Abnormal Profits in Health Care: High Efficiency or Low Quality?

Esmée Gadron

483141

Supervisor: Jeroen Suijs

Second Assessor: Jochen Pierk

Date Final Version: 25-08-2023

Abstract: This study examines whether abnormal profits are driven by efficiency or quality of care. In the Netherlands, some health care institutions make structural abnormal profits, which seems to be caused by working more efficient or providing lower quality of care. Using a sample of Dutch health care institutions, I investigate abnormal profits in three different industries: mental healthcare, disabled care, nursing homes, care homes and home care. After testing the hypotheses for each industry and controlling for size, I find no significant evidence that the cost structure of institutions with abnormal profits deviates in the mental healthcare or the nursing homes, care homes and home care. The results do show that there is a significant relation between abnormal profits and cost structure in the disabled care. Furthermore, I find no significant evidence that the abnormal profits are driven by high efficiency or low quality of care.

Keywords: Abnormal profits, Heath care institutions, Cost structure, Efficiency, Quality

1. Introduction

1.1. Background

In 2016, a Dutch local broadcaster commissioned a study of the public figures of various healthcare companies. This study focusses on healthcare companies that are active in mental health care (GGZ), care for the disabled (GHZ) and nursing, care and home care (VVT). Based on the available data for 2014, it is concluded that in particular small healthcare institutions are making huge profits. One in six healthcare institutions in the Dutch province of Gelderland make more than 10% profit (Spanjers, 2016; Suijs & Verbon, 2018).

According to Verbon, the conclusion can be drawn that there are too many healthcare institutions that make significantly high profits. Government funding is intended to provide care, but not all of this is spent on care. Based on this research, Suijs gives two explanations for the high profit margins. The care institutions either work very efficiently or more care is declared by the institutions than is actually delivered (Spanjers, 2016).

In 2018, a study by Suijs and Verbon (2018) was published in which they investigated the consequences of market forces in Dutch healthcare. They looked at the net profit margin and net profit and concluded that several healthcare institutions realized extremely high profits in 2014 and 2015. Following the study by Suijs and Verbon (2018), a fuss arose in the Netherlands about the extremely high profits of healthcare institutions.

Follow The Money, a Dutch platform for investigative journalism, started a new file in 2018 called 'de Zorgcowboys' (Care cowboys). In this file they look for people who 'benefit financially from the abuse of laws and regulations in healthcare' (Stevens, 2018). They introduce the term 'Care cowboy'. Care cowboys are defined by Follow The Money as shrewd entrepreneurs, cunning consultants and greedy managers who enrich themselves by abusing laws and regulations in the health care sector.

The term cowboys is used instead of fraudsters. In the Netherlands there is a gray area with respect to the term fraud in healthcare. We speak of healthcare fraud when three criteria are met: a rule is broken, an unlawful advantage has been obtained, and the act is done deliberately or intentionally. The institutions seem to operate opportunistically with the current rules and regulations and no rule seems to be broken. The only rule that may be broken is that the quality of care they provide is not sufficient, but this is very difficult to prove. Therefore, we speak of 'unlawful' or 'ineffective' care when an unjustified financial advantage has been obtained by a healthcare institution (Stevens, 2018).

At the time, several cases are discussed in the Dutch House of Representatives in which owners of care institutions earn high incomes, paid from money intended for the provision of care. At the same time, there are signs that the quality or quantity of care at these institutions is lagging (Suijs & Verbon, 2018).

In 2019, research conducted by Follow The Money in collaboration with KRO-NCRV's Pointer shows that small healthcare institutions realized extremely high profits on a structural basis in 2017, for which they could not find a logical explanation. Healthcare institutions achieved gains of 40%, while the industry average is around 2-3%. These healthcare institutions

are also referred to as Zorgcowboys by Follow The Money, because they managed to realize extremely high profits by abusing laws and regulations (Van Ark, 2021).

The research by Follow The Money and KRO-NCRV's Pointer was published on June 26, 2019, and once again caused a stir in the Netherlands. In June 2019, parliamentary questions were again asked following various investigations. Healthcare companies are allowed to make a profit, but according to the Ministry of Health, extreme profits are socially undesirable. The Minister of Health, Welfare and Sport (VWS) at the time reasoned that the profits were absurd, and the percentages could not be correct (NOS, 2019).

A critical review of the profits led to the municipality of Maastricht reclaiming millions in healthcare subsidies. In addition, two insurers stopped paying a Rotterdam based healthcare company because there were signals that supposedly unqualified employees were deployed (NOS, 2019). According to the Minister of Health, Welfare and Sport, healthcare rates would not allow room for providing good healthcare while making so much profit at the same time. The money that is paid is meant to provide good health care and not to maximize profit (NOS, 2019).

1.2. Research question

Since the abnormal profits of health care institutions may arise from higher efficiency or providing lower quality of care, the following research question has been formulated:

'Are the abnormal profits of health care institutions driven by efficiency or quality of care?'

To empirically test the predictions that are made on existing literature and financial data, data is collected from the DigiMV database. This database covers most health care institutions in the Netherlands. The sample consist of firm-year observations over the years 2018 and 2019. To test whether abnormal profits are driven by efficiency or quality of care, three regression models are used. The first model investigates the cost structure of health care institutions. We predict that the cost structure of health care institutions with abnormal profits differs from the industry. The second model examines the level of efficiency of health care institutions. We predict that health care institutions with abnormal profits have a higher level of efficiency. The third model investigates the quality of care provided by health care institutions. We predict that health care institutions with abnormal returns provide a lower level of quality of care.

1.3. Relevance

This study contributes to the literature on abnormal profits in health care, efficiency in health care and quality of care in health care.

Since abnormal profits rarely occur in health care, research on the cause of these profits is limited, especially regarding abnormal profits and the Dutch health care sector. This study provides a first insight into the relation between abnormal profits and efficiency and the quality of care and can act as a basis for further research.

The literature on efficiency and abnormal profits is already extensive. This study contributes to this literature by identifying a determinant of efficiency that less commonly named in health care literature.

The literature on quality of care in health care is extensive, but the quality of care is rarely measured based on financial data. Therefore, this study contributes to the literature about health care.

2. Literature Review

2.1. Profits and Abnormal Profits

Most companies operating in a market economy aim to maximize their profits (Hudon, Labie & Reichert, 2020). Maximizing profits by a company is seen by Miles (1993) as financially optimal.

Profit can be defined from three different point of views; an economical, legal, and accounting. In economics, profit is seen as an increase in wealth and as a surplus over costs of production. In law, profit is seen as the present value of assets minus liabilities and capital and as excess of returns over advances. From an accounting point of view, profit is seen as the net change in the total assets and as surplus earnings after providing for all costs. The explanations of profit are quite similar, but profit could be viewed from three different angels: social, legal, and business (Littleton 1928).

In addition, profit can also be defined as the return that arises when capital is used in a company, minus payments to third parties. Profit at a company level can then be defined as revenue minus expenditure (Maynard 1994; McKee 1989). Compared to the definitions of profit from an economic, legal, and accounting perspective, this definition is more simplified and concise.

In this thesis, the definition of profit is as follows: revenue minus expenses. Accrual accounting recognizes the effects of transaction (or other events) when they occur, rather than when cash or its equivalent is received or paid (Picker et al., 2019). This research is based on the principles of accrual accounting. In accrual accounting, expenses are defined as "decreases in economic benefits during the accounting period in the form of outflows or depletions of assets or incurrences of liabilities that result in decreases in equity, other than those relating to distributions to equity participants" (Picker et al., 2019).

'Follow The Money' and 'KRO-NCRV's pointer' have researched healthcare institutions that make profit. Their research showed that several institutions structurally achieve high profits. Such profits are seen as abnormal profits.

We refer to abnormal profits when profits margins of a certain company deviate significantly from the average in the industry (Bou & Satorra, 2007; Jacobsen, 1988).

Net profit margins of healthcare institutions fluctuate on average around 2% (Suijs & Verbon, 2018). When the net profit margin of a healthcare institution is greater than 10%, it deviates significantly from the average of 2%. According to Suijs and Verbon, this is a reason to further research the particular healthcare institution. Vermanen (2019) also cites this. In this study, a health care institution' profit is considered to be abnormal when the profit margin is above 10%.

Suijs & Verbon (2018) investigated healthcare institutions that had abnormal profits for two consecutive years, 2014 and 2015. According to van Ark (2019), these profits can be regarded as structurally high profits, because they were not incidental. For this study, the term structurally abnormal profits is used when abnormal profits have been made for 2 years in a row.

2.2. Market forces in healthcare institutions in the Netherlands

In the Netherlands, healthcare is part of the private sector and is subject to public regulations. The Healthcare Tariffs Board recorded what type of care was provided. Health insurance funds were seen as claim processors (de Vries, 2021). According to Den Hartog & Janssen (2014), this period from 1971 to 2006 was characterized by government regulation based on capacity planning and financing.

Since the 1990s, the Dutch have been able to switch to health insurance funds. According to health care professor Marco Varkevisser, this switch can be seen as the first market forces in health care. It made it possible for health insurance funds to compete on part of the premium (de Vries, 2021).

In 2001, the Ministry of Health commissioned research into market forces in the health care system. In 2006, the new Health Insurance Act was passed, introducing market forces in health care (de Vries, 2021). The aim of this law is to reduce costs whilst providing better care. In this situation there are market forces because the supply and demand of care is not fully aligned with the supply and price regulation by the government (Varkevisser, 2019). This current healthcare system stimulates a good price-quality ratio of healthcare through regulated competition. Insurers are expected to purchase decent care for their insureds as cheaply as possible, taken into consideration pressure from competition and within the rules set by the government (den Hartog & Janssen, 2014). Unlike the former Dutch sickness funds, this makes it possible for health insurers to purchase care on behalf of policyholders. They must compete to attract policyholders. Citizens namely must pick a health insurer of their choice. Therefore, health providers had to negotiate contracts with health insurers and compete to retain policyholders.

In the Netherlands, every resident is insured against medical expenses. Prior to 2006, there was a distinction between the national health insurance fund and private health insurance. The health insurance fund was publicly financed and regulated. Insured persons had limited options for a health insurance fund. Since the introduction of the Health Insurance Act in 2006, health insurers have been able to selectively purchase insured care. As a result, the regionally oriented market changed to a national market for health insurance (den Hartog & Janssen, 2014). The changes from 2006 resulted in competition with government supervision. This means that the government still monitors the balance between supply and demand in the healthcare sectors, but at the same time there is room for competition, differences in health care provision and differences in the prices of treatments. Thus, it is not a completely free market, but a market that is partly controlled and regulated by the government (Kuijper, 2014).

The sickness funds, the system before 2006, was a compulsory insurance for lower-income workers. High-income workers enjoyed private insurance. The sickness funds were based on solidarity and collective financing, with premiums based on income. Healthcare providers received a fixed rate for the treatments they provided. This rate was negotiated between the government and the healthcare providers. The sickness funds were set up in such a way that the rates for care remained within limits and prevented excessive profits (Okma & Poelert, 2001). In addition, patients could not freely choose their healthcare provider, which meant that there was limited competition between healthcare providers. Policyholders were bound to the care provider with whom their health insurance fund had a contract. Furthermore, the prices were limited. There was just enough room in the prices to provide the care and cover

all the expenses of the health care institutions. As a result, it was not possible for healthcare providers to make abnormal profits. Therefore, the system before 2006 limited the abnormal profits of healthcare institutions. The goal of the health insurance fund was to distribute the costs of care as fairly as possible, with the care providers receiving reasonable compensation for their services (Okma & Poelert, 2001). When the health insurance system was introduced, the diversity of care providers increased. Market competition strengthened the financial incentive of the health care provider, which may have enabled healthcare organizations to realize abnormal profits.

2.3. Health care

Healthcare is defined as follows; "the whole of care providers (and support staff), institutions, resources and activities that are directly aimed at maintaining and improving the state of health and/or the ability to take control, and at reducing, eliminating, compensating for and preventing deficiencies in this" (Gezondheidszorg, z.d.; van der Meer et al., 1997; Nuy & Bex, 1986).

Health care includes various parties: healthcare providers and professionals, patients, suppliers of medical products, healthcare institutions, health insurers and policyholders. In addition, healthcare can be subdivided into three healthcare markets. These are the healthcare market between patients and healthcare providers, the insurance market between insurance companies and policyholders, and the healthcare market for contracts between healthcare providers and healthcare insurers (Polder, Hoogland, Jochemsen & Strijbos, 1997). The focus of this study is on healthcare institutions, including the healthcare market between patients and healthcare providers and the healthcare market for contracts between healthcare providers and insurers.

2.4. Types of Health care institutions in the Netherlands

Healthcare in the Netherlands can be divided into seven categories. These are healthcare providers, primary care, hospital care, care for the disabled (GHZ), mental health care (GGZ) and nursing homes, care homes and home care (VVT) (Zorginstellingen, n.d.).

Healthcare providers provide for, or arrange, healthcare to be provided on a commercial or professional basis. A healthcare provider can be an institution or a care provider working individually (CIBG, n.d.)

Primary care is the first point of contact when people need care. This is care close to home. Primary care consists of care providers, such as general practitioners, dentists, physiotherapists, midwives, and pharmacists (Rijksoverheid, n.d.). Primary care prevents unnecessary usage of complex, more expensive care (Zorginstellingen, n.d.).

Hospital care consists of care provided by general and academic hospitals, categorical hospitals, independent treatment centers, top clinical care, and trauma care. This care is provided by a medical specialist and associated nursing and care (Zorginstellingen, n.d.).

Disability care provides care to people with disabilities who need care and support (Rijksoverheid, n.d.). This may concern a physical, mental, or psychological disability (Zorginstellingen, n.d.).

Mental health care, or GGZ, offers help in case of psychological problems. Treatment of these people takes place close to home. In addition, in case of more serious psychological disorders, this may also consist of voluntary or involuntary admission to a mental health institution (Zorginstellingen, n.d.).

Nursing homes provide care in institutions to people who are undergoing geriatric rehabilitation, who need long-term care or palliative care. Care homes provide care to frail elderly people who need help with activities of daily living, elderly people who need guidance or elderly people who cannot live independently (Boorsma, Joling, Dussel et al., 2012). These institutions must provide care that meets the quality requirements set out in the Healthcare Insurance Act, Zvw, and the Long-Term Care Act, Wlz (Rijksoverheid, n.d.).

Home care provides help and care to people who need help, but who do not stay in a care institution (Zorginstellingen, n.d.). This care is also referred to as care without accommodation (Rijksoverheid, n.d.). Home care consists of domestic nursing, care, and personal care (Zorginstellingen, n.d.).

Research by van Mostert & Vermanen (2019) has shown that abnormal profits were made in care for the disabled (GHZ), mental health care (GGZ) and nursing homes, care homes and home care (VVT). In this study, the focus will therefore be on these categories.

2.4.1. Profits healthcare institutions in the Netherlands

Healthcare institutions in the Netherlands generally achieve zero to five percent profit on revenues (Gupta, 2017). The average profit margin of healthcare institutions is between two and three percent. The government has not set a maximum profit margin for healthcare institutions (Mostert & Vermanen, 2019). A profit of more than ten percent at a healthcare institution is, as described earlier, seen as abnormal profit.

In 2015, healthcare institutions were the second largest subsector that made a profit in the Netherlands. A total of 7 billion euros was generated in healthcare in 2015. Of this, a profit of 1.5 billion euros was made by the healthcare institutions. The remaing profit was made by manufacturers of medical equipment and devices (1.8 billion), pharmaceutical companies (1 billion), health care professionals such as general practitioners (1.1billion), financial services (1 billion), insurance companies (0.4 billion), and property (0.2 billion) (Gupta, 2017). The profit made by health care institutions can be explained by the market forces in healthcare, the number of healthcare institutions, and the abnormal profits that some institutions make (ten Katen, 2017).

2.5. Hypothesis Development

In healthcare, the largest cost items are patients, healthcare personnel and equipment. The most important cost aspect here is personnel expenses and expenses related to equipment, appliances and supplies for patients (Waress, Pasternak & Smith, 1994). This is also confirmed by Márquez (1990). Márquez (1990) indicates that input controls can be done to reduce expenses. These can be checks on prices and quantities. The checks on prices may include allowances, salaries, equipment prices and drug prices. Quantity controls can include quantities such as personnel, equipment, and budgets.

The financial result of a health care institution consists of the start-up expenses, the annual operational expenses, and the revenues (Nystrom & Prata, 2008). The start-up expenses are the expenses that occur only once and are part of setting up a company. Annual operating expenses are expenses that occur every year, also known as operating expenses. The operating expenses differ per sector. In healthcare, these expenses depend on the number of hours spent on providing care and by which care providers this care is provided. The personnel expenses are a large part of the operating expenses in healthcare. Finally, the revenues are part of the

result. At government-qualified health centers, these consist primarily of billing and fee income (Nystrom & Prata, 2008).

Other expenses may include building and maintenance expenses, office supplies, equipment, education, and administrative expenses. In the case of abnormal results, or gains, they may be caused by one specific cost component. If that is the case, it is referred to as an abnormal item because of the effect this item has on the results and the size of the item (Cameron & Gallery, 2008).

2.5.1. Cost structure

The cost structure of a company can be defined as the proportion of a company's variable-to-fixed expenses. The fixed costs are defined as the expenses that do not immediately change when more care is provided. An institution's variable expenses vary with the delivery of a product or service. As more care is provided, these expenses rise (Chang, Hall & Paz, 2021). The cost structure affects a company's profitability (Irvine, Park & Yildizhan, 2016). A cost structure with a higher proportion of fixed-to-variable expenses allows companies to make more profit when more sales are made, but also results in lower profits when less care is provided. This is reinforced in a competitive market (Chang, Hall & Paz, 2021). Thus, the cost structure directly affects the profitability of a company (Irvine, Park & Yildizhan, 2016).

According to Suijs & Verbon (2018), an explanation for high profits could be that healthcare institutions are able to work very efficiently. This efficiency would lead to lower expenses, generating relatively high profits. Firms with a high profitability, have higher proportions of fixed costs, leading to higher profits (Chang, Hall & Paz, 2021).

If this were the case, the cost structure of high-profit healthcare organizations would deviate from the cost structure of the industry average. It is possible that one or more cost items deviate and lead to abnormal profits.

Another explanation, according to Suijs & Verbon (2018) is that healthcare institutions with high profits do not provide the quality of care they should deliver. In this case, the cost structure of these institutions may also differ from the industry average. These predictions lead to the following hypothesis:

H1: *In case of abnormal profits, the cost structure deviates from the industry average cost structure.*

2.5.2. Efficiency and quality of care

According to the Central Bureau of Statistics (CBS), the share of personnel expenses in 2021 in mental health care is 78%, in GHZ this is 73% and in VVT the share of personnel expenses is 76% (CBS, n.d.). From this data it may be assumed that personnel expenses are the largest cost item for healthcare institutions. This is consistent with the findings of Macdonnel & Darzi (2013). Their research shows that in many countries at least two-thirds of healthcare costs consist of wages.

Labor expenses are inevitable in healthcare. In care institutions, care workers, nurses, caregivers, and support staff are necessary. The expenses for these personnel must therefore also be incurred (Waldman, Kelly, Arora & Smith, 2004; Macdonnell & Darzi, 2013).

In health care, the idea is that more care is better, and that the quality of care is therefore expensive (van Leersum, Bennemeer, Otten, Visser, Klink & Kremer, 2019). Research by Clemens & Gottlieb (2012) shows that the volume of care is increasing in the care sector, but the quality of the care has not improved. It is possible in the healthcare sector to provide high-

quality healthcare against low expenses at the same time. In addition, there is a lot of waste in healthcare because unnecessary and unsubstantiated care is provided (van Leersum, Bennemeer, Otten, Visser, Klink & Kremer, 2019). To reduce healthcare costs, productivity (the amount of revenue generated by an employee) is seen as the most important driver (Westert, van den Berg, Zwakhals, de Jong & Verkleij, 2010).

However, productivity of healthcare workers has not increased in recent years. The work performed in healthcare is becoming increasingly expensive, while productivity has not improved (Kocher & Sahni, 2011). It is difficult for healthcare institutions to save on staff costs without compromising on the quality of healthcare (van Ark, 2019; Macdonnell & Darzi, 2013). It is hard for health care workers to reduce the time they spent with a patient, because most of the care performed by workers is not easy to automate. Providing care is therefore very labour intensive, which can limit the level of productivity of a care worker (Macdonnell & Darzi, 2013). When personnel costs are reduced, it is assumed that the quality goes down (Kajdos, 2008).

According to Suijs & Verbon (2018) an explanation for high profits can be that institutions which make abnormal profits work more efficient, or they provide lower quality health care. By working more efficiently, providing only the care that is necessary, it is possible to reduce these expenses, because care is currently being wasted (van Leersum, Bennemeer, Otten, Visser, Klink & Kremer, 2019).

The financial performance of nursing homes is influenced by the ability to generate revenue and the ability to reduce expenses (Weech-Maldonado, Neff & Mor, 2003). Nursing homes that provide high-quality care waste less and make fewer mistakes, which improves employee productivity, generates more employee revenue and increases profits (Harkey & Vraciu, 1992; Fleming, 1991). The abnormal profits of healthcare institutions could be explained by their higher efficiency, where an employee generates more revenue. This prediction leads to the following hypothesis:

H2: *In case of abnormal profits, the revenue per Full Time Equivalent (FTE) is higher than the average in the three industries.*

As mentioned earlier, the abnormal gains can also be explained by a lower quality of care. Weech-Maldonado, Neff & Mor (2003) investigated the relationship between the quality of care and the financial performance of nursing homes. With a higher quality of care, personnel costs will increase. When more skilled personnel is deployed, personnel costs per full time equivalent (FTE) will be higher compared to other institutions. Nursing homes that provide high-quality care have higher personnel costs and lower financial performance than institutions that provide low-quality care (Weech-Maldonado, Neff & Mor, 2003). If the quality of care is low, less highly trained personnel is used and less care is provided. It is therefore possible that wage costs are lower at healthcare institutions with abnormal profits. This prediction leads to the following hypothesis:

H3: *In case of abnormal profits, the labor cost per Full Time Equivalent (FTE) is lower than the average in the three industries.*

3. Method

3.1. Research Design

To test the first hypothesis, which investigates the cost structure of health care institutions, the following regression model is estimated:

$$Cost\ structure = \beta 0 + \beta 1 * AbnormalProfits + \beta 2 * Size + \beta 3 * Industry + \varepsilon \quad (1)$$

where the dependent variable, *CostStructure,* is the fixed-to-variable costs ratio of the health care institution. For institutions with abnormal profits, the cost structure is expected to consist of high fixed costs and low variable costs. *AbnormalProfits* is a dummy variable which indicates health care institutions with abnormal profits. We speak of abnormal profits when the profit percentage is greater than 10%, for both the year 2018 and 2019. The main variable of focus for the first hypothesis is *AbnormalProfits*. If the coefficient ($\beta 1$) for *AbnormalProfits* is positive, this means that abnormal profits lead to a higher cost structure compared to the industry. If the coefficient ($\beta 1$) is negative, this means that abnormal profits result in a lower cost structure compared to the industry. For institutions with abnormal profits, the fixed costs are expected to be larger than the variable costs.

To test the second hypothesis, which explores the efficiency of a health care institution, the following regression model is estimated:

$$Efficiency = \beta 0 + \beta 1 * AbnormalProfits + \beta 2 * Size + \beta 3 * Industry + \varepsilon \quad (2)$$

where the dependent variable, *Efficiency*, is the revenue divided by the number of FTE's. *AbnormalProfits* is as defined previously. The main variable of focus for the second hypothesis is *AbnormalProfits*. If the coefficient ($\beta 1$) for *AbnormalProfits* is positive, this means that institutions with abnormal profits work more efficient compared to the industry.

To test the third hypothesis, which examines quality of care, the final regression model is estimated:

$$Quality = \beta 0 + \beta 1 * AbnormalProfits + \beta 2 * Size + \beta 3 * Industry + \varepsilon \quad (3)$$

where the dependent variable, *Quality*, is the labor cost divided by the number of FTE's. *AbnormalProfits* is as defined previously. The main variable of focus for the second hypothesis is *AbnormalProfits*. If the coefficient ($\beta 1$) for *AbnormalProfits* deviates from 0, this means that there is a relation between abnormal profits and the quality of care. If the coefficient ($\beta 1$) for *AbnormalProfits* is negative, this means that the quality of care is lower when a company makes abnormal profits.

Following prior research, a control variable is added to control for several factors that may influence the cost structure, efficiency, and quality of care. *Size* is an indicator variable that measures the size of the company in terms of total assets. The regression is run for each sector separately because the coefficient of interest, ($\beta 1$) may differ across the three sectors.

3.2. Cost structure

The cost structure is defined as the company's fixed-to-variable costs. The fixed costs are defined as the costs that do not immediately change when more care is provided. An institution's variable costs vary with the delivery of a product or service (Chang, Hall & Paz, 2021).

In the dataset of DigiMV, different costs are specified. The total costs consist of personnel expenses, depreciation of fixed assets, impairment of fixed assets, fees for independent medical specialists and other operating costs. The other operating costs consist of six cost items: food and hotel costs, general costs, patient/client resident costs, maintenance and energy costs, rent and leasing, and additions and releases.

For this research, in line with the definition of variable and fixed costs of Chang, Hall & Paz (2021), the depreciation of fixed assets, and impairment of fixed assets are considered fixed costs and the variable costs are the personnel costs, and other operating costs.

The labor costs are defined as the wages and salaries minus the rewards for directors, plus the cost of outsourcing to subcontractors.

3.3. Definition of variables

Previously, different variables were mentioned. In this part, I am sharing a clear overview of the different variables.

CostStructure is the fixed-to-variable costs ratio of the health care institution, measured by

$$CostStructure_{i,t} = \frac{Fixed_{i,t}}{Variable_{i,t}}$$

where $Variable_{i,t}$ is the variable costs of health care institution i in year t and $Fixed_{i,t}$ is fixed costs of health care institution i in year t.

Efficiency, is the revenue to FTE ratio of the health care institution, measured by

$$Efficiency_{i,t} = \frac{Rev_{i,t}}{FTE_{i,t}}$$

where $Rev_{i,t}$ is the revenue of health care institution i in year t and $FTE_{i,t}$ is the number of FTE in health care institution i in year t.

Quality, is the ratio of labor costs compared to FTE of the health care institution, measured by

$$Quality_{i,t} = \frac{Labor_{i,t}}{FTE_{i,t}}$$

where $Labor_{i,t}$ is labor costs of health care institution i in year t and $FTE_{i,t}$ is the number of FTE in health care institution i in year t.

AbnormalProfits is a dummy variable equal to one if health care institutions that realized abnormal profits in 2018 and 2019, and zero otherwise. *Size* is the size of a health care institution, measured by the total assets.

This research builds upon previous research by Follow The Money and KRO-NCRV's pointer. The annual accountability in healthcare can be found on the CIGB site. The annual accounts can be used to find the accountability data per reporting year for the past years. The relevant variables from the DigiMV dataset are selected that match the hypotheses, such as the variables on the income statement.

4. Sample selection and data collection

For this research, the 2019 DigiMV dataset will be used. This dataset consists of two parts and contains all public accountability data of the organizations per reporting year for 2018 and 2019.

Part 1/tab 0 describes which variables can be found on the other tabs and which name has been assigned to these variables. One of the variables is the concern code. The concern code contains all entities that operate in the healthcare sector in the Netherlands. These are further specified in part 1 tab 1. In tab 0, care is also divided into categories. The categories that are important for this study are care for the disabled (GHZ), mental health care (GGZ) and nursing, care and home care (VVT).

In addition, in part 1 tab 0, a distinction is made between micro-entities and healthcare institutions apart from micro-entities. The micro-entities may submit a simplified annual report if they meet 2 of the 3 criteria for this. The 3 criteria are as follows; A net turnover of less than €700,000, fewer than 10 employees on average, and the value of total assets may not exceed €350,000 (according to the balance sheet with explanatory notes) (Vermanen, 2019). To be eligible to submit a simplified annual report, the healthcare provider must complete a basic questionnaire. This is then checked by DigiMV, after which the healthcare provider is approved and can provide a simplified accountability.

Not all needed data of a micro-entity is known in the DigiMV dataset. This makes it difficult to compare these data with other healthcare institutions. In addition, sole proprietorships may fall under the micro-entities. These are not relevant for this study, because the owners are paid out of the company's profits and do not receive salary from the company (Suijs & Verbon, 2018). For this study, therefore, only healthcare institutions apart from micro-entities, will be used.

First, healthcare institutions with abnormal profits are highlighted. We have previously described what is meant by abnormal profits. There is an abnormal profit (costs minus revenues) when the profit margin is above 10%. To calculate this, "sum of operating expenses" and "operating result" are used. The profit margin is defined as; operating result/total operating revenues.

The code of Berghuis (2019) is then used to find healthcare providers who generate abnormal profits. In 2019, following the research of KRO-NCRV's Pointer, he wrote an R script to reproduce the research with the 2017 and 2018 datasets. This script will be used as a starting point and for this research specifically adjustments to the code will be made. Furthermore, for this research the data from 2018 and 2019 will be used. In addition to the code of Berghuis, a dummy variable is added. The institutions with a profit of 10% or higher get assigned a 1. If this is not the case, and the profit is therefore less than 10%, it will be assigned the value 0. Both 2018 and 2019 have been taken into consideration, to speak of structurally abnormal profits.

Only the care institutions within the GHZ, GGZ and VVT are included in the data. Also, in line with Berghuis (2019), the Partnerships under Firm (VOF) are not included in the analysis. In addition, the sole proprietorships are also excluded from the analysis. With a VOF, a profit of more than 10% is not seen as excessive. The owner of the sole proprietorship and the partners of the VOF do not receive a salary form the company. Their compensation is funded by the company's profits (Suijs & Verbon, 2018). In addition, healthcare institutions with a revenue of less than € 100,000 are also excluded from the study. When more than 10% profit is achieved on a turnover of less than €100,000, little can be said about this (Vermanen, 2019).

A profit of 10% does not say a lot about a low turnover, because in this case the absolute amount of profit can be relatively small, and this is therefore not seen as striking.

Ultimately, there remains a group of 65 healthcare institutions with abnormal profits that will be used for this research to compare to the institutions without abnormal profits. Within this group, 12 care institutions operate in the care for the disabled (GHZ), 29 care institutions in mental health care (GGZ) and 28 care institutions in nursing, care and home care (VVT). Table 1 presents the sample selection. For these institutions, the cost structure, efficiency, and quality will be examined by means of testing the hypotheses. In total, there are 1130 institutions in the sample without abnormal profits.

5. Results

5.1. Descriptive information

Table 2 present the descriptive statistics for the dependent, independent, and control variables for the GGZ. The dependent variables, *CostStructure*, varies from a smaller ratio value (0) to larger ratios (0.175) and has a mean of 0.018. The second dependent variable, *Efficiency,* has a mean of €111,521.50, a minimum value of €0 and a maximum value of €1,910,918. The minimum value of zero could mean that the company did not provide any revenue and therefore, did not properly fill out the form. The third dependent variable, *Quality*, varies from €0 to €1,463,736 and has a mean of € 53,003.01. This means that on average, the fixed-to-variable ratio of a firm in the GGZ is 0.018, the average revenue per FTE is € 111,521.50 and the average salary per FTE is €53,003.01. The independent variable, *AbnormalProfits*, has a mean value of 0.077. This means that 7.7% of the firms in the sample make abnormal profits. The control variable *Size* shows that the sample consists of small firms with a total asset of €3,614 to large companies with total assets of €679,366,512.

Table 3 shows the descriptive statistics for the dependent, independent, and control variables for the GHZ. The dependent variables, *CostStructure*, representing the fixed-to-variable ratio, ranges from 0 to 0.163 and has a mean of 0.029. The second dependent variable, *Efficiency*, has an average value of €132,606.1, a minimum value of €0 and a maximum value of €3,162,625. The third dependent variable, *Quality*, ranges from €0 to €261,615.40 and has a mean of €42,830.83. This means that on average, the fixed-to-variable ratio (*CostStructure*) of a firm in the GHZ is 0.028, the average revenue per FTE is €132,606.10 and the average loan per FTE is €42,830.83. The independent variable, *AbnormalProfits*, has a mean value of 0.039. This means that 3.9% of the firms in the sample make abnormal profits. The control variable *Size* shows that the sample consists of small firms with total assets of €0 to large companies with total assets of €1,033,962,000.

Table 4 presents the descriptive statistics for the dependent, independent, and control variables for the VVT. The dependent variables, *CostStructure*, varies from a smaller ratio value (0) to larger ratios (0.449) and has a mean of 0.032. The second dependent variable, *Efficiency*, has a mean of €93,703.66, a minimum value of €0 and a maximum value of €2,309,435. The third dependent variable, *Quality*, varies from €0 to €1,188,491 and has a mean of €47,463.11. This means that on average, the fixed-to-variable ratio of a firm in the VVT is 0.031, the average revenue per FTE is €93,703.66 and the average labor cost per FTE is €47,463.11. The independent variable, *AbnormalProfits*, has a mean value of 0.046. This means that 4.6% of the firms in the sample make abnormal profits. The control variable *Size* shows

that the sample consists of relatively small firms with total assets of €7,458 to large companies with total assets of €679,366,512.

Table 5 (GGZ), Table 6 (GHZ) and Table 7 (VVT) show the correlation matrix for the dependent, independent, and control variables. The correlation between the independent and control variable is <0.1 for the GGZ, GHZ, and VVT, implying that multicollinearity does not appear to be an important concern.

5.2. Regression results

5.2.1. Cost structure

Table 8 reports the regression results of the GGZ. This table consists of three models; model 1 tests the effect of abnormal profits on the cost structure, model 2 measures the effect of abnormal profits on efficiency, and model 3 measures the effect of abnormal profits on quality. In model 1, the coefficient on *AbnormalProfits* is positive but insignificant, suggesting there is no significant association between abnormal profits and cost structure. Based on existing literature we predicted that the cost structure would be different for abnormal profits. This result is not in line with the prediction.

Table 9 presents the regression results of the GHZ. In model 1, the coefficient of *AbnormalProfits* is positive and significant at $p<0.05$, suggesting that abnormal profits lead to a higher fixed-to-variable ratio. This result is in line with the predictions based on existing literature.

Table 10 shows the regression results of the VVT. In model 1, the coefficient of *AbnormalProfits* is positive and insignificant, suggesting there is no significant association between abnormal profits and cost structure. This result is in line with the prediction, but the result is insignificant.

Based on the regression analysis of model 1 for the GGZ, GHZ and VVT we can conclude there was no significant change in cost structure due to abnormal profits in our sample for the GGZ and VVT. The results of model 1 for the GHZ provide evidence that there is a relation between abnormal profits and the cost structure.

5.2.2. Efficiency

Table 8, 9 and 10 report the regression results of efficiency analysis for the GGZ, GHZ and VVT respectively. The result for these analyses can be found in model 2. Table 8 presents the results for the GGZ. The coefficient on *AbnormalProfits* is positive but insignificant, suggesting there is no significant association between efficiency and abnormal profits. Since we predicted that firms with abnormal profits would work more efficiently, this result is in line with the predictions based on existing literature, but the result is not significant.

Table 9, model 2 shows the results for the GHZ. The coefficient on *AbnormalProfits* is negative and insignificant. This suggests that there is no significant association between efficiency and abnormal profits, and this is not in line with the prediction.

In Table 10, the results for the VVT are shown. The coefficient on *AbnormalProfits* is negative, but insignificant. These results are in line with the results of model 2, found in table 9. The results suggest that there is no significant relation between efficiency and abnormal profits, which is not in line with the prediction.

Based on the regression analyses of model 2, we do not have enough evidence to reject the null hypothesis of H2. In other words, there was no significant change in efficiency due to abnormal profits in the GGZ, GHZ and VVT.

Afterwards, I corrected for outliers in the dependent variable Efficiency. This had no effect on the results.

5.2.3. Quality

The results of the regression results of quality analyses can be found in model 3 in Table 8, 9 and 10. In the GGZ (Table 8) the coefficient on *AbnormalProfits* is negative but insignificant, suggesting there is no significant association between abnormal profits and quality of care. Based on existing literature, we predicted that the quality of care would be lower for abnormal profits. This result is in line with the prediction, but not significant.

Table 9 presents the result for the GHZ. In model 3, the coefficient on *AbnormalProfits* is negative but insignificant. This result is in line with the results for the GGZ.

Table 10 shows the results for the VVT. Again, the coefficient of *AbnormalProfits* is negative but insignificant in line with the results of the GGZ and GHZ.

Based on the regression analyses of model 3 we can conclude that the coefficient of the VVT is greater compared to the GGZ and GHZ, but all coefficients are insignificant. Therefore, we can conclude that there is no significant relation between quality of care and abnormal profits for the three different industries.

Afterwards, I corrected for outliers in the dependent variable Quality. This had no effect on the results.

6. Conclusion

This study investigates whether the cost structure of companies with abnormal profits differ. Furthermore, we examine whether these abnormal profits are driven by high efficiency or lower quality of care. The results of our studies show that in general the cost structure is not different for firms with abnormal profits. We conclude that there is no significant relation between abnormal profits and high efficiency or low quality of care. The results do show that there is a significant relation between abnormal profits and cost structure in the GHZ, as abnormal profits increase the fixed-to-variable ratio for this sector.

This study contributes to existing literature. Firstly, it is one of the first studies that examines the drivers of abnormal profits in Dutch health care institutions. There is still room for improvement, but this study can be used as a basis for further research on the drivers of abnormal profits. Secondly this study uses financial determinants of efficiency and quality of care and therefore provides an extension to the literature.

This study also suffers from multiple limitations. Firstly, the sample consists of Dutch health care institutions that provided their information for social accountability. This information may be incorrect or incomplete. Secondly, the classification of health care institutions and abnormal profits is made on characteristics such as legal form, revenue, and sector. There is a chance that firms that make abnormal profits (Health care cowboys) are excluded from the sample based on these characteristics. This could impact the reliability of the results. Third, by excluding multiple firms from the sample, the final sample is relatively small. Within the sample, the number of health care institutions with abnormal profits is relatively small compared to the other health care institutions. Therefore, the sample size may be too small to use for this study. The small sample size makes it harder to find significant

results, even if the relation would exist. This could also make the results of the regression inaccurate and unreliable. To conclude, there is a lack of financial research regarding the drivers of abnormal profits in health care. Therefore, the parameters of efficiency and quality could be too short-sighted.

Further research is suggested to investigate the drivers of abnormal profits in health care institutions within a larger sample or with other parameters. Health care is funded by society and abnormal profits are undesirable. Dutch municipalities and the Dutch government should carry out stricter checks on financial data supplied by health care institutions. One of the drivers of abnormal profits, which is not investigated in this research, could be that health care institutions declare more care than that they actually provide. In this study, no significant relation is found between efficiency and abnormal profits and quality of care and abnormal profits. Therefore, this study offers an opportunity for further research to investigate the differences between declared care and care provided.

References

Berghuis, J. (2019, July 1). Op zoek naar de 'zorgcowboys' met R: Megawinsten van zorginstellingen in 2017 en 2018. Retrieved from https://rpubs.com/jberghuis/zorgcowboys

Boorsma, M., Joling, K., Dussel, M., Ribbe, M., Frijters, D., van Marwijk, H.W.J., Nijpels, G., van Hout, H. (2012). The incidence of depression and its risk factors in Dutch nursing homes and residential care homes. The American Journal of Geriatric Psychiatry: Official Journal of the American Association for Geriatric Psychiatry, 20(11), 932-942.

Bou, J.C., Satorra, A. (2007). The persistence of abnormal returns at industry and firm levels: evidence from Spain. Strategic Management Journal, 28(7), 707-722.

Cameron, R., Gallery, N. (2008). The rise and demise of abnormal items. Australian Accounting Review, 18(1), 63-70.

CBS (z.d.). Zorginstellingen; financiele kengetallen. Statline. Retrieved from https://opendata.cbs.nl/#/CBS/nl/dataset/83670NED/table?ts=1623772558021

Chang, H., Hall, C.M., Paz, M.T. (2021). Suppliers's Product Market Competition, Customer Concentration, and Cost Structure. Journal of Management Accounting Research 33(3), 9-27.

Clemens, J., Gottlieb, J.D. (2014). Do physicians' financial incentives affect medical treatment and patient health? The American Economic Review 104(4), 1320-1349.

Den Hartog, M., Janssen R.T.J.M. (2014). Ontwikkeling van de marktstructuur van Nederlandse ziekenhuizen 1978 tot 2013: Zowel directe overheidssturing als gereguleerde concurrentie stimuleert concentratie. Tijdschrift voor gezondheidswetenschappen, 92(8), 334-341.

De Vries, J. (2021, July 25). Zorghoogleraar Marco Varkevisser: 'Het maken van winst in de gezondheidszorg hoeft geen verkeerde prikkel te zijn'. Retrieved from https://www.ftm.nl/artikelen/marco-varkevisser-zorgcowboys?share=drka9Ijh4X0Q45IoYN4dmejWY%2FSGrBY%2FMgI2vcM2YdZTe0BXcSJ3ErVXodVL6Aw%3D

Eerstelijnszorg (z.d.). Rijksoverheid. Retrieved from https://www.rijksoverheid.nl/onderwerpen/eerstelijnszorg

Fleming, S.T. (1991). The relationship between luality and cost: pure and simple. Inquiry, 28(2), 29-38.

Harkey, J., Vraciu, R. (1992). Qualtiy of health care and financial performance: Is there a link?. Helath Care Management Review, 17(4), 55-63.

Hudon, M., Labie, M., Reichert, P. (2020). 'What is a far level of profit for social enterprise? Insights from Microfinance'. Journal of Business Ethics 162, 627-644.

Irvine, P.J., Park, S.S., Yildizhan, Ç. (2016). Customer-base concentration, profitability, and the relationship life cycle. The Accounting Review, 91(3), 883-906.

Jacobsen, R. (1998). The persistence of abnormal returns. Strategic Management Journal, 9(5), 415-430.
Kajdos, M.P. (2008). Quality, ethics, and profits in health care. Drug Benefit Trends, 20(11), 436.

Kocher, R., Sahni, N.R. (2011). Rethinking health care labor. The New England Journal of Medicine, 365(15), 1370-1372.

Kuijper, K. (2014, September 10). Marktwerking in de zorg of terug naar het ziekenfonds? Zorgwijzer. Retrieved from https://www.zorgwijzer.nl/zorgverzekering-2015/marktwerking-zorg-of-terug-naar-ziekenfonds#:~:text=In%202006%20werd%20de%20gereguleerde,ook%20tussen%20ziekenhuizen%20en%20zorginstellingen

Littleton, A.C. (1928). What is profit? The Accounting Review, 3(3), 278-288.

Macdonnell, M., Darzi, A. (2013). A key to slower health spending growth worldwide will be unlocking innovation to reduce the labor-intensity of care. Health Affairs, 32(4), 653-660.

Márquez, P. (1990). Containing health costs in the Americas. Health Policy and Planning, 5(4), 299-315.

Maynard, R. (1994). What is profit? Management Accounting, 72(9), 12.

McKee, A. (1989). What is just profit? Review of Social Economy, 47(2), 173-184.

Miles, G. (1993). In search of ethical profits: Insights from strategic management. Journal of Business Ethics, 12(3), 219–225.

Mostert, D., Vermanen, J. (2019, June 26). Miljoenen aan winst bij 97 zorgbedrijven (en dat wordt zelden gecontroleerd). KRO-NCRV. Retrieved from https://pointer.kro-ncrv.nl/miljoenen-aan-winst-bij-97-zorgbedrijven-en-dat-wordt-zelden-gecontroleerd

NOS Nieuws (2019, September 25). Opnieuw ongebruikelijk hoge winsten bij 85 zorgbedrijven. Retrieved from https://nos.nl/artikel/2303257-opnieuw-ongebruikelijk-hoge-winsten-bij-85-zorgbedrijven

Nuy, M.H.R., Bex, J.H.M. (1986). Aspekten van de gezondheidszorg. Instituut Sociale Geneeskunde.

Nystrom, R.J., Prata, A. (2008). Planning and sustraining a school-based health center:cost and revenue findings from Oregon. Public Health Reports, 123(6), 751-760.

Okma, K.G.H., Poelert, J.D. (2001). Implementing prospective budgeting for Dutch sickness funds. European Journal Of Public Health, 11(2), 178-181.

Picker, R., Clark, K., Dunn, J., Kolitz, D., Livne, G., Loftus, J., van der Tas, L. (2019). Applying IFRS Standards. John Wiley & Sons.

Polder, J.J., Hoogland, J., Jochemsen, H., Strijbos, S. (1997). Profession, practice and profits: competition in the core of health care system. Systems Research and Behavioral Science, 14(6), 409-421.

Sanders, J. (2018, April 16). Sjoemelen en frauderen: FTM zoekt de grootste 'Zorgcowboys'. Retrieved from https://www.ftm.nl/artikelen/sjoemelen-en-frauderen-ftm-zoekt-de-grootste-zorgcowboys?share=F6IVayUXIj9URBLYa%2BFfF98NUfllDPgktr08fCfGgSS%2FOWrnkOdYKCSkG%2F8QvA%3D%3D

Spanjers, J. (2016, June 28). Miljoenen aan zorggeld verdwijnen in zakken directeuren. Retrieved from https://www.gld.nl/nieuws/2112374/miljoenen-aan-zorggeld-verdwijnen-in-zakken-directeuren

Suijs, J.P.M, Verbon, H. (2018). 'De winsten van zorginstellingen'. Beleid & maatschappij 45(1), 46–77.

Ten Katen, M. (2017, March 13). Meeste winst in zorg gaat naar fabrikanten medische hulpmiddelen en apparatuur. Financieel Dagblad. Retrieved from https://fd.nl/economie-politiek/1191228/meeste-winst-in-zorg-gaat-naar-leveranciers-medische-hulpmiddelen-en-apparatuur-vze3caFF3J5m

Toetreding zorgaanbieders: Wat betekent de Wtza? (n.d.). CIBG. Retrieved from https://www.toetredingzorgaanbieders.nl/wat-betekent-de-wtza/vragen-en-antwoorden-wtza

Van Ark, E. (2019, June 26). Binnen twee jaar miljonair in de thuiszorg. Retrieved from https://www.ftm.nl/artikelen/zorgcowboys-megawinsten-bedrijven?share=AsDMV1juUVwCxWJxRZkEqYAIpdY6WLucEhcasWmJ3sBstRGKpnC6tY4JSD%2B5qw%3D%3D&utm_campaign=sharebuttonleden&utm_source=linkbutton

Van der Meer, J., van Weel, C., Bol, P., Casparie, A.F., Donker, M.C.H., Habbema, J.B.F., Kievit, J., Kleijnen, J., Lankhorst, G.J., Rutten, F.H.H., Schouten, J.S. (1997). Volksgezondheid toekomst verkenning 1997, V: Effecten van zorg. Elsevier.

Van Leersum, N., Bennemeer, P., Otten, M., Visser, S., Klink, A., Kremer, J.A.M. (2019). Cure for increasing health care costs: The Bernhoven case as driver of new standards of appropriate care. Health Policy, 123, 306-311.

Varkevisser, M. (2019, July 1). Marktwerking de schuld geven is te simpel. Retrieved from https://www.trouw.nl/opinie/marktwerking-de-schuld-geven-is-te-simpel~ba8dd30d/

Vermanen, J. (2019, June 26). Op deze manier vind je zorginstellingen die megawinsten maken. Retrieved from https://pointer.kro-ncrv.nl/op-deze-manier-vind-je-zorginstellingen-die-megawinsten-maken

Waldman, J.D., Kelly, F., Arora, S., Smith, H.L. (2004). The shocking cost of turnover in health care. Health Care Management Review, 29(1), 2-7.

Waress, B.J., Pasternak, D.P., Smith, H.L. (1994). Determining costs associated with quality in health care delivery. Health Care Management Review, 19(2), 52.

Weech-Maldonado, R., Neff, G., Mor, V. (2003). Does quality of care lead to better financial performance?: The case of the nursing home industry. Health Care Management Review, 28(3), 201-216.

Westert, G.P., van den Berg, M.J., Zwakhals, S.L.N., de Jong, J.D., Verkleij, H. (2010). Dutch health care performance report 2010. National Institute for Public Health and the Environment.

Winst in de Nederlandse zorgsector. (2017, March 13). Gupta Strategists. Retrieved from https://gupta-strategists.nl/studies/winst-in-de-nederlandse-zorgsector

Zorginstellingen (n.d.). Zorgen.nl. Retrieved from https://zorgen.nl/zorginformatie/zorginstellingen/

Appendix

Table 1. Sample Selection

Sample Selection for Analysis	
Firms DigiMV 2018-2019	4919
Less: Industries other then GGZ, GHZ, VVT	(2296)
Less: entities with a revenue below €100000	(1377)
Less: VoF and Eenmanszaken	(51)
Number of firms used in analysis	**1195**
GGZ	376
GHZ	309
VVT	608
Number of firms with Abnormal Profits	**65**
GGZ	29
GHZ	12
VVT	28

Note: This tables details the sample selection process for this analysis

Table 2. Descriptive statistics - GGZ

Variables	**N**	**Mean**	**Std**	**Min**	**Max**
CostStructure	376	0.018	0.010	0	0.175
Efficiency	376	111521.5	153840.6	0	1910918
Quality	376	53003.01	76391	0	1463736
AbnormalProfits	376	0.077	0.267	0	1
Size	376	27.165	84.284	0.004	679.367

Note: This table details the descriptive statistics for variables used in the analysis (GGZ), where Size is measured in millions. All financial values are displayed in €

Table 3. Descriptive statistics - GHZ

Variables	**N**	**Mean**	**Std**	**Min**	**Max**
CostStructure	309	0.029	0.024	0	0.163
Efficiency	309	132606.1	316911.6	0	3162625
Quality	309	42830.83	20847.76	0	261615.4
AbnormalProfits	309	0.039	0.194	0	1
Size	309	33.838	87.679	0	1033.962

Note: This table details the descriptive statistics for variables used in the analysis (GHZ), where Size is measured in millions. All financial values are displayed in €

Table 4. Descriptive statistics - VVT

Variables	**N**	**Mean**	**Std**	**Min**	**Max**
CostStructure	608	0.032	0.036	0	0.449
Efficiency	608	93703.66	135966.2	0	2309435
Quality	608	47463.11	54918.82	0	1188491
AbnormalProfits	608	0.047	0.210	0	1
Size	608	30.323	65.210	0.007	679.367

Note: This table details the descriptive statistics for variables used in the analysis (VVT), where Size is measured in millions. All financial values are displayed in €

Table 5. Correlation Matrix - GGZ

Variables		(1)	(2)	(3)	(4)
CostStructure	(1)				
Efficiency	(2)	(0.054)			
Quality	(3)	(0.011)	0.610		
AbnormalProfits	(4)	(0.029)	0.010	(0.002)	
Size	(5)	0.460	(0.009)	(0.000)	(0.089)

Note: This table details the correlation between the variables used in the GGZ analysis.

Table 6. Correlation Matrix - GHZ

Variables		(1)	(2)	(3)	(4)
CostStructure	(1)				
Efficiency	(2)	(0.150)			
Quality	(3)	0.034	0.122		
AbnormalProfits	(4)	0.088	(0.018)	(0.044)	
Size	(5)	0.345	(0.038)	0.121	(0.074)

Note: This table details the correlation between the variables used in the GHZ analysis.

Table 7. Correlation Matrix - VVT

Variables		(1)	(2)	(3)	(4)
CostStructure	(1)				
Efficiency	(2)	(0.056)			
Quality	(3)	(0.070)	0.504		
AbnormalProfits	(4)	(0.070)	(0.019)	(0.038)	
Size	(5)	0.309	(0.012)	(0.013)	(0.095)

Note: This table details the correlation between the variables used in the VVT analysis.

Table 8. Regression Results - GGZ

	Model 1		Model 2		Model 3	
Variable	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
Intercept	0.014	0.000***	111500	0.000***	53050	0.000***
AbnormalProfits	0.001	0.809	5350	0.858	(519)	0.972
Size	0.000	0.000***	(15.297)	0.872	(0.171)	0.997
N	376		376		376	
Adj.-R^2	0.202		(0.005)		(0.005)	

*Note: This table reports regression results of GGZ. AbnormalProfits is an indicator variable equal to one for the companies with abnormal profits, and zero otherwise. Size is measured in millions. *, **, *** indicate statistical difference from zero (two-tailed) at the <0.10, <0.05, and <0.01 levels, respectively.*

Table 9. Regression Results - GHZ

	Model 1		Model 2		Model 3	
Variable	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
Intercept	0.024	0.000***	138800	0.000***	42030	0.000***
AbnormalProfits	0.014	0.040*	(34820)	0.711	(3822)	0.553
Size	0.000	0.000***	(143.596)	0.488	28.058	0.039*
N	309		309		309	
Adj.-R^2	0.120		(0.005)		0.009	

*Note: This table reports regression results of GHZ. AbnormalProfits is an indicator variable equal to one for the companies with abnormal profits, and zero otherwise. Size is measured in millions. *, **, *** indicate statistical difference from zero (two-tailed) at the <0.10, <0.05, and <0.01 levels, respectively.*

Table 10. Regression Results - VVT

	Model 1		Model 2		Model 3	
Variable	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
Intercept	0.026	0.000***	95200	0.000***	48380	0.000***
AbnormalProfits	0.007	0.288	(13450)	0.611	(10340)	0.334
Size	0.000	0.000***	(28.937)	0.734	(14.476)	0.674
N	608		608		608	
Adj.-R^2	0.094		(0.003)		(0.002)	

*Note: This table reports regression results of VVT. AbnormalProfits is an indicator variable equal to one for the companies with abnormal profits, and zero otherwise. Size is measured in millions. *, **, *** indicate statistical difference from zero (two-tailed) at the <0.10, <0.05, and <0.01 levels, respectively.*