Hossam Boutaïbi 314994

ERASMUS UNIVERSITEIT ROTTERDAM

Master thesis

Msc Economics and Business – International Economics and Business Studies

Corruption: The influence of government wages on corruption.

Hossam Boutaïbi 314994

Master thesis

Msc Economics and Business – International Economics and Business Studies

Corruption: The influence of government wages on corruption

An empirical study on the relationship between government wages and corruption for thirteen European countries, and an experimental design to examine the cheating behaviour of students.

Erasmus University Rotterdam

Erasmus School of Economics

Department of Economics – International Economics

Name: Hossam Boutaibi

Student number: 314994

Thesis supervisor: Dr. J.T.R. Stoop

In dedication to my father Allah y rahmou and my mother.

I did it my way.

Acknowledgments

Alhamdulillah.

I would like to acknowledge the support and patience of a few people. First, I would like to acknowledge and thank my supervisor, Jan Stoop, for his guidance and advice during my thesis. His feedback and quick responses helped me to complete this thesis. Likewise, I would like to thank my friends and particularly Mounssif Hammoudi, Rachid el Mimouni and Samaan Mochtari for their advices during the making of this thesis. Last but not least, I would like to thank my family and especially my little sisters for their support and their patience and off course my mother. Without her I could not have completed my thesis. She has sacrificed her life for my sisters and me. She had the opportunity to take the easy way out, but she didn't. Hence, I want to dedicate this master thesis to her. Further, I want to acknowledge the sacrifices of my father Allah y rahmou. Despite the fact that I cannot share this moment with him, I also want to dedicate this master thesis to him.

Houssam Boutaïbi

Rotterdam, September 2013

Abstract

People consider corruption as one of the biggest problems in the world, nonetheless there is still no effective solution for corruption. In the battle against corruption, international organizations frequently suggest higher wages in the civil service. Several authors have been investigating the relationship between the payment of higher wages and corruption, however the results are not sufficient. This thesis contributes to the existing literature by investigating the two important theories on how government wages can eliminate corruption, respectively the shirking hypothesis and the fair-wage hypothesis. I tested the fair-wage hypothesis empirically and found robust evidence that increasing government wages has a significant positive influence on corruption in developing countries. Furthermore, I designed an experiment to investigate the shirking hypothesis, however I was not able to execute the actual experiment due to limited funding. I conducted a questionnaire and found suggestive evidence that students have a higher incentive to cheat when they assume that they are anonymous, while they have a higher incentive to be honest when they assume that they are being monitored. The findings of this paper confirm that government wages have an influence on corruption.

Table of content

Section 1 Introduction

People consider corruption as one of the biggest problems in the world. The phenomenon has existed for centuries, but there is still no effective solution for corruption. Where the economists often focus on the incentives and punishments, social scientists accentuate the values and ethics of the people. We can see a tendency of a combination of the two approaches, not only in the economy, but also in the law. The interest in behavioural economics and behavioural law is spreading. In this paper I will try to combine the two worlds of International Economics and Behaviour Economics.

Unfortunately we can observe that wherever there is capital involved there will be problems of corruption. In order to solve the problem we need to understand what the cause of corruption is. First of all we need to define corruption. We can distinguish two general types of corruption: political corruption and economic corruption. This thesis will cover economic corruption. The most common definition of corruption in the economics is "the use of a public office for private gains", (Bardhan, 1997). In this thesis I will utilize this definition.

Before proceeding with the thesis, I want to make one more remark concerning a variation of economic corruption. Another type of economic corruption that has not been discussed in the literature, besides the discussions in journalism, is the corruption in sports. The world of sports nowadays is a multi- billion dollar business. In contrast to the other variants of corruption it is rather easy for people with bad intentions, for example the gambling industry, to bribe players in sports. For instance, in football, you can bet on the time of the first tackle or the first throw. For example, players that are bribed have a little risk of getting caught, since it is almost impossible to prove that the player did it on purpose.

Corruption is not only a problem of the developing countries. In the western world, political corruption forms a bigger problem than economic corruption. For instance, in the United Kingdom and the United States, the economic corruption is at a minimal level, nonetheless there is a large amount of political corruption in the shape of lobbying. In these countries laws are sold to the highest bidder. Transparency International launched in 1995 for the first time the Corruption Perception Index (CPI), the CPI is the most used index in empirical literature on corruption, and is based on the perceptions of businesspeople. Furthermore, the CPI only measures the economic corruption in a country. Bardhan (2006) pointed out that there is a

discrepancy on the view of corruption in the world, due to the different cultures in the way they measure corruption. Therefore we have to take that into consideration when we use the figures and statics of Transparency International.

Bardhan (2006) noted that corruption can have a positive effect on the economic growth, when the briber pays speed-money to speed up your case. On the other hand the bureaucrats will have a negative incentive to delay the file, as the bureaucrats will get higher bribes if the files are delayed.

In the battle against corruption, international organizations frequently suggest higher wages in the civil service. Several authors have been investigating the relationship between the payment of higher wages and corruption, however the results are as clear as dishwater (Svensson, 2005). There are not many empirical studies on the relationship between government wages and corruption. This thesis contributes to the existing literature by investigating the two important theories on how government wages can eliminate corruption, respectively the shirking hypothesis and the fair-wage hypothesis. The fair-wage hypothesis will be tested empirically, while I will test the shirking hypothesis with designing an experiment. The purpose of this thesis is to find out more about the relationship between government wages and corruption. The empirical study of this thesis is built on the theoretical framework of Van Rijckeghem and Weder (2001). The designed experiment is in some way a variation of the cheating games developed by Jiang (2013) and Heusi and Fischbacher (2008).

This thesis found robust evidence for a relationship between government wages and corruption. The empirical model shows that increasing government wages has a significant positive influence on corruption in developing countries. This is in line with the findings of Le, Haan and Dietzenbacher (2013). Since I was limited in funding, I was not able to execute the actual experiment. Hence, I conducted a questionnaire on a sample of 100 students of the Erasmus University. The questionnaire is a slimmed-down version of the experiment. I found robust evidence that students have a higher incentive to cheat when they assume that they are anonymous, while they have a higher incentive to be honest when they assume that they are being monitored.

This thesis continues as follows. Section 2 describes the relevant literature studies. Section 3 highlights the data and empirical model. After that, section 4 presents the empirical results and the analysis of the regression models. In section 5 I will present the designed experiment, followed by section 6 which presents the results of a questionnaire based on the experiment. Finally, I will finish with the concluding remarks in section 7.

Section 2 Literature review

Corruption has always been a popular topic in the economics, dating back to in the 1960s (Leff, 1964). Aidt (2009) described that economics tend to divide the world in two ways of view, the 'greasers' and the 'sanders'. The 'greasers' think that corruption can have a positive effect on economic growth of a country, whereas the 'sanders' think that corruption has a negative effect on the economic growth of a country.

Greasers

In a challenging article Leff (1964) argued that corruption can have positive effect on the economic growth. First, he argued that corruption can reduce uncertainty and increase investment. Secondly, that corruption also can increase the competition and therefore improve the efficiency of an economy. Leff's theory has been supported by several authors as Lui (1985), he argued that paying civil servants speed-money can be efficient. Beck and Maher (1986) showed that firms are indifferent if a country has a high level of corruption.

In an empirical study of Egger and Winner (2005) about the relationship between foreign direct investment (FDI) and corruption they found evidence for the theory of Leff (1964), that corruption can have a 'helping hand' with regard to the FDI. Egger and Winner (2005) first used a panel study of 73 countries, between 1995 and 1999 to estimate the short and long run impact of corruption on the FDI. Secondly, they used a Hausman-Taylor model to untangle the short and long run so they can account the potential endogeneity of the long run impact. Thirdly, they used several types of corruption data for the robustness of their study. This is in contrast to the empirical studies of 'sanders' since Egger and Winner used a cross sectional study to examine the impact of corruption on the economic growth on the long run. Their results suggest a positive relationship between corruption and FDI, due to the short time period the results are distorted.

Sanders

One of the most prominent 'sanders' is Paulo Mauro. Mauro (1995) examined the relationship between corruption and the economic growth, by using the indicators for corruption, political stability, the amount of red tape and judicial system efficiency with a cross section study for 58 countries. Mauro (1995) showed in his empirical study that there is a significant negative

relationship between corruption and economic growth. Mauro (1996) supported his findings of 1995 with new evidence that corruption has a significant negative effect on economic growth.

Mo (2001) supported the results of Mauro (1995) by using a different view on the influence of corruption in relation to economic growth. Mo wanted to study empirically which transmission channels had an effect on the economic growth, especially the gross domestic product (GDP) growth. He concluded that an increase in the corruption level of one percent decreases the growth rate with 0.72 percent. Of three transmission channels – Political instability, human capital and private investment – is the effect of corruption on the economic growth through the channel of political instability the biggest.

The majority of empirical studies that examined the relationship between corruption and economic growth found a significant negative relationship. For a review of some empirical literature and theoretical literature, I refer to Bardhan (1997) and Wei (2001). In following of Mo (2001), Pellegrini and Gerlagh (2004) found that a rise of the corruption level decreases the economic growth in a country. Aidt (2009) concludes that evidence of the 'greasers' is very poor, due to negative correlation he found between corruption and growth in genuine wealth per capita as a measure of sustainable development.

2.1 Theoretical framework

International organizations as well as economists acknowledge that acceptable rewards for civil servants are necessary, to avoid incentives to be corrupted (Tanzi 1994, Mauro 1996). We can distinguish two important theories on how wage is the most efficient way to eliminate corruption: The shirking model and the fair wage model. The theoretical framework of this thesis is built on the analysis of Van Rijckeghem and Weder (2001).

Shirking model

The shirking model is a model that was presented first by Becker and Stigler (1974) and later continued and developed by Shapiro and Stiglitz (1984). Corruption is modelled as a continuous variable in the theoretical framework, following Van Rijckeghem and Weder (2001). The present discounted value of expected income can be formulated in a multi- period model as:

$$PDVt = (1 - pC)(CB + Wg) + pC(Wp - f) \quad (1)$$

- ✓ $PDVt$ = the present discounted value of expected income in time t
- ✓ $pC = C$ stands for the amount of corrupted actions and p for the probability that an individual corrupted action can be detected.
- ✓ $CB = C$ is the amount of corrupted actions and B stands for the bribery level
- ✓ Wg = Government wage
- ✓ Wp = Private sector wages
- ✓ f = penalties or prison terms
- ✓ All variables are expected to be exogenous besides for C and are expected to be constant over time, besides variables C and Wg

The equation presents the present discounted value of expected income as an average of an income with corruption, and an income without corruption because of detection. In order to find the equation that will present the condition without any corruption, we need to take the first derivate of the present discounted value with respect to C. After that it is necessary to set C= 0. The equation that presents a condition without corruption can be described as:

$$Wg = Wp + \frac{B}{p} - f$$

In this equation, we can notice that the bribery level and penalties have an influence on government wages. Nonetheless, high probability of detection and high penalties or prison terms can also reduce corruption. Becker and Stigler (1974) and Shapiro and Stiglitz (1984) presume that civil servants maximize their present discounted value of expected income and that wage and penalties have an influence on corruption. A civil servant, in a shirking model, will draw up the balance of the advantage from corruption against the penalties of being arrested. When the bribes are low, and the chance of being caught – and additional the penalties - are high, the shirking model presumes that the incentives to be corrupt will be low. On the other hand when the bribes are high, and the chance of being caught – and additional the penalties - are low, the shirking model presumes that the wage of the civil servant has to be very high to eliminate corruption.

Besley and Mclaren (1993) concluded that an efficiency wage only matters if there is a strong monitoring and a distributed tax burden. So, Besley and Mclaren (1993) suggest that a

government could be better off paying 'capitulation wages' – wages under the efficiency wages that only engage the dishonest – instead of raising the wages to eliminate corruption.

Fair wage model

The fair wage model has been introduced and explored by Akerlof and Yellen (1990). The fair wage hypothesis assumes that workers have a perception of what a fair wage is. In the fair wage model civil servants will minimize their efforts if government wages are lower than the fair wages. Van Rijckeghem and Weder (2001) calibrated the fair wages hypothesis in a theoretical model of corruption. This model presents that workers are willing to achieve, through corruption, an expected income level that equals a fair wage. The equation can be formulated as:

$$EI = (1 - pC)(CB + Wg) + pC(Wp - f) = W*$$

- ✓ EI = Expected income level
- ✓ $W*$ = Fair wage

In order to find the equation that will present the condition without any corruption, we need to take the first derivate of the expected income level with respect to C. After that it is necessary to set C= 0. The equation that presents a condition without corruption can be simply described as:

$$Wg = W*$$

This equation simply shows that a higher fair wage, $W*$, indicates that government wages also need to increase to deter corruption. According to the fair wage model, civil servants would rather want a fair wage than to maximize their income. The motivation for this model is that people who don't get what they are due, will try to do everything to get what they are entitled to. The fair wage model implies that a change in the wages of a civil servant, will have a stronger effect on the corruption level, while under the shirking model monitoring cost and penalties can have greater influence on corruption than raising government wages.

The empirical evidence on the relationship between government wages and corruption is unclear. For instance, Treisman (2000) didn't find strong evidence that higher government wages decrease corruption. He suggested that it could be through the endogeneity, that corrupt civil servants can give themselves higher wages. On the contrary Le, Haan and Dietzenbacher

(2013) found robust evidence that there is a strong relationship between government wages and corruption. For their empirical study they used a new dataset based on micro data and modelled the government wages and corruption to the change of income level. They found robust evidence that an increase of government wages decreases corruption only in developing countries.

An important paper for this thesis is the first empirical study by Van Rijckeghem and Weder (2001) on the relationship between government wages and corruption. Van Rijckeghem and Weder (2001) assembled data on civil service and manufacturing wages, due to the lack of a panel of data on government wages. In this thesis I will also use this method for my empirical study. Van Rijckeghem and Weder (1997, 2001) found evidence for a significant relationship – economically as well as statistically - between government wages and corruption. They argued that a low wage for a civil servant will strengthen him to increase his income illegally, while a higher wage implies a bigger loss when he gets caught. Furthermore they argued that the relationship implies that a huge increase in wages is necessary to deter corruption. Van Rijckeghem and Weder's (1997, 2001) results are too inconclusive to check the validity of the two efficiency wage hypothesis – the shirking hypothesis and the fair wage hypothesis -.

2.2 Experimental literature

Experiments on corruption are an upcoming area in economic studies, dating back to the late 1990s and the early 2000s. In this new area is Klaus Abbink one of the pioneers. Abbink, Irlenbusch and Renner (2002) designed an experiment to test the effect of three aspects[1] on the behaviour of civil servants and bribers. They used a two-player reciprocity and trust game, where one player is the briber and the other player the civil servant. In their results they didn't find evidence that social welfare effects have an influence on the corruption level. However they found evidence that high penalties on corruption could have a strong negative impact on corruption and could tend to discourage corrupt behaviour by civil servants. Abbink (2000) used a comparable game to test the fair wage hypothesis. He didn't find evidence that high wages of civil servants would lead to lower corruption through to fairness factors. While it was impossible for Van Rijckeghem and Weder (2001) to test empirically the shirking and

[1] The three aspects are mutual relationships between civil servants and bribers, negative welfare effects and when discovered high penalties for the civil servant.

fair wage hypothesis, Abbink tested the two hypotheses with an experiment and found evidence for the shirking hypothesis.

Cameron et al (2009) tested the behavioural differences across cultures on corruption in the countries Australia, India, Indonesia and Singapore. They designed a three-player game, where player one is a briber (the firm), player two is a civil servant and player three is a citizen. In the experiment the firm has the ability to propose a bribe to a civil servant, while the civil servant has the possibility to reject or accept the offer. The citizen will observe the actions of the firm and civil servant. In case the civil servant accepts the bribe, the citizen will have the choice to punish both players for their corrupt act. Cameron et al (2009) found a greater diversity in the tendency to punish corrupt behaviour than in the tendency to participate in corrupt behaviour across the countries they had examined. Surprisingly, they found that participants in Indonesia, a country with a high corruption level, have a very low acceptance of corruption. In contrast to Singapore and Australia, countries with a low corruption level, have a higher acceptance of corruption. They assume that freedom of press and more democracy may explain the increased intolerance of corruption in Indonesia.

Veldhuizen (2011) examined the fair wage hypothesis on the relationship between wages in the public sector and corruption. He used an adapted version of the two-player game of Abbink et al (2002). In contradiction to Abbink (2002), Veldhuizen concluded increasing wages of civil servants would deter corruption. He argued that the reference wage is important in empirical studies and that therefore a difference occurred in his findings in comparison with Abbink (2002). In conclusion he argued that a positive monitoring rate is an obligated aspect to fulfil the fair- wage hypothesis.

An important paper for the experiment of this thesis is the paper of Heusi and Fischbacher (2008). They presented a one shot payoff game to determine if participants are either lying or being honest. In their experiment, participants need to throw a dice once to determine their payoff. For the participants it will be beneficial to cheat by reporting a higher score in order to have a higher payoff. Heusi and Fishbacher (2008) found that 39% of the participants are completely honest while 20% of the participants are completely dishonest. Furthermore, 41% of the participants are partial liars, since they didn't report the maximal payoff score. Heusi and Fishbacher (2008) conclude that their model failed to clarify why the majority lies partially.

Another important paper for the experiment of this thesis is the paper of Jiang (2011). In her paper Jiang designed a mind game to demonstrate that a little change in the rules of the game would influence the cheating behaviour. The game has two variants, the 'Throw-first' variant and the 'Report-first' variant. In both variants the player has to undergo three steps: (1) to choose a side of a die, (2) throw the die and (3) he has to report the side he chose. In the 'Throw-first' variant, the player has to throw the die first, and after the player sees the result he has to report the side he chose, 'Up' or 'Down'. In the 'Report-first' variant, the player has to write the side he will choose, 'Up' or 'Down', and after writing his results he may throw the die. Jiang (2011) found evidence that players cheat significantly more if they only choose in their mind, in contrast with the player who has to report his choice. She suggested that making a cheating intent more visible will deter cheating behaviour.

Section 3 Empirical strategy and Data descriptions

This section will present the empirical models and the methodology that was used for the empirical study. In the empirical study of this thesis I will test the fair-wage model. This section will present the description of the data and specifications.

In comparison of Rijckeghem and Weder (2001) I will introduce an estimation model compatible with the literature review. The basic regression model of this paper:

$$CORRUPTIONi,t = \alpha + \beta WAGESi,t + \delta CONTROLSi,t + \in i,t$$

CONTROLS stands for the variables that can have an influence on corruption. I will extensively specify the models used in the empirical study in section 3.3.

3.1 Data description

In order to test the fair-wage hypothesis, the empirical analysis will focus on thirteen European countries for the time period of eight years from 2001-2008. The main reason to focus on Europe is because of previous studies using data samples of countries from different continents which would not always prove to be valid data. The other advantage of European countries is that they all stand negative against corruption – as a result of the influence of the European Union (EU). The thirteen countries that are chosen for this empirical study are Bulgaria(BGR), Estonia(EST), Finland(FIN), Hungary(HUN), Italy(ITA), Latvia(LVA), Lithuania(LTU), Moldavia(MDU), Norway(NOR), Poland(POL), Slovakia(SVK), Slovenia(SVN) and Ukraine(UKR). The countries have been selected on the basis of available comprehensive data. The variables used for the empirical models are obtained from Transparency International, International Labour Organization (ILO) and the World Bank.

3.1.1 Main variables Corruption and Wages

In order to test the fair-wage hypothesis I used *corruption* as a dependent variable. I used the Corruption Perceptions Index (CPI) provided by Transparency International as the main indicator for assessing corruption. The CPI is one of the most used indicators of corruption in studies on corruption. The CPI is a composite index that presents data on corruption assembled by a diversity of independent and respectable institutions. These institutions used

data from a high number of sources. Every source measures the corruption level of a country, number and/or amount of bribes, in the public sector, furthermore every source provides a ranking of a country.[2] It is ranked from zero to ten, where zero stands for a high corruption level while ten means no corruption at all.

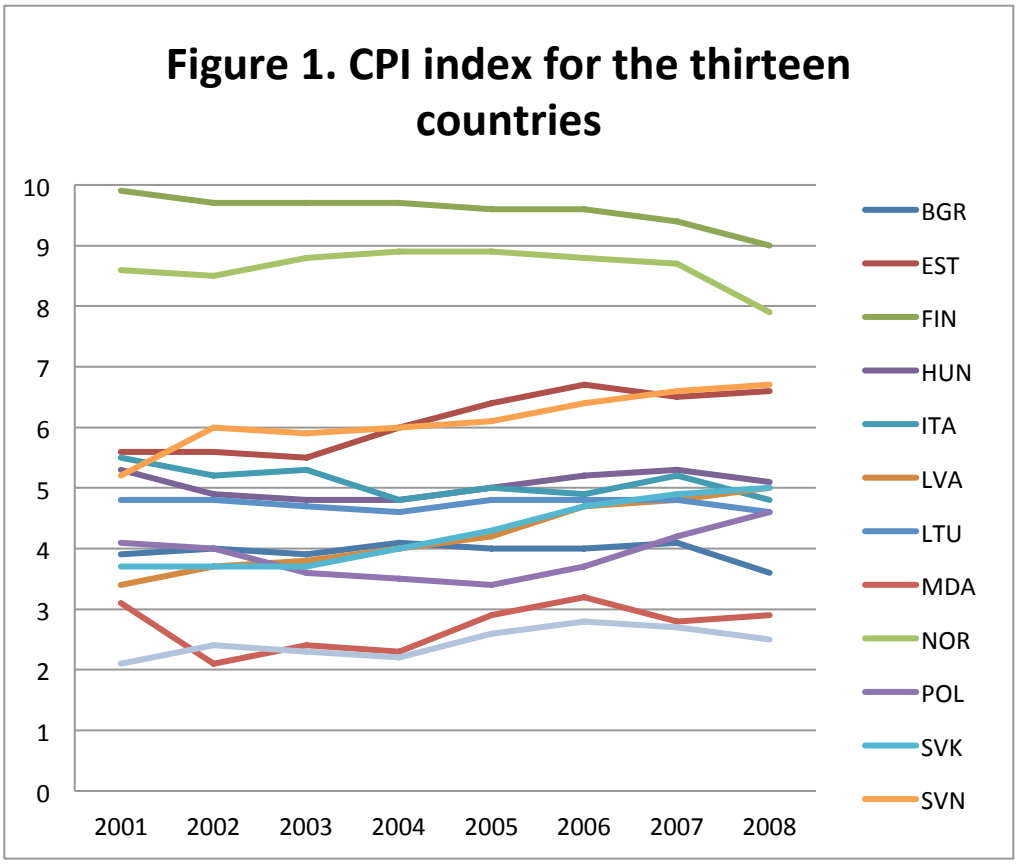


Figure 1 shows the CPI index for the thirteen countries. It is remarkable to see how high the two Scandinavian countries score in the CPI index and how low the Former Soviet Union Countries score. Not one of the Former Soviet Union Countries scored higher than 5, with Ukraine and Moldavia as negative outliers. It is noteworthy to mention that Slovenia and Poland have improved their scores over the years. A possible reason may be that both countries joined the EU since 2004.

[2] See for more information on how corruption is measured, a short methodological note; http://www.transparency.de/Methodologische-Hinweise.1748.98.html and for a long methodological brief; http://transparency.ee/cm/files/lisad/pikk_metoodika.pdf

To measure the effect of *wages* of civil servants on corruption, the ratio of government wages to manufacturing wages is being used. Similar to previous studies, Rijckeghem and Weder, (2001) and Le, Haan and Dietzenbacher (2013), I computed the wages by dividing the average government wages by the average manufacturing wages. Government wages and manufacturing wages are taken from the ILO database. Government wages are ranked in the ILO database as Public Administration and Defence; Compulsory social security. However I only selected data of high quality and fitting similarity. I used manufacturing wages as comparator instead of GDP per capita because manufacturing wages are, in comparison to GDP, rather similar across countries in terms of skill content. GDP per capita in developing countries is influenced by the predominance of agriculture. As a consequence of using a combination of developed and developing countries, GDP per capita would not be a reliable comparator. The objective is to work with a consistent benchmark.

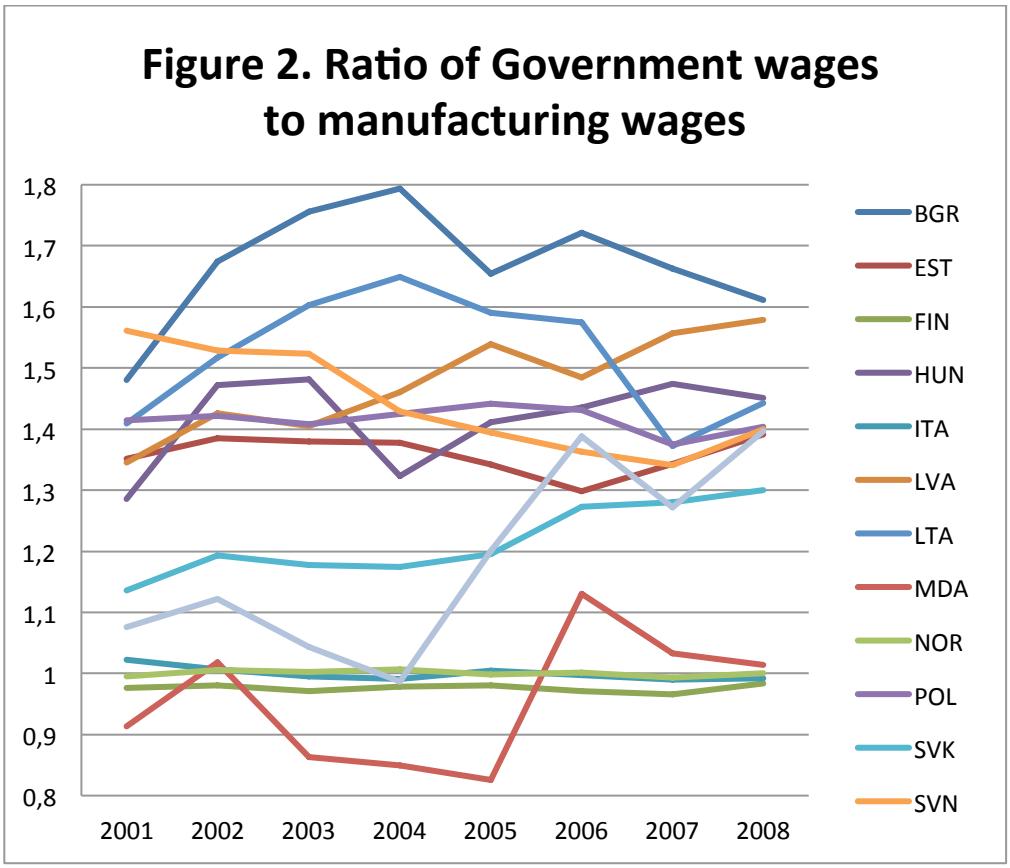


Figure 2 shows the ratio of government wages to manufacturing wages for the thirteen countries. It is worth mentioning that the three Western Europe countries Italy, Norway and Finland have a ratio of practically one, while the other countries have a ratio above 1.3,

besides Moldavia. It is remarkable to see the growth of the ratio of government wages to manufacturing wages for Ukraine, while the CPI index in figure 1 shows a constant level.

3.1.2 Control variables

To measure the effect of government wages on the corruption level, I obtained control variables based on the previous empirical studies e.g. Mauro (1995), Rijckeghem and Weder (2001), Akerlof and Yellen (1990). All control variables are derived from the database of the World Bank's World Development Indicators (WDI). I only used these external control variables for my empirical study due to the fact that internal variables like the GINI index and the index of quality of the bureaucracy were protected by property rights or were not comprehensive. In this thesis I restricted my empirical analysis to five control variables. I chose these five variables because of three reasons: firstly, all the variables influence corruption and wages directly and indirectly; secondly, they contain growth and development variables; thirdly, all the variables were selected on the basis of available comprehensive data.

Gross percentage of the total school enrolment in secondary education is used as an indicator for the variable *education.* The gross enrolment ratio can pass 100% because the World Bank included under-aged and over-aged graduates due to grade repetition and early or late school entry. The intuition behind this variable is that the higher the education, the higher the income level and as a consequence the incentive to be corrupt will be lower.

In order to have a variable that indicates the economic level of a country, I used the variable *GDP per Capita*. In general the economic assumption is that the higher economic level, the lower incentive to be corrupt. In addition to other studies I corrected the *GDP per capita* with the inflation of consumer prices. I did this to have a better view of the GDP influence on corruption.

I also included two variables to capture the influence of the labour force. *Employment* refers to the proportion of the labour force of a country that is working. The working-age is considered at the age fifteen and older. The assumption is that a higher employment rate will increase the income level of a country and therefore will have a positive impact on the corruption level. *Unemployment* stands for the proportion of the labour force that is unemployed although they are available for work. The intuition is that a higher

unemployment rate will have a negative impact on the economic level of a country and therefore will also have a negative impact on corruption.

Another interesting variable that I have obtained is *Population growth*. Population has an indirect influence on the economic level of a country. To capture the influence, I have obtained data on population growth to see if this will have a positive impact on corruption. The intuition is that a population growth will have a negative impact on the economic level and therefore a negative impact on the corruption level of a country. The intuition behind this is that more people means more consumption, more consumption means more demand for the same supply, and that means less purchasing power for the people in a country and as a consequence the incentive to be corrupt will be higher.

3.2 Comparative statistics of the data

Before I begin discussing the empirical models of the thesis I want to focus on the descriptive statistics of the data sample.

Table 1: Descriptive statistics for all variables and their individual samples

	CPI	WAGES	EDU	EMPL	POPGROW	GDPPC	UNEMPL
Mean	5.135577	1.279170	98.82366	51.44808	-0.071698	15096.87	9.042308
Median	4.800000	1.343962	98.24409	51.65000	-0.147281	8905.347	7.750000
Maximum	9.900000	1.793893	131.8254	65.60000	1.261127	84064.61	19.90000
Minimum	2.100000	0.825624	81.46826	41.30000	-1.91102	435.7851	2.500000
Std. Dev.	2.035601	0.241916	9.222524	5.622182	0.517222	17494.93	4.332687
Observations	104	104	104	104	104	104	104

A noteworthy observation is the large difference in the CPI level for the countries. The maximum value of 9.9 is achieved by Finland, while Ukraine and Moldavia managed to score the minimum value of this data sample of 2.1. As showed by figure 1 the CPI is more or less stable over the years in each country. The minimum value of the ratio of government wages to manufacturing wages belongs to Moldavia, whereas the maximum value of 1.79 belongs to Bulgaria. Both Moldavia and Bulgaria belong to the countries with the lowest score in the CPI index. As showed by figure 2 Finland, Italy and Norway have a ratio of almost 1, while the other countries managed to have scores above 1.3. That leads to a mean value of 1.279. A positive observation to mention is that the secondary school enrolments of all the countries

are close to 100%. The minimum value of 81.46 belongs to Moldavia but over the years Moldavia has improved its score to almost 90%. The maximum value of 131.82 belongs to Finland, like Finland Norway managed to score above the 100% for all years. The maximum value of employment belongs to Norway that has managed to score over 60% for all years. The minimum value of 41.3% belongs to Bulgaria in 2001, but over the years they have accomplished a growth of the employment rate till above 50% in 2007 and 2008. The mean value of population growth is below zero, on the other hand the countries Finland, Italy and Norway maintain a high value for population growth over the entire sample period. This is probably because of the emigration of people from developing countries to their countries. The minimum value of GDP per capita belongs to Moldavia, most countries of this data sample have a GDP per capita below the mean value. Only Finland, Italy and Norway have managed a GDP per capita above the mean value for all years, Slovenia accomplished that from the time period 2005-2008. An interesting observation to notice was that GDP per capita for all countries has grown in the time period of 2001-2007 and that their GDP per capita decreased in 2008. That is not very shocking due to the fact that 2007 was the last year before the economic crisis. The maximum value of 19.9% for unemployment belongs to Bulgaria in 2001; Slovakia is the next country after Bulgaria which had an unemployment rate around 19%. In the time period of 2001-2008 it is noteworthy to conclude that the unemployment rate of both countries had decreased to near the mean value of 9%. That is possibly a natural consequence of a higher GDP per capita.

Table 2: Covariance and correlation analysis for all variables

Covariance Correlation	CPI	WAGES	GDPPC	EDU	EMPL	POPGROW	UNEMPL
CPI	4.103830						
	1.000000						
WAGES	-0.14141	0.057961					
	-0.28994	1.000000					
GDPPC	28576.84	-2070.419	3.03E+08				
	0.810224	-0.493944	1.000000				
EDU	15.05843	-0.581855	111760.9	84.23712			
	0.809903	-0.263328	0.699397	1.000000			
EMPL	7.195885	-0.300884	61193.40	27.49363	31.30499		
	0.634867	-0.223371	0.628179	0.535394	1.000000		
POPGROW	0.667567	-0.065269	7109.350	2.180678	1.109076	0.264946	
	0.640208	-0.526697	0.793299	0.461595	0.385102	1.000000	

UNEMPL	-3.20814	0.258008	-30957.58	-10.1427	-12.783	-0.764098	18.59167
	-0.36728	0.248546	-0.412376	-0.2563	-0.52987	-0.344279	1.000000

Table 2 presents the covariance and correlation of all the variables used in my empirical study. Wages is negatively correlated with CPI, the coefficient is -0.28, indicating that the ratio of government wages to manufacturing wages is bigger in more corrupted countries. We can also conclude that CPI is very strongly positively correlated with the control variables GDP per capita (0.81) and education (0.80). These results suggest similar to the intuition that a higher economic and education level leads to an increase of CPI and therefore a lower corruption level. Wages is negatively correlated with all variables, except unemployment, that is not surprising because a higher education and economic level will have a positive influence on the manufacturing wages. It indicates that the ratio of government wages to manufacturing wages will be smaller in the countries. GDP per capita and Education are both strongly positively correlated with all variables, except for unemployment. Obviously, unemployment is negatively correlated with most variables, since a higher economic or education level will mean more economic growth and therefore more work and employed people.

3.3 Methodology

For the empirical study, the relation between government wages and corruption will be investigated, using the described data of section 3.1 and 3.2. In order to find such a relationship a panel data regression is being used. The regressions have been executed with *Eviews* 7. A fixed effects estimator was used to estimate the regression model. I will now specify the regression model mentioned earlier in this section. I will start with the simplest regression model without using control variables. The second regression model shows an addition of control variables. The third model shows an extension of the second regression model by using country and time fixed effects. In the fourth model country fixed effects are replaced by a dummy variable for rich and poor countries.

3.3.1 Empirical models

Model 1:

$$CORRUPTIONi,t = \alpha + \beta WAGESi,t + \boldsymbol{\varepsilon} i,t$$

CORRUPTIONi,t stands for the CPI index of country *i* at time *t*. *WAGES* is the ratio of government wages to manufacturing wages of country *i* at time *t* and *ε* stands for the distributed errors. This regression model is supposed to show that *WAGES* affect the CPI index. To test the fair-wage hypothesis, I will test the null hypothesis that government wages have no effect on corruption. The alternative hypothesis will be that government wages have indeed an effect on corruption. In following of Rijckeghem and Weder (2001) I assume that *WAGES* should have a negative sign when a regression model is estimated without any control variables.

Model 2.1- 2.5:

$$CORRUPTIONi,t = \alpha + \beta WAGESi,t + \beta GDPPCi,t + \beta EDUi,t + \beta EMPLi,t + \beta POPGROWi,t + \beta UNEMPLi,t + \boldsymbol{\varepsilon} i,t$$

This regression models are enlargements of the first model, with control variables, where the control variables are defined as in section 3.2, of country *i* at time *t*. For models 2.1-2.5 I will test two null hypotheses; First, that government wages have no effect on corruption and secondly that government wages have a significant negative effect on corruption. The alternative hypotheses will be that government wages have a significant positive effect on corruption. In following of the other empirical studies I will assume that *WAGES* should have a positive sign when a regression model is estimated with control variables.

Model 3.1- 3.5

$$CORRUPTIONi,t = \alpha + \beta WAGESi,t + \beta GDPPCi,t + \beta EDUi,t + \beta EMPLi,t + \beta POPGROWi,t + \beta UNEMPLi,t + Ci + Yt + \boldsymbol{\varepsilon} i,t$$

Model 3.1-3.5 are similar regression models as shown above, extended with country fixed effects C of country *i* and time fixed effects Y at time *t*. I chose to include a fixed effects model to test if government wages affect corruption, while controlling for time and country effects. As in the two regression models above, I will again test two null hypotheses; Firstly, that government wages have no effect on corruption and secondly that government wages have a significant negative effect on corruption. The alternative hypotheses will be that government wages have a significant positive effect on corruption. As described in the

previous regression model I will assume that *WAGES* should have a positive sign when a regression model is estimated with control variables in a fixed effect model.

Model 4.1- 4.5

$$CORRUPTIONi,t \ = \alpha + \beta WAGESi,t + \beta GDPPCi,t + \beta EDUi,t + \beta EMPLi,t + \beta POPGROWi,t + \beta UNEMPLi,t + RICHi + POORi + Yt + RICH_{WAGES} + POOR_{WAGES} + \boldsymbol{\varepsilon} i,t$$

In the last regression models I made a slight change in comparison to models 3.1- 3.5. Instead of using a country dummy, I used a dummy for the four richest countries of the panel dataset and a dummy for the four poorest countries of the panel dataset. Van Rijckeghem and Weder(2001) argued that the fair wage hypothesis wouldn't work for low-income countries since civil servants will know that their governments can't offer them a fair wage. Le, Haan and Dietzenbacher (2013) interpreted this argument as an indication that government wages only decrease corruption in rich countries. To investigate this assumption, I used an interaction term. The interaction is simply a multiplication of the dummy variables RICH and POOR with Wages. The null hypotheses that I will be testing are: Firstly, that government wages have no effect on corruption, secondly that government wages in rich countries and poor countries have a significant negative effect on corruption. The alternative hypothesis will be that government wages have a significant positive effect on corruption. The assumption is that I will found evidence for the theory of Van Rijckeghem and Weder (2001) and that richer countries will have a positive sign when a regression model is estimated.

In order to find the most significant and robust results I will add or remove a control variable in the regression models 2.1-2.5, 3.1-3.5 and 4.1-4.5. Section 4 will present all the results of the regression models.

Section 4 Empirical results

This section presents the outcome of estimating equation 1 – 4, respectively. After each regression model I will discuss the results of the estimating equations. I will present the regression models in the order in which I have mentioned them in section 3.3.

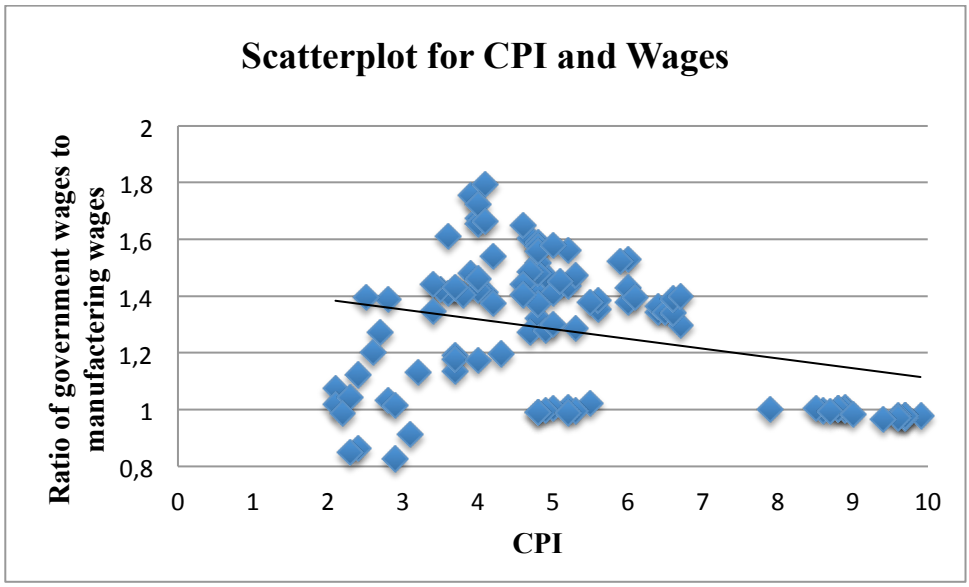
4.1 Results regression model 1

Table 3:

Dependent Variable CPI	C	wages	adj. R^2	no. Obs
ALL Countries	8.256407*** (1.037)	-2.43973*** (0.797)	0.075087	104

Note: Robust standard errors are showed in parenthesis. ***, ** and *, indicates significance at 1%, 5% and 10% level.

Figure 3:



In line with the findings by Van Rijckeghem and Weder (2001). I found a strong negative relationship between government wages and corruption across the thirteen European countries. Table 3 shows the results of the regression model and figure 3 the scatter plot of government wages and corruption. Both show a negative relationship between the two variables, when I do not add any control variable. This is probably because I used a data sample of developed and developing countries. Furthermore, the omission of control variables

can lead to bias. Therefore I will add control variables to the basic regression model in next regression models.

4.2 Results empirical model 2 with no fixed effects

Table 4:

	Dependent	Variable	CPI		
Independent variable	model (2.1)	model (2.2)	model (2.3)	model (2.4)	model (2.5)
C	2.015987** (0.776)	-6.885645*** (1.433)	-8.509262*** (1.611)	-9.559306*** (1.625)	-9.443637*** (1.726)
WAGES	1.227221** (0.551)	0.806025* (0.458)	0.703754 (0.454)	0.950066** (0.453)	0.957616** (0.456)
GDPPC	0.000103*** (7.62E-06)	6.23E-05*** (8.56E-06)	5.41E-05*** (9.29E-06)	3.32E-05*** (1.23E-05)	3.32E-05*** (1.24E-05)
EDU		0.101695*** (0.014)	0.096884*** (0.014)	0.10265*** (0.014)	0.102948*** (0.014)
EMPL			0.045736** (0.021)	0.056161** (0.021)	0.054091** (0.024)
POPGROW				0.781537** (0.312)	0.775221** (0.315)
UNEMPL					-0.005329 (0.025)
Adj. R^2	0.666061	0.772467	0.779805	0.790908	0.788846
No. Obs	104	104	104	104	104

Note: Robust standard errors are showed in parenthesis. ***, ** and *, indicates significance at 1%, 5% and 10% level. The basic model is extended with one control variable at a time, GDP per Capita in model (2.1), secondary school enrolment in model (2.2), employment rate in model (2.3), population growth in model (2.4) and unemployment rate in model (2.5), respectively.

Table 4 presents the results of estimating regression model (2.1 – 2.5) with controlled variables and no fixed effects. In all regression models (2.1 - 2.5), government wages continue to have a positive sign and stays significant at a 5% level, except for regression model (2.3). that is probably due to the fact that employment has a greater influence on the manufacturing wages than on the government wages. Furthermore, it is noteworthy to acknowledge that all control variables are highly significant, besides unemployment. The control variables GDPPC and EDU are highly significant at a 1% level and EMPL and POPGROW are significant at a 5% level. The adjusted R^2 value increases trough the models, although the last model (2.5) shows a decrease in R^2 value that is probably the consequence of

multicollinearity between the variables employment and unemployment. POPGROW has a positive sign in the regression model although I assumed that it will have a negative sign in the regression model. That is probably because most countries have a negative population growth. The other control variables show the signs that was assumed in the previous section.

4.3 Results empirical model 3 with country and time fixed effects

Table 5:

	Dependent	Variable	CPI		
Independent variable	model (3.1)	model (3.2)	model (3.3)	model (3.4)	model (3.5)
C	1.781647* (0.573)	-0.583688 (0.996)	-2.280469* (1.361)	-2.293066 (1.412)	-2.019431 (1.711)
WAGES	0.431849 (0.494)	0.245609 (0.478)	0.258208 (0.472)	0.260966 (0.481)	0.257065 (0.484)
GDPPC	-1.61E-05 (1.00E-05)	-1.40E-05 (9.64E-06)	-1.33E-05 (9.51E-06)	-1.32E-05 (9.92E-06)	-1.25E-05 (1.03E-05)
EDU		0.026867*** (0.009)	0.028166*** (0.009)	0.028126*** (0.009)	0.027878*** (0.009)
EMPL			0.030183* (0.016)	0.030308* (0.017)	0.026935 (0.020)
POPGROW				-0.007754 (0.211)	-0.006847 (0.212)
UNEMPL					-0.00631 (0.021)
adj. R^2	0.972174	0.974396	0.975084	0.974769	0.974473
no. Obs	104	104	104	104	104

Note: Robust standard errors are showed in parenthesis. ***, ** and *, indicates significance at 1%, 5% and 10% level. The basic model is extended with one control variable at a time, GDP per Capita in model (3.1), secondary school enrolment in model (3.2), employment rate in model (3.3), population growth in model (3.4) and unemployment rate in model (3.5), respectively.

I chose to do another regression model, respectively with fixed effects. To make sure that there are no huge differences between a regression model including fixed effects and a regression model without fixed effects. Table 5 presents the regression models and we can notice that government wages continue to have a positive sign through the different models, although the relationship p is not significant. All variables show a smaller corresponding coefficient, important to emphasize is that EDU is the only variable that remains highly significant through the models (3.2 -3.5) at a 1% level. A noteworthy difference between the

regression models (2) and (3) is that both GDPPC and POPGROW show in the fixed effects model a negative sign, however, the sign is not significant. Braun and Di Tella (2004) have found that by using a fixed effects model inflation can have a negative impact on corruption. Hence, I corrected GDPPC for inflation that will possibly be the explanation for the negative sign in table 5. All the variables show the sign that I had assumed, even POPGROW possible due to the fixed effects. In addition the R^2 square shows a huge improvement in comparison with regression model (2). Regression model (3) shows a difference in results between model (2), hence, the sample dataset contains developed and developing European countries. To distinguish the differences between developed and developing countries I have build another regression model. Instead of country fixed effects I used a dummy variable for rich countries and poor countries. Section 3.4 will present the outcome of this regression model.

4.4. Results empirical model 4

Table 6:

	Dependent	Variable	CPI		
Independent variable	model (4.1)	model (4.2)	model (4.3)	model (4.4)	model (4.5)
C	3.147848 (2.020)	-1.912524 (1.875)	-5.41093*** (1.862)	-4.146015* (2.122)	-1.596586 (2.438)
WAGES	1.035364 (1.464)	-2.350043* (1.340)	-1.328275 (1.233)	-1.871451 (1.306)	-2.760158** (1.357)
GDPPC	5.71E-05*** (1.240)	3.17E-05*** (1.120)	1.45E-07 (1.220)	7.60E-06 (1.360)	8.52E-06 (1.340)
EDU		0.100039*** (0.015)	0.071555*** (0.015)	0.066005*** (0.016)	0.069584*** (0.016)
EMPL			0.103457*** (0.022)	0.098793*** (0.022)	0.08053*** (0.024)
POPGROW				-0.506013 (0.410)	-0.522472 (0.403)
UNEMPL					-0.058075** (0.028)
RICH	3.305944 (2.495)	-2.431877 (2.282)	2.151932 (2.296)	1.675485 (2.322)	0.248335 (2.389)
POOR	-2.367706 (2.218)	-6.159247*** (1.954)	-5.554335*** (1.772)	-6.227308*** (1.850)	-7.951666*** (2.009)
RICH_WAGES	-1.797185 (1.845)	2.200148 (1.672)	-1.14445 (1.681)	-0.632667 (1.727)	0.221274 (1.750)
POOR_WAGES	0.973137 (1.597)	3.932024*** (1.419)	3.284545** (1.291)	3.640457*** (1.320)	4.822588*** (1.423)
Adj. R^2	0.728218	0.809262	0.843914	0.844825	0.850107
No. Obs	104	104	104	104	104

Note: Robust standard errors are showed in parenthesis. ***, ** and *, indicates significance at 1%, 5% and 10% level. The basic model is extended with one control variable at a time, GDP per Capita in model (4.1), secondary school enrolment in model (4.2), employment rate in model (4.3), population growth in model (4.4) and unemployment rate in model (4.5), respectively. In this model the RICH and POOR countries are based on the GDPPC of the country in comparison with the other countries of the dataset. The RICH countries included in this regression model are Finland, Italy, Norway and Slovenia. The POOR countries of this dataset are Bulgaria, Latvia, Moldavia and Ukraine.

Table 6 presents the results of regression model (4). In an attempt to capture the differences between rich and poor countries, I used an interaction term. The dummy variables RICH and POOR are multiplied with wages to make the new variable RICH_WAGES and POOR_WAGES. It is directly observable that there is indeed an evident distinction between rich and poor countries. Poor countries continuously have a positive sign through different models at a high significance level of 1% , except for model (4.1). This means that government wages in poor countries have a stronger positive relationship to corruption. On the other hand rich countries show a contradiction and have a negative sign, but the sign is not significant. This indicates that it is also possible that the coefficient is in reality zero. Furthermore, government wages are significantly negative in two models (4.2) and (4.5). Surely this is because I included both developed and developing countries in the model. Moreover it is noticeable that all variables show the sign that I had assumed. EDU and EMPL are all highly significant at a 1% level. This is not surprising because the two variables are also the most explaining variables of the dataset.

4.5 Summarizing empirical analysis

Recapitulating the empirical results, the sample dataset presented some interesting observations. In line with empirical studies, results show a significant relationship between government wages and corruption. The null hypothesis, that there is no relationship between government wages and corruption, can be rejected at a significance level of 0.01%. However the relationship was negative in the first model but that is due to the data sample with developing and developed countries and the omission of control variables.

The results in regression model (2) show that an increase of government wages, from 100% to 200%, in comparison to manufacturing wages will improve the CPI with 0.95 points. The first hypothesis that government wages have no effect on corruption can be rejected. The null hypotheses for the second model can also be rejected as I found robust evidence that

government wages have a significant positive influence on corruption. I could not reject the null hypotheses of the third model because results were not robust enough.

Furthermore, results show a strong significant difference between rich and poor countries. Government wages have a significant positive effect on corruption in poor countries, while government wages have a negative effect on corruption in rich countries, although the effect is not significant. I found robust evidence against the theory of Van Rijckeghem and Weder (2001) which argued that government wages only decrease corruption in rich countries. On the contrary I found evidence that government wages only decrease corruption in poor countries in line with the findings of Le, Haan and Dietzenbacher (2013). An increase of government wages in developing countries, from 100% to 200%, in comparison to manufacturing wages will improve the CPI level with 4.8 points.

Important to emphasize, is that the regression models on corruption show an intriguing relationship between education and the CPI level. Education was the only control variable that was significantly positive throughout all models with the highest coefficient. Since this empirical study was focussing on testing the fair-wage hypothesis, I have not examined this relationship. For further study, the suggestion that education has a bigger influence on corruption can be examined.

Finally, I want to take a closer look at the added control variables. The empirical results illustrate the following observations:

I. GDP per capita has a strong significant positive effect on corruption in the model without fixed effects. However the effect is negative in the model with fixed effects but not significantly.
II. Education has a strong significant positive effect on the corruption level in all regression models.
III. The employment level also has a strong positive significant effect in all regression models.
IV. Population growth has a negative impact on the corruption level, but the effect is not significant.
V. Unemployment obviously has the reversed effect of employment. However the coefficient is only significant in model (3.5).

Section 5 Experimental Design

In this section I will present an experiment to test the shirking hypothesis. The shirking model assumes that a civil servant will be less corrupt if there is strong monitoring and high penalties. In order to test this model, I have designed an experiment. Since I am writing a thesis, I am limited in funding. However, for the sake of this experiment I will act as if I have unlimited access to all resources and funding.

In order to find evidence for the shirking model, I have designed a cheating game. I will call the game, the compensation game. The designed cheating game is in some way a variation of the cheating games developed by Jiang (2013) and Heusi and Fischbacher (2008). In both cheating games players have to roll a six-sided dice and then self report the result of the rolled die. The difference between both cheating games is that in the cheating game of Jiang (2013), the player cannot be caught cheating because the player makes his choices in his mind. This makes the player untraceable as opposed to the cheating game of Heusi and Fischbacher (2008) which is detectable by the usage of cameras.

5.1 The experimental procedure

The Economics Faculty of the Erasmus University conducts experiments on a regular basis on the behaviour of people. In general each subject gets five euro for each 30 minutes of participation in their experiments. The compensation game will be designed in a way that it can be used to determine the payoff of the participants.

The Economics Faculty has his own database with subjects of the Rotterdam region that are willing to participate in an experiment. So, the recruiting process will be done by the Faculty itself. Furthermore, the compensation game will be conducted on a survey paper or computer in a room provided by the Faculty.

The compensation game has two variations, therefore we need to make sure that the same volunteers play in the same experiment. I will present a package deal to the subject by providing the ability to enrol in a two week experiment. Each Monday a subject can participate in an experiment. To attract people I will reward participants with ten euro for a 30 minute experiment and the possibility to choose their own time schedule for participation in the experiment.

Before the subjects begin the experiment they will be instructed about a new way to compensate their efforts. Instead of a fixed fee, students have the possibility to earn more money. At the end of an experiment, the subject will see the instructions on his screen for the compensation game. For the precise procedure of how subjects are instructed and how they will play the game, see appendix.

5.2 The compensation game

The experiment is a ten-throw individual cheating game. It will take no longer than five minutes to play the game. For this reason the compensation game will be easy to add at the end of other experiments. Before the subjects will participate on an experiment, they will be informed about the compensation game. At the end of the experiment they have to play a game to determine their reward. The subject will receive a six-sided dice and will be escorted to a private room.

The subjects will then receive an instruction paper where it is stated that they can earn a possible bonus and that the possible bonus are dependent on their own performance in playing the game. The payoff of each subject will be determined by rolling a die ten times in sequence and filling the outcome on an answer form, in the first variant or on a computer screen, in the second variant. Subjects are clearly informed to practice with rolling the dice before playing the game, so that they can be certain that the dice is fair.

The payoff will be calculated by the sum of throwing the dice ten times in sequence. If the subject throws and notices 2, 3, 4 or 5 he has to fill the corresponding number. To make it interesting the subject has to fill the opposite number when he throws 1 or 6. Hence, if the subject throws a 6 he has to fill in a 1, while he is allowed to fill in a 6 when he throws a 1. I have switched the payoff of number 6 and 1, to make it easier for the participant to cheat. Participants that will roll a 6 are going to experience unfair treatment and are willing to compensate this unfair treatment by filling out another high number.

Figure 4.

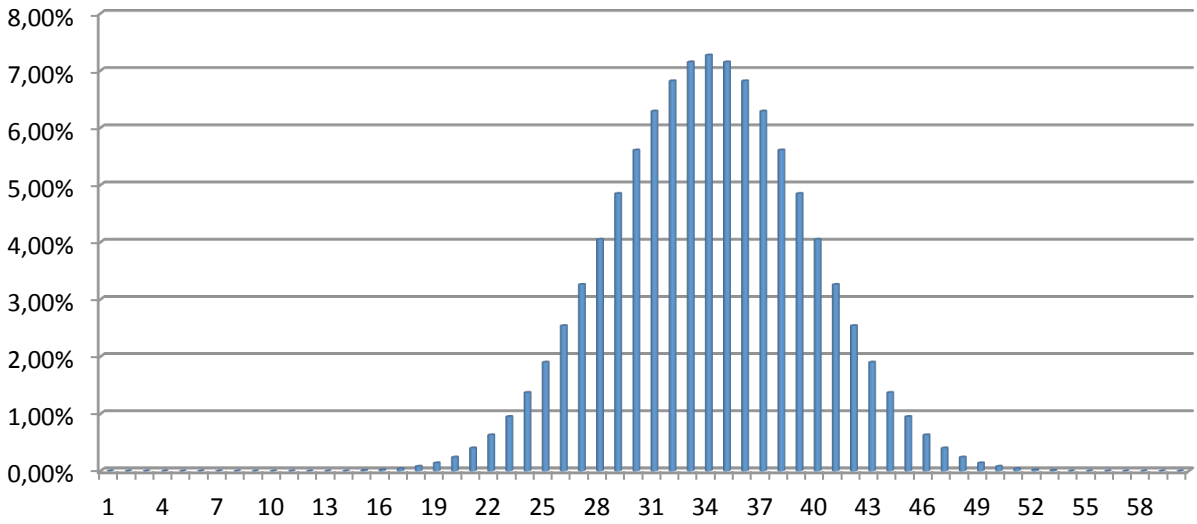


Figure 4 presents the possible results and the percentage of chance that a subject will throw that amount. So, the probabilities belonging to the possible results are;

- 15,63% if the subject throws 10 to 29
- 68,71% if the subject throws 30 to 40
- 13,12% if the subject throws 41 to 45
- 2,36% if the subject throws 46 to 50
- 0,18% if the subject throws 51 to 60

It is notable that it is most likely that subjects will throw an accumulated amount between 30 and 40.

The subjects will get 5 euro if they throw between 10 and 29, 10 euro if they throw between 30 and 40, 20 euro if they throw between 41 and 45, 30 euro if they throw between 46 and 50, and 40 euro between 51 and 60. The earnings show deliberately high differences as I want to make it beneficial to cheat. Furthermore, to raise the plausibility of the experiment, the subjects will have been explicitly informed that rolling the dice will decide their payoff in the experiment participation. Clearly, the subjects will have the incentive to earn the minimum amount of ten euro's.

In this compensation game, cheating is writing a different number than the subject has actually thrown. If the subject cheats he will earn a much higher payoff than he actually deserves in normal circumstances.

5.3 Subtle variations

In order to test how monitoring and penalizing affects cheating behaviour, I will adjust the settings of the game. In the first variant of the compensation game, subjects are guaranteed to remain anonymous which makes the detection level much lower. I will do that by telling the participants that they only have to show their student card to the experimenter. This is done so that the experimenter can ensure that the participants are students. The name or student number will not be listed. The participants will get an answer form and an envelope as they are being escorted to the private room. The participants will have to fill out the outcome of the thrown dice scores on the form. Subsequently, the participants will be asked to put the form in the included envelope and to hand it in to the secretary of the Department of International Economics. After that the participants can immediately collect their payoff at the secretary.

In the second variant of the compensation game the participants will be conducting the experiment in a public room instead of a private room. Furthermore, the participants will have to fill out the outcome of the thrown dice scores on the computer screen. The total score will be automatically sent to the secretary of the Department of International Economics. After a week the participants can collect their payoff at the secretary. Hence, the detection level will be higher due to the fact that participants are not anonymous and that the experimenter will be present during the whole experiment. Also, the monitoring is substantially higher in the second variant in comparison to the first variant. According to the shirking hypothesis, subjects will be the most honest in the second variant of the game, and subjects will cheat the most in the first variant of the game.

The rules of compensation game are in all variants the same; they are able to cheat in each variant.

Table 7: Steps of the compensating game

	First variant	Second variant
Step 1:	Throw the dice	Throw the dice
Step 2:	Fill out the outcome on the survey paper	Fill out the outcome on the computer screen
Settings:	Private room, detection level is low and the participant is anonymous.	Public room, experimenter can enter the room. Participant is not anonymous.

In order to be certain that the subject knows how high the detection level is in each game, I will make the settings as clear as possible. Firstly, I will escort the participant, in the first variant, to a private room and hand him the keys. Hence, I can ensure that the participants will think that the experimenter cannot find out what he has thrown in this variant. In the second variant the participant will play the compensation game in a public room. Secondly, I will ask the participants to throw the die as often as they feel like it. Thus, the participants have the possibility to cheat even in the second variant because the experimenter will not know if the participants are practicing or playing the game. Thirdly, the experimenter will not walk through the public room to control the participant. The experimenter will stay seated in the corner of the room. Therefore, it will still be possible for the subject to cheat in the second variant.

Obviously, we have to consider that people who cheat are not synonymously corrupt. Someone's honesty will always depend on his private circumstances, personality or other factors. Hence, the results of this cheating game need to be considered very carefully.

Section 6 Survey results

Due to limited funding, I conducted a questionnaire on a sample of 100 students of the Erasmus University. The questionnaire is a slimmed-down version of the compensation game of section 5. It is important to emphasize, that the results of the questionnaire need to be considered very carefully. There are some disadvantages of using a questionnaire to draw conclusions about the behaviour of people. Firstly, a questionnaire has a very low internal validity because the answers of participants would not show the reason for their answers. Is the participant truly honest? Does he take the questionnaire seriously? Secondly, I used exemplary situations for the questionnaire. So, the questionnaire is purely hypothetical and therefore loses reliability. The most heard comment form participants, was that they didn't know if they would answer the same if the experiment was performed in its real. Thirdly, the participants were all students and they have other values than the average citizen. So, they do not represent all people.

6.1 Survey design

The participants will be informed that they have to imagine they are playing the compensation game. The payoff will be calculated by the sum of throwing the dice ten times in sequence. In table 1 I presented the calculation method and in table 2 I showed the pay off model. I designed five exemplary situations where the participants have the incentive to cheat. The complete survey can be found in Appendix B.

Table 1:

Dice outcome	Corresponding score
1	6
2	2
3	3
4	4
5	5
6	1

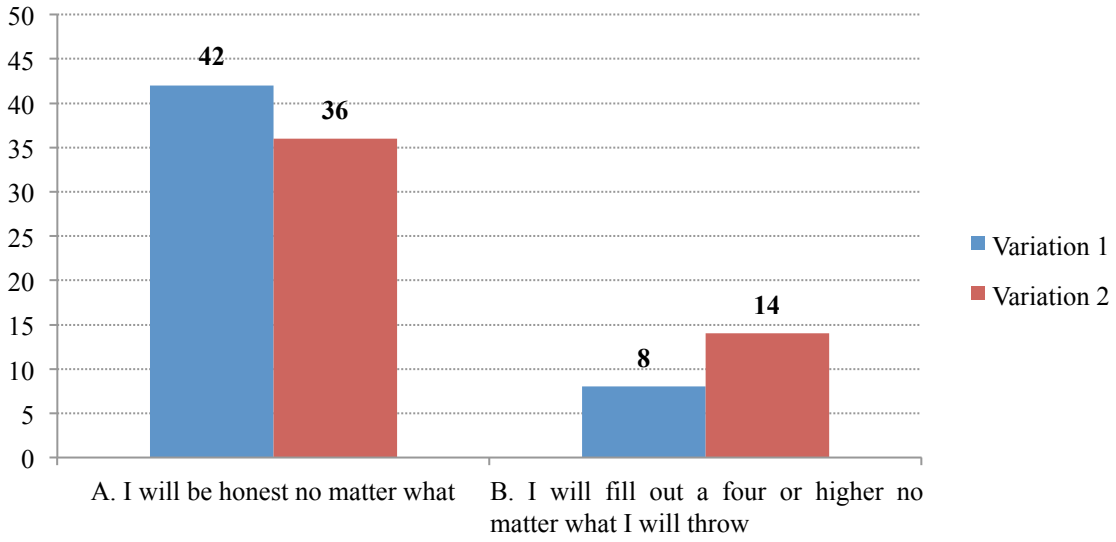
Table 2:

Scores	Payoff
10 – 29	€ 5,-
30 – 40	€ 10,-
41 – 45	€ 15,-
46 – 50	€ 20,-
51 – 60	€ 30,-

In order to test the shirking hypothesis, I conducted two variants of the questionnaire. Each variant is conducted by 50 students. A student was only allowed to participate in one variation. In the first variant participants are not anonymous because I asked them to fill out their name and email address. In the second variant participants are anonymous. According to the shirking hypothesis, people will be less corrupt if the monitoring and penalty costs are high enough. In my survey, participants will have the feeling of being monitored in variant 1. The null hypothesis will be finding no significant difference between the two variants. The alternative hypothesis will be that there is a significant difference between the two variants. I will use the Fisher's exact test to examine if the results are statistically significant. The Fisher's exact test is often used for small sample sizes. The results are statistically significant if the one-tailed P value is less than 0.10%. In the next paragraph I will present and discuss the results of the questionnaire.

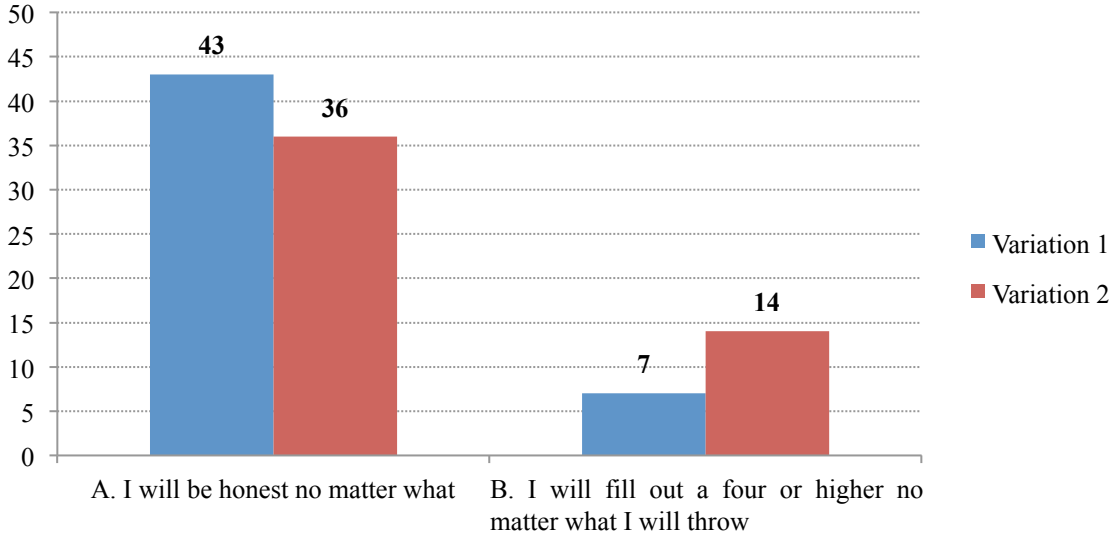
6.2 Results of the survey

1. *Imagine you have a score of **26** at the ninth throw. Are you going to be honest at the tenth throw or will you write down a four or higher no matter what, given that there is a higher incentive?*



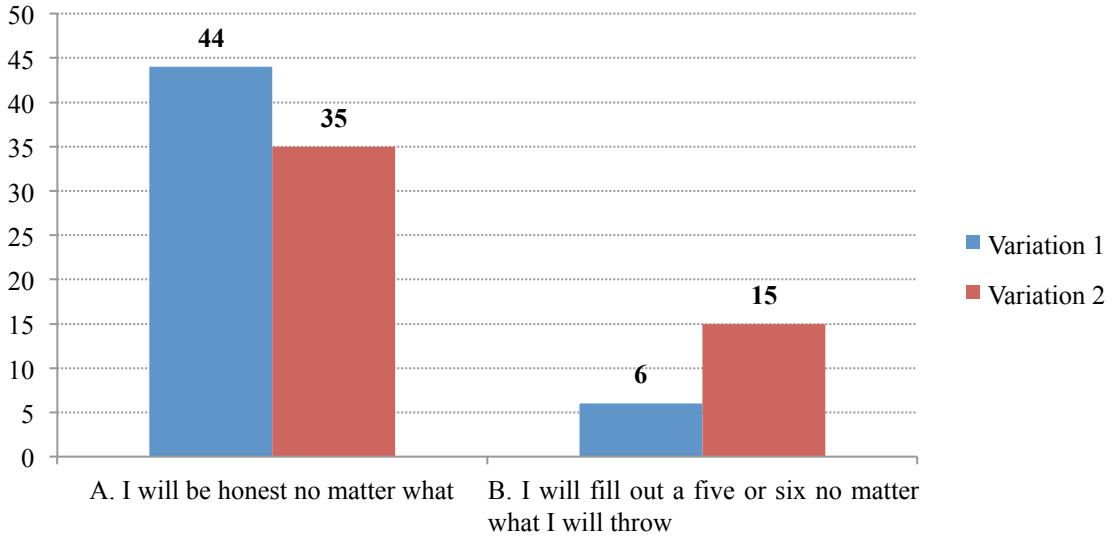
Fisher's exact test: The one-tailed P value equals 0.1135, hence the P value is not statistically significant. The null hypothesis that there is no significant difference between the two variants cannot be rejected.

2. *Imagine you have a score of **37** at the ninth throw. Are you going to be honest at the tenth throw or will you write down a four or higher no matter what, given that there is a higher incentive?*



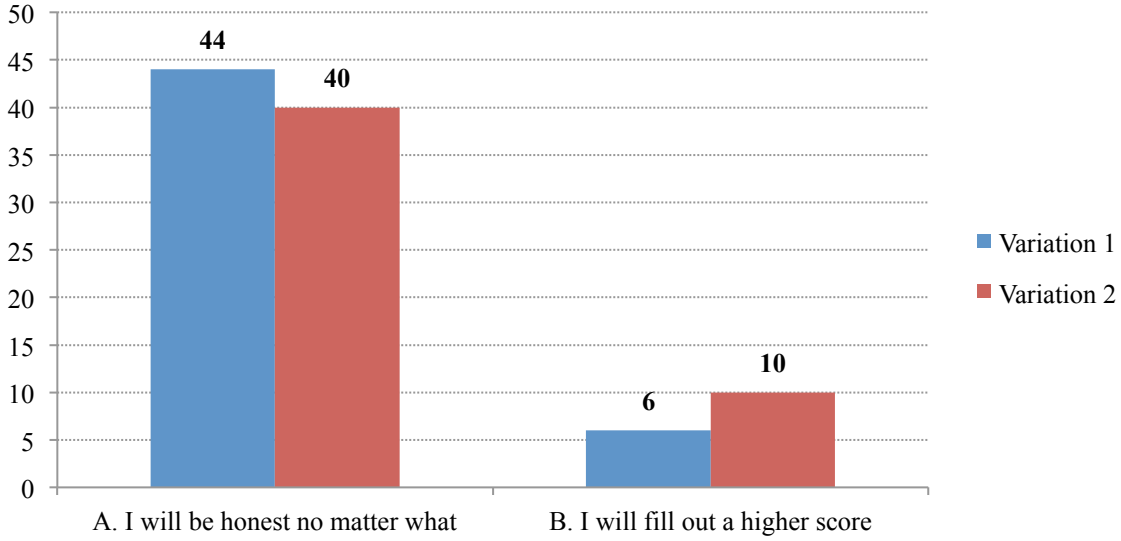
Fisher's exact test: The one-tailed P value equals 0.0698, hence the P value is statistically significant. The null hypothesis that there is no significant difference between the two variants can be rejected.

3. *Imagine you have a score of **46** at the ninth throw. Are you going to be honest at the tenth throw or will you write down a five or six no matter what, given that there is a higher incentive?*



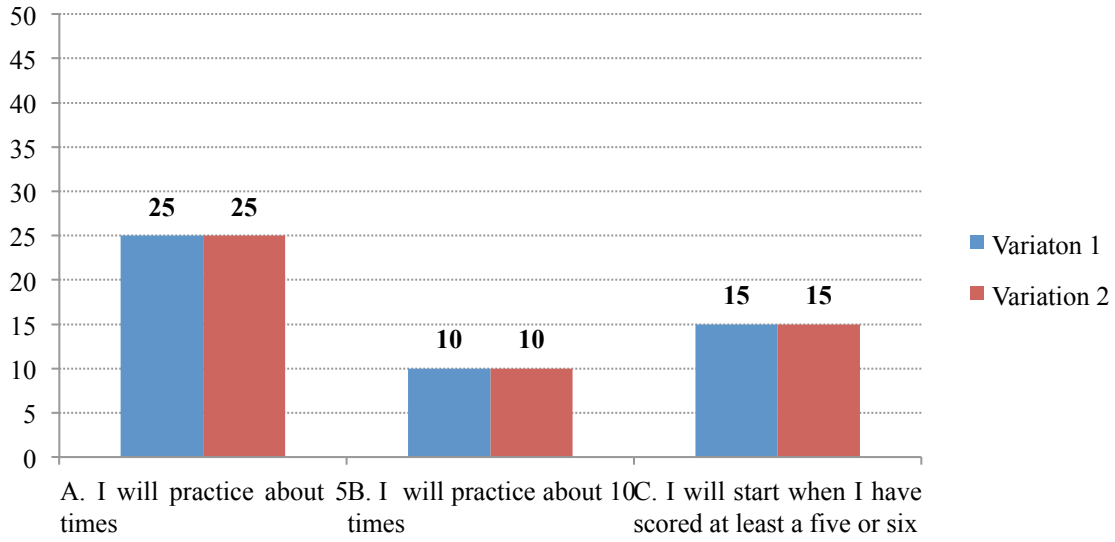
Fisher's exact test: The one-tailed P value equals 0.0239, hence the P value is statistically significant. The null hypothesis that there is no significant difference between the two variants can be rejected.

4. *Imagine you have thrown a 6. Are you going to be honest and fill in a 1 or will you write down a higher score no matter what?*



Fisher's exact test: The one-tailed P value equals 0.2070, hence the P value is not statistically significant. The null hypothesis that there is no significant difference between the two variants cannot be rejected.

5. *You are allowed to practice with rolling the dice before playing the payoff game. How many throws are you going to practice before you begin?*



Fisher's exact test: The one-tailed P value equals 0.9999, hence the P value is not statistically significant. The null hypothesis that there is no significant difference between the two variants cannot be rejected.

6.3 Conclusion

The results of the survey are quite remarkable. Question one show that students have an incentive to cheat more in variation 2 than in 1. Nonetheless, the results were not statistically significant.

Question two and three showed a statistically significant result. In variation 1, students tend to be more honest, while in variation 2 the students tend to cheat more. It seems that students have a higher incentive to cheat when it is more beneficial for them.

Question four also shows an incentive to cheat more in variation 2 than in 1 although the results were not statistically significant. However, I did not mention the amount of throws the participant had already thrown. Hence, it is possible that participants would have answered

differently in case they knew it to be throw eight to ten. Question five shows no significant difference between the two variants.

The results of the questionnaire present evidence in favour of the shirking hypothesis. I reject my null hypothesis in which there are no significant differences between the two variants. The results suggest that participants have a higher incentive to cheat when they assume that they are anonymous, while having a higher incentive to be honest when they assume that they are being monitored. Further, the results suggest that participants have a higher incentive to cheat when it is more beneficial for them.

Section 7 Conclusions

This thesis has investigated the influence of government wages on the corruption level for thirteen European countries in the period 2001 – 2008. In the literature we can distinguish two important theories on how wages can influence corruption. The two theories, the fair-wage hypothesis and shirking hypothesis, have been examined in this paper. I investigated the fair-wage hypothesis empirically. I found suggestive evidence of a relationship between wages of civil servants and corruption, using several regression models to examine this relationship.

I found robust evidence for a significant difference between rich and poor countries. The empirical model shows that increasing government wages only has a significant positive influence on corruption in developing countries. This is in line with findings of Le, Haan and Dietzenbacher (2013). An increase of government wages in developing countries, from 100% to 200%, in comparison to manufacturing wages will improve the CPI level with 4.8 points. This means that governments have to double the wages of their civil servants which is not always applicable. However in contrast to this, countries like Singapore and Hong Kong have successfully introduced this theory.

Furthermore, I designed an experiment to investigate the shirking hypothesis, which I named the compensation game. However due to limited funding, I was not able to execute the actual experiment. Hence, I conducted a questionnaire on a sample of 100 students of the Erasmus University. The questionnaire is a slimmed-down version of the compensation game. I designed two variants. In the first variant respondents were not anonymous, whereas the respondents were anonymous in the second variant. I found suggestive evidence that students have a higher incentive to cheat when they assume that they are anonymous, while they have a higher incentive to be honest when they assume that they are being monitored. Further, the results suggest that participants have a higher incentive to cheat when it is more beneficial for them.

Some caution is certainly required in drawing conclusions on the strength of the empirical results and results of the survey. Firstly, the relationship between government wages and corruption was not significant in all regression models. Secondly, the fair-wage hypothesis is highly dependent on the standards of fairness for the people of a country. Thirdly, I could not test the shirking hypothesis empirically because internal variables were either protected by

property rights or were not comprehensive. And finally, I could not conduct the experiment because of a lack of funding.

Further research is required to learn more about the influence of government wages on corruption. In addition, this paper found suggestive evidence for a relationship between education and corruption. Since my empirical study was focussed on testing the fair-wage hypothesis, I have not examined this relationship. For further study, the suggestion that education has a bigger influence on corruption can be examined thoroughly. Corruption is a difficult phenomenon to capture, but for every problem there is a solution.

References

Abbink, K., Irlenbusch, B., Renner, I., 2002. "An Experimental Bribery Game," Journal of Law, Economics and Organization, vol. 18(2), 428-454.

Abbink, K., 2002. "Fair Salaries and the Moral Costs of Corruption," Bonn Econ Discussion papers bgse1_2000, 1-5.

Aidt, T.S., 2009. "Corruption, Institutions and Economic Development," Oxford Review of Economic Policy, vol. 25(2), 271-291.

Akerlof, G.A., Yellen. J.L., 1990. "The Fair Wage-Effort Hypothesis and Unemployment," The Quarterly Journal of Economics, vol.105(2), 255-283.

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

Bardhan, P., 2006. "The Economist's Approach to the Problem of Corruption," Elsevier, vol.34(2), 341-348.

Beck, P.J., Maher, M.W., 1986. "A comparison of Bribery and Bidding in Thin Markets," Economic Letters, 20, 1-5.

Becker, G.S., Stigler G.J., 1974. "Law Enforcement, Malfeasance, and Compensation of Enforcers. Journal of Legal Studies," vol.3(1), 1-18.

Besley, T., McLaren, J., 1993. "Taxes and Bribery: The Role of Wage Incentives," Economic Journal, vol.103(416), 119-141.

Cameron, L., Chaudhuri, A., Nisvan, E., Gangadharan, L., 2009. "Propensities to Engage in and Punish Corrupt Behavior: Experimental Evidence from Australia, India, Indonesia and Singapore," Journal of Public Economics, 93(7/8), 843-851.

Egger, P., Winner, H., 2005. "Evidence on Corruption as an Incentive for Foreign Direct Investment," European Journal of Political Economy, vol. 21(4), 932-952.

Fischbacher, U., Heusi, F., 2008. "Lies in Disguise. An Experimental Study on Cheating," TWI Research Paper Series, 40, 1-36.

Fisher's exact test Calculator – www.vassarstats.net/tab2x2.html

Heij, C., de Boer, P., Frances, P.H., Kloek, T., van Dijk, H.K., 2004. "Econometric Methods with Applications in Business and Economics," Oxford University Press.

International Labour Organization - http://laborsta.ilo.org

Jiang, T., 2013. "Cheating in Mind Games: The Subtlety of Rules Matters," Journal of Economic Behavior & Organization.

Le, V-H., de Haan, J., Dietzenbacher, E., 2013. "Do Higher Government Wages Reduce Corruption? Evidence Based on a Novel Dataset," CESifo Working Paper Series, 4254, 1-28.

Leff, N.H., 1964. "Economic Development through Bureaucratic Corruption," American Behavorial Scientist, vol. 8, 8-14.

Lui, F.T., 1985. "An Equilibrium Queuing Model of Bribery," Journal of Political Economy, vol. 93 (4), 760-781.

Mauro, P., 1995. "Corruption and growth," The Quarterly Journal of Economics, vol. 110(3), 681-712.

Mauro, P., 1996. "The Effects of Corruption on Growth, Investment, and Government Expenditure," IMF Working Papers 96/98, 1-27.

Mo, P.H., 2001. "Corruption and Economic Growth," Journal of Comparative Economics, vol. 29(1), 66-79.

Pellegrini, L., Gerlagh, R., 2004. "Corruption's Effect on Growth and its Transmission Channels," Wiley Blackwell, vol. 57(3), 429-456.

Political cartoons – www.politicalcartoons.com

Shapiro, C., and Stiglitz, J.E., 1984. "Equilibrium Unemployment as a Worker Discipline Device," American Economic Review, 74 (3), 433-444.

Svensson, J., 2005. "Eight Questions about Corruption," Journal of Economic Perspectives, vol. 19(3), 19-42.

Tanzi, V., 1994. "Corruption, Governmental Activities and Markets," IMF Working Paper, 1-20.

The World Bank data Base – http://data.worldbank.org

Transparency International, CPI index – www.transparency.org

Transparency International, for a short methodological note –

www.transparency.de/methodologische-Hinweise.174898.html

Transparency International, long methodological brief -

http://transparency.ee/cm/files/lisad/pikk_metoodika.pdf

Treisman, D., 2000. "The Causes of Corruption: A Cross-National Study," Journal of Public Economics, 76(3), 399-457.

Van Rijckeghem, C., Weder, B., 1997. "Corruption and the Rate of Temptation: Do Low Wages in the Civil Service Cause Corruption?," IMF Working Paper no. 97/73, 1-56.

Van Rijckeghem, C., Weder, B., 2001. "Bureaucratic Corruption and the Rate of Temptation: Do Wages in the Civil Service Affect Corruption, and by how Much?," Journal of Development Ecnomics, 65(2), 307-331.

Van Veldhuizen, R., 2011. "Bribery and the Fair Salary Hypothesis in the Lab," Working paper, University of Amsterdam, 1-26.

Wei, S., 2001. "Corruption in Economic Transition and Development: Grease or Sand?," http://www.unece.org.unecedev.colo.iway.ch/fileadmin/DAM/ead/sem/sem2001/papers/Wei.pdf , 1-36.

Appendix A: Instructions compensation game variant 1

The instructions are presented on survey paper.

1. For completing the questionnaire you will be rewarded by playing the compensation game. Although all participants fill out the same questionnaire your payoff can differ from other participants.
2. Your payoff will be calculated by rolling the die ten times in sequence and filling out the outcome on the survey paper.
3. You are allowed to practice with the die before beginning the compensation game
4. You can choose when you want to start, but you have to remember that you have to throw the die ten times **in sequence.**
5. Table 1 presents how the results are calculated and table 2 presents the payoff system.

Table 1:

Dice outcome	Corresponding score
1	6
2	2
3	3
4	4
5	5
6	1

Table 2:

Scores	Payoff
10 – 29	€ 5,-
30 – 40	€ 10,-
41 – 45	€ 15,-
46 – 50	€ 20,-
51 – 60	€ 30,-

Example:

If you throw a 5, you have to fill out a 5 in the answer form. If you throw a 6, you have to fill out a 1 in the answer form.

Test question:

1. If you throw a 1, what do you need to fill out in the answer form? ____

The correct answer is 6.

2. If you throw a 2, what do you need to fill out in the answer form?____

The correct answer is 2.

Answer Form:

Throw	Score
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

If you completed the compensation game, please put the answer form in the included envelope, and hand in the envelope to the secretary of the Department of International Economics. You will immediately get your reward.

Instructions compensation game variant 2

Login with your student email. The instructions are presented on the computer screen.

Screen 1: Welcome to the compensation game

Screen 2:

For completing the questionnaire you will be rewarded by playing the compensation game. Although all participants fill out the same questionnaire your payoff can differ from other participants.

Your payoff will be calculated by rolling the die ten times in sequence and filling out the outcome on the survey paper.

You are allowed to practice with the die before beginning the compensation game

You can choose when you want to start, but you have to remember that you have to throw the die ten times **in sequence.**

Table 1 presents how the results are calculated and table 2 presents the payoff system.

Table 1:

Dice outcome	Corresponding score
1	6
2	2
3	3
4	4
5	5
6	1

Table 2:

Scores	Payoff
10 – 29	€ 5,-
30 – 40	€ 10,-
41 – 45	€ 15,-
46 – 50	€ 20,-
51 – 60	€ 30,-

Screen 3:

Example:

If you throw a 5, you have to fill out a 5 in the answer form. If you throw a 6, you have to fill out a 1 in the answer form.

Test question:

1. If you throw a 1, what do you need to fill out on the computer screen? ____

After filling out the answer, the correct answer 6 will be shown on the screen.

2. If you throw a 2, what do you need to fill out on the computer screen?____

After filling out the answer, the correct answer 2 will be shown on the screen.

[Table 1 with the calculation method and table 2 with the payoff system are also shown on the screen]

Screen 4:

Please throw the dice and report the outcome on the screen.

[Table 1 with the calculation method and table 2 with the payoff system are also shown on the screen]

Screen 5:

Please throw the dice and report the outcome on the screen.

[Table 1 with the calculation method and table 2 with the payoff system are also shown on the screen alongside the score until now]

Screen 6:

Please throw the dice and report the outcome on the screen.

[Table 1 with the calculation method and table 2 with the payoff system are also shown on the screen alongside the score until now]

Screen 7: Please throw the dice and report the outcome on the screen.

[Table 1 with the calculation method and table 2 with the payoff system are also shown on the screen alongside the score until now]

Screen 8:

Please throw the dice and report the outcome on the screen.

[Table 1 with the calculation method and table 2 with the payoff system are also shown on the screen alongside the score until now]

Screen 9:

Please throw the dice and report the outcome on the screen.

[Table 1 with the calculation method and table 2 with the payoff system are also shown on the screen alongside the score until now]

Screen 10:

Please throw the dice and report the outcome on the screen.

[Table 1 with the calculation method and table 2 with the payoff system are also shown on the screen alongside the score until now]

Screen 11:

Please throw the dice and report the outcome on the screen.

[Table 1 with the calculation method and table 2 with the payoff system are also shown on the screen alongside the score until now]

Screen 12:

Please throw the dice and report the outcome on the screen.

[Table 1 with the calculation method and table 2 with the payoff system are also shown on the screen alongside the score until now]

Screen 13:

Please throw the dice and report the outcome on the screen.

[Table 1 with the calculation method and table 2 with the payoff system are also shown on the screen alongside the score until now]

Screen 14:

Thank you for participating in the compensation game. Your total score of ___ will be sent to the secretary of the Department of International Economics. You can collect your reward in a week from now. You may be asked to identify yourself with your student card.

Appendix B: Questionnaire

Survey Payoff game **Variation 1**

Name:

Email:

Firstly, Thank you for filling out this survey.

Before filling out the survey, please read the instructions carefully. It is essential that you know certain details about the settings.

Instructions:

1. The survey will take, at the most, five minutes to complete.
2. Your answers cannot be traced back to you and will be kept strictly confidential. So please, be completely honest while you are filling out this survey.
3. To determine your payoff, you will be asked to throw a dice ten times in a sequence and fill out the outcome on the survey paper.
4. Table 1 presents how the results are calculated and table 2 presents the payoff system.

Table 1:

Dice outcome	Corresponding score
1	6
2	2
3	3
4	4
5	5
6	1

Table 2:

Scores	Payoff
10 – 29	€ 5,-
30 – 40	€ 10,-
41 – 45	€ 15,-
46 – 50	€ 20,-
51 – 60	€ 30,-

Below you will find five example situations for this survey:

1. **Imagine you have a score of 26 at the ninth throw. Are you going to be honest at the tenth throw or will you write down a four or higher no matter what, given that there is a higher incentive?**

A. I will be honest no matter what.
B. I will fill out a four or higher no matter what I will throw.

2. **Imagine you have a score of 37 at the ninth throw. Are you going to be honest at the tenth throw or will you write down a four or higher no matter what, given that there is a higher incentive?**

A. I will be honest no matter what.
B. I will fill out a four or higher no matter what I will throw.

3. **Imagine you have a score of 46 at the ninth throw. Are you going to be honest at the tenth throw or will you write down a five or six no matter what, given that there is a higher incentive?**

A. I will be honest no matter what.
B. I will fill out a five or six no matter what I will throw.

4. **Imagine you have thrown a 6. Are you going to be honest and fill in a 1 or will you write down a higher number no matter what?**

A. I will be honest no matter what.
B. I will fill out a higher number.

5. **You are allowed to practice with rolling the dice before playing the payoff game. How many throws are you going to practice before you begin?**

A. I will practice about 5 times.
B. I will practice about 10 times or more.
C. I will start when I have scored at least a five or six.

Thank you for your participation in my survey.

Survey Payoff game **Variation 2**

Firstly, Thank you for filling out this survey.

Before filling out the survey, please read the instructions carefully. It is essential that you know certain details about the settings.

Instructions:

5. The survey will take, at the most, five minutes to complete.
6. Your answers cannot be traced back to you and will be kept strictly confidential. So please, be completely honest while you are filling out this survey.
7. To determine your payoff, you will be asked to throw a dice ten times in a sequence and fill out the outcome on the survey paper.
8. Table 1 presents how the results are calculated and table 2 presents the payoff system.

Table 1:

Dice outcome	Corresponding score
1	6
2	2
3	3
4	4
5	5
6	1

Table 2:

Scores	Payoff
10 – 29	€ 5,-
30 – 40	€ 10,-
41 – 45	€ 15,-
46 – 50	€ 20,-
51 – 60	€ 30,-

Below you will find five example situations for this survey:

1. **Imagine you have a score of 26 at the ninth throw. Are you going to be honest at the tenth throw or will you write down a four or higher no matter what, given that there is a higher incentive?**

C. I will be honest no matter what.

D. I will fill out a four or higher no matter what I will throw.

2. **Imagine you have a score of 37 at the ninth throw. Are you going to be honest at the tenth throw or will you write down a four or higher no matter what, given that there is a higher incentive?**

C. I will be honest no matter what.

D. I will fill out a four or higher no matter what I will throw.

3. **Imagine you have a score of 46 at the ninth throw. Are you going to be honest at the tenth throw or will you write down a five or six no matter what, given that there is a higher incentive?**

C. I will be honest no matter what.

D. I will fill out a five or six no matter what I will throw.

4. **Imagine you have thrown a 6. Are you going to be honest and fill in a 1 or will you write down a higher number no matter what?**

C. I will be honest no matter what.

D. I will fill out a higher number.

5. **You are allowed to practice with rolling the dice before playing the payoff game. How many throws are you going to practice before you begin?**

D. I will practice about 5 times.

E. I will practice about 10 times or more.

F. I will start when I have scored at least a five or six.

Thank you for your participation in my survey.