

Corruption and Performance in the Healthcare Services of European Member States: An Empirical Analysis

Tessa M. J. Huis in 't Veld¹

¹ MSc International Public Management and Public Policy (IMP)

Erasmus School of Social and Behavioral sciences, EUR

Student Number – 438093

1st reader: Dr Bert George

2nd reader: Dr Michal Onderco

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Summary

Healthcare corruption remains a matter of concern within the European Union. Attention to this concern is increasingly important, since many European member states are grappling with the rise of healthcare costs and increasing budget control due to demographic ageing and the rise of chronic diseases. The objective of this study is to explore the relationship between healthcare corruption and performance in healthcare services, to create a better understanding of the most effective strategies in fighting the corruption problem in the healthcare sector. This study sought to identify different performance dimensions which led us to focus on both the dominant performance dimensions as the responsiveness dimension of New Public Management. Within healthcare services this relates to both the outcome-related determinants and the process-related determinants including patient satisfaction and the accessibility of healthcare services. This paper has conducted a Pooled OLS regression analysis. This regression analysis is based on an intensive data collection, considering the self-created panel dataset, made out of three existing databases: Special Eurobarometers, the European Core Health Indicators and the organization for Economic Co-Operation and Development. The results led to the conclusion that experienced bribery by EU citizens in the last 12 months is significantly associated with healthcare effectiveness – measured as the life expectancy at birth. Concluding by answering the main research question: the relationship between corruption and performance in the healthcare sector of the EU member states is negatively confirmed, in context of the performance dimension of effectiveness. Since the results show a significant negative association between healthcare bribery and life expectancy at birth, this paper is able to confirm the ‘sand the wheels’ theory while rejecting the ‘grease the wheels’ theory. These results are a concerning matter for scientists and policy makers, since increased health is a crucial determinant of economic productivity and growth. In addition, the findings confirm that EU member states are not immune for the reality of deep-rooted corruption, and that the consequences of corruption harm the EU’s economy and society. Therefore, there is a moral obligation and high societal relevance for increasing knowledge and policy actions to prevent and reduce corruption to improve the general health outcomes of the European population.

Keywords:

Corruption, Bribery, Performance, Public sector, Healthcare, New Public Management

Acknowledgment

I proudly present my Master thesis “*Corruption and Performance in the Healthcare Services of European Member States: An Empirical Analysis.*” I was dedicated and motivated to write this thesis due to my genuine interest in “health” and eagerness to increase my understanding on how public policy making affects health systems nationally and internationally. Since, such an understanding can help me in my further career to prevent and reduce health inequalities and equities caused by poverty and social exclusion.

In addition, this thesis reflects the end of my student-years and the match between the master International Public Management and Public Policy at the Erasmus University of Rotterdam and my previous programs MSc Global Health and BSc Health Sciences both at the University of Maastricht.

I would like to express my sincere gratitude to my first supervisor Dr Bert George, for the continuous feedback and helpful insights during my research. Your support and expressed trust in my knowledge and abilities, gave me confidence to get the best result out of myself. Most of all, I would like to thank you for your highly reflecting enthusiasm and motivation, during the thesis meetings. With him, I would like to thank my second supervisor, Dr Michal Onderco for help and assistance.

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List of abbreviations

CPI – Corruption perception Index

CEE – Central and Eastern European

ECHI – European Core Health Indicators

EU – European Union

EUR – Erasmus University Rotterdam

GDP – Gross Domestic Product

NGOs – Non-governmental Organizations

NPM – New Public Management

OECD – Organization for Economic and Co-operation and Development

OLS – Ordinary Least Squares

UN – United Nations

USD – United States Dollar

WHO – World Health Organization

1. Introduction

1.1. Background

Corruption in public administration is a complex and pervasive phenomenon (OECD, 1999). In general terms, corruption is defined as “*the abuse of entrusted power for private gain*” (Transparency international, 2017). In governance terms, “*corruption threatens democratic public institutions by permitting the influence of improper interests on the use of public resources and entrusted power and by undermining the confidence of citizens in the legitimate activities of state*” (OECD, 1999). Meaning that, deep-rooted corruption can hamper not only the misdirected resources, but also undermines the trust of citizens in the fair and impartial application of public institutions (European Commission, 2014; Thompson, 1992). In that way, corruption in the public sector can cause difficulties to guarantee compliance with public standards or respect for the rule of law (Caiden, 2001; Rothstein, 2011).

In the academic field of public administration, it has been suggested that the traditional model of public administration can foster corruption within public institutions. The traditional model of public administration can be characterized by guaranteeing lifelong careers, formalizing recruitment, and introducing strong legal protection for civil servants (Dahlstrom & Lapuente, 2012). A new paradigm for public management, called New Public Management (NPM) (Hood, 1995) has emerged since 1980s (Zia & Khan, 2014). The public administration reform from the traditional model of public administration to the paradigm of NPM, was a response to the decreasing levels of satisfaction, trust, and legitimacy in public institutions (Zia & Khan, 2014). Indeed, “*public management reform consists of deliberate changes to the structure and processes of public sector organizations with the objective of getting them to run better*” (Pollit & Boueckaert, 2004). The NPM doctrine was not just a reform from centrally steered to market mechanisms, also huge efforts were made to changing organizational structures, modernize accountability and transform the public sector (NISPAcee, 2013; Ignituous, 2005; Skalen, 2004). Meaning that under the doctrine of NPM competition, quality standards, performance measurement and a clear responsibility structure were introduced. Proponents of NPM argue that these factors were of positive influence in deterring corrupt deals (Osborne & Gaebler, 1997; Osborne, Gaebler, & Plastrik, 1997). This positive responses were meant in contrast to the traditional public administration model, which, according to proponents of NPM, itself

encourages corruption. Yet, opponents of the NPM reform raise the argument that NPM only focuses on performance dimensions as efficiency and effectiveness and thereby neglects public welfare in the traditional sense of equality and equity (Adonis, 1997; Doig, 1997; Yesilkagit & De Vries, 2002; Gregory, 2002; Savoie, 1998). Yet, NPM reform has various impacts in countries. The problems of accountability that arise with the NPM reform are higher within countries which have low social discipline and the lack of institutional capacity (Barzelay, 2001; Pollit & Boueckert, 2004). Hereby, the most undesirable effects are the loss of political control and the increase in the levels of corruption (Ignituous, 2005).

Within Europe governments have introduced modes of governance, under the label of “New Public Management” during recent decades (Schmitt & Schuster, 2010). Due to the various institutional capacities, academics have tended to argue against and in favor for the suitability of NPM instruments in Central and Eastern Europe (Dan, 2015). Mostly arguing that the provision of NPM instruments in Central and Eastern Europe remains rather low and that there is frequent occurrence of administrative corruption (Bouckaert, 2009). The European commission stated in the EU anti-corruption report, that EU member states are not immune for the reality of deep-rooted corruption (European Commission, 2014). In an additional statement within the Eurobarometer on corruption, the European Commission states that while the nature and scope of corruption has major differences between EU member states, it can harm the EU’s economy and society (European Commission, 2014; European Commission, 2017; WHO, 2013). Within the EU, petty corruption is specified as a specific risk area which remains widespread in a few Member states (European Commission, 2014). Petty corruption is defined by transparency international (2018) as *“everyday abuse of entrusted power by public officials in their interactions with ordinary citizens, who often are trying to access basic goods or services in places like hospitals, schools, police departments and other agencies”*. Within the EU, the healthcare sector has appeared to be the most vulnerable to petty corruption in public procurement (European Commission, 2014). This is caused by risk-prone conditions in the healthcare sector of European Member states, where incentives to give unofficial payments differentiated treatment persist (European Commission, 2014). Therefore, within the EU healthcare sector, the corruption in public procurement, informal payments and pharmaceutical sector remains an important matter of concern (European Commission, 2014).

This study will contribute to literature on the association between corruption on performance in the healthcare sector. Measuring the performance of the healthcare system is useful to better understand how they work, what their consequences are, and which strategies will be most

effective in fighting the corruption problem in the public sector (USAID, 2006). Studies focusing only on one performance dimension without discussing what is excluded is problematic, as most public organizations have multiple and conflicting goals (Andersen, Boesen, & Pedersen, 2016). Therefore, this study will not only give focus on the NPM dominant dimensions of effectiveness and efficiency, but also include other performance dimensions such as equity, quality, and satisfaction. Since effective and efficient health systems will not be performing the best, because the focus on probity and public welfare in the traditional sense of equality and equity (Adonis, 1997; Doig, 1997; Yesilkagit & De Vries, 2002; Gregory, 2002; Savoie, 1998). This research will therefore, give focus on the gap of literature on the performance dimensions within the responsiveness dimension of NPM. Analyzing these dimensions, comes closest to the very essence of the NPM reform philosophy, as a response to the decreasing levels of satisfaction and trust (Pollit & Boueckert, 2004).

1.2. Objective of the study

The objective of this study is to explore the association between corruption and performance in public healthcare institutions in EU member states. The aim is to create a better understanding of the most effective strategies in fighting the corruption problem in the healthcare sector.

To answer the main research question, this paper conducts a Pooled OLS regression analysis to see whether the concepts of healthcare corruption and healthcare performance are significant. This regression analysis is based on an intensive data collection whereby a self-created panel dataset was used, made out of three existing databases, Special Eurobarometers, the European Core Health Indicators (ECHI) and data by the organization for economic co-operation and development (OECD). The independent variable of corruption is based on a series of Special Eurobarometers conducted in five years, 2005, 2007, 2009, 2011 and 2013. All Eurobarometers were screened to find whether the same questions focused on healthcare corruption were asked over time. The dependent variable of five performance dimensions were individually matched with five different healthcare indicators of the ECHI, based on their descriptives by the European Commission. The control variables were personally selected by the OECD database, based on the extensive literature review.

1.3. Research questions

To obtain the objective of this study, the following research question will be addressed:

What is the relationship between corruption and performance in the healthcare sector of EU member states?

To answer and address the central research question in a structured manner six partial questions are formulated:

(1) What does the literature say about corruption in the public sector, and specifically, the healthcare sector?

(2) What does the literature say about the performance of public organizations, and specifically, healthcare organizations?

(3) What is the theoretical relationship between corruption and performance of public organizations, and specifically, healthcare organizations?

(4) What is corruption in the context of the healthcare sector in EU member states?

(5) What is performance in the context of the healthcare sector in EU member states?

(6) Is the theoretical relationship between corruption and performance in public organizations confirmed in the context of healthcare services in EU member states?

1.4. Relevance

1.4.1. Societal relevance

“Health is clearly among the most precious treasures we can have” (WHO, 2013). Health systems play a fundamental role in maintaining and improving people’s health. To lead them to their best performance, we must understand how they work (WHO, 2013). Since healthcare expenditure has grown steadily in most European countries, governments are becoming increasingly concerned in achieving higher levels of healthcare performance, including higher levels of efficiency, and matching financial sustainability with high quality of healthcare delivery (Deloitte, 2017; WHO, 2013). In addition, the interest of international organizations on healthcare corruption and healthcare efficiency is growing. “Control of corruption” is defined as one of the six composite worldwide governance indicators by the World Bank (World Bank, 2018). The sustainable development goals of the United Nations (UN) highlight the importance of good governance for achieving global health goals and the relevance for every development (United Nations, 2017), and the World Health Organization (WHO) has cited fraud a one of the ten leading causes of inefficiency in health systems (Gee & Button, 2015; WHO, 2018). Therefore, the emphasis of this study will be in line with the WHO and the sustainable development goals of the UN by accentuating on corruption in the healthcare sector.

Within the Global Corruption Report 2006 of the non-governmental organization Transparency international it is highlighted that the health sector is particularly prone to corruption as it constitutes a network of complex systems (The Lancet, 2006). Attention to healthcare corruption is increasingly important for developed countries, which are grappling with the rise of healthcare costs and increasingly impossible budget control. Globally, approximately 3 trillion US dollar (USD) is spent annually on healthcare, with average losses from corruption of up to 10% (Transparency International, 2006). Within the study of Liang & Mirelman (2014) on the complex relationship across government healthcare expenditure, results show that corruption in developed countries is linked to higher government health spending. Since, many European Member States expect demographic ageing and the rise of chronic diseases to push up health spending further, increasing knowledge about the consequences of corruption will be of great importance (Thomson, Foubister, & Mossialos, 2009; Transparency International, 2006). Increasing knowledge, to prevent and reduce corruption therefore is important to increase resources available for health, to make more efficient use of existing resources and, ultimately, to improve the general health status of the European population.

1.4.2. Scientific relevance

The goal of this study is to explore the association of the independent variable (X) corruption on the dependent variable (Y) healthcare performance in EU member states. The dependent variable within this study is performance of healthcare organizations. Measuring the performance of the healthcare system is useful to better understand how they work, to make performance clear and transparent, and to improve effectiveness, efficiency, equity, quality, and satisfaction. Studies focusing only on one performance dimensions without discussing what is excluded is problematic, since healthcare organizations have multiple goals (Andersen, Boesen, & Pedersen, 2016). Since effective and efficient health systems will not be performing the best, other performance dimensions of the responsiveness dimension of NPM are included. These performance dimensions of equity and quality give focus on probity and public welfare in the traditional sense (Adonis, 1997; Doig, 1997; Yesilkagit & De Vries, 2002; Gregory, 2002; Savoie, 1998). The study of Walker & Boyne (2009) states that the dimension equity is most often lacked behind. Besides, Habibov (2016) highlights that the performance dimension of satisfaction is recognized as a crucial component of healthcare delivery, since it provides feedback from customers which is an important impetus to improving healthcare delivery (Smith, Humphreys, & Jones, 2006; Kimenyi & Shughart, 2006; Kettl, Fanaras, Lieb, & Michaels, 2006; Amponsah-Nketiah & Hiemenz, 2009; Qatari & Haran, 1999; Bara, van den

Heuvel, Maarse, & Van Dijk, 2002; Brinkerhoff & Wetterberg, 2013). Habibov (2016) continues his argument by stating that satisfied customers are more likely to demonstrate higher level of compliance, which ultimately leads to better health outcomes (Margolis, Al-Marzouqi, Revel, & Reed, 2003; Bleich, Ozaltin, E. , & Murray, 2009; Njong & Tchouapi, 2014). Besides, higher levels of healthcare satisfaction will also show whether patients will be able or motivated to be a crucial actor in preventing corruption in the public sector (United Nations, 2017).

Within the European Union as a whole, and particularly in Central and Eastern European (CEE) member states corruption in healthcare remains widespread (European Commission, 2014; Bonilla-Chacin, Murrugarra, & Temourov, 2005; Falkingham, Akkazieva, & Baschieri, 2010). Yet, the body of literature lacks consensus regarding the association between healthcare corruption and the performance in healthcare services in these transitional countries. While most empirical studies show a negative relation between corruption and the performance of healthcare systems, arguing that informal payments are associated with lower propensity of using healthcare when needed and specialized healthcare services remain out of reach for the poor (Habibov, 2016; Balabanova, McKee, Pomerleau, Rose, & Haerper, 2004; Falkingham, 2004; Fan & Habibov, 2009). Other empirical studies highlight the positive outcomes of corruption, arguing that corruption can have a redistributive effect towards the poor when healthcare professionals charge a lower out-of-pocket rate or even provide free care to citizens struggling with poverty, compensating the “lost” revenue by asking wealthier patients for higher payments (Ensor & Savelyeva, 1998; Belli, Gotsadze, & Shahriari, 2004; Gotsadze, Bennet, Ranson, & Gzirishvili, 2005; Meon & Weill, 2010). Due to the lack of consensus within the body of literature, studying the association between healthcare corruption and performance is useful to better understand how their interconnections work, what their consequences are, and which strategies will be most effective in fighting the corruption problem in the public sector. This research will therefore, give focus on the gap of literature on the performance dimensions within the responsiveness dimension of NPM.

1.5. Thesis guide

The background and research questions presented in **chapter 1** are based on conclusions and recommendations from earlier studies. Within this study the partial research questions will be guided throughout this paper. Within **chapter 2** the concepts of “corruption” and “performance” will be further explained, as well as their connection with the public sector and specifically the healthcare sector. Within **chapter 3** the theoretical relationship between

corruption and performance of public organizations will be further discussed, specifically in the context of healthcare services. This chapter concludes with the theoretical formulation of hypotheses and a conceptual framework. **Chapter 4** will present the research design and methods of data collection and data analysis. The theoretical framework presented in chapter 3, will form the basis for the empirical data analysis. Within **chapter 5** a Pooled OLS regression analysis is conducted, the findings of the analysis will be discussed and concluded in **chapter 6** considering the broader context of existing literature. Within this chapter the scientific and political implications as well as recommendations for further research are discussed. Within **chapter 7**, the main research question: *What is the relationship between corruption and the performance of healthcare services in the EU member states?* will be answered. Within this thesis research, a one-loop process have been conducted, without returning to a new research idea.

2. Literature review

This chapter answers the first two partial research questions: (1) *What does the literature say about corruption in the public sector, and specifically, the healthcare sector?* (2) *What does the literature say about the performance of public organizations, and specifically, healthcare organizations?* containing the concepts of “corruption” in **part 2.1** and “performance” in **part 2.2**, and their specific connection with the public sector and healthcare services. Two systematic scoping literature reviews were conducted to select relevant papers and reliable sources for an in-dept explanation of both variables. The bibliographic searches were performed in the “Web of Science” database. In addition, manual searches were performed to select paper from the reference lists of the identified Web of Science papers.

2.1. Corruption in the public sector

A bibliographic search was performed in the “Web of Science” database with the search terms “corruption” AND “public sector”. In addition, manual searches were performed using the statements from international organizations, and relevant papers were selected based on the citations and reference lists of selected papers. An overview of literature search strategies and inclusion and exclusion criteria is presented in **Table 1**. The data extraction flow chart and a detailed description is shown in **Figure 1**.

All the citations were systematically screened and evaluated to exclude publications irrelevant to the inclusion criteria. Articles without EUR library access and published before 2007 were excluded. Since, the most relevant articles published before this ten-year time-period were selected by reviewing the reference list on often cited articles. The literature searches were performed using “Web of Science” (as described in **Table 1**) resulted in 18 selected papers. Out of these, a total of 4 papers were selected by reviewing the reference list of all selected papers. These 22 papers were used for the review process and extended by 1 European commission article within the grey literature searches (as described in **Table 1** and **Figure 1**). Several papers specifically deal with corruption in healthcare. Although these articles do not concern a general corruption definition, the studies were included because of their relevance. Ten out of eighteen papers made a comparative cross-country analysis, while seven studies exclusively focused on the European Union. Papers that primarily focused on causes of corruption, as well articles focused on the consequences of corruption, are together important to understand the definition of corruption in particularly the healthcare sector. Eighteen studies that mention public sector corruption were selected.

Table 1. Search strategy applied scoping review on corruption	
Inclusion criteria	Papers on Public sector corruption Papers on Healthcare corruption Multiple case studies
Exclusion criteria	Papers describing personal factors influencing corruption Papers not in English or Dutch Papers published before 2007 Papers without EUR library access
Web of Science search for published material	Web of science Search terms: “ <i>Corruption</i> ” AND “ <i>Public sector</i> ”
Manual search for Secondary literature	Website of the European Union, Transparency international The reference lists of selected papers

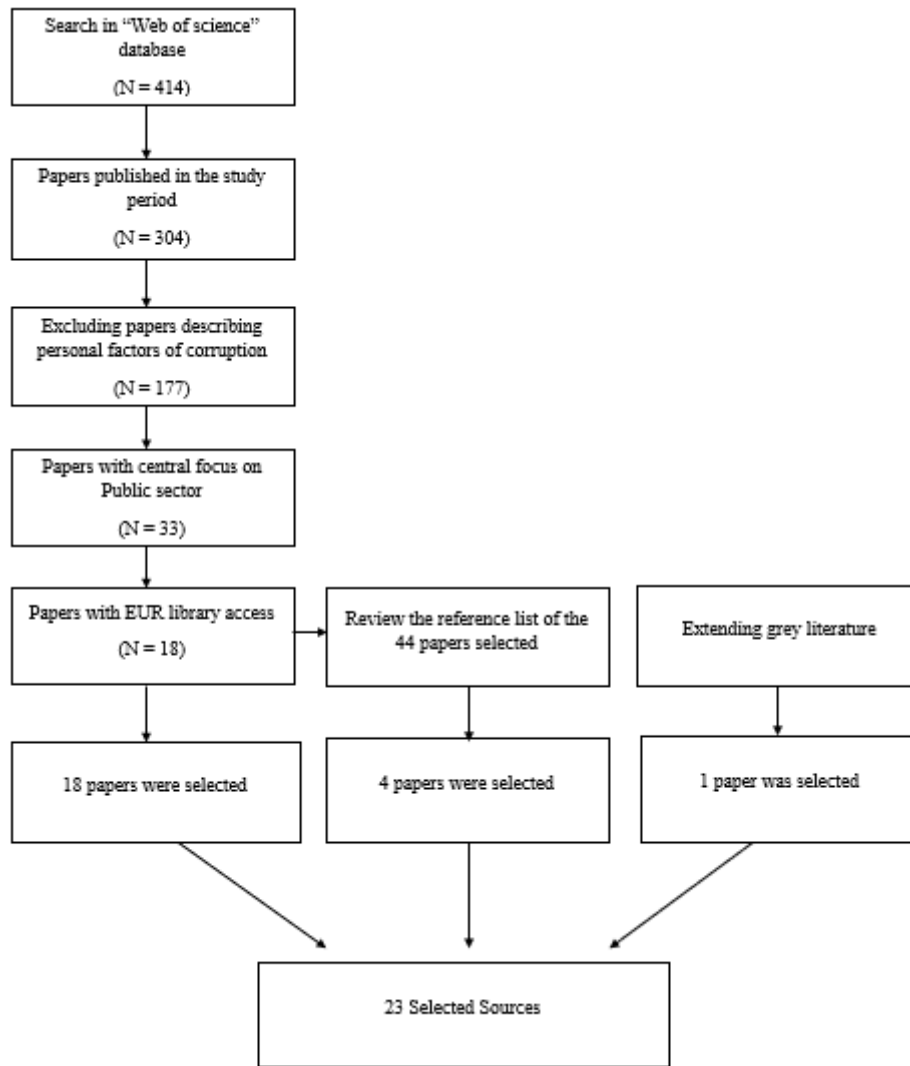


Figure 1. Data flow chart scoping literature review and extended sources on corruption

2.1.1. Defining corruption

Definitions of corruption can be discussed at length without necessarily providing an actual added value to the reader (Lambsdorff, 2007). This research will not provide all definitions of corruption, rather focusing on the main definitions used in literature. The scoping review resulted in the selection of eighteen research papers on corruption in the public sector (**Table 1 & Figure 1**). Relevant characteristics of these studies are presented in **Table 2**. In this table, only the articles from the database search are included since the other articles are co-selected on their definitions.

Table 2. Descriptive characteristics of the selected 18 articles						
Study design	Literature Review		Quantitative		Mixed Methods	
	6	33%	12	67%	0	0%
Context	Europe		Developing-countries		Global	
	7	39%	1	5%	10	55%
Domain in public sector	Healthcare		Administration		General	
	4	22%	2	11%	12	67%
Defining Corruption	Providing Definition		Not providing Definition		Explanation ¹	
	9	50%	6	33%	3	17%

Corruption is a pervasive phenomenon that is prevalent in all countries in varying degrees (Budak & Vizek, 2015; Bosco, 2015). Yet various interpretations of corruption exist around the world (Rose-Akerman, 1978). The problem of corruption definition is understandable for its complexity, and its clandestine nature away from the glare of publicity and which is difficult to measure empirically (Blackburn, 2012). Corruption has long been considered as an efficiency-enhancing practice that helps private market operators circumvent alleged noxious government measures such as excess taxation, service rationing, or cumbersome regulations (Aidt, 2003). Consequently, bribes – the instruments of corruption – were considered useful side payments that improved bargaining outcomes and promoted overall efficiency (Bosco, 2015). Rose-Akerman (1978) showed, on the contrary, that corruption should be perceived as sand and not grease in the wheels of economic systems (Bosco, 2015). Contemporary research confirms the negative influence of corruption on economic growth and development (Budak & Vizek, 2015). Given the complex nature of corruption and its consequences, it is not surprising that there is

¹ Explanation: articles not providing a definition of corruption but providing an explanation of corruption.

no “unified theory” or international consensus on the possible variables explaining the existence of corruption (Akbar & Vujic, 2014). Within the literature review, nine out of eighteen selected articles give a definition of corruption highly related to the definition of Transparency International **Table 3**, while three out of eighteen articles provide further exploratory explanations to understand corruption. While six articles did not provide a definition of corruption (Bosco, 2015; Charron, Dahlstrom, Fazekas, & Lapuente, 2017; Jesus-Morales & Prasad, 2017; De Vries & Sobis, 2015; Neshkova & Kostadinova, 2012; Nikoloski & Mossialos, 2013). This avoidance of definitions of corruption by authors is following Lambsdorff (2007) the result of unambiguously perceived by most observers among most cases of corruption. (Lambsdorff, 2007) argues that this is like Weber’s definition of the spirit of capitalism; he rejects a definition and claims that this term is composed by the various fragments and conceptions provided in his subsequent writing.

Table 3. Given definition of corruption												
Definitions	Sources											
	1	2	3	4	5	6	7	8	9	10	11	12
“The abuse of public power for private benefit”												
“The abuse of entrusted power for private gain												
“A misuse of public power for private gain”												
“The abuse of authority by public officials to make personal gains”												

1: Akbar & Vujic, 2014; 2: Budak & Vizek, 2015; 3: Blackburn, 2012; 4: Charron, 2016; 5: Dhami & al-Nowaihi, 2007; 6: Fritzen, Serritzlew, & Svendsen, 2014; 7: Kumar & Bhasker, 2015; 8: Lalountas, Manolas, & Vavouras, 2011; 9: Liang & Mirelman, 2014; 10: Navot, Reingwertz, & Cohen, 2016; 11: Podobnik, Vukovic, & Stanley, 2015; 12: van Veldhuizen, 2013

As seen from the definitions of corruption used in literature **Table 3**, the definitions are highly related and make use of three slightly different terms. First, the terms “private benefit, private gain, and personal gains” are commonly used. This term related to receiving money or valuable assets, but it may also encompass increased in power or status. Regarding favors for relatives and friends, the terms nepotism and favoritism are also common used (Lambsdorff, 2007). Second, the use of “public power, entrusted power and authority”. The difference between “public power and authority” and “entrusted power” is that the latter broadened the scope of

the definition of corruption in the private sector. “Public power” is exercised in a variety of sectors, such as public procurement, taxes, police, public utility, health, and education (Lambsdorff, 2007). Third, the term “misuse” or “abuse” which are used interrelatedly, either relating to a behavior that deviates from the formal duties of a public role, or, more generally, where narrow interests are followed at the expense of the broader interests of the public at large. In a functioning government system these definitions fall into one: public interests are supposed to feed into the public’s expectations vis-a `-vis office holders. These, in turn, are supposed to define formal obligations in line with the public’s interest, **Figure 2** (Lambsdorff, 2007). However, corruption is about government failures, which provides some problems to the definitions. Corruption as a real-world phenomenon thus destroys the foundation on which the just given formal definition rests (Lambsdorff, 2007).

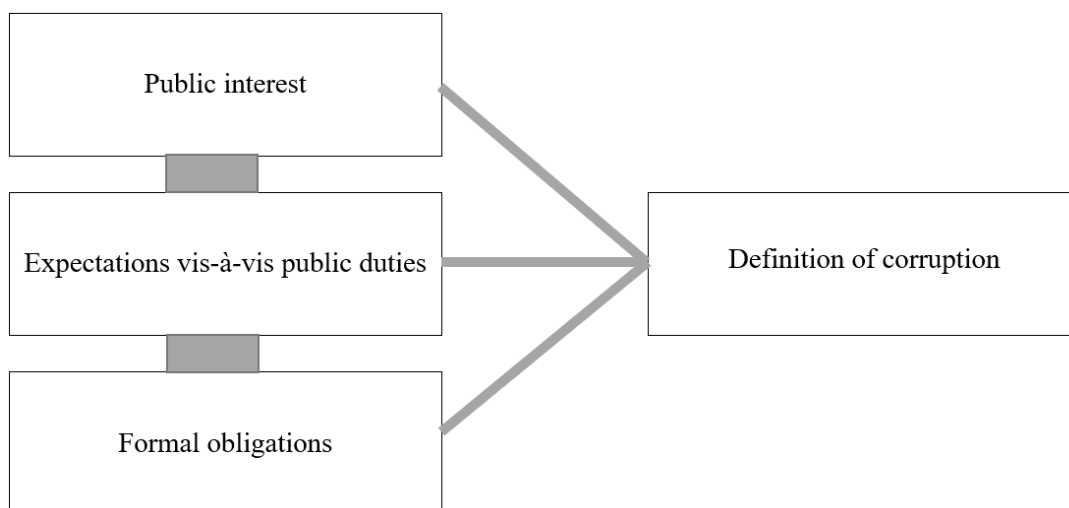


Figure 2. Defining corruption Based on the conceptual model of Lambsdorff (2007)

2.1.2. Types of corruption

A world free of corruption is associated with public servants who intend to serve the public, be it through intrinsic motivations, incentives, threats of penalties, or peer pressure. Corruption is defined differently in different regions of the world. The four aspects in **Figure 2** may obtain different weightage in different countries. For example, equality of treatment may be less relevant in societies characterizes by strong personal relations, where relatives and friends expect office holders to provide favorable treatment. What seems to be universal, though, is that the public commonly considers self-seeking behavior by politicians and bureaucrats as corrupt when this goes along with a neglect of their expectations and interests (Lambsdorff, 2007). According to the principal-agent-client theory, corruption is an exchange of favors

between two of the three actors. Bribery, extortion, embezzlement, and fraud in the public sector are variants of corrupt behavior, amounting to the defecting agent considering self-seeking behavior, **Figure 3** and **Figure 4**. Based on this, four ideal types of corruption can be distinguished. In the case of bribery (**B**), the client acts as a briber and makes a payment to the agent, who then is called a bribe. In return the client obtains an advantage such as a service of license he is not entitled to obtain. In the case of extortion (**T**) the agent uses her power to extract money or other benefits from the client. The client may have to pay for a service, although he is legally entitled to obtain it without such payment. The agent uses coercion, violence, or threats to obtain this payment. Embezzlement (**E**), in contrast, is simply theft of public resources by the agent. Without an involvement by the client a disloyal agent steals from the principal. Bribery, extortion, and embezzlement imply that the principal rules are trespassed, and his interests are hurt. The agent is commonly better informed about details of her daily tasks and her efforts devoted to their fulfillment. This implies that she can benefit from informational advantages. The agent can also actively conceal information from the principal with the help of trickery, swindle, deceit, manipulation or distortion of information, facts, and expertise. In this case the term defrauds (**D**) is used (Lambsdorff, 2007). Some behavior would be termed corruption equivocally by all observers. But corruption is viewed differently in different regions of the world, which encounters the existence of “grey areas.” Lobbying is one such gray area, where it is often legal, carried out in a transparent and competitive manner. Gift-giving is another grey area, which can in contrast to bribes, be given in a transparent manner, but involves the danger of dependency and reciprocity by the receiver (Lambsdorff, 2007).

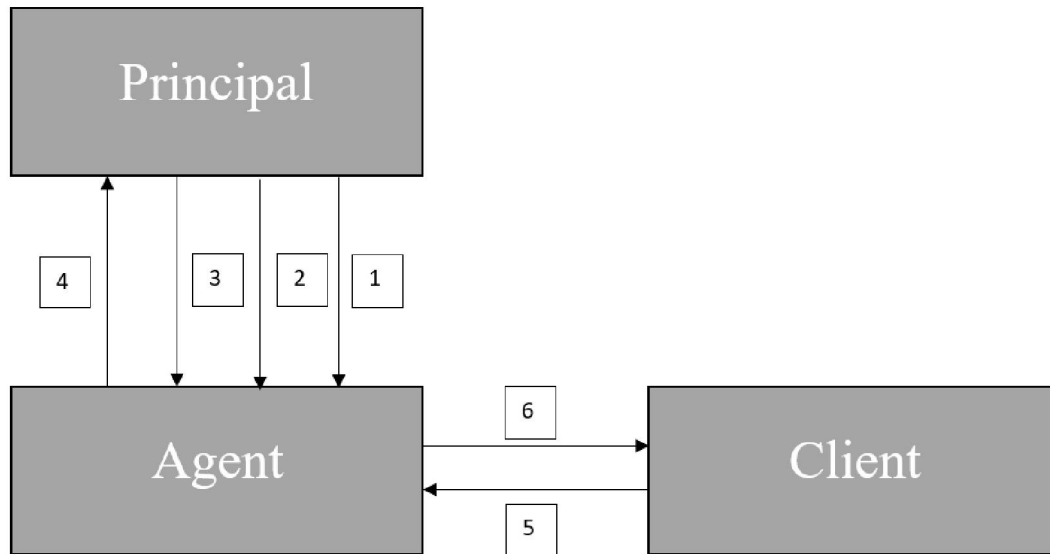


Figure 3. The basic principal-agent-client model 1. Delegates certain tasks to the agent; 2: Determines the formal rules according to which the tasks are to be performed; 3: Offers remuneration to the agent for completing the task; 4: The agent (is entrusted with the power by the principal); 5: Remains loyal to the principal, which means he performs the task in according with the rules that have been laid out; 6: Expectably respond to the client's needs within the specified framework (Lambsdorff, 2007)

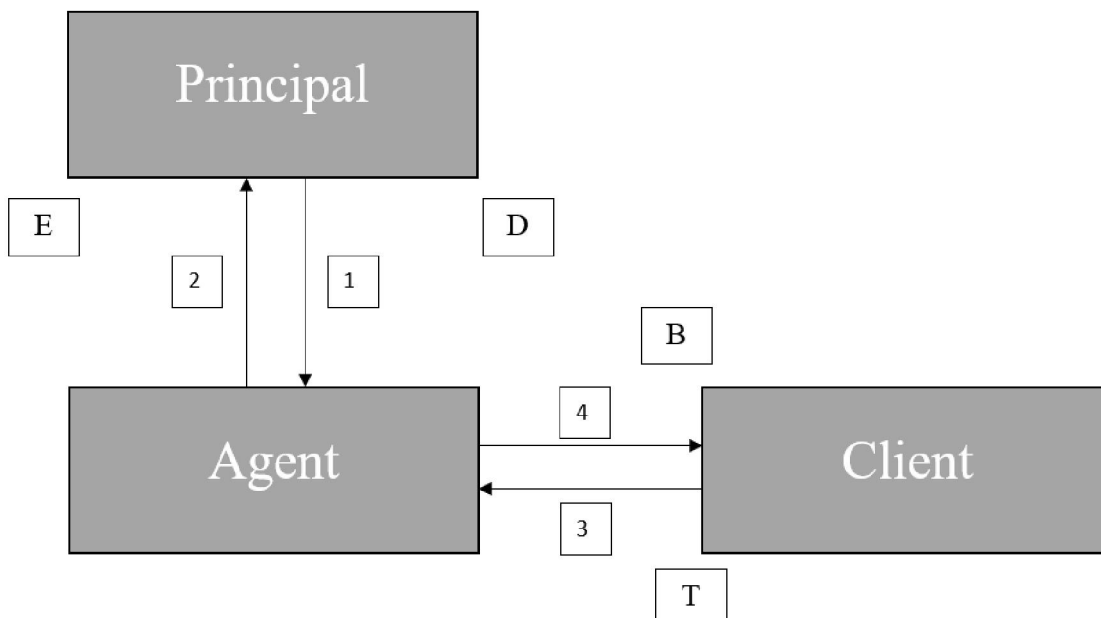


Figure 4. Corruption in a principal-agent-client model 1: Makes rules, pays salary; 2: Honors contract; 3: Pays taxes; 4: Provides service, awards contracts. E: Embezzles; D: Defrauds; B: Pays a bribe; T: Extortion (Lambsdorff, 2007)

2.1.3. Defining public healthcare sector corruption

Corruption in healthcare can directly take toll of human life, increases morbidity and medical complications, cause inhumane suffering in the times of pinnacle of achievements of modern medicine, create inhumane and unimaginably filthy conditions of healthcare delivery (Kumar & Bhasker, 2015). Corruption in healthcare is almost always the part of general corruption in society, its attitude and culture and usually do not exist as an isolated entity.

Within the healthcare sector roles and responsibilities in most developed countries are split between five actors, which are generally present in each healthcare system, while the mechanisms vary, **Table 4** (European Commission, 2013). Within the study on corruption in the healthcare sector of the European Commission (2013) six typologies of corruption in the healthcare sector are identified. Bribery in doctor to patient service delivery is the most visible form of corruption in healthcare. In the area of medical devices and pharmaceuticals, procurement, corruption and improper marketing relations appear to be the most prevalent types of corruption (European Commission, 2013). In **Figure 5** a simplified model of the corruption typologies between actors in the healthcare system is presented, based on the model of the European Commission (2013). Within the model the financial flows are excluded, and extortion as type of corruption is included from the simple principal-agent-client theory.

Table 4. Key healthcare actors	
Category	Subcategories
Patients	Individual patients Patients' organizations and pressure groups
Providers	Individual healthcare providers (Doctors, nurses, pharmacists etc.) Healthcare institutions Healthcare researchers and research institutions
Payers	Public and private insurance Social security and public funding
Industry	Pharmaceutical companies Medical device companies Intermediary companies
Regulators	Non-health (Judiciary, procurement regulators) Health (Ministry of health, Healthcare authority, inspectorate etc.)

(European Commission, 2013)

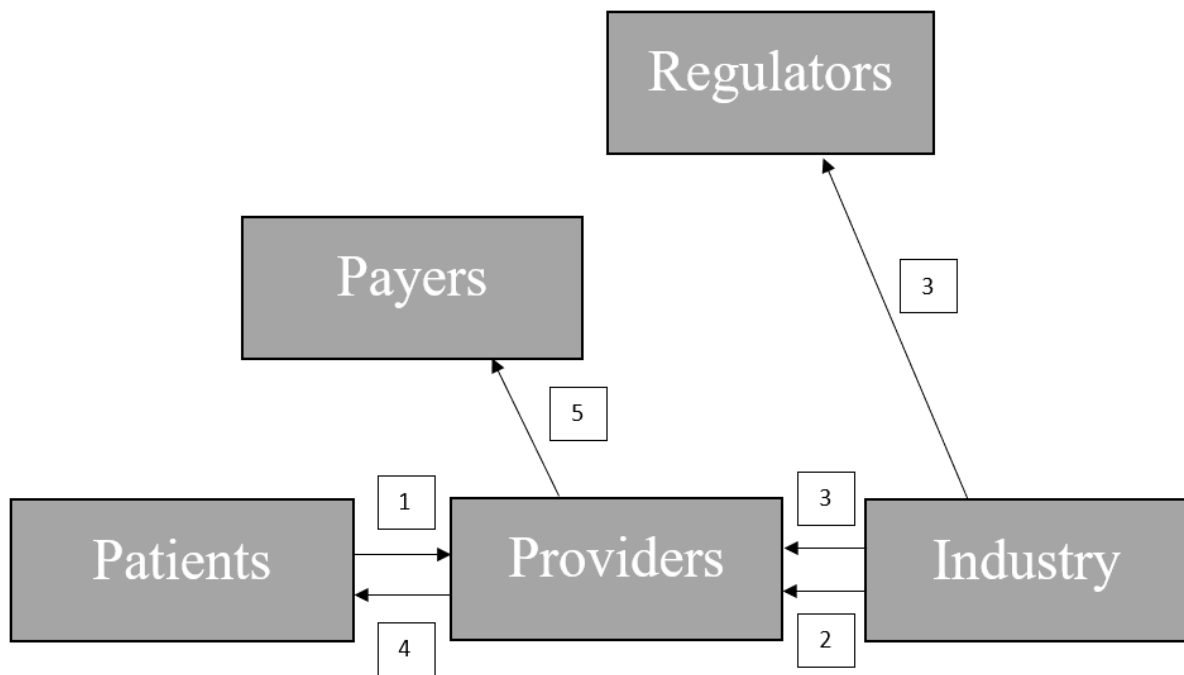


Figure 5. Healthcare corruption typologies 1: Bribe; 2: Procurement corruption; 3: Improper marketing; 4: Extortion; 5: Undue reimbursement claims. Based on European Commission (2013)

In the case of bribery **(1)**, the patient acts as a briber and gives extra money to the healthcare provider. In return the client obtains an advantage such as access to healthcare, preferential treatment, better quality of healthcare or obtain false sick leave statement. Within the Eurobarometers of the EU, the definition of bribery includes the acceptability of giving money, gifts or/and favors, to obtain something from the public services (European Commission, 2014). In the case of procurement corruption **(2)** corruption occurs in all phases. Markets of medical devices and pharmaceuticals have some special characteristics that influence the functioning of these markets and have an impact on the risk for corruption such as; patented products and close relationship between industry and providers in the development of new goods. The industry can give healthcare providers money, leisure and trips, favor relatives and offer discounts. While the healthcare providers can participate conferences, have free supply of materials, and give research funding and other forms of monetary and non-monetary sponsorship (European Commission, 2013). Improper marketing relations **(3)** in the markets of medical devices and pharmaceuticals have been considered one of the most problematic areas in healthcare regulation. The characteristics of improper marketing relations are created through different channels of money, hospitality, sponsorship, and consultancy contracts. In the case of extortion **(4)** in healthcare provider to patient service delivery is the most visible form of corruption.

Extortion burdens healthcare consumers directly, as they must pay an extra fee for services that they are entitled to and which often already have been paid through insurance or by the state. It is a major problem from the social point of view, since it directly touched upon the universal principle of equal access to healthcare. In the case of undue reimbursement claims **(5)** financing parties such as health insurers are paying healthcare providers for their services. The claims of the insured are often directly issues to the insurer by the provider themselves. Therefore, the provider can reimburse maximum tariffs, unnecessary treatments of non-delivered treatments (European Commission, 2013).

2.2. Performance in the public sector

A bibliographic search was performed in the “Web of Science” database with the search terms “Performance” AND “public sector”. In addition, manual searches were performed to find important authors in the field of performance using the reference lists of the selected papers. An overview of literature search strategies and inclusion and exclusion criteria is presented in **Table 5**. The data extraction flow chart and a detailed description is shown in **Figure 6**. All the citations were systematically screened and evaluated to exclude publications irrelevant to the inclusion criteria. The literature searches were performed using “Web of Science” (as described in **Table 5**) resulted in the selection of sixteen research papers (**Table 5 & Figure 6**). Out of these, a total of 5 papers were selected by reviewing the reference list of all 45 selected papers. These 21 papers were used for the review process and extended by 1 article on healthcare performance selected from the grey literature searches (as described in **Table 5**). Both qualitative as quantitative studies are included. Several papers specifically deal with performance dimensions in healthcare and education organizations within the public sector. Although these articles do not concern an in dept explanation of performance, the studies were included because of their relevance.

Table 5. Search strategy applied scoping review on performance	
Inclusion criteria	Papers on Performance in public organizations Papers on Performance in healthcare organizations
Exclusion criteria	Multiple case studies Papers not in English or Dutch Papers published before 2007 Papers without EUR library access
Web of Science search for published material	Web of science Search terms: “ <i>Performance</i> ” AND “ <i>Public organizations</i> ”
Manual search for extending literature	The reference lists of selected papers

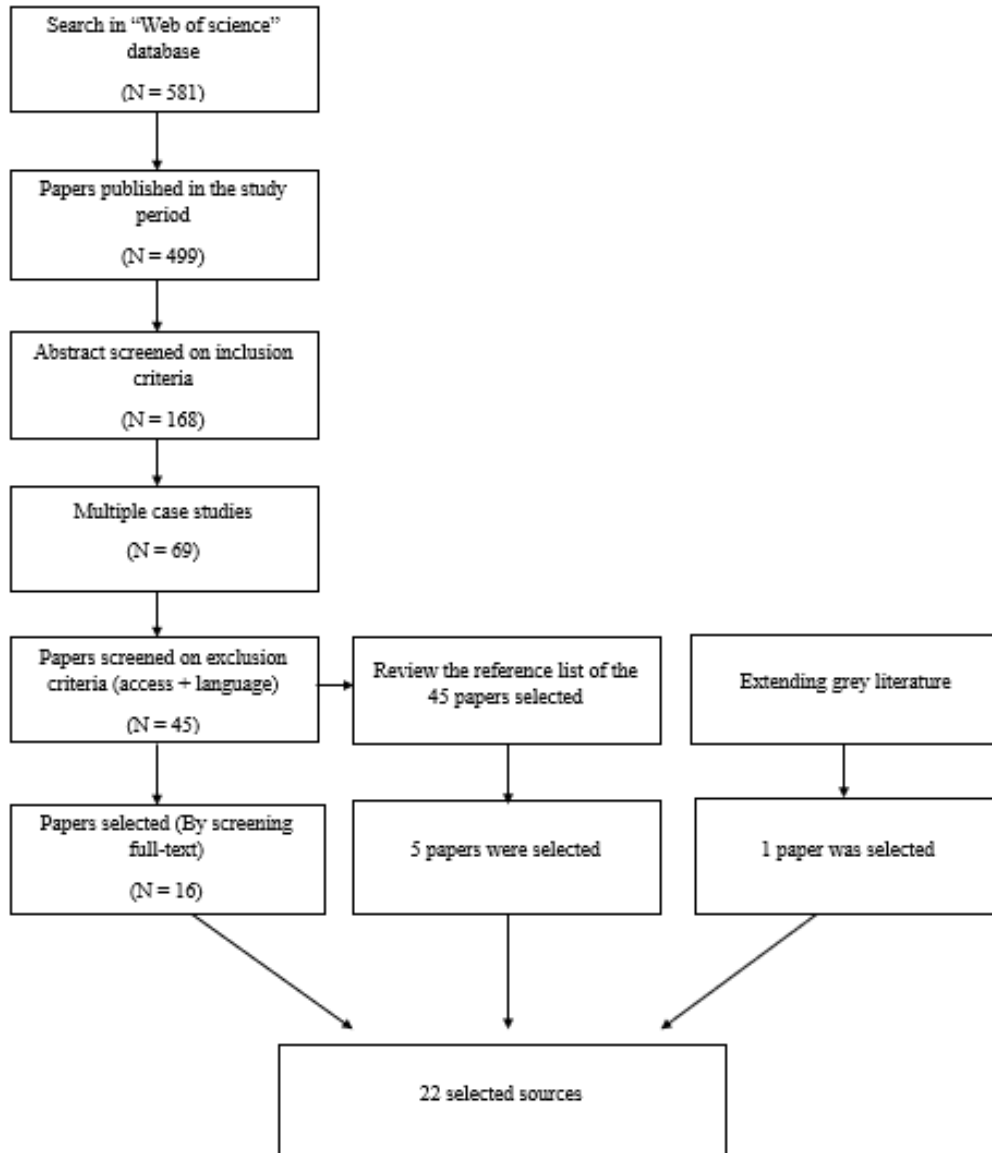


Figure 6. Data flow chart scoping literature review and extended sources on performance

2.2.1. Defining performance

The contemporary interest in the performance of public organizations is substantial, with the rise of NPM (Walker & Boyne, 2009). This scoping review briefly describes what past studies have written about performance. The scoping review resulted in the selection of sixteen research papers on corruption in the public sector (Table 5 & Figure 6). Relevant characteristics of these studies are presented in Table 6. In Table 6 and Table 7, only the articles from the database search are included since the other articles are co-selected on personal preferences, which can influence the objective information taken out of the studies describing performance.

Study design	Literature Review		Quantitative		Mixed Methods	
	4	25%	11	69%	1	6%
Context	Local		National		Cross-national	
	2	13%	4	25%	10	63%
Domain in public sector	Healthcare		Administrative		Education	
	1	6%	13	81%	2	13%
Key questions	External environment		Organizational characteristics		Management	
	3	19%	10	63%	3	19%

The topics examined in the academic literature deal with key questions around the external environment, organizational characteristics, and management on performance. The external environment plays out in many unforeseen ways (Walker & Boyne, 2009). Vashi, Vigoda-Gabot, & Shlomi (2013) argue that the public service environment is important, as it influences the practices of daily lives, the interactions with other citizens and governmental institutions. In recent decades the scope of literature has increased their understanding on its meaning, its organizational climate, and the effects on performance of individuals, teams, and organizations (Vashi, Vigoda-Gabot, & Shlomi, 2013). Within a research of Boyne (2009) the widely believed relation between a turbulent external environment and the damaging effects on public service performance is confirmed. Boyne (2009) also argues that public managers can mitigate the harmful effects of volatility in the external environment by maintaining structural stability. As De Waal (2010) cites by applying performance management, public organizations were more likely to achieve their objectives and improve their overall efficiency (De Waal & Kerklaan, 2004; Moriarty & Kennedy, 2002). This is in line with, the study of Walker & Boyne

(2009) arguing that public managers can have a variety of positive impacts on the performance of their organizations. Additional literature have focused systematically on whether and how public management matter for performance (Im & Lee, 2012; Ma, 2016). They both find that management makes a significant difference in the citizen satisfaction of public organizations. The literature addressing the empirical measurement of performance in public organizations employs a wide range of dimensions on various units of analysis. Within the scoping literature review only three out of sixteen articles are focused on other units of analysis than public administration. These studies are implying services in public hospitals (Sari, 2017) and educational outcomes (Boyne, 2009; Ma, 2016) (**Table 6**).

2.2.2. Types of performance dimensions

The aim of performance management in the public sector is to make performance clear and transparent, and to improve effectiveness, efficiency, quality, and accessibility. Performance is always relative and depends on what dimensions of performance are defined. The most often used dimensions within performance measurement are effectiveness (**A**) – the achievement of formal objectives – and efficiency (**C**) – cost per unit of output (Andersen, Boesen, & Pedersen, 2016). Outputs concern the actions performed in the production process and include both quantity (**D**) and quality (**E**). Outcomes concern changes in external units, which are the object of target of the relevant policy or service intervention (Andersen, Boesen, & Pedersen, 2016). This can include effectiveness as well as equity (**I**) in outcomes. Equity is defined by the WHO as “*the absence of avoidable or remediable differences among groups of people whether those groups are defined socially, economically, demographically, or geographically*”. (WHO, 2018). The ratio of outcomes to inputs is defined as cost-effectiveness (**B**) (Andersen, Boesen, & Pedersen, 2016). The study of Walker & Boyne (2009) states that the dimensions of cost-effectiveness and equity are most often lacked behind. Within eight of the sixteen studies the dimensions “responsiveness” (**F**), “level of satisfaction” (**G**) and “perceived performance” (**H**) are used. Studies using these dimensions are focused on the need for public agencies to show better results and to diminish the dissatisfaction among citizens with government’s performance. Citizen satisfaction can be defined as “*the combination of general and subjective assessments of the experiences people have with public services*”, which not only include feelings or opinions (Im & Lee, 2012). This complexity and multifaceted makes reviewing the literature on performance a challenging task (Monteduro, 2017). While it is impossible to provide an exhaustive review within this study; this section addresses this issue by focusing on the selected literature from the scoping review to see which performance measures in the public sector are

used. This literature review has largely attempted to assess the performance dimensions by public organizations. The measurement and reporting of outcomes indicators are presented in a detailed breakdown of performance dimensions extracted from these studies (**Table 7**). The 6 articles selected from the reference list and extended grey literature are not presented in **Table 7**. Since these articles are manually selected based on their focus on responsiveness dimensions of performance, this could lead to an inaccurate presentation of the actual use of different performance dimensions within academic literature.

Table 7. Performance dimensions used within articles																
Performance dimensions	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
A Effectiveness																
B Cost-effectiveness																
C Efficiency																
D Quantity																
E Quality																
F Responsiveness																
G Citizen satisfaction																
H Perceived performance ²																
I Equity																

1: Andersen, Boesen, & Pedersen, 2016; 2: Andrews, Boyne, Meier; 2012 3: Boyne, 2009; O'Toole, & Walker, 2012; 4: Caillier, 2018; 5: De Waal, 2010; 6: Im & Lee, 2012; 7: Jung & Kim, 2014; 8: Ma, 2016; 9: Monteduro, 2017; 10: Paille, Grima, & Dufour, 2015; 11: Rogge, Agasiti, & De Witte, 2017; 12: Sari, 2017; 13: Vashi, Vigoda-Gabot, & Shlomi, 2013; 14: Vermeeren, 2017; 15: Vigoda-Gadot, Shoham, Schwabsky, & Ruvio, 2008; 16: Walker & Boyne, 2009

2.2.3. Defining performance of public healthcare organizations

Healthcare organizations present a sector where performance management is structured by multiple dimensions, since they have many stakeholders (**Table 4**) with conflicting or overlapping interests (Dimitropoulos, 2017). In public healthcare organizations the importance of securing increased effectiveness, efficiency, productivity, quality of activities and outputs, satisfaction of citizens and equity is increased (Rogge, Agasiti, & De Witte, 2017), because of

² Perceived Performance: These articles did mention a different dimension of performance, not explicitly referring to one performance dimension

the expected growth in healthcare expenditure because of demographic ageing and the rise of chronic diseases. Ensuring increased efficiency in healthcare management mechanisms can enhance utilization of scarce resources (Dimitropoulos, 2017). Within healthcare organizations, patient safety and service quality are providing the evidentiary basis for patient outcomes (Cowing, Davino-Ramaya, Ramaya, & Szmerekovsky, 2009). Within the study of Sari (2017) the quality of care is defined as “*the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge*”. Broad determinants of performance are necessary to adequately assess the multiple dimensions of healthcare delivery performance.

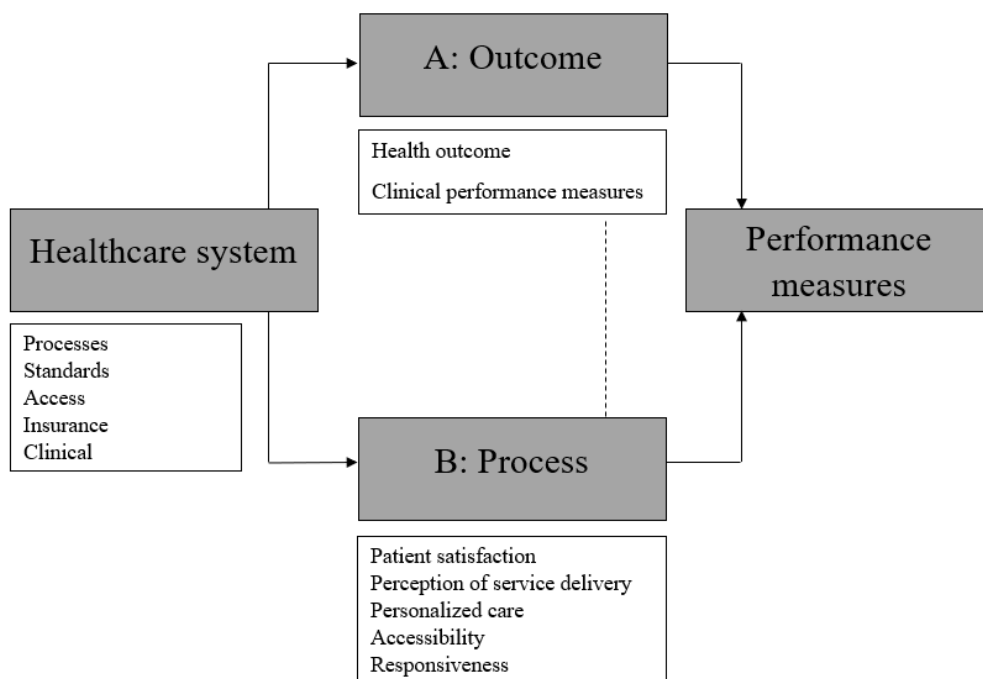


Figure 7. Determinants of healthcare performance Box A represents indicators of performance quality. Box B represents process-related determinants of quality (Cowing, Davino-Ramaya, Ramaya, & Szmerekovsky, 2009).

Within **Figure 7** items in box A and box B indicates the determinants of healthcare performance (Cowing, Davino-Ramaya, Ramaya, & Szmerekovsky, 2009). Box A captures those aspects of performance that are in line with the definition giving by Sari (2017). These measures include the more objective guidelines and standards used to assess health outcomes. Box B captures the relevant process-related determinants including patient satisfaction and the accessibility of healthcare services. Both boxes are affected by the design of the healthcare system such as implemented procedures, clinical standards, and insurance. **Figure 7** also shows the important feedback between box B the process-related measures and Box A the outcome measures. It is

well documented that patients which are satisfied with provider-patient interaction often have better health outcomes (Cowing, Davino-Ramaya, Ramaya, & Szmerekovsky, 2009).

3. Theoretical framework

This chapter answers the third partial research question; (3) “*What is the theoretical relationship between corruption and performance of public organizations, and specifically, healthcare organizations?*” Within **part 3.1** the theoretical relationship between corruption and performance of public organizations will be discussed using the principal-agent-client theory. This theory is both used within the articles selected in **chapter 2** to explain the concepts of corruption and performance. Within **part 3.2** the principal-agent-client theory will be used to specify the theoretical relationship in healthcare organizations. The analysis of this question will conclude in ten hypotheses and a conceptual framework.

3.1. Principal-agent-client theory in the public sector

Claims of corruption in **Table 3** and external reporting of performance dimensions in **Table 7**, can be explained by the principal-agent theory. Both Andrews, Boyne, Meier, O'Toole, & Walker (2012) and Monteduro (2017) uses this theory to explain the performance information. While it is a dominated approach to understand corruption within political science literature, see **Figure 3** and **Figure 4**. The rational choice approach stems from the assumption that individual self-interest dominates human behavior. In this view, the desire to maximize self-interest guides everyone's behavior.

The relationship within the principal-agent-client theory can be modeled as the interaction between three parties, the "principal" (individual who oversees carrying out a public function), and "agent" (individual who performs the operation of the agency), and a "client" (a private individual with whom the agent interacts) (Rose-Akerman, 1978). An agency problem can occur when the agent pursues a self-interested objective that deviates from the goals of the principal. The principal may reduce divergence by monitoring the agent, or by bonding the agent by guaranteeing that he will not deviate from the goals of the principal. Not all divergence can be eliminated, and the value of the remaining divergence is defined as the residual loss. Agency costs are the sum of the monitoring costs, the bonding costs, and the residual loss (Monteduro, 2017). Agency costs increase when there is significant information asymmetry. Information asymmetry problems occur because agents can access more information than principals. Based on an agency framework, the disclosure of outcome measures by public organizations can be explained by the need to reduce information asymmetry between principals and agents and therefore the agency costs. This explanation reveals that public organizations disclose outcome measures in their annual reports because this can reduce agency costs. Within this theory the degree of disclosure will depend on the extent of information asymmetries (Monteduro, 2017). Corruption in this view is based on a cost-benefit analysis of the agent in which he or she weighs the private gain against the risk of being exposed and sanctioned (De Vries & Sobis, 2015). This theory emphasized that the combination of self-interest and information asymmetry results in moral hazard. It assumes that if the interest of the agent and principal are not aligned, the information asymmetry provides opportunities to the agent to serve his own interests at the expense of the principal, **Figure 8** (De Vries & Sobis, 2015).



Figure 8. The four ideal typical corruption transactions (De Vries & Sobis, 2015).

The classic solution to the principal-agent problem is to select an agent with the same values as the principal (Andrews, Boyne, Meier, O'Toole, & Walker, 2012). In theory, then, by maximizing her values the agent also maximizes those of the principal – and the organization's performance improves (Andrews, Boyne, Meier, O'Toole, & Walker, 2012). The principal-agent literature suggests that principals will desire agents to hold the same values, so that when a principal decides, the agent will implement the decision as given rather than transforming it to their own preferences (Ross, 1973; Mitnik, 1980; Perrow, 1986). This is in line with the model of Yang (2012), wherein individual behavior is central to the organizational performance. Nevertheless, Yang (2012) also assume that a lack of individual felt accountability influenced by personal and organizational characteristics can indirectly influence the organizational performance by directly influencing individual behaviors, for example in forms of corruption (Yang, 2012). In addition, Lambsdorff (2007) argues that corruption occurs when public interests due not feed the public expectations of office holders. In this way, corruption in the public sector is defined in negative association with performance of public organizations.

Nevertheless, there is still a lack of consensus regarding the association between corruption and the performance in public services. The first school of thought **“sand the wheels”** suggests a negative effect of corruption, while the second school of thought **“grease in the wheels”** suggests a positive effect of corruption. The latter mostly focused on countries in transition such as Eastern European member states. To confirm or reject these theories by existing literature, only one article was selected out the systematic literature review on the Web of Science. This study by (Nguyen, et.al. (2017) contributes to this debate by suggesting that corruption significantly decreases the quality of public services. Since this was the only article selected within based on the inclusion criteria of *“Papers on the influence of Corruption on Performance in public organizations”* and/or *“Papers on the influence of Corruption on Performance in healthcare organizations”* this paper gives more focus on the manual search of (grey) literature in the field of the relationship between corruption on performance in healthcare organizations. Hereby, the search terms **“Corruption” AND “Healthcare” AND “Performance”** were used in

databases such as google scholar, PubMed, and the Erasmus university library. A total of 15 papers were selected for the review process. Due to the manual search and the presentation of a controversial school of thought, the relevant characteristics of the articles together with its findings are presented within **Table 8**. The different articles presented in **Table 8** show opposing relationships for the performance dimensions of effectiveness, efficiency, equity, quality, and satisfaction.

Table 8. Theoretical relationship between corruption and public performance						
N	Descriptive characteristics per article				Relationship	
	Study design	Country	Sector	Performance Dimension	(+)	(-)
1	Cross-sectional survey	Soviet Union ³	Healthcare	Equity		
2	Panel data analysis	Italy	Public	Efficiency		
3	Living Survey	Tajikistan	Healthcare	Equity		
4	Cross-country analysis	World	Public	Quality		
5	Regression analysis	Soviet Union ³	Healthcare	Satisfaction		
6	Regression analysis	India	Public	Effectiveness		
7	Literature study	World	Healthcare	Effectiveness		
8	Welfare analysis	Developing ⁴	Public	Satisfaction		
9	Focus Groups	Tanzania	Healthcare	Quality		
10	Panel data analysis	69 countries	Healthcare	Efficiency		
11	Panel data analysis	119 countries	Healthcare	Effect ⁵ , Quality		
12	Household survey	Vietnam	Public	Quality		
13	Household survey	Lithuania	Healthcare	Equity, Quality		
14	Focus groups	Tanzania	Healthcare	Equity, Quality		
15	Panel data analysis	World	Public	Quality		

1: Balabanova et.al. 2004, 2: Del Monte & Papagni, 2001; 3: Falkingham, 2004, 4: Gupta, Davoodi, & Tiongson, 2000; 5: Habibov, 2016, 6: Kato & Sato, 2014; 7: Lewis & Pettersson, 2009, 8: Liu & Sun, 2012; 9: Maestad & Mwisongo, 2011, 10: Meon & Weill, 2010, 11: Mon-Chi & Ming-Hsuan, 2015, 12: Nguyen, et.al. 2017; 13: Riklikiene, Jarasiunaite, & Starkiene, 14: Stringhini et.al 2009; 15: Tanzi & Davoodi, 1997.

³ Former-Soviet Union

⁴ Developing countries

⁵ Effectiveness

3.2. Principal-agent-client theory in the healthcare sector

Based on the Principal-agent-client theory the healthcare sector is particularly vulnerable for corruption, due to its organizational characteristics. Within the healthcare sector roles and responsibilities are split between more than the simple three actors within the principal-agent-client theory. Two important additional actors are the payers and the industry. This increased number of actors increases the vulnerability of the healthcare sector for corruption since of their complex inter-relations. Since the payer is often not the same as the recipient of healthcare services (the patient), the actors payers increases the vulnerability of the healthcare sector since unlike consumer markets for more regular goods, the complex market of healthcare pricing is much more opaque. There is no immediate check on the actual provision of goods and services and it is nearly impossible to define the “right” amount to be spent on healthcare (European Commission, 2013).

First, there is a high degree of information asymmetry between providers of care and clients. Within the healthcare sector this can result in a decrease of the individual felt accountability and an increase in individual behavior in forms of corruption (Yang, 2012). This information asymmetry can challenge healthcare providers to act as their agents in diagnosing and treating illnesses (Lewis, 2006). This process is strengthened by patients which are highly self-interested, since they are exercising demand for services to become healthy. Yet, patients are aware they do not feel healthy, but they rely on healthcare providers to act as their agents. Patients themselves are ill-equipped to assess the adequacy and quality of healthcare provider decisions (Lewis, 2006). Therefore, the evaluating of healthcare providers is more focussed on elements easier to evaluate for patients, such as environmental and interpersonal aspects of clinical services, rather than focussed on actual diagnosis and treatments of the agents (Lewis, 2006). In addition, Lewis (2006) states that *“adverse selection by private health insurers lead to an uninsured population disproportionately made up of those most in need for healthcare services”*. In Member states without health insurance the same constraints apply.

The theory emphasized that this combination of self-interest and information asymmetry results in moral hazard. The moral hazard is twofold. First, the coverages of costs by a third party, lead to over production by healthcare providers. Second, the over-consumption by the insured parties, are often not the actors who face the cost of healthcare, which requires active cost control (Lewis, 2006). While, in most EU member states market failure has resulted into a public financed and delivered healthcare system, and regulation from public and private bodies,

other EU member states depend profoundly on public intervention rather than regulation (Lewis, 2006). The model of De Vries & Sobis (2015) assumes that moral hazard can lead to not aligned interests between the healthcare provider and patients, the information asymmetry provides opportunities to the healthcare provider to serve his own interests at the expense of the principal, **Figure 8** (De Vries & Sobis, 2015).

In the article of Lewis (2006) a straightforward framework represents the core of public healthcare systems embodying capital (**K**) labor (**L**) and governance (**G**). Within this framework healthcare performance is defined as healthcare outcomes, including quality, effectiveness, efficiency and satisfaction dimensions of performance. Governance can represent a measure of institutional quality or healthcare governance. Governance within this framework includes third parties and consumer payments. Labor includes management and healthcare providers, and capital includes equipment, infrastructure, and other fixed assets, inclusive of financing. Increases in capital and labor can improve healthcare outcomes, but healthcare governance and institutional quality may enhance or dampen these effects (Lewis M. , 2006).

$$\text{Healthcare performance} = (\mathbf{L}, \mathbf{K}, \mathbf{G})$$

Following Lewis (2006), *“the functioning of the public healthcare system is determined by the incentives facing actors in the system, the manner in which inputs are managed and the accountability imbedded in the incentive structure”*. Within this model the accountability, felt towards a central government, local government, patients, or some combination is crucial. This is in line with the model of Yang (2012), which assumes that a lack of individual felt accountability influenced by personal and organizational characteristics can indirectly influence the organizational performance by directly influencing individual behaviors, for example in forms of corruption (Yang, 2012). Meaning that the lack of felt-accountability by healthcare providers (**L**) will increase the incentives of corrupt behavior and will indirectly influence the performance of healthcare services, by a lower functioning of the public healthcare system. The lower felt accountability can result in acts at their own interest, at the expense from the public interests and do not feed the public expectations of office holders (Lambsdorff, 2007). An act at their own interest can undermine healthcare delivery, and represent higher healthcare costs due to informal payments, less focus on diagnosis and treatment due to misuse of information asymmetry and lower access to healthcare especially for people within the low quintile of equalized income (Lewis, 2006). These actions out of moral hazard will suggest a negative effect of corruption.

This is in line with most studies showing a negative effect of corruption on healthcare, assuming increased agency-costs, and a decreased functioning of the healthcare organization. Especially, bribes and other corruption barriers are associated with lower propensity of using healthcare when needed, and specialized health services which remain out of reach for the poor (Balabanova et.al. 2004; Habibov, 2016). This school of thought conceptualises corruption as “**sand the wheels**” and suggests a negative effect of corruption, especially for people within the low quintile of equitized income. Confirming this theory two case studies both conducted in the context of Tanzania, suggest that the practice of informal payments negatively affects the access to healthcare services and the quality of the healthcare system (Stringhini et.al. 2009; Maestad & Mwisongo, 2011). In addition an instrumental variable regression conducted by Habibov (2016) on post-soviet nations argues that corruption significantly reduces healthcare satisfaction. Especially in public healthcare organizations the importance of measuring effectiveness, efficiency, quality of activities and outputs, satisfaction of citizens and equity is of great importance, rather than measuring only the two dominant performance dimensions of NPM effectiveness and efficiency. Based on this literature, the theory of principal-agent-client theory can be explained following the next hypothesis **H1**.

H1: Corruption will negatively influence the performance of healthcare services

Yet, within Member states with respectable governance systems and high institutional quality (G), corrupt behavior by healthcare providers (L) will be less feasible due to great control and surveillance of governments and institutions. This dampening effects of healthcare governance and institutional quality (G) systems will in this way have a balancing or increasing effects on healthcare performance. Nevertheless, within Member states with ill-functioning governance and institutional systems (G), corruption by healthcare providers (L) may be enhanced. Yet, when healthcare providers (L) act in an ethical and moral way, its corrupt behavior, may be beneficial by alleviating the distortions caused by the institutions itself (Meon & Weill, 2010). These beneficial effects of the behavior of healthcare providers (L) which can provide better access to healthcare services, are of small extent within a detrimental system.

This can be one of the explanations of the lack of consensus within the body of literature regarding this effect of an corrupt agent, see **Table 8**. The most common argument in favor of the beneficial effects of corruption rests on the “**grease the wheels**” school of thought (Meon & Weill, 2010). This controversial school of thought, mostly used by economists, highlights the positive outcomes of corruption, since the self-interest goals of the agent, acting in a

deviating way of its principal, can still be an act of public interest, when healthcare professionals charge a lower out-of-pocket rate or even provide free care to citizens struggling with poverty compensating the “lost” revenue by asking wealthier patients for higher payments (Habibov, 2016). This school of thought is advanced by the articles of Leff (1964) “*Economic development through bureaucratic corruption*” and (Leys, 1965) “*What is the problem of Corruption?*” As addressed in the introduction the problems of accountability that arise with the NPM reform are higher within countries which have low social discipline and the lack of institutional capacity (Barzelay, 2001; Pollit & Boueckert, 2004). Yet, this school of thought argues that within these ill-functioning institutions corruption may be beneficial by alleviating the distortions caused by the institutions itself (Meon & Weill, 2010). The study by Meon & Weill (2010), tests whether corruption may be an efficient grease in the wheels of an otherwise deficient institutional framework. The results of this study provide substantial evidence of the grease in the wheels hypothesis, while no evidence for the sand in the wheels hypothesis, when analyzing efficiency within the economy. Most importantly, Meon & Weill (2010) highlight the fact that the average result of corruption and economic performance may be negative within countries with effective institutional frameworks, whereas the correlation may be positive in other countries (Meon & Weill, 2010). It is for this reason, that this theory is important to consider when analyzing different countries with many different systems of bureaucracy. An example is the study of Riklikiene, Jarasiunaite, & Starkiene (2014), which gives focus on the beneficial association of informal payments in the healthcare sector. This nationwide quantitative household survey in Lithuania conclude that informal payments are still highly persistent and can have positive relationships with the performance indicators of equity and quality, stating that: “*national health insurance payments...are further augmented by informal payments from service consumers, used routinely for better access to and higher quality of healthcare services*” (Riklikiene, Jarasiunaite, & Starkiene, 2014). Stepurko et.al. (2010) acknowledge the fact that informal patient payments are an important feature of healthcare systems in many countries around the world. As (Falkingham, 2004) states within an analysis in Tajikistan: “*There is evidence of informal targeting of unofficial charges with doctors charging according to some subjective assessment of ‘patients ability to pay’*”. To acknowledge this controversial thought within the body of literature this study has identified the following hypothesis, **H2**.

H2: Corruption will positively influence the performance of healthcare services

Given the lack of consensus about the effect of corruption on healthcare performance, a theoretical framework is established to test above hypothesis, explained in **Figure 9**. This theoretical framework is a simplification of the discussed literature in **chapter 3**, and forms the basis for the method in **chapter 4**. Within **part 4.2** both the independent variable and the dependent variable are further operationalized based on earlier discussed literature, **Table 9**.

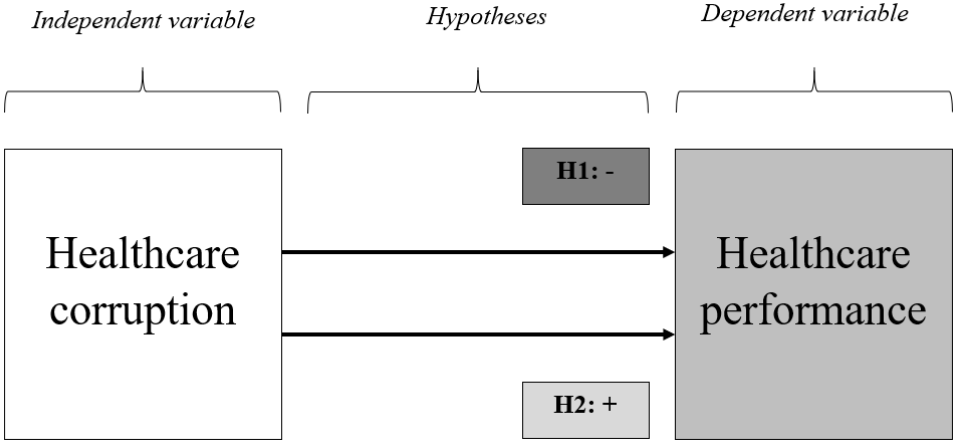


Figure 9. Theoretical framework

4. Research design and methods

This chapter elaborates on the data analysis answering the following defined partial research questions of this research (4) *‘What is corruption in the context of the healthcare sector in EU member states’* and (5) *‘What is performance in the context of the healthcare sector in EU member states?’*. For this study a self-created panel dataset was used, made out of three existing databases, Special Eurobarometers, the ECHI and the OECD. All variables implemented within this study are presented in **part 4.1**. As well as the explanation of their measurement and the reason these indicators are chosen within a certain dimension. The method used to analyze this relationship is a five-year time-point Pooled OLS regression analysis, further examined in **part 4.2**. In addition, several tests were conducted: variance inflation test, Breusch-Pagan hettest, Shapiro-Wilkinson test and Cook’s distance test in order make sure no problems occur when continuing to the Pooled OLS regression analysis in **chapter 5**. The reliability and validity of the study designs are discussed within **part 4.3**.

4.1. Data collection

Methodology can be understood as the logic behind chosen methods, when conducting a statistical causal analysis (Mehmetoglu & Jakobsen, 2017). The choice of the method implies that the search for regularities or correlations between corruption (independent variable) and healthcare performance (dependent variable). The objective is to unveil and explain these regularities (Mehmetoglu & Jakobsen, 2017). Specifically, this study wants to analyze what the relationship is between healthcare corruption and five different performance dimensions; healthcare effectiveness, healthcare efficiency, healthcare equity, healthcare quality and healthcare satisfaction. In this context, the theories “sand in the wheels” and “grease in the wheels”, explained in **chapter 3**, are guiding.

This research specifically focuses on healthcare corruption rather than public sector corruption. This focus let us decide to choose the surveys of Eurobarometers rather than the dominant Corruption perception index (CPI) surveys of transparency international, in the field of corruption research. This choice was made because CPI sees corruption as applicable to the whole public sector, while in practice there may be significant variance at different levels of society and between public sectorial types. In addition, the Eurobarometer surveys are conducted by respondents aged 15 years and over from different social and demographic groups were interviewed face-to-face at home in the local language, while Transparency international conducts its surveys by country ‘experts’ and business executives, by focusing on the former this study can bring new insights.

Yet by choosing to specifically focus on healthcare corruption and therefore using the Eurobarometer surveys further data had to be collected to operationalize the variables. As Hsiao (2007) argues *“the collection of panel data is much more costly than the collection of cross-sectional or time series data”*. However, there is a proliferation of panel data studies. One of the reasons for this growth is the existence of many existing databases (Hsiao, 2007). As for this study a self-created a panel dataset was used, made out of three existing databases, Special Eurobarometers, the ECHI and the OECD. The independent variable of corruption is based on a series of Special Eurobarometers conducted in five years, 2005, 2007, 2009, 2011 and 2013. All Eurobarometers were screened to find whether the same questions focused on healthcare corruption were asked over time. The dependent variable of five performance dimensions were individually matched with five different healthcare indicators of the ECHI, based on their descriptives by the European Commission. The control variables were personally selected by

the OECD database, based on the extensive literature review. Subsequently these selected variables measured for the same countries at multiple points in time need to be properly structured. The following programs were used to properly structure the data: Excel, the Statistical Package for the Social Sciences (SPSS) and STATA software. Within SPSS the dataset was created, and additional descriptive analysis were performed. After performing these analysis, the dataset was confirmed to Excel to create a map of the European Union for the independent variables of corruption. Finally, the dataset was confirmed to STATA to conduct a Pooled OLS regression analysis, which is presented in **chapter 5**.

The dataset was created by identifying the relevant variables and data sources, which can be organized in three dimensions: units $i = 1, \dots, n$, measurements (panel waves) $t = 1, \dots, T$, and variables $v = 1, \dots, V$. The 13 variables were inserted into a new SPSS file. Since, a relative high number of 5 time points were measured, the risk of systematic drop-out from the study has increased (Mehmetoglu & Jakobsen, 2017). Therefore, 43 missing values were manually deleted out of the dataset, before the start of the data analysis. Therefore, this analysis includes $N = 97$, and 23 EU member states, since Bulgaria, Croatia, Cyprus, Malta, and Romania have been fully excluded from the dataset due to missing observations, partially due to their later EU membership status. The decrease in the N , makes generalization about the associations of different phenomena more difficult (Mehmetoglu & Jakobsen, 2017). Especially, since this sample is taken out of a large population (Mehmetoglu & Jakobsen, 2017). Nevertheless, the number of time points for the same countries also makes causal analysis more trustworthy (Mehmetoglu & Jakobsen, 2017). Due to other missing observations, an unbalanced panel was created with unequal time periods per individual. The number of participants varies from year to year, and only in 2009 23 EU member states are included.

The process of data collection of different variables, the independent variables (**IDV**), dependent variables (**DV**) and control variables (**CV**) is presented in **Table 9**. The descriptive analysis and correlations are presented in **Table 11**. Within the **part 4.1.1**, **part 4.1.2**. and **part 4.1.3** the definition of all variables is given, as well as the reasons for inclusion of these indicators in a certain dimension. In addition, the explanation of their measurement and the used database is discussed.

Table 9. Measurement table all variables

Variable	Dimensions	Indicators	Database	Operationalization	Reason for inclusion
IDV	Healthcare Corruption	Perceived healthcare corruption (Q1)	Special Eurobarometers	Perceptions of how widespread corruption is among public healthcare professionals ⁶	Both the general perception of corruption as bribery are included, hereby specifically focusing on public healthcare professionals ⁶
	Healthcare corruption	Perceived bribery corruption (Q2)	Special Eurobarometers	Experienced bribery by public health services in the past 12 months ⁶	Focuses on bribery in public healthcare services as the most visible form of corruption ⁶
DV	Healthcare effectiveness	Life expectancy at birth	ECHI	Life expectancy at birth - the age-specific all-cause mortality rates in an area in a given period ⁷	The life expectancy is a basic indicator for population health, what reflects the effectiveness of interventions and treatment ⁷
	Healthcare efficiency	Vaccination coverage in children	ECHI	Percentage of infants who have been fully vaccinated against tetanus ⁷	Immunization is one of the most powerful and cost-effective forms of primary prevention ⁷
	Healthcare equity	Equity of access to healthcare services	ECHI	Self-declared unmet need for health care services ⁷	This indicator provides useful information on how to overcome the obstacles for use and improve health ⁷
	Healthcare quality	Infant mortality	ECHI	The ratio of the number of deaths of infants per 1,000 live birth based on one-year data ⁷	This indicator is a measure of the quality of medical care, preventive services, and health promotion interventions ⁷
	Healthcare satisfaction	Self-perceived health	ECHI	Proportion of persons who assess their health to be very good or good ⁷	Subjective health measurement is contributing to the evaluation of health needs at population level ⁷
CV	Income inequality	Income distribution and poverty	OECD	Gini (disposable income, post taxes and transfers) ⁸	The selected dimensions of equity and effectiveness of healthcare services are highly correlated to countries level of development. Therefore, this study will control for the development indicators by focusing on four economic health dimensions ⁸
	Education	Adult education level	OECD	Below upper secondary, % of 25-64-year-olds ⁸	
	Health expenditure	Health spending in USD	OECD	Total, health spending, US dollar/capita ⁸	

⁶ European Commission (2006)⁷ European Commission (2018)⁸ OECD (2018)

4.1.1. Independent variable

The independent variable of corruption, as such is defined within **part 2.1.1.** as a combination between the interrelatedly terms “*private benefit, private gain, personal gains*”, and “*public power, entrusted power and authority*” and “*misuse*” or “*abuse*”. In **Figure 3** and **Figure 4**, four ideal types of corruption are defined as bribery, extortion, fraud and embezzlement. This study focuses on corruption, and specifically on bribery and extortion in doctor to patient service delivery, since within the case of healthcare corruption these are defined as the most visible forms of corruption.

The corruption indices were drawn from a series of Special Eurobarometers; Eurobarometer 397, Eurobarometer 374, Eurobarometer 72.2, Eurobarometer 68.2, and Eurobarometer 245. The Eurobarometer surveys were carried out by TNS opinion & social network in the all Member States of the European Union, the time wherein the surveys were carried out is presented in **Table 10**. Respondents aged 15 years and over from different social and demographic groups were interviewed face-to-face at home in the local language. The basic sample design applied in all states is a multi-stage random design, meaning that in each country several sampling points were drawn with probability proportional to populations size. This increased the total coverage of the country and the population density (European Commission, 2013). According to EUROSTAT, these samples represent the whole territory of surveyed countries (European Commission, 2012). It is highlighted throughout each report that the survey results rests upon the sample size and upon the observed percentage of its population (European Commission, 2012), the total population and number of interviews are presented in **Table 10**. As seen in **Table 10**, the notable increases in the population and the number of interviews between Eurobarometer 245 and 68.2 and Eurobarometer 374 and 397 represent the enlargement of the EU by accession of Bulgaria and Romania in 2007 and Croatia in 2013. It is also highlighted in **Table 10**, that it was only in 2009 that the European Commission presented a full report on corruption, which was based on the previous Eurobarometer surveys in 2005 and 2007. Since, these surveys highlighted that the majority of European believed that corruption was a major problem for their country and that it existed in every level of their institutions. In addition, the financial crisis that first hit the global economy in 2007 increased economic uncertainty. With this backdrop and the high relevance of corruption, along with the need to assess public opinion the EU commissioned the wave of surveys in 2011 to focus on European’s opinions about corruption (European Commission, 2012).

Table 10. Characteristics Eurobarometers (EB)				
EB	Title report	Time surveys were carried out	Total N interviews	Total population 15 + EU
245	Opinions on organized cross-border crime and corruption	Nov / Dec 2005	24.683	366.356.283
68.2	European Union policy decision making, corruption, civil justice, E-communications, agriculture, and environmental protection	Nov 2007 / Jan 2008	26.730	392.942.290
72.2	Attitudes of Europeans towards corruption full report	Sept / Oct 2009	26.663	406.557.138
374	Corruption report	Sept 2011	26.856	408.787.006
397	Corruption report	Feb/March 2013	27.786	412.585.683

Nevertheless, all surveys cover public attitudes to the acceptability of giving a bribe from a public service, the extent of corruption in their country, the areas of society in which corruption is widespread present, changed perceived corruption in the last years, services facing the biggest corruption problems. It needs to be recognized that not all the questions in the survey captured corruption in the healthcare sector. Therefore, only the indices capturing corruption at the service provision level of healthcare are selected, these include the following questions **Q1** and **Q2**:

***Q1:** In (OUR COUNTRY), do you think that the giving and taking of bribes, and the abuse of positions of power for personal gain, are widespread among any of the following? – Public healthcare professionals*

***Q2:** Over the last 12 months, has anyone in (OUR COUNTRY) asked you, or expected you, to pay a bribe for his or her services? – Public healthcare services*

The findings of the questions analyze at country level of attitudinal categories. To provide additional insights on the variable of healthcare corruption these questions both measure different dimensions of healthcare corruption. The first questions looked at respondent's perceptions of how widespread corruption is in a range of public and private services and institutions. Respondents were shown a list of authorities, institutions and public office-holders and asked if they thought that bribery and the abuse of power for personal gain were widespread among any of them (European Commission, 2013). Within the list, public healthcare

professionals were included. This question examines European’s perceptions on how widespread corruption is among public healthcare professionals at a national level. Hereby corruption is asked in general forms by giving the definition of corruption and in specific forms of defining bribery. Within the second question it is asked whether citizens who have visited a public health service in the past 12 months report having had to make an extra payment, give a gift, or donate to the official fees paid to receive the service (European Commission, 2013). This question gives focus on bribery as the most visible form of corruption. The inclusion of both questions increases the validity of the variable of corruption. To draw conclusions on healthcare corruption both questions will be used in a complementary matter. From this point forward there will be referred to two separate questions as **Q1_CorruptionWidespread** and **Q2_CorruptionBribery**, and together as perceived healthcare corruption, see **Table 9**. To create a better understanding of the spread of corruption between EU member states, the scores of Q1_corruptionWidespread and Q2_Corruptionbribery are presented in two maps in **Figure 10** and **Figure 11**. Within these maps the mean scores of Q1_corruptionWidespread and Q2_Corruptionbribery are presented for each EU member state. Based on these two maps it is suggested that both corruption scores are highly correlated.



Figure 10. Country scores for the mean of Q1_CorruptionWidespread



Figure 11. Country scores for the mean of Q2_CorruptionBribery

In **Table 11** the descriptive statistics of the independent variables collected are presented. As described, the data used in this analysis spans 23 EU members states from the years, 2005, 2007, 2009 and 2011 and includes variables for corruption and performance. The variable **Q1_Corruption-Widespread** can be between 0 (when corruption is widespread, 0%) and 100 (when corruption is widespread, 100%), although in the sample used in the analysis the minimum observed value is 3.9 (Finland, 2007) and the maximum is 84.8 (Greece, 2007). The mean is 34.894 with a standard deviation of 21.0212, meaning that the data is spread out around the mean. The variable **Q2_CorruptionBribery** can be between 0 (when 0% bribery is experienced in the last 12 months, 0%) and 100 (when 100% bribery is experienced in the last 12 months), although in the sample used in the analyses the maximum observed value is 21.0 (Lithuania, 2013). The mean is 3.507 with a standard deviation of 4.9717, meaning that the data is close to the average score.

4.1.2 Dependent variable

The dependent variable of this study is performance of healthcare organizations. Within **part 2.2.2.** dimensions of performance used within this study are defined. As described, the most often used dimensions within performance measurement are effectiveness and efficiency.

Nevertheless within healthcare organizations the importance of securing not only effectiveness and efficiency but also equity, quality and satisfaction is increased, due to the decreased public budgets and increased healthcare costs due to demographic ageing and the rise of chronic diseases. While, the dimensions of effectiveness, efficiency, and quality, give focus to the outcome measures of performance, the dimensions equity and satisfaction give focus to process measures of performance. In this way, this study will focus on both outcome measures and process measures of the healthcare system, see **Figure 7**. For every performance dimension one performance indicator is personally selected, out of a complete list of European Core health indicators (ECHI) from health status and health interventions. The ECHI data tool provides data on European health indices, which serve as a basis for policy-making (European Commission, 2018). The indicators of the performance dimensions are presented in **Table 9**.

4.1.2.1 Healthcare effectiveness

The effectiveness of healthcare services is measured by using the indicator life expectancy at birth. This indicator is defined as *“the age-specific all-cause mortality rates in an area in a given period”* (European Commission, 2018). Moreover, the European Commission (2018) states that *“The life expectancy is a basic indicator for population health, which reflects the cumulative effect of the impact of risk factors, occurrence and severity of disease, and the effectiveness of interventions and treatment”*. Since life expectancy at birth is an indicator of effectiveness of interventions and treatment, life expectancy at birth was selected as indicator for the dependent variable of healthcare effectiveness. The minimum observed value of the variable life expectancy at birth in this analysis is 70.6 (Latvia, 2015) and the maximum observed value is 83.2 (Spain, 2013). The mean is 78.780 with a standard deviation of 3.1061. The variable healthcare effectiveness is presented in **Table 11** and illustrated in **Figure 12**.

4.1.2.2 Healthcare efficiency

The variable healthcare efficiency is measured as the vaccination coverage in children. The vaccination coverage is defined as *“the percentage of infants who have been fully vaccinated against important infectious childhood diseases”* (European Commission, 2018). This data is provided from the European Health for All database of the World Health organization Regional office for Europe. The childhood disease selected within this study is tetanus. Defined as *“the percentage of infants reaching their first birthday in the given calendar year who have been fully vaccinated against diphtheria (tetanus, pertussis, poliomyelitis, 3 doses)”* (European Commission, 2018). This indicator is selected, since immunization is one of the most powerful and cost-effective forms of primary prevention (European Commission, 2018). This variable is

can be between 0 (when 0% of children is vaccinated) and 100 (when 100% of children is vaccinated), although in the sample used in the analysis the minimum observed value is 83.0 (Austria, 2009) and the maximum is 99.0 scored by many countries in multiple years. The mean is 96.165 with a standard deviation of 3.1645, meaning that all countries have a high percentage of children vaccinated with tetanus. The variable healthcare efficiency is presented in **Table 11** and illustrated in **Figure 13**.

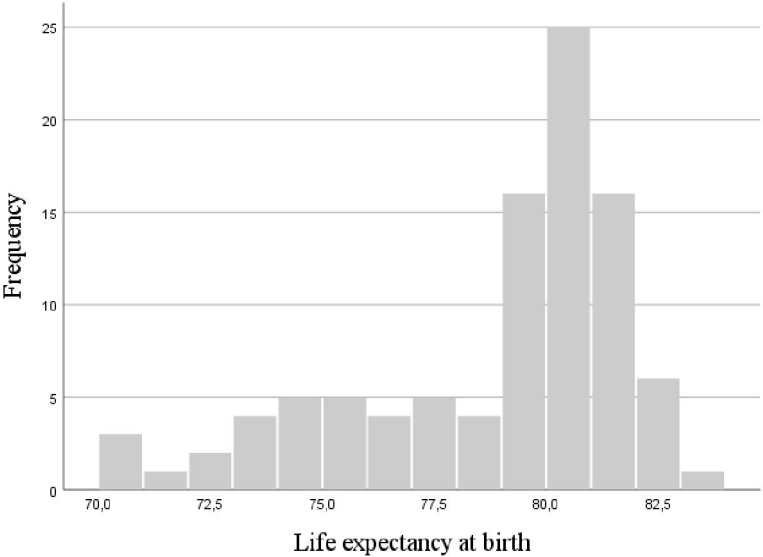


Figure 12. Histogram frequency life expectancy at birth (healthcare effectiveness)

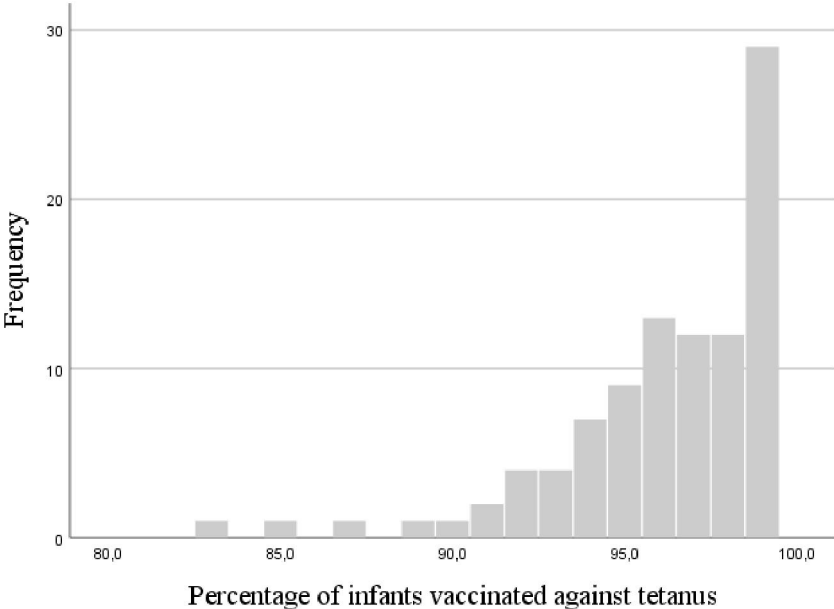


Figure 13. Histogram percentage of infants vaccinated against tetanus (healthcare efficiency)

4.1.2.3. Healthcare equity

The variable healthcare equity is measured as the equity of access to healthcare services (European Commission, 2018). *“Defined as the total self-reported unmet need for medical care for the following three reasons: financial barriers, waiting times, too far to travel”* (European Commission, 2018). This data gives insight into the need for medical care and the obstacles that stand in the way of the actual use of healthcare services (European Commission, 2018). This indicator provides useful information on how to overcome the obstacles for use and improve health (European Commission, 2018). The variable equity of access to healthcare services is measured as the self-declared unmet need for healthcare services. The variable can be between 0 (when there is 0% unmet need for healthcare services) and 100 (when there is 100% unmet need for healthcare services), although in the sample used in the analysis the maximum observed value is 18.5 (Latvia, 2005). The mean is 3.322 with a standard deviation of 3.6088. The variable healthcare equity is presented in **Table 11** and illustrated in **Figure 14**.

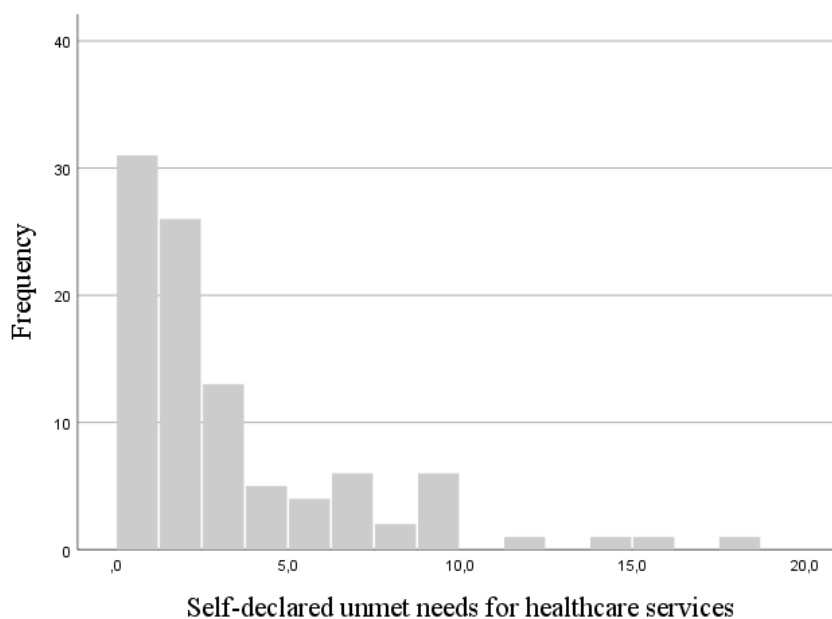


Figure 14. Histogram self-declared unmet needs for healthcare services (healthcare equity)

4.1.2.4. Healthcare quality

The variable healthcare quality is measured as the infant mortality. The infant mortality gives the ratio of the number of deaths of infants per 1,000 live births on one-year data. The infant mortality indicator belongs to the portfolio of health indicators for monitoring the European strategy for social inclusion and social protection. Moreover, the European commission states *“infant mortality comprises the deaths in the post-neonatal period, which are often preventable and are highly influenced by social factors. This indicator can thus serve as a measure of the quality of medical care, preventive services, and health promotion interventions”* (European

Commission, 2018). The variable infant mortality is measured as the ratio of the number of deaths of infants per 1.000 live birth based on one-year data. In the sample used in the analysis the minimum observed value is 1.8 (Luxembourg, 2007) and the maximum observed value is 8.5 (Latvia, 2007). The mean is 3.902 with a standard deviation of 1.352. The variable healthcare quality is presented in **Table 11** and illustrated in **figure 15**.

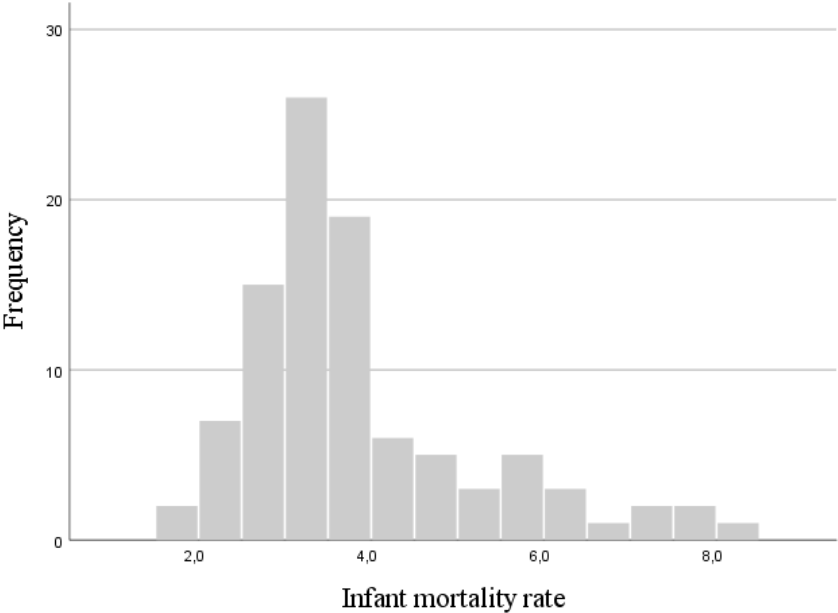


Figure 15. Histogram Infant mortality rate (healthcare quality)

4.1.2.5. Healthcare satisfaction

The variable healthcare satisfaction is measured as the self-perceived health. This indicator gives the proportion of people who assess their health to be good or very good. The data comes from the Eurostat survey European Statistics of Income and Living Condition. The self-perceived health indicator belongs to the portfolio of health indicators for monitoring the European strategy for social inclusion and social protection. The European Commission acknowledges that subjective health measurement is contributing to the evaluation of health needs at population level (European Commission, 2018). The variable self-perceived health can be between 0 (0% of persons assess their health to be very good or good) and 100 (100% of persons assess their health to be very good of good), although in the sample used in the analysis the minimum observed value is 35.1 (Latvia 2005) and the maximum observed value is 84.2 (Ireland, 2007). The mean is 65.202 with a standard deviation of 11.5571, meaning that the data is quite spread out around the mean. The variable healthcare satisfaction is presented in **Table 11** and illustrated in **Figure 16**.

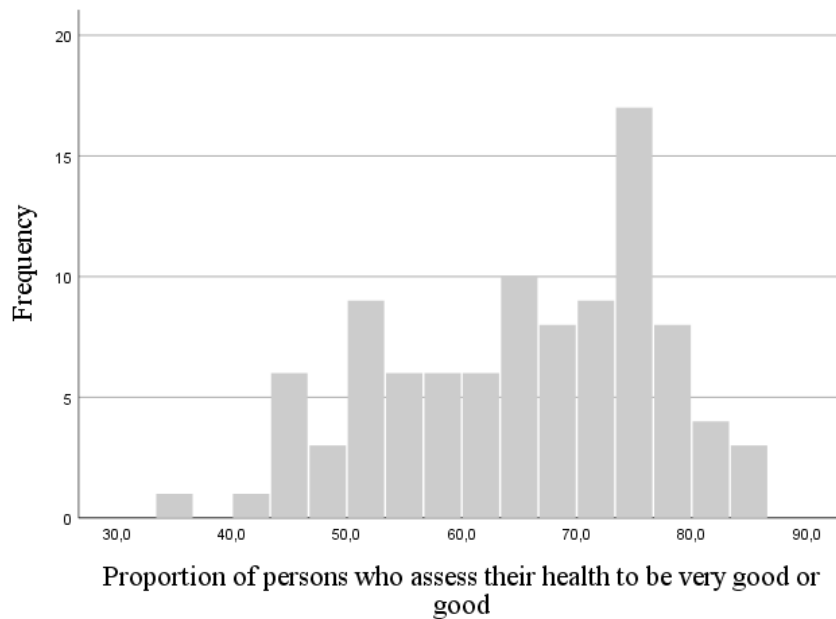


Figure 16. Histogram proportion of persons who assess their health to be very good or good (healthcare satisfaction)

4.1.3. Control variables

The largest problem for the Pooled OLS regression analysis, is that it is not controlling for spurious effects, meaning that there could have been other underlying variables affecting both the healthcare performance as healthcare corruption. One of the reasons to include control variables in this model is to limit this number of spurious effects. This control for confounders is particularly important since the relationship between corruption and performance cannot be easily separated from other effects without using statistical techniques (Miller & Whicker, 1999). The most important confounder is development, since the selected dimensions of equity and effectiveness of healthcare services are highly correlated to countries level of development (Transparency International, 2016). Therefore, this study will control for the development indicators by focusing on three economic health dimensions, health spending, education levels and income inequality see **Table 9**. Since, there is not a special developed EU measurement tool for these dimensions, this study has made use of the existing OECD main economic indicators database to specify the correct indicators to measure the dimension. This database is chosen over the World Bank development indicators, since the world bank did not longer provide information on health spending, and important control variable within this study design. The selected control variables are income inequality, education levels and health spending.

The first indicator included income inequality measured as the income distribution and country level poverty rates by the OECD. This data is measured as levels and trends of income

distribution before and after taxes and transfers, average and median household disposable incomes, relative poverty rates and poverty gaps (OECD, 2018). This is an important variable due to the ongoing policy discussion about income inequality and poverty (OECD, 2018). The control variable income inequality is measured a Gini coefficient, measuring the statistical dispersion intended to represent the income distribution of a country. The Gini coefficient can be between 0 (0% expresses perfect equality) and 1 (100% expresses maximal income inequalities). Although in the sample used in the analysis the minimum observed value is 0.24 (Denmark, 2009) and the maximum observed value is 0.39 (Latvia, 2005). The mean is 0.30 with a standard deviation of 0.04, presented in **Table 11**.

The second indicator looks at adult education level as defined by the highest level of education completed by the 25-64-year-old population. The indicator is measured as a percentage of same age population, for tertiary and upper secondary (OECD, 2018). The control variable can be between 0 (0% of the population between 25 and 64 has completed the highest level of education) and 100 (100% of the population between 25 and 64 has completed the highest level of education). Although in the sample used in the analysis the minimum observed value is 6.56 (Lithuania, 2013) and the maximum observed value is 73.55 (Portugal, 2005). The mean is 24.69 with a standard deviation of 15.21, presented in **Table 11**.

The third indicator health spending measured the final consumption of health care goods and services, including personal health care, and collective services, but excluding spending on investments. This indicator is presented as a total and by type of financing (such as health insurance, out-of-pocket payments, Non-governmental organizations (NGOs)), and is measured as a share of GDP, as a share of total health spending and in USD per capita. Since this indicator is measured as a share of GDP, the model did not control for actual GDP. Most importantly, since the repetition of the same kind of variables may lead to the problem of multicollinearity. The control variable health expenditure can start from 0 (0 USD has been spent on health care goods and services) to an infinite number. Within the sample used in the analysis the minimum observed value is 807 (Poland, 2005) and the maximum observed value is 6693 (Luxembourg, 2013). The mean is 2943.77 with a standard deviation of 1384.12, presented in **Table 11**.

In addition, a Pearson correlation test was conducted for all 97 observations in 23 EU member states. The outcomes of the correlations presented in **Table 11**, provides some insight into the behavior of the variables. Most of the variables are moderately correlated with

Q1_CorruptionWidespread. As suggested, the model shows that the variables Q1_CorruptionWidespread and Q2_CorruptionBribery are highly correlated with each other. This correlation suggests that these variables will be able to explain variation in the other corruption rates. The correlation of the variables effectiveness, equity, quality, and satisfaction with Q1_CorruptionWidespread suggest that these variables will moderately able to explain variation in the corruption rates. The only variable not to be very highly correlated with Q1_CorruptionWidespread is the efficiency, though it also does not suffer from high correlation with the other independent variables. In **Table 11**, the correlation of the variables effectiveness, quality, and satisfaction with Q2_CorruptionBribery suggest that these variables will moderately able to explain variation in the bribery rates. The variables of efficiency and equity are weakly correlated with Q2_CorruptionBribery. This means that the variables effectiveness, quality, and satisfaction are better to explain variation in the Q2_CorruptionBribery rate than the Q1_CorruptionWidespread rate. In addition, all variables, except for efficiency, are also highly or moderately correlated with each other which may lead to issues of imperfect multicollinearity.

Table 11. Descriptive statistics and correlations ⁹																
		Mean	s.d. ¹⁰	Variance	Min.	Max.	A	B	C	D	E	F	G	H	I	J
A	Q1_Corruption Widespread	34.89	21.02	438.07	3.9	84.8	1.00									
B	Q2_Corruption Bribery	3.51	4.97	20.66	0.0	22.0	0.76	1.00								
C	Health effectiveness (Life expectancy)	78.78	3.11	9.65	70.6	83.2	-0.55	-0.72	1.00							
D	Health efficiency (Vaccination)	96.17	3.16	10.01	83.0	99.0	0.17	0.08	0.05	1.00						
E	Health equity (Access to healthcare)	3.32	3.61	13.02	0.0	18.5	0.47	0.31	-0.52	0,02	1.00					
F	Health quality (Infant mortality)	3.90	1.35	1.83	1.8	8.5	0.48	0.61	-0.76	-0.05	0,50	1.00				
G	Health satisfaction (Self-perceived health)	65.20	11.56	133.57	35.1	84.2	-0.54	-0.55	0.77	-0.04	-0,56	-0.52	1.00			
H	Health income (Income inequality)	0.30	0.04	0.00	0.24	0.39	0.27	0.20	-0.22	-0.17	0.58	0.37	-0.27	1.00		
I	Health education (Adult education level)	24.69	15.21	231.37	6.56	73.55	-0.17	-0.34	0.49	-0.03	-0.10	-0.30	0.21	0.33	1.00	
J	Health expenditure (Tot. Health spending)	2943.77	1384.12	1915795.74	807.00	6693.00	-0.64	-0.60	0.74	0.00	-0.53	-0.55	0.72	-0.36	0.18	1.00

⁹ N = 97, Correlations > 0.45 or < -0.45 a moderate relationship (Light grey), Correlations > 0.60 or < -0.60 a strong relationship (Dark grey)

¹⁰ Standard deviation

4.2. Statistical analysis

4.2.1. Panel data analysis

The investigation of the development of variables over time, so-called panel data, comes from the fact that data used in many social sciences usually combine time series and cross sections of units (Mehmetoglu & Jakobsen, 2017; Greene, 2012). This study design is chosen since the independent variable is measured as the score of respondents being interviewed at five time points. The dependent variable was also measured across time and countries, which reduces the uncertainty of information. Within this study the countries are the unit of analysis rather than the time points, what makes this panel data different from time series (Mehmetoglu & Jakobsen, 2017). Panel data has several advantages over cross-sectional or time-series data by blending the inter-individual differences and intra-individual dynamics (Hsiao, Panel Data Analysis - advantages and challenges, 2007). According to many authors, the multi-dimensional data observed over multiple time periods allows to account for individual heterogeneity by controlling for control variables, increases the sample size, testing hypotheses about the presence of heteroscedasticity, and are better suited to study the dynamics of complex behavioral models (Hsiao, 2007; Gil-Garcia & Puron-Cid, 2015; Wooldridge, 2010; Mehmetoglu & Jakobsen, 2017). Nevertheless, these authors have also mentioned that panel data models have limitations that need to be addressed (Gil-Garcia & Puron-Cid, 2015). In particular Hsiao (1986) mentions that the limitations of panel data are mainly in the data generating process, such as question design errors and time references. Another limitations mentioned by Mehmetoglu & Jakobsen (2017) is the scarcity of available panel data, due to data collection issues. The actions to reduce such limitations by self-creating a panel dataset is explained in **part 4.1**. In **part 4.3** the validity and reliability of this study are further explained.

4.2.2. Pooled OLS regression analysis

Simple linear regression using a panel data arrangement is called Pooled Ordinary Least Squares (OLS) regression analysis (Gil-Garcia & Puron-Cid, 2015). In the dataset, $N=23$ is too small in either dimensions for any approach other than Pooled OLS regression analysis. Therefore a Pooled OLS regression analysis has been used rather than random effects regression analysis or fixed effects regression analysis (Mehmetoglu & Jakobsen, 2017). The technique of the Pooled OLS regression analysis is used to estimate coefficients for panel data. One of the assumptions of the Pooled OLS regression analysis is that each unit has more observations and the data is thus nested as the observations are not independent of each other (Mehmetoglu &

Jakobsen, 2017). Within this method an estimation can be made to distort the true picture of the association of healthcare corruption and healthcare performance across countries and over time, disregarding the effect over individuals and time (Gil-Garcia & Puron-Cid, 2015). To get valid results of the Pooled OLS regression analysis controls for the correlation of the error terms for each country. Hereby Pooled OLS regression analysis reduces the risk of producing statistically significant results that are not necessarily significant (Mehmetoglu & Jakobsen, 2017). An assumption of the use of Pooled OLS regression analysis is the investigation of a fully Pooled model:

$$y_{it} = \beta_0 + \beta x_{1it} + \varepsilon_{it}$$

The fully Pooled model means that all units obey the same specification with the same parameter values (Mehmetoglu & Jakobsen, 2017). The following model includes the two different variables for healthcare corruption and the control variables identified in **part 4.1**.

$$y_{it} = \beta_0 + x_{1it} \beta_1 + x_{2it} \beta_2 + x_{3it} \beta_3 + x_{4it} \beta_4 + x_{5it} \beta_5 + Z_{it} + \varepsilon_{it}$$

Where y_{it} is one of the two corruption variables in country i and year t ; x_1 is an index of healthcare effectiveness; x_{2it} is an index of healthcare efficiency; x_{3it} is an index of healthcare equity; x_{4it} is an index of healthcare quality and; x_{5it} is an index of healthcare satisfaction; Z are control variables such as public spending on healthcare services. The pooled OLS regressions techniques is a means of obtaining good estimates of β_1 , β_2 , β_3 , β_4 and β_5 , and to create a better understanding of the independent variables relationship with the dependent variable. Running the Pooled OLS regression analysis helps to discover whether the coefficients on the performance variables are really different from 0, meaning that the independent variables are having a genuine association with the corruption variables or if alternatively any apparent differens from 0 are just due to random chance (Princeton University, 2018).

Before continuing to the Pooled OLS regression analysis, all assumptions of Pooled OLS regression analysis are tested, to make sure no problems would occur within the Pooled OLS regression analysis. he explanation and results of these tests are presented in **Table 12**. The first conducted test is the Wooldridge test (**A**) for autocorrelation. Autocorrelation could lead to heteroskedasticity, which means that the model predicts some values of the dependent more precisely than others (Mehmetoglu & Jakobsen, 2017). Meaning that is shows whether the correlation between the values of the same variables is based on related objects (solutions, 2018). This test was performed to see if the null hypothesis of autocorrelation could be accepted, meaning that there is a problem with autocorrelation in this model.

Table 12. Regression assumptions			
	Tests	Outcomes	
A	Woodridge test	< 0.01	All dependent variables: 0.00
B	Breusch-Pagan hettest	> 0.05	Chi2 (1): 0.237 / p-value: 0.626
C	Variance inflation factor	< 5.00	Q1_Corruption: 2.82 Q2_Corruption: 2.38 Health expenditure: 1.96 Education: 1.44 Income: 1.44
D	Shapiro-Wilk test	> 0.01	z: 1.177 / p-value: 0.120
E	Cook's distance	< 1.00	No distance is above the cut-off

As all dependent variables have a p-value of 0.00, this means that the null hypothesis firmly rejects and that there is autocorrelation in this model. This autocorrelation could lead to heteroskedasticity. Heteroskedasticity means that the model predicts some values of the dependent more precisely than others (Mehmetoglu & Jakobsen, 2017). The problem of heteroskedasticity is that the variance of the errors may be a function of explanatory variables, since the OLS regression assumes that errors are both independent of each other and normally distributed (Mehmetoglu & Jakobsen, 2017). The existence of heteroskedasticity is statistically tested by performing a Breusch-Pagan hettest (**B**). The result of this test showed a p-value higher than 0.05 meaning that there is no heteroskedasticity problem within the dataset, **Table 13**. The third conducted test is the variance inflation test (**C**). This test was conducted to see whether there was a multicollinearity problem within the dataset. Multicollinearity is a state of very high intercorrelations among the independent variables (Allen, 1997). This test was conducted since this might affect calculations regarding individual dependent variables, especially which dependent variable are redundant with respect to others. For example, high multicollinearity was found between the possible control variables of GDP per capita and health expenditure as a share of GDP. The results of the variance inflation test show that both independent variables and selected control variables are under the 5.00, meaning that the independent and control variables are not multicollinear. Fourth, the Shapiro-Wilk test (**D**) was conducted to test for normality. The null-hypothesis is that the sample comes from a normally distributed population. Meaning, that if the p-value is less than the chosen alpha level of 0.01 the null hypothesis should be rejected. Yet are p-value being above the alpha level of 0.01, means the null-hypothesis cannot be rejected and that there is evidence that are sample comes from a normally distributed population. The final conducted test was Cook's distance (**E**), to

estimate the influence of a data point when performing the Pooled OLS regression analysis. This test has shown that there is no distance above the cut-off and no influential observations are included within the dataset. Within this section the appropriate technique and model are identified. Before a Pooled OLS regression analysis can be performed, further explanation is given to the validity and reliability of this model, in **part 4.3**.

4.3. Validity and reliability

Concepts of validity and reliability are of great importance in social science research (Drost, 2011). Within this study the central question is based on the variables of corruption and performance, which are measured by international databases based on surveys and national databases. This measurement of human behavior to discern reality belongs to the empirical analytic approach or positivist view (Smallbone & Quinton, 2004). Because this study of corruption takes place within this paradigm of behavioral research, the importance of valid and reliable measurement instruments is increased (Drost, 2011).

4.3.1. Validity

Validity is the extent to which a measurement is measuring what it intended to measure (Drost, Validity and Reliability in Social Science Research, 2011). Within this research the four types of validity – statistical conclusion validity, internal validity, construct validity and external validity – will be considered.

Statistical conclusion validity is the actual existence of the relationship between two variables, wherein low statistical power, violation of assumptions, and random heterogeneity of respondents are some major threats (Drost, Validity and Reliability in Social Science Research, 2011). The statistical power within this research is low, due to a small n of 23 included countries. Yet within the results of the Pooled OLS regression analysis there is significant power between the included control variables and performance, which means that there is enough significant power to find significant results between the dependent and independent variable. Wherefore the limitations of significant power within this research are restricted. While low statistical power is logical for country level analysis it decreases the internal validity.

Internal validity refers to whether the analysis is valid for the population and sample being studied. The major weakness of this study is the internal validity, since the dataset was self-created, meaning that the data was not measured as part of this research. Therefore, measurement errors can occur in both the dependent variable and independent variable. Yet, the model is quite robust with a high R-square score – also quite high for the use of different datasets - meaning that the model can explain variation. Since a regression analysis has been conducted and the internal validity is weak, no conclusions can be drawn on the causality between the variables. To increase the internal validity and control for some spurious effects, control variables are included within this study. While, this model is controlled for the levels of healthcare expenditure, income distribution and education levels within EU member states,

there can be other unknown underlying variables affecting both corruption and healthcare effectiveness, **Figure 17**. The effect of underlying variables are called spurious effects, which is seen as the main weakness of conducting a Pooled OLS regression analysis (Mehmetoglu & Jakobsen, 2017). Due to spurious effects, it is difficult to separate selection of effects from real effects.

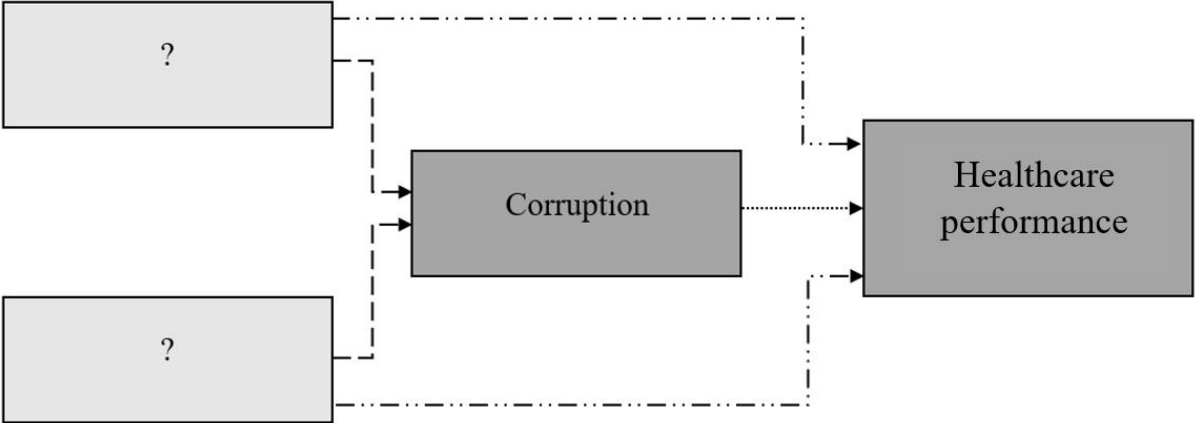


Figure 17. Spurious effects (Mehmetoglu & Jakobsen, 2017)

Construct validity refers to the operationalizations in the study based on theoretical constructs. Within this study the problem of construct validity refers to generalization of one performance indicators to a whole performance dimension. Meaning that one performance indicator such as life expectancy, is not sufficient to generalize healthcare effectiveness. A limitation within this study is the generalization from the measures of performance indicators to the concepts of performance dimensions in this study. Yet, due to the simplification in the model, it was not able to include more than one performance indicator and operationalize the variables of different performance dimensions.

Like construct validity, external validity is related to the generalizability of the study results. But, where construct validity involves generalizing of used concepts, external validity examines the generalizability of the causal relationship between two variables (Drost, Validity and Reliability in Social Science Research, 2011). The first problem occurs due to the use of an unbalanced panel. Preferably, a balanced panel is used, meaning that the number of time periods per country are equal (Mehmetoglu & Jakobsen, 2017). Yet, the use of an unbalanced panel becomes problematic when the attrition rate is high. The larger the amount of missing data, the greater the loss of efficiency (Mehmetoglu & Jakobsen, 2017). Within the dataset Bulgaria, Croatia, Cyprus, Malta, and Romania, are excluded due to missing observations. The exclusion of 5 out of 28 countries is infrequent wherefore a little efficiency is lost in estimating this model.

These countries are fully excluded due to the missing observations by the OECD. Yet, it can be speculated whether the exclusion is at random, since it is equally plausible that OECD membership relates to lower levels of corruption. In addition, having national data service in place, could also suggest higher levels of healthcare performance. Therefore, it can be assumed that these countries are not a random sample within the population of EU member states. When, this speculations of specific missing observations are correct, the chance of a biased sample is increased (Mehmetoglu & Jakobsen, 2017). In addition, the decrease in the N, makes generalization about the associations of corruption and performance more difficult (Mehmetoglu & Jakobsen, 2017). Nevertheless, the number of time points for the same countries also makes causal analysis more trustworthy (Mehmetoglu & Jakobsen, 2017). According to many authors, panel data allows to account for individual heterogeneity by controlling for control variables, increases the sample size, testing hypotheses about the presence of heteroscedasticity, and are better suited to study the dynamics of complex behavioral models (Hsiao, 2007; Gil-Garcia & Puron-Cid, 2015; Wooldridge, 2010; Mehmetoglu & Jakobsen, 2017). In this way, using a panel data analysis will increase the validity of the study in comparison to using time series analysis or cross-sectional analysis. Nevertheless, within this study design it is difficult to make assumptions on a causal relationship as well the construct of its validity.

4.3.2. Reliability

Reliability is defined as *“the extent to which measurements are repeatable when different persons perform the measurements, on different occasions, under different conditions, with supposedly alternative instruments which measure the same thing”* (Drost, 2011). The reliability of this model has increased due to the positive outcomes when testing the regression assumptions, meaning that the variables are autocorrelated, not multicollinear and normally distributed. In addition, the model has no heteroskedasticity and influential observations. Yet, this behavioral research will consider the influence of random and systematic errors existing in the obtained data.

Measurement errors come either in the form of systematic error or random error (Drost, 2011). Systematic error would be at play when the surveys of corruption are repeatedly the same, while the scores of corruption are always giving lower scores as it should be. Random error would be that the scale of corruption was accurate, but that the scale is misread and misinterpreted (Drost, 2011). In panel data analysis, results may be less reliable because of the persistence of corruption over time in the sample countries, the limited annual data on social indicators, and

the quality of reported social indicators that are based on estimates from demographic models (Mehmetoglu & Jakobsen, 2017). In sum, numerous sources of error may be introduced by situational factors and different approaches used by different examiners. Hence, this study is limited by the reliability of the measurement instruments by the selected sources of Eurobarometer, Transparency international, ECHI and OECD.

The basic sample design applied by the European Commission when conducting the corruption variable is a multi-stage random design, meaning that in each country several sampling points were drawn with probability proportional to populations size. This increased the total coverage of the country and the population density (European Commission, 2013). According to EUROSTAT, these samples represent the whole territory of surveyed countries (European Commission, 2012). In addition, the data on corruption was measured as perceived and experienced corruption among citizens. Critics argue that perceptions do not reflect the actual corruption in that they are biased by external factors such as economic performance. Nevertheless, within a study of Charron (2016) using a survey data on 85.000 European respondents in 24 countries, the issue of the strength of corruption is empirically analyzed. This study concluded strong counter-evidence to critics in the literature, by finding remarkable high consistency between actual reported corruption, as well as citizen perceptions of corruption (Charron, 2016). Concluding that perceptions certainly have their problems, concerns regarding validity and bias of perceptions have, perhaps been overstated (Charron, 2016). This study panel data results may be less reliable because of the persistence of corruption over time in the sample countries, the limited annual data on social indicators, and the quality of reported social indicators that are based on estimates from demographic models (Mehmetoglu & Jakobsen, 2017). In addition, the reliability of this study is increased by measuring the corruption and performance variables over a period of ten years.

5. Results

This chapter elaborates on the data analysis to answer the hypothesis formulated in **chapter 3**. In this context, the theories “sand in the wheels” and “grease in the wheels” are guiding. Elaborating on the data defined in **chapter 4**, will help by answering the main research question in **chapter 7**. To answer this research question, a Pooled OLS regression analysis is conducted for a 5-year time-period in 23 EU member states, **part 5.1**.

5.1. Pooled OLS regression analysis

This part elaborates on the results of the Pooled OLS regression analysis. The previous part has shown correlations between variables, yet these correlations need to be tested, to see whether these correlations are significant. The choice and method of the Pooled OLS regression analysis are both explained in **part 4.2**. The results of the Pooled OLS regression analysis are presented for every performance dimension, and can be seen in **Table 13**. The null hypothesis in this study is that each corruption variable is having absolutely no association with performance variables (Princeton University, 2018). The alternative hypothesis shows that corruption has an association with performance variables. The nature of the relationship between the variables can be conducted by looking at the coefficient. The Pooled OLS regression analysis is conducted to look for a reason to reject the null hypothesis.

H0: Corruption is absolutely not associated with performance variables

HA: Corruption is associated with performance variables

First, it is important to look at the **p-value** of the **F-test**, **Table 13**. The null hypothesis of the F-test is that R-squared is equal to zero, meaning that the model explains none of the variation in the dependent variable. The alternative hypothesis is that R-squared is not equal to zero, meaning that the model has explanatory power. Ideally, the probability of the p-value of the F-test is less than 0.1, corresponding with the significance level. The model of the Pooled OLS regression analysis on corruption and performance shows a p-value less than 0.1 for the variables effectiveness, equity, quality and satisfaction. Meaning that these variables are statistically significant. Therefore, the null hypothesis is rejected, stating that there is 90% confidence that the model has explanatory power for the variables effectiveness, equity, quality and satisfaction. As expected from the correlation in **Table 11**, the variable efficiency has shown a F-test above 0.1, the null hypothesis will be accepted, since the model has none explanatory power of the variation for health efficiency. Therefore, the variable healthcare efficiency is excluded within the regression model.

After looking at the p-value of the F-test, it is important to look at the **R-squared** scores, **Table 13**. R-square takes a value between 0 (the closer to 0 the worse the model) and 1 (the closer the score is to 1, the better the model). In the model, 76% of the variation in health effectiveness is explained by corruption and the control variables. That leads us with 24% which is not explained (error) in the model. For health equity, 54% of the variation in health equity is

explained by corruption and the control variables, and 46% (error) is not explained in the model. For health quality, 51% of the variation in health quality is explained by corruption and the control variables, and 49% (error) is not explained in the model. For health satisfaction, 55% of the variation in health satisfaction is explained by corruption and the control variables, and 45% (error) of the variation is not explained in the model. These relative high scores, mean that the model is quite robust for these four healthcare performance indicators.

Third, it is important to look at the **p-value** of the **t-test**, **Table 13**. These scores can be interpreted the same way as the p-values of the F-test. The null hypothesis of the t-test is that the variable equals zero or that the coefficient equals zero, meaning that there is no significant association between the dependent and independent variable. The alternative hypothesis is that there is a significant association between the dependent and independent variable. With the p-values of a t-test it is possible to reject the null hypothesis in one case and not reject it for another. Ideally, the t-value is being less than 0.1. There is the same number of t-tests for each dependent variable as the number of independent variables in the model. In the model the p-value for Q1_CorruptionWidespread for every performance dimension is higher than 0.1. For Q1_CorruptionWidespread and all healthcare performance dimensions the null hypothesis is accepted, meaning that there is no significant association of Q1_CorruptionWidespread and healthcare effectiveness, healthcare equity, healthcare quality and healthcare satisfaction. For the p-value of Q2_CorruptionBribery and healthcare equity, healthcare quality and healthcare satisfaction, the same conclusions can be drawn since the p-value is higher than 0.1. Therefore the null hypothesis will be accepted. Nevertheless the p-value of Q2_CorruptionBribery and healthcare effectiveness is zero, the null-hypothesis is rejected, meaning that Q2_CorruptionBribery has a significant association on healthcare effectiveness. The model is confident at a 90% level that Q2_CorruptionBribery does not equals zero, and that is has a significant association on healthcare effectiveness.

As the control variables are included as the independent variables within this model, the p-value of income distribution for healthcare equity and healthcare quality is less than 0.1. The null hypothesis is rejected, meaning that the control variable income distribution has a significant association on healthcare equity and healthcare quality. The model is confident at a 90% level that income distribution has a significant association on healthcare equity and healthcare quality. For the control variable education, the p-value for healthcare effectiveness and healthcare quality is less than 0.1, the null hypothesis is rejected, meaning that the control variable education has a significant association on healthcare effectiveness and healthcare quality. The

model is confident at a 90% level that education has a significant association on healthcare effectiveness and healthcare quality. Last, for the control variable healthcare expenditure, three out of four performance variables have a significant relationship. For the control variable healthcare expenditure the model is confident at a 90% level that healthcare expenditure has a significant association with healthcare effectiveness, healthcare equity and healthcare satisfaction.

Last, it is important to look at the **coefficient** which shows the nature of the relationship between the variables, **Table 13**. For example, the coefficient of Q2_CorruptionBribery and healthcare effectiveness is - 0.29. The negative number of Q2_CorruptionBribery shows that Q2_CorruptionBribery and health effectiveness are negatively correlated with each other. And a 1 unit increase in Q2_CorruptionBribery causes a -0.29 decrease in healthcare effectiveness.

In conclusion, the Pooled OLS regression analysis shows that for Q1_CorruptionWidespread the null hypothesis is accepted for all performance variables. Meaning that Q1_CorruptionWidespread has no significant association with any of the performance variables within EU member states. In addition, the only reason to reject to null hypothesis was for the corruption variable Q2_CorruptionBribery and healthcare effectiveness. This means that Q2_CorruptionBribery only has a significant association with the life expectancy at birth within EU member states. This significant association is negative, meaning that when bribery increases the life expectancy at birth within EU member states decreases. More significant associations were found between healthcare performance and income distribution, education and healthcare expenditure. The values of the Pooled OLS regression analysis show that health expenditure has significant association with most performance indicators. The increase in health expenditure has a positive association with health effectiveness, health equity and health satisfaction. The negative coefficient of health equity shows that an increase in health expenditure has a negative association with the self-declared unmet need for healthcare services. In addition the control variable income distribution has significant positive associations with healthcare equity and quality. And the education levels has a significant positive association with healthcare effectiveness and a significant negative association with healthcare quality.

Table 13. Pooled OLS regression analysis						
Performance dimensions		Effectiveness	Efficiency	Equity	Quality	Satisfaction
F (5, 22)		52.36	1.28	4.50	4.05	7.77
Prob > F		0.000	0.3080	0.006	0.009	0.000
R-squared		0.76	0.10	0.54	0.51	0.55
Q1_Corruption Widespread	Coef.	-0.03	0.05	0.06	-0.01	-0.01
	T	1.59	1.42	1.70	-0.61	-0.06
	P > t	0.127	0.169	0.103	0.551	0.954
Q2_Corruption Bribery	Coef.	-0.29	-0.04	-0.24	0.12	-0.41
	T	-6.02	-0.24	-1.39	1.66	-1.15
	P > t	0.000	0.810	0.180	0.112	0.263
Income	Coef.	-7.80	-19.38	50.44	11.17	-10.07
	t	-0.84	-1.33	2.22	1.94	-0.21
	P > t	0.412	0.196	0.037	0.066	0.839
Education	Coef.	0.06	0.02	-0.07	-0.02	0.04
	t	2.55	0.91	-1.69	-1.93	0.24
	P > t	0.018	0.373	0.105	0.067	0.816
Health exp. ¹¹	Coef.	0.00	0.00	-0.00	-0.00	0.00
	t	3.56	0.51	-2.24	-1.31	2.94
	P > t	0.002	0.613	0.036	0.202	0.008
Cons	Coef.	76.07	99.38	-9.70	1.49	54.15
	t	28.41	19.10	-1.73	0.84	3.74
	P > t	0.000	0.000	0.098	0.409	0.001

¹¹ Health expenditure

6. Discussion of findings

In this chapter the theoretical interpretation of the results presented in **chapter 5** will be compared with earlier research. The results are taken in consideration and explain the results in connection to the hypotheses. To do so, first the interpretation of the results is given, and a comparison with existing literature is made. This will help to answer the in **chapter 3** formulated hypotheses, and the last partial research question (6) *Is the theoretical relationship between corruption and performance in public organizations confirmed in the context of healthcare services in EU member states*, in **part 6.1**. Continuing by stating the policy implications, the scientific implications of the research findings and recommendations for further research, **part 6.2**.

6.1. Theoretical relationship

“The goal of scientific research is to make conclusions that go beyond the collected data”
(King, Keohane, & Verba, 1994).

The outcomes in **chapter 5** show that the statistical power within this model is sufficient due to the significant results between the control variables and dependent variables. In addition, this model is quite robust with relative high R-square scores meaning that the model can explain variation. Since a Pooled OLS regression analysis has been conducted and the internal validity is weak, no conclusions can be drawn on the causality between the variables. The results led to the conclusion that experienced bribery in the last 12 months is associated with healthcare effectiveness – measured as the life expectancy at birth. This means that when bribery increases the life expectancy at birth will decrease within EU member states. This negative relationship between corruption and performance is in line with the ‘sand the wheels’ school of thought. Due to these findings the hypothesis **H1** is partially accepted, meaning that there is a negative relation between healthcare corruption and healthcare effectiveness. Yet, a more profound understanding of these mechanism and the limitations discussed in **part 4.3** may improve knowledge of how bribery is associated with the effectiveness of healthcare services, further discussed in **part 6.4**.

The results of the Pooled OLS regression analysis reveal less variety of mechanisms through which corruption may impact healthcare performance than expected based on existing literature in **chapter 3**. Four out of five performance dimensions, formulated within the ‘sand the wheels’ school of thought will be rejected. While, the Pooled OLS regression model was not able to test healthcare efficiency – measures as the vaccination coverage of children with tetanus, it shows that perceived widespread corruption in public healthcare organizations and experienced bribery by public healthcare officials has no negative association with healthcare equity – measured as access to healthcare services, healthcare quality – measured as infant mortality, and healthcare satisfaction - measured as the self-perceived health (**H1**). This non-significant findings are surprising based on the existing body of literature which generally shows a negative relationship between corruption and healthcare performance, due to increased agency-costs, and a decreased functioning of the healthcare organizations. The articles that focused on other performance dimensions than effectiveness and efficiency, mostly confirm that there is a negative relationship between corruption and healthcare equity and healthcare quality (Stringhini, et al. 2009; Maestad & Mwisongo, 2011). Besides, two articles even confirm that

a high level of corruption has adverse consequences for infant mortality (IMF, 2000; Mon-Chi & Ming-Hsuan, 2015). In addition, five out of five performance dimensions, formulated within the ‘grease the wheels’ school of thought will be rejected. The conducted Pooled OLS regression analysis shows that perceived widespread corruption in public healthcare organizations and experienced bribery by public healthcare officials has no positive association with healthcare effectiveness – measured as life expectancy at birth, healthcare efficiency – measured as vaccination coverage in children, healthcare equity – measured as access to healthcare services, healthcare quality – measured as infant mortality, and healthcare satisfaction - measured as the self-perceived health (H2). Yet again, the Pooled OLS regression model was not able to test healthcare efficiency – measures as the vaccination coverage of children with tetanus. This finding suggests that there is no significant positive association between healthcare corruption and healthcare performance. Yet, in corruption literature, this controversial school of thought is confirmed by the study of Riklikiene, Jarasiunaite, & Starkiene (2014), showing the beneficial relationship between informal payments and the performance within healthcare sector in Lithuania. In addition, the study of Stepurko et.al. (2010) acknowledges that informal patient payments are an important feature of healthcare systems in many countries around the world. Based on these results of the conducted Pooled OLS regression analysis, the formulated hypothesis based on the ‘grease the wheels’ school of thought is rejected, while the formulated hypothesis based on the ‘sand the wheels’ school of thought is partially accepted, **Figure 18**.

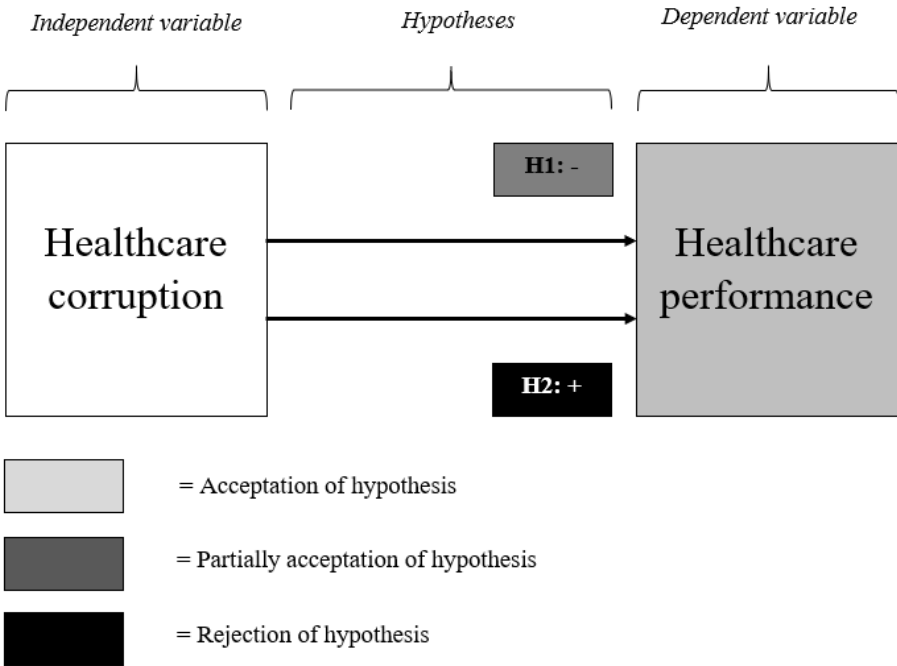


Figure 18. Theoretical framework with accepted or rejected hypothesis

6.2. Implications and recommendations

6.2.1. Policy implications

The significant relation between healthcare corruption and healthcare performance show the way in which corruption can undermine welfare. First, these results can have sincere policy implications since this study highlights the human cost of corruption, which can help by building coalitions to fight corruption (Li, An, & Balamoune-Lutz, 2018). Second, the results of this study can ensure that the incentives of good governance can get more focus on targeting health outcomes. The impact of healthcare investments in transition countries are typically measured by general health outcomes (Lewis & Pettersson, 2009). The results suggest that life expectancy at birth is significant associated with healthcare corruption, meaning that the investment in control and surveillance on healthcare provider accountability in countries with low health outcomes would lead to better life expectancy rates. In addition, good governance is central to raising performance in healthcare delivery (Lewis & Pettersson, 2009). Good governance in health systems can promote accountabilities which induce high performance from public providers. Yet to explain the role of governance and the quality of institutions, more information is needed on this enhancing and dampening influence of governance and the quality of institutions. Third, the results of this study can provide insights regarding the amounts of resources that should be devoted to corruption-combating to improve health outcomes (Li, An, & Balamoune-Lutz, 2018). In addition, tackling corruption is not only essential for the life expectancy at birth within EU member states, but is also consistent with the WHO and the sustainable development goals of the UN (United Nations, 2017; WHO, 2018).

6.2.2. Scientific implications

This study finds significant negative results between healthcare bribery and the life expectancy at birth. The findings on this topic add to the expanding list of ways corruption can undermine welfare, controlled for general development indicators as income distribution, education, and health expenditure. By controlling for capital (K), we argue based on the theoretical framework of Lewis (2006), that corruption by labor (L) has an influence on healthcare performance. Since, the lower level of felt accountability can result in acts of bribery by healthcare providers (Lambsdorff, 2007). Such an act at their own interest can undermine healthcare delivery, and represent higher healthcare costs due to informal payments and lower access to healthcare especially for people within the low quintile of equalized income (Lewis, 2006). Negative association between bribery and life expectancy can be explained, due to the fact that lifelong

access to the right information, and early access to healthcare services is crucial. Due to the fact that life expectancy at birth can be largely explained by healthcare measures, as smoking, blood pressure, blood glucose and adiposity (Danaei, et al., 2010).

Based on the theory of De Vries & Sobis (2015) more strong relations were expected between corruption and different performance dimensions within healthcare services. Since healthcare services are more prone and vulnerable to corruption than the public organizations, due to the high degree of information asymmetry between healthcare providers and clients, and a high self-interested of clients since they are exercising demand for services to become healthy, resulting in moral hazard (European Commission, 2013). Nevertheless, the other ‘sand the wheels’ hypotheses were rejected based on the results of the Pooled OLS regression analysis. According to these findings, the theoretical relationship between corruption and performance in public organizations in the context of healthcare services in EU member states cannot be confirmed.

The results contribute to the ongoing lack of consensus within the body of literature regarding the association between corruption and performance in public healthcare services. The results confirm the ‘sand the wheels’ theory and reject the ‘grease the wheels’ theory within the context of EU member states. Moreover, this research gives focus on the gap of literature on the performance dimensions within the responsiveness dimension of NPM. The results of this study show the importance of including more than one performance dimensions and highlight the problem of excluding performance dimensions without discussing what is excluded, by showing the difference in dimensions and results. In addition, including more than one performance dimension is even more important in analyzing the performance of healthcare organizations since these organizations have multiple and conflicting goals. Besides, this research gives focus on the gap of literature on corruption in public policies in the social sectors, yet these themes need to be considered due the increased interest in efficient resource use (Lewis M. , 2006). These three assets of this study on the association between healthcare corruption and performance, are useful to provide a better understanding of how the interconnections of corruption and performance work and what their consequences are.

6.2.3. Further research

A more profound understanding is needed to understand the association with bribery and the effectiveness of healthcare services. Since, it can be argued that the preventable events hampering life expectancy at birth are beyond the control of service providers (Lewis & Pettersson, 2009). This suggests that there are more factors involved within the relationship

between bribery and life expectancy which need further clarity. From the findings in the literature study, it is suggested that the life expectancy as an outcome measure, is influenced by the process-related measures as equity and satisfaction (Cowing, Davino-Ramaya, Ramaya, & Szmerekovsky, 2009). As Cowing, Davino-Ramaya, Ramaya, & Szmerekovsky (2009) highlight that patients which are satisfied with provider-patient interaction often have better health outcomes. To clarify these reversed relations and concepts, further research needs to be conducted. In addition, further research should increase the construct validity, by including more performance indicators for the performance dimension of healthcare effectiveness. In addition, based on the data analysis in **chapter 5**, it can be suggested that the performance indicator - vaccination coverage of children with tetanus - had very high country scores in all EU Member states, which resulted in relative small differences, and exclusion within the Pooled OLS regression analysis. In addition, based on the correlations in **chapter 4**, the performance indicator of – infant mortality – can be questioned as a good measure based on the lesser amount of variation among EU Member states. So far, infant mortality is a readily available and commonly used measure of outcome, due to the lack of more complex measures of health system performance, such as staff output, state of physical infrastructure, drug and medical availability, functionality of equipment, and factors which reflect whether health systems are meeting minimal quality standards, are rarely collected on a routine basis in all EU countries (Lewis M. , 2006). Yet, the inclusion of more available data per performance dimension could improve the internal validity and statistical power of the model. In addition, the inclusion of more data on recent years would allow the model to include Bulgaria, Romania and Croatia which could to overcome possible sample bias. In addition, further research could moderate for specific countries or regions within the EU to investigate the characteristics of the relation between corruption and effectiveness in healthcare services.

This study has focused on the relationship between corruption and performance in EU member states. Rather than on the influences of the relationship between corruption and performance in EU member states. An interesting factor to consider when studying the influence of the relationship between corruption and performance is the healthcare expenditure. Since healthcare expenditure has grown steadily in most European countries, due to demographic ageing and the rise of chronic diseases. When simplifying the selected data, by taking the mean of all variables and normalize them for a score between 0 and 100, an illustration has been made, showing the association between 12 EU member states with relatively low healthcare corruption, high healthcare performance and high healthcare expenditure, **Figure 19**.

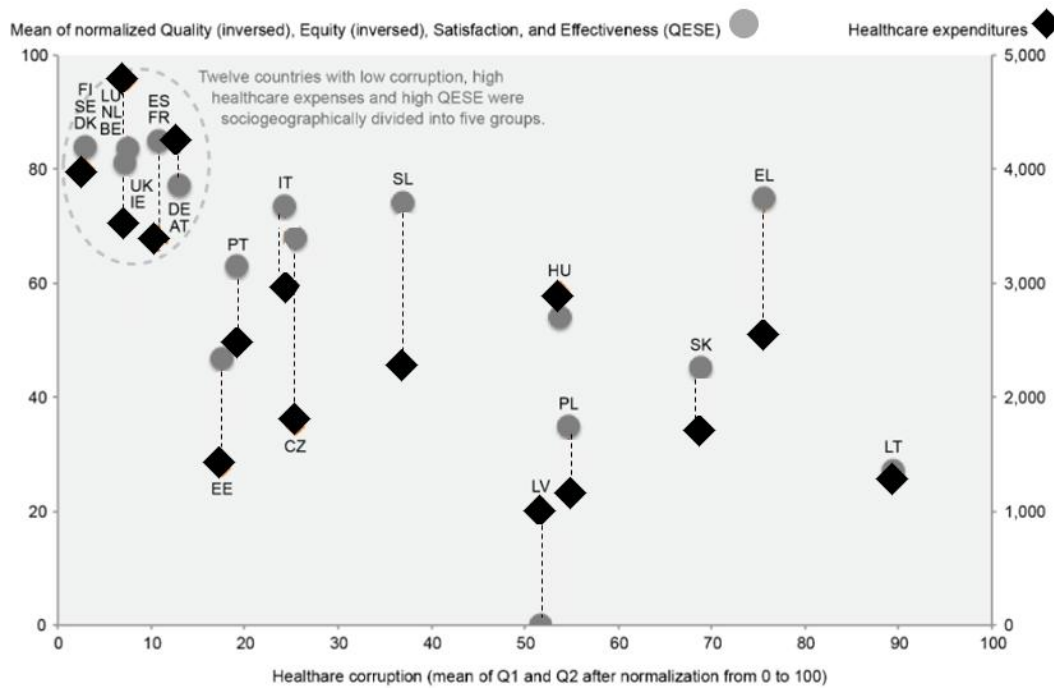


Figure 19. Simplified scatterplot of healthcare performance, corruption, and expenditure

For further research it would be interesting to discuss these influential factors on the relationship between healthcare corruption and healthcare performance, which will increase the general understanding on country-specific factors. For example, a country-case study on Greece would be interested to explain the underlying reason, why not all countries with high healthcare corruption rates have low levels of healthcare performance.

7. Conclusions

This article begins with the inconsistency between the essence of the NPM reform as response to the decreasing levels of satisfaction, and the dominant NPM performance dimensions of effectiveness and efficiency. This study sought to identify different performance dimensions which led us to focus on both the responsiveness dimension of NPM and the dominant performance dimensions of NPM as effectiveness and efficiency. Within healthcare services this relates to both the outcome-related determinants and the process-related determinants including patient satisfaction and the accessibility of healthcare services. A Pooled OLS regression analysis was conducted. The results led to the conclusion that experienced bribery by EU citizens in the last 12 months is significantly associated with healthcare effectiveness – measured as the life expectancy at birth. Therefore this study concludes by answering the main research question: the relationship between corruption and performance in the healthcare sector of the EU member states is negatively confirmed, in context of the performance dimension of effectiveness. Since the results show a significant negative relation between that healthcare bribery and life expectancy at birth. This study is able to partially confirm the ‘sand the wheels’ theory while rejecting the ‘grease the wheels’ theory. Hereby, the results contribute to the ongoing lack of consensus within the body of literature regarding the association between corruption and performance in public healthcare services. These results have implications for scientists and policy makers, since increased health is a crucial determinant of economic productivity and growth. The findings confirm that EU member states are not immune for the reality of deep-rooted corruption, and that the consequences of corruption can harm the EU’s economy and society. Therefore, there is a moral obligation and high societal relevance for increasing knowledge and policy actions to prevent and reduce corruption to improve the general health outcomes of the European population.

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