Master thesis

Managerial compensation, ownership structure and profitability in Norwegian hydroelectric energy companies

By Tore Frimanslund

The master thesis is carried out as a part of the education at the University of Agder and is therefore approved as such. However, this does not imply that the University answers for the methods that are being used or the conclusions that are made.

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December 1st 2009

Preface

The 15 months of studying towards the Master's degree in Business Administration at the University of Agder has been an enriching and eye-opening period of my life. The master thesis is the final part of the program in the area of International Strategy, and amounts to 30 ECTS credits. Since having only three and a half month at disposal for this thesis, it required a high level of efforts which I at this day am glad to have gone through.

The main focus of the thesis has been to examine the relationships between the level of managerial compensation, ownership structure and profitability of all of the Norwegian hydroelectric energy companies with total revenues exceeding NOK 100 millions.

By living and working in Sogn, the heart of the mountainous Western Norway, I am surrounded by rivers and waterfalls, where many of them have been developed for producing electricity. Since this part of the Norwegian energy sector is so deep-rooted in the local communities and working life of so many people, it was natural for me to select this topic.

I would like thank professor Trond Randøy for great help in getting me started and swift responses when needed during the working process.

I would also like to thank my cohabiting girlfriend, and her understanding and patience for my three and a half month long period constantly sitting in my working space.

Sogndal, November 27th 2009

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Tore Frimanslund

Abstract

Today, the Norwegian energy sector is significantly dominated by public ownership, both directly and indirectly, and the sector has turned out to be very profitable compared to other sectors.

This master thesis starts by introducing some concepts of corporate governance and the agency theory which will be the theoretical basis.

The study attempts to determine the relationship between the level of fixed pay and profitability, and ownership structure and profitability of Norwegian hydroelectric energy companies. According to a tremendous amount of research conducted on these relationships in other industries and sectors, the level of compensation to the CEO, the number of owners and the size of the largest shareholder are explanatory factors to the profitability of each company. In this study, I will examine whether we can make the same generalization about the Norwegian energy industry, with regards to the extensive governmental and municipal ownership influence and the historical perspective regarding the monopolistic pre-1991 market conditions of these companies in Norway.

The empirical data collection was based on all of the companies with total revenues exceeding NOK 100 millions, hence no regional or structural limitations. I have used regression analyses in order to carry out the research.

Despite the vast amount of research on this field which indicates relations, I was not able to determine any relationship between the level of fixed pay or the number of owners and profitability in my population. However, I was able to indicate a weak positive relationship between owner concentration and profitability of the industry.

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1 Introduction

1.1 Background

How is the level of managerial compensation of Norwegian hydroelectric energy companies affecting the profitability? And what impacts does the ownership structure have on the energy industry in Norway? Today, the sector is dominated by companies owned by the state or municipalities in the region which is directly affected by the power plant. In some of cases there are a large number of municipalities having equal shares in the companies, where each municipality is controlling a small part. In other companies, Statkraft or a single municipality may single-handedly control the entire company. This paper focuses on what the ownership structure and the level of managerial pay in Norwegian hydroelectric energy companies have to say on corporate governance and the profitability. The reason behind this topic is that the companies have a significantly high average rate of profitability compared to many other industries.

So, to begin, efficient corporate governance assumes a sufficient level of incentives and managerial pay (Milgrom & Roberts, 1992). There are two criteria which need to be met in order to have efficient corporate governance according to Keasey, Thompson and Wright (2005), one at a micro level and the other at a macro level.

At the micro level the company needs to establish a corporate governance system which leads the company as a whole onto the track toward its objectives. There are different requirements depending on where the company is situated around the world when it comes to this level. The differences are mainly regarding stakeholders, and how the stakeholders (i.e. employees, social communities, etc.) should be emphasized. The management needs in this case to not only focus on maximizing shareholder value, but stakeholder as well (Keasey, Thompson & Wright, 2005), (De Wit & Meyer, 2004).

The macro level implies establishing trust with investors and other potential investors. From a society's point of view there are many reasons why companies should be managed according to high standards. First of all, the companies are adding value in the society. Secondly, the companies may be the corner stone and the foundation of an entire society. In this case with energy companies in Norway, this is the case in several scarcely populated rural districts where important part of the income comes from a local power plant.

During the last decades, Norway has positioned itself as an important exporter of hydroelectric power. In 1991 the conservative government lead by prime minister Syse liberalized the market conditions and opened up to free competition on the energy market, thus converging Norway's conditions to the ones of the European markets. The main difference between the European and Norwegian energy industry is the ownership structure and corporate governance, where the European is in a significantly larger degree privatized compared to the Norwegian competitors. In Norway on the other hand, it is normal to observe the state or a selection of local municipalities as the major stock owners in the companies. And when it comes to micro level as mentioned above and the stakeholder values in the Norwegian energy industry, emphasizing stakeholder values is not only recommended; a company applying for a licence to produce electricity is forced by law to include stakeholders, for instance the entire local society, in the planning process. This can be done by arranging a public meeting between interest parties in the society and company representatives or management (NVE).

1.2 Problem definition and hypothesis

I would like to study how the number and concentration of owners, private and public, means for the efficiency and profitability of Norwegian energy companies. I would also like to find out whether high public concentration of owners implies barriers when it comes to ambitions of expanding, being competitive and thus a lack of motivation to struggle towards higher costs efficiency. I assume that the most important focus for public owners is to support the community as a stakeholder, not necessarily maximizing shareholder value. Even though the elected representatives of the municipalities as shareholders of a company are forced to emphasize the social community, it can lead to conflicts as with the example of the small municipality of

Leikanger. Here, a development of a power plant which will yield increased annual dividends to the already penniless municipality does not have the support among the community since they fear the new power lines will ruin a highly appreciated and untouched natural area (Sogn Avis).

There are many energy companies in Norway. The large degree of precipitation together with a mountainous landscape makes it possible to produce electricity from a large number of dammed up lakes, waterfalls and rivers varying in size. The objectives of this research will be the big and mid-size companies. I will exclude micro plants since most of these do not compete in any market, and are being fully owned by either a larger nearby energy company or the group of receivers of the electricity from the power plant. Therefore the selection will be on the all of the companies with a total income exceeding NOK 100 million. What I would like to study is whether energy companies with a large number of minor owners will have lower profitability than companies with more a more concentrated ownership structure.

Therefore, my problem definition is:

Is there coherence between managerial pay, ownership structure, ownership concentration and profitability of Norwegian hydroelectric energy companies?

Based on the information above and the following chapters regarding relevant theories, my hypotheses for corporate governance in the Norwegian hydroelectric energy companies are as follows:

Hypothesis 1 (H1): There is a positive relationship between the amount of fixed pay to the CEO and the profitability of the company.

Hypothesis 2 (H2): There is a positive relationship between ownership concentration and the profitability of the company.

Hypothesis 3 (H3): There is a negative relationship between the number of owners and the profitability of the company.

1.3 Corporate governance system

According to Thomsen (2008) a governance system is *a set of governance mechanisms in use in a given country or context.*

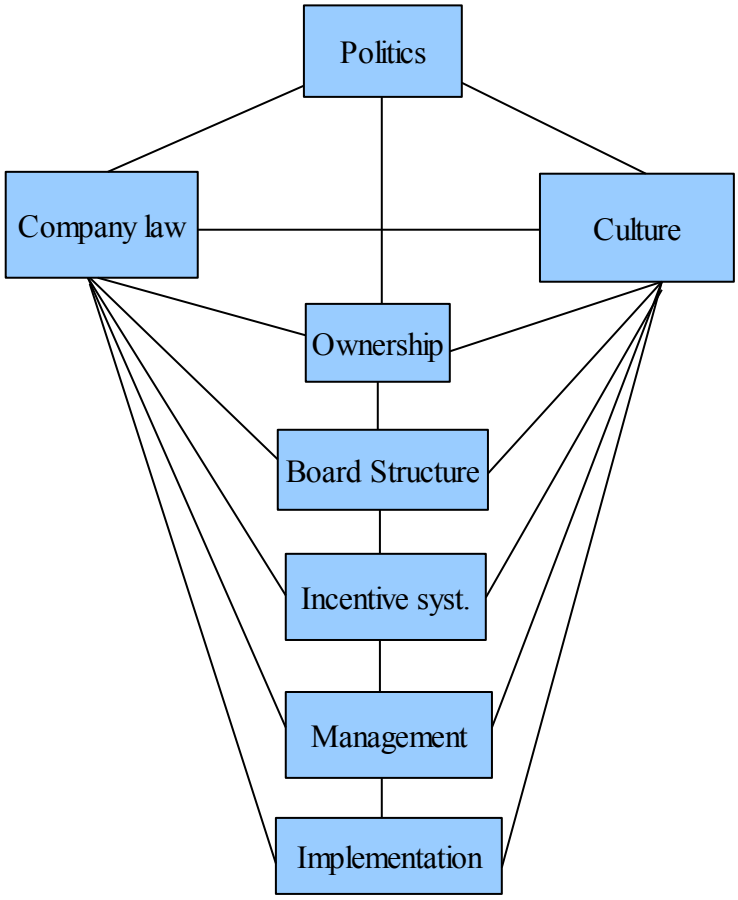


Figure 1.1: A schematic model of corporate governance (Thomsen, 2008).

As seen above, one of the governance mechanisms is having an incentive system for managerial compensation. As we will see, in the case of the Norwegian energy sector both culture, board structure, incentive systems differ from what is mainstream in publicly listed companies at for instance Oslo Børs.

1.4 Incentive systems

Thomsen (2008) describes incentive systems as: […] *the incentives given to managers. Managerial pay (compensation) consists of fixed salary, bonus, stock options, stock grants, and other benefits (i.e. health insurance, fringe benefits, and a pension scheme).* According to Thomsen, incentive systems should give managers incentives to act in the interest of the shareholders. Both the well-known agency problems of adverse selection and moral hazard can be reduced or avoided by implementing an efficient incentive system.

Although Thomsen warns; incentive systems are not all good. If badly designed, they can lead to opportunism in the sense that managers exploit the system for their own benefit. After all, incentive systems implies large transactions of money from the shareholders to the managers.

So how are the effects of in Norwegian hydroelectric energy companies? Here it is assumed that the more incentives that are being used, the higher is the company's rate of profitability. As already mentioned, many of the Norwegian energy companies are owned by a few or many relatively equal partners, being municipalities or the state-owned Statkraft (directly or indirectly). Thomsen states that *the vast majority (99% of all companies) are owned by one or two shareholders who also manage the company. It is difficult to understand why. Owner-management aligns the interests of owners and managers. It is their own money, so they have the incentive to manage it well.* In this case of the Norwegian hydroelectric energy industry, it is seldom like this, unless huge industrial corporations have their own power plant to supply electricity to their own factories. However, these cases are normally small, and do not have revenues over NOK 100 million, so they are excluded from this paper.

As a critique, Thomsen also states: *Large owners may also have idiosyncratic preferences, which do not maximize shareholder value. For example, they may prefer that the company is managed by a family member or they may want to retain ownership in the family despite an attractive offer from the outside which the minority shareholders would prefer.* Can we see any similarities between Thomsen's example and a typical Norwegian energy company without one large owner but instead

several small municipal shareholders? Arguably yes, in the sense that all of the municipalities will have a common goal, similar structure, size and interests (e.g. stakeholder value), so it can be said that the bunch of minor municipal shareholder can in fact be regarded as an entity – one large shareholder. However, in the following parts of this paper the municipal shareholders will be regarded as single units with limited liability and interests.

Thomsen finishes off with a statement which is highly relevant to this topic. He says that the effect of large owners depends on the owners identity. Is the owner a financial investor will the objective probably be pure shareholder value. On the other hand, if the identity is a government owner, then the objective will probably be somewhat different other then shareholder maximization.

1.5 Norwegian context

As mentioned above, a governance system is *a set of governance mechanisms in use in a given country or context.* The next parts focuses on the Norwegian context, which in many cases is quite different from other countries and industries.

1.5.1 History

According to NVE, *the rivers and the waterfalls have been used for a very long time in Norway. Long before 1900 nearly all small villages and hamlets had a sawmill run by water power. […] Many of the companies involved in this industry were owned by non-Norwegians. The authorities were concerned that the water resources could fall into foreign hands and wanted to retain control. The licence laws were passed, prohibiting the purchase of waterfalls and storage of water in reservoirs for power plants without permission of the King. These laws were passed and amended between 1906 and 1917.*

Due to the massive destructions during world war two, Norway had to be rebuilt with new industry and new homes. As a result, the need for electricity in households and industry had increased rapidly. New technologies also increased the demand, thus dams were being constructed, tunnels were being built and expansion of power lines gave electricity to the periphery of Norway.

Thus, the electricity market in Norway was traditionally made up by local monopolies, owned by either the state or one or more municipalities. Some private companies was dedicated to deliver electricity only to a certain industry. These companies was operating under the law of "hjemfall", meaning that the ownership should be transferred back to the state after 60 years. The companies was in addition to this obligated to deliver to every consumer. The most interesting aspect about this is that the price was set politically, implying that the only factors setting the price was to: a) compensating for the production costs, b) incomes for investments and c) potential taxation to the municipality.

In 1991 something happened that would change the industry. A new "energy law" open up to free competition and buying and selling of electricity. The law was put forward by the conservative Syse-government, and was supported by the Labour Party. Because of the new law, the energy companies was no longer tied only to their own region, and they were not forced to deliver to everyone within the area. In other words, electricity had now become a product that could be traded both domestic and abroad, and the price was set by the market. There was even an *exchange* set up where electricity could be traded. In 1998, the market was expanded to include Sweden, and later both Denmark and Finland joined. As time went by and a market was established, the public companies was transformed into joint stock companies, which paves the way for fully or partially privatization of the companies (NVE).

1.5.2 Perspectives today

Since the European Union (EU) was formed in 1957, it's overall goal has been to remove borders and barriers of trade among the European countries, which include the energy industries. Even though Norway is not fully a member of the union, we are bounded to the European Economic

Agreement (EEA). In 2000, 56 % of hydro electric industry in Norway was owned by the municipalities and 31 % by the state. A conflict between Norway and ESA, which controls the EEA, has emerged because of the 13 % owned my private companies and the already mentioned law of "hjemfall". In Norway, private ownership of energy companies has to be transferred back to the state after 60 years, which ESA states is a discrimination of private owners (DeFacto).

Because of this law, Statkraft which is owned by the state will be able to take over these plants, and strengthen its position internationally, which will make it even mote attractive for private investors, hence The Norwegian Competition Authority does not allow Statkraft to grow any more in the Norwegian market (DeFacto).

1.5.3 Juridical basis

There are a few underlying causes to why the ownership structure of the Norwegian hydroelectric energy companies are as dominated by the state or the local authorities as they are today which are worth mentioning. These causes will later on contribute to providing explanations to the outcomes of the analyses.

To be able to produce electricity in Norway companies need to apply for a licence. According to NVE, a license in this context is "*a document which grants special permission to a specified company to develop and run power stations and dams specified in the license, including conditions and rules of operation."*

Another definition also given by NVE is the following: "*A licence can also be defined as permission granted by the authorities to cause damage to the environment. However, those damages should be less important compared to the advantages of the project. The damage should not be larger than necessary, and may be mitigated at acceptable costs."*

The "environment" in this context does not only encompass damages like pollution (however it is

the main consideration), but also social conditions. In other words, stakeholder values as defined by Freeman and Reed (1983), where the wide sense of stakeholders includes *any identifiable group or individual who can affect the achievement of an organization's objectives or who is affected by the achievements of an organization's objectives* is being emphasized in a legal sense. Because of the increased focus on environmental issues during the 1960's, hydro plants applying for licenses was in 1969 obliged to notify stakeholders via NVE and include them in the planning process. The reason was to avoid conflicts between stakeholders (NGO's, landowners, local communities or persons, etc.) and the shareholders of the company. Further, when a notification is sent from the developer to NVE, it is being forwarded to central and local authorities and the public for consultation. The local community gets the chance to study the plan at a post office, public library or town hall. Later, a meeting is being arranged where all stakeholders can comment on the plan and give information on special usage of the river or waterfall. From this paper's point of view, this is a very interesting matter indicating a judicial basis for the distribution of influence between shareholders and stakeholders, which will be discussed later on (NVE). An example of current interest is given where Sognekraft are planning to invest NOK 10 billions the next two years, where a large part of it is set aside for developing power lines through untouched nature in the municipality of Leikanger. Here, the elected representatives have raised objections against the plans, and have (per October 2009) able to stop the project (Sogn Avis). The influence of the these stakeholders, among others, mainly through ownership of such companies will be looked into later.

1.6 Structure of the assignment

This paper is divided into 5 chapters, each influenced by the research procedure presented by Lund and Haugen (2006).

Chapter 1 – Introduction

In the first part I explain why I have chosen this topic, and how the structure is through out the assignment. The problem definition is presented, as well as the boundaries to the selection of objectives in this research. I have briefly presented some background information which may enlighten the reader to why the industry is so heavily dominated by the state or local authorities as it

is today compared to other sectors. There is a section about the terms of corporate governance, ownership structure and incentives which is the focus of this paper.

Chapter 2 – Theory

In order to provide an answer to the problem of this paper, a theoretical foundation is needed. The theoretical part is based on Agency theory, which is considered to be relevant since I will in this paper look for coherence between incentives, ownership structure and profitability of Norwegian hydroelectric energy companies.

Chapter 3 – Methodology

Here is where I do thoroughly into the research process based on relevant theory about methodology, and a presentation of the process I have chosen for this paper. The chapter will finish off with a presentation of different sources of error which can occur during this process.

Chapter 4 – Data and analysis

This chapter cover the empirical part of the paper. The first part of the chapter will deal with statistics displaying the collected data and correlation analyses. I will use regression models in order to supply an answer to the problem definition as mentioned above.

Chapter 5 – Discussion

After going through the empirical data, I will in this chapter discuss findings in elucidation of relevant theory. Finally I will present a conclusion of the findings and a critique of the paper together with a suggestion to further research.

2 Theory

2.1 The Agency theory

To begin at the bottom, the basic governance problem is according to Thomsen (2008) the *agency problem*, which occurs because of the separation of between ownership and management. Agency theory is directed at the ubiquitous agency relationship between the agent, which can be for instance managers, act on behalf of the principal, i.e. the shareholders. Thus, the general problem of motivating one person or organization to act on behalf of another is known among economists as the *principal-agent problem* (Milgrom & Roberts, 1992). A a common counter-measure to the problem is so-called *incentive contracts*, where individual incentives are strengthen by holding the managers at least partially responsible for the results of their actions, even though doing so exposes the managers to risk that could be more easily borne by an insurance company.

The reason for establishing incentive contracts, is to avoid what we call moral hazard. Moral hazard occurs when managers abuse the responsibility given to him or her, in order to pursue personal interests. It happens when the action of the agent can not be observed by the principal. Moral hazard also illustrates a general principle; there is a trade off between risk and incentives. If you insure people against risk, they also lose the incentives to do anything about it (Thomsen, 2008). Another contracting problem is risk sharing and adverse selection. Adverse selection occurs when there are elements in the situation which are known to the agent, but not known to the principal. An example of adverse selection is when the shareholders via the board is going to hire a new manager. In this case there is no certain way of achieving the desirable amount of knowledge about the applicants. Hence, there is a risk involved that the person being hired is for instance lazy, not capable of handling stress, lies about his/hers achievements, qualities or weaknesses, hides a criminal record or similar. In other words, the shareholders and the board cannot measure how the person will actually perform the tasks as the new manager.

The key idea of agency theory is that the principal-agent relationship should reflect efficient organization of information and risk-bearing costs. We look at the contractual relationship between the agent and the principal as mentioned above, and we assume that managers have incentives to pursue a certain self interest, that they are risk averse, and that they are what economists call bounded rational. Bounded rationality is when a person makes a rational decision based on the accessible information, and where the action not necessarily is the same he would have done if he had access to all of the information needed in order to make an efficient decision (Thomsen, 2008).

In addition to these assumptions, there are some organizational assumptions to be made. Agency theory assumes conflicting goals between the agency and the principal, or other participants. We also assume efficiency as the effectiveness criterion. The last assumption is that there is asymmetric information between the principal and the agent, which means that actors possesses different information relevant for the decision making.

The problem domain is the relationships in which the principal and agent have partly differing goals and risk preferences. This can for instance be managerial compensation, regulation, impression management, leadership, vertical integration of the organization, whistle blowing and transfer pricing.

Eisenhardt, M, K. (1989) sums up 10 propositions for the agency theory:

1. *When the contract between the principal and agent is outcome based, the agent is more likely to behave in the interests of the principal.*

The argument for this is that outcome based contracts between the principal and agent coalign the preferences of both of them. This is because the reward for both depend on the same actions, and therefore the conflict of self-interest between the principal and agent are reduce*d.*

2. *When the principal has information to verify agent behaviour, the agent is more likely to behave in the interests of the principal.*

This proposition implies that information system also have an affect on agent opportunism. In other words, if the principal has established efficient routines for supervising the agent, it will reduce the risk for agent opportunism if the agent is aware of the system.

3. *Information systems are positively related to behaviour-based contracts and negatively related to outcome-based contracts.*

And so forth according to Eisenhardt, M, K. (1989), the main focus of principal-agent focus literature is to determining the optimal contract, behaviour versus outcome between the principal and the agent. The model assumes conflicting goals between the both, and that the agent is more risk averse than the principal. The reasoning behind the agent's risk aversion, is that the agent is unable to diversify the employment, where as the principal can diversify its investments. When establishing a contract, the principal has two options, either to establish information systems in order to control the agent's actions. Information systems could for instance be to budget systems or reporting procedures. The other option is to let the agent be responsible for the outcome through the contract. In this case, there is a reduced need for information systems. Thus, this proposition 3 has been formulated.

4. *Outcome uncertainty is positively related to behaviour-based contracts and negatively related to outcome-based contracts.*

An outcome-based contract motivates the agent for working in accordance with the principal's interests. But if there is uncertainty to whether the agent will fulfil the conditions as specified in the contract, the principal would have to establish information systems.

5. *The risk aversion of the agent is positively related to behaviour-based contracts and negatively related to outcome-based contracts.*

This proposition is based on that if the agent is getting less risk averse, it becomes more attractive to pass risk on to the agent using an outcome-based contract.

6. *The risk aversion of the principal is negatively related to behaviour-based contracts and positively related to outcome-based contracts.*

Proposition 6 is more of the opposite than proposition 5. For instance, when the principal is getting less risk averse, it will be more attractive to enter a outcome-based contract.

7. *The goal conflict between principal and agent is negatively related to behaviour -based contracts and positively related to outcome-based contracts.*

If there is no goal conflict what so ever, the agent will be happy to work in full accordance with the preferences of the principal, regardless of whether his of hers efforts are being monitored. This proposition says that the more variance there is between the goals of the agent and the principal, the more attractive a behaviour-based contract becomes.

8. *Task programmability is positively related to behaviour-based contracts and negatively related to outcome-based contracts.*

Programmability is defined by Eisenhardt, M, K. (1989) as the *degree to which appropriate behaviour by the agent can be specified in advance.* For instance, a factory worker can be more easily programmed than someone with a complex and changing working environment. Proposition 9 states that the more programmed the task, the more attractive it is to enter a behaviour-based contract, because information about the agent's behaviour is more readily determined. This is why a factory worker is more often paid by the hour, and for instance an entrepreneur which is paid as specified by an outcome-based contract.

9. *Outcome measurability is negatively related to behaviour-based contracts and positively related to outcome-based contracts.*

When outcomes are measured with difficulty and a great deal of effort and resources, outcome-based contract understandably becomes less attractive than behaviour-based contracts. The same goes vice versa; when outcomes are easily measured, outcome-based contracts becomes more attractive.

10. *The length of the agency relationship is positively related to behaviour-based contracts and negatively related to outcome-based contracts.*

For proposition 10, the same goes here as with proposition 9. If the principal and the agent engage in a long-term contract, it is more attractive to enter a behaviour-based contract. An outcome may in this case be difficult to measure over time, and it is probably more appropriate to monitor the agent's behaviour during the engagement.

2.1.1 Theory overview

An overview of the agency theory is made by Eisenhardt, M, K. (1989) which is presented by Clarke (2008).

Agency theory overview	
Key idea	Principal-agent relationships should reflect efficient organization of information and risk-bearing costs.
Unit of analysis	Contract between principal and agent.
Human assumptions	Self interested Bounded rationality Risk aversion
Organizational assumptions	Partial goal conflict among participants Efficiency as the effectiveness criterion Information asymmetry between principal and agent
Information assumption	Information as a purchasable commodity
Contracting problem	Moral hazard Adverse selection Risk sharing
Problem domain	Relationships in which the principal and agent have partly differing goals and risk preferences (e.g. compensation, regulation, leadership, impression management, whistle blowing, vertical integration, transfer pricing).

Figure 2.1: Overview Agency theory

2.2 Incentive pay

Managerial compensation is according to Milgrom and Roberts (1992), and as previously stated, an agreement between an actor who possesses organizational ownership, control or risk (principal) and a person working on his behalf (agent). To avoid opportunism by the agent, meaning that the agent puts his own interests at the expense of the company objectives, proper use of incentives is necessary. Among the theories covering this topic, I have considered the Agent theory to be the most suitable for this paper. This chapter will be a theoretical foundation for the paper later on which deals with incentive pay.

As Milgrom and Roberts continues, they claim that financial incentives must come from basing compensation on performance. On the other hand, efficient risk sharing requires that each person should bear only a fraction of the total risk, regardless of its source. Thus, performance-based compensation systems cause a loss from inefficient risk sharing.

But why is incentives need to elicit the employee's best performance? Some employees might dislike their work tasks, and may neglect them unless they are held responsible for the results. But also even if the employee is hard working and dedicated to the job, he may still have priorities which are different from the employer's preferences. An example of an unfortunate consequence by the lack of incentives, is that the manager can give their employees too many privileges, as for instance time off, raises, or other benefits, on the expense of efficiency and objectives. With an efficient incentive contract, the managers is given a personal encouragement to increase the level of effort by their subordinates (Milgrom & Roberts, 1992).

2.2.1 A mathematical example

Further, Milgrom and Roberts (1992) states that the general problem of motivating one person or an organization to act on behalf of another is what constitutes the principal-agent problem. In this case, they have composed a mathematical model of incentive compensation.

In this model, they presume the following variables:

I. e = effort level of an employee. Example could be energy expended or hours worked. e is not observable, but the employer can observe some incomplete indications of e.

II. z = the indicator of the employee's efforts. Thus, z = e + x, where x is a random variable.

III. y = a second random variable which is not affected by e, but can be statically related to e and the observed z.

IV. w = wage

V. $w = \alpha + \beta(e + x + \gamma y)$ The compensation thus consists of a base amount (fixed pay), α, plus a portion that varies with the observed elements, z and y. β is the intensity of the incentives provided to the employee. A higher β means that the contract provides better incentives. The notion of γ is how much weight that is being put on the information variable y.

This model assumes a linear relationship, which is easier to understand and administer. An actual employment contract involves several factors, but this model includes only those which are dealing directly with incentive pay. That is why the contract is specified by the parameters (e, α, β ,γ) that specify the level of effort (e) the employer expects to elicit and how the employee is to be compensated on the basis of performance. It also assumes that the employer is risk neutral.

Based on this, we get the employee's certainty equivalent (CE), which is the expected compensation paid, minus the personal cost to the employee to supply effort, minus any risk premium. Mathematically formulated, this will be: $\alpha + \beta(e + \hat{x} + \hat{y}) - 1/2rVar[\alpha \ \beta(e + x - \gamma y)]$. $\hat{x}$ and $\hat{y}$ is the mean levels of *x* and *y*, and *r* is the employee's coefficient of absolute risk aversion. $\hat{x}$ and $\hat{y}$ is set to be zero in order to simplify the model. This gives us:

Employee's certainty equivalent: $\alpha + \beta e - C(e) - 1/2r\beta^2 Var(x-\gamma y)$

The employer's certainty equivalent consists of the expected gross profits minus the expected compensation paid:

Employer's certainty equivalent: $P(e) - (\alpha - \beta e)$

We can see from this that both of the certainty equivalents consists of a constant, α, which indicates a money transfer. The rest of the parameters are functions of the other variables. By applying the value maximizing principle for both actors we can specify a contract which maximizes the certainty equivalent for both the employer and the employee:

Total certainty equivalent: $= P(e) - C(e) - 1/2r\beta^2 Var(x-\gamma y)$

But which choices of the contracts are feasible? The ideal choice would be if the employee would work hard, bear all of the risk, and accept no compensation, but to be realistic, Milgrom and Roberts says that the effort level would have to be compatible with the incentives that are provided to the employee. This model assumes that the employer can determine the employee's effort level based on the other parameters, (α, β, γ).

Based on this, the level of incentives that maximizes both the employee and the employer's certainty equivalent is the equation called an *incentive constraint*, which is calculated by finding where the marginal total certainty equivalent equals zero:

Incentive constrain: $\beta - C'(e) = 0$

This equation must be satisfied by any feasible employment contract. It says that the employees select their level of effort so their marginal gain from working equal their marginal personal costs. The gain is the increased pay. The total certainty equivalent and its marginal values can be graphically illustrated in the following figure.

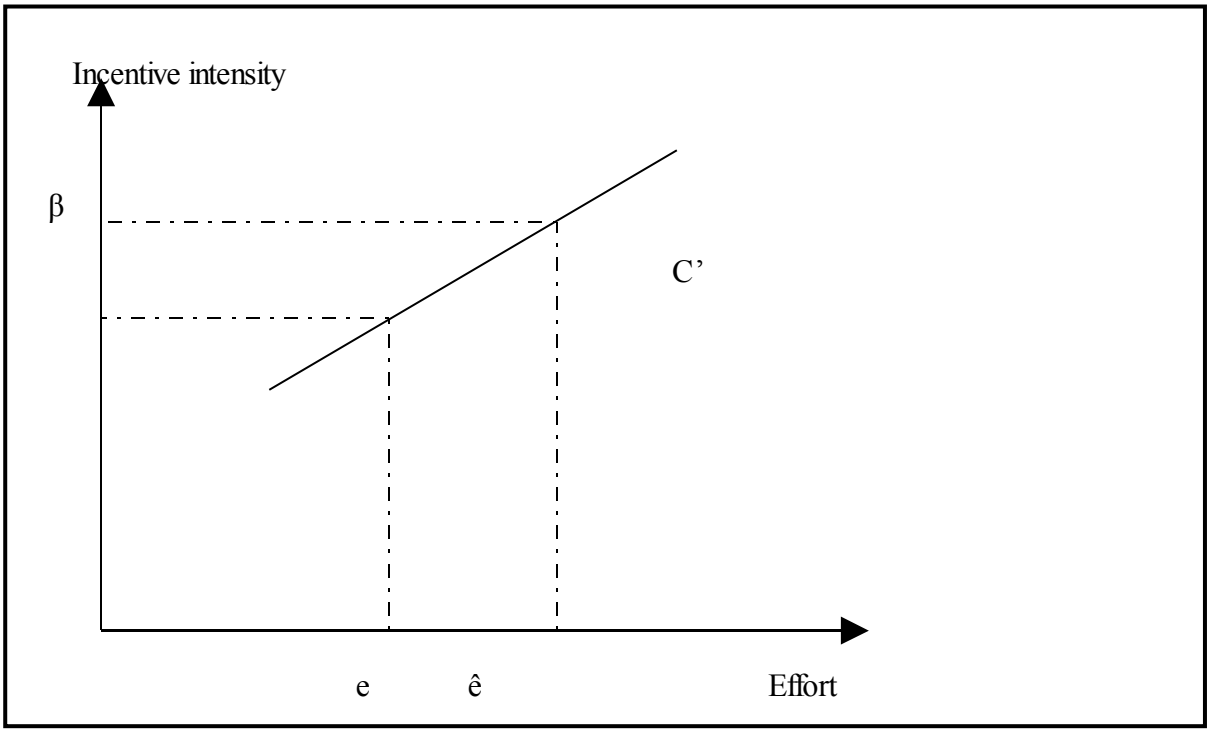


Figure 2.2: Increasing effort provided from e to ê requires increasing β to β'.

As we can see from this diagram, increased incentive pay in addition to the fixed pay should result in an increased level of effort by the employee if the contract is feasible and efficient. But we should notice that α is not included in the total certainty equivalent at all, only in the certainty equivalents of each of the employee and the employer. After all, α determines only *how* the money is divided between the parties, and thus is being equalled out in the total.

2.3 Corporate ownership

To understand the mechanisms of corporate governance, we have to (among other factors) take a closer look at corporate ownership. Corporate ownership is according to Thomsen (2008) a set of rights concerning assets like user rights, profit rights, control rights, and transfer rights. He also emphasizes that there is a great deal of responsibility involved with these rights.

In public listed companies, there are two characteristics of ownership structure. These are

ownership concentration and owner identities. In other words, this means who the owners are, and how much of the firm they own. According to Thomsen (2008, p. 87), the ownership concentration *measures the power of shareholders to influence managers, the identity of the owners has implications for the for their objectives and the way they exercise their power.* The interesting part for this thesis, is where Thomsen (2008) quotes Henry Hansmann (1988, 1996) when saying that this is reflected in company strategy with regard to profit goals, dividends, capital structure, and growth rates. Thomsen continues; *ownership concentration can be measured as a first cut approximation by the share of the largest owner of total stock.* This will be the starting point for the choice of variables which will be elaborated in chapter 3 about methodology.

According to the agency theory, the optimal ownership structure implies a trade off between risk and incentive efficiency (Jensen & Meckling, 1976). Because of this, larger owners will have stronger incentives to monitor managers and ensure that their interests are being maintained. It is then easy to make the conclusion that the optimal ownership structure will be one large shareholders, but if we take risk into consideration, the optimal structure will be different. A shareholder would probably like to diversify his or hers portfolio. Thus, a variable indicating the largest shareholder is expected to be concave, also of the reason that the minority shareholders' interests could be neglected if the largest owner becomes too large.

Fama and Jensen (1983) say in their article *Separation of ownership and control* as presented in Clarke (2008) that if a company holds a very large part of the shares, managers could expropriate the wealth of minority shareholders. Based on this, a bell-shaped graph illustrating the relationship between ownership concentration, meaning the share of the largest owner, and economic performance can be presented. Economic performance is measured by firm value, accounting rates of profitability, shareholders value creation, or other variables (Thomsen, 2008). The shape of the graph depends on several factors, for instance the type of owner, which can be a person or a family, the government, a company or financial.

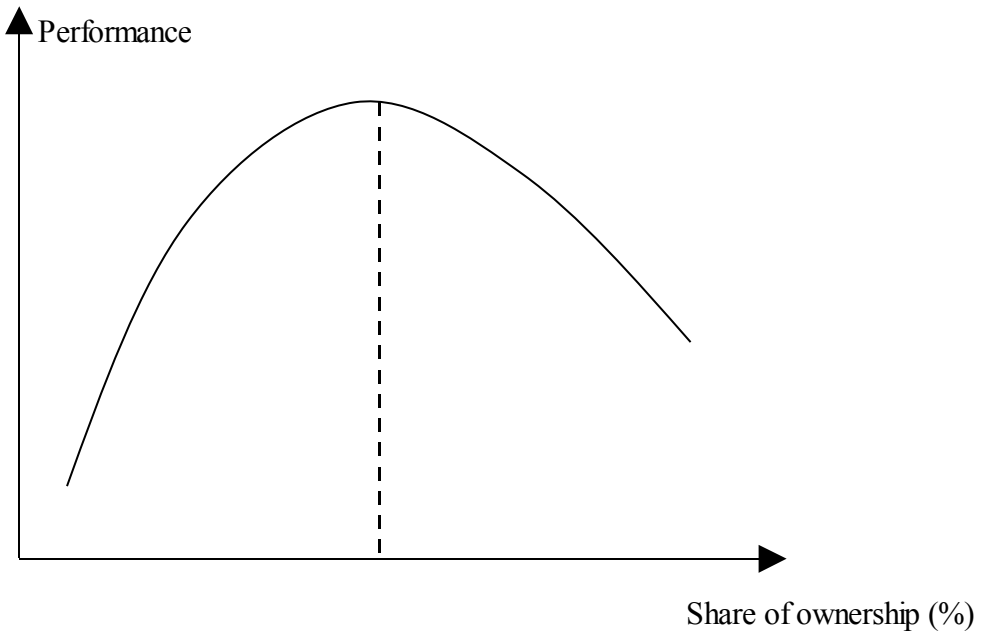


Figure 2.3: Relationship between share of ownership and firm performance (Thomsen, 2008)

This graph illustrates the relationship between share of ownership and the performance of the firm. As we can see, performance decreases after a certain ownership percentage, which is as mentioned determined by several factors (owner characteristics, etc.). Up to that point, larger share means that the owner will have strong incentives to maximize performance and influence the managers. But as Thomsen states; beyond that point the entrenchment effect kicks in. Beyond the maximum the owner becomes so large that he will might take advantage of his strong position. Examples of this can be to enjoy private benefits, or as a public energy company to emphasize stakeholder interests on the expense of firm performance. Additionally, the larger the share is, the more risk averse will the shareholder be because of an unbalanced portfolio.

In the example of the Norwegian hydroelectric energy sector, most of the largest companies are either fully or partially owned by the Norwegian government. Governmental ownership is an institutional alternative to regulations (Thomsen, 2008). There are arguments saying that governmental ownership will emphasize stakeholder interests and political goals in a larger degree. Examples of political goals relevant for the energy industry are low output prices or employment.

The following section is mostly cited from the article of Jensen and Meckling (1976); “Theory of the firm: Managerial behaviour, agency, costs and ownership structure” which is reproduced in Clarke (2008). Jensen and Meckling start out by presenting their definition of property rights. According to them, the main basic focus is the determination of individual rights, and on the costs and rewards of an organization are being allocated among the participants of the organization. The specification is normally put down in a contract, which can be both implicit or explicit. By entering such a contract, the principal would like to reduce what Jensen and Meckling call *agency costs.*. These encompasses:

- costs in connection with monitoring the agents behaviour
- bonding expenditures by the agent
- the residual loss

Additionally, they say that agency costs occur in any situation involving cooperative efforts by two or more people.

But how can we generalize the issue of the agency problem? Presumably, every relationship which includes an agent who acts on behalf of a principal in order to maximization the principal's welfare is subject to the agency problem. It is existing in all kinds of organizations and on all levels of the organization.

Chapter 1 included among other things an elaboration on stakeholder influence on the ownership structure and decision procedures of Norwegian hydroelectric energy companies, where the state (hence the people) has either directly or indirectly control over the absolute majority of the largest companies. Even though there can be a large number of shareholders, ultimately they are all controlled by a governmental or municipal authority. Thus, in Norway there is a juridical and cultural basis (see chapter 2.4 for further elaboration) for emphasizing the social communities in the decision processes. An example of current interest was given with reference to Sogn Avis. In this case, the consideration of stakeholders are in contrast to the consideration of the company's profitability. De Wit and Meyer (2004) go thoroughly into this paradox when elaborating on that they call *the paradox of profitability and responsibility* and the underlying *shareholder value perspective* versus the *stakeholder value perspective* (De Wit & Meyer, 2004, pp. 597-509). They list a few things where the two perspectives are contradicting, for instance organizational purpose, how we look at the organization, measure of success, major difficulties, implementation of

corporate governance and social responsibility. To exemplify, a company competing in a relatively unregulated market such as a under typical American market conditions, will have different objectives and purpose than a typical Norwegian energy company. Where the American company places profitability over social responsibility, where the purpose of the organization is to serve the owner, and where the measure of success is the share price and dividends (shareholder value), the Norwegian energy company have it the other way around. Here, social responsibility is placed over profitability (even though profitability rates are unusually high in this industry), the purpose of the organization is to be a joint venture serving all parties involved, and the measure of success is satisfaction among the stakeholders.

Blair (1995) present a similar case. She separates between a *property conception* and a *social entity conception.* She illustrates the property conception with an example from 1919, where the Dodge brothers sued Ford Motor Co. complaining that Henry Ford had suspended dividend payments. According to the Dodge brothers, they had the rights as shareholders to withdraw the profits. After all, the shareholders owned the company. The Michigan Supreme court agreed, stating that *a businesses corporation is organized and carried on primarily for the profit of the stockholders* (Clarke, 2008, p. 176). On the other hand, the modern social entity conception can be said to be in alignment with Scandinavian views, where the corporation has been described as *constellations of interests* rather than an instrument for personal acquest. The conflicting views between Scandinavia (and mainland Europe in general) and the USA is supported by Clarke (1998) where he illustrates the European view as *stakeholder capitalism* and the Anglo-American as *stockholder capitalism.*

2.4 Corporate governance in Scandinavian and global perspectives

In the context of corporate governance, corporate ownership and incentives in the Norwegian hydroelectric energy industry, it is relevant to briefly present some comparisons on the fields of Scandinavian and global corporate governance.

The Scandinavian countries, Norway, Sweden and Denmark are different from most other countries in the world in the sense that they are relatively scarcely populated (between five to eight millions),

and are homogeneous, which means that governance mechanisms like reputation and culture are more effective than in larger countries (Edling et al., (2007). In addition, they have had social democratic governments for a rather long period of time. Consequently, employee representation on boards is common to see in Scandinavian and especially Norwegian companies, and particularly companies of a larger size.

The following table gives an international comparison of owner concentration, owner identities, incentive pay, and other variables of the Scandinavian countries (reproduced with a relevant selection of the variables).

	Germany	**Denmark**	**Norway**	**Sweden**	**UK**
Owner concentration	Medium	High	Medium	Medium	Low
Owner identity	Banks Families	Families Foundations Coops	Governments Foreign	Business groups	Institutions Investors
Performance pay	(+)	+	+	+	-
Employee representation	+	+	+	+	-

Figure 2.4: International comparison (Edling et al., 2007, presented in Thomsen, 2008).

Here, we see that Norway stands out by having a large degree of governmental ownership. When it comes to performance pay (incentive pay) and owner concentration, there are no significant differences from the other countries. But, is must be specified that the subject of this paper, the Norwegian hydroelectric energy industry is far from aligned with other publicly listed companies when it comes to both structure and results.

According to the source of the managerial pay (Proff) of this paper as we will see later on, many energy companies have had a high growth in CEO salaries the last few years. This is in accordance with Oxelheim and Randøy (2005), who's findings indicates that globalization increases the

managerial pay because managers are looking to other competing companies abroad, but in the same industry, where the level of CEO salaries is much higher.

2.5 The Agency theory and the Norwegian energy sector

So why would I use the agency theory as a theoretical basis for the research in this paper? First of all, I would, among other things and as elaborated in chapter 3, like to examine whether efficiency and the operating results of Norwegian hydroelectric energy companies are affected by the salaries given to the CEOs. When asking this question, I realize that many factors affects the answer, and many of the same factors are subject to elaboration in the agency theory. Some of these factors are summed up in an overview by Eisenhardt, K.M, (1989) as presented by Clarke (2008):

Assumption	**Perspectives and theories**				
	Political	Contingency	Organizational control	Transaction cost theory	Agency theory
Self interest	√			√	√
Goal conflict	√			√	√
Bounded rationality	√	√	√	√	√
Information asymmetry		√		√	√
Pre-eminence of efficiency		√	√	√	√
Risk aversion					√
Information as a commodity					√

Figure 2.5: Comparison of agency theory assumptions and organizational perspectives (Eisenhardt, K.M, (1989) as presented by Clarke (2008)).

Most of these assumptions are highly relevant when discussing managerial compensation versus the revenues of any kind of business, including hydroelectric energy companies. For instance, some of the companies may have different kinds of incentive systems. As can be seen later, if on e company rapports it fixed wages to the CEO to be 50.000, it seems clear that the top manager also is receiving some other kind of compensation for his/her efforts. Agency theory states that if the compensation to the CEO is based on his results, he or she will have more incentives to lead the company to better results in order to improve his/her own wealth.

2.6 Critique to the use of agency theory

Regardless of the relevance to the case of Norwegian hydroelectric energy companies, a general critique according to Thomsen (2008) is that even though agency theory is undoubted one of the most important theories in corporate governance, there one should apply alternative models to achieve a better and more nuanced understanding of the principal-agent relationship. We would have to look to the fields of psychology, economics, political science, sociology and law to find theories which give a supplementary explanation of the relationship.

2.7 Chapter summary

The starting point of chapter 2 is agency theory and the principal-agent relationship and the focus has been on managerial compensation, with emphasizing on incentives and performance pay. I started out by elaborating on risk sharing, and continued about problems in the principal-agent relationship as a consequence from the imperfect risk distribution between the parties. Next, I presented ten proposition for the agency theory based on the work by Eisenhardt, M, K. (1989).

Secondly, I elaborated more on incentive pay. I presented mathematical basis for incentive

contracts. I then moved on to corporate ownership, elaborating more on the matter of separation of ownership and control. In the same context I chose to put corporate governance in an international perspective, presenting a comparison to other nearby countries in northern Europe. Then I moved on to giving a brief reasoning on why I have chosen agency theory as a theoretical basis for this paper, before finishing off with a critique to the choice of theory.

3 Methodology

3.1 Introduction

Research is about achieving new reliable knowledge and interpret the surrounding world. The theories and methods can vary between the different fields of science, but the scientific requirements remains the same. The research process, no matter which level we are at, demands initially a thought-through consideration of previously works in the same field. This is for developing own ideas in such way that they becomes reliable, new and significant (Olsson & Sörensen, 2003).

There are some requirements to the research method being used in order to be able to use it in scientific works. To chose the best method we have to use the problem of this paper as a starting point. Additionally, the choice of method has to be in accordance with the reality which we are examining. The collected data being used in scientific works has to be accurate, and it is important that the research process and all of the procedures are transparent and accessible for the reader. The most prominent reason for this is that others should be able to test the result of the research for the posterity (Lund & Haugen, 2006).

Still, it has to be said that the choice of method is not always obvious, and according to Zikmund (2003) it is because there is never a right method. The choice will depend on how much time and resources we have available. Therefore it is important to consider all of the existing methods and decide on one with regards to what is needed in the context.

The research process

The following table is the different steps in the research process according to Lund & Haugen (2006). These stages does not fully match the structure of this paper, but make a good basis.

Stage I	• Background • The objective of the research • Problem definition • Theory
Stage II	• Validity criteria • Pilot studies • Ethical criteria
Stage III	• Methodical approach • Population • Design • Instruments (i.e. questionnaires, interview guide, tests, etc.) • Situation/context and time for the research
Stage IV	• Collecting the data (i.e. numbers, observations, etc.) • Analysis of the data (i.e. statistical analysis, text analysis, etc.) • Result
Stage V	• Summing up • Discussing the result in comparison to other research/theory • Critique and weaknesses to the research • Ideas for further research

Figure 1.2: The research process and its stages

3.2 Problem definitions

Maybe the most difficult stages in the research process is to identify and determine the problem or question which we would like to examine. The starting point does not have to be a problem, but rather a question about something we would like to have answer.

In this assignment, the main focus is to see if there is any coherence between ownership concentration, incentives and profitability in Norwegian energy companies which are producing hydroelectric power. To be able to examine this relationship closer, it is necessary to ask a few questions (Gripsrud og Olsson 2000):

1. Which decisions do we wish to make based on this research?
2. How will the empirical result affect these decisions?
3. Which information is required in order to make the decisions?
4. What is the purpose with this research?
5. Do we have everything that is required to make the decision?

Based on these questions, I would like to examine the following:

- Does the number of shareholders and the size of their stake affect the profitability of the energy companies?
- Does the managerial compensation have any effect on the annual results of the energy companies?
- Does the identity of the shareholders, whether they are of a private or public kind, affect the incentive systems of the energy companies?

The purpose with this paper, will be to increase the understanding of the deep-rooted public

ownership structure, of Norwegian energy companies. The decisions being made in this paper, can make it easier to do a comparison with regards to profitability, between state owned companies and companies dominated by private shareholders. In order to make a reliable conclusion, it is required to control whether external elements are not affecting the results.

These considerations lead to the problem definition of this paper as mentioned in chapter 1:

Is there coherence between managerial pay, ownership structure, ownership concentration and profitability of Norwegian hydroelectric energy companies?

3.2.1 Variables

When the problem has been defined and the purpose and hypotheses have been specified, the next step is to determine the variables. A variable is a concrete representation of a concept, and can be both abstract or concrete. If they are abstract we would have to operationalize the term based on previous research on the same topic. As we will see in this case, there is no need to operationalize the variables since they are already based on relatively accessible financial numbers. An independent variable's meaning is to predict the dependent variable. Time plays an important role in determining the dependent and independent variables (Olson & Sørensen, 2003). In this case, I am looking for a relationship between shareholder concentration and profitability. Thus, I have chosen the following variables based on my problem

Dependent variable:

The dependent variable in this paper is profitability. More specific, the profitability of the companies are in this context observed by the operating result expressed as a percentage. First of all, the reason why I have not chosen the annual result is that some of the companies have had huge investments which give a inaccurate illustration of the industry. By focusing on the operating result, I am able to isolate the profitability of the daily operations which is much more comparable between businesses in the sector.

Secondly, I have chosen the operating result expressed as a percentage of two reasons:

1. Together with the ROI, the operating result is a clear indication of the profitability of a company. The results can be explained and classified as follows:
   a) The percentage is calculated by (Operating result) x 100 / (Sum of running incomes). This formula shows how much of each currency unit is left after deducting running costs (*Vurdering av nøkkeltall – Resultat av driften i %,* Proff).
   b) This figure shows the evaluation of operating result percentages. As we will see later, the Norwegian companies producing hydraulic power have some peculiar numbers when it comes to this table.

Not satisfactory	Weak	Satisfactory	Good	Very good
< 0 %	0 - 2 %	3 - 4 %	5 - 7 %	> 7 %

Figure 3.2: Evaluation of key numbers (Proff.no).

2. Of all the available financial numbers, these ones are the most accessible and does not require a large amount of time and calculations to achieve. With regards to the purposed amount of time and the large number of companies to examine, the operating result is the most practical and adequate to base this paper on.

Independent variable:

The independent variable in this context is shareholder concentration of the ownership structure of the companies. I would like to see whether this variable has any influence on the dependent variable; profitability.

The reason why the choice of independent variable is ownership concentration, is that in the hydroelectric energy industry, companies can be argued to be relatively homogeneous. This is again because most of them was originally founded to supply electricity to nearby households and industries. Additionally, electricity is no doubt a homogeneous product. The most prominent difference with the exception of a few large companies and Statkraft, lies in the ownership structure with regards to the number of shareholders and the existence of a dominant owner.

The independent variables of this paper are:

- Fixed pay to the CEO of the company
- The number of owners
- The size of the largest owner

Control variables

This kind of variables are widely used in research processes to avoid misleading results. By using control variables, we can assure that no other factor is influencing the relationship between the dependent and independent variable(s). Based on this, I have decided on the following control variable:

- Total revenue to the company as an indicator for the size. If it turns out that the size of the company affects the result, we might say that there can for instance be benefits about being large that gives the company higher profitability. In example, a large company like Statkraft will have the power to attract the very best energy managers in the industry, and this can not be reflected in this research.

3.3 Hypothesis and testing

The problem of the paper is as mentioned earlier seen with regards to the relevant theory, and it will lead to one or more hypotheses. A hypothesis can be said to be an assumption or a fundamental idea. A hypothesis is formed by putting different concepts in relation to each other. A scientific hypothesis is an assumption made to explain the relationship between two or more concepts (Olson & Sørensen, 2003), or as Lund and Haugen (2006) states in one sentence; *experimentally statements about how something is [or behaves]; a kind of explained guessing*

There are many requirements for a hypothesis to be used in scientific research (Zikmund, 2003):

- It must be possible to test the hypotheses empirically by different statistical methods.
- One can reject the hypothesis in case the hypothesis is not being supported by the research.
- The person defining the hypothesis can not be affected by personal or external factors when formulating it. The hypothesis must be formulated in an unbiased matter.
- All of the hypotheses must be formulated based on relevant and acknowledged theory, or previous research on on the same topic.
- The hypothesis has to be clear regarding the relationship between the different variables, both in positive or negative sense and under what conditions.
- The variables in the hypothesis have to be operazionalized.

In chapter 4 I will take a closer look at the relationship between ownership concentration and profitability of Norwegian hydroelectric, whether higher concentration of owners, meaning fewer and larger shareholders, implies higher profitability as shown by operating results.

This is why I have come to the following hypotheses as mentioned in chapter 1:

Hypothesis 1 (H1): There is a positive relationship between the amount of fixed pay to the CEO and the profitability of the company.

Hypothesis 2 (H2): There is a positive relationship between ownership concentration and the operating result of the company.

Hypothesis 3 (H3): There is a negative relationship between the number of owners and the operating result of the company.

3.4 Research design

The choice of research design will depend on the problem which we would like to give an answer to. The design will determine the choice of data collection and analysis method. Research design is primarily categorized in the following types according to Otto Andersen [1]:

1. **Causal and descriptive design:**

As the name indicates, this kind of design is when we want to prove a cause and effect between different variables. Normally causal design is used in quantitative researches, and appear as more experimental. One assumption of causal design is that there are already theories about the topic being examined.

2. **Explorative design:**

This kind of design is appropriate in case the goal is to achieve new perspectives on the topic we are looking at. This design is of a qualitative nature, and can be used when we do not have a clear understanding of the problem.

3. **Descriptive design:**

Descriptive design is used to prove a relation between variables, to describe characteristics of for instance a group of people, to determine a frequency of events or similar observations. The goal is to measure the variables and determine a relationship between them. Descriptive design requires a clear specification of the who, what, where, when, and how of the research.

In order to measure or estimate causal effects there are three main groups of designs; real experimental design, quasi-experimental design and non-experimental design (Lund, 2006).

1 Otto Andersen: Research Methods, Lectures at the University of Agder, 08.04.09.

3.5 Data collection procedure

Before we start on the data collection, I would like to elaborate on the categorization of data; primary data and secondary data. The difference is that primary data is being collected exclusively according to the problem. There are some different kinds of collection methods which can be used for this:

1. Questionnaires
2. Observations
3. Interviews

On the other hand, secondary data is describes as data which is being collected for other purposes than the original research problem. This kind of data can be easily accessible for the public, but it is questionable whether the quality and reliability of the data is good enough.

The data collected in this paper does not fit perfectly into neither of the categorizations. My data is solely collected from a publicly accessible database called *Proff*. Even though the information is not collected from the companies themselves there is no reason to question the reliability of the data. Every registered Norwegian joint-stock company is obliged to report a variety of information to the government every year, and much of this information is accessible at www.proff.no. Accessible information is for instance:

- Financial and corporate information
- Complete accounting data, figures and analyses, including for instance:
    - Operating result
    - Annual results
    - Corporate taxes
    - Return on equity (ROI), (%)
    - Liquidity ratio, (%)

- Equity capital, (%)
- Depths, fixed assets and liquid assets
- Dividend, etc.
- Managerial pay (fixed) with history plus other wage costs.

- List of owners.
- List of board members and their date of birth (including the CEO).
- Misc. proclamations and news about the company.

3.6 Scale

The scale consists of the levels *nominal, ordinal, interval.* When running the analyses in SPSS we do not need any "stronger" scale than interval, so the question of ratio is not relevant. The SPSS program does not separates between the highest levels; interval and ratio (Wenstøp, 2003).

3.7 Population and methods of sampling

Hair et al. (2007) states that *sampling involves a procedure of selecting elements from a larger group (population) in order to infer something about the larger group.* They mention at the same time that a population *is defined as the totality of cases that conform to some designated specifications. The specifications define the elements that belong to the totality of cases, and those that are to be excluded.*

The sampling method normally involves six steps:

1. Defining the population. Populations normally consist of only one kind of observation unit, but can in some cases include different types of units. The population is sometimes referred to as the *level of generalization.* To define the population, we have to look at:
   a) time boundaries
   b) geographic boundaries
   c) type of units
   d) specific characteristics
2. The next step involves a sampling frame. This is *a listing of elements from which the actual sample will be drawn.*
3. The third step is selecting a sampling procedure, within there are two main categories; *probability samples* and *non-probability samples*. The difference is that in the first category there is a given chance for each element to be picked out of its population or sample frame. With the latter option, it is impossible to estimate the probability of the each element to be a part of the sample frame. This could be a problem since there is no way of knowing whether the sample is representative for the whole sample frame.
4. All of this leads us to the next step, which is determining the sample size. There are many factors affecting the question of sample size. These can be time and money available, number of categories, the homogeneity of the population, acceptable magnitude of error, or type of sampling method.
5. Next to determining the sample size is collecting the data. When collecting the data there are two kinds of errors that often arises:
   a) Sampling errors. Hair et al (2007) describes sampling errors as *the difference between the observed values of a variable and the long-turn average of the observed values in repetitions of the measurement.* In other words, sampling errors can be reduced by increasing the size of the sample.
   b) Non-sampling errors. These errors can be any error arising in the research.

In this case, the population is set to be every company producing hydroelectric power which has a significant level of turnover. That is why I have chosen to examine all of the companies which turnover are exceeding NOK 100.000.000. The number of companies in my population can in addition be representative for the rest of the hydroelectric energy industry in Norway, even though that is not taken into consideration. I will primarily just examine the largest companies. And assume that the number of companies which meet the turnover criterion is large enough to point out possible and reliable causalities. Additionally, and as mentioned in step four above; there can be many factors affecting the sample size. In the hydroelectric energy industry, the degree of homogeneity of the companies is remarkably high compared to other industries.

3.8 Statistical method

To be able to answer the hypotheses in this paper, I would have to chose a suitable statistical method. This is required to simplify the collected data and make it easier to draw conclusions based on the data. The statistical method will help indicating a relationship between the dependent variable and the independent. A regression analysis will in this case be suitable (Wenstøp, 2003).

3.8.1 Regression analysis

Regression analysis is widely used in economic research, and its purpose is to reveal coherence or relationships between two or more variables. We assume in regression analysis that there are one or more independent variables influencing the dependent variable. The following section will be a presentation of how this analysis works (Wenstøp, 2003).

In order to see if the regression analysis of this paper is sufficient, we would have to examine the beta (β), the significant, R^2 and R^2 (adjusted) of the regression equation.

The multiple regression model:

$Y_i = \alpha + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 ... + \beta_k x_k + \varepsilon$

Y = the dependent variable which will be explained by the independent variables.

x = independent variable (also called explanatory variable)

α = constant (?)

β = shows the change in the dependent variable if an independent variable is being de- or increased by one unit.

ε = shows the remaining change which cannot be explained by the chosen variables

As we see here, Y is the dependent variable, and the model explains the effect of independent variables to Y, which is why they are called explanatory variables. By using regression analysis, we are able to calculate α and β, which are the parameters. α shows the value of Y when the x('s) are set to be 0. β indicates the change in the dependent variable if the independent variable (x) changes by one unit.

A critique to the model is that we cannot include as many explanatory variables as desired. When including variables with minimal effect on Y, the model becomes less accurate. And vice versa, when excluding variables with significant effect on Y, the parameters will be calculated incorrectly, and ε will be incorrect as well.

To say whether the model is accurate enough and suitable for further use, we could use R^2(adjusted). R^2 is the explanatory degree or power to the regression, and by dividing R^2 with the number of degrees of freedom we get R^2(adjusted):

$R^2(\text{adjusted}) = (1 - ((N - 1) / (N - K - 1)) \times (1 - R^2))$

R^2(adjusted) will not be needed in this study since my sample is equal to the entire population.

Before I move on, there are five assumptions to be made about the regression model:

1. $E(\varepsilon) = 0$. This implies that the expected (E) value of ε is equal to 0.
2. Var (ε) = O2, meaning that the variance of ε is unknown. The correlation (ε_i, ε_j) is set to be = 0, which means that ε of the different observations are independent.
3. $\tilde{Y}_i = \acute{\alpha} + \beta x + \varepsilon$, there is a linear relationship between the dependent variable and the independent variable.
4. $\varepsilon_i = N(0,O^2)$. This means that ε is normally distributed with no expectation of a constant varians.
5. In addition to this, we assume that there does not exist any multi correlation between the different variables of the model. If there should in case exist a multi correlation, this will mean that the parameters would not be correct, and that the result from the examination would be incorrect. A correlation between two variables shows how they react to one another, and to avoid an incorrect result we should check for any multi correlation (Wenstøp, 2003).

3.9 Sources of errors

For the findings of this paper to have any value, it is necessary to examine for any sources of errors which can occur during the process. It is relevant to examine the reliability and validity. The degree of reliability and validity need to be high in order to approve the findings of a research.

The terms can not be considered independently from each other. They are closely related in the way that one of them indicates whether we measure the right thing, and the other indicates the quality of the measurement. In a research process, we don not know the real value of what we are examining, so we have to consider the possible sources of error which can occur. Mathematically it is formulated like the following:

$X_0 = X_t + X_s + X_r$

- X_0 = Is the observed value which we find among our sample.
- X_t = Is the true value. Ideally, this is the value we would like to discover.
- X_s = Consists of systematic errors. These errors occur as a result of incorrect administration of the research, and errors as a result of the lack of responses from the participants of the survey. This kind of error can not necessarily be eliminated by increasing the size of the population (Zikmund, 2003).
- X_r = Are random errors which can occur, and are caused by random variations in the population. This source of error can in contrast to systematic errors be avoided by increasing the size of the population.

In the case of the population of this paper, we can assume that at least $X_r = 0$, since I am looking at each and all of the companies with revenues exceeding NOK 100 millions. We can also assume that X_s is low since I was able to receive information about all of the companies. Thus, my sample is equal to the true population (Wenstøp, 2003).

3.9.1 Reliability

Reliability is the degree of correspondence with measurement carried out with the same instrument. If the result remains the same from time to time, there is a high degree of reliability. For instance, reliability can be measured by conducting a *test-retest* method, where the measurement is done at a certain time, and repeated later on.

When it comes to reliability, the requirement is that: $X_0 = X_t + X_s$

In other words, if the observed value equals the true value plus systematic errors, the result satisfies the requirement of reliability. The amount of X_s must be low in order for the result to be reliable.

As mentioned above, since I have examined all of the companies with revenues more than the chosen limit, the chance of random errors has been eliminated, thus the result can be said to be reliable (Wenstøp, 2003).

3.9.2 Validity

As important as having a high degree of reliability, it is also important to ensure the validity of the research. Validity is ensured if the procedures or instrument of measurement are able to measure the right or relevant things (Olson & Sörensen, 2003).

Validity is categorized in several ways.

- First of all, we have *face validity*, which is the "obvious" deduction of an observed value. For instance, if we would know the date of birth of a manager, we could also easily determine his age.

- *Content validity* means that we measure the whole area of interest, and that is is consistent. For example, by measuring ownership concentration, it is relevant to measure not only the number of shareholders, but also the size of the largest owner.

- *Criterion validity* is the most secure way of measuring validity (Olson & Sörensen, 2003). This means that we compare the result with another criterion which measures the same thing (*golden standard).*

- *Consensual validity* implies that there are consensus among several "experts" that the results are valid.

- *Predictive validity* encompasses the ability of the measurement instruments or procedures to predict future behaviour of what we are examining. Predictive validity is measured by comparing the predictions with the actual outcomes.

- *Construct validity* is high when there is a high degree of correlation between the measurement instruments and other closely related terms or instruments.

The criterion for validity is that $X_0 = X_t$, ergo the observed value equals the true value. In other words, we would have to avoid both systematic and random errors in order to satisfy this requirement.

As mentioned above, I have received the data from a public database (Proff.no) which offers comprehensive corporate and financial information in addition to information about owners. The information is coming from the Brønnøysund Register Centre, which is *an administrative agency responsible for a number of national control and registration schemes for business and industry. The overarching goal of the centre is to improve the conditions for financial security and efficiency for business and industry, and the public at large* (Brønnøysundregisteret). This database must be said to have as large degree of validity as one can expect when examining both incentive systems and ownership structure of Norwegian energy companies.

4 Analysis

4.1 Introduction

To provide an answer to the hypotheses in this paper, I have conducted an empirical survey. This has been done by using the statistical program SPSS.

This chapter will be dedicated to the result of the empirical analysis. The first part of the chapter will be a presentation of the descriptive statistics. Following part will be about a correlation analysis, which examines any correlation between the variables. An important aspect correlation analysis is also if there should exist any multi correlation between the variables. The last part is a presentation of different regression analyses.

4.2 Descriptive presentation of data

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Revenues	65	100082000	25465000000	1.35E9	3.495E9
Operating_result	65	-56.00	76.20	39.2769	30.09289
Fixed_pay	65	50000	7685000	1179015.38	1060199.679
Number_owners	65	1	23	4.18	5.414
Owner_concentration	65	10	100	70.38	32.728
Valid N (listwise)	65				

Figure 4.1: Descriptive statistics of the data material

This table displays the number of observations of this paper. The number is 74, and these are the 74 hydroelectric energy companies in Norway with the highest revenues. Since 9 companies have missing values I have chosen to exclude them from the table. The number of observations is therefore 65. The table also displays the following:

- **Mean**. This value is the sum of observed values divided by the number of observations. Generally, this number should be regarded as potentially inaccurate. Extreme values can make the result less representative than if the values are excluded.

  We can see that the mean operating result is approximately 39 %, which is unusually high for any industry. This number is categorized as "very good" if it exceeds 7 % (Proff.no).

- **Minimum and maximum values.** Taking a closer look at the minimum and maximum values can help us draw some conclusion about the descriptive statistical data. Here we can see whether the mean value has been distorted by any extreme values. For instance, an operating result of 76 % could normally be regarded as an extreme value, but since such a large number is not a unique case in this collection of data, I will let it be.

- **Standard deviation**. This number indicates the spreading of the data material. Since a large standard deviation implies a high degree of spreading from the mean value, this number has to be closely evaluated. For instance, the standard deviation indicates any extreme values. If the standard deviation value is large, there can be extreme values making the mean higher than usual.

4.3 Analysis – correlation

Correlation is a way of indicating the covariation between variables. I have conducted a correlation analysis in order to examine the correlation between the revenues, operating result, fixed pay, number of owners and owner concentration. In the regression analysis presented later on, it is important that there is not any multi correlation between the variables. A correlation analysis will

also show the significance of the independent variables I have chosen. Each of the independent variables should correlate to the dependent variable.

Correlations

		Operating result	Fixed pay	Number of owners	Owner concentration
Pearson Correlation	Operating result	1	.093	-.038	.277*
Sig. (2-tailed)			.461	.766	.026
N		65	65	65	65
Pearson Correlation	Fixed pay	.093	1	.146	-.184
Sig. (2-tailed)		.461		.245	.143
N		65	65	65	65
Pearson Correlation	Number of owners	-.038	.146	1	-.675**
Sig. (2-tailed)		.766	.245		.000
N		65	65	65	65
Pearson Correlation	Owner concentration	.277*	-.184	-.675**	1
Sig. (2-tailed)		.026	.143	.000	
N		65	65	65	65

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Figure 4.2: Correlation matrix

A correlation coefficient will be between -1 and +1. If the coefficient is -1, the correlation is said to be perfect negative. And vice versa, if the correlation is +1, is is perfect positive.

Since we can not observe any high degree of correlation between the independent variables, we can assume that there is not any multi correlation in the matrix. We can also see that the independent variables have a small degree of either positive or negative correlation to the dependent variable, which implies that the independent variables do not affect the dependent variable in any significant degree.

4.4 Regression analysis

This part contains different kinds of regression models I have used in order to make a conclusion. It is where I examine how each of the variables are affecting the dependent variable (operating result). I will also examine these relationships with the use of control variables. This is because I would like to examine if there are any underlying variables which can be affecting the dependent variable.

As mentioned above, I have chosen to remove 9 observations of the reason that there were missing values. If I would include them, the of the results of the regression analyses could be misrepresented. After I removed the observations, I ran the test again to see whether the result was changed.

There are some factors which will be evaluated in the next parts:

1. **The level of significance.** This is the probability for being wrong. In this paper, I have chosen the level of significance to be 5 %.

2. **t-test.** The t-test is a statistical test which shows if each of the variables will have a significant effect on the dependent variables.

3. **F-test.** The F-test is a statistical test which compares the variance between two dimensions; MS(between) and MS(within). The larger the sizes of these are, the higher is the probability for the result being significant.

4. **Regression coefficient R^2 (adjusted).** This is the explanatory factor of this model, and it should lie closer to 1. It is in contradiction to R^2 adjusted for the number of independent variables. It shows how much the independent variables can explain the variance of the

dependent variable. As mentioned before, since I examine every single company with revenues exceeding NOK 100 million, I have no need for basing any decision on this coefficient.

5. **The coefficient β of each of the independent variables.** This value shows us how each of the independent variables are being effected by the dependent variable.

6. **P > t.** P is the level of significant of each of the variables in the model. It tells us the significance of the different variables, and should ideally be closer to 0.

4.4.1 Managerial compensation

In this first part I would like to examine in what degree, if any, managerial pay and ownership concentration is affecting the operating result of the companies. Based on this, I have made a few models which will help me make a conclusion about that:

Models	**Variables being used in the models**
#1	Operating result Managerial pay
#2	Operating result Managerial pay Number of owners Owner concentration Total revenues of the companies

Figure 4.3: Model overview #1

In model 1 I have chosen only to include the fixed pay managers receive annually for the responsibility of being the CEO. In model 2 I have chosen to examine the relationship between the owner concentration and the operating result, whether the number of owners and the size of the largest shareholder are factors that affect the operating result.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.093[a]	.009	-.007	30.19931
2	.394[b]	.155	.099	28.56446

a. Predictors: (Constant), Fixed_pay

b. Predictors: (Constant), Number of owners, Revenues, Fixed pay, Owner concentration

Figure 4.4: Explanatory factors

As we can see from figure 4.4, model 1 has a very low degree of explanatory power, and model 2 has a medium degree of explanatory power (R^2). The powers are ranging from 0.9 % to 15.5 % (-0,7 % and 9,9 % for R^2 (adjusted)). We also see that for both R^2 and R^2 (adjusted) the values are increasing from model 1 to model 2. This means that the variation of the control variables would be increasing the explanatory power for the operating result of the 65 largest hydroelectric energy companies in Norway if I would have used a sample instead of the whole population.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			95,0% Confidence Interval for B	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
1	(Constant)	36.164	5.626		6.428	.000	24.921	47.407
	Fixed pay	2.640E-6	.000	.093	.741	.461	.000	.000

a. Dependent Variable: Operating result

Model		Unstandardized Coefficients		Standardized Coefficients			95,0% Confidence Interval for B	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
2	(Constant)	.559	14.941		.037	.970	-29.327	30.445
	Owner concentration	.398	.154	.433	2.584	.012	.090	.706
	Revenues	1.262E-9	.000	.147	1.147	.256	.000	.000
	Fixed pay	2.779E-6	.000	.098	.771	.444	.000	.000
	Number owners	1.363	.900	.245	1.514	.135	-.438	3.163

a. Dependent Variable: Operating result

Figure 4.6:

The information in Figure 4.6 tells us that none of the variables have any significant influence on the dependent variable, which we can see by the t-value of the variables. In this case, the t-values are relatively low, except when it comes to owner concentration in model 2 which might indicate a relationship.

ANOVA[b]

Modell		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	501.357	1	501.357	.550	.461[a]
	Residual	57455.879	63	911.998		
	Total	57957.235	64			

a. Predictors: (Constant), Fixed_pay

b. Dependent Variable: Operating_result

Modell		Sum of Squares	df	Mean Square	F	Sig.
2	Regression	9001.545	4	2250.386	2.758	.036[a]
	Residual	48955.690	60	815.928		
	Total	57957.235	64			

a. Predictors: (Constant), Owner_concentration, Revenues, Fixed_pay, Number_owners

ANOVA[b]

Modell		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	501.357	1	501.357	.550	.461[a]
	Residual	57455.879	63	911.998		
	Total	57957.235	64			

a. Predictors: (Constant), Fixed_pay

b. Dependent Variable: Operating_result

Modell		Sum of Squares	df	Mean Square	F	Sig.
2	Regression	9001.545	4	2250.386	2.758	.036[a]
	Residual	48955.690	60	815.928		
	Total	57957.235	64			

b. Dependent Variable: Operating_result

Figure 4.7:

As seen from this table, none of the models have a significant F-value. By this, we can say the these models are not very good, and do not support the hypothesis that higher pay influences the operating result of the companies on a 5 %-level.

4.4.2 Ownership concentration

Models	Variables being used in the models
#1	Operating result Number of owners
#2	Operating result Owner concentration
#3	Operating result Managerial pay Number of owners Owner concentration Total revenues of the company

Figure 4.8: Model overview #2

The second hypothesis deals with owner concentration and its effect on the operating result of the companies. The ownership concentration means the size of the largest shareholder.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.038[a]	.001	-.014	30.30927
2	.277[b]	.076	.062	29.14797
3	.394[c]	.155	.099	28.56446

a. Predictors: (Constant), Number of owners

b. Predictors: (Constant), Owner concentration

c. Predictors: (Constant), Number of owners, Revenues, Fixed pay, Owner concentration

Figure 4.9: Explanatory factors

Figure 4.9 tells us that also these models have low explanatory power, ranging from 0,1% to 15,5 % (-1,4 % to 9,9 % for R^2 (adjusted)). Also here, the values are increasing from model one to model 3, meaning that the explanatory power would have been increasing if the companies in this paper would be a representative sample.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	40.153	4.765		8.426	.000	30.630	49.676
	Number of owners	-.209	.700	-.038	-.299	.766	-1.608	1.189

a. Dependent Variable: Operating result

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
2	(Constant)	21.421	8.432		2.541	.013	4.613	38.230
	Owner concentration	.280	.106	.298	2.652	.010	.070	.491

a. Dependent Variable: Operating result

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
3	(Constant)	.559	14.941		.037	.970	-29.327	30.445
	Owner concentration	.398	.154	.433	2.584	.012	.090	.706
	Revenues	1.262E-9	.000	.147	1.147	.256	.000	.000
	Fixed pay	2.779E-6	.000	.098	.771	.444	.000	.000
	Number of owners	1.363	.900	.245	1.514	.135	-.438	3.163

a. Dependent Variable: Operating result

Figure 4.10:

Figure 4.10 shows us that the constant is significant in all three models on a 5 %-level. One variable in a model had a considerable high significant level. This variable is the number of owners in model 1. When it comes to model 2, it seems like there is a coherence between the existence of a large owner and the operating result in the companies, where the t-value is 2.652 and the significance level is 0,12. This is also possible to see in model 3.

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	82.180	1	82.180	.089	.766[a]
	Residual	57875.055	63	918.652		
	Total	57957.235	64			

a. Predictors: (Constant), Number_owners

b. Dependent Variable: Operating_result

Model		Sum of Squares	df	Mean Square	F	Sig.
2	Regression	4432.179	1	4432.179	5.217	.026[c]
	Residual	53525.057	63	849.604		
	Total	57957.235	64			

c. Predictors: (Constant), Owner_concentration

b. Dependent Variable: Operating_result

Modell		Sum of Squares	df	Mean Square	F	Sig.
3	Regression	9001.545	4	2250.386	2.758	.036[d]
	Residual	48955.690	60	815.928		
	Total	57957.235	64			

d. Predictors: (Constant), Owner_concentration, Revenues, Fixed_pay, Number_owners

b. Dependent Variable: Operating_result

Figure 4.11:

We can see from this table that none of the models have any significant F-value, except model 2 where the F-value is 5.217. Still, the value is weak.

With regards to figure 4.10 where model 2 displayed a t-value at 2.652, and despite the low explanatory power of the model, there can be basis for arguing that there can be a weak positive relationship between the existence of a large and dominant owner and the operating result of Norwegian hydroelectric energy companies.

Since all of these regression analyses told us that the explanatory power increased the more variables I included, I have chosen to present a new correlation analysis containing all of the variables.

Correlations

		Revenues	Operating result	Fixed pay	Number owners	Owner concentration
Revenues	Pearson Correlation	1	.243	.265*	-.034	.183
	Sig. (2-tailed)		.051	.033	.789	.145
	N	65	65	65	65	65
Operating result	Pearson Correlation	.243	1	.093	-.038	.277*
	Sig. (2-tailed)	.051		.461	.766	.026
	N	65	65	65	65	65
Fixed pay	Pearson Correlation	.265*	.093	1	.146	-.184
	Sig. (2-tailed)	.033	.461		.245	.143
	N	65	65	65	65	65
Number owners	Pearson Correlation	-.034	-.038	.146	1	-.675**
	Sig. (2-tailed)	.789	.766	.245		.000
	N	65	65	65	65	65
Owner concentration	Pearson Correlation	.183	.277*	-.184	-.675**	1
	Sig. (2-tailed)	.145	.026	.143	.000	
	N	65	65	65	65	65

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Figure 4.12: Correlation matrix with all variables

We can see from this table that there is no significant correlation between the control variable and the independent variables. On the other hand, there is a significant correlation between the variables number of owners and owner concentration (-0,675), but I choose to ignore this since the information of both of the variables derives from the observations of ownership structure.

There is also a correlation between operating result and owner concentration (0,277). This number is on the other hand not very high, and we can therefore say that the variables are not strongly correlated.

4.4.3 Chi² test

There are more than 65 hydroelectric energy companies in Norway. Actually there are several hundred producers of electricity from back water, rivers and waterfalls. Before I can make a generalized conclusion of the results to cover all of the companies, not only the 65 with the largest revenues, the criterion of equal variance or homoscedasticity has to be fulfilled. Homoscedasticity means that the variations around the regression line are relatively equal for all values of the independent variable (Wenstøp, 2003). This is an important criterion to fulfil in order to generalize the findings. In the following part a Chi² test has been conducted. I have excluded the operating result and owner concentration since I can not test percentages in a test like the chi².

H0: constant variance

H1: changing variance of the variables

Test Statistics

	Fixed pay	Number of owners
Chi-square	56.216[a]2	51.541[b]
df	65	14
Asymp. Sig. (p)	.773	.000

a. 66 cells (100,0%) have expected frequencies less than 5. The minimum expected cell frequency is 1,1.
b. 15 cells (100,0%) have expected frequencies less than 5. The minimum expected cell frequency is 4,9.

Figure 4.13: Chi² test

The chi² test is always testing the *null hypothesis*, which states that there is no significant difference between the expected and observed result. It tells us in what degree we can generalize the findings of the research. As we can see here, the chi² values tells us that we can not accept the findings since 66 cells have expected frequencies less than 5, even though $p > 0,05$ for fixed pay, meaning that we could accept the hypothesis.

5 Discussion

After the empirical presentation in chapter four, I will try to provide an answer to the hypotheses as mentioned in chapter three. The interpretation of the empirical data will be presented with the theoretical basis of Agency theory from chapter two. I will finish off by concluding my findings, present a critique of my work, in addition to write briefly about my thoughts for further research.

5.1 Managerial compensation

In chapter 2.1 and 2.2 I elaborated on managerial compensation, on incentive systems consisting of both one part fixed pay and one part performance-based pay. One of the cornerstones in Agency theory and the principal-agent relationship is that the compensation system or level of the agent is highly related to the agent's level of efforts, as indicated by Jensen (1998), Milgrom and Roberts (1992), Omholdt and Nesse (2001), and so on. And there has been done a tremendous amount of research on the relationship between managerial pay and firm performance Lazear (1996), Fernie and Metcalf (1996), Kahn and Sharer (1990), Barkema and Gomez-Mejia (1998), Randøy and Skalpe (2007) and many, many more. As previously mentioned, the amount of time available for carrying through this paper did not allow collecting data about any potential performance-based managerial compensation. Instead, I had to base my analysis on the fixed pay to the CEO of each company, which information was significantly more accessible. Nevertheless, since most of the companies had such a contract with their CEO, I considered it possible to examine the relationship with the sufficient degree of reliability.

Based on the extensive amount of theory about the principal-agent relationship, I still expect to see that there is a positive coherence between the managerial fixed pay and the operating result of the

energy companies. The development of managerial compensation in Norway between 1998 and 2004 was according to Randøy and Skalpe (2007) increased by three times as much as the general increase. They say that it is so because of the introduction of stock options after 1998. They continue to say that *the economical value of assigned stocks/stock options amounted to 34 % of the managerial salaries in publicly listed companies in 2005* (Randøy & Skalpe, 2007, p. 7). The growth has allegedly declined after 2003. If this data is representative for the energy sector as well, it means that the stock options constitutes a significant part of the management's compensation, and should therefore take it into consideration when evaluating the result of the analysis of the relationship between fixed pay and operating result.

On the other hand, Randøy and Skalpe (2007) have concluded with something that will increase the reliability of the analysis. Accordingly, the existence of large and active owners, which is the case with the majority of the Norwegian hydroelectric energy companies, reduce the need for high managerial salaries.

The following overview in Norwegian is received from the article *Lederlønnsutvikling i Norge 1996-2005 by* Trond Randøy and Ole Skalpe (2007), published on www.regjeringen.no:

Figure 5.1: Explanatory factors to the level and growth of managerial pay

The factors which leads to lower managerial compensation are whether the company has a female CEO, female chairman of the board, or the seniority of the chairman of the board, whether it consists of one large and dominant owner, is situated in a rural district, and is owned by the public. Based on the presentation of the Norwegian hydroelectric energy companies in chapter 1.6, we see that the absolute majority of the companies are characterized by half of the factors which leads to lower wages, in addition to that we can assume that the use of stock options have had a lower growth than many other sectors. .

With all of the information as mentioned above taken into consideration, I regard the reliability of the data to be sufficient enough as long as the different kinds of compensations (fixed pay and performance-based pay) are being held wide apart. After all, I do not have the sufficient information

to make any further statements about performance-based pay in these companies.

Based on the information above I expect that my first hypothesis is correct for my population:

Hypothesis 1 (H1): There is a positive relationship between the amount of fixed pay to the CEO and the profitability of the company.

The regression analysis gives the following result for the variables:

Model 1:	β = .093	t = .741	Sig = .461
Model 2:	β = .098	t = .771	Sig = .444

Figure 5.2: Regression analysis for models 1 and 2.

For repetition, in model 1 I examined the relationship between the operating results and the fixed pay. In model 2 I included total revenues, the size of the largest owner and the number of owners as control variables. Based on the values listed the table above, it can seem like the level of fixed pay does not have any significant effect on the dependent variable measured by operating results at a 5 % significance level.

This is not in accordance with the vast amount of research made about incentive pay, but again, there is a change the outcome would have been different if I would have used performance-based pay instead of fixed pay. Another underlying reason could be the history of the Norwegian energy industry as elaborated in 1.6, where which describes the industry as being homogeneous and deep-rooted in the old-fashion, pre-1991 market conditions where the only purpose of the power plants was to support their home regions at a reasonable price level.

According to Randøy and Skalpe (2007), managerial compensation has increased by 89 % from 1999 to 2005, primarily by the introduction of stock option, and at the same time as historical charts show that the profitability of the energy companies has increased as well (Proff). This *is* in accordance with relevant Agency theory, but the increase does not seem to be because of the level

of fixed salaries to the CEO. Additionally, Oxelhaim and Randøy (2005) state that as a consequence of globalization, the salaries have increased as well, which one would assume is the case of the energy companies because of the deregulation in 1991 where the market went from being a relatively closely and regulated market, to an open market with more 'capitalistic' objectives.

More interesting, we have from before that the certainty equivalent of the CEO (employee) is $[\alpha + \beta e - C(e) - 1/2r\beta^2 Var(x-\gamma y)]$, the certainty equivalent of the board (employer) is $[P(e) - (\alpha - \beta e)]$, and thus the total certainty equivalent as presented in chapter 2.2.1 is $[P(e) - C(e) - 1/2r\beta^2 Var(x-\gamma y)]$. Consequently, the incentive constraint is $[\beta - C'(e) = 0]$ (Milgrom & Roberts 1992). As mentioned before, we see that the fixed pay which is the independent variable of this part is not even included in the total certainty equivalent. The equation therefore states that the employee is not basing his effort level on fixed pay at all. In contradiction to most agency theories, this is actually in accordance with the findings of this paper. Moreover, it follows that the mathematical example would support a positive relationship between performance-based pay and profitability. At the same time, Randøy and Skalpe (2007) state that the 89 % increase in managerial pay between 1999 and 2005 is because of the increasing use of stock options, and not any significant increase in the fixed pay. Put together with the increase in profitability of the hydroelectric energy companies, neither this supports the hypothesis.

This is also in accordance with Eisenhardt, M, K. (1989), in which proposition number one said that w*hen the contract between the principal and agent is outcome based, the agent is more likely to behave in the interests of the principal.* Thus, I have no basis for saying that the level of the fixed pay will affect the profitability.

The next and final argumentation on why my findings goes against most research on the area of the principal-agent relationship, is that there are other external factors which have significantly more effect on profitability than managerial pay. These external factors encompass the rate of flow, or flow of water of the river or waterfall which is controlled by each company. In addition to the size of the river, the annual level of precipitation is also affecting the results. This also goes for the relationship between ownership structure and profitability, thus it will be thoroughly elaborated in chapter 5.5.

Conclusively, I refer to chapter 5.5 (critique) on an elaboration on the external factors in which I believe have a considerable effect on the relationship of the hypothesis H1.

5.2 Ownership concentration

In chapter 2.1, 2.3 and 2.4 the focus was on ownership concentration where the mainstream research supports a positive effect by having a few and large owners. The hypotheses regarding ownership concentration were:

Hypothesis 2 (H2): There is a positive relationship between ownership concentration and the operating result of the company.

And:

Hypothesis 3 (H3): There is a negative relationship between the number of owners and the operating result of the company.

Hansmann (quoted in Thomsen, 2008 pp. 99-95) says that the ownership concentration is deciding the shareholders' power to influence the strategies and objectives of the companies, in addition the way they exercise their power. He continues by arguing that ownership concentration effects the profit goals, dividends, capital structure and growth rates of the companies, in other words; profitability. According to the research of Hansmann, we should see a positive relationship between the size of the largest owner and the operating result, and a negative relationship between the number of owners and the operating result. One of the reasons to this is what Jensen and Meckling (1976) called a trade off between risk and incentive efficiency. They say that large owners will have stronger incentives to monitor managers and ensure that their interests are being maintained. Accordingly, this would explain any positive relationship between high profitability and the energy companies which have only one owner, or a few minorities with one dominating owner.

Fama and Jensen (1983) on the other hand said that if the share becomes too large, the expropriation of the minor shareholders kicks in, and the profitability declines, as seen in figure 2.3. Based on this, it should be hypothetically possible to figure out the optimal share with regards to maximum operating results. Anyhow, if the research of Fama and Jensen can be generalized on to the Norwegian energy sector, we should already be able to reject H3 and H3.

On the other hand, I also elaborated on the role of the government as a major owner in all but one of the largest energy companies in my population, both directly and indirectly. Based on the presented theory by Thomsen (2008) we could assume a non-existing or weak relationship between the independent variables and the dependent variable, despite the consensual research on this field. There are arguments saying that governmental ownership will emphasize stakeholder interests and political goals in a larger degree. Examples of political goals relevant for the energy industry are low output prices or employment. So to say, an in accordance with the pre-1991 market conditions as mentioned above, governmental ownership is an institutional alternative to regulations (Thomsen, 2008).

If we regard the theories about governmental majority ownership (Thomsen, 2008), the stakeholder value perspectives by Freeman and Reed (1982) and De Wit and Meyer (2004), and the article by Jensen and Meckling (1976) defining property rights together, we can say that the purpose of the Norwegian hydroelectric energy companies is to emphasize the social regional communities in a much larger degree than other companies. According to Randøy and Skalpe (2007) and Jensen and Meckling (1976), this would also explain and support a weaker relationship between ownership concentration and profitability. That means that it could explain any relationship between the variables in H2 and H3.

So what does the findings of this paper tell us? The regression analysis in chapter 4.4.2 gives us the following numbers:

	β	t	Sig.
Model 1:	-.038	-.299	.766
Model 2:	.298	-455787	.010
Model 3:	.433	.2.584	.012

Figure 5.3: Regression analysis for model 1-3.

To sum up, the models included:

Model 1: Operating result, number of owners

Model 2: Operating result, owner concentration

Model 3: Operating result, Managerial pay, Number of owners, Owner concentration, Total revenues of the company

As we can see from these numbers, there seem to be a weak negatively relationship between the number of owners and the operating results of the companies. This is as expected and in accordance with relevant theories. However, the numbers are not good enough to conclude a relationship. Therefore, it seems like I would have to reject hypothesis 3; I do not have a good enough basis for saying there is is a negatively relationship between the number of owners and the operating results in Norwegian hydroelectric energy companies.

5.3 Summary of the results

In order to reject or support the hypotheses, some decision criteria have to be defined. First of all, there are two kinds of tests which can be used. In this paper, I have used a two-tailed test in order to determine any relationship between the dependent variable and the independent. The alternative

would be to use a one-tailed test, which is used to point out the direction of the between the variables, meaning whether the variables are positively or negatively related. SPSS has in this case provided a two-tailed test. If the Sig.-values provided by SPSS fall under the 5 %-significance level (0,05), we should reject the hypothesis. Thus, I will base the results on the t and Sig.-values.

5.3.1 Hypothesis 1

Hypothesis 1 (H1): There is a positive relationship between the amount of fixed pay to the CEO and the profitability of the company.

SPSS tells us that the beta coefficient is 0,093, meaning that if the profitability will increase by 0,093 if the fixed pay is increased by 1. This indicates a positive relationship between the variables. On the other hand, we can not say that the the variable F*ixed pay* is significant based on the t-value of 0,771 and significance level of 0,461. **We therefore reject hypothesis 1.**

5.3.2 Hypothesis 2

Hypothesis 2 (H2): There is a positive relationship between ownership concentration and the operating result of the company.

When it comes to the size of the largest owner, we see that the beta coefficient is 0,298. But based on the t-value of 2.652 and the level of significance at 0,010 we can say there is a weak positive relationship between the size of the largest shareholder and the operating results of the companies. **Thus; hypothesis 2 is supported.**

5.3.3 Hypothesis 3

Hypothesis 3 (H3): There is a negative relationship between the number of owners and the operating result of the company.

In this case, we see that the beta coefficient is -0,038, which tells us that if the number of owners increase by 1, the profitability will decrease by 0,038. The t-value of -0,299 shows a very weak negatively relationship between the number of owners and the operating result. This is in accordance with the relevant theories, which as previously mentioned indicated that a higher number of owners goes on the expense of profitability of the company. However, the numbers are not good enough to point out a significant relationship. **Based on this, we reject hypothesis 3.**

5.4 General interpretations

5.4.1 Managerial compensation

From before, we know that there has been an average increase in managerial salaries between 1999 and 2005 (Randøy & Skalpe, 2007) which can assumed to be partly valid for the energy companies as well, and we also know that there has been a significant increase in profitability in the energy sector (Proff). Thus, there seems to be a positive relationship between the increase in managerial pay and profitability of the largest Norwegian hydroelectric energy companies.

What we can say based on the test results in this paper, is that the profitability seems to be insignificantly affected by the level of fixed pay. Instead, other methods of compensation, such as stock options in particular, seems to be the value adding factor in this context. In fact, Randøy & Skalpe (2007) determined the economical value of stock options in 2005 to be 34 % of CEO pay.

5.4.2 Size of the largest owner

The description by Edling et al. (2007) (presented in Thomsen, 2008) of owner concentration and common owner identities in some of the northern-European countries has proven to be correct with regards to Norway and the energy sector. First, to recall the bell-shaped graph in figure 2.3:

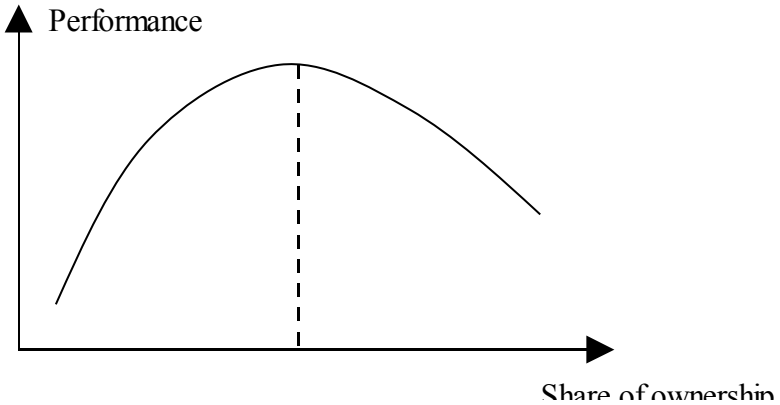


Figure 5.4: Relationship between share of ownership and firm performance (Thomsen, 2008)

As mentioned in chapter 2, the dotted line indicates the optimal share. If the interpretation by Thomsen (2008) based on the research of Demsetz and Lahn (1985) and Zeckhauser and Pound (1990) is transfarable to the Norwegian energy sector, we would not be able to see a linear positive relationship between the size of the share and the oparating result. Instead, the companies with one very large owner a few minorities as for instance Røldal-Suldal Kraft AS (see appendix), would not have the same basis for achieving good operating results. At the same time Thomsen emphasizes that the governmental type of ownership could give a graph which looks different from this.

In the regression analysis in chapter 4.4.2 and 5.3.2 we could see that there seemed to a weak positive relationship between the size of the largest shareholder and the profitability as indicated by the operating results. In this context, it means that the companies consisting of a large number of municipalities as for instance Trønder Energi AS which is owned by 23 nearby municipalities where none of them own more than 10 % of the company. In this case, the operating result is "as low as" 38 %, in other words; what we would expect it to be according to the theories mentioned above.

At the same time, hypothesis 2 and the determined, though weak, relationship between these variables is in accordance with Jensen and Meckling (1976) and Fama and Jensen (1983) which state that a larger owner will have better incentives to monitor the management and ensure the level of efforts in order to achieve the highest profitable results. A large and dominant owner will also have better decision power in order to influence the managers, which means that a large owner could communicate its wishes and guidelines to the manager, than a small and insignificant owner would be able to.

Even though we can assume that the stakeholder value perspective as mentioned by Freeman and Reed (1983) and De Wit and Meyer (2004) is moderating the relationship between the variables, since focusing on the environment, employment or consumer friendly output prices goes on the expense of profitability, it seems like even the government and the local authorities do emphasize the shareholder value when in a strong position to influence the management.

5.4.3 Number of owners

According to chapter 5.3.3, I was not able to determine a positive relationship between the number of owners and the operating results. This is despite of research of for instance Randøy and Skalpe (2007), Hansmann (as quoted in Thomsen, 2008 pp. 99-95) and Jensen and Meckling (1976) which by the way has to be regarded in the same context as the size of the largest owner.

One of the reasons to why not any link has been determined, could be the tremendous governmental and municipal influence on these companies. First of all, as mentioned above, in the majority of the companies which have a larger number of owners, the owners are mostly different municipalities with the same share. We can assume that these are shareholders with homogeneous preferences and can therefore be considered as one large owner. This implicates the matter of which this analysis has been conducted, and can thus give an incorrectly result.

Secondly, as it has been said by De Wit and Meyer (2004) and Freeman and Reed (1982) the government will tend to emphasize stakeholder values. There is even a juridical basis for including stakeholder values in the decision making processes (NVE) and focus more on political goals such as output prices and employment Eisenhardt, M, K. (1989), and a green environment.

Finally, it must be said that the number of owners and the size of the largest shareholder are related in the sense that if the largest shareholder has 10 % of the company, it is a given that there must be at least 10 shareholders which in this case is above the average and can be defined as “many”. Thus, a part of the interpretation of the ownership concentration in chapter 5.4.2 is can be said about the number of owners as well.

5.5 Conclusion

Since this study focused on the 72 largest companies with regard to total revenues, any findings would be of significance. Still, we should be careful if we are to transfer the findings to smaller companies since the outcomes of Szroeter's test of homoscedasticity were not good enough.

The purpose of this study was to examine the relationship between the level of fixed pay and the profitability of a significant number of the largest producers of hydroelectric electricity in Norway, and to find out whether the ownership structure, meaning the number of owners and the size of the largest shareholder, would affect the profitability as well. The *profitability* in this case is indicated by the operating result variable. The reason why I did not choose the annual results as a variable is that the unusually high average operating results in the hydroelectric energy sector justifies extensive investments in developing power plants and lines. Hence, the annual results do not reflect the efficiency, level of competency and the "real" profitability of the companies. Based on this, the formal problem definition was as follows:

Is there coherence between managerial pay, ownership structure, ownership concentration and profitability of Norwegian hydroelectric energy companies?

In the light of the analyses in chapter 4, I was able to answer the problem definition using a selected few variables. I was not able to determine a significant positive relationship between the level of fixed pay, the number of owners, and profitability. However, based on the regression analysis of the relationship between ownership concentration and operating results in chapter 4.4.2 there seems to be a weak positive relationship between the size of the largest shareholder and the profitability of the companies.

First of all, managerial compensation, here indicated by the level of fixed pay to the CEO, has been subject to a vast amounts of studies. One of the cornerstones in Agency theory is the problem of motivating the agent to attain a higher level of effort and converging the goals of the principal and

the agent (Clarke, 2008). Managerial pay normally consists of one part fixed pay, and one part performance-based pay, and it is the performance-based part that best explains the relationship between managerial pay and profitability. Unfortunately, since the limited time period for this thesis did not allow collecting empirical data about stock options or other performance-based compensation methods of 72 companies, I had to use the more easily accessible information about the fixed pay.

Secondly, the ownership concentration is according to Thomsen (2008) measured by the size of the largest shareholder. As mentioned above, the profitability of companies where there is one large and dominant owner seemed to be slightly higher than the companies equally owned in cooperation by for instance a larger number of municipalities, which is a common ownership structure in the Norwegian energy industry. This is in accordance with the relevant theory on this field, for instance as presented by Clarce (2008), Keasey, Thompson, and Wright (2005), and Thomsen (2008). This relationship seems to be existing despite the fact that in the pre-1991 market conditions the hydroelectric energy companies existed for one reason only; to support the local communities or what Freedman and Reed (1983) would call emphasizing stakeholder values in a wide sense. This purpose of organizational existence seems to still be existing until this day, both culturally and juridically, in addition to the fact that even though the domestic energy market was opened up and deregulated by the conservative Syse-government in 1991, there is still a considerably strong governmental or municipal dominance in all but a few of the energy companies, both directly and indirectly. According to Freedman and Reed (1983) this would moderate the effect between the assumed positive relationship between ownership concentration and profitability. We can only speculate in whether the relationship between the variables would be much more significant if the companies were privately owned and were operating without “stakeholder constraints”.

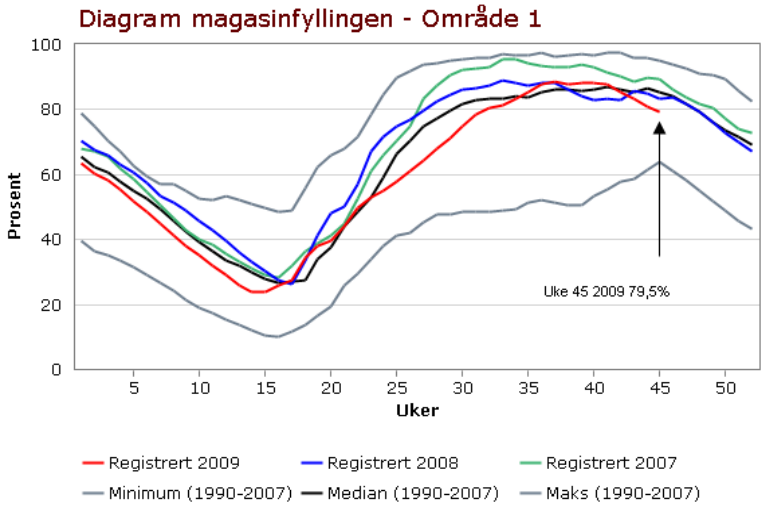
And finally, I expected to find a similar, but negatively, relationship between the number of owners and the profitability of the companies. However, I was not able to determine such a correspondence. As elaborated above, the number of owners is closely related to the size of the largest shareholder. The relevant theories about the effect of an increasing number of owners say that owners with an relatively insignificant number of shares do not have the incentives to monitor the management of the companies, thus creating a lower level of efforts among managers which in the next step leads to decreased profitability (Jensen & Meckling, 1976).

5.6 Critique

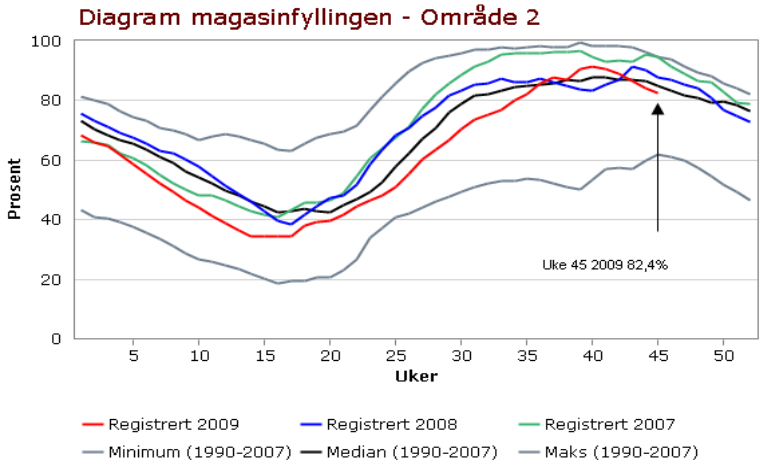
There are several things that could effect the results of this study. For starters, the methodical framework presumes sufficient validity and reliability in order to draw conclusions. The first focus of the study was managerial compensation. I chose fixed pay to indicate the managerial pay, and it was considered to be sufficient in chapter 3.9.1. A better alternative would be to use the fixed pay in combination with other methods of compensations which are based on the performance of the CEO's. There is a chance that the fixed pay does not give a complete and sufficiently nuanced image of the relationship between the managerial compensation and the operating result. Unfortunately, to come up with information about other arrangements, for instance bonuses, stock options, stock grants, and other benefits (i.e. health insurances, fringe benefits, pension schemes, etc.) for even a small portion of the companies in this this research turned out to be too difficult and time-consuming for the limited time available for this paper. Of perhaps even higher importance is that if we assume a relatively equal or standardized CEO total salary in the industry, and that the distribution of fixed pay and performance-based pay is unequal from company to company, we can imagine that if part consisting of the the fixed pay is low, it might indicate that the performance-based part is correspondingly hight. If this is the case, if would mean implications for the reliability of the paper since this study takes for granted that low fixed pay indicates a low total pay.

Secondly, early in the research process I discovered that there could be external factors which could have significantly stronger influence on the financial results of the companies than the variables I had selected for this thesis. By this I mean the rate of flow (flow of water) through the turbines of each power plant. For instance, there can be relatively small companies which have the property rights of large rivers, waterfalls, or back waters with a very high rate of flow. At the same time, some of the companies may produce their electricity from smaller rivers and waterfalls, or dammed up lakes with unoptimized water pressure, but still be large enough to be on the list of this research. An hypothetical example may be two different hydroelectric energy companies. The first company has the property rights of a huge river, but is situated in a small place where the use of complexed incentive systems are not as common, despite the aftermath of globalization influence as indicated by Randøy and Oxelholm (2008). The CEO of this company receives a relatively low fixed salary as he has done for many years. The other company has through many years hired top students and managers from reputable schools and firms, which leads to higher managerial compensation than the first company. This happens despite the fact that the river is smaller and highly dependent on the

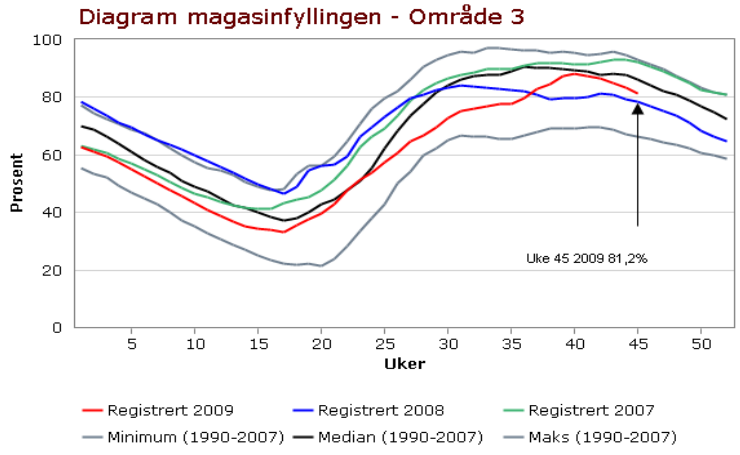
seasonal precipitation. In this case, the first company will still be able to achieve a better operating result than the second company. When it comes to this research, it can lead to inaccurate results. Another external factor which is similar to the one above, is how stable the precipitation is over the years and in different parts of the country. For instance, my population is not limited to any specific parts of the country. To illustrate the difference I will present the following diagrams in Norwegian (NVE).



- ***Område 1 (Area 1)*:** This diagram illustrates the filling of water dams in the eastern parts of Norway and the Agder-regions.



- ***Område 2 (Area 2)*:** This diagram illustrates the areas of the west cost counties, including Rogaland, Hordaland and Sogn og Fjordane.



- ***Område 3 (Area 3):*** Covers the northernmost areas of Finnmark, Troms, Nordland, Nord-Trøndelag, Sør-Trøndelag in addition to Møre & Romsdal.

Figures 5.5: Filling of water dams

As we can see from these diagrams, there are differences that will in the first step affect the production of electricity, then the pricing of electricity, and in the last step the operating result and the profit margins of the companies. In addition to the regional differences, we can see even more clearly that there are differences from one year to the other. The variance between the minimum and maximum value between 1990 and 2007 for area 1 is almost as much as 100 %. Unquestionably, this must have an financial impact on the companies.

So with regards to this, how can the research be improved in order to achieve a more nuanced image of the industry? An alternative would be to conduct analyses for each of the regions 1 2 or 3, or most important; to include rate of flow as a variable. Unfortunately, this could have been possible in the beginning of the working period, but has instead become an idea for further research.

When it comes to the managerial pay of the companies, it has been mentioned that the companies have had a high growth in salaries as a result of globalization among other factors. According to Randøy and Skalpe (2007), there has been a significant growth (89 %) in CEO compensation between 1999 and 2005. This has happened because the managerial incentive system has changed from consisting of a large part of fixed pay to a larger part of stock options. Unfortunately and as mentioned above, it was not possible to include stock options as a variable in this paper because of the restricted accessibility of the information and the limited amount of time available.

Other factors which has an impact on the compensation is the age of the CEO. According to Oxelheim and Randøy (2008), the age of the CEO plays a role in when determining the level of compensation. Accordingly, as the age of the CEO increases the level of compensation increases simultaneously because of seniority. The age of the top executive in the companies could have been included for adjusting the relationship between managerial compensation and operating result. In the same research, Oxelheim and Randøy also mentions diversity of Anglo-American board members as contribution for higher compensation. On the other hand, if the CEO has share of the company, or if the length of service of the chairman of the board is long-lasting, the level of compensation will decrease. The date of birth of not only the CEO, but the board members as well, is actually accessible together with the rest of the company information and accounting data. Unfortunately, it was excluded from this analysis because of the limited amount of time.

5.7 Thoughts for further research

Primarily, and as mentioned above, it would be interesting to conduct the same research and include the rate of flow (flow of water) for each hydroelectric power plant as a variable. As previously discussed, it can seem like the rate of flow could have a greater effect on the financial numbers than the variables related to the agency theory.

Another though of interest would be to include a few of the variables used in Oxelheim and Randøy (2008) such as:

- Regional location
- The age of the CEO
- Whether the company has a female CEO
- Whether the company has a female chairman of the board
- The seniority of the board members

According to empirical research and discussions on this field, these factors could be considered when examining the principal-agent relationship in Norwegian hydroelectric energy companies.

While working on this paper, I also longed for an international comparison to the organizational structures and conditions in other relevant countries. Undoubtedly, the production of hydroelectric power is significantly higher in Norway than other countries which are not blessed with mountainous topology, but the principal-agent relationship as a subject for analysis remains comparable across state boarders.

And finally, as mentioned by Randøy and Skalpe (2007), managerial compensation has increased by 89 % between 1999 and 2005, at the same time as historical charts show that the profitability of the energy companies has increased as well (Proff). Without proving a direct relation, this seems to be

in accordance with relevant Agency theory. However, the increase in managerial compensation does not seem to be caused by level of fixed salaries to the CEO. Instead, Randøy and Skalpe (2007) say that the increase is primarily caused by the introduction of performance-based incentive systems as stock options. The next step could be to do the same analysis, but focus on the relationship between performance-based pay and profitability of the companies.

Appendix

Companies (more than NOK 100 millions in total revenues)	Total revenues	Operating result (%)	Managerial compensation
Statkraft SF	25465000000	68.8	3.013.000
Statkraft AS	12154000000	56.5	2.300.000
Hydro Norsk Energie	20635882000	5,00	0
Lyse Energi AS	4394601000	55.6	1.537.000
BKK AS	4121272000	57.8	1.976.000
Agder Energi Produksjon AS	3503109000	52.3	1.116.000
Skagerak Energi AS	3384010000	64.2	1.350.000
E-CO Vannkraft AS	2902905000	74.9	1.629.000
Lyse Produksjon AS	2492563000	71.9	1.079.000
BKK Produksjon AS	2345177000	71.3	1.113.000
Nte Energi AS	2024491000	34.7	935.000
Skagerak Kraft AS	1932509000	74.2	1.099.000
Eidsiva Vannkraft AS	1408200000	68.6	1.155.000
Istad AS	1310000000	10.0	1.098.000
Helgelandskraft AS	1279895000	27.0	1.015.000
Trondheims Energi AS	1145405000	72.4	953.000
Tafjord Kraft AS	115880000	48	4.919.000
Trønder Energi AS	1023320000	38	1.411.000
SKL Produksjon AS	964855000	58.9	1.119.000
Sunnhordaland Kraftlag AS	964855000	58.9	0
Hafslund Produksjon AS	896714000	76.2	1.150.000
Oppland Energi AS	835252000	72.3	600000
Haugaland Kraft AS	776202000	16.0	1.340.000
Sogn og Fjordane Energi AS	434010000	24.0	1.111.000
EB Kraftproduksjon AS	691910000	63.7	963.000
Østfold Energi AS	718623000	71.1	1.393.000
Trønderenergi Kraft AS	712596000	60.2	829.000
Tafjord Kraftproduksjon AS	689839000	73.1	978.000
Tussa Kraft AS	662000000	27.0	781000
SKS Produksjon AS	654722000	58.0	1.029.000
SFE Produksjon AS	543541000	26.0	879.000
Aktieselsk. Tyssefaldene AS	616200000	2.0	1.060.000
Gudbrandsdal Energi AS	501110000	8.0	866.000
Kraftverkene i Orkla AS	498196000	70.9	150000
Ringerikskraft AS	142520000	21.0	984.000
Aktieselskabet i Saudefaldene	428607000	42.8	551.000
Nordkraft Produksjon AS	415303000	57.2	1.535.000
Troms Kraft Produksjon AS	407661000	49	880.000

Istad Kraft AS	402022000	13.0	845.000
Røldal-Suldal Kraft AS	399709000	75.7	0
Bodø Energi AS	378720000	18.0	1.039.000
Tussa Energi AS	366598000	44.7	0
Elkem Energi Siso AS	350167000	74.7	1.009.000
Oslo Lysverker AS	340248000	76.9	0
Sunnfjord Energi AS	323760000	23.0	945.000
Glomma Kraftprod. AS	311779000	81.2	0
Vardar AS	232500000	-0.6	1.496.000
Sira Kvina Kraftselskap AS	305961000	18.0	1.284.000
Lågen og Øvre Glomma Kraftproduksjon AS	284185000	76.8	0
Uste Nes AS	252000000	48.6	0
AS Eidefoss	247000000	54.6	818000
Dalane Energi IKS	245714000	21	777000
Elkem Energi Bremanger AS	230755000	64.8	1030000
Sognekraft AS	209836000	40.2	1059000
Eastern Norge Svartisen AS	183861000	62.4	245000
Arendals Fossekompagni AS	173584000	71.1	1500000
Pasvik Kraft AS	164810000	69.6	512000
Tinfos AS	160416000	42.8	7685000
Otra Kraft DA	150586000	-14.9	874000
Ringerikskraft-Produksjon AS	148859000	59.2	295000
Skagerak Energi AS	138401000	-56	1359000
Sykkylven Energi AS	137649000	13.0	636000
Midt-Telemark Energi AS	134811000	11.0	814000
Opplandskraft DA	127225000	-39.2	250000
Meløy Energi AS	123515000	6.0	853000
Voss Energi AS	120479000	33.6	914000
Røros Elektrisitetsverk AS	117119000	15.0	774000
Rauma Energi AS	116029000	44.8	352000
Øvre Hallingdal Kraftproduksjon AS	115181000	80.7	0
Gaudal Energi AS	112457000	5	896000
Alta Kraftlag AS	108683000	-8.6	760000
Trollfjord Kraft AS	105332000	9	867000
Stranda Energiverk AS	103651000	11.0	802000
Kvænangen Kraftverk AS	100082000	67.1	50000

Companies (more than NOK 100 millions in total revenues)	Number of owners	Share of largest owner (%)
Statkraft SF	1	100
Statkraft AS	1	100
Hydro Norsk Energie	1	100
Lyse Energi AS	17	67
BKK AS	18	49
Agder Energi Produksjon AS	1	100
Skagerak Energi AS	4	67
E-CO Vannkraft AS	1	100
Lyse Produksjon AS	1	100
BKK Produksjon AS	1	100
Nte Energi AS	1	100
Skagerak Kraft AS	1	100
Eidsiva Vannkraft AS	1	100
Istad AS	3	50
Helgelandskraft AS	14	20
Trondheims Energi AS	1	100
Tafjord Kraft AS	4	50
Trønder Energi AS	23	10
SKL Produksjon AS	1	100
Sunnhordaland Kraftlag AS	8	40
Hafslund Produksjon AS	1	100
Oppland Energi AS	1	100
Haugaland Kraft AS	7	10
Sogn og Fjordane Energi AS	10	48
EB Kraftproduksjon AS	2	60
Østfold Energi AS	14	50
Trønderenergi Kraft AS	1	100
Tafjord Kraftproduksjon AS	1	100
Tussa Kraft AS	9	10
SKS Produksjon AS	2	79
SFE Produksjon AS	1	100
Aktieselsk. Tyssefaldene AS	3	40
Gudbrandsdal Energi AS	4	25
Kraftverkene i Orkla AS	4	33
Ringerikskraft AS	2	88
Aktieselskabet i Saudefaldene	2	85
Nordkraft Produksjon AS	3	50
Troms Kraft Produksjon AS	1	100
Istad Kraft AS	1	100
Røldal-Suldal Kraft AS	2	91
Bodø Energi AS	1	100

Tussa Energi AS	1	100
Elkem Energi Siso AS	1	100
Oslo Lysverker AS	1	100
Sunnfjord Energi AS	8	37
Glomma Kraftprod. AS	1	100
Vardar AS	21	20
Sira Kvina Kraftselskap AS	4	41
Lågen og Øvre Glomma Kraftproduksjon AS	1	100
Uste Nes AS	1	100
AS Eidefoss	5	20
Dalane Energi IKS	4	60
Elkem Energi Bremanger AS	1	100
Sognekraft AS	7	45
Eastern Norge Svartisen AS	1	100
Arendals Fossekompagni AS	20	10
Pasvik Kraft AS	1	100
Tinfos AS	5	23
Otra Kraft DA	2	68
Ringerikskraft-Produksjon AS	1	100
Skagerak Energi AS	3	66
Sykkylven Energi AS	1	100
Midt-Telemark Energi AS	3	33
Opplandskraft DA	4	25
Meløy Energi AS	1	100
Voss Energi AS	1	100
Røros Elektrisitetsverk AS	3	66
Rauma Energi AS	1	100
Øvre Hallingdal Kraftproduksjon AS	1	100
Gaudal Energi AS	2	50
Alta Kraftlag AS	1	100
Trollfjord Kraft AS	1	100
Stranda Energiverk AS	1	100
Kvænangen Kraftverk AS	5	20

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