to the latest issued data at that time was the year 2015.

The data of variables have been constructed from different sources. Because currently there is no same provider for all, see Tab. 1. Also there are shown all the variables, which are in the model. Next to each variable is written abbreviation, which was used in Gretl. The dataset includes the data of countries in the South America, which had a sufficient number of data of income inequality that was mentioned before. Countries included in the dataset and their specific values can be found in Attachments - Data of the models.

Tab. 1   Variables, Measurement, Data source

Variable	Measurement	Data source
Corruption (*cpi*)	Corruption Perception Index, range from 0 (highly corrupted) to 100 (very clean)	Transparency International
Income inequality (*gini*)	Gini index, range from 0 (perfect equality) to 100 (perfect inequality)	The World Bank
Government size (*g_exp*)	General government final consumption expenditure (% of GDP)	The World Bank
Unemployment rate (*une_rate*)	Unemployment rate (% of total labor force)	The World Bank

Corruption Perception Index is collected and published by Transparency International. The index acquires values from 0 to 100 current years. The countries, which have lower level of Corruption Perception Index are affected by untrustworthy working public institutions, people perceive and meet bribery such as big cases like Petrobras mentioned in next chapter in Brazil. The huge corruption cases have influenced the results because violates human rights, overall development and so on. On the other hand highly ranked countries have higher degrees of access to the

information about public expenditures, good independent judicial systems, freedom of the press and so on however there still could exist not so perceived forms of corruption. So the lower value the worse score of Corruption Perception Index, for the instance 0 means highly corrupted state and 100 is for a very clean county.

The World Bank provides values of income inequality as Gini index. It has the same range as Corruption Perception Index however with a different meaning, in a country that reaches the value of 0 is perfect equality and so with the value of 100 in state occurs perfect inequality.

Also, values of government size and unemployment rate could be found in the website of World Bank. Government size is expressed as a percentage of GDP and unemployment rate as a percentage of total labor force.

5 Development of corruption and income inequality in South America

5.1 Descriptive statistics

In Tab. 2 can be found a descriptive statistics of used variables in the model. As could be seen below the values of mean and median in the causes of income inequality, government size and unemployment rate are quite similar which show that in the dataset should not occur extreme values. It is also possible to calculate the range of the variables due to subtraction maximum from minimum. Standard deviation shows how tightly all various are clustered around the mean in a set of data. The low standard deviation means that most of the numbers are close to the mean. What is obvious from the table is a higher number of missing data mainly in the case of Gini index, which is missed, mainly in early years and in the case of Venezuela also from the year 2007 that could be found in Attachments – Data of the models.

Tab. 2   Descriptive statistics of variables

Variable	Mean	Median	Minimum	Maximum	Std.	Missing Obs.
Corruption (*cpi*)	11.247	3.6500	1.5000	74.000	16.897	26
Income Inequality (*gini*)	51.606	51.750	41.300	63.000	4.9916	62
Government Size (*g_exp*)	13.414	12.646	5.0128	22.734	3.0941	11
Unemployment rate (*une_rate*)	8.1110	7.5000	2.6000	18.800	3.4547	20

Corruption Perception Index acquires values from 1.5000 to 74.000 in chosen countries. The lowest value had Paraguay in 1998 and still is one of the countries, which has the worst numbers. Moreover that year Paraguay with this value was ranked as 84th of 85 countries that had been calculated, which showed situation accurately. Other countries that have low score in this group are Venezuela, Argentina and Ecuador. Venezuela for example in 2015 was ranked 158th of all 167 states that indicates very bad position all around the world. On the other hand, the highest scores of the chosen countries reached mainly Chile and Uruguay, for the instance Uruguay with 74.000 that was calculated in 2015 was in the 21st place of all 168 states in given year. All the values of Corruption Perception Index can be found in the Tab. 4 CPI of the states of South America (1995-2015) in Attachments.

Gini index has values of given countries of South America from 41.300 to 63.000. As can be seen in the Tab. 5 Gini index of the states of South America (1995-2015)

in Attachments. Like was mentioned above the lower value the state has it is closer to perfect equality. The lowest result so the result closest to perfect equality of the given countries obtained Uruguay in 2012 with 41.300. On the contrary the highest value so the closest to the perfect inequality from the countries of South America had Bolivia in 2000. Other one with high results is Colombia.

General government final consumption expenditure, which is used for government size, has the range from 5.0128 to 22.734 in the case of South America. The value 5.0128 had Venezuela in 1996. On the other hand, the highest value had Colombia in 1999. In the Tab. 6 General government final consumption expenditure (% of GDP) of South America (1995-2015) in Attachments can be seen the government expenditure of all states is mainly getting higher last five years.

The unemployment rate has the range from 2.6000 to 18.800 in this case. The Bolivia is the one that reached the lowest value with 2.600 in the year 2013. The highest value had Argentina in 1995. As could be seen in Tab. 7 Unemployment rate (% of total labor force) of South America (1995-2015) in Attachments there is mainly lowering the value in given countries recent years.

5.2   Corruption in South America

Transparency International (2012) notes that corruption in South America is part of an everyday lifetime of all people that includes police system, judiciary, and president. It absolutely diminishes trust of a political system. Many countries there suffer from amounts of corruption but democratizations and reforms give hope for progress in the fight against corruption.

In 2013 citizens of Brazilian cities showed their dissatisfaction with their government's massive public spending and lack of institutional transparency and due to this fact Clean Companies Act was passed. This legislation establishes direct civil and administrative liabilities for companies found guilty of bribery. Again in 2016 citizens have joined rallies thanks to the worst recession in century, the biggest corruption scandal in their history and several other problems. The former head Marcelo Odebracht of South America's biggest company of constructions was found guilty of bribery for executives of a state-controlled oil giant Petrobras for contracts and influence. The interesting point is that the president Dilma Rousseff was a few years ago the board chairman of Petrobras. That made citizens very furious. Also, president's co-workers have been charged with money laundering and bribes (Watts, 2016). On top of that 60 percent of the members of Brazil's Congress face serious charges like bribery, kidnapping, and electoral fraud (Romero and Sreeharsha, 2016). However still the position of a state is one of the best in the South America, see Fig. 2 and Fig. 3 below (for better orientation CPI values are divided into two figures).

Colombia has corruption in public concern. In 2013 was passed the High Level Reporting Mechanism that is preventing tool against corruption in the public procurement and public sector. Also in Argentina deals with corruption, the Supreme Court created a group of experts to help during corruption causes (Romero, 2013).

In Chile was set up a set of new rules. Politicians are required to realise their own financial information. Despite this act president's inner circle is accused of bribery from one of the largest companies and president Bachelet was under fire because political corruption that involved financial institutions and ministers was unfolded. As could be seen in Fig. 2 and Fig. 3 Chile still obtains despite these facts every year one of the highest values of Corruption Perception Index in the region (deBlack, 2015).

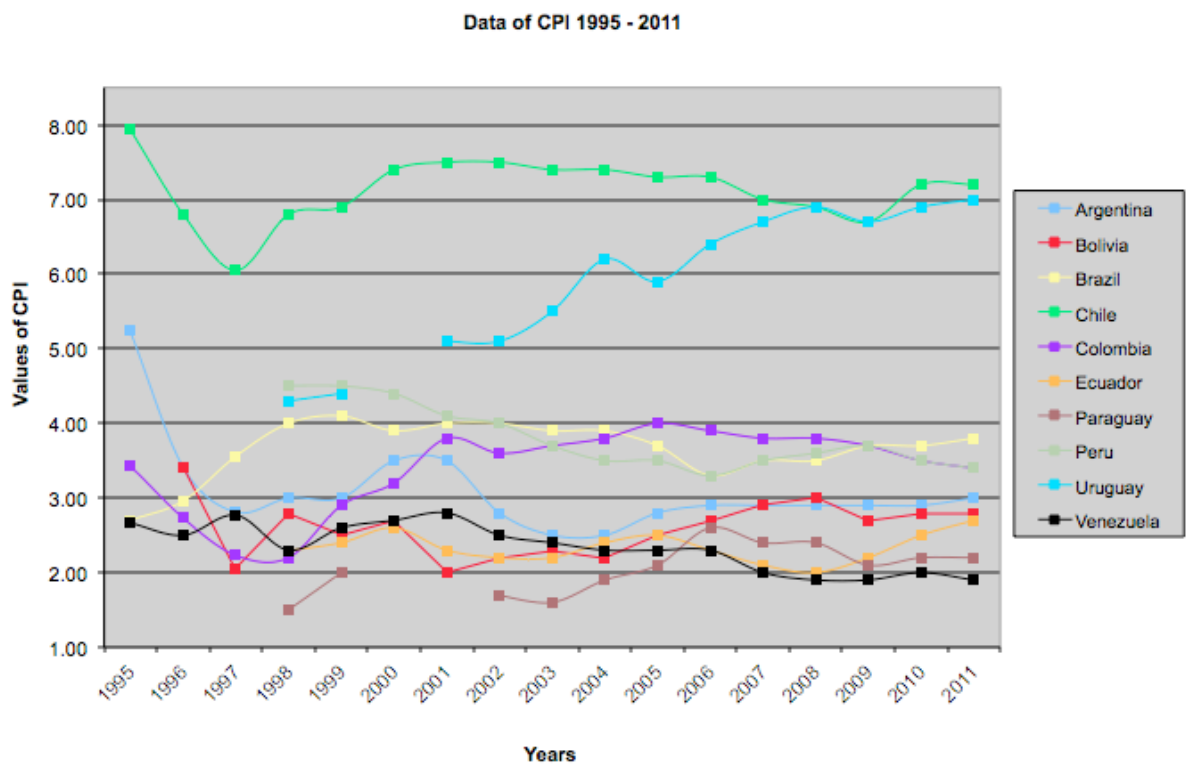**Data of CPI 1995 - 2011**

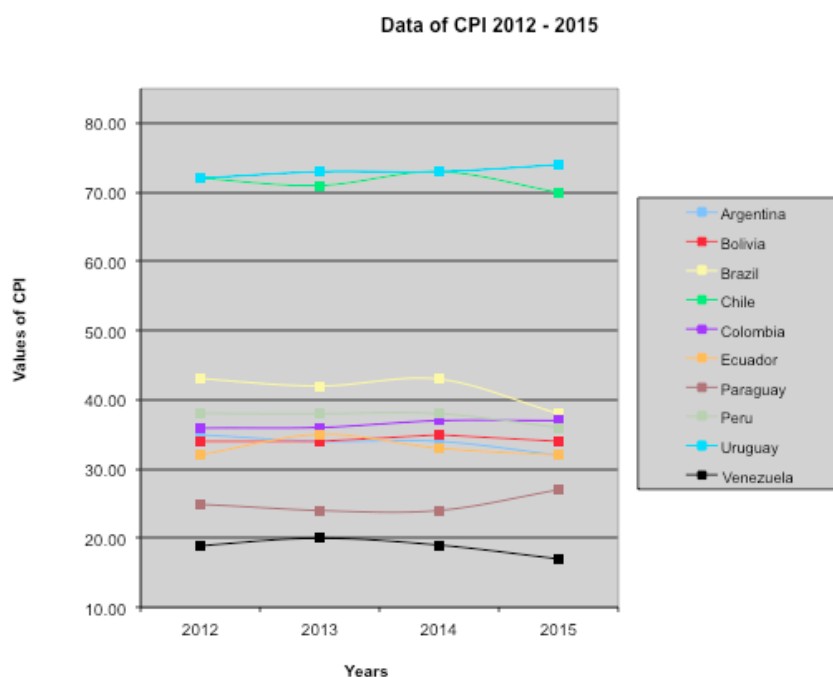Fig. 2   Data of CPI 1995-2011 in chosen countries of South America

Fig. 3   Data of CPI 2011-2015 in chosen countries of South America

Most of the sectors of its economy suffer from high level of corruption. There is the ineffective judiciary that is not able to crack down on corruption. The vice president of the National Assembly's Controller's Commission stated that one of the most corrupted entities is state-owned oil company Petroleum of Venezuela. Despite the fact that the formers were implicated in the frauds it is very complicated to put it in order because for example one of them has immunity to prosecution due to his function as Venezuela's Permanent Representative in the United States. It is often acting in Venezuela embezzling or appointing family relatives to important positions, like the former of Venezuela's antinarcotics agency Néstor Luis Reverol Torres appointed his mother in law as a director general of the institution responsible for the administration of seized criminal assets. One of the most common corruption schemes can be tracked back to former president Chávez's decision to control the amount of foreign currency flowing into the country. Due to the scarcity of US dollars in Venezuela and the huge disparity between government-controlled exchange rates and those on the black market, importers inflate the price of their invoices to obtain more dollars. However, to earn the right to trade at the government's exchange rates, importers have to bribe the officials. These days endemic corruption is one of the factors that sending Venezuela into a downward spiral (Clavel and Gagne, 2016).

Just to be mention much of illicit financial outflows from this countries are found in fine art, corporate stocks, apartments, mansions in Miami and New York. The corrupt groups of bankers, accountants, and lawyers hold companies in places like the British Virgin Islands where is no need for an origin of the wealth (Vogl, 2015).

5.3   Income inequality in South America

For decades, one of the features of the states of the South America was their high and quite persistent level of socioeconomic inequalities. There are disparities among their citizens in income, access to education, services and other variables. Although there are still missing data of international inequality statistics all the evidence say that states of South America are one of the most unequal all over the word (Byanyima, 2016). There are several papers and discussions about the persistence of inequality in these states. Some of them say that societies there have been uneven in absolute terms and relative to the rest of the word, which is difficult to change.

According to the World Bank is getting better thanks to a combination of favourable economic conditions and well-designed and equality-oriented policies have brought states more closely to better results. The World Bank's regional chief economist Augusto de la Torre claims that there is a reduction in inequality but confirms that in this region there are still states which are one of the most unequal in the word. He ads that the reasons of a better situation are GDP growth, growth in incomes and spending power, however, it is important to mention that the system is fragile and people could easily slip back into poverty because some of them just use situation and increase their spending power through better access to credit (Watts, 2012).

As could be seen in Fig. 4 below the lowest level of income inequality has mainly for most of the time Uruguay in South America which means in really that the country is closest to perfect equality of given countries. The fight against income inequality was mainly led by ex-president Jose Mujica, who is described as the world's poorest president thanks to fact that he stayed living in farmhouse and donated about 90% of his salary. Also countries with left-leaning or more socialist governments like Uruguay, which was mentioned above, Venezuela, Ecuador, Bolivia tend to have the lower levels if inequality these days due to administrations which tend to have more equitable distribution (Tucker, 2014). In Colombia large proportion of the population lives in poverty. There is a poor quality and access to education disproportionately that affect children from poor families, making it even harder for them to ever break the cycle of poverty. Despite the fact that reducing it is one of the government's priorities, there are still unsolved factors that influence income inequality such as very large informal sector and wide wage dispersion in the formal sector (Joumard and Vélez, 2013).
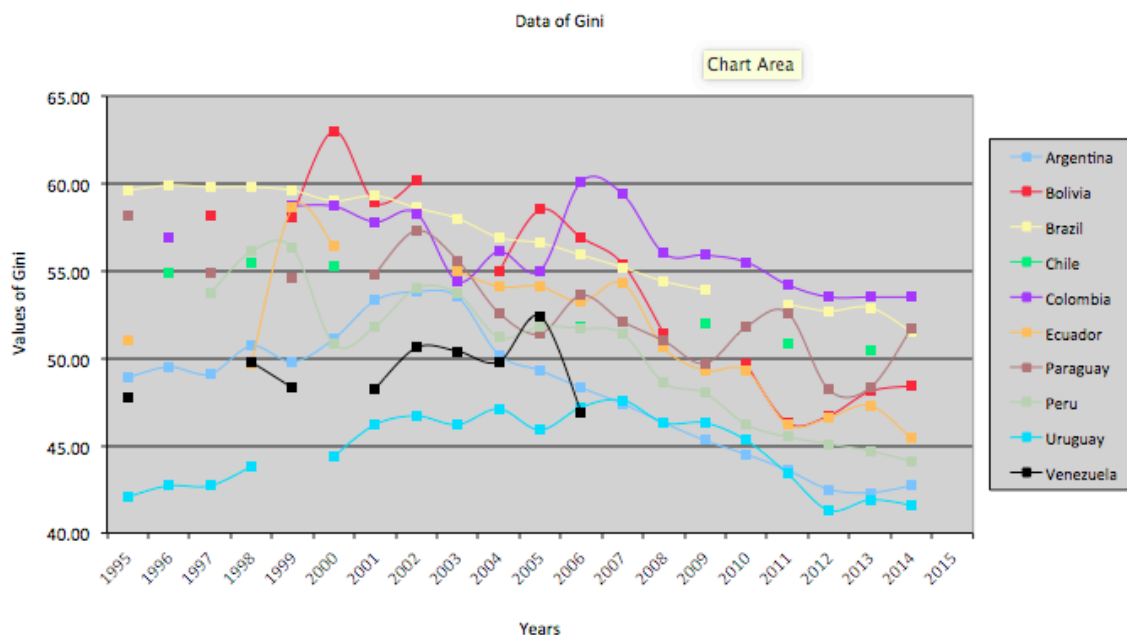
Fig. 4   Data of Gini coefficient 1995-2015 in chosen countries of South America

Tsounta and Osueke (2014) suggest some tools for declining income inequality in South America. Such as improving the access of low-income families to education could lower income inequality in the long run. Countries could coordinate actions to build a tax system that fit for the twenty-first century because their poorly de-signed systems are costing billions of dollars in unpaid tax revenues. These additional revenues could be the key to reducing of the gap.

6 Analysis

The following econometric analysis is based on the panel data that was used in works that are described in previous chapters. When panel data are used there is the need to deal with the stationarity of the variables to avoid spurious regression estimated on nonstationary data. The consequences of spurious regressions are unreliable results. To ensure, that presented results are not biased, there is regression estimated a model with the variables as they were collected (levels form) and estimated control econometric model where was applied the first differences of the variables to observe whether the estimated coefficients are stable. Testing of stationarity does not make much sense in this case because the series of all states are too short (Verbeek, 2012).

Tab. 3   Main and Control First Differences Model

Fixed-effects regression estimates with the dependent variable: *CPI*		
	(1: Main Model)	**(2: Control First Differences Model)**
const	93.16** (18.85)	2.247** (0.1101)
gini	-2.197** (0.4398)	-0.4000 (0.3830)
g_exp	2.385** (0.8987)	1.374** (0.4677)
une_rate	-0.2896 (0.9259)	0.3215 (0.3823)
n	149	122
R²	0.4034	0.0406
Standard errors in parentheses * Indicates significance at the 10 percent level ** Indicates significance at the 5 percent level		

Both panel regression models, which are presented in Tab. 3 Main and Control First Differences Model, were estimated with the fixed effects approach. The fixed effects approach is suitable for an estimation of the panel regressions based on quite stable units over the time, such as regions or countries according to Wooldridge (2006). Once was estimated the regression models, econometric and statistical verification had to be conducted. From the econometric point of view, results may be biased due to heteroscedasticity, autocorrelation or multicollinearity. Heteroscedasticity and autocorrelation are related to the reliability of the tests of statistical significance. To test the heteroscedasticity was used Wald test inte-

grated in Gretl, which rejected the null hypothesis of homoscedasticity and confirmed that heteroscedasticity is in both models. The level of autocorrelation was investigated through the value of Durbin-Watson statistic, which was far from the ideal number that is 2 and therefore it looks that obtained results could be biased by both, the heteroscedasticity and autocorrelation. As a remedy, there are estimated econometric models with robust standard errors, which deal with consequences of autocorrelation and heteroscedasticity (Verbeek, 2012). In the models was needed to deal with the potential occurrence of the multicollinearity but from the correlation matrix inspection, no perfect collinearity among the explanatory variables in the models was detected (meaning values in the matrix higher than 0.9). Tests and correlation matrices may be found in Attachments – Complete data of the models.

After the econometric verification, statistical verification needs to be done. F-test testing the statistical significance of both models confirmed that the models are different from zero at least on 10% level of statistical significance. R-Squared informs that the model fit in the first (main) model was quite good, it is able to explain 40% of the variability of the dependent variable. However, in the second model, the proportion of explained variance was substantially lower. This was caused by the estimation on the level of first differences (Verbeek, 2012). To test the statistical significance of individual variables, t-test was used. In first model, two variables were found to be statistically significant – g_exp and gini. Variable une_rate is present in the models as a control variable. Control estimation for stationarity based on the first differences confirmed the signs of both variables, despite the fact that in the case of gini variable, no statistically significant influence was detected. According to this observation, the estimated results are not biased by the stationarity and therefore one may proceed towards the interpretation of the results. Complete model tables can be found in Attachments – Complete data of the models.

Based on the estimated coefficients in results could be seen the negative relationship between the corruption and income inequality. It means that lower income inequality causes a higher level of the corruption. However the higher level of the Corruption Perception Index means better situation of corruption in given country, as was mentioned before, the 0 value of Corruption Perception Index means highly corrupted country and finally 100 value means very clean country. In another words, the higher level of income inequality the lower the level of corruption occurs, so again there is worse result of Corruption Perception Index in reality. In particular, if the level of income inequality increases by 1 unit, in ceteris paribus, the corruption decreases by 2.197 units so in reality the situation of both gets worse, results get closer to the perfect inequality and highly corrupted country. So it means that more income inequality causes more corruption, as a social class gap is wider there is more corrupt activities.

Also the result suggests a positive statistically significant relationship between corruption and government size. In another words, the coefficient of the government size is positive, suggesting that the higher level of government expenditures is, the higher level of corruption exists in given countries. So again in reality higher value of Corruption Perception Index means better situation of corruption in the country so with higher government size expressed by general government final consumption expenditure (% of GDP) is the Corruption Perception Index higher so the country is cleaner from the corruption.

7 Discussion

7.1 Comparison with literature sources

As was mentioned above the investigation of the relationship between corruption and income inequality is young discipline and so there are mainly two approaches that examine the relationship quite reversely and so explore it in very different ways.

The one approach is that income inequality is the consequence of corruption, which has studied several experts such as Gupta et al. (2002). Their studies provide several findings of the causality from corruption to inequality. The high and rising corruption increases income inequality and poverty. Their findings are valid for countries at different stages of economic development, growth experiences. They add that policies that reduce corruption also reduce income inequality and poverty.

The second approach is the reverse one that income inequality is a factor of corruption so the income inequality is able to affect the level of corruption in given countries. This thesis actually focuses on this approach and studies the extent of it so it is absolutely in opposite side like another approach, which shows also the particular results.

During the whole process were discovered several studies which are crucial like one by Jong-Sung and Khagram (2005), Samadi and Farahmandpour (2013). Jong-Sung and Khagram say that inequality increases the level of corruption through several mechanisms. Their results are that power of inequality is at least as important and effective as causes of economic development on corruption and sum it up those societies often fall into vicious circles of inequality and corruption. The result of the thesis is in accordance with the statement of Samadi and Farahmandpour that in reality higher income inequality makes worse level of the corruption. In order to slightly easier the interpretation they used inverted Corruption Perception Index to achieve the same scale of measurement like Gini index.

Another experts who studied this approach are Uslaner, Alam too. Uslaner (2005) says that the way from inequality to corruption may be indirect through trust that could be the key why in some societies are more corrupted than others. He argues that when people distrust strangers their compunctions against corrupt behaviour become less strict and on the other hand when people trust people they are more willing to threat them honestly without any immoral actions like corruption. So from inequality to low trust to corruption and back again to low trust to greater inequality. To sum it up the inequality that reduces trust in a society leads to the lack of the trust and so generates corruption. Alam (1997) assumes that higher level of income inequality brings higher level of corruption. People who have the

higher incomes have bigger possibilities to corrupt so this result is in accordance with the result in this thesis.

Like was mentioned above the research of the thesis is used the panel model inspired by the model of professors Billger and Goel (2009). In their work with the relationship between corruption and the government size can be found the result that increase in government size do not reduce corruption and they add that larger governments are unable to check corruption thanks to the fact that more officials can be corrupted, which negates the enforcement efforts. So the result is not in coordination with the one that is reached in this thesis. It could happen thank to difference of used data, which were collected in different countries. Moreover, the result is in accordance with the findings of Goel and Nelson (1998) who also shown that the government size has a positive influence on corruption. So larger governments are in this case associated with stronger checks and dealing with corrupted acting.

7.2 Restricting aspects

To the model for next research could be add another variables such as legal origins of the country or religion and another factors that were considered as factors of corruption in previous chapters because in reality these factors influence each other and with more of them there could be reach even more reliable results.

Also all the data are from the states of South America that have sufficient number of the values so in the case of Guyana and Suriname, which have one measurement of income inequality each, were removed. Still there is quite huge missing data of Gini index provided by the World Bank that may change the results in some way.

Moreover, this model used only data of South America, which should be taken account because it may be deterministic. So the results are not taken for the whole world.

Another restriction is that Corruption Perception Index that is published annually and is measured for quite short time from the year 1995. And moreover time to time there is a gap of data in some countries, which does not fulfil the rules of needed data. Also the data for year 2016 were not at the time of calculating available. So it can be possible that with more data the results could be different too.

Also there should be still take an account that corruption is measured with several tools however the real level of corruption is difficult to catch. In this thesis was used Corruption Perception Index that is very useful and is taken very seriously around the world however still as can be seen from the name it is still perception of the corruption. So this should be also mention in order to consider how accurate the results are.

Next problem could be that everyone may perceive just some kind of corruption. In another words, some state may see the corruption but for another country it is not corruption at all but still Transparent International does it the best way that it is possible. So the index still sends powerful indication how the country is seen over-all and government should take notice and act in the way in order to have better results.

Some of the experts also add and confess that there exists the relationship between the corruption and income inequality that influences and feeds off each other. So it creates a vicious circle between these two.

8 Conclusion

The thesis is motivated by the need to ascertain the relationship between corruption and income inequality. The economic research of the relationship is young discipline and so there are two approaches that explore it in quite opposite ways. This thesis mainly focuses on that income inequality is a factor of corruption and studies the extent of it.

For this purpose are chosen countries of South America that have sufficient number of all needed data so Guyana and Suriname, which have one measurement of income inequality each, had to be removed from the measuring. Those data are constructed from different sources to compile a dataset due to fact that there is still no same provider for those variables.

Firstly there are in the thesis summed up the details of corruption and income inequality such as causes, forms, consequences, and measuring and also description of income inequality as a factor of corruption. The next part was set in accordance with the literature overview and so to reach the aim of the thesis is used the panel data model inspired by the existing one. There were used variables like country's level of prosperity, democracy, economic freedom, government size and the degree of urbanization on the corruption. From the model were removed variables democracy and economic freedom due to the fact that their methodologies include counting with corruption. Also in order to avoid multicollinearity that was proved by the testing of the model, there was an excision of country's level of prosperity and the degree of urbanization. There was added variable the income inequality to the model in order to study this relationship. Additionally, to the model was added another variable the unemployment rate, which was used in another works described as a factor of corruption.

So the panel model based on the reviewed literature was set and estimated with the fixed effects approach that is favourable to stable units over the time, such as countries. In order to confirm that estimated coefficients are stable there was also estimated an econometric model with first differences. During the whole process there should be done several steps to deal with the problems such as the heteroscedasticity, autocorrelation and multicollinearity in order to be able interpret the reached results. After the econometric verification, the statistical verification was done.

In the first model two variables were found to be statistically significant – government size and Gini index. Control estimation for stationarity based on the first differences confirmed the signs of both variables.

Based on the estimated coefficients in results could be seen negative relationship between the corruption and income inequality. So it means that lower income ine-

quality increases the level of the corruption. However the higher level of the Corruption Perception Index means in reality better situation of corruption in given country so if the level of income inequality increases by 1 unit, in ceteris paribus, the corruption decreases by 2.197 units and so in the meaning of Corruption Perception Index the situation of both get worse. So in the reality it means that higher level of income inequality causes more corruption. Also the result shows a positive statistically significant relationship between corruption and government size. In another words it suggests that the higher level of government expenditures is, the higher level of corruption exists in given countries. So again in reality higher value of Corruption Perception Index means better situation of corruption in the country so with higher government size expressed by general government final consumption expenditure (% of GDP) the Corruption Perception Index is higher so the country is cleaner from the corruption. So thanks to the results could be said that experts who studied the relationship between corruption and income inequality from different points of view have mainly same results as this thesis so with worse level of income inequality comes worse situation of level of corruption.

From the description of the actual cases in countries of South America can be seen the trend that nearly all countries have several problems which have to be processed in order achieve better results of Corruption Perception Index and income inequality too. One way could be from the citizens' sides. They could hold on the pressure on leaders and governments to reach transparent, accountable, and functioning institutions and fighting against increasing corruption may be performed as one of the ways through income equality policies.

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10 List of Figures

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Attachments

A   Data of the models

Tab. 4   CPI of the states of South America (1995-2015)

	Argen-tina	Bolivia	Brazil	Chile	Colom-bia	Ecua-dor	Para-guay	Peru	Uru-guay	Vene-zuela
1995	5.24		2.70	7.94	3.44					2.66
1996	3.41	3.40	2.96	6.80	2.73					2.50
1997	2.81	2.05	3.56	6.05	2.23					2.77
1998	3.00	2.80	4.00	6.80	2.20	2.30	1.50	4.50	4.30	2.30
1999	3.00	2.50	4.10	6.90	2.90	2.40	2.00	4.50	4.40	2.60
2000	3.50	2.70	3.90	7.40	3.20	2.60		4.40		2.70
2001	3.50	2.00	4.00	7.50	3.80	2.30		4.10	5.10	2.80
2002	2.80	2.20	4.00	7.50	3.60	2.20	1.70	4.00	5.10	2.50
2003	2.50	2.30	3.90	7.40	3.70	2.20	1.60	3.70	5.50	2.40
2004	2.50	2.20	3.90	7.40	3.80	2.40	1.90	3.50	6.20	2.30
2005	2.80	2.50	3.70	7.30	4.00	2.50	2.10	3.50	5.90	2.30
2006	2.90	2.70	3.30	7.30	3.90	2.30	2.60	3.30	6.40	2.30
2007	2.90	2.90	3.50	7.00	3.80	2.10	2.40	3.50	6.70	2.00
2008	2.90	3.00	3.50	6.90	3.80	2.00	2.40	3.60	6.90	1.90
2009	2.90	2.70	3.70	6.70	3.70	2.20	2.10	3.70	6.70	1.90
2010	2.90	2.80	3.70	7.20	3.50	2.50	2.20	3.50	6.90	2.00
2011	3.00	2.80	3.80	7.20	3.40	2.70	2.20	3.40	7.00	1.90
2012	35.00	34.00	43.00	72.00	36.00	32.00	25.00	38.00	72.00	19.00
2013	34.00	34.00	42.00	71.00	36.00	35.00	24.00	38.00	73.00	20.00
2014	34.00	35.00	43.00	73.00	37.00	33.00	24.00	38.00	73.00	19.00
2015	32.00	34.00	38.00	70.00	37.00	32.00	27.00	36.00	74.00	17.00

Tab. 5   Gini index of the states of South America (1995-2015)

	Argen-tina	Boliv-ia	Brazil	Chile	Colom-bia	Ecua-dor	Para-guay	Peru	Uru-guay	Vene-zuela
1995	48.90		59.60			51.00	58.20		42.10	47.80
1996	49.50		59.90	54.90	56.90				42.70	
1997	49.10	58.20	59.80				54.90	53.70	42.70	
1998	50.70		59.80	55.50		49.70		56.10	43.80	49.80
1999	49.80	58.10	59.60		58.70	58.60	54.60	56.30		48.30
2000	51.10	63.00	59.00	55.30	58.70	56.40		50.80	44.40	
2001	53.30	58.90	59.30		57.80		54.80	51.80	46.20	48.20

2002	53.80	60.20	58.60		58.30		57.30	54.00	46.70	50.60
2003	53.50		58.00	54.70	54.40	55.00	55.60	53.70	46.20	50.40
2004	50.20	55.00	56.90		56.10	54.10	52.60	51.20	47.10	49.80
2005	49.30	58.50	56.60		55.00	54.10	51.40	51.80	45.90	52.40
2006	48.30	56.90	55.90	51.80	60.10	53.20	53.60	51.70	47.20	46.90
2007	47.40	55.40	55.20		59.40	54.30	52.10	51.40	47.60	
2008	46.30	51.40	54.40		56.00	50.60	51.00	48.60	46.30	
2009	45.30		53.90	52.00	55.90	49.30	49.70	48.00	46.30	
2010	44.50	49.70			55.50	49.30	51.80	46.20	45.30	
2011	43.60	46.30	53.10	50.80	54.20	46.20	52.60	45.50	43.40	
2012	42.50	46.70	52.70		53.50	46.60	48.20	45.10	41.30	
2013	42.30	48.10	52.90	50.50	53.50	47.30	48.30	44.70	41.90	
2014	42.70	48.40	51.50		53.50	45.40	51.70	44.10	41.60	
2015										

Tab. 6   General government final consumption expenditure (% of GDP) of South America (1995-2015)

	Argen-tina	Boliv-ia	Brazil	Chile	Colom-bia	Ecua-dor	Para-guay	Peru	Uru-guay	Vene-zuela
1995	13.35	13.57	18.64	10.38	15.24	11.21	8.87	9.88	11.84	7.12
1996	12.50	13.33	19.75	10.97	18.46	10.88	9.63	10.36	12.81	5.01
1997	12.06	13.90	19.54	11.12	20.41	11.27	10.18	10.24	11.04	13.53
1998	12.49	14.22	20.07	11.49	20.84	11.09	10.51	10.98	10.90	13.47
1999	13.72	14.80	19.78	12.40	22.73	11.77	10.29	11.55	12.19	12.32
2000	13.78	14.54	18.77	11.57	16.79	9.35	10.97	11.45	12.36	12.45
2001	14.16	15.72	19.34	11.65	16.89	9.45	10.18	11.72	12.49	14.24
2002	12.24	15.97	19.81	11.82	16.37	9.83	9.12	11.17	12.35	13.01
2003	11.44	16.52	19.08	11.37	15.93	10.71	8.81	11.52	11.99	12.87
2004	11.11	16.26	18.47	10.80	15.99	10.88	8.52	11.26	11.01	11.96
2005	12.10	15.97	18.89	10.46	16.00	10.72	9.28	11.44	10.94	11.06
2006	12.37	14.35	19.04	9.95	15.70	10.60	9.77	10.92	11.29	11.71
2007	12.93	14.06	18.94	10.31	15.64	10.93	9.22	10.46	11.48	12.47
2008	13.57	13.28	18.84	11.25	15.52	11.83	8.89	10.37	12.21	11.86
2009	15.83	14.71	19.65	12.67	16.70	13.73	10.92	11.47	12.94	13.70
2010	15.08	13.83	19.02	12.29	16.93	13.20	10.45	10.53	12.65	11.21
2011	15.60	13.78	18.69	12.11	16.10	12.73	10.60	10.36	12.76	11.52
2012	16.56	13.44	18.57	12.15	16.68	13.34	12.65	10.87	13.27	12.19
2013	16.74	13.84	18.96	12.55	17.70	14.01	12.26	11.50	13.52	12.39
2014	16.84	14.71	19.49	13.01	17.93	14.12	12.27	12.68	13.70	14.60
2015	18.30	17.50	20.20	13.40	18.24	14.38	12.87	13.18	13.88	

Tab. 7   Unemployment rate (% of total labor force) of South America (1995-2015)

	Argenti-na	Boliv-ia	Brazil	Chile	Colom-bia	Ecua-dor	Para-guay	Peru	Uru-guay	Vene-zuela
1995	18.80	5.00	6.00	7.10	12.40	4.70	3.40	5.50	10.70	10.20
1996	17.20	5.20	6.80	6.30	13.70	4.70	4.40	6.50	10.90	12.40
1997	14.90	4.30	7.70	6.10	11.60	7.50	5.30	5.30	9.40	10.60
1998	12.80	3.50	8.90	6.30	13.10	5.50	5.30	4.90	8.80	11.00
1999	14.10	4.30	9.60	9.80	14.80	6.30	6.60	6.30	9.80	14.50
2000	15.00	4.80	9.50	9.20	16.60	7.20	7.60	6.40	10.70	13.20
2001	18.30	5.40	9.30	9.10	15.10	8.40	7.60	5.10	9.70	12.80
2002	17.90	5.40	9.10	8.90	15.80	9.10	10.70	5.70	8.60	16.20
2003	16.10	5.40	9.70	8.50	14.10	9.30	7.90	6.10	7.60	16.80
2004	12.60	4.30	8.90	8.80	14.30	6.70	7.40	5.20	7.60	15.00
2005	10.60	5.40	9.30	8.00	12.00	6.60	5.80	5.20	8.50	11.40
2006	10.10	5.30	8.40	7.70	11.70	6.30	6.70	4.60	10.60	9.30
2007	8.50	5.20	8.10	7.10	11.20	5.00	5.60	4.50	9.20	7.50
2008	7.80	2.90	7.10	7.80	11.10	6.00	5.60	4.50	7.60	6.90
2009	8.60	3.40	8.30	9.70	11.80	6.50	6.50	4.40	7.30	7.80
2010	7.70	3.30	7.90	8.10	12.00	5.00	5.70	4.00	7.20	8.60
2011	7.20	2.70	6.70	7.10	11.10	4.20	4.30	3.90	6.30	8.30
2012	7.20	2.70	6.10	6.40	10.60	4.10	4.90	3.60	6.50	8.10
2013	7.10	2.60	6.50	6.00	9.60	4.20	5.00	4.00	6.60	7.50
2014	8.20	2.70	6.80	6.40	10.10	4.60	4.50	4.20	7.00	8.60
2015										

B Complete data of models

Tab. 8   Complete data of the Main Model

Main Model: Fixed-effects, using 149 observations
Included 10 cross-sectional units
Time-series length: minimum 8, maximum 20
Dependent variable: cpi
Robust (HAC) standard errors

	Coefficient	Std. Error	t-ratio	p-value	
const	93.1604	18.8513	4.9419	0.0008	***
g_exp	2.38453	0.898655	2.6534	0.0263	**
gini	−2.19672	0.439776	−4.9951	0.0007	***
une_rate	−0.289603	0.925884	−0.3128	0.7616	

Mean dependent var.	9.794094	S.D. dependent var.	15.23543
Sum squared resid.	20494.45	S.E. of regression	12.27577
LSDV R-squared	0.403425	Within R-squared	0.360114
Log-likelihood	−578.2571	Akaike criterion	1182.514
Schwarz criterion	1221.565	Hannan-Quinn	1198.380
rho	0.678079	Durbin-Watson	0.663080

Joint test on named regressors -
Test statistic: F(3, 9) = 10.1005
with p-value = P(F(3, 9) > 10.1005) = 0.0030682

Robust test for differing group intercepts -
Null hypothesis: The groups have a common intercept
Test statistic: Welch F(9, 51.3) = 1.96526
with p-value = P(F(9, 51.3) > 1.96526) = 0.0630256

Distribution free Wald test for heteroscedasticity -
Null hypothesis: the units have a common error variance
Asymptotic test statistic: Chi-square(10) = 224.275
with p-value = 1.36075e-042

Correlation coefficients, using the observations 1:01 - 10:12
(missing values were skipped)
5% critical value (two-tailed) = 0.1354 for n = 210

gini	g_exp	une_rate	
1.0000	0.3550	0.1287	gini
	1.0000	0.2081	g_exp
		1.0000	une_rate

Source: Gretl output

Tab. 9   Complete data of the First Differences Model

Control Model: Fixed-effects, using 122 observations
Included 9 cross-sectional units
Time-series length: minimum 6, maximum 19
Dependent variable: d_cpi
Robust (HAC) standard errors

	Coefficient	Std. Error	t-ratio	p-value	
const	2.24699	0.11013	20.4031	<0.0001	***
d_g_exp	1.37386	0.467674	2.9376	0.0188	**
d_gini	−0.399996	0.382978	−1.0444	0.3268	
d_une_rate	0.321536	0.382259	0.8411	0.4247	

Mean dependent var.	2.380000	S.D. dependent var.	9.419515
Sum squared resid.	10300.00	S.E. of regression	9.676586
LSDV R-squared	0.040611	Within R-squared	0.025830
Log-likelihood	−443.6990	Akaike criterion	911.3981
Schwarz criterion	945.0463	Hannan-Quinn	925.0650
rho	−0.073967	Durbin-Watson	2.123420

Joint test on named regressors -
Test statistic: $F(3, 8) = 3.20235$
with p-value = $P(F(3, 8) > 3.20235) = 0.0835438$

Robust test for differing group intercepts -
Null hypothesis: The groups have a common intercept
Test statistic: Welch $F(8, 44.9) = 0.268109$
with p-value = $P(F(8, 44.9) > 0.268109) = 0.973053$

Distribution free Wald test for heteroscedasticity -
Null hypothesis: the units have a common error variance
Asymptotic test statistic: Chi-square(9) = 2250.01
with p-value = 0

Correlation coefficients, using the observations 1:02 - 10:12
(missing values were skipped)
5% critical value (two-tailed) = 0.1358 for n = 209

d_g_exp	d_une_rate	d_gini	
1.0000	0.0101	-0.0539	d_g_exp
	1.0000	0.2192	d_une_rate
		1.0000	d_gini

Source: Gretl output