

Charles University in Prague

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BACHELOR THESIS

**Corruption and growth in developing
countries**

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Academic Year: **2012/2013**

Declaration of Authorship

The author hereby declares that he compiled this thesis independently, using only the listed resources and literature.

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Prague, May, 17, 2013

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Acknowledgments

The author is grateful especially to doc. Ing. Tomáš Cahlík CSc, for his wise advices and his availability, Professor Laurent Weill for his support, and Elise, Juliette, Damien, Laura, Thomas, Alex, Sanela, Martin and Claudia for their moral support and for bearing him during the writing of this work. The usual caveat applies.

Abstract

Corruption is morally condemnable but what about its economical effect on the efficiency of an economy? Different transmission channels positively and negatively correlated with growth exist. The aim of this work is to catch the overall reality behind this impressively high number of transmission channels. Another task is to show the concrete consequences of corruption on a little economy like Haïti and what could be the consequences of the weaknesses induced by corruption. A presentation of the theoretical background is described together with the particularities of corruption in developing countries. A case study on Haïti, its infrastructure and the impact of corruption after the earthquake of 2010 will illustrate the theory. Last but not least, we present a model, where we analyze corruption as a determinant of growth in developing countries using data of 2011.

JEL Classification

O11, O17, O47, H83,
H84

Keywords

Corruption, Growth
determinants,
Governance,

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ACRONYMS

FDI Foreign Direct Investment

MNC Multinational Company

HDI Human Development Index

GNP Gross National Product

PETS Public Expenditures Tracking Survey

Thesis Proposal

Key words: Corruption, Growth, Governance, Public expenditures, Transmission Channels, Impact of corruption, Institutional development

Preliminary scope of the work.

Topics characteristics

Since the sixties the number of studies about corruption has increased a lot and this trend grew up during the nineties. Due to problems to measure corruption (see Kenny, 2009), the causality between corruption and growth is hard to catch. The mainstream describes an adversely relation between corruption and growth (see Mauro 1995). But a minority describes corruption as grease for an economy; even more if this economy is characterized by a strong regulation and an inefficient bureaucracy (see Houston 2007). Moreover we can imagine an inverse link; certain types of growth can lead to corruption. The relation between corruption and growth is much more complicated than it could seem to be. It is also interesting to study the transmission channels between corruption and growth and how these channels are significant taking into account different indicators of corruption. The study will be focused on developing countries, because of three aspects. The first one is that developing countries face widespread corruption; they are really concerned by growth issues and their governance models are multiple and can explain the difference of the impact of corruption in growth. In order to cover this topic, I will use academic papers, statistical surveys, reports and data of the NGO Transparency International, and of the World Bank

Hypotheses

1. Corruption has an impact on Growth.
2. The growth speed has an impact on the magnitude of corruption.
3. The impact of corruption in developing countries is bigger than in other countries.
4. Political models of developing countries could explain the importance of corruption.
5. The cultural and political differences within developing countries could explain differences concerning the causality between corruption and growth.

Methodology

Concerning the literature on growth and corruption; I will start with a up-to-date survey of literature. I'll use a meta-analysis, in comparing works which deal with the same aspect and use the same metric analysis. I will use a regression analysis, first to determine the link between growth and corruption (first in different group of countries with the same specificities and afterward within different groups) and will try to nuance and explain the relationship in using pseudo-panel on developing countries and meta-regression. I will use regression with some transmission channels to explain differences between countries; afterward I should be able to compare the combined significance with variables (Corruption and education, Corruption and Investment, Corruption and Governance quality). I could also compare different types of growth (with high direct investment, role of public expenditures or strong regulation). I will add to my work some case studies (Impact of growth on infrastructure, education...). Finally I will compare countries and create sample of typical political regimes and of typical historical background and use meta-regression.

Outline

What is corruption?

- I. **Literature surveys: Corruption and Growth in developing countries**
 - a) The mainstream: Corruption and growth are adversely connected
 - b) The minority opinion: Corruption could be grease for the economy.
- II. **Is corruption adversely connected with Growth? Could corruption be grease for the economy?**
 - a) Cases studies, the impact of corruption on infrastructure quality
 - b) Regression analysis
 - c) East-Asia: Corruption can promote growth.
 - d) Type of growth and corruption: regression analysis
- III. **What could be the transmission channels from corruption to growth?**
 - a) The role of investment: Regression analysis
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 - a) Political regime and corruption
 - b) Historical background and corruption
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Conclusion

Bibliography

1. Aidt Toke S., "Corruption, Institutions and economic development", *Oxford review of economic policy*, Volume 25, number 2, 2009, p271-291.
2. Bardhan Pranhbab, "Corruption and development: a review of issues", in *Journal of Economic literature*, Vol 35, n°3 (September 1997), p1320-1346.
3. Bonnet Heidi, Rock Mickael T., "The comparative Politics of Corruption: Accounting for the East Asian Paradox in Empirical Studies of Corruption, Growth and Investment", in *World Development*, Vol 32, n°6, 2004, p999-1017
4. Ehrlich Isaac, Francis T Lui, "Bureaucratic corruption and Endogenous Economic Growth", *Journal of Political economy*, vol 107, n°6, 1999, p270-293.
5. Henisz Witold J., The institutional Environment for Economic Growth, *Economics and Politics*, 12(1), 2000, p1-31.
6. Mauro Paolo, "Corruption and Growth", *The Quarterly Journal of Economics*, Vol 110, n°3 (August 1995), p681-712.
7. Méon Pierre-Guillaume, Weill Laurent, "Is corruption an efficient grease ?" in *World development*, Volume 38, Issue 3, March 2010, p244-259.
8. Svenson Jakob, "Eight questions about corruption." In *Journal of Economic Perspectives*, Volume 19, number 3, Summer 2005, Page 19-42.

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INTRODUCTION

“The first sign of corruption in a society that is still alive is that the end justifies the means.”

Georges Bernanos, *The Last Essays of Georges Bernanos*, 1955.

Corruption is today a worldwide-spread phenomenon. The problem is that by definition corruption is hidden, and its effects are hard to catch. If we adopt a moral or legal viewpoint corruption is condemnable, but economically speaking corruption cannot be so easily treated. Our judgment on corruption is effectively often biased by a moral appreciation of this variable. The number of studies on the price of immorality has increased during the last decade and is now one important topic for academic studies. Moreover recently a growing attention is paid to development problem. The desire to better understand growth and to create new policy package inducing growth is present both in academic and in public field. No common results were found to explain the correlation between corruption and growth.

In this academic framework, we can not give an absolute answer to the question “What is the impact of corruption on growth?”, nevertheless we can catch an idea of the trends and the determinant of this effect. The topic of the consequence of corruption is too vast to be treated in this paper, so we will focus on developing countries (because of their particular growth path compared with developed countries) and we will treat corruption as a whole and avoid distinction between small and big forms of corruption and the different ways to corrupt.

On the next pages we first will uncover the previous approaches of corruption, start to define the terms corruption and developing countries, study their correlation, and present how corruption can be measured. Afterward we will try to uncover the current debate on the topic, show the major opinions. Finally we will present our own model in a regression analysis of growth including corruption proxies.

1) LITERATURE SURVEYS: CORRUPTION AND GROWTH IN DEVELOPING COUNTRIES

Before we start the discussion about the topic of this work, we have to set the definitions of key notions we will use and we have to draw an academic framework. Since the sixties the approach of problems induced by corruption has changed. The definition of corruption varies according to the dimensions taken into account. The term developing countries could be specified too, even if everybody can understand its reality. The problem is treated not only as a moral problem of each individual, or for a society but is treated as a parameter which could make vary the efficiency of an economy.

A) WHAT IS CORRUPTION?

The role of corruption in the governance field and its impact on the economic environment can not be denied. The word “corruption” is often used by journalists, politicians, economists but it is still quite abstract. It came from the Latin: corrumpere, that we can be split into two part “cum”= all together and “rumpere” = break. First of all corruption referred to the disappearance of the morality in spirits (cf. Socrates’ corruption of the Youth). This corrupt spirits will accomplish corrupt actions, and greed is one of the often used determinants of these actions. As a consequence this word arrived in the economical vocabulary. But has the morality judgment still an existence in this word? We can say that until the sixties, studies on corruption just focused on a moral viewpoint and do not deal with economical effects. Nowadays we can say that corruption holds both realities.

As Svensson² noticed corruption is “an outcome – a reflection of a country’s legal, economic, cultural and political institutions”. Corruption exists as an outcome, and a reaction to rules (Svensson precised that these rules can be “beneficial or harmful”). This article is a reference but shows that there is no clear-cut definition of corruption. Corruption covers two domains, economics and morality, and the morality reality must be converted into economical actions to catch what is corruption in the daily life and to be sure that we are able to study its

² (Svensson, 2005)

causes and consequences. We have still to be careful to distinguish corrupt and immoral. An immoral action is not necessarily a corrupt action. For example we can imagine that you pay a bribe to a policeman to save an innocent of going to jail. That a case of corruption but not an immoral action. You can also pay a blackmailer, the blackmailer is immoral somehow, but that not a case of corruption either.

Nowadays, a frequently used definition is the “misuse of a public office for private gain” (World bank’s definition in 1997). Even this definition covers many aspects. According to specialists the problem is that corruption is perceived differently among the countries (according to legal and even more cultural aspects). The law has to be taken into account because it influences a lot the perception of the corruption level in a country even if corruption is not directly correlated with law.

The first distinction among different corruption types could be made between legal and illegal corruptions. Corruption is actually not only connected with laws. In its definition, the World Bank did not mention the law. Gifts, sponsoring or certain “exchange of favors” are not illegal in the major part of the world, but could be associated to corruption. The logic of “rent-seeking” could have the same effects and use the same mechanisms in an economy as corruption. One example illustrating the importance of legal corruption is described in the Philippines, when Marcos lead the country cheap credit, tax incentives, state licenses and monopoly privileges were accorded on “personal considerations”³. It was legal to take into account these personal considerations and also the private interactions between the official and the rent-seeker. The notion of corruption avoids the difference in legislation among different countries, and sticks to a reality which implies “poor public governance”⁴. This poor public governance does not imply that officials override the laws. They may use the law in order to improve their private benefits.

Wei used the notion of “poor public governance” to cover this notion, but it seems to be a mean and not the finality of corruption. We may actually consider both solutions; corruption could be an output after corrupt actions or could be the sum of these actions. Corruption could be perceived as the action of corrupting a transaction (in economical

³ (Hutchcroft, 1991)

⁴ (Wei, 2000)

framework), that is the reason why one of the main concrete example of corruption is bribing. In bribing the contract involves dishonesty and advantages against money. That is not the only form of corruption, but bribing process and bribes are often used to model corruption.

Moreover the work of Rose-Ackerman (1978)⁵ distinguishes three types of corruption, the corruption to avoid the cost, to have some benefits and for official positions. This classification lays on the will of the briber. The finality of his bribe is not the same in each case. Another classification is used by Wederman⁶, he distinguished: looting, rent-scraping and dividend-collecting. This classification looks more accurate to study the impact of differences in “corruption” rules imposed by officials.

The word corruption could imply other aspects, like corruption in the private sector (if a seller rations its production to decrease the supply, it could be considered as corruption), but we will stick to the notion of use of a public office for a private gain which implies political corruption.

B) IMPACT OF CORRUPTION IN DEVELOPING COUNTRIES, AN OVERVIEW

A rapid analysis of the political and economical situation of the developing countries let us know that corruption is deeply implanted in those countries. Moreover these countries are defined by the World Bank as countries with low or middle levels of GNP per capita, so have experienced a low growth rate in their history and still have a pretty high growth potential.

I) DEVELOPING COUNTRIES: DEFINITION.

Even if the World Bank tries to give a definition of developing countries, this term is hard to catch. Approximately each country is developing more or less. However we have to split countries into two parts: the countries already developed (with a high standard of living,

⁵ (Rose-Ackerman, Corruption, a study in political economy, 1978)

⁶ (Wedeman, 1997)

with a pretty high HDI, and a good stock of physical capital). Developing countries are defined as all countries except developed countries. The International Statistical Institute published a list for 2013 (list in which we are interested in for our study) and take into account just the GNI per capita criteria to classify countries, whereas the World Bank precise that Hong-Kong, Israel, Kuwait, Singapore and United Emirates States are not a part of the developed countries despite their high GNI per capita indexes. Developing countries are a very heterogeneous group but have although some characteristics in common. These characteristics are a young labor force, problems with infrastructures, political and economic instability (due to business environment, here is our interest for corruption coming), high population growth and in general low education level.

An alternative group of countries could be considered (but will be not considered in this study) as developing countries. This group is transition countries. They are parts of the ancient communist bloc, and should face the problem of adopting the liberal economic system and way of life. But finally, their characteristics are quite the same as the characteristics of some developing countries in the dimension that they have to be well-developed according to new values and new development goals. The growth model of the former soviet bloc leads to a certain homogeneity in the political situation (if countries have not achieve their transition yet) but a high inequality according to the GDP per capita (the growth of USSR advantaged some regions despite other regions, which are in a worst situation now). These two facts let us wonder that there could exist different regression coefficients for these two groups.

We can split developing countries in two other sub-groups too. These subgroups are the least developed countries and the landlocked least developed countries, they will be part of our study too. Least developed countries are defined by the United Nations- Office for the High Representative of Least Landlocked developing countries as “low income countries, where the growth faces long term impediment- such as structural weaknesses and low human resources development.” The UN-OHRLI employed the indicator of economic vulnerability in order to classify these countries too (volatility of food production, risk of natural disasters...).

The landlocked least developed countries have the same characteristics as least developed countries but they have moreover no access to the sea. The importance of the maritime trade has not to be proven now. These landlocked countries face other impediments

to growth. The UN-OHRLC considers this category because of its special needs in terms of technical and financial help.

II) SPECIFICITIES OF DEVELOPING COUNTRIES IN TERMS OF CORRUPTION

Definitions of developing countries, transition countries, Least Developed Countries and Landlocked Least Developed countries (all parts of our study except transition countries) help us to point out common characteristics. The political and economic instability is one of these characteristics and are one determinant of corruption too. The number of studies focusing on the relationship between growth and corruption is really high, but there is a little amount of them focusing on developing countries. Even if these countries are the main part of the samples used in other studies, it could be interesting to isolate them and see if a special correlation between corruption and growth emerges from that.

Compared to “other countries” (i.e developed countries), developing countries face a higher corruption level according to two indicators (Corruption Perception Index by Transparency International and the Corruption control index, part of the World Governance Index edited by the World Bank).

CPI (2011)	Transition economies	Developing countries	Developed countries
Mean Value	2,561762	3,198734369	6,945858632
Mean squared error	0,603913913	1,127083467	1,89370497

TABLE 2: CORRUPTION PERCEPTION INDEX 2012, COMPARISON BETWEEN DEVELOPING COUNTRIES AND OTHER COUNTRIES⁷

The CPI in 2011 assigned a grade for each country according to its corruption level compared to other countries. The table gives two informations. First the level of corruption in developing countries is higher than in developed countries but lower than in transition

⁷ List of each countries belonging to different groups in appendix

countries. Moreover transition and developing countries seem to be coherent group (a lower mean squared error), it could be explained by a certain proximity in terms of political situation for these groups (more for transition countries).

Mean value of the corruption control index (WGI,2011 Worldbank)	1996	2000	2004	2008	2011
Developing countries	-0,44	-0,48	-0,50	-0,48	-0,49
Other countries	0,87	0,91	0,99	0,95	0,97
Mean square error	1996	2000	2004	2008	2011
Developing countries	0,64	0,58	0,60	0,64	0,65
Other countries	0,89	0,90	0,82	0,85	0,83

TABLE 2: CORRUPTION CONTROL INDEX 2011, COMPARISON BETWEEN DEVELOPING COUNTRIES AND OTHER COUNTRIES

Because CPI and the indicator of the WGI are really correlated we find the same difference as before across the time. WGI’s control of corruption index is based on the range from -2,5 to 2,5. According to World Bank’s definition this indicator reflects “the perception of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests.”⁸ Since 1996, developed countries improve their score in this index, whereas the score of developing is constant over time.

We can also observe that the corruption level is one of the characteristics of developing countries, that is the reason why we will focus on these countries in the thesis. Another characteristic of this group is indicated in its name: There is a difference in GDP per capita between developing countries and developed countries (which “achieve” the development process). Generally speaking developing countries have a good growth potential (their GDP are low, so are easier to improve). Lambsdorff⁹ described this problem and connect it with corruption. If a country faces a low level of corruption, he received investment previously, it increases its actual GDP but it affects the change in GDP per year too. Because denominator and numerator increase thanks to the absence of corruption, the ratio (growth rate) will remain constant. It is one of the other reasons why we choose to stay focus on

⁸ World Bank’s dataset: World Governance indicator.
⁹ (Lambsdorf, 2003)

developing countries. We take into account countries which development processes are still in motion and for which the growth ratio would not be affected by a relatively high GDP in the first period. A comparison of growth ratios between developing and developed countries will be a non-sense. A developing country with slow growth and a developed country with slow growth are not facing the same problem. The first one faces structural impediments to growth whereas the situation of second one could be explained by conjunctural variables.

Moreover, because we can define developing countries as “non-developed” countries, we have to concede that they do not form a uniform subset. They are different in terms of growth (that is a reason why we are interested in this group), and in term of culture (which could determine the type and the level of corruption), and simply in term of growth potential. The aim of the study is to know if corruption is one of the inhibitors of the growth potential.

In order to study if corruption could be one of the impediments for growth it could be consequently interesting to stay focus just on developing countries, because they have really different growth rate, still in a development process, and experience different level of corruption and sometimes even different types of corruption.

C) MEASURING CORRUPTION?

One of the other problems when we are interested in corruption is the way to measure it. Corruption and corrupt activities are in general frowned on a moral viewpoint or are outright illegal or on the razor edge according to law and briber have to handle a certain amount of risk. Individuals involved in this kind of activities don't conceal easily what they do. Moreover as we observed, corruption exists in different form (reflecting different techniques to cheat on a national framework). That is why corruption is hard to observe by nature. Researchers have to find complex indicators and complex way to measure it and to study its consequences.

Different ways exist to measure corruption. Nowadays perception indicators are often used. Transparency International uses this method for the CPI (one we will use). It is based on

expert analysis of countries and ranking of these countries on a scale. For 2012, the CPI was founded on 13 institutions; all institutions did not have the same quizzes and scale to fill. After collecting all the data, they standardize it (0 is the higher perceived level of corruption and 100 is the lower one and they try to have a mean of 45 and a mean square error of 20). To enter in this ranking, a country needs at least a grade from three different sources. The grade of a country will be the mean value of these sources and a confidence interval is indicated because a country could have a high volatility of its grade according to different sources. The problem of this type of corruption is the bias induced by the difference of perception of each individual.

Another method is used by Kaufmann, Kraay and Mastruzzi (2003) to calculate the “Control of corruption” index. They have a large definition of corruption and are interested in perceptions ranking of different aspect of corruption. They aggregate these data. However, the difference between this index and the index of Transparency International is not puzzling. As noticed, the CPI and the Control of corruption index have a simple correlation of 0,95.

Another way to measure corruption is micro-survey. It is not the easier way to measure the level of corruption, but three types of measure are possible with a microeconomic approach¹⁰. These measures lay on public expenditure tracking surveys, service provider surveys, and firm surveys.

Public expenditure tracking surveys (PETS lay on the analysis of the flow of “government resources allocated for private uses”¹¹. There are different levels of government officials involved in this process of allocation. The aim of such an analysis is to know which percentage of the allocated money reaches each level of government officials. The comparison between the allocation of the central government and what school and hospital effectively receive is a way for the central government to measure corruption among local elites. After taking it into account governments could enforce their control (after PETS, Uganda government decided to publish the amount of grant in one newspaper and required primary school to post what they received¹²).

¹⁰ (Reinikka & Svensson, 2006)

¹¹ (Reinikka & Svensson, 2006) p 360.

¹² (Reinikka & Svensson, 2006) p 363

Service provider surveys are used to measure the efficiency of public services allocation, corrupt behavior, and others dimension of public services providing. This type of surveys could be compared to quality of service delivery study and could test a lot of parameter in profit or non-profit public services. Standard-firm level study used data on financial and structural information on firms to approach the importance of bribing in a country. The interviews complete the study.

Finally, measuring corruption is a hard task. First, corruption is not directly measurable we need some proxies and aggregate indicators to have an idea about it. Moreover it exists two levels of study with pros and cons. Microeconomic level appears as the best way to catch the implication of corruption on firm performance and to catch directly effects of corruption whereas macroeconomic level gives us a trend for each country without taking into account the reality of the impact of corruption on public services delivering, quality of life and political variables.

D) THE MAINSTREAM: CORRUPTION AND GROWTH ARE ADVERSELY CONNECTED

Today, many organizations try to combat diverse forms of corruption. James Wolfensohn¹³ announced in 1997, that prevent corruption will be one of the priority of his institution. But if corruption is combated because of its moral issues by institutions and NGO's, academics shifted their interest on the economic value of corruption. The studies show that corruption tends to spread itself in the economy. A relatively important amount of studies confirm that corruption slows growth and examine different transmission channels such that investment rate, quality of infrastructure, productivity.

One of the first articles adopting this viewpoint was written by Susan Rose-Ackerman in 1978. According to her mind "corruption can significantly affect the efficiency, fairness

¹³ President of the World Bank (1995-2005)

and the legitimacy of state activity”.¹⁴ Corruption is a widespread phenomenon and affects a lot of economic parameters, but Rose-Ackerman distinguished the effects among countries. Corruption is not puzzling in all countries. Moreover different countries facing the same level of corruption would react by different ways (e.g “Systematically corrupt countries that have nevertheless experienced satisfactoring economic growth risk sinking into a downward spiral”¹⁵). Corruption affects the allocation of economic output too. The problem for Rose-Ackerman is not only an efficiency problem but the unfairness of the corrupt system too. There could be somehow connected in the measure that unfairness could leads to a lack of motivation so a lack of productivity.

Nevertheless the harms of corruption on growth were first analyzed by Mauro¹⁶. He presents his work as the first cross-country empirical studies which connected indicators on bureaucracy honesty and economic growth. Comparatively to Rose-Ackerman he analyzed empirically the transmissions channel between corruption and growth.

An important part of the literature argues that corruption has a negative impact on growth. This impact is very difficult to catch and to define because we have to take into account other variables (all the countries have not the same potential growth). That is why some countries experienced a fast growth and a high level of corruption at the same time (see Wei 2000, or Rock and Bonnet 2004¹⁷). This complicated correlation lead some authors to study deeper the theory of the grease the wheel and they find a positive correlation between corruption and growth.

One of the alternative and ideologically neutral models is proposed by Aidt¹⁸. This model involves decision-making process on a micro-level. The impact of corruption on individual decisions implies a lot of variables. Aidt used the game theory to explain that corruption could be efficient or harmful. It depends on the talent of the individuals, and the profit they can make without bribing. It is summarized by the formula:

An individual decide to become an entrepreneur if :

¹⁴(Rose-Ackerman, The political economy of corruption, 1996)

¹⁵ Op cit p33

¹⁶ (Mauro, 1995)

¹⁷ (Rock & Bonnet, 2004)

¹⁸ (Aidt, 2009)

$$a \Pi(n_e) - w(n_e) \geq 0$$

An individual can continue to open new businesses until

$$a \Pi(n_e) - w(n_e) = 0$$

With a higher than 1 if the agent is talented and equals 1 if he is not talented.

n_e = number of firms at equilibrium. The wage increases with the number of firms and the profit decreases with the number of firm.

If the government introduces a system of license with $n_a < n_e$ and let corrupt officials selling licenses to the highest bidder (if the bid is higher than $\pi(n_e) - w(n_e)$, just talented people will bribe). Corruption involves the expression of most-talented people and could be also seen as efficient. One problem reminds with Aidt's model. Aidt was just focused on one type of corruption: bribing of individuals to start a business.

Effect of corruption is also impacted by the environment of bribing, which is the reason why authors modulated their mind on the effects of corruption.

E) THE MINORITY OPINION: CORRUPTION COULD BE GREASE FOR THE ECONOMY.

In 1997, Wedeman¹⁹ studied this relationship and particularly the importance of the given definition for corruption in the results. There are different impacts with respect to different types of corruption. Some authors are not nuanced as he is and argue that corruption in general might have benefits for the economy. These reactions are diverse, some authors are opposed to the moralistic point of view adopted by some analysts, others tried to identify a typology explaining differences within the countries, and others explained that the correlation between growth and corruption could be explained by other variables.

¹⁹ (Wedeman, 1997)

First of all, this presentation which separates the debate in two parts is not totally correct. As Aidt (2009) remarks there are no just sander theorists and greaser theorists, and the topic may not be totally represented just in studying both separately. Nevertheless it could be interesting to observe nuanced and sanders theories in a whole because of the logic building these opinions. Somehow we can observe that these theories were the first on the corruption-growth interaction (see Leff 1964²⁰).

Another particularity on the correlation between corruption and growth is that we can imagine a counter correlation too. Susan Rose-Ackerman recognized the double-link between growth and corruption²¹. So a corrupt country may not stay corrupt at a very high level very long because the amount of income to share will be low and it is not an incentive for corruption. The relation could also be inversed and a low growth discourages corruption for officials because they have less to tax and bribes will be lower.

In the 90's a mainstream emerged thank to Mauro's ideas. The studies on the link between growth and corruption start to be seriously documented and argued (the number of citations for articles dealing with growth-corruption issues goes up since the end of the 90's)²². After this trend each theory was quite nuanced by commentators thanks to empirical results. Moreover Aidt (2009)²³ noted that the "greasing the wheels" theorists do not presume that corruption could improve growth directly but it could be efficiency-enhancing in some cases (lack of governance, cumbersome regulations...). That is the reason why administrative structures and policies have to be scanned too. The correlation between corruption and growth is highly connected with administrative, political and even social frameworks.

Leff and Huntington (1968)²⁴ were the first arguing that corruption could be desirable to improve economic growth. The debate on the relationship between corruption and growth was open. Two explanations emerged. First corruption can serve as "speed money". When people pay bribe, it's a way to avoid delays of bureaucracy. Paying a bribe permits to have the

²⁰ (Leff, 1964)

²¹ "Growth may, however, be a cause of corruption since it creates gains to share" Op cit p45

²² Statistics by « Scholar google », 2013

²³ Op cit. p 277

²⁴ (Huntington, 1968)

authorizations quickly. Secondly, bribes are an incentive for government employees to work harder. These arguments focus mainly on the bureaucracy efficiency. The first argument deals with inefficient bureaucracies but the second one is puzzling regardless of the level of “red-tape”²⁵. At the step of the research, theorists take corruption as a whole and made no distinctions between its different forms. Huntington works was more relevant in the sociological field than in economics. The lack of data was even more important than today and could not lead to empirical studies.

But nowadays, the improvement of the data and of the tools to its study permits a better approach of the problem. For example, Wedeman²⁶ distinguished three types of corruption (looting, rent-scraping and dividend-collecting). If looting has a bad effect on growth and the effect of rent-scraping could be discussed, Wedeman argued that dividend-collecting may be beneficial for growth. Micro-based decision-making models could help us to understand the impact of corruption as Aidt’s model.

2) EMPIRICAL MEASUREMENT OF THE EFFECTS OF CORRUPTION

Several different types of empirical measurement of the effects of corruption and growth exist. This diversity can be explained by the fact that corruption covers multiple realities but have different effect with respect to the geographical area we are interested in. This reality differs because of the variation on the relevance of different transmission channels (we will present the most common). Moreover, I will lead a case study on the impact of corruption on infrastructures in Haïti, as an example of how corruption works on the field and how it could change the standard-of-living of citizens.

A) EMPIRICAL RESULTS OF PREVIOUS STUDIES

A large number of empirical studies on corruption was made and gave different results. Big differences in terms of methodology (micro or macro level; focused on a geographical area...) exist. It will therefore be a hard task to summarize the empirical results

²⁵ Excessive bureaucracy or adherence to rules and formalities, esp. in public business

²⁶ (Wedeman, 1997)

of previous studies. Nevertheless most of the studies used cross-country evidences and aggregate index in order to cover the whole reality of corruption

Most of the studies find an inverse correlation between corruption and growth, but the control variables depends a lot according to authors. The first study conducted by Mauro²⁷ did not lead to very conclusive conclusions on the correlation between growth and corruption. One problem could be the lack of data and the fact that the method used has no predecessors. The indicators used by Mauro did not cover all the country in his set of study. Mauro explained more a trend than a direct correlation among variables. This first study shows us that the correlation between corruption and growth is not so easy to catch. But further several studies catch an inverse correlation between corruption and growth through different transmission channels: productivity²⁸, investment²⁹ and more in details with government quality³⁰

Moreover this type of studies is complemented by studies focused on a certain type of countries where corruption worked. The East Asian Paradox is one of the more puzzling examples. A study conducted by Heidi Bonnett and Mickael T. Rock shows us that corruption in large and new industrialized countries is positively correlated with corruption. They founded that no correlation is significant for big developing countries, but the result is significant if we focus on big developing countries in East Asia. Nevertheless, for these countries the correlation implies that in some framework corruption could enhance growth.

Other articles argued for a positive influence of corruption on growth. The article of Le Méon and Weill,³¹ studied the relationship between the inefficiency of a country and corruption. In their sample, inefficiency is positively correlated for 6 estimators over 15, negative for 2 and insignificant for 7. But if government inefficiencies is taken into account in the regression formula (such that countries with the same government inefficiencies but different levels of corruption are compared), we can see that the grease the wheels hypothesis could be valid (at least for countries experiencing high government inefficiency like Zimbabwe).

²⁷ (Mauro, 1995)

²⁸ (Lambsdorf, 2003)

²⁹ (Wei, 2000)

³⁰ (Wedeman, 1997)

³¹ (Méon & Weill, 2008)

The correlation is highly connected with the control variables taken into account, and so with the variables taken into account in the regression model.

B) PRESENTATION OF THE DIFFERENT TRANSMISSION CHANNELS

These different control variables represent different growth explaining models. These growth models involve different factors for growth and so different transmission channels if they are linked to corruption.

This problem of productivity in a corrupt country was pointed out by Lambsdorff (2003)³². The work of Lambsdorff lays on Rose-Ackerman observations of x-inefficiency, harmful rent-seeking and inefficient public decisions. The link between political and economical aspects of corruption is more and more deeply analyzed. According to Lambsdorff, “we might regard the absence of corruption as factor of production comparable to human capital”³³. Afterward Lambsdorff described the different transmission channels from corruption to productivity and focused on the role played by institutions. (law, order, bureaucracy efficiency, government stability). In fact productivity could be impacted by corruption but not necessarily growth. Lambsdorff argument is that corrupt countries may have the same growth rate as others because their previous GDP amount is low.

But another type of x-efficiency is observed. This one is directly connected in public services decision-making. A special kind of these efficiencies is “white elephant project”³⁴. Public expenditures conducted by corruption are one of the most important aspects of x-inefficiencies. It could induce problems on the use of public money and a lot of waste but it could induce problems in terms of security too (cf. case study). The quality of infrastructures is sacrificed for private gains.

³² (Lambsdorf, 2003)

³³ Op cit p458.

³⁴ Really expensive projects which don't satisfy specifications

Mauro found a correlation between a bureaucratic efficiency index and GDP per capita, investment rate, and growth. In an endogenous growth model investment is a strong transmission channel between corruption and growth, directly because a misallocation of investment, or indirectly by lowering investment rate. This subject has been deepened by Wei (2000)³⁵.

Corruption in a country does not affect just this country economy but the global economy. A good example is the role of investment decision-making and the place of institutional environment in it. Corruption does not affect the economy just by its absolute value but in comparative terms with other regions too. Interrelationship and comparison between countries and even between different social groups explain corruption as well. Wei develops the argument that firms compare the administrative environment of each country before invest. He took three hypotheses. The first one is that corruption reduces FDI. The second one is that China could be an exception in which corruption is not harmful for growth. The third one is that corruption could change the investment composition and the possibility of a currency crisis. The confidence of international firms in developing countries is fragile, that is why a small difference in terms of corruption may imply important changes in terms of investment.

Moreover the direction of investments changes a lot with corruption. Corruption drives investment to speculative project, in order to increase the short-run capacity to bribe, in the long-run it is problematic because viable projects are given up.

Moreover Mauro shows that ethnolinguistic fractionalization could lead to social conflicts and so political instability and be a cause of corruption. He found a correlation between high probability of conflicts and investment rate but not necessarily with growth. Mauro was the first one making an empirical study on the correlation between social-political and economical aspects of corruption. The problem of corruption could be explained on a societal viewpoint. A negative correlation exists between ethnolinguistic fractionalization³⁶

³⁵ (Wei, 2000)

³⁶ Measured by the probability that two people picked randomly in a country will not belong to the same ethno-linguistic group.

and administrative efficiency, and this ethnolinguistic fractionalization could be a catalyst for corruption to spread into a society and to affect even deeper growth and economical aspects.

Another transmission channel which could affect the relationship between corruption and growth is culture. For example corruption in a democracy and in a dictatorship do not take the same form and it is not necessarily connected with corruption level (for example we can note that the CPI of Lesotho is 3,5 and the CPI of Greece is 3,4 in 2011). Lambsdorff³⁷ proved that the effect of corruption on a protestant society is not as important as in other countries. It could be explained by the protestant ethic (personal success is a sign of divine election) so corruption might exist but serves efficient investment.

Corruption affects growth through regulation too. In the short-run, corruption could be positively correlated with growth because it grease the wheels and avoid delays. But corruption in long-run stimulates harmful laws and so could be an inhibitor for growth. Corruption exists because of power relationship, and each protagonist tries to modulate this relationship thanks to his respective power. Enforcing laws is one of the powers of officials.

As a conclusion, transmission channels are numerous and various. Enumerate all of them is an impossible task because corruption covers political, economical, and social aspects. Corruption is basically an interaction between people (politicians, businessmen...) so transmission channels are not just direct correlations between two variables but are also composed by the reactions of individuals in a corrupt society. These reactions are moreover contingent to a moving environment. It could be a solution to study a concrete case to catch deeply what corruption could involve and its correlation with its environment.

C) CASE STUDY, IMPACT OF CORRUPTION ON INFRASTRUCTURE: CORRUPTION, INFRASTRUCTURES AND NATURAL DISASTERS IN HAITI

To conduct such a study a country like Haiti seems to be a good framework. Its CPI grade is one of the lowest on earth (see the chart).

³⁷ (Lambsdorf, 2003), p 462

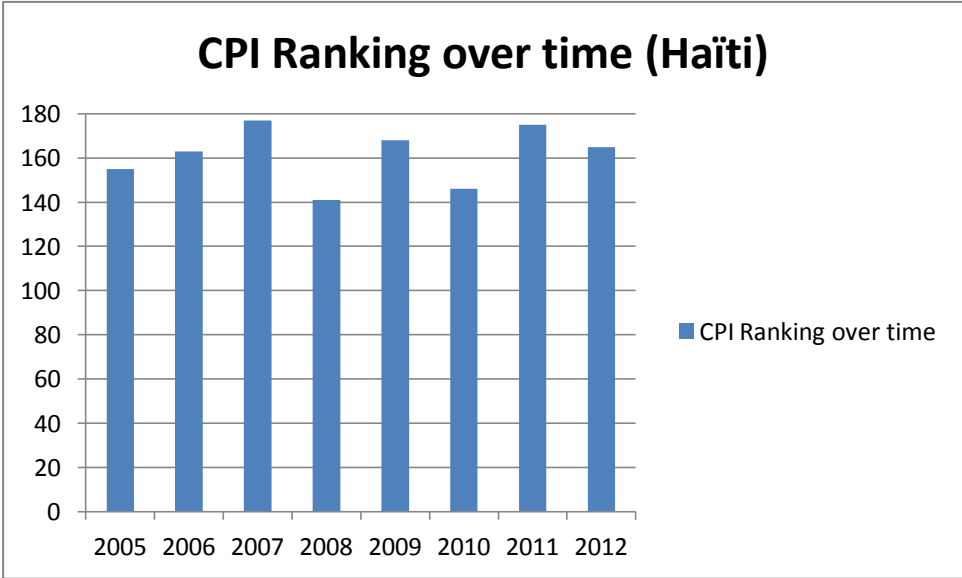


CHART 1: CPI RANKING OF HAITI FROM 2005 TO 2012 (HISTOGRAM) / SOURCE: TRANSPARENCY INTERNATIONAL CPI RANKING

This chart shows that Haïti was and is still in the last five percentiles of the CPI ranking (fluctuations are explained more by the size of the sample than by real fluctuations of Haitian level of corruption.)

Moreover, history gave us some hint to understand deeply what the problem of corruption is. One of these “tests” on the quality of Haitian governance and infrastructure was the earthquake of 2010. 250.000 residences and 30.000 commercial buildings were destroyed or damaged by this natural disaster. The earthquake had a big impact because of the lack of governance effectiveness. Before the earthquake, there was no regulation on construction specifications. Building permissions were accorded to the highest briber. That is the reason why the Haiti’s ambassador said to CNN that Haiti was a “catastrophe waiting to happen”.³⁸.

The Organisation of American States said in a report that “Among the numerous factors explaining the extent of the loss of lives and goods are the absence of land use zoning and building guidelines, and comprehensive enforcement mechanisms”. The construction was

³⁸ CNN, 13st January 2010

anarchic and bribing was a mean to get the best place and the best services for your residence. The systematic corruption involves the misdistribution of public money.

The lack of public expenditures involves poor infrastructures. For example in 2004, the government of Haiti estimated that 80 percent of the roads are in bad or very bad conditions.³⁹ . The fragility of the road network prevents rescue to reach some places.

Another main problem is the water system. The water and sanitation sector plan of the government of Haiti in 2008⁴⁰ estimated that 52 percent of urban households have an access to water supply and only 26 percent of rural households have an access to water supply. Moreover no city in Haiti has and had in 2010 a functioning sewage system. As a consequence of a disturbed political system, we can see that Haïti lost time in its development process 20 years before the quake.

With a low level at the beggining (36th lowest %) Haïti was before the quake the 18th worst country in term of improved water access in rural areas.⁴¹ As a consequence the cholera epidemia killed 7.000 people after the quake. In a country like Haiti, water supply deficiance is a proof of high corruption level too.⁴²

After the earthquake, these fragile infrastructures were totally destroyed. The impact of the earthquake was amplified by the weaknesses of infrastructures. The main problem was an epidemic of cholera. Obviously all these facts are not just caused by corruption but corruption created a favorable environment to generate such weaknesses. As a consequence, international community pledged to support the reconstruction. A Haitian Reconstruction Fund was set up by the World Bank to manage the reconstruction.

³⁹ Analysis of the road network by Haitian government
(http://www.lessonsfromhaiti.org/download/About_Haiti/infra_transport-v4.pdf)

⁴¹ See the sample in appendix.

⁴² (Nejat Anbarci, May 2009)

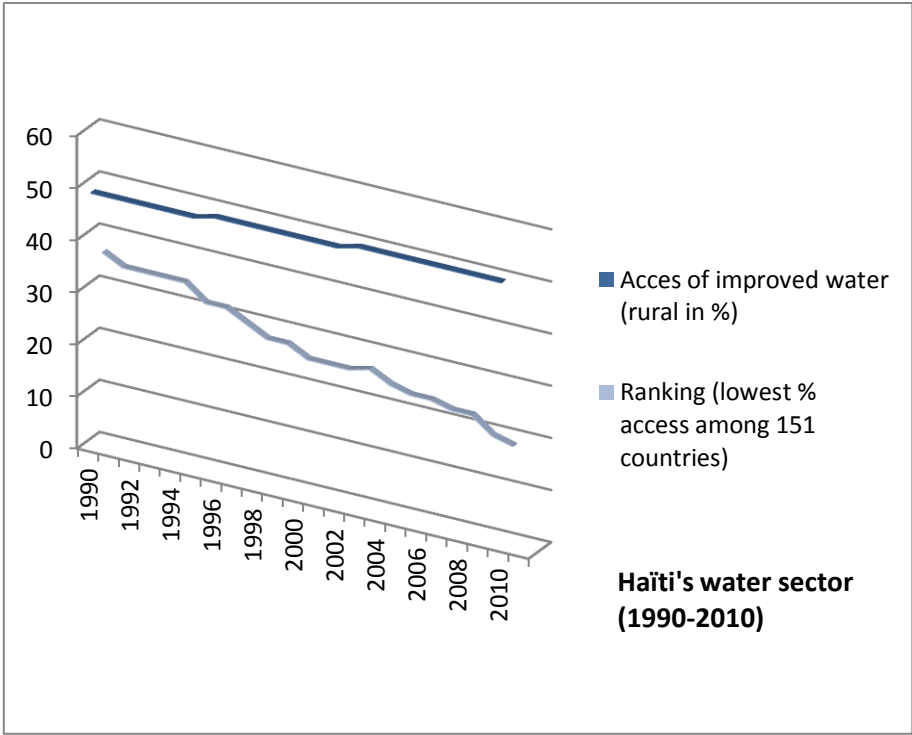


CHART 2: HAITI'S WATER SECTOR (1990-2010). SOURCE: WORLD BANK DATABASE

The problem of the reconstruction was that it is impossible to be efficient in a corrupt environment where a big part of donations did not reach their goals. By September 2010, only 134 millions over the 11 billions of US dollars promised during a conference in March were available. In January 2013, Transparency International announced that Haiti would receive only one half of the promised donations.

The mistrust of government competences causes a lack of coordination between actors, and leads to a big amount of uncoordinated actions and to inefficiencies and a loss of money. For example a report of the Disaster Accountability Project⁴³ shows that only 17 percent of American NGOs accepted to fill in a survey on their missions in Haiti. The problem of corruption affects the efficiency of charities' work too. Haïti is the place where there were more charities per capita than in other places in the world. (Approximately 12.000 charities in the country in 2010). Moreover during the last half century, Haïti received more than four times the per capita amount delivered during the Marshall plan for the reconstruction of Europe after the Second World War. The problem again could be corruption. These NGOs

⁴³ <http://www.disasteraccountability.org/>

were not familiar to this operation field and so have to go through a deeper corruption. The Daily Mail⁴⁴ reports that NGOs paid double rates for lorry loads of water.

In April 2010 a Haiti Interim Recovery Foundation was composed by Haitian government and donors to manage the reconstruction. In such an urgent case, a government mined by corruption could not face the problem and manage the recovery. Corruption damages trust in government and this trust is essential for the success of recovery. Moreover corruption leads to some inefficiency. It is the case for public plan of intervention but for NGOs initiatives too. In the case of Haiti, a stable government would be a barrier for such inefficiencies and the disaster would not have such an impact in the whole country.

3) DATA PRESENTATION AND METHODOLOGY

After working on the theoretical field, I will conduct a cross-country study on the correlation between growth and corruption. The added-value of this regression analysis is in the use of new data (for 2011).

A) DATA SOURCES

To conduct this study, I will use two types of data, first aggregate data on countries situations giving me materials for my control variables and two types of corruption indicator.

The first one is the Corruption Perception Index computed by the NGO, Transparency international together with Johann Graff Lambsdorff from the University of Passau. I took the value of the CPI for 2011. This index is described in the first part and summarizes the data collected by surveys of different institutes on the way how businessmen, officials and citizens feels the corruption in each country.

⁴⁴ Daily Mail : <http://www.dailymail.co.uk/news/article-2092425/Haiti-earthquake-How-donated-billions-INCREASED-poverty-corruption.html#ixzz2NWNJGYoB>

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The second one is the Corruption control index from the World Governance Index established by the World Bank. As for the CPI, I took the values for the year 2011. The corruption control index, as the World Bank defined it, “captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests”⁴⁵. This index has been computed by Daniel Kaufmann, Aart Kraay and Massimo Mastruzzi.⁴⁶ The lowest value is (-2,5) and involves a high level of corruption whereas the biggest value is 2,5 and involves no corruption in the country.

Corruption Index for developing countries in the sample	Mean	Standard deviation	Minimum	Maximum
CPI	3,14	1,08	1,50	7,20
Control of corruption	-0,45	0,59	-1,55	1,57

TABLE 3: CPI INDICATOR AND CONTROL OF CORRUPTION INDICATOR / SOURCE: TRANSPARENCY INTERNATIONAL (2011) AND WORLD BANK’S WORLD GOVERNANCE INDICATOR (2011)

Concerning the aggregate values reporting the country situation, I will use the GDP per capita using purchasing power parity and constant dollar (2005), the trade openness indicator (defined as (Export+Import)/Gross Domestic Product) data collected by the World Bank. Moreover I will use the computed mean years of schooling using Barro and Lee’s (2010) methods and actualized with the UNESCO Institute for Statistics data on education attainment data of 2011. Moreover I will use the latitude value of the countries contained in the set collected by the NASA. All values taken into account are for 2011. We can summarize these data in the following table:

⁴⁵ <http://info.worldbank.org/governance/wgi/pdf/cc.pdf>
⁴⁶ (Kaufmann, Kraay, & Mastruzzi, 2010)

Control variables for developing countries in the sample	Mean	Standard deviation	Minimum	Maximum
GDP per capita	4993,40	4331,28	329,30	15501,42
Trade openness	81,47	35,44	24,51	223,99
Mean years of schooling	6,09	2,44	1,21	12,11
Absolute value of the latitude	17,03	11,98	0,00	46,00

TABLE 4: PRESENTATION OF CONTROL VARIABLES AND OF EXPLAINED VARIABLE / SOURCE: WORLD BANK DATABASE (2011) AND NASA.

B) DISCUSSION ON THE CONTROL VARIABLES

Before going further I should discuss the control variables I will use to conduct my regression analysis. As introduced before, I will use three control variables: trade openness, Mean years of schooling (as a proxy of the education level) and the absolute value of the latitude.

I use trade openness and take the definition given by Sachs and Warner (1995). The debate on the impact of trade on growth is open since a very long time but since Ventura (1997), Acemoglu and Ventura (2002), or even Edwards (1998), we have some evidences to prove that growth is positively connected with trade.

The second control variable is latitude. Even if there is not a commonly accepted explanation, a correlation between the absolute value of the latitude and the economic performance has been proved by several authors (see Nordhaus and Xi Chen, 2009).

I add education to my control variables because several studies found a direct correlation between growth and education (Krueger and Lindhal 2001). Some author defines education as a determinant of growth (Barro 2002). The debate appears as closed, and the link obvious on the theoretical field.

C) METHODOLOGY

To deal with the problem of corruption, I will regress a proxy of growth on different corruption indicators and study the robustness of the indicators obtained. First of all I used values for the year 2011 to conduct a cross-country study. Using data of 2011 and focusing on developing countries let me work with data and a sample never used for this type of studies before.

First, I use an analysis in log-linear terms to be able to compare change in the percentage value of the GDP per capita with change in the value of my corruption indicators and of my control variables. This method is used by Mauro for the first approach of the subject. Moreover using a per capita variable provides us a measure of efficiency. Variations in Y are consequently not explained by population growth. The goal of our study is so to study how corruption affects the impact of classical production determinants in a classical production function (Cobb-Douglas for example). K could be correlated with corruption so it will not be added to the model.

I use linear terms for all control variables as it was made previously in the majority of the studies except for trade openness. As Yanikkaya (2003) summarizes it in his paper, the literature on the effect of trade barriers on growth in developing countries did not arrive to a consensus. With our data, we found a relationship with a quadratic term, which fit more or less with the previous literature.

For the “control of corruption” variable I will add 2,5 (- the lower bound of the indicator) to the value computed for each country in order to avoid distortion due to the sign of the indicator or due to same absolute values representing different corruption level), but the main goals is to create an indicator comparable with the CPI and a ranking from 0 to 10 that is the reason why I multiply the result $WGI+2,5$ by two. As a consequence I obtain a ranking from 0 to 10, 10 being the lower level of corruption possible in order to be able to compare estimate with this proxy and estimate with CPI.

To test the hypotheses, I will use the following formula:

$$\text{Log}(Y/L) = \beta_0 + \beta_1 \text{ corr} + \beta_2 \text{ lat} + \beta_3 \text{ trad}^2 + \beta_4 \text{ trad} + \beta_5 \text{ mys}$$

Afterward I will lead two regressions with two proxies of corruption (CPI and 2(WGI+2,5)) to check the accuracy of the results.

The key parameter is β_1 . If growth is adversely correlated with corruption level, β_1 is positive, and if β_1 is positive growth appears as negatively correlated with corruption (a higher corruption indicator indicates a lower level of corruption).

Moreover the objective is to understand the magnitude of the impact of corruption on growth so I will construct confidence interval for β estimates.

With corruption perception index, corruption control index from the world governance indicator is the corruption indicator used, lat is the absolute value of the latitude, trad^2 is the quadratic term of trade openness, and mys is the mean years of schooling in the country (used as a proxy of the quality of education).

D) SAMPLING

To create the sample, I take countries present in all data sets and stay careful on taking into account different countries types, from different part of the world and with different political regime (to avoid no meanings in my control variables). The first set includes 95 developing and transition countries (defined as non-developed countries) but a simple regression of growth on CPI for this sample let appear an important subgroup: Transition countries (see chart 3)

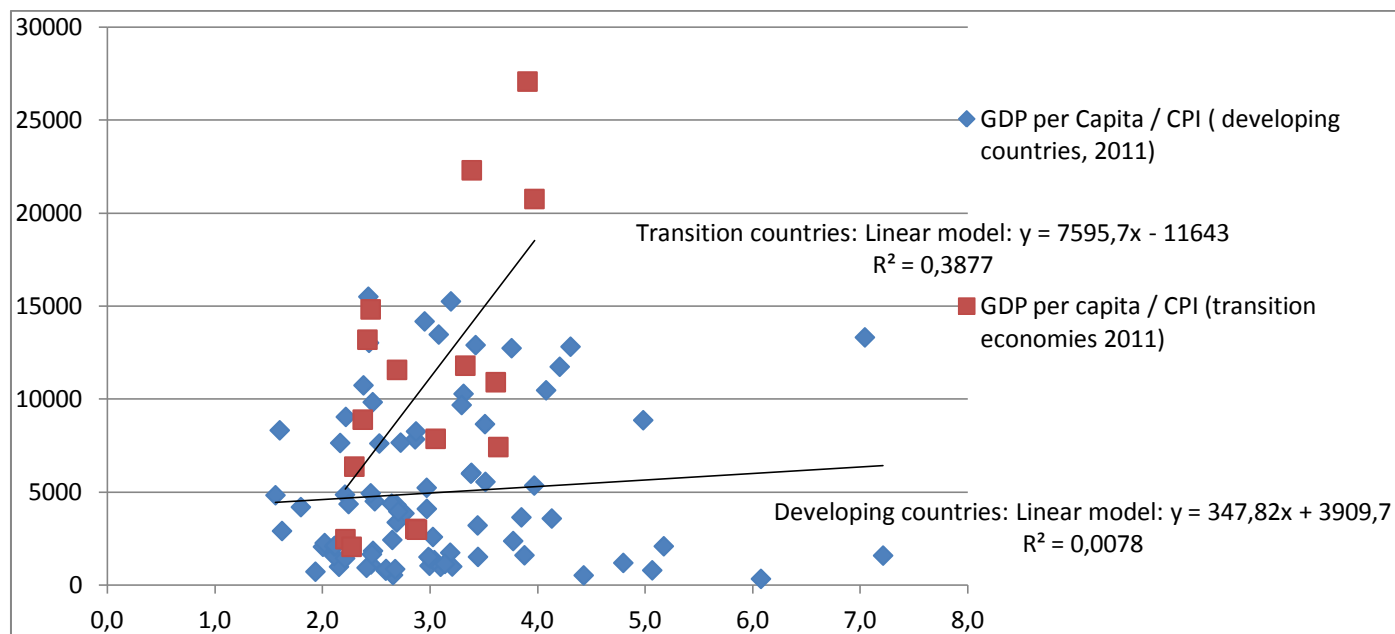


CHART 3: SIMPLE REGRESSION DRAWING: GDP PER CAPITA ON CPI / SOURCES: WORLDBANK (2011) TRANSPARENCY INTERNATIONAL (2011)

According to the literature, no consensus exists on the place of transition countries. On the chart 3, we can see that they compose a pretty homogeneous group regarding the corruption level (CPI index between 2 and 4). Analyzing this fact we can say that transition countries have quite the same institutional and cultural structure remaining from the soviet union. The difference in GDP per capita are more puzzling, it could be the result of the development decision-making of soviet politicians. These decisions created a lot of differences among the union and therefore some differences in the transition process during the nineties.

We will consequently separate transition and developing countries (strictly speaking) in our sample. We obtain a group of 78 strictly speaking developing countries and a group of 17 transition countries (See the sample in appendix) which we will treat as a full sample (regression would be hard because of the low number of countries in the sample and so we will not report results because they appear as meaningless).

4) CORRUPTION AND GROWTH: REGRESSION ANALYSIS AND COMMENTS

To conduct this econometric study, I will first use a multiple regression model in order to find the trend in the relationship between corruption and growth. Afterward I will interpret the results in term of correlation but in term of magnitude of the correlation too. Finally I will check the robustness of my results in using another proxy and drop control variables to observe possible correlation between independent variables.

A) FINDINGS

We will first lead regressions of the CPI on log(GDP per capita). The first set of results is reported in Table 5

<u>Regression</u> <u>Log (GDP per</u> <u>capita)</u>	<u>Coefficient β</u>	<u>Standard error of</u> <u>coefficient</u>	<u>t statistic</u>
<u>Constant</u>	6,40698	0,39676	16,14837**
<u>CPI Index</u>	0,19905	0,07543	2,63879**
<u>Latitude</u>	0,01097	0,00649	1,69*
<u>Trad²</u>	0,00008	0,00003	2,22653**
<u>Trad</u>	-0,01597	0,00761	-2,09907**
<u>MYS</u>	0,25519	0,03618	7,05330**

*, ** indicates respectively an estimate significantly different from zero at the 10% and 5% level

standard error of regression	0,61366	adjusted coef of determination	62,25%	residual degrees of freedom	72
coefficient of determination	64,70%	number of observations	78	t-statistic (95%-confidence intervals)	1,9935

TABLE 5: REGRESSION OUTPUT FOR DEVELOPING COUNTRIES. LOG(GDP PER CAPITA) ON CPI (2011)

B) INTERPRETATION

These results confirm the first hypothesis that corruption has an impact on growth. Looking at the value of the coefficient β_1 , we can see that $\log(\text{GDP per capita})$ is positively correlated with what we may call “probity index” (to have a direct connection between GDP per capita and corruption, the ranking should have been inversed and a higher value would indicate a higher corruption level). The β estimate is positive, so growth is adversely connected with corruption. It confirms the first hypothesis I put at the beginning of the Thesis.

But the relationship is strictly linear, so we can't imagine an optimum level of corruption according to these data. These results are in line with the results of previous studies on the impact of corruption on growth (e.g. Mauro 1995) or (Lambsdorff, 2004). To have an idea on the meaning of the β value we can say that an increase of approximately two points (the difference between two countries such Central Africa and Turkey) in the CPI index causes a change of approximately 0,1% of the GDP. The variation does not look so important concerning growth but it could explain a big loss in absolute terms. Moreover this value could explain the difference among developing countries and the impact is multiplied since ages (like a geometric sequence).

The total effect of a two points-difference in terms of CPI on growth could be computed as it follows:

$-0,1/(1-0,1) = 0,111$ points in terms of $\log(\text{GDP per capita})$ if we spread the effect on a long period (and because corruption is a long-term problem).

According to these data we can be pretty sure about the effect of corruption on growth, the t-ratio for the variable “CPI” is 2,63879 so the p-value is about one percent and this variable is significant. Moreover the model gives us a good explanation of the model. To have an idea on the signification of this ratio. We can construct one confidence interval for the value of β_1 such that the “real value” of β_1 is in a 95%-confidence interval defined as:

$$(\beta_{1\text{estimate}} - t_{\alpha/2} * SE\beta_1 ; \beta_{1\text{estimate}} + t_{\alpha/2} * SE\beta_1)$$

So the value of β_1 belongs to the interval (0,0487; 0,3494). Consequently the value of β_1 is at least positive at a 95%-confidence level.

We can also say that our model explain pretty well the variation in $\log(\text{GDP/Capita})$, because we check a pretty good value for the adjusted $R^2= 62,25\%$.

Moreover we can check the control variables, which are all significant with the correlation expected in the model. The model constructed is consequently significant, corruption is one of the key determinants for growth as education, geography, trade openness and variables non-included in our model.

C) ROBUSTNESS CHECK

To check the robustness of our results to the choice of control variables, we therefore run our estimations again, first dropping one control variable at a time, and then drop all of them. To validate the model I decided to apply a robustness check using the “Control of corruption” variable contained in the world governance indicator. The results obtained are in table 6.

<u>Regression</u> <u>Log(GDPper</u> <u>capita)</u>	<u>Coefficient β</u>	<u>Standard error of</u> <u>coefficient</u>	<u>T statistic</u>
<u>Constant</u>	6,32299035	0,42293526	14,9503**
<u>2(WGI + 2,5)</u>	0,1620802	0,06964903	2,3271**
<u>Latitude</u>	0,01084757	0,00656202	1,6531
<u>Trad²</u>	7,3141E-05	3,5163E-05	2,0801**
<u>Trad</u>	-0,0152516	0,00769665	-1,9816*
<u>MYS</u>	0,25898264	0,03672651	7,0517**

*, ** indicates respectively an estimate significantly different from zero at the 10% and 5% level

standard error of regression	0,619	adjusted coef of determination	61,492%	residual degrees of freedom	72
coefficient of determination	63,993%	number of observations	78	t-statistic (95%-confidence intervals)	1,9935

TABLE 6: REGRESSION OUTPUT FOR DEVELOPING COUNTRIES: LOG (GDP PER CAPITA) ON WGI (2011)

We again find the same signs for all variables. All control variables are significant except latitude (we can imagine that because WGI is basically a governance index, it could be correlated with geography and so this variable could be insignificant after all). We can find a small difference concerning the R² with a value of 58,14% now. As in the previous model (with a different proxy for corruption) we can construct a confidence interval for β₁.

$$(\beta_{1estimate} - t_{\alpha/2} * SE\beta_1 ; \beta_{1estimate} + t_{\alpha/2} * SE\beta_1)$$

β₁estimate confidence intervals	<u>I</u> <u>statistics</u>	<u>With proxy 1</u>	<u>With proxy 2</u>	<u>(Both conditions taken into account)</u>
<u>Value of β₁estimate</u>		0,19905	0,1620802	
<u>Value of standard deviation</u>		0,07543	0,069649	
<u>95% Confidence intervals (upper bound)</u>	1,9935	0,349417	0,300923	0,300923
<u>95% Confidence intervals (lower bound)</u>	1,9935	0,048683	0,0232374	0,048683
<u>90% Confidence intervals (upper bound)</u>	1,6663	0,324739	0,2781364	0,27814
<u>90% Confidence intervals (lower bound)</u>	1,6663	0,073361	0,046024	0,07336

TABLE 7: CONFIDENCE INTERVAL CONSTRUCTION

With this proxy β₁ belongs to (0,02325; 0,3009). In both regression we can see that it is hard to catch the magnitude of the effect of corruption on growth. But we can cross the values of this interval and we obtain a smaller one.

Combining the intervals β₁ should belong to the interval (0,0487,0,3009) (the interval is not more precise). But if we take an interval with a 90%-confidence level, for the first regression we obtain better intervals as it is shown in table 7.

Nevertheless, confidence intervals constructed by this way do not lead to a very precise idea of the magnitude of corruption effects on growth. We can although notice that the β

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coefficient is not equal to zero in all confidence intervals. We can claim that corruption and growth are consequently negatively correlated.

Moreover, we took into account a lot of country-specific traits, but we should stay vigilant because of multi-colinearity problem. A positive correlation between corruption and education or trade openness might exist because education and trade openness are a mean for the diffusion of ideas and could reduce corruption. Moreover corruption weakens the educational system and somehow discourages the pursuit of schooling so it could reduce our proxy (mean years of schooling).

The latitude and even more the geographical aspect could explain the level of corruption (Especially regarding the strategy of the colonizers (Treisman 2000)). To check the validity of the results on the choice of the control variables, we will first drop one of these variables and then all of them to see if the relationship between growth and corruption exists. Results will be summarized in table 8

<u>Variables / β coefficients</u>	<u>Constant</u>	<u>CPI index</u>	<u>Latitude</u>	<u>Trad²</u>	<u>Trade Openness</u>	<u>MYS</u>
<u>Without Lat</u>	6,3863**	0,2069**		7,0095E-05**	-0,0145*	0,2750**
<u>Without Trad</u>	5,7957**	0,1962**	0,0091			0,2487**
<u>Without MYS</u>	6,5139**	0,4407**	0,02584**	5,38E-05	-0,00834	
<u>Without control Variables</u>	6,4961**	0,5053**				

*, ** indicates respectively an estimate significantly different from zero at the 10% and 5% level

TABLE 8: ROBUSTNESS CHECK AND CONTROL VARIABLES DROPPING.

We can see that despite the change concerning control variables, probity and log(GDP per capita) are positively connected in each case. According to these results education and probity are positively correlated because the value of β_1 increases a lot if we omit the variable mean years of schooling.

After these robustness checks, the model is confirmed and corruption is negatively correlated with growth and it does not depend on the control variables we choose. The results are consistent with the sand the wheels hypothesis. The magnitude of betas indicates a high form of sand the wheels hypothesis, implying that corruption leads to inefficiencies in the majority of the countries present in the sample.

CONCLUSION

The introducing quote of Bernanos is puzzling. The main problem of corruption is that “the end justifies the means”. But corruption creates a distortion in the definition of end. It is not the notion of public welfare as in most of constitutional systems but the private gain. Corruption let men achieves their own “ends” and not the end of the society. As Bernanos remarks this sacrifice of a societal end for the sum of private ends is the key point of the corruption problem. He suggested that the change of the societal end by personal ends could cause the “death of a society”. The mean justified by this end is the destruction of the means achieving society’s welfare.

First corruption may deals with moral issues, which are the reason why NGOs like Transparency International tries to fight it. Corruption intervenes in the domain of law at first but implies a lot of economical interferences. That is the reason why the World Bank put the fight against corruption as one of the most important objective of its actions. This paper emphasizes the economic consequences of corruption. We were interested in two types of reality behind this conceptual correlation. First we wanted to catch the concrete aspects induced by corruption on growth. Second we decided to catch an overall reality and to present statistical results with new data (for 2011) of a regression model explaining change in GDP per capita. Mixing both approaches let us catch two different realities.

To illustrate the mainstream, we took one easily measurable variable; GDP per capita as a proxy of growth and of economic efficiency of a country. Thanks to a literature review we were aware that the correlation between growth and corruption is hard to catch. The countries in the sample reflect the variety of developing countries. A case study on Haïti was conducted in order to point out the concrete forms of corruption in a country in its impact on a society. As Bernanos argues, corruption weakens the society (here I took the Haitian infrastructure examples) until a point where corruption leads to poverty and poverty leads to corruption. Corruption leads to weak infrastructure and so to a weak economy and sometimes to a shorter life expectancy. Nevertheless, after this case study to show an extreme situation, I choose to lead a standard regression to catch overall phenomena and see if the case of Haiti

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could spread over a corrupt world or not. Our model shows that probity could be a growth factor as human capital, natural resources...

One of the policy packages we may draw from this study is to protect some sectors from corruption. It could also be a strategy for corrupt officials. If bribing is fully spread on a country, it weakens its economy. If the economy is too weak, officials have not the certitude of their future income from bribing (the disposable revenue of an economy to bribe official is very volatile if the economy is weak). Moreover in the case of Haiti corruption affects the labour force. The example of Haiti shows a double correlation. If corruption slows down growth, this brake will reduce a future bribing too. That is the reason why some officials imagine different form of corruption (percentage of enterprise profit...) in order to avoid weakening the basis of an economy.

Huge differences exist between developing countries regarding the effects of corruption. That is the reason why we incorporated 3 control variables representing one geographical variable (latitude), one representing how the country is integrated in international trade (trade openness) and one representing the efficiency of the political system on the labour force (mean year of schooling as a proxy of education quality or level).

The results I obtain are in line with the mainstream. Corruption could be somehow negatively correlated with growth and so validates the sand the wheels hypothesis. This hypothesis is confirmed. The regression let some question unsolved. The magnitude of the effect of corruption over growth cannot be computed so easily due to a high standard error for the regression coefficient. Interpretations on the value of the coefficient are also really hard to lead. The negative correlation is moreover confirmed with a regression of a second proxy ($2(WGI+2,5)$), and the estimated amplitude of corruption on $\log(\text{GDP per capita})$ is approximately the same but with an important variance.

A possible policy implication of these results would be to reduce some types of corruption in order to improve the efficiency of good governance. The role played by corruption on growth is somehow correlated with governance. Corruption is a way to avoid law; it could be harmless laws but efficient laws as well. Consequently we can not deduce precise policy implications from our results because corruption is not an isolated variable. Its

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effects are connected with governance variables for example (see Méon & Weill, 2008).
Moreover the efficiency of those policy depends on phenomena we can not fully understand.

APPENDIX

A1- COUNTRIES IN THE SAMPLE.

Developing countries: Afghanistan, Angola, Argentina, Bangladesh, Benin, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, Burundi, Cameroon, Central African Republic, Chile, Colombia, Comoros, Congo Republic, Congo Democratic Republic, Costa Rica, Cote d'Ivoire, Dominica, Dominican Republic, Ecuador, Egypt, El Salvador, Ethiopia, Gambia, Georgia, Ghana, Guatemala, Guinea, Haiti, Honduras, India, Indonesia, Kenya, Lebanon, Lesotho, Liberia, Madagascar, Malawi, Malaysia, Maldives, Mauritania, Mauritius, Mexico, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nepal, Nicaragua, Nigeria, Pakistan, Papua New Guinea, Paraguay, Peru, Philippines, Rwanda, Samoa, Sao Tome & Principe, Senegal, Serbia, Sierra Leone, Solomon Islands, South Africa, Sri Lanka, Soudan, Swaziland, Tanzania, Thailand, Togo, Tonga, Tunisia, Turkey, Uganda, Uruguay, Zambia.

All countries belong to the dataset of the Worldbank and of Transparency International dataset for the CPI index.

Transition countries: Albania, Azerbaijan, Belarus, Bulgaria, Cambodia, China, Kazakhstan, Kyrgyzstan, Laos, Moldova, Romania, Russia, Tajikistan, Turkmenistan, Ukraine, Uzbekistan, Vietnam.

Developed countries: Australia, Austria, Bahamas, Belgium, Brunei, Canada, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hong Kong, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea (South), Luxembourg, Malta, Netherlands, New Zealand, Norway, Portugal, Saudi Arabia, Singapore, Slovakia, Slovenia, Spain, Sweden, Switzerland, United Kingdom, United States.

BIBLIOGRAPHY

Acemoglu, & Ventura. (2002). The World Income distribution. *The Quaterly Journal of Economics*, May , pp. 659-684.

Aidt, T. S. (2009). Corruption, institutions and economic development. *Oxford review of economic policy*, Vol 25, no 2 , pp. 271-291.

Bardhan, P. (1997). Corruption and development: a revue of issues. *Journal of economic literature*, Vol 35, no 3 , pp. 1320 -1347.

Barro, R. J. (2002). Education as a determinant of economic growth. *Hoover Institutions Press* .

Ehrlich, I. (1999). Bureaucratic Corruption and endogeneous economic growth. *Journal of Politic Economy*, Vol 107 , pp. 270-293.

Huntington, S. (1968). *Political order in changing societies*. New Haven: Yale University Press.

Hutchcroft, P. D. (1991). Oligarchs and Cronies in the Philippine State the Politics of Patrimonial Plunder. *World Politics*, Vol 43 , pp. 414-450.

Jain, A. K. (2001). Corruption: a review. *Journal of economic surveys*, Vol 15 , pp. 71 - 121.

Kaufmann, D., Kraay, A., & Mastruzzi, M. (2010). The Worldwide Governance Indicators : A Summary of Methodology, Data and Analytical Issues. *World Bank Policy Research Working Paper no 5430* .

Kenny, C. (2007). Measuring Corruption in Infrastructure: Evidence from Transition and Developing Countries. *Journal of Development Studies* ,pp. 314 -332.

Krueger, A. B., & Mikael, L. (2001). Education for Growth: Why and for Whom? *Journal of Economic Literature*, *American Economic Association* vol. 39(4) , pp. 1101-1136.

La Porta, R., Lopez de Silanes, F., & Shleifer, A. (1996). Law and Finance. *National Bureau for Economic Research - Working Papers* .

Lambsdorf, G.-J. (2003). How corruption affects productivity? *Kyklos* Vol. 56 , pp. 457-474.

Leff, N. (1964, November). Economic development through bureaucratic corruption. *American Behavioral Scientist*, Vol 8 , , pp. 8-14.

Mauro, P. (1995, August). Corruption and Growth. *The Quaterly Journal of Economics*, Vol 110, no 3 , , pp. 681-712.

Mendez, F., & Sepulveda, F. (2006). Corruption, growth and political regimes: cross country. *European Journal of Political Economy* , vol. 22, no. 1 , pp. 82-98.

Méon, P.-G., & Weill, L. (2008). Is corruption an efficient grease? *Bank of Finland, Institut of transition economies* .

Nejat Anbarci, M. E. (May 2009). The Ill Effects of Public Sector Corruption in the Water and Sanitation Sector. *Land Economics* , pp. 363-377.

Corruption and growth in developing countries

Reinikka, R., & Svensson, J. (2006). Using Micro-Surveys to measure and explain corruption. *World development*, vol 34, no 2 , pp359-370.

Rock, M. T., & Bonnet, H. (2004). The comparative politics of Corruption: Accounting for the East-Asian Paradox in empirical studies of corruption, growth and investment. *World Development*, Vol 32, no 6, , pp. 999-1017.

Rose-Ackerman, S. (1978). *Corruption, a study in political economy*. Academic Press.

Rose-Ackerman, S. (1996). *The political economy of corruption*. WorldBank.

Sachs, & Warner. (1995). Natural Resource Abundance and Economic Growth. *Papers 517a, Harvard - Institute for International Development*.

Sebastian, E. (1998). Openness, productivity and growth: What do we really know? . *National Bureau of Economic Research* .

Svensson, J. (2005). Eight questions about corruption. *Journal of economic Perspectives*, no 3 , pp. 19-42.

Tanzi, V., & Hamid, D. (1997). Corruption, Public Investment and Growth. *IMF Working papers* .

Treisman, D. (2000). The causes of corruption: a cross-national study. *Journal of public economies* , pp. 399-457.

Ventura, J. (1997). Growth and Interdependence . *The Quaterly Journal of Economics*, Vol 112 , pp. 57-84.

Wedeman, A. (1997, Summer). Looters rent-scrapers, and dividend-collectors: corruption and growth in Zaire, South Korea and the Philippines. *The Journal of Developing Areas*, Vol 31, no 4 , pp. 457-478.

Wei, S.-J. (2000, February). Local corruption and global capital flows, Comment and Discussion. *Brookings Papers on Economic Activity* , pp. 303-346.

Yanikkaya, H. (2003). Trade openness and economic growth: a cross-country empirical investigation. *Journal of development economics* , pp. 57-89.