U.PORTO

FEP FACULDADE DE ECONOMIA UNIVERSIDADE DO PORTO

HOW CORRUPTION IMPACTS POVERTY IN DEVELOPING COUNTRIES? THE ROLE OF EDUCATION

Carlota Campos Castro

Dissertation

Master in Economics

Supervised by

Maria Isabel Gonçalves da Mota Campos

2019

Acknowledgments

To Professor Isabel Mota I am very grateful for all the patience, dedication and all she has taught me throughout this year. The exigency and professionalism with which she accompanied me, along with all the constructive advices that made me go further, is something that I will always take into consideration.

To my family and friends for all the love, support, understanding and confidence they have given me.

To the volunteer project of which I am part, o Grão, for teaching me that the true meaning of being present is to be present, for making me look to the small things, for teaching me to give myself totally to everything I do without expectations and for teaching me to put as much as I am in the least that I do.

I will be forever grateful.

Para ser grande, sê inteiro: nada
Teu exagera ou exclui.

Sê todo em cada coisa. Põe quanto és
No mínimo que fazes.

Assim em cada lago a lua toda
Brilha, porque alta vive

Ricardo Reis, in "Odes"
Heterónimo de Fernando Pessoa

Abstract

The main objective of this dissertation is to analyse the impact of corruption on poverty in developing countries and how does education influence this relationship. Particularly, we aim to answer the following research questions: How does corruption influence poverty in developing countries and particularly, in low-income countries? How does education affect poverty? What is the role of education in the control of corruption and how is it related to poverty? Literature on the relationship between corruption and economic growth is considerable but studies that relate poverty and corruption are quite few and the issue of education is almost inexistent.

We start with a literature review on the relationships between poverty and corruption, as well as with the relationship between corruption and education. Thereafter, an econometric model is estimated using panel data analysis and considering a sample of 81 low and middle-income countries for the period 1998-2017. Our model uses the Poverty Headcount Ratio as dependent variable and the Corruption Perception Index and education enrolment and expenditures in education as independent variables, after controlling for other variables. We also consider a subsample with the low-income countries, and subsamples according to the education level.

It is possible to conclude that corruption has a strong negative impact on poverty. However, the variable loses significance when considering the low-income countries. Our second conclusion is that education also impacts poverty negatively, having an important role in poverty reduction. Thirdly, we find that the impact of the control of corruption on poverty is higher for developing countries with more investment on education and for countries with lower school enrolment in primary.

As a result, countries should invest in education to make people more aware of the consequences of corruption, how to detect it and how to avoid it in order to promote poverty alleviation in developing countries.

JEL-codes: D73; I32; I25; O15; C23

Key-words: Poverty; Corruption; Education; Economic development

Resumo

O principal objetivo desta dissertação é analisar o impacto da corrupção na pobreza nos países em desenvolvimento e como a educação influencia essa relação. Particularmente, pretendemos responder às questões: Como é que a corrupção influencia a pobreza nos países em desenvolvimento e, particularmente, nos países de baixo rendimento? Como é que a educação afeta a pobreza? Qual é o papel da educação no controlo da corrupção e como ela está relacionada com a pobreza? A literatura considera a relação entre corrupção e crescimento económico, mas apenas alguns trabalhos que relacionam pobreza e corrupção e a questão da educação é quase inexistente.

Começamos com uma revisão de literatura com as contribuições da relação entre pobreza e corrupção, e da relação entre corrupção e educação. Posteriormente, um modelo econométrico é estimado utilizando dados em painel para uma amostra de 81 países no período 1998-2017, onde consideramos o Índice de Incidência de Pobreza como variável dependente e o Índice de Perceção da Corrupção e o registro escolar de educação e gastos em educação como variáveis independentes. Consideramos também subamostras com os países de baixo rendimento e subamostras de acordo com o nível de escolaridade.

Concluímos que a corrupção tem um impacto negativo sobre a pobreza, perdendo esta variável significância nos países de baixo rendimento. A nossa segunda conclusão é que a educação afeta negativamente a pobreza, tendo um papel importante na sua redução. Em terceiro lugar, descobrimos que o impacto do controlo da corrupção sobre a pobreza é maior para os países em desenvolvimento com mais investimentos em educação e para os países com menos matrículas em escolas primárias.

Como resultado, os países deveriam investir na educação para tornar as pessoas mais conscientes das consequências da corrupção, como detetá-la e evitá-la, para promover a redução da pobreza nos países em desenvolvimento.

Códigos-JEL: D73; I32; I25; O15; C23

Palavras-chave: Pobreza; Corrupção; Educação; Desenvolvimento económico

Contents

List of tables

List of figures

Chapter 1. Introduction

Even after the Second World War, poverty is still a problem for developing and underdeveloped countries (Yildiz, 2017). Extreme poverty, weak service delivery, high levels of corruption and the low standards of living of people are some of the characteristics in the world of poor (Madinda, 2014).

According to Nwankwo (2014), corruption has existed since pre-biblical times, both in developed and developing nations. As reported by the Transparency International[1], corruption is one of the major challenges in the world and it affects the functioning of governments and public policies, leading to a bad allocation of resources, damaging the private sector and harming the poorest. Corruption is defined by Deininger and Mpuga (2005) as "the abuse of public power for private benefit, as a key constraint to efficient allocation of economically valuable resources, effective provision of public goods and services, and people's confidence in the state and the legal system" (*Ibid*, p.5). The authors point out that corruption is highly exposed when there is high level of economic integration between countries and easy access to information – reducing the scope of discretionary action made from the public officials and improving the economic efficiency, playing a main role in the development process. The need for transparency in the allocation of public expenditures is crucial if the aim of investments in public goods is to increase the economic growth of developing countries.

Corruption affects poverty, and, in turn, poverty can impact corruption. Chetwynd, Chetwynd and Spector (2003) and Yildiz (2017) point out that corruption has consequences on governance and economic factors, and this increase poverty. Additionally, authors such as Negin, Rashib and Nikopour (2010) argue that corruption can cause poverty. As cited by Annan (2004) "corruption hurts the poor disproportionately diverting funds intended for development, undermining a governments ability to provide basic services, and feeding inequality and injustice and discouraging foreign aid and investment" (*Ibid*, p.iii). In countries affected by corruption, there is weak trust on public institutions, the quality of public services is not very good – the expenditures on health and education are not a priority – and this increases the levels of poverty (Chetwynd *et al.*, 2003). Literature also states that poverty can impact corruption. In Mauro (1998)'s article, there is evidence that poor countries have

[1] http://transparency.org.au/mission-statement/ (accessed on: 7/11/2018)

more corrupt activities because of the difficulty of allocating resources that these countries face. Also, Unver and Koyuncu (2016) argue that countries with higher levels of poverty face higher levels of corruption.

Chetwynd *et al.* (2003) state that poverty is multidimensional and it can be related with low levels of income, weak levels of education and health, vulnerability and, also powerlessness. Siddique, Shehzadi, Shaheen, & Manzoor (2016) point out that poverty and education are influenced by economic growth, governments and institutions, since governments and institutions are the main influences in the poverty reduction and the in quality of education. Eicher, García-Pẽalosa and Ypersele (2009) sustain that corruption can negatively affect education, but education also influences corruption. In fact, corruption leads to the decrease of available income and investment in education and education generates high output, corruption rents and increases the risk of corrupt politicians being detected and punished.

This dissertation aims to examine the impact of corruption on poverty in developing countries and how education mediates this relationship. Particularly, this study intends to answer the following questions: How does corruption influence poverty in developing countries and particularly, in low-income countries? How does education affect poverty? What is the role of education in the control of corruption and how is it related to poverty?

To achieve our goals, we estimate through OLS an econometric model by using panel data analysis to understand the influence of corruption and education on poverty, after controlling for other variables. Our model uses the Poverty Headcount Ratio as dependent variable and the Corruption Perception Index and education enrolment and expenditures in education as independent variables, after controlling for other variables. We consider a dataset with 81 countries for the period from 1998 to 2017. The data used is retrieved from the Transparency International and the World Bank (2019). Using the classifications of the World Bank (2019), we consider the low-income and middle-income countries and also a subsample with only the low income countries. In order to analyse the role of education in the relationship between corruption and poverty, we also divide our sample in subsamples according to the education level.

This topic deserves attention for several reasons. For academic purposes, since to the best of our knowledge, in spite of existing a significant research on the topic of corruption and economic growth, there are very few works relating corruption and poverty, and the

issue of education is almost absent. Azward (2018) studies the relationship between corruption and poverty focusing on Indonesia. Although not including education as an independent variable, the author compares the social spending on education with the Corruption Perception Index (CPI). We go further and include education, measured by enrolment rates and by government expenditures on education, as explaining poverty, and to study if the effect of corruption on poverty is affected by education. In addition, for social and political reasons, as eradicating poverty is one of the greatest challenges facing humanity.[2]

This dissertation is organized as follows. After this Introduction, chapter 2 starts with the definition of the key concepts – poverty and corruption. Chapter 3 explains the econometric model estimated, as well as the data. Chapter 4 shows and discuss the results. Chapter 5 concludes and offers new paths for future research.

[2] United Nations (2018), *Sustainable Development Goals,* https://www.sustainabledevelopment.un.org/?menu=1300 (accessed on 12/11/2018)

Chapter 2. Corruption and Poverty: a literature review

In this chapter we introduce some concepts and measures of poverty and corruption. We will start with the definition of poverty from the monetary perspective, either absolute or relative, and then proceed with Sen's capability approach. On the second part of the chapter we will discuss the concept of corruption and its measurement, either considering perception or non-perceptual measures.

2.1 Poverty: concepts and measures

For many years, there has been an effort to define poverty and to find ways of accurately measure it. In this section, we will present some distinct perspectives of poverty, as well as a list of procedures the authors use to measure it.

2.1.1 Concepts

Poverty can be defined as the lack of resources needed to meet the basic needs of an individual or family (Fields, 1994). In Mabughi and Selim (2006) paper, the authors aim to provide a definition of poverty as social deprivation. As pointed by them, **absolute poverty** can be defined by "the subsistence below a minimum, socially acceptable living condition, established based on nutritional requirements and other essential goods" (*Ibid*, p. 184).

Mabughi and Selim note that Rowntree's in 1901 was one of the major contributors to the definition of absolute poverty. Absolute poverty is accounted by the number of individuals living below a poverty line, an income or consumption threshold below which population is considered poor (Mabughi & Selim, 2006). Additionally, Yildiz (2017) considers that absolute poverty is related to human needs and their deprivation. The author claims that this deprivation is associated with the lack of food, sheltering, safe drinking water, health services, access to information, sewerage facilities and education.

In the definition of the **poverty line**, families and individuals are considered poor when they are below a consumption threshold, usually defined as a minimum level of social well-being in terms of calories per day - 2200 calories (Mabughi & Selim, 2006). Moreover, poverty lines can also be defined through income. Since 2016, the World Bank defines extreme poverty as individuals living with less than US $ 1.9 per day (PPP).[3]

[3] http://www.worldbank.org/en/news/feature/2016/06/08/ending-extreme-poverty (accessed on 28/10/2018)

To assess the extent of poverty, we may count the number of people below the poverty line or the extent of the resource gap (Fields, 1994). Fields refers to a question that leads to the debate about the existence of a single poverty line for all developing countries or whether the poverty line is defined for each country. For him, there are advantages in using a common and internationally comparable poverty line. However, there are countries with well-established national poverty lines that do not accept the common poverty line established by the World Bank (WB) claiming that they are poorer than what the WB refers to (Mabughi & Selim, 2006). Since 2015 the World Bank reports two higher-value poverty lines: $3.20 (low-middle income) and $5.50 (upper-middle income) per day.

A different approach to poverty is the relative one. Mabughi and Selim (2006) define **relative poverty** as "measured in terms of judgments by members of a particular society by what is considered a reasonable and acceptable standard of living" (*Ibid,* p. 186). The authors point out that Townsend in 1979 makes a major contribution to relative poverty, when he argues that individuals with lack of access to resources that are necessary for normal living conditions may be in poverty. Therefore, the authors consider that relative poverty is dependent on social expectations and living standards and consequently some luxuries may be assumed as necessities. The concept of relative poverty is represented in two dimensions: poverty with low incomes and poverty as a private lifestyle (Townsend, 1979) (*cfr.* Mabughi & Selim, 2006). According to the authors, Townsend considers that income cannot be the only variant in the definition of poverty, including in its conclusions in 1979, variables such as work, friends or housing conditions that are important to keep a stable standard of living.

Misturelli and Heffernan (2008) state that literature offers numerous definitions of poverty. Besides the income-based concept above mentioned, poverty may also be defined though the capability or multidimensional perspective.

According to Sen and Anand (1997), poverty is the deprivation of the basic necessities and the lack of opportunities for human lives. As so, the use of a **multidimensional** approach is required for an appropriate indicator of human poverty. According to Atkinson (2003) the deprivation is multidimensional. Based on several studies, Misturelli and Heffernan (2008) affirm that the multidimensional concept of poverty has grown from the social construction of poverty, and it can be seen in social, cultural and political standards at the community level. The Multidimensional Poverty Index (United Nations Development

Programme, 2018)[4] measures poverty and compares it internationally, focusing on real deprivation. This index presents three dimensions: health, education and living standards.

Regarding the **capability approach** defined by Sen (1985), poverty is not measured by what one has but instead by what can be done with it. Misturelli and Heffernan (2008) defend that the concept of poverty that refers only to the lack of material things is limited and partial and one should also analyse the ability to achieve basic skills.

According to Sen (1999) freedom is essential for the general well-being and the reduction of deprivation is fundamental for development. Actually, poverty can be decreased by political freedom and stability in opportunities, empowerment, capabilities and security (Negin *et al.*, 2010). Nafziger (2006) describes the theory of Sen and state that "unfreedoms include hunger, famine, ignorance, an unsustainable economic life, unemployment, barriers to economic fulfilment by women or minority communities, premature death, violation of political freedom and basic liberty, threats to the environment, and little access to health, sanitation, or clean water." (*Ibid,* p.45). Indeed, the author states that some components of development such as freedom of exchange, labour contract and social opportunities are also meaning to achieve development and freedom.

Sen's welfare theory is based on the capabilities of individuals and not on their individual achievements (Nafziger, 2006). The author also states that Sen uses a reduced number of basic functionings necessary for well-being. According to Nafziger, some of the basic functionings presented as examples by Sen are "being adequately nourished, avoiding premature mortality, appearing in public without shame, being happy, and being free" (*Ibid*, p.178).

2.1.2. Measures

There are different measures of poverty, such as, the Headcount Ratio (HRC), the Poverty Gap Ratio (PGR) and the Squared Poverty Gap, with different characteristics and the limitations.

Mabughi and Selim (2006) use the Headcount Ratio (HCR) to measure the proportion of population below the monetary poverty line. This index has some problems referred by the authors. The HCR only counts the number of poor people and not how much of the individuals incomes are below the poverty line. Also, it does not reflect the depth of poverty nor how poor individuals are harmed by the relative severity of poverty, as also stated by Chong, Gradstein and Calderon (2009).

[4] http://hdr.undp.org/en/2018-MPI (accessed on 03/12/2017)

The Poverty Gap Ratio (or income-gap approach) overcomes some these limitations as it measures the amount of income necessary to move the poor out of the poverty line (Nafziger, 2006). Still, Mabughi and Selim argued that the Poverty Gap Ratio does not give enough importance to the distribution of income among the poor, since it does not account for income inequality among the poor. Chong *et al.* (2009) agree with this limitation, adding that the index remains unchanged when the poor make monetary transfers to the less poor.

As so, the Squared Poverty Gap gives more relevance to the poverty gaps, becoming an indicator of the severity of poverty. The Squared Poverty Gap reflects the monetary transfers between the poor below the poverty line and the poorest. For Alvi and Senbeta (2011), this index brings more weight to the poorest of the poor.

Sen's article (1976) presents two distinct issues: determining how many are the poor relatively to the total population and the construction of a poverty index given the existing information about the poor. Regarding the first one, the problem refers to the poverty criteria chosen, namely the choice of the "poverty line", and the determination of individuals that are below the "poverty line" and those who are not. The procedure used by the author – the Headcount Ratio – to combat the second problem, aims to account for the number of poor and their respective percentage of the total population of poor. However, Sen (1976) also presents the limitations of the Headcount Ratio and the Poverty Gap Ratio. The first one has problems measuring the fall in poverty per person and the second one has difficulties in measuring the numbers involved. Neither of them presents enough information on the distribution of income of the poor.

2.2 Corruption

For the past few years, different authors try to define corruption and to find a way to truthfully measure it. However, corruption is hard to define and even harder to measure because corruption can be found in different ways and is that one thing that everyone tries to hide. We will start by describing some of the perspectives from different authors when they try to define a concept for corruption and then we will present the procedures used to measure it.

2.2.1. Concepts

Yusuf (2012) states that corruption can be defined as the abuse of power that an individual withdraws from his position with the goal of achieving individual gains. Jain (2001)

states that this power is used over the allocation of resources from different types of agents – the political elite, the administrators and the legislators. Tanzi (1998) considers that in some cases of corruption "the abuse of public power is not necessary for one's private benefit but it can be for the benefit of one's party, class, tribe, friends, family, and so on" (*Ibid*, p.8). The Transparency International[5] states that "corruption can be classified as grand, petty and political, depending on the amounts of money lost and the sector where it occurs". Additionally, the Transparency International Australia[6] describes corruption as "one of the greatest challenges of the contemporary world. It undermines good government, fundamentally distorts public policy, leads to the misallocation of resources, harms the private sector and private sector development and particularly hurts the poor". Undermining good government – government with low levels of inequality, diverse people and that are good for economic development, with security of property rights, high quality of bureaucracy, and effective spending, among other things – can negatively impact the country since it is important for its growth and its economic development (La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 1999).

The paper of Lalountas, Manolas and Vavouras (2011) focus on the public sector corruption. They characterize corruption as access to public goods and services, bribes, illegal hiring in the public sector, among other things. Zhao, Kim and Du (2003) (*cfr.* Unver & Koyuncu, 2016, p.4), state that "corruption acts as a major deterrent to perfect competition and creates political instability and social issues".

La Porta *et al.* (1999) states that corruption is related with bureaucratic discretion, since the delays caused by it generate opportunities to take bribes. Also, in countries with high levels of corruption, politicians earn huge wages and collect bribes due to their power. For Blackburn and Powell (2011), corruption can be defined as misappropriation of public funds and in their results they claim that the larger the corruption, the higher the rates of monetary growth. Tanzi (1998) states that corruption does not only result in bribes, since it can be found in individuals that abuse of the power gained from their public position, such as, individuals that go on vacations but claim being sick.

Different authors like Amundsen (1999), Jain (2001), Perera and Lee (2013) Shleifer

[5] https://www.transparency.org/what-is-corruption#define (accessed on 7/11/2018)
[6] http://transparency.org.au/mission-statement/ (accessed on data 24/10/2018)

and Vishny (1993), Tanzi (1998), Truex (2011), Yildiz (2017), Yusuf (2012) and the Transparency International[7] identified different types of corruption. In Table 1 we offer a categorization of corruption, aiming to synthetize different perspectives and classifications.

First, we identify **political corruption**, which is the manipulation of policies, organizations and rules in the allocation of resources, it involves political decision-makers and it occurs in the highest positions of the political system. We may also include in this category **legislative corruption**, defined as the bribes that interest groups pay to legislators in order to influence the voting results; **lobbying**, where an activity can influence the decisions of politics and bureaucrats; and **vote trading** (form of political corruption), where electors buy votes from voters.

Another category of corruption is **grand corruption**, defined as economic policies that politicians do by abusing their power, in order to achieve their personal interests and not only the interests of the population.

Also, **petty corruption** is one of the categories of corruption. It consists in the abuse of power made by public officials in their low and mid-level positions that ask people for something in the exchange of access to public services or goods such as schools, hospitals, police and other agencies. In this category we include **bureaucratic corruption**: the bureaucratic are corrupt and their actions are reflected in the relationship with the political elite or the population, making individuals pay bribes to have access to public services or bureaucratic procedures.

We then consider **economic corruption** as a category of corruption, where it is included **government corruption**, represented by government officials. Other types of corruption are involved in this category, such as, **rent-seeking**, for example a tariff, license, or quota; **nepotism**, when public officials favour people they know either friends, family or other politicians in an illegal way; **gift vs cash**, that refers to when a tax collector receives some gift/cash from the shopkeeper with the objective of not having to pay taxes; **public vs private**, where a job is offered to a friend or family even if other candidates were more qualified or where a government employee or a businessman receive a gift in order to receive a construction contract either public or private; **favouritism**, referring to situations where the people involved are friends and because of that they receive something easier; **developmental corruption**, found in East Asia, and it happens when public officials receive a slide of profits from political activities in exchange for protection of the private industry and the

[7] https://www.transparency.org/what-is-corruption (accessed on: 28/12/2018)

provision of resources to it; and **degenerative corruption**, found in Africa, the Caribbean and Latin America, that corresponds to looting of treasure or extortions to private properties made by public officials.

Finally, the last category is **financial corruption** that incorporates **bribery**, defined as a payment made to an individual or institution in exchange of illegal actions; **insider trading**, that happens when investors have access to insider information prior to public announcements and use this information to make investments in the capital markets, giving advantages to other investors; and **money laundering**, which can be defined as a commission of an act in order to undercover the corruption.

Table 1 – Types of corruption

Types of corruption	
Political	Political corruption (Amundsen, 1999; Transparency International[8]), Lobbying (Yildiz, 2017), Vote trading (Yildiz, 2017), Legislative corruption (Jain, 2001)
Grand	Grand corruption (Jain, 2001; Transparency International[9]),
Petty	Petty corruption (Transparency International[10]), Bureaucratic corruption (Jain, 2001)
Economic	Government corruption (Shleifer and Vishny, 1993), Rent-seeking (Yildiz, 2017), Nepotism (Yildiz, 2017), Gift vs cash (Truex, 2011), Public vs private (Truex, 2011), Favouritism (Truex, 2011), Developmental corruption (Perera, 2013), Degenerative corruption (Perera, 2013)
Financial	Bribery (Yildiz, 2017), Insider trading (Yildiz, 2017), Money laundering (Yusuf, 2012)

Source: own elaboration

As stated in the literature (*e.g.* Tanzi (1998); Jain (2001)) as the definition of corruption also measuring corruption is really hard. However, it is possible to find some measures, such as, Business International Corporation (BI), Bribe Payers Index, Corruption Perceptions Index (CPI) and World Bank Group's Worldwide Governance Indicators (WGI) (Mauro, 1995; Jain, 2001; Heywood & Rose, 2014).

[8] https://www.transparency.org/what-is-corruption#define (accessed on 26/10/2018)
[9] https://www.transparency.org/what-is-corruption (accessed on: 28/12/2018)
[10] https://www.transparency.org/what-is-corruption (accessed on: 28/12/2018)

2.2.2. Measures

According to Jain (2001) and Tanzi (1998), it is very difficult to measure corruption, because it is very hard to measure something that people try to hide. However, in his research, there are some measures identified such as Business International Corporation (BI) and Bribe Payers Index. Regarding BI, published by the Economist Intelligence Unit, it refers to a private firm that computes indices of the corrupt countries based on the risk and efficiency factors for the period of 1980-1983 and sell it to banks, companies and other private investors (Mauro, 1995). Mauro (1995) uses BI and defines corruption as "the degree to which business transactions involve corruption or questionable payments" (*Ibid*, p.684). On the other hand, the Bribe Payers Index is produced by the Transparency International, an organization that focuses on identifying bribes in the entire world. Also, Heywood and Rose (2014) believe it is difficult to measure corruption because there is no authorized agreed definition of what corruption is. However, they point some measures such as the Corruption Perceptions Index (CPI) from Transparency International, the World Bank Group's Worldwide Governance Indicators (WGI) and, like Jain (2001), the Bribe Payers Index. According to Tanzi (1998), measuring corruption is impossible, the only possible thing is to measure the perceptions of corruption. Heywood and Rose (2014) state that the CPI and the WGI are perceptions measures to combat corruption, since they focus in public sector bribes and misappropriation of public funds for private purposes. According to the authors, these measures of perception are correlated with measures of corruption based on experience – measures that relied on honest reports from individuals or reality –, although this relationship is not linear. So, the authors argue that perceptual measures correspond to absolute levels of corruption within countries, which means that even if corruption is the same per person, larger countries will have higher levels of corruption. There are some limitations mentioned by the authors about these measures since perceptions may not demonstrate reality. In fact, these measures are not able to differentiate the corruption types or their distinction between sectors, thus presenting a disadvantage.

Heywood and Rose (2014) suggest non-perceptual measures of corruption. These measures are based on existing infrastructures compared to monetary investments in regions, to perceive the absence of physical infrastructures in each region. Also, the non-perceptual measures may be founded on levels of conviction of public sector officials for corruption offenses. Some mathematical models were also implemented as a measure of the study of

corruption, especially in cases of electoral fraud. According to the authors, both non-perceptive measures and perceptive measures face problems with the concept of corruption, the identification of different types of corruption, and with dealing with specific cases of corruption or possible solutions to their resolution.

2.3 Poverty and corruption: main insights from the literature

Corruption influences economic development, captured by economic growth, or by other variables such as poverty and income inequality. Before analysing the relationship between poverty and corruption, it is relevant to understand the influence of corruption on economic growth.

Yildiz (2017) states that corruption has impacts on economic growth because it decreases the quantity and quality of public services, such as the expenditures on infrastructures, tax revenues and human capital accumulation. Additionally, corruption influences the development of a country, and as Jain states it "seems to affect the level of investment, entrepreneurial incentives, and the design or implementation of rules or regulations regarding access to resources and assets within a country" (*Ibid*, 2001, p.72).

According to Mauro (1995), corruption reduces investment and economic growth because of rent-seeking – there are bad allocation of resources that can be a barrier to new private investments, therefore decreasing economic growth. He states that there are many economists who argue that the obstacles to investment, entrepreneurship and innovation are due to the poor functioning of governments. The author finds a negative relationship between corruption and investment, and in turn, economic growth. However, if countries make the integrity and efficiency of their bureaucracy better, corruption may induce increases in the countries investment rate and in turn in GDP. Mauro says that rich countries have better government institutions than poor countries. However, he also claims that corrupt countries, such as Thailand, have a very positive economic growth, showing the ambiguity of this argument. Moreover, according to Leff (1964), corruption can benefit economic growth or it can worsen it depending on the context and perspective analysed. Corruption may help economic growth when the rate of investment is increased. Also Bardhan (1997), who follows the study of Leff in 1964, states that in developing countries, corruption benefits economic growth and increases efficiency. The author uses the example of Philippines, where price discrimination is practice by corrupt bureaucrats with a different time preference. Another example is when bureaucrats take advantage of corruption in the allocation of contracts or

licenses benefiting the interested parties and thus increasing the efficiency.

2.3.1. Corruption and Poverty

According to Mabughi and Selim (2006), poverty is a social deprivation, and is influenced by several variables. The authors identify the location (people that lives in areas far from markets, health centres and schools for children), education (people that has less than the basic education) and health (lack of access to health services) as main determinants of poverty. In addition, Gupta, Davoodi, and Alonso-Terme (1998) considers that income inequality impacts the poor. Chetwynd *et al.* (2003) point out that poverty is influenced by the levels of education and health. Rahayu and Widodo (2012) also include powerlessness and vulnerability. They consider that these four variables decrease poverty and invite corruption. Negin *et al.*, (2010) point out that rural areas strongly depend on natural resources that leads to risk environment, the high transactions costs and lack of access to social and physical infrastructures that are impacted by the low density of the population and their geographical constrains, being associated with higher poverty rates.

Many authors consider that poverty can be also affected by corruption. In Appendix 1, we list some empirical studies that focus on the relationship between corruption and poverty.

According to Negin *et al.* (2010) "corruption is a cause of poverty and a barrier to successful poverty eradication" (*Ibid,* p.2). Chetwynd *et al.* (2003) and Negin *et al.* (2010) state that corruption in the public sector worsens poverty – causing low income, weak health and education status and the countries became more vulnerable to shocks –, decelerating the economic growth in these countries.

According to Yildiz (2017), who agrees with Chetwynd *et al.*, the relation between corruption and poverty is an indirect one because the consequences of corruption on poverty are on economic and governance factors first and then this will increase poverty.

In Table 2, we summarize mechanisms through which corruption affects poverty. As we can see, corruption affects the economic and political stability, it affects the income distribution and the government effectiveness, it worsens the public sector and reduces the investments in education and health, and economic growth suffers impacts.

Table 2 - Mechanisms through which corruption affects poverty

	Mechanisms	References
Corruption ➔ Income distribution	Decreases the income growth rate of bottom 20% of the population	Gupta *et al.* (2002), Chetwynd *et al.* (2003), Negin *et al.* (2010), Tebaldi and Mohan (2010)
	Reinforces income inequality	Rahayu and Widodo (2012)
Corruption ➔ Institutions	Poor political stability	Tebaldi and Mohan (2010)
	Reduces government effectiveness	Tebaldi and Mohan (2010)
	Worsens democratic accountability	Perera and Lee (2013)
	Weakens institutional quality	Perera and Lee (2013)
Corruption ➔ Economic conjuncture	Decreases economic stability	Gupta *et al.* (2002)
	Lowers economic growth	Chetwynd *et al.* (2003), Negin *et al.* (2010), Rahayu and Widodo (2012), Azward (2018)
Corruption ➔ Public services	Increases prices of public goods	Rahayu and Widodo (2012)
	Worsen the quantity and quality of public services	Rahayu and Widodo (2012)
	Makes it difficult to have access to public services	Rahayu and Widodo (2012), Justesen and Bjørnskov (2014)
	Distorting public expenditure allocation	Rahayu and Widodo (2012)
	Lower social spending of governments on education and health	Mauro (1997), Tanzi (1998), Chetwynd *et al.* (2003), De la Croix and Delavallade (2009), Eicher *et al.* (2009), Azward (2018)

Source: own elaboration

Gupta, Davoodi, and Alonso-Terme (2002) analyse the effects of corruption on income inequality and poverty. They use income growth of the bottom 20% as the dependent variable, and independent variables such as: natural resource abundance, initial income of the poor, initial secondary schooling, education inequality, initial distribution of assets, social spending, and corruption. The authors find that corruption impacts poverty, since an increase on the growth rate of corruption decreases the income growth of the poor. They conclude that resources allocation, economic stability and income distribution are characteristics impacted by corruption, therefore, poverty is also affected.

Rahayu and Widodo (2012) investigate the causal relationship between corruption

and poverty. The authors state that poverty does cause corruption, but corruption directly affects the poor because it increases the prices of public services, leads to smaller quantity and quality of public services, and makes it difficult to have access to public services – health care, education, water, sanitation, and others. They conclude that corruption has indirectly impacts on poverty, by decreasing economic growth, reinforcing income inequality and distorting public expenditure allocation.

Dincer and Gunalp (2008) investigate corruption, income inequality and poverty in the US. They estimate a model where poverty, measured as a percentage of people with income below the poverty threshold, is the dependent variable and corruption was measured as the number of government officials criminals convicted for corruption. Regarding the independent variables, they use poverty, income, government policies, education, union, and unemployment. The authors find that corruption leads to an increase in poverty levels, where variables such as education, income, union, and unemployment are significant. According to them, poverty can be affected by corruption and directly and indirectly through income inequality.

There are also studies that adopt a broader approach and focus on the influence of institutional variables on poverty, including corruption. Tebaldi and Mohan (2010) analyse institutions and poverty and their relationship. They consider poverty as the dependent variable measured by the percentage of population living on less than PPP 2$ a day. Institutions and the vector of geographical variables were used as the independent variables. They find that poverty and institutions are negatively correlated. Countries with better institutions – control of corruption, regulatory quality, rule of law, government effectiveness, voice and accountability, and political stability – have smaller poverty rates, according to the authors. The geographical variable has no direct effects on poverty. The authors find that poverty increases in economies with weak regulatory systems or lack of law endowment by having low levels of income. However, poverty is affected via income distribution through corruption, government effectiveness and political stability.

Other authors such as Perera and Lee (2013), studied the connection between GDP*pc* growth and poverty and found out that they have a negative relationship, meaning that poverty reduction may be caused by economic growth. In their results, there is evidence of a stronger institutional quality and better government stability that helps to decrease poverty levels. The authors prove that corruption levels, improves the democratic accountability and the quality of bureaucrats may increase poverty levels. The authors state that corruption in

Africa, Latin America and the Caribbean is different to the one in found in East Asia, since the last one is less unfavourable to growth and poverty. They find that government stability and law decrease poverty, and an increase in corruption index and democracy accountability index will increase poverty.

Azward (2018) also analyses the impact of corruption on poverty, using the HCR to measure poverty and the CPI to measure corruption, after controlling for other variables such as economic growth, inflation and unemployment. The author states that corruption affects indirectly poverty, because these levels of corruption lead to a smaller social spending and an increase in the levels of corruption could decrease the government spending on health and education. So, he argues that by decreasing economic growth, corruption increases and as a result poverty increases.

There are also studies that investigate the effects of poverty on corruption. Poverty is affected by corruption through the reduced foreign and domestic investments, the distortion of a market and higher income disparities (Chetwynd *et al.*, 2003). The institutions - either social, economic and political – are negatively affected by poverty that invites corruption (Negin *et al.*, 2010). The authors, Negin *et al.*, state that factors such rural population have a negative correlation with corruption – by increasing corruption because of increased rural population – and political freedom and stability have a positive correlation because if they are increased corruption decreases.

Justesen and Bjørnskov (2014) use OLS regressions to test the relationship between bribery and poverty. They use an afrobarometer to measure corruption, that contains questions asking people if they pay bribes to have access to public services and to measure poverty, they ask people if is regular to have lack of access to household necessities that are basic to live. The authors find that poverty increases the regularity of individuals paying bribes to have access to services.

Unver and Koyuncu (2016) focus on the impact of poverty on corruption, after controlling for other variables such as trade openness, inflation and democracy indicators. In their research, they found some evidences that the higher rates of inflation and public debt levels are caused by the higher levels of corruption. The authors also find out that poverty strongly affects corruption: the higher the poverty levels the higher will be the corruption levels in a country.

Focusing on social welfare, Yildiz (2017) states that CPI has a negative relationship with inflation and Human Development Index and positive with unemployment, GDP *per*

capita and population. The author states that, since developing countries are unable to face the social and economic problems, there is a problem regarding the distribution on prosperity to the population.

From the literature analysed, it is possible to conclude that corruption impacts poverty through different mechanisms, either through worsening income distribution or damaging institutions and public services. In addition, poverty can impact corruption, as increases the probability of paying bribes or having weak institutions.

The main focus of this dissertation is to study the impact of corruption on poverty and if education has some influence in this relationship. The next section outlines the literature that studies the connection between corruption and education.

2.3.2. Corruption and Education

Chetwynd *et al.* (2003) claim that the number of children enrolled in schools and infant mortality are related with corruption, because if the public services are corrupt – due to the influence that corruption has on governance by reducing their capacity – and do not give importance to the expenditures on health and education, the levels of poverty increase, and the poor suffer the consequences. The authors state that in countries with high levels of corruption, the quality of the public services is worst. And because of that, the poor face the impacts through these channels. Due to the smaller governance capacity caused by corruption, the public trust on government institutions is also affect. According to the authors, this makes the poor more vulnerable and their economic productivity suffer the impacts: reduced incentives to enter in productive activities. So, Chetwynd *et al.* argue that poverty is not produced by corruption; but corruption impacts poverty because it affects the economic growth and this in turn affects poverty.

Public officials with low levels of education tend to seek for bribes (Beets, 2005). As pointed by Beets, these public officials only understand the short-term personal profits they earn from bribes and do not care about the economic implications of corruption both in their countries and worldwide. Beets (2005) states that education is related to corruption, since countries with high values of perceived corruption are associated with relatively small enrolment in school, relatively low rates of literacy, and relatively classes with more students and only one teacher in primary school. So, low levels of investment in education and government purposes may affect poverty in a country limiting the funds arranged by taxes.

According to the statistical analysis made by Mauro (1997), corruption and education

as a ratio to GDP have a negative correlation. So, this means that the investments on education is lower when the levels of corruption are higher (Mauro, 1997; Tanzi, 1998). Other variables were also measured in Mauro (1997), such as transfer payments – welfare payments and social insurance – that are also negatively and significantly associated with corruption. But education is the only variable of public spending that has a correlation with corruption when the additional explanatory variable of the level of *per capita* income is used. The author states that education is a very important since is one of the determinants of economic growth. Also, Azward (2018) states that corruption indirectly affects poverty, because corruption lead to a smaller social spending and an increase in the levels of corruption could decrease the government spending on health and education.

De la Croix and Delavallade (2009) find that countries investments on housing and physical capital are higher when these countries have more predatory technology, and that the investments on education and health are smaller.

In Eicher *et al.* (2009) study, a model is presented that examines what problems block the growth of low-income countries with poor institutions, low human capital and high inequality. These authors defend that corruption can negatively affect education, but education also influences corruption. On one hand, corruption leads to the decrease of available incomes and investment in education. On the other hand, education generates higher income, and increases the risk of corrupt politicians being detected and punished. Eicher *et al.* (2009) stated that in countries with high levels of education, governments tend to move away from corruption, since individuals have the incentive to be honest because they want to maintain their political power. In countries with low schooling, poverty is more likely to be trapped.

Eicher *et al.* (2009) point out that one of the most corrupt countries in the world is Zimbabwe. As one of the least corrupt countries in Africa, they indicate that according to the Transparency International, Botswana is the country seen. They also note that, after the independence granted by the Botswana Democratic Party (BDP), this country had an investment in education, health and public infrastructure, and then becoming one of the countries with high income *per capita* levels in Africa.

The authors also find some results concerning the development paths. The first one indicates that education expansion may be caused by institutional reforms that decrease corruption levels. The second development path happens when human capital is increased by education subsides, decreasing future corruption on governments.

Eicher *et al.* (2009) also give the example of Latin American countries that are associated with poor institutions and corruption. These countries have intermediate education levels by the mid-20th century, and corruption rents were very high where political participation was not strong enough to avoid these corrupt actions. Another example is East Asia in the 1950s, where the poverty trap was inevitable, since these countries were very populated, with weak resources and uneducated. But, increasing public education programs accompanied with high levels of *per capita* incomes were achieved in the decades after.

Another study that relates education and corruption is presented by Truex (2011), where the author considers some categories that are related to education as independent variables. The author considers some attitudes as behaviours of corruption in the public sector as the dependent variable. As a result, he finds that high level education is associated with less corrupt attitudes, meaning that there are positive effects of education on corruption by reducing the tolerance for corruption behaviours and this increases with high levels of schooling. In the type of corruption as favouritism, a stronger relationship is found between education and the smaller acceptance attitudes. Contrarily, the effect of education is smaller when bribery happens, since there are sympathetic respondents to this situation that are more educated.

Also, Kaffenberger (2012) points out that the effects of education on corruption are large, since education helps to decrease illegal behaviour, to increase social cohesion and civil responsibility. However, the author states that education can create more bribery opportunities. As it is for common knowledge, developing countries have a tendency for corrupt education systems, where the students need to pay bribes for good grades or to move to the next grade level. Additionally, Kaffenberger argues that poor are likelier to pay bribes. As mentioned by the author, if students pay bribes to have access to their education systems, they will believe that bribes are a solution and them practice bribes their own. In their results, the author finds that the higher the education level, the higher the probability of individuals participation in bribery in developing countries.

According to Harber (2002), education has a main role in poverty reduction. The author believes that the mechanism through which education can decrease poverty is democracy, but there is a need of a consciously form of education to foster democratic values and behaviours. There is evidence that authoritarian rules increase the levels of poverty through corruption, violence and wars. Harber (2002) points to the need of promoting democracy through education, although it would be a long walk. Another point of view is present by

Ogundele, Akingbade and Akinlabi (2012), stating that entrepreneurship education may lead to poverty alleviation because individuals achieve innovative skills that makes them job creators rather than job seekers.

Chapter 3. Methodology

In this chapter we explain the methodology used in this research. First, we describe the model we use and then the variables and data.

3.1 The model

In order to fully examine the influence of corruption on poverty, this study uses a dataset comprising 81 low- and middle-income countries between 1998 and 2017 for which we have available information for at least three years concerning the dependent variable.

Our data set combines time-series and cross-sectional information, so we use panel data estimation since it incorporates the economic procedures and accounts for both heterogeneity across countries and dynamic effects (Gujarati, 2004). According to Greene (2012), there are different models in panel data such as the Pooled Regression, the Fixed Effects and Random Effects. Focusing on the last two, the author states that the fixed effects model assumes that the individual effect is unobserved and correlated with the dependent (or explanatory) variables. For the random effects, the unobserved individual heterogeneity is uncorrelated with the dependent (or explanatory) variables. Gujarati (2004) point out that the fixed effects exist because the individual intercept does not change over time although the intercept may be different between individuals, being time invariant. According Gujarati (2004), when the number of cross-sectional units is higher than the number of periods (as is our case), FEM may be adopted.

The econometric model used can be described as:

$$Y_{it} = \beta_1 X_{it} + \beta_2 Z_{it} + \alpha_i + \delta_t + u_{it},$$

where i represents the country (i = 1, …, 83) and t represents time (t = 1998, …, 2017). Y_{it} is the dependent variable and refers to a measure of poverty (Poverty Headcount Ratio) of country i at time t; β_1 is a vector of coefficients associated with the explanatory variables; X_{it} is the vector of explanatory variables (Corruption, measured by CPI, and Education, measured by School enrolment primary (% gross), School enrolment secondary (% gross) and Government expenditure on education (% of GDP)), defined for each country i at time t; β_2 is a vector of coefficients associated with the control variables; Z_{it} is the vector of control variables, defined for each country i at time t; α_i and δ_t are the unobserved country and time specific effect; and u_{it} is the random term for country i at time t. According to Gujarati

(2004), we have an unbalanced panel as the number of observations among the panel members is different. To estimate the model, we use *eViews* software package, version 10.

3.2 Data

This study aims to analyse the impact of corruption on poverty focusing on developing countries, so we consider a dataset of countries with low and middle income.[11]

Considering the World Bank[12] classification, the structure of the sample is the following (Table 3):

Table 3 – Structure of the sample by income level

Threshold	GNI per capita (current US$)	Number of countries in the sample
Low-income	< 995	17
Lower-middle income and upper-middle income	996 - 3,895 3,896 - 12,055	64
High-income	> 12,055	0

Source: World Bank[13]

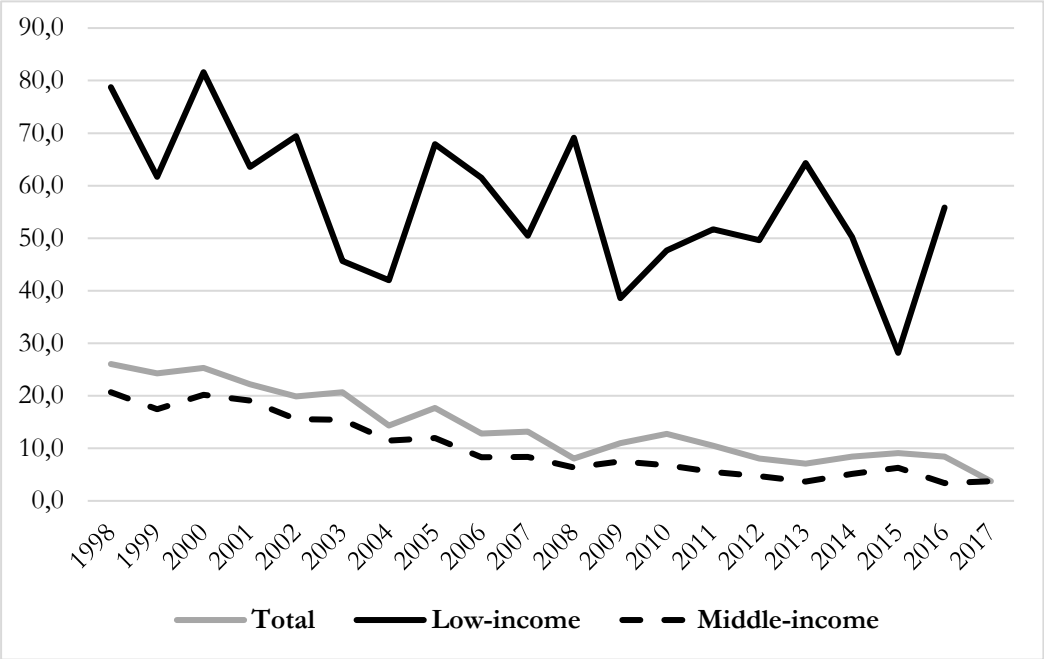
On Figure 1, we can see the evolution of the average of Poverty HCR between 1998 to 2017 from the different classifications of countries made by the World Bank – low-income, middle-income and both.

[11] We adopt the World Bank's classification that uses the GNI per capita calculated with the Atlas method (in current US dollars) for 2017. The World Bank aggregates economies in four categories: high income, upper middle income, low middle income and low income. Available at https://data-helpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups (accessed on 26/03/2019)

[12] https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups (accessed on 26/03/2019)

[13] https://blogs.worldbank.org/opendata/new-country-classifications-income-level-2018-2019 (accessed on: 26/03/2019)

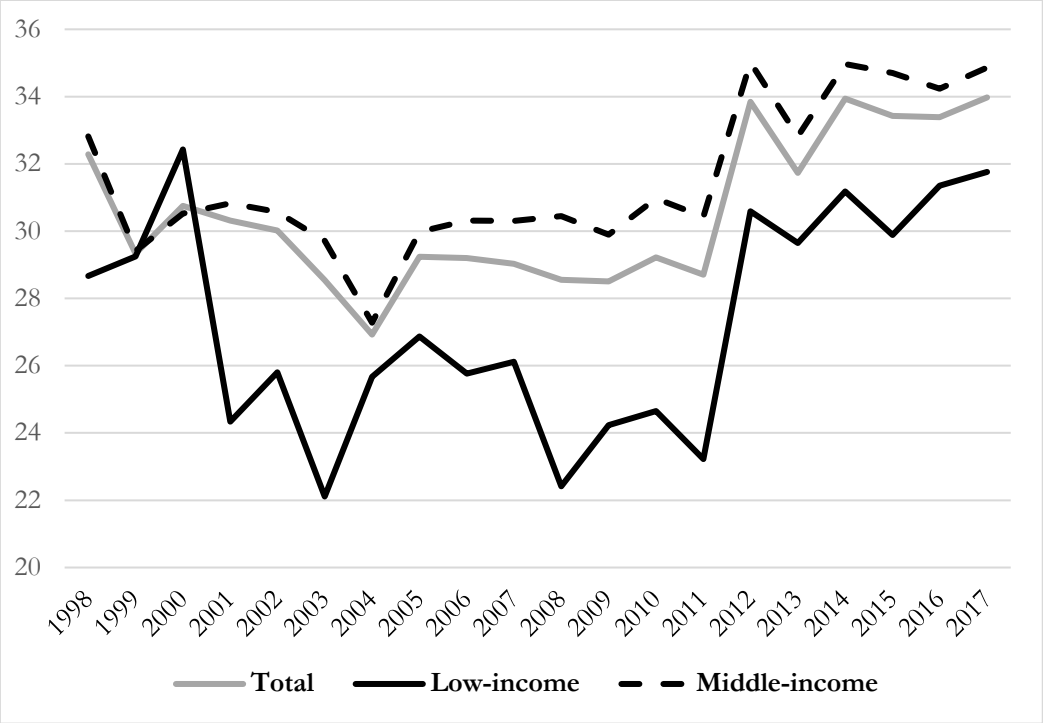
Figure 1 – Poverty HCR in low- and middle-income countries, 1998-2017



The low-income countries in Figure 1 present higher values of the Poverty HCR, which makes sense because these countries are the poorer countries in the world. When considering the total sample, the Poverty HCR decreases during the period, while it increases in the low-income sample. From the figure, we see a discrepancy between the low-income countries and the total sample, this happen because there are only 17 low-income countries and 66 middle-income countries that have more impact on the average of the full sample.

Figure 2 shows the evolution of CPI in our sample, for the same period.

Figure 2 – CPI in low- and middle-income countries, 1998-2017



As we can see in Figure 2, the control of corruption is higher- in middle-income countries when compared with low-income countries, particularly in recent years. The middle-income countries reached in 2017 a CPI of 31, on average, that compared with 89 for New Zealand[14], the highest one. For low-income countries, CPI is lower, which makes sense because these countries have smaller control of corruption levels which means that they are more corrupted than the middle-income ones.

Next, we describe the variables. First, we will present the definition and justification of the dependent variable. Then, we will do the same for the independent variables (explanatory and control variables).

Dependent variable

Our dependent variable is poverty. Considering the literature (*e.g.* Alvi and Senbeta (2011), Azward (2018), Chong *et al.* (2009), Perera and Lee (2013)), we use the Poverty Headcount Ratio at $1.90 a day (2011 PPP) as a measure of poverty. This indicator measures the proportion of population below the monetary poverty line (Mabughi and Selim, 2006). Since

[14] https://www.transparency.org/news/feature/corruption_perceptions_index_2017 (accessed on 26/06/2019)

this measure is the simplest measure and most common one in the literature analysed, we choose it instead the Poverty Gap or the Squared Poverty Gap, in order to fully compare our results with other studies. The data is taken from the World Development Indicators of the World Bank (World Bank, 2019).

Explanatory and control variables

The explanatory variables are corruption and education. There are different control variables considered for controlling the influence of other variables on poverty:

- **Corruption**, measured by the Corruption Perception Index (CPI) from the Transparency International from 1995 to 2017. As mentioned before, corruption is very hard to measure, so we choose this index since it is the most widely used in the literature examined (*e.g.* Azward (2018), Rahayu and Widodo (2012)) and it measures corruption nationally. This measure varies from 0 to 100, being 0 the highly corrupt countries and 100 the highly clean countries. As pointed by Rahayu and Widodo (2012), corruption directly affects the poor by increasing the prices of public services, leading to a smaller quantity and quality of these public services and making difficult to the poor to have access to services such as health, education, sanitation, … Also, corruption affects poverty indirectly by lowing the economic growth, increasing income inequality and by distorting the public expenditure allocation (Azward, 2018).
- **Education**, measured by School enrolment primary (% gross) and School enrolment secondary (% gross), each of them corresponding to the level of education shown. This measure is taken from the World Bank (2019), but the source is from UNESCO Institute for Statistic. According to the World Bank, primary education gives children skills such as reading, writing and mathematics skills needed, and secondary education completes the provision of basic education and offers skill-oriented instruction with teachers more specialized. Ogundele *et al.* (2012) point out that entrepreneurship education is effective on the poverty reduction. Since the expenditures on education are also a measure of education and in order to see the investment that government have on this variable, the Government expenditures on education (% of GDP) are included. This variable includes expenditure funded in current, capital and transfers, and it is available at World Bank World Indicators database (World Bank, 2019). According to the literature (*e.g.* Azward, 2018, Gupta *et al.*, 2002), we shall expect that the lower the social spending is, the higher is poverty.

The control variables are chosen taking into consideration the literature analysed in previous chapter:

- **GDP*pc***, at 2011 international Purchasing Power Parity (PPP) dollars is retrieved from the World Banks World Development Indicators database (World Bank, 2019). Considering the studies of Azward (2018) and Perera and Lee (2013), we use this measure to control for the level of economic development in a country. Perera and Lee (2013), have showed in their results that the relationship between GDP*pc* and poverty is negative, meaning that poverty reduction is related with economic growth.
- **Current health expenditure (% GDP)**, includes the goods and services of healthcare that are consumed each year, and it is available at World Bank - World Indicators database (World Bank, 2019). According to Azward (2018) and Gupta *et al.* (2002), decreasing the social spending on health increases poverty.
- **Trade openness**, refers to the sum of exports and imports of goods and services as a share of GDP and it is retrieved from the World Bank -World Indicators database (World Bank, 2019). Perera and Lee (2013) point out in their conclusions that one of policies that help to reduce poverty is international trade openness. Alvi and Senbeta (2011) show that trade and poverty have a negative correlation, which means that countries with higher openness experience poverty reduction.
- **Gross Capital Formation (GCF)** consists in investments in fixed assets as a percentage of GDP and is gathered from the World Banks World Indicators database (World Bank, 2019).
- **Urban Population**, referring to individuals that live in urban areas (as a percentage of total population), is sourced from the World Bank World Indicators database (World Bank, 2019). According to Negin *et al.*, (2010), the likelihood of being poor in developing countries is higher in rural areas than in urban areas and the severity of poverty is also higher in rural areas.
- **Gini index**, which measures the distribution of income among individuals or families in an economy, deferring from 0 (perfect equality) to 100 (perfect inequality). Gupta *et al.* (2002) argue that Gini and income growth of the poor are negatively correlated. As pointed out by Negin *et al.*, (2010), higher income inequality reduces economic growth and worsens poverty.

In the Table 4, a list of summary statistics of the variables is available.

Table 4 – Summary Statistics

Variable		Mean	Median	Max	Min	Standard Deviation	Source
HCR	Poverty Headcount Ratio (% population)	17.775	6.100	86.000	0.000	18.280	World Bank
CPI	Corruption Perception Index	31.859	31.000	67.000	4.000	9.016889	Transparency International
EDUCPRI	School enrolment, primary (% gross)	101.325	102.547	165.645	29.023	17.938	World Bank
EDUCSEC	School enrolment, secondary (% gross)	65.160	71.141	126.054	5.210	26.824	World Bank
EXPEDUC	Government expenditure on education, total (% of GDP)	4.220	4.031	9.662	0.000	1.563	World Bank
GDPPC	GDP per capita, PPP (constant 2011 international $)	6790.769	5676.682	26824.08	540.095	5293.181	World Bank
EXPHEA	Current health expenditure (% of GDP)	5.544	5.279	13.677	0.966	1.858	World Bank
GCF	Gross capital formation (% of GDP)	24.448	23.193	73.777	0.000	8.795	World Bank
TRADE	Trade (% of GDP)	74.950	68.519	220.407	16.439	32.860	World Bank
URBPOP	Urban population (% of total)	47.775	47.334	90.747	7.830	19.361	World Bank
GINI	Gini	42.526	41.000	75.447	24.000	10.358	World Bank

Chapter 4. Do corruption and education impact poverty in developing countries?

In this chapter the results and the estimation of the models are present, as well as their analysis. The sample corresponds to 81 countries that are considered by the World Bank as low-income, low middle-income and upper middle-income and for which we have information for the dependent variable – Poverty Headcount Ratio – at least for 3 years. We will first estimate the total sample and then, we consider a subsample with the low-income countries. The following results are own work and elaboration.

We start by computing the correlation coefficients between all pair of variables (Table 5). The correlation coefficient between the Poverty Headcount Ratio and CPI, is negative and statistically significant, which means that the higher the control of corruption (CPI), the lower the poverty (HCR).

From the analysis of the table, we can state that the correlation between the variables is low, with all correlation coefficients lower than 0.6. However, there are some exceptions such as the correlation between HCR and School enrolment secondary (% gross) and the correlation between Urban Population and School enrolment secondary (% gross), with a value of -0.729 and 0.686, respectively.

Table 5 – Correlation Matrix

	HCR	CPI	EDUPRI	EDUSEC	EXPEDUC	GDPPC	EXPHEA	GCF	TRADE	URBPOP	GINI
HCR	1.000										

CPI	-0.140**	1.000									
	(0.030)	-----									
EDUPRI	0.022	-0.274***	1.000								
	(0.734)	(0.000)	-----								
EDUSEC	-0.729***	0.264***	0.011	1.000							
	(0.000)	(0.000)	(0.871)	-----							
EXPEDUC	-0.150*	0.202***	0.064	0.232***	1.000						
	(0.021)	(0.002)	(0.321)	(0.000)	-----						
GDPPC	-0.566***	0.400***	-0.137``	0.583***	0.040	1.000					
	(0.000)	(0.000)	(0.034)	(0.000)	(0.543)	-----					
EXPHEA	-0.073	0.125*	-0.280***	0.250***	0.510***	-0.172***	1.000				
	(0.264)	(0.054)	(0.000)	(0.000)	(0.000)	(0.008)	-----				
GCF	-0.173***	-0.202***	0.033	0.113*	0.008	0.079	-0.094	1.000			
	(0.008)	(0.001)	(0.612)	(0.082)	(0.898)	(0.224)	(0.150)	-----			
TRADE	-0.201***	-0.042	-0.179***	0.059	0.277***	0.055	-0.009	0.246***	1.000		
	(0.002)	(0.517)	(0.006)	(0.363)	(0.000)	(0.395)	(0.894)	(0.000)	-----		
URBPOP	-0.585***	0.313***	0.052	0.686***	0.086	0.625***	0.097	-0.130**	-0.224***	1.000	
	(0.000)	(0.000)	(0.426)	(0.000)	(0.188)	(0.000)	(0.134)	(0.045)	(0.001)	-----	
GINI	0.088	0.497***	-0.033	-0.015	0.010	0.241***	0.004	-0.426***	-0.236***	0.307***	1.000
	(0.173)	(0.000)	(0.609)	(0.817)	(0.881)	(0.000)	(0.952)	(0.000)	(0.000)	(0.000)	-----

Note: p-value in parenthesis; the significance at 1% (***), 5% (**) and 10% (*)

In order to fully examine the relationship between corruption and poverty, and how education influences this relationship we estimate six models. All of them have different control and explanatory variables. Model I correspond to the simplest one, including only the effects of CPI on Poverty, controlling for GDP*pc*. Model II adds education measured by School Enrolment Primary (% gross). Models III and IV include other educational variables, School Enrolment Secondary (% gross) and Government expenditure on education (as a percentage of GDP), respectively. Models V, VI and VII are similar to models II, III and IV but include all the other control variables. The variables of education (EDUPRI, EDUSEC and EXPEDUC) are introduced one by one and then all at once in order to analyse the significance of them and if the corruption influence on poverty changes.

Since we need to choose between the random effects and the fixed effects model, we performed a Hausman test to fully compare them. The results obtained are presented in Table 6, with p-values between 0.00 and 0.01, rejecting the null hypothesis of no correlation between the effects and the correlators, meaning we choose the fixed effects model.

We have cross-section and time series data and because of that we need to carry out the Redundant Fixed Effects test to examine the significance of them. We test the Redundant Fixed Effects on cross-section and period, separately. In the first two tests (Cross-section F and Cross-section Chi-squared), we reject the null hypothesis that the cross-section effects are redundant, so the cross fixed effects are considered. In the case of period effects (Period F and Period Chi-squared), we do not reject the null hypothesis of no period effects, which means that period effects are not necessary. Therefore, we will only estimate the model with fixed cross-section effects.

Table 6 – Specification and diagnosis tests: Full sample

		Model I	Model II	Model III	Model IV	Model V	Model VI	Model VII
Hausman test		21.087*** (0.000)	24.926*** (0.000)	19.837*** (0.000)	38.532*** (0.000)	60.109*** (0.000)	85.093*** (0.000)	66.282*** (0.000)
Redundant Fixed Effects test	Cross-section F	34.630*** (0.000)	39.164*** (0.000)	23.224*** (0.000)	39.742*** (0.000)	70.505*** (0.000)	53.697*** (0.000)	47.701*** (0.000)
	Cross-section Chi-square	1082.712*** (0.000)	1006.089*** (0.000)	774.679*** (0.000)	874.462*** (0.000)	1106.695*** (0.000)	986.705*** (0.000)	813.758*** (0.000)
	Period F	0.681 (0.839)	0.443 (0.981)	0.717 (0.802)	0.517 (0.955)	0.566 (0.900)	0.738 (0.746)	0.865 (0.604)
	Period Chi-square	13.282 (0.824)	8.735 (0.978)	14.113 (0.777)	10.299 (0.945)	8.928 (0.881)	11.633 (0.707)	13.737 (0.546)

Note: p-value in parenthesis; the significance at 1% (***), 5% (**) and 10% (*)

4.1 Estimation results: full sample

The estimation results when considering the sample are presented in Table 7.

By analysing the R-Squared, we may observe that the regressions explain around 89.7% to 97.2% of the variation in the poverty measure – poverty Headcount Ratio. It is also possible to conclude that the general appreciation of Adjusted R-Squared in all models ranges from 0.881 to 0.966. All the regressions have a global significance due to the F-statistics values that rejects the null hypothesis of the coefficient values are equal to zero.

We can see from the results on Table 6 that the effect of CPI on poverty HCR is always negative when significant. In particular, the CPI coefficient from Model I, implies that a 1% decrease in the control of corruption will increase the poverty rate by 0.326%, *ceteris paribus*.

The results presented by Negin *et al.* (2010) align with ours, where corruption negatively impacts poverty. According to Tebaldi and Mohan (2010), control of corruption helps to decrease poverty, this is consistent to our results in the models where CPI is significant. This may be explained by Tanzi (1998) who argues that corruption decreases the income earnings of the poor, and, consequently, increases poverty.

In Models II, III and IV, we include the impact of education measured by School enrolment primary (% gross), School enrolment secondary (% gross) and Government expenditure on education (% of GDP), respectively. All these variables are negative and significant, which means that the lower they are the higher is poverty. In Models II and III, CPI coefficients continue to be negative and significant. However, when we estimate Model IV, the coefficient value of CPI becomes insignificant.

In models V, VI and VII we add all the control variables and the results change, with exception to Model V where adding new variables do not change the coefficient of CPI. Yet, Models VI and VII present an insignificant CPI coefficient indicating that corruption do not affect poverty in the presence of all other control variables.

Therefore, the results point out that corruption has a significant impact on poverty, where the lower the CPI (0 being highly corrupt) the higher the poverty HCR, with exceptions to the last two models. Education also have an important impact on poverty but may change the results of CPI coefficients, as we can see from the results.

Table 7 – Corruption and Education on Poverty, 1998-2017: Full sample

Dependent variable: Headcount Ratio (HCR)							
	Model I	**Model II**	**Model III**	**Model IV**	**Model V**	**Model VI**	**Model VII**
Constant	34.753***	42.290***	41.218***	36.452***	15.455*	1.831	11.321
	(0.000)	(0.000)	(0.000)	(0.000)	(0.074)	(0.835)	(0.152)
CPI	-0.326***	-0.235***	-0.191***	-0.055	-0.106**	-0.054	-0.020
	(0.000)	(0.000)	(0.001)	(0.296)	(0.018)	(0.255)	(0.676)
EDUCPRI	---	-0.110***	---	---	-0.072**	---	---
		(0.000)			(0.032)		
EDUSEC	---	---	-0.186***	---	---	-0.057**	---
			(0.000)			(0.047)	
EXPEDUC	---	---	---	-3.559***	---	---	-2.141***
				(0.000)			(0.000)
GDPPC	-0.001***	-0.001***	-0.001***	-0.001***	-0.000	-0.000*	-0.000*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.409)	(0.075)	(0.077)
EXPHEA	---	---	---	---	-0.753**	-1.419***	-1.143***
					(0.022)	(0.004)	(0.000)
GCF	---	---	---	---	-0.245***	-0.233***	-0.230***
					(0.000)	(0.000)	(0.000)
URBPOP	---	---	---	---	-0.185***	0.027	-0.007
					(0.006)	(0.823)	(0.946)
TRADE	---	---	---	---	0.006	-0.027	-0.040**
					(0.818)	(0.223)	(0.035)
GINI	---	---	---	---	0.684***	0.766***	0.657***
					(0.000)	(0.000)	(0.000)
Effects specification							
R-Squared	0.897	0.916	0.908	0.936	0.972	0.970	0.965
Adjusted R-Squared	0.881	0.901	0.890	0.922	0.966	0.963	0.955
F-statistic	58.255	63.865	52.953	64.969	149.349	130.113	97.517
Prob (F-statistic)	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Observations	603	503	473	387	401	383	317
Number of countries	77	71	72	69	69	70	62

Note: p-value in parenthesis; the significance at 1% (***), 5% (**) and 10% (*)

Our results are in accordance with literature. Azward (2018) point out that corruption affects poverty directly and indirectly through impacts on social spending (education and health). From our results it is possible to conclude that when education is significant, the lower the school enrolment in primary and secondary and the lower are the expenditures of governments on education, the higher is poverty. CPI is also affected since its coefficient decreases when we compare all models with Model I. According to Gupta (1998), countries with high corruption have a tendency to have lower levels of education and this is in accordance with our results. Also, in Models V, VI and VII, the lower the school enrolment in primary and secondary (EDUPRI and EDUSEC) and the lower the expenditures of government on education (EXPEDUC), the higher the poverty HCR since the coefficient are negative and significant. This means that the lack of education negatively impacts poverty, by increasing the percentage of people living with less than 1.90$ a day.

As showed in all models, the lower the GDP*pc* the higher the poverty HCR, this is consistent with Chetwynd *et al.* (2003) and Tebaldi and Mohan (2010) articles where the authors state that economic growth leads to poverty reduction in developing countries.

By adding other control variables to the models, the results change.

Models V, VI and VII include the control variables described on section 3.2. Concerning the social spending on health, the results reveal that an increase in the Current health expenditure (% GDP) decreases poverty, as the coefficient of this variable is negative and significant in the last three models. This result is also found in Gupta *et al.* (2002).

Regarding the Gross Capital Formation (GCF), the estimation results have a negative and significant impact on poverty. Trade does not have a significant impact on poverty on the models with exception to Model VII, where an increase in the exports and imports (TRADE) contributes to poverty reduction, as the coefficient indicator is negative and significant.

As in the article of Negin *et al.* (2010), rural population has a positive effect on poverty as there is a higher likelihood of being poor and the severity of poverty is also higher in rural areas. In our estimation we include Urban Population (URBPOP), where the coefficient has a negative and significant effect on poverty (Model V), meaning that the lower the URBPOP the higher the poverty HCR.

Finally, the Gini coefficient is highly significant at 1% level by impacting poverty in a positive way. The positive relationship between Gini and poverty HCR indicating that inequality increases poverty is consistent with Dincer and Gunalp (2008).

4.2 Low-income subsample

Following the World Bank classification of the low-income economies around the world and considering the available information regarding our dependent variable (Poverty HCR), we considered a subsample of 17 countries. From Table 8, it is possible to say that the Hausman test does not reject the null hypothesis of using random effects in almost every model, with exception of Models IV and VI where the significant coefficients have a value of 8.601 and 21.844 at 1% and 5% level, respectively. When the period fixed effects are considered, the redundant tests in these two models do not reject the null hypothesis so only the cross section fixed effects are considered in the estimation of the models.

Table 8 – Specification and diagnosis tests: Low income subsample

		Model I	Model II	Model III	Model IV	Model V	Model VI	Model VII
Hausman test		3.185 (0.203)	1.928 (0.587)	1.632 (0.652)	8.601** (0.035)	3.571 (0.8936)	21.844*** (0.005)	9.860 (0.275)
Redundant Fixed Effects test	Cross-section F	---	---	---	9.004*** (0.000)	---	9.763*** (0.000)	---
	Cross-section Chi-square	---	---	---	77.685*** (0.000)	---	92.898*** (0.000)	---
	Period F	---	---	---	0.596 (0.814)	---	0.980 (0.512)	---
	Period Chi-square	---	---	---	12.087 (0.439)	---	23.303** (0.038)	---

Note: p-value in parenthesis; the significance at 1% (***), 5% (**) and 10% (*)

The estimation results of the low-income subsample are presented in Table 9. From the results showed, we see that all models are significant, since the F-statistic reject the null hypothesis that all coefficients are equal to zero. Regarding the R-Squared, the results presented for the subsample explain about 40.9% to 96.5% of the variation in the poverty rate, which is a significant difference that may happened due to the change of the random effects to fixed effects.

Focusing on the corruption variable, we can see CPI is not significant in most models, meaning that when considering low-income countries, corruption does not explain poverty, either when considering or nor other control variables. Only in model IV' CPI explains poverty, implying that a 10% decrease in the control of corruption will increase the poverty rate by 0.437%.

The variables measuring education also lose significance when considering the low-income countries. Particularly, school enrolment in primary is never significant, while the school enrolment in secondary has a negative coefficient when significant, implying that the lower the school enrolment the higher the Poverty HCR. The government expenditures on education (EXPEDUC) have also a negative when significant. However, when including all the control variables, all the education variables are non-significant, meaning that these variables do not impact poverty.

In every model, GDP*pc* has a negative value when it is significant. This is the only variable that works in the models and that is consistent with the results for the full sample. The negative coefficient of GDP*pc* means that the lower the economic growth the higher the poverty in a country. As previously mentioned in the literature (*e. g.* Azward (2018), Chetwynd *et al.* (2003), Negin *et al.* (2010), Rahayu and Widodo (2012)), the economic conjuncture lowers economic growth levels and this leads to an increase in poverty.

Most of the control variables lose significance in the low-income subsample. The other control variables with a significant value are Gini and GCF, being these values positive and negative, respectively.

To sum up, it seems that when considering the low-income subsample, corruption dos not impact poverty. As well, most explanatory variables lose relevance, with the exception of GDP*pc*, Gini and GCF.

Table 9 – Corruption and Education on Poverty, 1998-2017: Low-income subsample

Dependent variable: Headcount Ratio (HCR)							
	Model I'	**Model II'**	**Model III'**	**Model IV'**	**Model V'**	**Model VI'**	**Model VII'**
Constant	90.319*** (0.000)	87.333*** (0.001)	84.521** (0.000)	83.406*** (0.000)	64.609** (0.043)	31.600 (0.460)	61.829** (0.047)
CPI	0.010 (0.976)	0.240 (0.512)	0.289 (0.369)	-0.437* (0.078)	0.322 (0.270)	0.370 (0.524)	0.371 (0.336)
EDUCPRI	---	-0.001 (0.995)	---	---	0.073 (0.967)	---	---
EDUSEC	---	---	-0.359* (0.080)	---	---	0.105 (0.804)	---
EXPEDUC	---	---	---	-4.466*** (0.006)	---	---	-2.439 (0.277)
GDPCP	-0.028*** (0.000)	-0.030*** (0.000)	-0.021** (0.021)	-0.005 (0.199)	-0.021** (0.014)	-0.041 (0.160)	-0.019** (0.029)
EXPHEA	---	---	---	---	0.924 (0.410)	4.556 (0.116)	1.480 (0.405)
GCF	---	---	---	---	-0.933*** (0.005)	-0.456 (0.126)	-0.742** (0.044)
URBPOP	---	---	---	---	-0.226 (0.543)	0.653 (0.533)	-0.139 (0.697)
TRADE	---	---	---	---	-0.161 (0.121)	-0.012 (0.907)	-0.132 (0.136)
GINI	---	---	---	---	0.774** (0.051)	0.715** (0.031)	0.853 (0.208)
Effects specification							
R-Squared	0.409	0.434	0.475	0.965	0.795	0.981	0.765
Adjusted R-Squared	0.384	0.392	0.425	0.914	0.735	0.929	0.655
F-statistic	16.293	10.458	9.367	18.637	13.128	18.848	6.920
Prob (F-statistic)	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Observations	50	45	35	31	36	31	26
Number of countries	17	17	15	16	16	16	15

Note: p-value in parenthesis; the significance at 1% (***), 5% (**) and 10% (*)

4.3 The role of education

In this section, we analyse the role of education in the relationship between corruption and poverty. First, we divide the full sample in subsamples according to the education level and estimate Model I – the simplest one – in all subsamples. Second, we introduce an interaction term between corruption and poverty.

We start by diving the full sample according to the school enrolment in primary: the first subsample with 45 countries (**Group I**) with the values of EDUPRI higher than 101.7 – which is the average of this variable for full samples; the second one with 36 countries (**Group II**) with values of EDUPRI lower than 101.7.

In Table 10 we have the results for Model I in the two subsamples. We can see that Model I is significant in both Groups I and II, since their F-statistic reject the null hypothesis that all coefficients are equal to zero.

Table 10 – Corruption and Education on Poverty, 1998-2017: Group I (EDUPRI > 101.7) and Group II (EDUPRI < 101.7)

	Dependent variable: Headcount Ratio (HCR)		
	Model I Full sample	**Model I Group I**	**Model I Group II**
Constant	34.753*** (0.000)	34.422*** (0.000)	35.022*** (0.000)
CPI	-0.326*** (0.000)	-0.320*** (0.000)	-0.395*** (0.001)
GDPCP	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.012)
Effects specification			
R-Squared	0.897	0.899	0.999
Adjusted R-Squared	0.881	0.887	0.863
F-statistic	58.255	76.100	33.280
Prob (F-statistic)	0.000	0.000	0.000
Observations	603	422	181
Number of countries	77	43	34

Note: p-value in parenthesis; the significance at 1% (***), 5% (**) and 10% (*)

Focusing on the corruption variable, the results suggest that there are no huge differences comparing Groups I and II with the full sample, as CPI remains with a negative and

significant coefficient in all subsamples. Apparently, it seems that the impact of the control of corruption in the reduction of poverty is higher when the school enrolment in primary is lower (Group II) (although the F-statistic for Group II is the lowest value).

The full sample was also divided into two subsamples considering the school enrolment in secondary with respect to its average of 62.5: the first subgroup with the countries with values higher than 62.5 of school enrolment in secondary (**Group III)**; and **Group IV** including the countries with values smaller than 62.5 of school enrolment in secondary.

We can see that Model I is significant in the both groups (III and IV), because the F-statistic values reject the null hypothesis that all coefficients are equal to zero.

Table 11 – Corruption and Education on Poverty, 1998-2017:
Group III (EDUSEC > 62.5) and Group IV (EDUSEC < 62.5)

	Dependent variable: Headcount Ratio (HCR)		
	Model I	**Model I**	**Model I**
	Full sample	**Group III**	**Group IV**
Constant	34.753***	26.636***	68.501***
	(0.000)	(0.000)	(0.000)
CPI	-0.326***	-0.195***	-0.645***
	(0.000)	(0.000)	(0.001)
GDPCP	-0.001***	-0.001***	-0.006***
	(0.000)	(0.000)	(0.000)
Effects specification			
R-Squared	0.897	0.266	0.921
Adjusted R-Squared	0.881	0.267	0.890
F-statistic	58.255	81.844	30.313
Prob (F-statistic)	0.000	0.000	0.000
Observations	603	455	142
Number of countries	77	38	38

Note: p-value in parenthesis; the significance at 1% (***), 5% (**) and 10% (*)

The results suggest that there are differences regarding the effect of CPI on poverty: in countries with higher levels of school enrolment in secondary, control of corruption has a lower impact on poverty reduction than in countries with lower levels of enrolment in secondary. That is, poverty is more impacted by the control of corruption in countries with lower levels of school enrolment in secondary. This result is in accordance with the ones

obtained for the enrolment rates in primary. One possible explanation for this may be found on the study of Kaffenberger (2012), where the author explains that education leads to bribery opportunities. The author finds that higher education levels are related with higher bribes in developing countries. He also states that developing countries have more corrupt education systems: students pay bribes to have good grades and to pass to the next grade level. So, more educated students may believe that corruption is the solution and will practice bribes in the future.

Additionally, we also divide the full sample in two subsamples according to the government expenditures in education: **Group V** with 38 countries and **Group VI** including 43 countries, by considering the average of the variable EXPEDU in the full sample, 4.21.

In Table 12 we estimate Model I for both subsamples. The results show that model I is significant in both Groups V and VI, since their F-statistic reject the null hypothesis that all coefficients are equal to zero. Group V is the most significant of the four groups analysed, because its F-statistic has the highest value (80.826).

Table 12 – Corruption and Education on Poverty, 1998-2017: Group V (EXPEDUC > 4.21) and Group VI (EXPEDUC < 4.21)

	Model I Full sample	**Model I Group V**	**Model I Group VI**
Constant	34.753***	39.423***	32.904***
	(0.000)	(0.000)	(0.000)
CPI	-0.326***	-0.364***	-0.321***
	(0.000)	(0.001)	(0.000)
GDPCP	-0.001***	-0.002***	-0.001***
	(0.000)	(0.000)	(0.000)
Effects specification			
R-Squared	0.897	0.923	0.879
Adjusted R-Squared	0.881	0.912	0.861
F-statistic	58.255	80.826	48.333
Prob (F-statistic)	0.000	0.000	0.000
Observations	603	263	338
Number of countries	77	33	43

Note: p-value in parenthesis; the significance at 1% (***), 5% (**) and 10% (*)

In addition, and considering the corruption variable, we may observe that there are no huge differences comparing Groups V and VI with the full sample, as CPI remains with a negative and significant coefficient in all subsamples. However, it seems that the impact of the control of corruption in the reduction of poverty is higher when the investment in education by governments is higher (Group V).

Considering the results found, we may conclude that in countries with higher investment on education, the control of corruption has a higher impact on poverty reduction. However, we also found that the impact of corruption on poverty are higher in countries with lower levels of education enrolment in primary and secondary. This might be explained by the fact that we are using two different variables to assess education level, an input variable (expenditures in education) and two output variables (education enrolment rates).

Finally, we introduce an interaction term between CPI and the variables of education such as school enrolment in primary, school enrolment in secondary and the government expenditures on education in order to examine the effectiveness of these variables on poverty reduction (Table 13), since the effect of CPI on poverty is different for different measures of education. In model V", the interaction between the school enrolment in primary and corruption has a negative and significant coefficient (CPI*EDUPRI). When the school enrolment in primary is equal to 1, the effects of CPI on poverty are equal to 0.623-0.007*1=0.626. Thus, the effect of CPI is positive, which means that poverty increases when the school enrolment in primary schools influences corruption. This might be related with the results found in Table 10 that show that the effects of corruption in the reduction of poverty are higher when the level of students enrolled in primary school is lower.

Regarding the interaction with school enrolment in secondary and corruption (CPI*EDUSEC), the coefficient has a positive and significant value. Being school enrolment secondary equal to 1, the effects of CPI – influence by secondary school – on poverty are equal to -0.540+0.006*1=-0.534. This means that the interaction of the variables has a negative effect on poverty – the students enrolled in secondary school influence the control of corruption and these leads to poverty alleviation. According to Beets (2005), countries with high levels of corruption have low levels of school enrolment in primary and secondary. He points out that corruption enhances poverty, and that more educated people understand the effects of corruption. So, education matters for corruption decreasing and this helps with

poverty reduction. So, the higher the school enrolment in secondary, the greater the effect of CPI on poverty.

Table 13 – Corruption and Education on Poverty, 1998-2017: Interaction

Dependent Variable: Poverty Headcount Ratio (HCR)			
	Model V" CPI*EDUPRI	**Model VI" CPI*EDUSEC**	**Model VII" CPI*EXPEDUC**
Constant	-9.811 (0.288)	27.167** (0.026)	20.760** (0.020)
CPI	0.623*** (0.003)	-0.540*** (0.003)	-0.224** (0.030)
EDUCPRI	0.171*** (0.008)	---	---
EDUSEC	---	-0.259*** (0.001)	---
EXPEDUC	---	---	-3.861*** (0.000)
GDPPC	-0.000 (0.630)	0.000** (0.011)	0.000 (0.192)
CPI*EDUPRI	-0.007*** (0.000)	---	---
CPI*EDUSEC	---	0.006*** (0.002)	---
CPI*EXPEDUC	---	---	0.050** (0.026)
EXPHEA	-0.834** (0.018)	-1.463*** (0.003)	-1.161*** (0.000)
GCF	-0.262*** (0.000)	-0.212*** (0.000)	-0.220*** (0.000)
URBPOP	-0.144* (0.051)	-0.078 (0.555)	-0.090 (0.410)
TRADE	0.004 (0.878)	-0.026 (0.226)	-0.037 (0.052)
GINI	0.676*** (0.000)	0.701*** (0.000)	0.674*** (0.000)
Effects specification			
R-Squared	0.973	0.972	0.965
Adjusted R-Squared	0.967	0.965	0.955
F-statistic	151.621	134.785	97.773
Prob (F-statistic)	0.000	0.000	0.000
Observations	401	383	317
Number of countries	69	70	62

Note: p-value in parenthesis; the significance at 1% (***), 5% (**) and 10% (*)

Finally, the last column refers to the relationship between the government expenditures on education and control of corruption (CPI*EXPEDUC), the coefficient is also positive and significant, which tells us that the effectiveness of CPI varies with the expenditures on education in a positive way. Being expenditures on education equal to 1, the effects of CPI on poverty are equal to -0.224+0.050*1=-0.174, meaning that the government expenditures on education influence the control of corruption positively and thus leading to poverty reduction. From the literature (*e.g.* Azward (2018), Mauro (1997), Tanzi (1998)), different authors state that higher corruption levels cause low investments in education and these levels of corruption indirectly impact poverty because they lead to smaller social spending. Comparing these results with the ones found in Table 12, we see that the impact of the control of corruption in the reduction of poverty is higher when the investment in education by governments is higher.

The role of education on the relationship regarding corruption and poverty show different results.

In one way, less enrolment in schools (primary and secondary) have less suggested impact of CPI on poverty. These results align with Kaffenberger (2012), where developing countries have higher tendency for corrupt educational systems, leading to more people enrolled in bribery actions. However, school enrolment in secondary shows controversy results when we analyse its interaction with CPI, where it is found a negative and significative impact on poverty which means that the higher control of corruption influence by this education measure leads to poverty alleviation. These results are consistent with Beets (2005), that states that countries with low levels of enrolment in primary and secondary schools have higher levels of corruption and this improves poverty.

On other way, countries with more government investments on education have higher impacts of the control of corruption on poverty reduction. This aligns with Eicher *et al.* (2009), when the author states that corruption leads to lower investments on education and that education increases the probability of corrupt politicians being caught. Also, Truex (2011), founds evidence that more educated individuals are associated with less corrupt attitudes, showing that with high levels of education people do not have tolerance for corruption unless it is bribery.

4.4 Robustness analysis

In order to analyse the robustness of our results, we test for non-linear effects of GDP*pc*. We then include the quadratic and cubic functions of GDP*pc* in models V, VI and VII. Tables 7 and 9 suggest that GDP *per capita* has a significant and negative impact on poverty. In Table 13, the coefficient of the quadratic GDP*pc* is positive and significant. This means that the relationship between income and poverty is nonlinear. Therefore, poverty is more impacted by increases of GDP*pc* when the income is lower. This result is in accordance with the literature (*e.g.* Alvi and Senbeta (2011), Dincer and Gunalp (2008)).

Table 14 – Robustness Analysis

Dependent Variable: Poverty Headcount Ratio (HCR)			
	Model V'''	**Model VI'''**	**Model VII'''**
Constant	29.722*** (0.000)	26.025** (0.022)	34.866*** (0.000)
CPI	-0.046 (0.241)	0.022 (0.704)	0.051 (0.282)
EDUCPRI	-0.042* (0.088)	---	---
EDUSEC	---	-0.0529*** (0.001)	---
EXPEDUC	---	---	-2.088*** (0.000)
GDPPC	-0.005*** (0.000)	-0.006*** (0.000)	-0.006*** (0.000)
GDPPC²	3.12^{-07}*** (0.000)	3.92^{-07}*** (0.000)	3.70^{-07}*** (0.000)
GDPPC³	6.71^{-12}*** (0.000)	-7.97^{-12}*** (0.000)	-7.61^{-12}*** (0.000)
EXPHEA	-0.660*** (0.003)	-1.164** (0.014)	-0.904*** (0.000)
GCF	-0.235*** (0.000)	-0.222*** (0.000)	-0.206*** (0.000)
URBPOP	-0.225** (0.016)	-0.009 (0.893)	-0.037 (0.720)
TRADE	0.001 (0.956)	-0.016 (0.4694)	-0.039** (0.034)
GINI	0.640*** (0.000)	0.631*** (0.000)	0.520*** (0.000)
Effects specification			
R-Squared	0.974	0.974	0.969
Adjusted R-Squared	0.968	0.967	0.960
F-statistic	155.580	143.009	107.628
Prob (F-statistic)	0.000	0.000	0.000

Observations	401	383	317
Number of countries	69	70	62

Note: p-value in parenthesis; the significance at 1% (***), 5% (**) and 10% (*)

Chapter 5. Conclusions

Poverty reduction is one of highest challenges that humanity is currently facing. In this research, we intended to understand how corruption influences poverty, and what is the role of education in this relationship.

We started by defining poverty and corruption as well as by discussing their measurement. Then, the main insights from the literature of poverty and corruption were summarized. Different authors analysed the impact of corruption on poverty through mechanisms such as income distribution, institutions, economic conjuncture and public services and concluded that corruption, in fact, has a negative impact on poverty. In addition, the literature also showed that although some authors believe that low levels of education are associated with high levels of corruption since they create opportunities to ask for bribes, there are other studies that show that in one way, corruption leads to lower investments on education, but on the other way, education increases the probability of the corrupt politicians being caught (Eicher *et al.* (2009)).

This research intended to study the impact of corruption and education on poverty, after controlling for other variables. We started by estimating an econometric model using panel data analysis considering a sample with 81 low-income and middle-income countries for the period of 1998 to 2017. Our results led us to conclude that corruption negatively affects poverty. This result aligns with the literature analysed (Azward (2018); Negin *et al.*, 2010; Tanzi, 1998; Tebaldi & Mohan, 2010), where poverty is influenced directly and indirectly by corruption through impacts on social spending. In addition, we also estimated the same model in a subsample of 17 low-income countries. We then observed that when considering low-income countries, corruption was not significant in explaining poverty. Moreover, in this subsample, the only variable that works is GDP*pc* indicating that higher poverty levels in a country is related to low economic level of that country. From the literature examined, we have seen that the economic conjuncture influence poverty (*e.g.* Azward (2018); Chetwynd *et al.* (2003); Negin *et al.* (2010); Rahayu and Widodo (2012)). We must, however, highlight that these results are partially explained by data limitations that characterize low-income countries.

We also intended to understand how education affects poverty. We included different educational measures (school enrolment in primary and in secondary and government ex-

penditures in education) and found that they had a negative effect on poverty. We also included other control variables and observed that the CPI variable loses significance, indicating that these variables absorbs the effects of corruption on poverty reduction.

In order to understand the role of education in the relationship between corruption and poverty, we then considered subsamples of countries according to their education level. We concluded that the impact of corruption in poverty reduction is higher for the group of countries with higher investment on education, and for the group of countries with lower school enrolment in primary and secondary. These results show the ambiguity of education on the relationship between corruption and poverty. In one way, less enrolment in schools have smaller impacts of CPI on poverty, aligning with Kaffenberger (2012) that states developing countries have a tendency for corrupt educational systems leading to more individuals involved in bribery activities – more educated countries have less control of corruption, according to our results. On the other way, more investments in education have higher impacts on the control of corruption and, thus, on poverty reduction. The literature analysed also agrees with these results (*e.g.* Eicher *et al.* (2009); Truex (2011)). Following that, an interaction term between CPI and education variables was also tested. We observed that for the same level of corruption, an increase in school enrolment in primary induces an increase in the poverty rate. On the contrary, for the same level of corruption, an increase in the school enrolment in secondary or in government expenditures in education induces a decrease in the poverty rate. These results are consistent with the literature, where it is stated that more educated individuals know the effects of corruption, and that corruption enhances poverty (Beets, 2005). As find in Gupta (1998) results, countries with high corruption have a tendency for lower levels of education. In addition, other authors argue that the higher corruption levels that lead to low investments in education are the ones that affect poverty indirectly by leading to lower social spending (*e.g.* Azward (2018); Mauro (1997); Tanzi (1998)).

We also developed a robustness analysis to test the non-linear effects of GDP*pc*. It was possible to conclude that the relationship between poverty and income was nonlinear.

We may conclude that corruption invites poverty through different channels. As we saw from our results, corruption is very common in developing countries, particularly in the poorest ones. As education has a main role in poverty alleviation, it is possible to conclude that the higher the investment on education the lower the levels of poverty. From the literature analysed we see that education and corruption have effects in both sides, since more educated individuals have a tendency to avoid corruption and corruption is more common

among poor individuals with low levels of education. The results allow us to conclude that corruption impacts education negatively and this leads to higher poverty levels. So, countries should invest in education in order to make individuals more aware of corruption consequences, the way to detect it and how they can avoid it to promote poverty alleviation in developing countries.

Some limitations may be due to the lack of data regarding the low-income countries and to the difficulty of measuring corruption. However, our results align with most of the literature.

The issue of education and how does education influence corruption and, in turn, poverty may be analysed in different ways, because there are other measures of each of these variables. So, it should be interesting in future research to look into this relationship using multidimensional approach to poverty rather than an income approach. Another interesting topic for future research may be to analyse the impact of education on corruption and vice-versa. Additionally, we suggest a discussion on the policy measures directed to the fight of corruption and their impact in poverty reduction.

References

Alvi, E., & Senbeta, A. (2011). Does Foreign Aid Reduce Poverty? *Journal of International Development*. Retrieved from www.wileyonlinelibrary.com

Amundsen, I. (1999). *Political Corruption: An Introduction to the Issues*. *CMI Working Paper*.

Annan, K. (2004). *United Nations convention against corruption*. Vienna: United Nations Office on Drugs and Crime.

Atkinson, A. B. (2003). Multidimensional deprivation: contrasting social welfare and counting approaches. *Journal of Economic Inequality*, 1(1), 51–65. Retrieved from http://www.springerlink.com/index/QM617882U0U321VJ.pdf

Azward, R. S. (2018). Does Corruption Affects Poverty in Indonesia? *BPPK*, *11*.

Bardhan, P. (1997). Corruption and Development: A Review of Issues. *Journal of Economic Literature*, 35(3), 1320–1346.

Beets, S. D. (2005). Understanding the Demand-Side issues of International Corruption. *Journal of Business Ethics*, 57(1), 65–81.

Blackburn, K., & Powell, J. (2011). Corruption, inflation and growth. *Economics Letters*, 113(3), 225–227. Retrieved from http://dx.doi.org/10.1016/j.econlet.2011.06.015

Chetwynd, E., Chetwynd, F., & Spector, B. (2003). *Corruption and Poverty : A Review of Recent Literature*. Washington.

Chong, A., Gradstein, M., & Calderon, C. (2009). Can foreign aid reduce income inequality and poverty? *Public Choice*, 140(1–2), 59–84.

De La Croix, D., & Delavallade, C. (2009). Growth, public investment and corruption with failing institutions. *Economics of Governance*, 10(3), 187–219.

Deininger, K., & Mpuga, P. (2005). Does Greater Accountability Improve the Quality of Public Service Delivery? Evidence from Uganda. *World Development*, 33(1), 171–191. Retrieved from http://linkinghub.elsevier.com/retrieve/pii/S0305750X04001822

Dincer, O. C., & Gunalp, B. (2008). *Corruption, Income Inequality, and Poverty in the United States*. Milan. Retrieved from http://www.feem.it/Feem/Pub/Publications/WPapers/default.htm

Eicher, T., García-Pẽalosa, C., & Ypersele, T. (2009). Education, corruption, and the distribution of income. *Journal of Economic Growth*, 14(3), 205–231.

Fields, G. S. (1994). Data for measuring poverty and inequality changes in the developing countries. *Journal of Development Economics*, 44(1), 87–102.

Greene, W. H. (2012). *Econometric Analysis*. (P. Education, Ed.) (7th .edi.). Upper Saddle

River: Prentice Hall.

Gujarati, D. N. (2004). *Basic Econometrics* (4th Editio). The Mc Graw-Hill Companies.

Gupta, S., Davoodi, H., & Alonso-Terme, R. (1998). *Does Corruption Affect Income Inequality and Poverty?* Retrieved from https://ssrn.com/abstract=882360

Gupta, S., Davoodi, H., & Alonso-Terme, R. (2002). Does corruption affect income inequality and poverty? *Economics of Governance*, 3, 23–45.

Harber, C. (2002). Education, Democracy and Poverty Reduction in Africa. In *Comparative Education* (Vol. 38, pp. 267–276).

Heywood, P. M., & Rose, J. (2014). Close but no Cigar: The measurement of corruption. *Journal of Public Policy*, 34(3), 507–529.

Jain, A. K. (2001). Corruption: A Review. *Journal of Economic Surveys*, 15(1), 71–121. Retrieved from http://doi.wiley.com/10.1111/1467-6419.00133

Justesen, M. K., & Bjørnskov, C. (2014). Exploiting the Poor: Bureaucratic Corruption and Poverty in Africa. *World Development*, 58, 106–115. Retrieved from http://linkinghub.elsevier.com/retrieve/pii/S0305750X14000035

Kaffenberger, M. (2012). *The Effect of Educational Attainment on Corruption Participation in Sub-Saharan Africa*. Faculty of the Graduate School of Vanderbilt University.

Kumar Sen, A. (1976). *Poverty: An Ordinal Approach to Measurement*. *Econometrica* (Vol. 44).

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. (1999). The Quality of Government. *Journal of Law, Economics and Organization*, 15(1), 197–200.

Lalountas, D. A., Manolas, G. A., & Vavouras, I. S. (2011). Corruption, globalization and development: How are these three phenomena related? *Journal of Policy Modeling*, 33(4), 636–648. Retrieved from http://linkinghub.elsevier.com/retrieve/pii/S0161893811000172

Leff, N. H. (1964). Economic Development Through Bureaucratic Corruption. *American Behavioral Scientist*, 8(3), 8–14. Retrieved from http://journals.sagepub.com/doi/10.1177/000276426400800303

Mabughi, N., & Selim, T. (2006). Poverty as social deprivation: A survey. *Review of Social Economy*, 64(2), 181–204.

Madinda, A. S. (2014). The Relationship Between Development and Corruption: The Status of England Towards the Eradication of Corruption and the Lesson for Africa. *International Journal of Education and Research*, 2(7), 177–188.

Mauro, P. (1995). Corruption and Growth. *The Quarterly Journal of Economics*, 110(3), 681–

712. Retrieved from http://www.jstor.org/stable/2946696

Mauro, P. (1997). *Why Worry About Corruption?* (Economic I). Washington D.C.: International Monetary Fund.

Misturelli, F., & Heffernan, C. (2008). What is poverty? A diachronic exploration of the discourse on poverty from the 1970s to the 2000s. *European Journal of Development Research*, 20(4), 666–684.

Nafziger, E. W. (2006). *Economic Development* (4th edi.). Cambridge: Cambridge University Press.

Negin, V., Rashib, Z. A., & Nikopour, H. (2010). *The Causal Relationship between Corruption and Poverty: A Panel Data Anaylsis*. Retrieved from https://mpra.ub.uni-muenchen.de/24871/

Nwankwo, O. F. (2014). Impact of Corruption on Economic Growth in Nigeria. *Mediterranean Journal of Social Sciences*. https://doi.org/10.5901/mjss.2014.v5n6p41

Ogundele, O. K. ., Akingbade, W. A., & Akinlabi, H. B. (2012). Entrepreneurship Training and Education as Strategic Tools for Poverty Alleviation in Nigeria. *American International Journal of Contemporary Research*, 2(1).

Perera, L. D. H., & Lee, G. H. Y. (2013). Have economic growth and institutional quality contributed to poverty and inequality reduction in Asia? *Journal of Asian Economics*, *27*, 71–86. Retrieved from http://linkinghub.elsevier.com/retrieve/pii/S1049007813000614

Rahayu, I. P., & Widodo, T. (2012). Causal Relationship between Corruption and Poverty in ASEAN: a General Method of Moments /Dynamic Panel Data Anaylsis. *Journal of Economics, Business and Accountancy Ventura*, 15(3).

Sen, A. (1985). *Commodities and capabilities*. Amsterdam; New York; New York, N.Y., U.S.A.: North-Holland ; Sole distributors for the U.S.A. and Canada, Elsevier Science Pub. Co.

Sen, A. (1999). *Development as freedom*. New York: Anchor Books.

Sen, A., & Anand, S. (1997). Concepts of Human Development and Poverty: A Multidimensional Perspective. In *Poverty and Human Development: Human Development Papers 1997* (pp. 1–20). New York: United Nations Development Programme.

Shleifer, A., & Vishny, R. W. (1993). Corruption. *The Quarterly Journal of Economics*, 108(3), 599–617. Retrieved from https://academic.oup.com/qje/article-lookup/doi/10.2307/2118402

Siddique, H. M. A., Shehzadi, I., Shaheen, A., & Manzoor, M. R. (2016). The impact of governance and institutions on education and poverty alleviation: a panel study of SAARC economies. *Science International Lahore*, 28(2), 1431–1435.

Tanzi, V. (1998). *Corruption Around the World: Causes, Consequences, Scope, and Cures*. *Staff Papers - International Monetary Fund* (Vol. 45). Washington D.C.: International Monetary Fund. Retrieved from http://www.palgrave-journals.com/doifinder/10.2307/3867585

Tebaldi, E., & Mohan, R. (2010). Institutions and Poverty. *Journal of Development Studies*, 46(6), 1047–1066. Retrieved from http://www.tandfonline.com/doi/abs/10.1080/00220380903012730

Truex, R. (2011). Corruption, Attitudes, and Education: Survey Evidence from Nepal. *World Development*, 39(7), 1133–1142. Retrieved from http://dx.doi.org/10.1016/j.worlddev.2010.11.003

Unver, M., & Koyuncu, Y. (2016). The Impact of Poverty on Corruption. *Journal of Economics Library*, 3(4). Retrieved from www.kspjournals.org

World Bank. (2019). World Development Indicators. Retrieved February 14, 2019, from https://datacatalog.worldbank.org/dataset/world-development-indicators

Yildiz, A. (2017). *Different Aspects of Poverty and Corruption*. (A. Yildiz, Ed.). Gece Kitaplığı.

Yusuf, H. O. (2012). High value' migration and complicity in underdevelopment and corruption in the global South: Receiving from the attic. *Third World Quarterly*, 33(3), 441–457.

Appendices

Appendix 1 - Literature on poverty and corruption: main research findings

Authors	Title	Sample	Research Method	Dependent variable	Independent variables	Indicators	Results
Gupta *et al.* (2002)	Does corruption affect income inequality and poverty?		OLS	Income growth of the bottom 20% (measure of change in poverty)	Natural resource abundance	Share of natural resources in total exports	Higher levels of corruption are associated with lower income growth of the poor. In their results, the authors find that corruption on poverty has quantitatively impacts. According to them, increases on the growth rate of corruption lead to a decrease in income growth of bottom 20% of the population. They find that education inequality and income inequality are expected to have a positive correlation. The authors also find that high poverty causes high corruption. In their conclusions, they state that the resources allocation, the economy stability and the income distribution are some of the characteristics affected by corruption, therefore, poverty and income distribution are also affected.
					Initial income of the poor	Real income of the bottom 20 percent of the population measured in PPP	
					Initial secondary schooling	Years of secondary education in population	
					Education inequality	% of adult population with no schooling	
					Initial distribution of assets	The initial Gini coefficient for land	
					Social spending	Various measures relative to GDP: social security and welfare; education and health; sum of spending items above plus housing and community amenities	
					Corruption	International Country Risk Guide (ICRG) Index	
						Business International (BI) Index	

Authors	Title	Sample	Research Method	Dependent variable	Independent variables	Indicators	Results
						CPI	
Dincer and Gunalp (2008)	Corruption, Income Inequality, and Poverty in the United States	50 states; period: 1981-1997	OLS Estimation	Poverty (% of people with income under the poverty threshold provided by the Census Bureau[15])	Corruption	The number of government officials convicted in a state for crimes of corruption	Corruption increases poverty, without including income inequality. Corruption increases Gini and decreases AFDC/TANF by the same percentage. The authors find that Unemployment, Income (measured by the pc personal income), Education, and Union are all significant. Which means that, education and unionization have effects of equalization and unemployment rates increase income inequality. In the poverty regressions, the authors find that corruption has a positive effect on poverty by increasing poverty. According to them, poverty can be affected directly or indirectly through income inequality. Corruption increases poverty by the same amount, as an increase in poverty increases unemployment. They find evidence that poverty and education have an inverse U-shaped relationship. In their conclusions, the authors state that corruption can be found in low-income countries as well as high-income countries. They use US cross country data, where they find evidence that corruption increase leads to an increase in income inequality and poverty.
					Income Inequality	Gini Index	
						Standard deviation of the logarithms (SDL)	
						Relative mean deviation (RMD)	
						Atkinson indexes	
					Government policies	Earned income tax credit benefit rate (EITCB)	
						Earned income tax credit phase-out rate (EITCP)	
						Aid to families with dependent children/temporary assistance to needy families (AFDC/TANF)	
					Education	Share of secondary school enrolment in the population	

[15] The Census Bureau utilizes a set of income thresholds that vary by size and the family composition. Meaning that, if a family lives with less income than the family threshold it is considering to be poor.

Authors	Title	Sample	Research Method	Dependent variable	Independent variables	Indicators	Results
					Union	Unionization rate	
					Income	Real per capita personal income	
					Unemployment	Unemployment rate	
Negin *et al.* (2010)	The Causal Relationship between Corruption and Poverty: A Panel Data Anaylsis	97 developing countries; period: 1997-2006	Granger: GMM Estimation	Corruption (CPI)	Poverty	HPI	. Rural population have a negative value as expected, that means that increased rural population is related with increased corruption – decrease CPI. Gender has a positive and insignificant value, since increasing the woman participation in public life is associated with decreasing corruption – increase CPI. Inflation has a negative and significant coefficient, meaning that inflation increases corruption. And, political freedom and stability have a positive and significant coefficient at 1% level, indicating that increasing political freedom and stability (as a governance factor) decreases corruption. So, poverty causes corruption.
					Rural population	% of total population	
					Gender	Female labour force participation rate	
					Inflation	Inflation rate	
					Political freedom and Stability	Political freedom and Stability	
				Poverty (HPI)	Corruption	CPI	The results present a significant relationship between corruption and poverty. In their specifications, rural population has a positive effect on poverty since in rural areas of developing countries there is a higher likelihood of poverty and severity is also higher. Gender has a negative correlation with poverty, which means that
					Rural population	% of total population	
					Gender	Female labour force participation rate	
					Inflation	Inflation rate	

Authors	Title	Sample	Research Method	Dependent variable	Independent variables	Indicators	Results
					Political freedom and Stability	Political freedom and Stability	woman is essential to prevent increasing household poverty. Inflation has a positive correlation and is statistically significant. And, political freedom and stability have a negative effect on poverty. So, corruption causes poverty.
Tebaldi and Mohan (2010)	Institutions and Poverty	50 countries; period: 2000-2004	Estimate a set of regressions using the instrumental variable method	Poverty (% of population living on less than PPP 2$ a day) Institutions	Institutions	Control of Corruption	In their empirical results, the authors find that institutions and poverty rates are negatively correlated. They find that countries have smaller poverty rates when they have better institutions. Because economic and social conditions may be created by poverty, preventing good institutions development. This equation of institutions on poverty analyses the impacts that impacts may have on poverty rates. The authors discover that accounting for endogeneity and geography control, poverty rates are negatively related to institutions. In developing countries with better institutions – control of corruption, regulatory quality, rule of law, government effectiveness, voice and accountability, and political stability – the poverty rates are smaller. When the variable of geography is analysed, there are no direct effects on poverty. But, when there is control for voice and accountability, geography may have some influence. Political stability does not have a key role on expropriation risk. The authors state
						Regulatory Quality	
						Rule of Law	
						Government Effectiveness	
						Voice Accountability	
						Political Stability	
						Absence of Violence	
						Expropriation risk	
					Vector of geographical variables	Coastal land (quantifies the proportion of land area within 100kim of the coast)	
						Latitude	
						Colonial legacy	
						Ethnolinguistic fragmentation	

Authors	Title	Sample	Research Method	Dependent variable	Independent variables	Indicators	Results
							that political stability is related to political systems. Geographical variables impact the agriculture sector and the majority poor are dependent on that sector. Regarding the institutions, variables such as control of corruption, rule of law, regulatory quality, and government effectiveness have stronger effects on reducing poverty than voice and accountability. The authors find that poverty increases due to economies with weak regulatory system or lack of law enforcement by having low levels of income. But, poverty is not increased by income distributions of these institutions. However, poverty is affected via income distribution through corruption, government effectiveness and political stability. In their conclusions, they state that poverty is affected by institutions from different channels. Developing countries with an effective government, stronger control of corruption and a stable political system will promote economic growth, reduce poverty and decrease the income distributions conflicts.
Rahayu and Widodo (2012)	Causal Relationship between Corruption and	9 Asian countries; period: 2005-2009	Granger: GMM Estimation	Poverty (HDI)	Corruption	CPI	Poverty does not cause corruption, but corruption directly affects the poor because it increases the prices of public services, leads to smaller quantity and
					Education and adult literacy	HDI	

Authors	Title	Sample	Research Method	Dependent variable	Independent variables	Indicators	Results
	Poverty in ASEAN: a General Method of Moments /Dynamic Panel Data Analysis				Life expectancy and household income	HDI	quality of public services, makes it difficult to have access to public services (health care, education, sanitation, water, …). Corruption indirectly affects poverty through lower economic growth, reinforcing income inequality, distorting public expenditure allocation
					Inflation	Inflation	
					Gender	Gender	
Perera and Lee (2013)	Have economic growth and institutional quality contributed to poverty and inequality reduction in Asia?	9 East and South Asia; period: 1985-2009	GMM Estimation	Poverty (HCR, Poverty Gap Index, Squared poverty gap index, WATTS)	GDP	PPP	According to the results obtained, GDP per capita growth and poverty have a negative relationship, which means that poverty reduction may be caused by economic growth. No matter the measure of poverty used, the authors reveal that poverty reduction may happen due to economic growth. High levels of corruption, weak institutional quality, poor judicial systems, and weak bureaucratic quality worsen poverty. In their results a stronger institutional quality and better government stability help to decrease poverty levels. The results from the GMM estimation prove that decreasing the corruption levels, improves the democratic accountability and the quality of bureaucrats may increase poverty levels. However, there are countries like China and Thailand that have high corruption levels and high growth rates, the effect of corruption on growth and income inequality may depends on the region analysed. The authors state that corruption in Africa, Latin America and Caribbean is different
					Institutional quality	Overall institutional quality	
						Government stability	
						Corruption	
						Law and order	
						Democratic accountability	
						Bureaucratic quality	

Authors	Title	Sample	Research Method	Dependent variable	Independent variables	Indicators	Results
							to the one in found in East Asia, since the last one is less unfavourable to growth and poverty. They find that government stability and law and order decrease poverty, and an increase in corruption index and democracy accountability index will increase poverty. They conclude that corruption needs to be decreased in order to reduce poverty and to ensure a sustainable growth of the economy.
Justesen and Bjørnskov (2014)	Exploiting the Poor: Bureaucratic Corruption and Poverty in Africa	18 African countries; period: 2005 and 2006	Hypothesis (OLS regressions)	Corruption (Afrobarometer that contains 5 phrased questions: asking people if they pay bribes in order to have access to public services. The dependent variable is based on experience)	Poverty (they ask individuals how often they have lack of access to basic household necessities) Index of Lived Poverty	People that obtain government services easily or difficultly as public services users People that never try to obtain government services (nonusers)	The authors test the relationship between poverty and bribery. People experiences with paying bribes to street-level bureaucrats increase with increasing poverty levels. There is evidence that the effect of poverty on the frequency of being involved in corrupt transactions is large. But there is evidence that poverty may act as a proxy for regional variables, meaning that in poor regions the public officials are more frequent to demand bribes. The authors find in their results that public services such as health and education are easier for people to exit, but public services like the police are more difficult to avoid. Poverty has a positive effect on the probability of individuals paying for bribes, and it is more significant in public services such as education and health. They also state that poverty increases the frequency with which individuals face

Authors	Title	Sample	Research Method	Dependent variable	Independent variables	Indicators	Results
							demands for bribes in return to obtaining services from government officials.
Unver and Koyuncu (2016)	The Impact of Poverty on Corruption	154 countries; period: 2000-2013	Granger	Corruption (WGI, CPI and Freedom from corruption)	Poverty	HDI	In the estimation results using WGI, they find that poverty deteriorates corruption levels in an economy. In the estimating results of CPI and Freedom for corruption, higher level of poverty leads to a higher level of corruption in economy. Openness has a negative effect, which means that corruption levels are lower when the degree of openness is higher in an economy. Democracy also have a negative sign meaning that there less corrupt practices in democratic countries. Inflation indicates that countries that are more vulnerable to higher uncertainty and political and economy stability have more corruption. The FDI indicator implies that countries with more FDI have less corruption. The authors found evidence that higher poverty levels experience higher corruption levels. And there are no differences when other variables are added to the models.
						Headcount	
						MLD	
						WATTS	
					FDI	FDI	
					Inflation	Inflation, GDP deflator (annual %)	
					Democracy	Democracy level	
					Openness	Trade (% GDP)	

Authors	Title	Sample	Research Method	Dependent variable	Independent variables	Indicators	Results
Yildiz (2017)	Different Aspects of Poverty and Corruption	15 underdeveloped countries; period: 2005-2015		CPI	Inflation	Inflation rate	The author states that there is a problem regarding the distribution of prosperity to the population. Since, developing countries are unable to face the social and economic problems. CPI negative relationship with inflation and HDI and positive with unemployment, per capita income and population.
					HDI	HDI	
					Unemployment	Unemployment	
					Nation per capita income according to purchasing power parities	GDP	
					Rural population	Population	
Azward (2018)	Does Corruption Affects Poverty in Indonesia?	180 countries; period: 1995-2017	ADRL Cointegration test	Poverty (HCR)	Corruption	CPI	Corruption affects poverty directly. But, Azward (2018) states that corruption affects indirectly poverty, because corruption lead to a smaller social spending and an increase in the levels of corruption could decrease the government spending on health and education. Since, higher corruption leads to lower social spending; an increase in the levels of corruption leads to a decrease in the total spending of governments for education and health. Corruption leads to higher poverty by decreasing economic growth.
					Growth	GDP	
					Inflation	INF	
					Unemployment	UNE	