UNIVERSITY OF TURKU

ABSTRACT

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Abstract

Finland has a relatively large state-enterprise sector comparing to other OECD countries. The State has full ownership of 34 companies and a significant portfolio of holdings in listed companies, exceeding the value of EUR 37 billion. Due to the size of state ownership, the State plays a major role in the functioning of the markets and the economy.

This study analyzes the effects of ownership structure, and particularly the impact of privatization on the performance of state-owned enterprises in Finland by comparing the pre- and post-privatization performance of 16 companies privatized between 1988 and 2018. The changes in profitability, operating efficiency, output and employment level are analyzed using Wilcoxon signed-rank test. The results indicate no improvement in profitability or operating efficiency but find some evidence suggesting an increase in output and employment level.

Key words	Privatization, state-owned enterprises, performance, efficiency, Finland

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Tiivistelmä

Suomessa on suhteellisen paljon valtionyhtiöitä, kun verrataan OECD-maita. Valtio omistaa täysin 34 yhtiötä, ja omistusten arvo pörssilistatuissa yrityksissä on huomattava, ylittäen 37 miljardia euroa. Yritysomistusten määrästä johtuen valtiolla on merkittävä vaikutus markkinoiden toimintaan sekä yleisesti maan talouteen.

Tässä tutkimuksessa selvitetään omistajuuden ja erityisesti yksityistämisen vaikutusta suomalaisiin valtionyhtiöihin vertaamalla 16 yrityksen taloudellista suoriutumista ennen ja jälkeen yksityistämisen. Yksityistämiset on toteutettu vuosien 1988 ja 2018 välillä. Muutoksia kannattavuudessa, operatiivisessa tehokuudessa, tuottavuudessa ja työntekijöiden määrässä analysoidaan Wilcoxonin merkittyjen sijalukujen testillä. Tutkimuksessa ei löydetty näyttöä, että yksityistäminen parantaa kannattavuutta tai operatiivista tehokkuutta, mutta osa tuloksista viittaa tuottavuuden ja työntekijöiden määrän kasvuun.

Avainsanat	Yksityistäminen, valtionyhtiöt, menestyminen, tehokkuus, Suomi

UNIVERSITY OF TURKU
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EFFECTS OF PRIVATIZATION ON THE PERFORMANCE OF STATE-OWNED ENTERPRISES IN FINLAND

An Empirical Analysis

Master's Thesis
in Accounting and Finance

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1 INTRODUCTION

1.1 Background

Today, the privatization of state-owned enterprises (SOEs) is a global phenomenon. During the past four decades, there has been a spread of privatization programs in more than a hundred countries. Finland is no exception and took its first steps on privatization at the end of the 1980s when the government sold Ajokki and Televa, which later became Nokia Telecommunications. Since then, the State has acquired more than €18 billion in revenue from selling its holdings, and the companies have gathered a total of €1.4 billion in venture capital from private investors.

One main argument for divestiture of SOEs has been their economic inefficiency and poor performance. Privatization may have other motives, but financial performance is almost always used as reasoning when privatization is considered. The performance of state-owned enterprises has been a subject of numerous studies. Although the results are not unanimous, most studies find that SOEs are significantly less efficient than private firms. Privatization increases efficiency on the firm-level and generates positive macroeconomic effects. However, further studies are still needed since there is also evidence that several factors and circumstances may impact the outcome of privatization. Also, SOEs are already under increasing pressure to rationalize their operations. Kole and Mulherin (1997) analyzed the impacts of market pressure and concluded that, in a competitive environment, other factors than ownership determine the firm's performance. This suggests that the inefficiency of SOEs is not something inevitable and that efficiency may change over time. It also indicates that privatization is not the only available solution to possible performance issues of SOEs. Furthermore, it has been documented that SOEs perform relatively better in some countries than in others. This supports the theory that environmental factors affect the performance of SOEs.

Economic factors are not the only driving forces behind privatizations. State ownership is also a highly political issue. Ranki (2012) identifies four possible motives for privatizing, or respectively, advocating state ownership. These motives include supporting significant/minimal state ownership on principle; following a trend; privatizing or expanding state ownership from an economic necessity; and pragmatic reasons, referring to a case-by-case approach to privatizing without an ideological cause. The political motives are, in fact, crucial when privatization is considered. After all, politicians are the ones

making the decisions. The differences in ideologies between political parties have had surprisingly little effect on privatizations in Finland. Unlike many other countries, Finland never had an explicit privatization program, and privatizations were executed on a case-by-case basis. This policy has carried throughout governments, regardless of the ruling political party. Naturally, different standpoints exist and are also present in Finnish public debate, with left-wing typically supporting wider state ownership and right-wing favoring private ownership in companies without strategic importance. The intriguing question is, of course, which of the companies constitute strategic importance. There has been some controversy on privatizing natural monopolies in recent years, such as companies operating in the electricity distribution business. Electricity distribution is not considered to contain strategic importance, allowing privatization. However, the State has not been successful in regulating the monopoly, which has led to significantly higher consumer prices.

Privatization has not always been as fashionable as it is today. It became something of a trend only after the conservative administration of Margaret Thatcher got elected in 1979 and started extensive privatizations in the United Kingdom. Until then, the general sentiment had favored further nationalization instead of privatization - also in Finland. State ownership was regarded as an asset, as opposed to foreign ownership, which was considered a threat. State ownership also had an essential role in industrializing the nation after the Second World War, when the capital was scarce. The first actual reference to privatization in the government program appeared in 1991 when Harri Holkeri's government included in a possibility to raise funds from private investors in certain companies (Ranki 2012, 34-62, 183-184).

State-owned enterprises make an exciting subject also due to the contradictory expectations they face. On the other hand, they are criticized for inefficiency compared to privately owned firms. However, at the same, as the recent debate on executive compensation in state enterprises shows, SOEs are not expected to play by the same rules as private firms. The public discussion implies that maximizing shareholder value is not always expected from state-owned enterprises, at least not at the cost of employment.

The case of STX shipyard in Turku is one example of these expectations on government's role. Several politicians and columnists demanded government intervention to ensure the cruise liner order and continuity of production in Turku. Even partial ownership was suggested. In essence, this means subsidizing unprofitable industries suffering from overcapacity to maintain jobs. The implications for privatization research are that if the

goals set for SOEs and privately owned firms are different, the comparison of their performance becomes complicated.

The primary motivation for choosing this subject was to find out how successful privatizations have been in Finland in terms of firm performance. This is a valid question since many Finnish SOEs have a good reputation and seem relatively profitable. It is not self-evident that private ownership will improve the efficiency of these companies.

1.2 Objectives of the Study

This thesis aims to empirically analyze the effects of privatization on the performance of state-owned enterprises in Finland. The goal is to answer one specific research question:

Has privatization improved the performance of the privatized state-owned companies in Finland?

To answer this research question, the performance of SOEs will be measured before and after divestiture. Several accounting performance measures will be used to achieve a comprehensive understanding of the effects of privatization. The expectation, based on prior research, is that privatization is likely to improve performance. By answering the research question, this study also gives evidence on the underlying fundamental question: does state ownership affect firms' performance? The performance effects are measured in profitability, operating efficiency and output. Additionally, this study analyzes the effects of privatization on employment. The purpose is to examine whether the potential benefits of privatization are achieved while maintaining the employment level or whether privatization leads to layoffs. This is a relevant question since the unemployment level is considered a problem in Finland.

1.3 Structure of the Thesis

The thesis is divided into five main chapters. After the introductory chapter comes a theoretical part, in which the leading theories concerning ownership and privatization will be illustrated. The main empirical findings will also be presented. This part will receive much weight, as the knowledge of existing theories is essential for understanding the development hypotheses. An extensive survey of prior studies and existing theories will also help demonstrate why the study's topic is relevant. The theoretical part constitutes

Chapter 2. The third chapter presents data, hypotheses and methodology. The problems that arise from the data set, as well as other technical issues, will be discussed here. The main concepts have been defined in the introduction chapter, but a comprehensive description of the chosen methodology will be provided here. Chapter 4 presents the empirical results obtained from testing the hypotheses. Some technical issues concerning the tests are also discussed. A more extensive analysis of the results and a comparison to prior research, along with the conclusions for the study, are left to the final chapter of the thesis. Chapter 5 also provides a summary and an evaluation of the thesis.

In addition to the five main chapters, two appendices are also included. Appendix 1 gives additional information on the sample firms. Details on possible measures taken inside the companies to improve performance after privatization are also reported. Appendices 2 and 3 provide a money value conversion table and GDP measures in Finland, used in this study.

2 THEORETICAL BACKGROUND

2.1 Conceptual Framework

2.1.1 Separation of Ownership and Control

Privatization literature and other SOE-related literature builds on classical economic theories on ownership structure, agency problems and corporate governance. All these research traditions concentrate on the issues arising from the separation of ownership and control of a firm. A short introduction to the theories is given here, as some knowledge of the theoretical foundation is needed to understand the assumptions behind privatization theories.[1]

The separation of a firm's ownership from control has been a topic in the economic literature since Adam Smith. However, Berle and Means set up the foundations for modern ownership theories in *The Modern Corporation and Private Property* (1932) (Jensen and Meckling 1976, 31). The main observation of the study was that the typical ownership structure of a firm had changed. Larger companies had evolved into corporations, which did not have one clear owner, and where the ownership was not permanent. The control of these corporations was also separated from ownership. Berle and Means defined that ultimately the control lies in the hands of those individuals who have the power to select the directors to the company. Most shareholders remained passive owners. When the ownership is widely distributed, the bulk of owners have little control over the enterprise allowing the controlling party to increase their wealth at the expense of the minority shareholders. In an extreme case, control moves away from ownership and is ultimately in the hands of the operative management itself (Berle and Means 1932, 69-130, 352).

Ronald Coase's *Nature of the Firm* (1937) created foundations for the agent theory by introducing the so-called contractual view of the firm. In his essay, Coase seeks to explain why firms emerge in an economy instead of market participants acting individually. Coase argues that there is a cost for negotiating and concluding a separate contract for each exchange transaction. While these costs cannot be eliminated, they can be lowered within a firm since these individual contracts are replaced by one contract. In the

[1] The theoretical literature on SOEs draws its arguments from a wide set of economic theories. In addition to agency and corporate governance theories, arguments are derived, among others, from property rights theories, transaction costs theories and public choice theories. These theories are closely related to each other, and all have their origins in Coase's theory of a firm.

contract, the firm's employees agree to obey the directions of an entrepreneur within certain limits (Coase 1937, 396-397).

2.1.2 Agency Theory

Deriving from the research tradition set up by Berle, Means and Coase, what is called an agency theory was established in a set of articles in the 1970s and 1980s. These papers examined the so-called agency problem, which arises when one party, "the principal," delegates work to another "the agent" (Jensen and Meckling 1976, 5). Jensen and Meckling introduced essential ideas with the article *Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure* (1976). Fama and Jensen further developed the theory in their article *The Separation of Ownership and Control* (1983).

Agency theory concentrates on the agency relationship, which can be defined as a contract under which one party (the principal) engages another (the agent) to perform some service on their behalf, which involves delegating some decision-making authority to the agent. If the agent is a utility maximizer, there is reason to believe that he will not always act in the principal's best interests (Jensen and Meckling 1976, 308). Under conditions of asymmetric information and uncertainty, agency theory recognizes two distinct problems: *moral hazard* and *adverse selection*. Moral hazard refers to a situation where the principal cannot be sure whether the agent has put forth the agreed-upon effort. The term for the lack of effort, in the context of agency theory, is shirking. Adverse selection can be defined as a condition under which the principal cannot wholly verify if the agent has the skills or abilities he claims at the time of hiring or while the agent is working (Eisenhardt 1989, 61). Akerlof describes this problem in the article *The Market for "Lemons": Quality Uncertainty and the Market Mechanism* (1970), in which he gives the example of the secondhand car market. The car dealer has complete information on the quality of the car he is selling, but the buyer cannot be sure if the car is of poor quality ("lemon"). Since buyers cannot tell the quality of cars in advance, all the cars of the same model end up selling at the same price. However, the risk of buying a lousy car lowers the price buyer is willing to pay. The good cars disappear from the market as owners have little incentive to sell for a lower price than the car's actual value (Akerlof 1970, 489-490).

Agency theory proposes ways to reduce the problems arising from the agency relationship. Efficient production can be achieved by monitoring the agent and metering productivity, thus reducing the information asymmetry and causing shirking to become

more difficult (Alchian and Demsetz 1972, 778-779). Agency problems can also be reduced through appropriate incentives for the agent. This can be achieved by offering the agent compensation based on residual claims instead of fixed wages. In some situations, the agent may also wish to expend resources ("bonding costs") to show that he is acting in the principal's interests. However, these actions are not costless and cannot entirely eliminate the problem under conditions of incomplete information. This remaining divergence between the agent's decisions and those decisions that would maximize the principal's welfare is called residual loss. The costs associated with the principal-agent relationship are referred to as agency costs. They can be defined as the sum of monitoring expenditures by the principal, bonding expenditures by the agent and the residual loss (Jensen and Meckling 1976, 5-6).

2.1.3 Corporate Governance

Corporate governance can be defined as a response to the agency problems that arise from the separation of ownership and control in a corporation (Boubakri et al. 2003, 1). Theories of corporate governance seek to find ways to ensure the efficient management of corporations. Economic literature has been interested in these problems since Berle and Means, but the term "corporate governance" did not exist until the 1970s (Zingales 1997, 1).

According to Becht et al. (2002), corporate governance literature is fundamentally concerned with a problem involving an agent (the CEO) and multiple principals (the shareholders, creditors, suppliers, clients, employees, and other parties) with whom the CEO engages in business on behalf of the company. Thus, the corporate governance problem is closely related to agency theory and can also be described as a "common agency problem," referring to an agency problem involving multiple principals. Furthermore, corporate governance rules can be seen as the outcome of the contracting process between these principals and the CEO. Becht et al. summarize the fundamental goal of corporate governance literature as "to understand what the outcome of this contracting process is likely to be, and how corporate governance deviates in practice from the efficient contracting benchmark" (Becht et al. 2002, 14-15).

2.2 Prior Research on State-Owned Enterprises

2.2.1 Theories Related to State Ownership

There exists a vast number of studies analyzing the effects of ownership on a firm's performance. This part of the thesis presents an overview of the theoretical and empirical research on the relative economic performance of state-owned versus privately owned firms. Research on state ownership in Finland is discussed separately at the end of the chapter.

According to Shirley and Walsh (2001), three broad approaches can be distinguished in the theoretical literature on SOEs. The first set of theories argues that product market competition, instead of property rights, is the most critical factor in a company's performance. Another approach focuses on ownership and government behavior, arguing that states use SOEs for purposes other than to maximize social welfare.[2] This would not be possible if the firms were private and would have an adverse effect on performance in any market structure. The third set of theories argues that, regardless of market competition and government goals, SOEs will be less successful than private firms in addressing corporate governance problems (Shirley and Walsh 2001, 4). A short introduction to these approaches is given here:

A. Competition

Competition in product markets has many positive effects on the allocative efficiency of the markets. Shirley and Walsh note that prices tend to move towards marginal cost in a competitive environment, leading to an optimal resource allocation. Also, in an environment where competition is absent, prices are raised, and production is lowered relative to the competitive markets. The theory of competition's impact on operational efficiency can be divided into two related categories. These categories are incentive effects and information effects. Shirley and Walsh point out that competition creates incentive effects since the managers of inefficient firms face diminishing market share. In an environment of incomplete competition, managers may give less than maximal effort. When competition is present, ineffective firms eventually disappear from the markets. According to the theories on the information effects, competition in product markets provides owners an

[2] Social welfare = consumer surplus + producer surplus.

increased amount of information about costs and managers' effort. With this information, the owners can create better incentive systems and evaluate managers' efforts more accurately (Shirley and Walsh 2001, 5-6).

Theoretically, privately owned firms are likely to be more efficient than SOEs because they face market competition, and investors have an incentive to monitor the managers, thus creating pressure to succeed (Omran 2002, 4). In the past, sheltered from competition, SOEs were often instructed to keep their prices low. This resulted in financial losses, which were in some cases documented to amount to even 5 to 6 percent of GDP (Kikeri and Nellis 2002, 1). However, state ownership does not necessarily mean that the firm would be sheltered from competition. If both private and state-owned firms are under the same competitive pressures, the ownership structure should not affect performance in terms of their allocative efficiency (Omran 2002, 5-6).

B. Government Behavior

One reason SOEs can perform less efficiently than privately owned firms may be linked to the government having goals other than maximizing financial performance (Kikeri and Nellis 2002, 8). Shirley and Walsh argue that two different sets of assumptions can be connected with the behavior of governments. One expects that political markets work efficiently and have incentives to maximize social welfare. The competition among politicians allows voters to support those who represent their interests while rejecting those who do not. This means that politicians must align their policies with the interests of the voters to be elected. However, Kikeri and Nellis (2002, 34) point out that even well-intentioned governments may not be able to assure that managers of SOEs give maximal effort. The other set assumes political markets to work inefficiently. In this scenario, the government actors, such as bureaucrats or legislators, can maximize their utility (votes, income, or favors) in ways that the common good is not actualized. For example, politicians may be inclined to promote output and employment beyond the commercially optimal level to please voters (Willner 2001, 725). Under these circumstances, state ownership leads to inefficient SOE practices as politicians reap political benefits (Shirley and Walsh 2001, 14-15).

C. Corporate Governance

Private and state-owned firms must deal with the same problems that originate from the separation of ownership and control; however, their responses and, therefore, their performance can differ significantly. Shirley and Walsh list four different categories in which the methods of governance can be examined. These include monitoring by owners; formal legal restraints; takeovers; and bankruptcy (Shirley and Walsh 2001, 29-30). In other words, this field of research is interested in corporate governance issues in the context of public vs. private ownership.

Monitoring managers is one solution to the problems caused by the separation of ownership and control. However, the success of monitoring depends mainly on the effort and characters of the owner. It can be considered that SOEs are owned by all citizens, meaning that ownership is more widely distributed than in any private firm. This may lead to monitoring failures, as a single owner has neither incentive nor means to monitor managerial performance. If the owner is considered government, ownership is concentrated, but politicians responsible for monitoring may pursue their own agendas instead of ensuring optimal financial performance (Vickers and Yarrow 1991, 115). The government may also bear more risk than optimal, as it carries all the costs and benefits of monitoring (Shirley and Walsh 2001, 31-32).

The second category of corporate governance is the formal legal protection of the owners. This refers to the use of contracts as a method of controlling the managers. Shirley and Walsh specify that the term is used in a broad sense, including all the formal legal arrangements that are utilized to prevent managerial slack. SOE literature is interested in how the characteristics of state ownership affect the outcome of these processes and whether the variations can be explained by the differences in the legal systems between nations (Shirley and Walsh 2001, 32-33).

The two remaining categories, takeovers and bankruptcy, may prevent managerial slack by creating an ex-ante threat to firm management. Also, if a takeover leads to a more concentrated ownership structure, it may prevent some of the monitoring failures arising from widely distributed ownership. The research in this area is interested in whether and in which context these theoretical benefits influence corporate control and, ultimately, the firm's performance (Shirley and Walsh 2001, 33-36).

2.2.2 Privatization Theories

The economic theory of privatization can be seen as a subset of the literature on the economics of ownership and the role of government ownership of productive resources (Megginson and Netter 2001, 7). In case private firms are more efficient than SOEs, privatization can be a logical solution. Typically, privatization literature is interested in whether and under which conditions the privatization leads to improved efficiency, as the ownership theories predict. The focus may be on the firm level or the macroeconomic welfare implications. Some studies have also chosen a normative perspective and attempt to answer how to implement a privatization program.

Cavaliere and Scabrosetti survey the leading theories on privatization in their study *Privatization and Efficiency: From Principals and Agents to Political Economy* (2008). The study raises three motives why governments implement privatization programs: reducing state's budget deficit and amount of debt; encouraging financial market development; and increasing efficiency. The first motive refers to the revenues received from divestiture and, in the case of unprofitable SOEs, to the potential reduction in government expenditure through subsidies. There is some evidence suggesting that privatization revenues are, in fact, typically saved and that they substitute existing domestic financing instead of leading to an increase in government spending (Barnett 2000, 8-9).

The current consensus on the second objective is that privatization has a positive impact on financial market development. Former Finnish Minister of Economic Affairs, Jyri Häkämies, used this argument when he suggested privatizing selected state enterprises to promote stock market development and liquidity.[3] However, Naceur et al. (2009) suggest that these benefits may vary across geographical regions. They document the most substantial beneficial effects in the Asian sub-sample and mixed results in other regions.

The third objective, increasing efficiency, can be considered the most common field of study in privatization research and is also the focus of this thesis.[4] In this privatization theory tradition, *Privatization, Information and Incentives* (1987), by Sappington and Stiglitz, is regarded as a seminal work. It analyzes the choice between the public and

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[3] *Häkämies kysyy, miksi valtiolla on oma asvalttiyhtiö? [Häkämies Asks, Why the State Owns an Asphalt Company]*, Aamulehti 3.10.2012.

[4] *Improving efficiency* is such a broad concept that it could also include the first motive, *reducing the state's budget deficit and amount of debt*. However, reducing the state's budget deficit by privatizing does not necessarily lead to improved efficiency in the privatized firm. It only means that the state is no longer responsible for the future capitalization of the company.

private provision of goods and services under asymmetric information. Deriving from the agency theory setting, the study continues and presents a theorem which states that, under certain conditions, public production cannot improve upon private production. However, Sappington and Stiglitz note that these ideal settings will not generally prevail in practice. The conclusion is that neither public nor private provision can fully overcome the incentive problems arising from delegating authority under asymmetric information (Sappington and Stiglitz 1987). Subsequent privatization literature has been devoted to defining and analyzing these conditions, which determine the outcome and success of privatization. The main findings will be reviewed in the next chapter.

Today there is a vast amount of privatization literature, both theoretical and empirical. Nevertheless, as Megginson et al. point out, when the mass privatization s began in the 1980s, they were adopted mainly on faith. At the time, academic literature offered little theoretical analysis on the costs and benefits of privatization, and empirical studies were also far from conclusive (Megginson et al. 1994, 3). The general view was that SOEs were inefficient, and privatization was seen as the logical solution. This attitude is also present in the theoretical literature.

2.2.3 Empirical Findings

While most theoretical arguments recognize advantages in private ownership and predict that privatization leads to improved efficiency, there are also questions that theory alone cannot answer. In addition, theories are often based on strong assumptions, which may not be valid in the real world. A significant number of empirical studies have been conducted to achieve more conclusive evidence on the matter. The empirical studies have been relatively consistent in favoring private ownership over state ownership.

One approach to the effects of privatization is to analyze its welfare consequences. This is the focus of the so-called social welfare theory. The studies in this field attempt to determine the welfare consequences of privatization by calculating the sum of consumer and producer surplus. The fundamental question is whether society benefits from privatization when all affected parties are considered, including the public seller, private buyers, company employees, consumers and competitors. To mention some of many studies in this field, Galal et al. (1994) analyze the welfare consequences of selling public enterprises by comparing the pre- and post-divestiture performance of twelve SOEs through case studies. To achieve this, they construct an alternative scenario for each firm in which the company had not been privatized. The welfare consequences of actual events

and this counterfactual scenario are then estimated and compared. The results suggest that privatization is likely to improve economic welfare, although this is by no means guaranteed. They also find evidence that partial divestiture can provide gains comparable to those of full divestiture. Considering the consequences for the parties involved, workers seemed to gain the most benefits, with increased salaries and minimal change in employment. The effects for governments were generally positive. However, consumers lost in five cases out of twelve due to rising prices. Most of the case companies were monopolies, so there was little opportunity to determine the effects on competitors (Galal et al. 1994).

The firm-level performance has been studied, for example, by Ehrlich et al. (1994). They provide evidence on productivity differences between SOEs and privately-owned companies. A regression analysis on a sample of 23 international airlines of varying levels of state ownership finds results suggesting that in the long run, private ownership leads to higher rates of productivity growth and declining costs. They also show that the causality goes from ownership to productivity and cost efficiency rather than vice versa. These results are consistent even if the firms already operate under market competition. Also, differences in the regulatory environment do not show in the results (Ehrlich et al. 1994, 1007-1008, 1036).

In a more recent study, Tahani and Heshmati (2009) examine the operating and financial performance of privatized firms in Sweden. Their sample consists of ten fully or partially privatized firms from a period of 1989 - 2007. The research is particularly interesting, not only because of the geographical proximity but also for the methodological similarities: the pre- and post-privatization performance is compared using the Wilcoxon signed-rank test. The test is chosen since it is also suited for the small sample sizes. They also use the Standard test for differences in the mean performance of the two populations as a complementary test to the Wilcoxon signed-rank test. The results indicate statistically significant improvements in profitability, operating efficiency, capital investment, capital structure (reduced debt level) and employment. Furthermore, they examine post-privatization through an event-study method, which refers to comparing the share prices of privatized firms and other initial public offerings (IPO) during the period and calculating the performance based on cumulative excess returns. These results indicate that privatized companies perform worse than private IPOs. Overall, they conclude that privatization in Sweden has not been as successful as in some other countries. They suggest that this might be resulting from the fact that SOEs were typically privatized only partially and

that the government influence remained strong after the privatization (Tahani and Heshmati 2009, 1-16).

Even though the empirical evidence generally recognizes many benefits in private ownership, many studies suffer from methodological problems. Vickers and Yarrow raise this issue in their paper, *Privatization: An Economic Analysis* (1988). They conclude that many studies focus exclusively on the ownership variable and fail to consider the effects on the performance of differences in market structure, regulation, and other relevant economic factors. Another problem in measuring performance has been a tendency towards relying on easily observable variables. The usual approach has been to analyze factors such as profitability, productivity or unit cost levels instead of estimating the overall consequences for society. This methodology has a risk of leading to a bias in favor of private ownership as it considers only the effects on the firm-level from a shareholder perspective (Vickers and Yarrow 1988, 39).

2.2.4 Evidence From Finland

Although a small country, Finland has a relatively large state enterprise sector. The high level of state ownership has occurred through two main channels. The first channel involves the State taking an active part in the industrialization process after independence. This was necessary for developing the country because private capital was relatively scarce. SOEs also had a significant role in the decades following the Second World War, although the war reparations to the Soviet Union were mainly manufactured by private companies (Ranki 2012, 36). The second channel refers to creating state enterprises out of former budget-funded government agencies.[5] Between 1989 and 2001, 14 state enterprises were created out of formerly budget-funded government agencies. These state enterprises operated in the areas including transport and communications, support services for the state, asset holding and forest management (Parker 2003, 7; Kauppa- ja teollisuusministeriö 1998, 8).

In the late 1980s, when the government initially started privatizations, SOEs were responsible for about 20 percent of the domestic value added in Finland compared to 10

[5] Budget-funded agencies in Finland are a part of public administration and directly dependent on the state budget. In contrast, state enterprises are independent of the state budget, although owned wholly or partly by the government. For example, telecommunications, railways and postal services were earlier budget-funded agencies but have been reorganized as limited companies (Willner 2003, 5).

- 11 percent domestic value added in the United Kingdom (Willner 1994, 2).[6] According to Faccio and Lang, in 2002, Finland had a 15.8 percent share of SOEs in listed companies (Faccio and Lang 2002, 375).

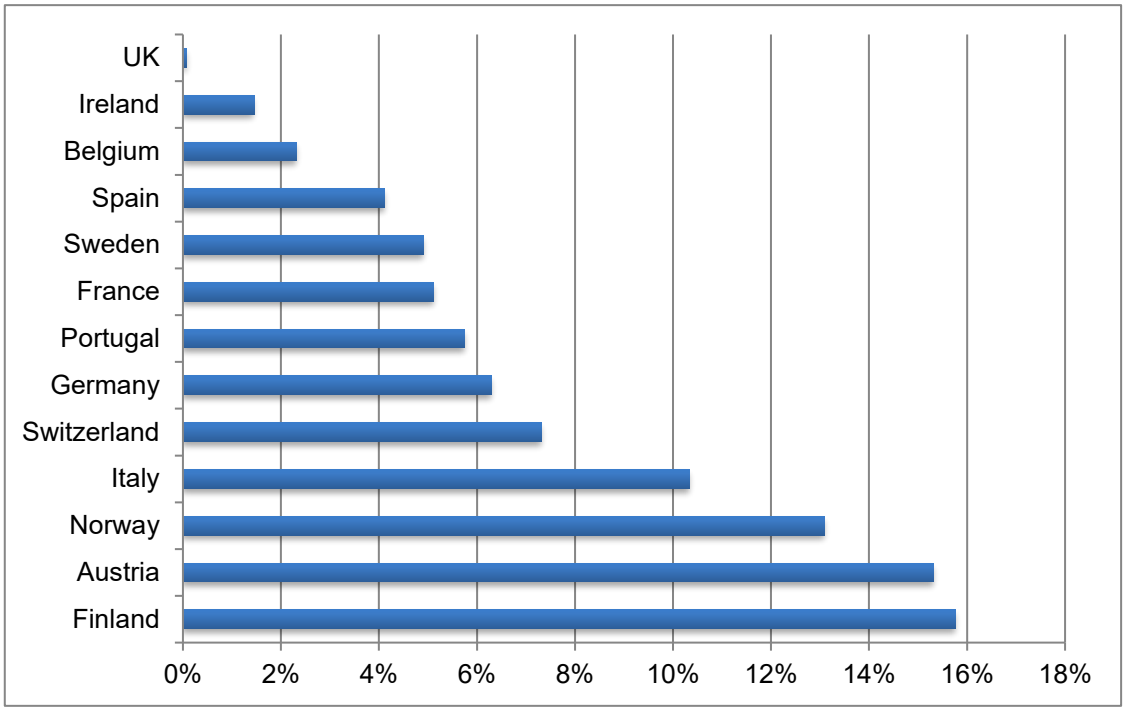

Figure 1. The Share of SOEs in Listed Companies.

In 2021, the value of the State's shareholdings in listed companies was EUR 37 billion (Valtioneuvosto 2021). The size of the state enterprise sector makes Finnish state ownership an exciting subject for study. The efficiency of state ownership in Finland, as well as privatization of Finnish SOEs, have indeed been studied previously by a few scholars. This chapter presents the main findings of these studies.

Professor Willner from Åbo Academi has published several studies on privatization and uses Finnish data in some studies. In his paper, *Privatization and public ownership in Finland*, Willner analyzes the motives and success of privatization processes in Finland. Willner defines a company as state-owned if the state has at least 50 percent ownership. Consequently, privatization is defined as lost majority ownership (Willner 2003, 1).

[6] It is worth noting that Finland has never had a privatization program aiming at full privatization of all state-owned companies. Parliament decides in which companies the state may relinquish its sole ownership and in which the control of the company. Each sale of shares is decided individually by the government.

Willner claims that policy documents in Finland are not always explicit on the motives for privatization. However, the government blueprint that introduced privatization on the agenda emphasized the sales revenues as the most important motive.[7] To avoid increased domestic competition, the blueprint recommended mergers. Furthermore, it also warned against public-sector dominance, which could become a problem in the case of a merger without privatization. Subsequent policy documents also note that the mission to industrialize has been fulfilled, thus making privatization a topical issue. Further motives for privatization include changed business conditions, in particular integration, and international competition. Privatization is also believed to make access to venture capital easier. However, Willner suggests that the official motives may not give the full explanation. Completed industrialization does not mean that SOEs should be sold. Also, at the time of the first blueprint, there was no urgent need for sales revenues. Selling state enterprises only reduces the state's creditworthiness and future dividend incomes. Willner concludes that despite weak official motives, decision-makers act out of conviction (Willner 2003, 6-8).

After presenting the motives for privatization, Willner attempts to evaluate the success of privatization. He points out that success is partly a question of objectives, referring to the fact that government may have other expectations than improving financial performance. For example, as the government did not expect drastic cost reductions by selling shares, unchanged cost efficiency would not necessarily mean a failure. Instead, success would require significant sales revenues (*i.e.*, selling at an optimal point of time) and industrial restructuring through mergers. Although Willner gives a few examples where better timing would have generated substantially higher revenues, his general view is that privatization has, in most cases, proceeded as planned. During 1993 - 2002, the divestiture proceeds to the State amounted to over EUR 10 billion (Kauppa- ja teollisuusministeriö 2002, 2), but this has not reduced the state's dividend incomes (Willner 2003, 8-11).

Willner also analyzes the effects of privatization on financial performance and cost-efficiency, although they have not been the main reasons for privatization in Finland. He argues that while inefficiency may cause divestiture elsewhere, a well-performing company would become more and not less likely to be privatized in Finland. This refers to the presumption that the Finnish government prioritizes sales revenues, and a fair price can only be obtained if the company is in a sound condition. Willner acknowledges that

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7 *Visio yksityistämisestä Suomessa [A Vision for Privatization in Finland]*, 1991

the impact of privatization on cost efficiency may be difficult to distinguish due to mergers and change that SOEs may have also had non-commercial objectives. The overall conclusion is that while privatization has been successful in its stated goals of generating revenues and achieving industrial restructuring, Finnish SOEs have also been relatively successful. There is no clear evidence of improved financial performance or cost efficiency (Willner 2003, 12-15).

OECD report, *Regulatory Reform in Finland: Marketisation of Government Services – State-Owned Enterprises*, analyzes the institutional set-up and use of policy instruments in Finland. The study examines how successful the privatization process has been and what policy lessons have been learned. The general view is that Finland has been relatively successful in commercializing SOEs, and companies have benefitted from operating in competitive markets. As the final step in the commercialization process, privatization is carefully staged and carried out on a case-by-case basis according to pragmatic principles. However, the OECD study concludes that further privatization would be desirable and ultimately help the fiscal sustainability of the welfare state (Parker 2003, 3-38).

The state ownership in Finland has also been analyzed in empirical studies. In their paper *Omistajuus ja yritysten menestyminen [Ownership and Company Performance]* (2006), Pajarinen and Ylä-Anttila examined the impacts of ownership structure on the firm performance utilizing regression analysis on the sample of 1060 Finnish companies from years 1986 - 2004. Out of these, a little over 3 percent were state-owned. The other ownership categories on the analysis were family ownership, foreign ownership and publicly listed companies. The analysis shows that state ownership, along with listed companies, is linked with lower leverage levels. On the other hand, profitability (ROA) seemed to correlate with foreign ownership. The growth in employment level was lower with state-owned companies compared to the other forms of ownership (Pajarinen and Ylä-Anttila 2006, 39, 43-46).

The government has also examined the efficiency of state ownership. Ministry of Trade and Industry commissioned study *Ylimmän johdon palkitsemisjärjestelmien toimivuus valtionyhtiöissä ja osakkuusyhtiöissä [Executive Compensation Systems in Finnish State-Owned Enterprises and Associated Companies]* (2007) analyzed the compensation issues in Finnish SOEs and made observations on the performance of these companies. The results show that the performance in the service sector, measured by economic value added, was higher with the state-owned companies compared to other listed companies.

In comparison, SOEs operating in the industrial sector seemed to have relatively poor performance. In general, SOEs seem to create shareholder value comparable to other companies listed on the Helsinki Stock Exchange. A more recent evaluation report, *Valtion omistajaohjauksen arviointi [Evaluator Report of the State's Ownership Policy]* (2004), analyzed the profitability and productivity of SOEs compared to private firms in Finland. The conclusion was that there is no significant difference in profitability, measured by operating profit margin or return on capital employed (Tuominen-Thuesen et al. 2019, 96).

3 HYPOTHESES, DATA AND METHODOLOGY

3.1 Hypotheses Development

To answer the research question about the impacts of privatization on the performance of SOEs, the performance is divided into dimensions, and the performance change is tested in these dimensions using one or multiple performance measures. The dimensions are profitability, operating efficiency, output and employment. The first three dimensions represent different aspects of the firm's performance. The last dimension provides additional information on the impacts of privatization by answering whether the potential changes in performance are gained at the cost of eliminating jobs.

As a firm's ownership structure changes from state ownership to private ownership, profitability should increase (see, *e.g.*, Yarrow 1986). The rationale behind this is that private shareholder replaces the governmental monitoring and control of the firm's management. Under state ownership, the management is monitored by the government, which in turn can be viewed as an agent of the voters. This leads to increased monitoring costs. Under private ownership, the management is responsible to shareholders who expect firms to maximize value and have more incentives to monitor the firm's performance. The conclusion is that rational managers should place greater emphasis on profit goals under private ownership. This leads to the following hypothesis:

H1: Privatization improves the profitability of state-owned enterprises.

The operational efficiency dimension measures the efficiency of the firm's human resources by comparing profitability and sales to the staff level (Kikeri and Nellis 2002). Sheltered from the competition, SOEs tend to over-produce, keeping the prices inefficiently low. Following privatization, firms will have to deal with the shareholders' profit goals and closer monitoring. Management should be more concerned with the efficient use of resources. Based on these arguments, the following hypothesis can be formed:

H2: Privatization improves the operating efficiency of state-owned enterprises.

Changes in output are measured using sales, inflation-adjusted sales[8] and GDP-adjusted sales as performance measures. Megginson et al. (1994) argue that privatization will increase the output level because of better incentives, more flexible financing opportunities, increased competition and greater scope for entrepreneurial. On the other hand, Boycko et al. (1996) predict a fall in output since managers do not have an incentive to maintain inefficiently high output levels in the absence of government subsidies. However, SOEs in Finland do not receive subsidies on a regular basis. Thus, the latter theory does not seem as plausible as the former. Based on the arguments of Megginson et al., the following hypothesis is proposed:

H3: Privatization increases the output level of state-owned enterprises.

The effect privatization has on employment is an important issue when considering the benefits of privatization from society's perspective. However, prior research has not concluded whether privatization leads to an increase in employment or whether layoffs would be expected. As a consequence of the government's goal of maintaining employment, SOEs tend to be over-staffed (Boubakri and Cosset 1998, 1099). This would suggest a decrease in the level of employment, given the pressure from private owners. On the other hand, privatized firms are expected to target growth and expand their investment spending, which would lead to increased employment (Omran 2002, 19). However, SOEs are not entirely sheltered from market competition, and the level of competition has increased due to market deregulation. The competition also guides managers of SOEs to more efficient use of resources. Also, to maximize revenues, the government may be more willing to sell when market conditions are strong. In this case, the level of employment could be expected to increase, although rather due to the strong economic period than privatization itself. Accordingly, the following hypothesis is formed:

H4: Privatization increases the employment level of state-owned enterprises.

[8] Inflation-adjusted sales = *real sales*. Appendix 2 provides a money value conversion table for calculating the real sales.

3.2 Data and Sample Collection

The hypotheses are tested using a sample of 16 Finnish SOEs that were privatized between 1988 and 2018. The method used in the study sets limits to the firms that can be accepted to the sample. The main limitation is that pre- and post-privatization data must be comparable. This excludes SOEs that have been privatized through fusion or divided into two or more companies. A restructured company may be included in the sample if comparable figures are available via pro forma financial statements. Before the privatization, the firm must be fully owned by the State.[9] However, also partial privatization is counted. The rationale here is that even partial privatization brings in the private interest to the managing of the company. It is also worth noting that the entry of just one minority shareholder changes the nature of a company: According to the Finnish Companies Act and the Securities Market Act the companies are liable to ensure shareholder equality in all their operations (Vuoria 2004, 11).

The data for the sample of privatized SOEs used in this study have been collected from various sources. The population of Finnish state-owned companies was acquired from the Internet pages of Prime Minister's Office.[10] Further information on the companies and government privatizations were gathered from various government publications, namely *Privatization of Finnish state-owned* companies and three annual publications *Valtionyhtiöt [State-Owned Enterprises in Finland], Valtionyhtiöomistus [State Shareholdings in Finland]* and *Valtion määräysvallassa olevien osakeyhtiöiden toiminta [Evaluator Report on State-Owned Enterprises]*. Ranki's comprehensive *Niin siinä käy kun omistaa - Tarinaa valtionyhtiöistä [This Is What Happens, When You Own - Stories on State-Owned Enterprises]* was also used to crosscheck certain details. In addition, annual reports have been used when available. However, obtaining older annual reports from the Trade register, companies' Internet pages or other sources proved challenging.

The next section describes the process of selecting the sample firms from the population of all privatized SOEs. Table 1 lists all the transactions where Finnish SOEs have been fully or partially privatized. The list consists of all transactions where the State has

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9 Kela and The Bank of Finland are counted as state ownership for the purposes of this study. These instances have a level of autonomy with their operative decisions but are ultimately under governmental supervision. Also, from the perspective of ownership theory, they all represent public ownership in contrast to private ownership.

10 https://vnk.fi/en/government-ownership-steering

given up holdings, including companies where the State held a minority interest from 1981 to 2020.

Table 1. Privatization in Finland

Year	Company	Notes
1981	Televa	Gave up control
1986	Ajokki	Gave up control
1987	Televa	Gave up total ownership
1988	Valmet	Initial public offering
	Outokumpu	Initial public offering
1989	Outokumpu	Sale of shares to the employees
	Rautaruukki	Initial public offering
1991	Suomen Malmi	Sale of shares to the management
	Kokkolan Puhelin	Sale of shares to a competitor
	Turun Asennuspaja	Sale of shares to a competitor
1992	Finnair	Seasoned equity offering
1993	Outokumpu	International public issue
	Rautaruukki	Rights issue and sale of the State´s subscription rights
	Kulinaari-ravintolat	Sale of shares to a competitor
1994	Kemira	Initial public offering
	Outokumpu	International public issue
	Valmet	International public issue
	Rautaruukki	International public issue
	Sisu	Structural arrangements with Valmet
	Veitsiluoto	Strategic cooperation with Enso-Gutzeit
1995	Finnair	International public issue
	Neste	Initial public offering
	VTKK-yhtymä	Gave up control
1996	Karttakeskus	Sale of shares to private owners
	Kemira	International equity offering
	Valmet	International public offering and redemption
	Veitsiluoto	Merger with Enso-Gutzeit
1997	Kemijoki	Sale of shares to northern electricity companies
	Sisu	Merger with Partek
	Rautaruukki	International equity offering
	Postipankki	Gave up total ownership
1998	Enso	Merger with Stora
	Sponda	Initial public offering
	Engel	Sale of the majority of the State’s shares
	Sonera-yhtymä	International public offering
	Valmet	Merger with Rauma
	Fortum	Initial public offering

Table 1. ***Continued***

Year	Company	Notes
2000	Medivire	Sale of shares to Solidium and private owners
	Sonera	International public offering
2001	Patria Industries	Sale of shares
2002	Stora Enso	International equity offering
	Vapo	Sale of shares to Metsäliitto
	Partek	Sale of shares and convertible bond to Kone
	Stora Enso	International equity offering
	Fortum	International equity offering
	AvestaPolarit	Sale of the State's shares to Outokumpu
	Inspecta	Sale of shares
	Avena	Sale of shares to Lännen Tehtaat
	Haus kehittämiskeskus	Sale of shares
	Suomen luottovakuutus	Sale of State's shares to other owners
2003	Suomen Autokatsastus	Sale of shares to a company to be established
	Kone	International equity offering
2004	Sampo	Sale of the State's shares to Varma
	Kemijoki	Sale of shares to company
	Sampo	International equity offering
	Engel-Yhtymä	Sale of shares to ISS
	Vapo	Sale of shares to Metsäliitto
	Sponda	International equity offering
	TeliaSonera	International equity offering
2005	Sampo	International equity offering
	Fortum	International equity offering
	TeliaSonera	Sale of shares to company
	Kemira	International equity offering
2006	Kapiteeli	Sale of share capital to Sponda
	Outokumpu	International equity offering
2007	Kemira GrowHow	Sale of the State's shares to Yara International ASA
	Kemira	Sale of the State's shares to Oras Invest etc.
2008	OMX	Sale of the State's shares to Borse Dubai
	Elisa	Sale of shares
2009	Santapark	Sale of shares to Santa's Holding
2010	Rautaruukki	International equity offering
	Sponda	International equity offering
	Tikkurila	International equity offering
	Silta	Sale of shares to Sampo
2011	TeliaSonera	International equity offering
2012	FCG Finnish Consulting Group	Sale of shares to Suomen Kuntaliitto
	TeliaSonera	International equity offering
	Sponda	International equity offering
2013	TeliaSonera	International equity offering

Table 1. ***Continued***

Year	Company	Notes
2014	Sampo	International equity offering
	Destia	Sale of shares to Ahlström Capital
	TeliaSonera	International equity offering
2015	TeliaSonera	International equity offering
	Outokumpu	International equity offering
2016	Patria	Sale of shares to Kongsberg Defence & Aerospace
	SSAB	International equity offering
2017	Outokumpu	Sale of shares (two separate transactions)
	Stora Enso	International equity offering
2018	Raskone	Sale of shares to Lease Deal Group
	Altia	Initial public offering
	Neste	Sale of shares
	SSAB	International equity offering
	Telia Company	International equity offering
	Sampo	International equity offering
	Stora Enso	International equity offering
2019	Kemira	International equity offering
	Nordea Bank	International equity offering
2020	Sampo	International equity offering

Sources: Kauppa- ja teollisuusministeriö 1998, 18-19; Valtioneuvosto 2020, 1-2.

Between 1981 and 2020, there have been 100 transactions on 50 individual companies, where the State has given up of ownership. Privatizations have occurred relatively evenly during those 40 years, although a slightly higher frequency can be observed from the late 1990s to the early 2000s. Between 2004 and 2017, there were no transactions where a fully state-owned company was sold to private owners.

The method used in this study presumes SOEs to be fully owned by the state before privatization. Also, pre- and post-privatization data must be comparable, excluding mergers and fusions from the sample. A minimum of two years of pre- and post-privatization data is required. Table 2 lists those privatizations, which do not meet one of these criteria and have been excluded from the sample. If a company is not included in the sample, additional information is provided on the reasons.

Table 2. Privatized SOEs Excluded From the Sample

Company	Reason for exclusion
Ajokki	No data available
Avena	Merger with Lännen Tehtaat
AvestaPolarit	Merger with Outokumpu
Destia	Post-acquisition figures not comparable due to significant changes in the group structure
Elisa	Not fully owned by the state
Enso	Merger with Stora
FCG Finnish Consulting Group	Not fully owned by the state
Finnair	Not fully owned by the state
Fortum	Not fully owned by the state
Haus kehittämiskeskus	Shares sold to a company owned by public organizations
Kapiteeli	Company was acquired by Sponda
Kemijoki	Not fully owned by the state
Kemira GrowHow	Not fully owned by the state
Kokkolan Puhelin	Not fully owned by the state
Kone	Not fully owned by the state
Kulinaari-ravintolat	Company was sold to Fazer
Nordea	Not fully owned by the state
OMX	Not fully owned by the state
Partek	Not fully owned by the state
Postipankki	Combined with Vientiluotto to form Leonia
Sampo	Not fully owned by the state
Santapark	Not fully owned by the state
Silta	Not fully owned by the state
Sisu	Merger with Partek
SSAB	Not fully owned by the state
Stora Enso	Not fully owned by the state
Suomen luottovakuutus	Not fully owned by the state
Suomen Malmi	The minimum of two years post-privatization data not available. Trade register microfilm containing financial statements was missing.
Televa	No data available
TeliaSonera	Not fully owned by the state
Tikkurila	Not fully owned by the state
Turun Asennuspaja	The minimum of two years pre-privatization data not available
Veitsiluoto	Comparable post-privatization data only for one year due to the merger with Enso-Gutzeit.
VTKK-yhtymä	Combined with Tietotehdas and Unic to form TT Tieto

Out of 50 privatized state-owned companies, 34 had to be left out of the sample. A total of 19 companies were not fully owned by the State at the time of initial privatization. Ten companies had to be excluded since pre- and post-privatization data was not comparable due to mergers or other significant changes in the company structure. Furthermore, there were less than two years of comparable pre- and post-privatization data available in four cases. Also, one company was sold to another company owned by public organizations. This left a total of 17 companies, which met the selection criteria set by the methodology. However, one of these companies had to be left out since the Trade register microfilm containing financial statements was missing. This led to a final sample size of 16 companies.

Table 3 presents the final sample of privatized SOEs.[11] The table also provides additional information on privatizations describing the type of transaction and listing the proceeds from the privatizations and the percentage of ownership given up.

[11] Additional information on the sample companies is provided in Appendix 1.

Table 3. Sample of Privatized SOEs in Finland

Company	Year	Measures	Proceeds to the State (EURm)	Change of the State's ownership (%)
Outokumpu	1988	Initial public offering	n.a.	25.0
Valmet	1988	Initial public offering	n.a.	19.6
Rautaruukki	1989	Initial public offering	n.a.	13.2
Kemira	1994	Initial public offering	n.a.	27.7
Neste	1995	Private placement and sale of public shares	57.6	14.0
Karttakeskus	1996	Sale of shares to private owners	0.8	100.0
Sponda	1997	Directed share issue to Merita	n.a.	17.5
Engel	1998	Sale of the majority of the State's shares	57.9	55.0
Sonera	1998	International public offering	1144.4	22.2
Medivire	1999	Sale of shares to Solidium and private owners	n.a.	100.0
Patria	2001	Sale of share capital	42.0 (-16.8)[12]	26.8
Vapo	2002	Sale of shares to Metsäliitto	88.6	33.3
Inspecta	2002	Sale of share capital	8.5	100.0
Suomen Autokatsastus	2003	Sale of shares to a company to be established	n.a.	100.0
Raskone	2018	Sale of shares to Lease Deal Group	6.8	85.0
Altia	2018	Initial public offering	171.5	63.8

Table 3 reveals the fact that privatizations in Finland have been typically partial privatizations. Total ownership was given up in only four cases out of the 16 fully state-owned sample companies. Out of the ten partial privatizations, the average change in ownership was 25.4 percent. The relatively small number of full privatizations results from the fact that privatizations are treated case by case without a formal privatization program aiming at full privatization of SOES's (Willner 2003, 10).

Table 4 provides the data used in the statistical tests. Monetary figures are presented in EURm.

[12] Equity investment by the State. In return, the company paid back a convertible loan granted by the State earlier.

Table 4. Sample Data

The inflation-adjusted *real sales* ratio is also reported, although it is not an accounting figure. The statistical tests use inflation-adjusted sales for better comparability. Real sales are normalized to the base year 2020.

	3 years before privatization			3 years after privatization		
OUTOKUMPU	1985	1986	1987	1989	1990	1991
Operating income	90.0	44.6	107.3	234.5	24.6	0.5
Net income	16.3	-18.0	25.2	24.1	-26.9	-68.8
Sales	851.2	1202.9	1270.3	1980.9	1898.2	2122.0
Real sales	1714.5	2338.9	2382.8	3323.1	3001.6	3222.6
Total assets	947.8	1102.7	1601.7	1987.1	2281.6	2366.1
Employees	10079	15168	14913	15880	18819	17716
VALMET	1985	1986	1987	1989	1990	1991
Operating income	52.2	31.5	44.2	12.6	-30.4	79.2
Net income	18.1	24.3	65.9	-58.5	-60.7	-106.8
Sales	1023.9	1113.5	1222.4	1686.4	1700.2	1289.3
Real sales	2062.5	2165.1	2293.0	2829.0	2688.5	1958.0
Total assets	1116.9	1161.9	1122.6	1913.8	2056.8	1823.3
Employees	16721	17864	17139	19203	17646	14508
RAUTARUUKKI	1986	1987	1988	1990	1991	1992
Operating income	70.5	108.5	152.9	96.9	-7.4	76.4
Net income	5.2	4.6	21.0	18.5	-67.6	-71.5
Sales	617.2	734.8	879.6	1093.1	1152.1	1094.4
Real sales	1200.2	1378.3	1572.8	1728.4	1749.6	1619.9
Total assets	976.7	1084.5	1935.2	1417.7	1609.6	1935.2
Employees	7419	8570	8601	10596	11197	9281
KEMIRA	1991	1992	1993	1995	1996	1997
Operating income	52.1	76.2	110.8	224.9	209.9	198.0
Net income	68.8	11.4	46.6	87.8	103.7	104.1
Sales	1824.5	1882.9	1991.0	2234.2	2256.6	2420.0
Real sales	2770.8	2786.9	2886.3	3172.9	3186.0	3375.1
Total assets	2466.1	2658.7	2756.8	2405.1	2316.3	2447.1
Employees	14321	12648	11446	10900	10631	10392
NESTE	1992	1993	1994	1996	1997	1998[13]
Operating income	-38.2	90.8	377.2	181.3	272.0	-
Net income	-216.1	199.4	227.6	82.2	32.8	-
Sales	9659.0	10610.8	8275.0	7295.2	7679.5	-
Real sales	14292.4	15382.0	11866.7	10299.8	10710.4	-
Total assets	7492.6	8142.5	7626.0	5621.3	5315.7	-
Employees	13838	13332	8948	8662	8704	-

[13] Fortum fusion.

Table 4. Continued

	3 years before privatization			3 years after privatization		
KARTTAKESKUS	1993[14]	1994	1995	1997	1998	1999
Operating income	-	0.03	0.4	1.0	0.8	0.1
Net income	-	-0.4	0.3	0.6	0.0	0.1
Sales	-	6.6	7.9	8.8	9.0	8.3
Real sales	-	9.5	11.2	12.3	12.4	11.3
Total assets	-	3.9	3.6	3.2	3.7	3.8
Employees	-	115	120	103	96	94
SPONDA	1994	1995	1996	1998	1999	2000
Operating income	113.8	-2.4	108.0	46.5	47.0	69.1
Net income	-8.0	-33.6	42.7	35.4	29.4	28.4
Sales	179.4	188.6	325.3	57.7	74.8	109.4
Real sales	257.3	267.9	459.3	79.3	101.7	143.9
Total assets	1098.7	984.4	940.3	630.8	610.0	949.6
Employees	30	28	26	27	32	49
ENGEL	1995	1996	1997	1999	2000	2001
Operating income	5.6	9.1	5.5	2.7	7.4	9.2
Net income	3.8	6.7	4.5	2.2	5.3	6.7
Sales	56.5	73.1	81.6	111.3	128.1	153.5
Real sales	80.3	103.2	113.8	151.4	168.5	196.9
Total assets	-	35.2	34.4	39.8	38.3	41.6
Employees	1936	2616	3266	4519	5123	5753
SONERA[15]	1995	1996	1997	1999	2000	2001
Operating income	168.0	191.0	309.0	476.0	314.0	-4.0
Net income	121.0	128.0	219.7	370.2	1505.1	409.3
Sales	991.0	1125.0	1352.4	1848.6	2056.5	2187.4
Real sales	1407.4	1588.4	1886.2	2513.3	2704.8	2804.6
Total assets	1214.0	1381.0	1451.0	2814.0	3609.4	9774.2
Employees	7239	7667	7967	9270	10305	10482
MEDIVIRE	1996	1997	1998	2000	2001	2002
Operating income	-0.4	0.2	0.8	1.7	-1.1	-1.0
Net income	-0.4	0.2	0.6	1.0	-1.4	-1.3
Sales	23.9	26.6	29.2	41.4	46.9	47.3
Real sales	33.8	37.1	41.1	54.4	60.2	59.7
Total assets	2.5	6.5	6.4	7.3	12.6	14.5
Employees	384	400	425	537	638	634
PATRIA	1998	1999	2000	2002	2003	2004
Operating income	12.5	2.8	9.7	7.0	15.8	25.7
Net income	7.9	-2.2	8.8	2.9	8.5	19.2
Sales	177.8	192.9	208.5	232.5	259.1	346.1
Real sales	244.5	262.3	274.2	293.5	324.3	432.7
Total assets	194.5	208.3	205.4	318.1	333.8	375.2
Employees	2209	2033	2214	2117	2032	1988

[14] Not comparable due to a company restructuring.

[15] Privatization was preceded by de-merger, where the post and the telecom operations were divided into separated companies. Sonera annual reports provide comparative figures for the telecom operations starting from 1994.

Table 4. Continued

	3 years before privatization			3 years after privatization		
VAPO	1999	2000	2001	2003	2004	2005
Operating income	25.9	31.7	31.4	38.4	27.8	21.3
Net income	15.1	20.7	18.1	22.5	17.3	10.9
Sales	333.1	380.6	412.3	472.2	527.7	523.9
Real sales	452.9	500.6	528.6	591.0	659.2	648.9
Total assets	372.6	435.8	482.4	524.8	549.7	553.3
Employees	1162	1289	1209	1744	1814	1734
INSPECTA	1999	2000	2001	2003	2004	2005
Operating income	0.7	1.9	0.5	0.9	1.9	3.6
Net income	0.5	1.2	0.0	0.3	0.6	2.2
Sales	8.5	14.7	17.3	25.0	31.5	41.1
Real sales	11.5	19.4	22.2	31.3	39.4	50.9
Total assets	3.5	4.3	11.8	22.2	20.3	23.7
Employees	147	248	250	289	355	458
SUOMEN AUTOKATSASTUS	2000	2001	2002	2004	2005	2006[16]
Operating income	3.2	4.9	4.7	15.3	23.1	-
Net income	2.2	3.2	3.2	10.6	18.8	-
Sales	53.3	57.5	62.4	81.3	95.5	-
Real sales	70.1	73.7	78.8	101.6	118.3	-
Total assets	38.8	40.9	43.2	72.1	58.9	-
Employees	1031	1042	1063	1200	1363	-
RASKONE	2015	2016	2017	2019	2020	2021[17]
Operating income	-1.3	0.1	0.4	1.8	2.3	-
Net income	-2.4	0.0	0.3	1.7	2.4	-
Sales	60.3	65.5	60.7	66.8	66.5	-
Real sales	62.4	67.6	62.2	67.0	66.5	-
Total assets	22.5	20.8	21.7	18.4	19.2	-
Employees	490	482	451	497	497	-
ALTIA	2015	2016	2017	2019	2020	2021[18]
Operating income	23.6	26.4	28.2	26.8	30.5	-
Net income	18.1	36.1	18.3	18.4	17.8	-
Sales	380.7	356.6	359.0	359.6	342.4	-
Real sales	394.2	368.0	367.7	360.6	342.4	-
Total assets	501.5	466.7	438.6	390.4	400.2	-
Employees	879	829	762	682	650	-

Sources: Annual reports; Kauppa- ja teollisuusministeriö – Valtionyhtiöt publications series; Valtioneuvosto – Valtionyhtiöomistus publications series.

Out of 16 companies, 11 have three years of pre- and post-privatization data available. Five companies are missing one year of data for the pre-or post-privatization period. Total

16 Bridgepoint acquired the company. Comparative figures not available.
17 Not yet available.
18 Not yet available.

assets refer to the opening balance of the financial year. Employees refer to the average number of employees during the year. In some cases, the sources provide just one figure for the number of employees without specifying whether it is the average number for the financial year.

3.3 Methodology

The methodology follows Megginson et al. (1994) with some modifications. The objective is to analyze the changes in different aspects of performance, comparing pre- and post- privatization data. To do this, four performance dimensions are chosen. Those dimensions are profitability, output, employment and operating efficiency. In principle, the chosen dimensions follow those of Megginson et al.; however, some alterations are made to the performance measures due to the nature and limitations of the data available. The number of dimensions has also been reduced from seven to four. The methodology, first used by Megginson et al., has since been employed in several privatization studies. To mention a few, the technique was used by Boubakri and Cosset (1998), Omran (2002) and D'Souza et al. (2004). One of the main reasons this approach was chosen is that it allows comparing results across those studies. The relatively small sample size further emphasizes the benefit of being able to compare the findings.

Each performance dimension is tested using one or more performance measures. Table 5 presents the ratios used for each of the dimensions.

Table 5. Performance Measures for Each Performance Dimension

Performance dimension	Performance measure	Definition
Profitability	Operating income	$Operating\ income$
	Operating income to sales (ROS)	$\frac{Operating\ income}{Sales}$
	Return on assets (ROA)	$\frac{Net\ income}{Total\ assets}$
Operating efficiency	Real sales to employees	$\frac{Real\ sales}{Number\ of\ employees}$
	Operating income to employees	$\frac{Operating\ income}{Number\ of\ employees}$
Output	Real sales	$\frac{Nominal\ sales}{Consumer\ price\ index}$
Employment	Number of employees	$Average\ number\ of\ personnel$

Profitability is measured using three performance measures: operating income, operating income to sales (ROS) and net income to total assets (ROA).[19] Operating efficiency is measured using two performance measures: *real sales*[20] to employees and operating income to employees. The rationale with these operating efficiency performance measures is to determine if privatization affects the efficiency of employees. Naturally, the results must be interpreted with caution, as possible changes in efficiency may occur for various underlying reasons. Output is measured by real sales, and employment is measured using the number of employees. The number of employees refers to the average number of employees during the year.

Mean values for the three years before and after the privatization year are computed for each performance measure individually for each sample company. The year of privatization is thus excluded from the calculations. If the government has sold shares of the company on more than one occasion, the privatization date is the date when shares were sold for the first time. If three years of pre- or post-privatization data is not available but mean values for two years can be calculated, the company is included in the sample.

After the mean values have been calculated, the predicted changes in performance measures are tested using the Wilcoxon signed-rank test. The purpose of the test is to determine whether there are significant differences between pre- and post-values considering both the direction and magnitude of the change. The Wilcoxon signed-rank test is a statistical hypothesis test, which can be used on two related samples or repeated measurements on a single sample. It is a nonparametric alternative to the paired sample *t*-test when the population cannot be assumed to be normally distributed. It is also a more powerful alternative to the sign test as it takes into account both the magnitude and direction of the differences between observation pairs. In practice, this means that the test takes into account the proportion of positive and negative changes and the scale of each change, but at the same time, possible abnormal observations will not get too much weight on the results. The null hypothesis in the Wilcoxon signed-rank test is that the median difference between pairs of observations is zero. To determine the value of the test statistic W,

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19 If financial reports show adjusted figures to achieve comparability between financial years, these adjusted figures are used on the performance measures.

20 Real sales is defined as nominal sales divided by the Finnish consumer price index (CPI). The conversion is calculated with a money value conversion table provided by Statistics Finland (see Appendix 2). Real sales is used to eliminate the effects of inflation on sales, considering the privatizations took place over a period of 31 years. The CPI is defined as a measure describing the price development of goods and services purchased by households resident in Finland. When calculated, the prices of different commodities are weighed together with their shares of consumption. The CPI is commonly used as a general measure of inflation.

absolute values of the differences between observation pairs are calculated. Zero-differences are then eliminated, and the rest of the values are ranked in ascending order so that the smallest difference gets 1, second 2, etc. If two or more pairs have equal absolute differences, the same rank is given to all of them. The rank is the mean of the rank numbers, which those differences would get if they were not equal. The ranks of all positive differences are summed, and the ranks of all negative differences are summed. The smaller sum of ranks is the test statistic *W*. If the test statistic is less than or equal to the critical value at an appropriate significance level, the null hypothesis is rejected, and the alternative hypothesis is accepted (Wilcoxon, 1945).

There are several reasons why the Wilcoxon signed-rank test has been chosen to be used. Naturally, the main reason is that it was used by Megginson et al. and others in similar studies, and this study intends to bring comparable evidence with Finnish data. A similar method allows a comparison between these results and the results from previous studies. Secondly, the test suits well for measuring performance changes as it considers both whether the change is positive or negative and the magnitude of the chance. As a nonparametric test, the Wilcoxon signed-rank test is also considered relatively robust to outliers. However, a smaller sample size always increases the vulnerability to outlying observations. Other alternatives to consider for testing the pre- and post-privatization performance changes were the parametric *t*-test and the nonparametric Mann-Whitney test. However, the *t*-test may not be used as normal distribution cannot be assumed (Loc et al. 2006, 12). Even with the normally distributed populations, the *t*-test is not significantly more powerful than the Wilcoxon signed-rank test (Siegel 1956, 83).[21] The Mann-Whitney test is used for comparing two samples that are independent or unrelated from each other (Corder 2014, 69). The pre- and post-samples are considered *matched pairs*, not independent; thus, the Wilcoxon signed-rank test is preferred.

3.4 Ethical Considerations

All research should be conducted following the highest standards and practices of the scientific method, aiming for integrity, transparency and honesty. Data privacy is also

[21] Some studies favor *t*-test more clearly. For example, Meek et al. (2007) show that the *t*-test has fewer type II errors with small sample sizes, although the difference decreases when the sample size increases. For *p*-level 0.1 and 0.05, the error rates are similar when *n*=15. On the other hand, the Wilcoxon signed-rank test produced fewer type I errors.

essential, especially if the research involves human subjects or the research uses data that contains company information that should not be revealed to competitors.

This study relies solely on public data, so privacy issues are not a concern. The data used in the statistical tests is provided in Table 4. This allows the reader to review the data and replicate the study. Also, the results are analyzed conservatively, avoiding the temptation to interpret the findings in favor of the hypotheses if the data does not support this. Naturally, there is no room for plagiarism in this study. To avoid involuntary plagiarism, the study is tested with the originality checking service, Turnitin.

4 EMPIRICAL RESULTS

This section of the thesis presents the test result on the impact of privatization on the performance the SOEs. Chapter 4.1 provides descriptive statistics for the data. Normality tests are conducted in chapter 4.2 to determine whether the paired sample *t*-test or the Wilcoxon signed-rank test should be used. Chapter 4.3 presents the results of the statistical tests. Finally, the robustness of the test results is analyzed in chapter 4.4. The significance level is set to $\alpha = 0.05$ for all the tests.

4.1 Descriptive Statistics

Table 6 shows an overview of the changes in performance measures for the sample companies. The reported change is the difference in three-year means between the pre- and post-periods. If the reported value is zero, there is no difference between the pre- and post-privatization period for that performance measure. Monetary figures are presented in EURm.

Table 6. Changes in Performance Measures Between the Pre- and Post-Privatization

	Operating income	Operating income to sales (ROS)	Return on assets (ROA)	Real sales to employees	Operating income to employees	Real sales	Employees
Outokumpu	5.870	-0.032	-0.015	0.032	-0.001	1036.985	4085.000
Valmet	-74.978	-0.062	-0.072	0.026	-0.005	318.358	-122.333
Rautaruukki	-55.334	-0.095	-0.029	0.018	-0.008	315.527	2161.333
Kemira	131.257	0.050	0.044	0.067	0.013	430.016	-2164.000
Neste	83.337	0.013	0.002	0.056	0.011	-3341.937	-3356.333
Karttakeskus	0.475	0.051	0.087	0.028	0.005	1.657	-23.333
Sponda	-18.914	0.371	0.043	-6.175	-1.086	-219.873	8.000
Engel	-0.278	-0.049	-0.042	-0.002	-0.001	73.173	2525.667
Sonera	39.333	-0.053	0.082	0.051	-0.002	1046.927	2394.667
Medivire	-0.328	-0.007	-0.007	0.009	0.000	20.755	200.000
Patria Industries	7.832	0.011	0.004	0.047	0.004	89.810	-106.333
Vapo	-0.479	-0.021	-0.011	-0.020	-0.008	138.980	544.000
Inspecta	1.122	-0.017	-0.098	0.026	0.001	22.835	152.333
Suomen autokatsatus	14.963	0.142	0.157	0.014	0.011	35.763	236.167
Raskone	2.319	0.035	0.140	0.003	0.005	2.682	22.667
Altia	2.583	0.010	-0.006	0.082	0.011	-25.099	-157.333

As Table 6 shows, none of the performance measures change only in one direction. Real sales show predominantly positive change with only three privatizations, where the post-period mean is lower than the pre-period. However, the biggest change in real sales is negative, resulting in a negative mean change for sample companies. Real sales to employees show positive change for 13 companies. For the rest of the performance measures, observations are more dispersed.

Table 7 shows descriptive statistics for the chosen performance measures. Again, the statistics are calculated for the differences in three-year means between the pre- and post-periods. Mean, median, minimum and maximum values are provided for each performance measure. Standard deviation, skewness and kurtosis are also reported to describe the shape of the distribution for the observations. The sample size is 16 for all the performance measures.

Table 7. Descriptive Statistics for the Performance Measures

N = 16	Mean	Median	Min.	Max.	Std.Dev.	Skewness	Excess kurtosis
Operating income	8.674	1.720	-74.978	131.257	47.534	1.004	2.617
ROS	0.022	0.002	-0.095	0.371	0.109	2.446	7.323
ROA	0.018	-0.002	-0.098	0.157	0.071	0.546	-0.116
Real sales to employees	-0.359	0.026	-6.175	0.082	1.551	-3.998	15.989
Operating income to employees	-0.066	0.0001	-1.086	0.013	0.272	-3.996	15.977
Real sales	-3.325	54.468	-3341.937	1047.161	959.515	-3.000	11.183
Number of employees	400.010	87.500	-3356.333	4085.000	1776.266	0.034	1.024

The mean change is positive in four of the seven performance measures. However, the median change is negative for only one performance measure, ROA. This implicates that, on average, the changes in the performance measures tend to be positive, but there are some large negative observations, which affect the mean values. Looking at the standard deviation, skewness and kurtosis confirms that the values are spread out over a wide range, and there are outliers in the sample. The relatively high standard deviations compared to the mean values indicate significant variance in data. The skewness values can

also be considered high for all the performance measures, except ROA and the number of employees. Real sales to employees, operating income to employees and real sales show strong negative skewness, while ROS has a positively skewed distribution. The distribution is leptokurtic for all the performance measures except ROA. Especially the real sales to employees, operating income to employees and real sales show high kurtosis values implying heavy-tailed distribution.

4.2 Normality Tests

The data is tested for normality to determine whether a parametric or a nonparametric statistical test should be chosen. In the case of paired data, the paired differences are tested. If the difference in three-year means between the pre- and post-periods is normally distributed, the parametric paired sample *t*-test is chosen. If normality cannot be assumed, the nonparametric Wilcoxon signed-rank test is preferred.[22] The results of normality tests are presented in Table 8. The Shapiro-Wilk test is more appropriate for small sample sizes, but the Kolmogorov-Smirnov test results are also reported.

Table 8. Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Operating income	0.260	16	0.005	0.848	16	0.013
ROS	0.268	16	0.003	0.747	16	<0.001
ROA	0.199	16	0.091	0.951	16	0.504
Real sales to employees	0.524	16	<0.001	0.288	16	<0.001
Operating income to employees	0.522	16	<0.001	0.294	16	<0.001
Real sales	0.366	16	<0.001	0.597	16	<0.001
Number of Employees	0.252	16	0.008	0.900	16	0.080

a. Lilliefors significance correction[23]

The Shapiro-Wilk's test indicate that out of seven performance measures only ROA, $W(16) = 0.95$, $p = .504$, and Number of employees, $W(16) = 0.90$, $p = .080$, are

[22] The other nonparametric alternative is the Mann-Whitney test, but the Wilcoxon signed-rank test is preferred for matched pairs.

[23] The Lilliefors correction improves the Kolmogorov-Smirnov test reducing the probability of type II error.

approximately normally distributed. However, the Kolmogorov-Smirnov test rejects the normality for Number of employees, $D(16) = 0.25$, $p = .008$. For ROA, skewness is 0.55, and kurtosis is -0.12, which does not rule out normality. For the number of employees, skewness is 0.03, and kurtosis is 1.02. The kurtosis value suggests a heavier tail compared to a normal distribution. However, skewness and kurtosis are strongly dependent on sample size and normality should not be rejected based solely on them.

Since five out of seven performance measures do not follow a normal distribution, the Wilcoxon signed-rank test is adopted instead of the paired sample *t*-test. The Wilcoxon signed-rank test is used for all the variables. Additionally, ROA is also tested with the paired *t*-test for comparison. There is some evidence suggesting that the number of employees follows a normal distribution. However, since some of the results were mixed, a conservative approach is taken, and a parametric test is not used.

4.3 Test Results

The test results are grouped by the performance dimensions. First, the Wilcoxon signed-rank test results are reported for each of the performance measures. Additionally, ROA is tested using the paired sample *t*-test. After the main tests, the robustness of the test results is analyzed with subsamples based on the privatization year and size of the company. Subsamples are tested with the Wilcoxon signed-rank test. Figure 2 presents the first set of subsamples. The figure shows the privatization frequency in each year, classifying the SOEs into four subsamples based on the privatization year.

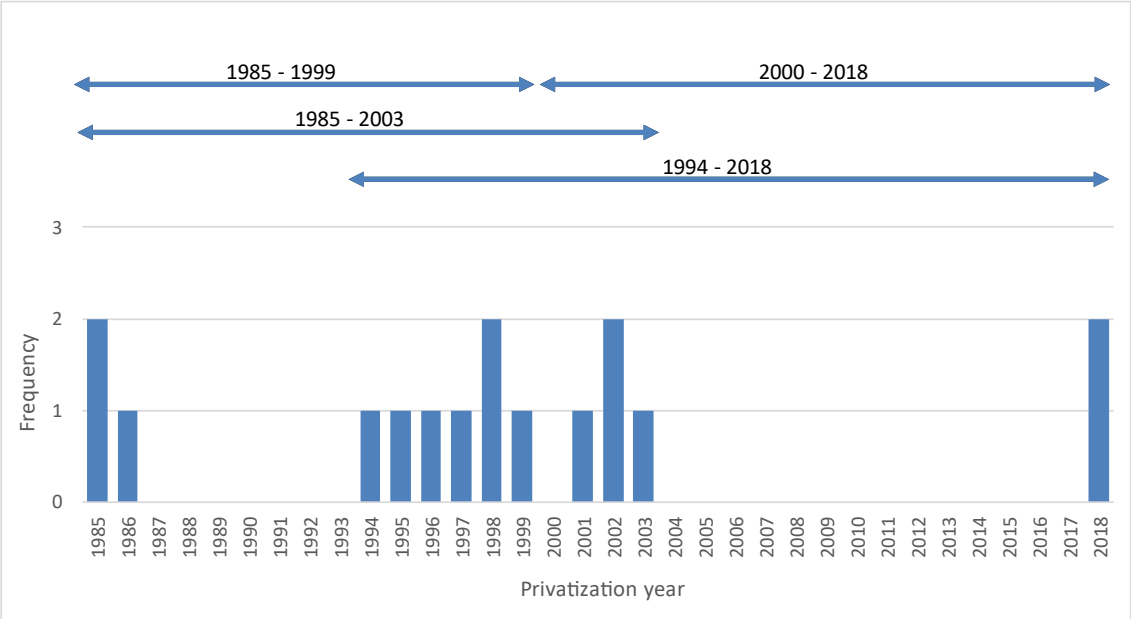

Figure 2. Subsamples Based on Privatization Year

The groups “1985-1999” and “2000-2018” test if the results are identical before and after the year 2000. The group “1985-2003” excludes the most recent privatizations in 2018 and the group “1994-2018” leaves out the first privatizations in 1985 and 1986. There is a seven-year gap between the first privatizations in the 1980s and the next one in 1994, and a fourteen-year gap between 2003 privatization and the last two privatizations in 2018.

Figure 3 presents the subsamples based on company size. SOEs are divided into two groups based on the total assets of the company in the privatization year.

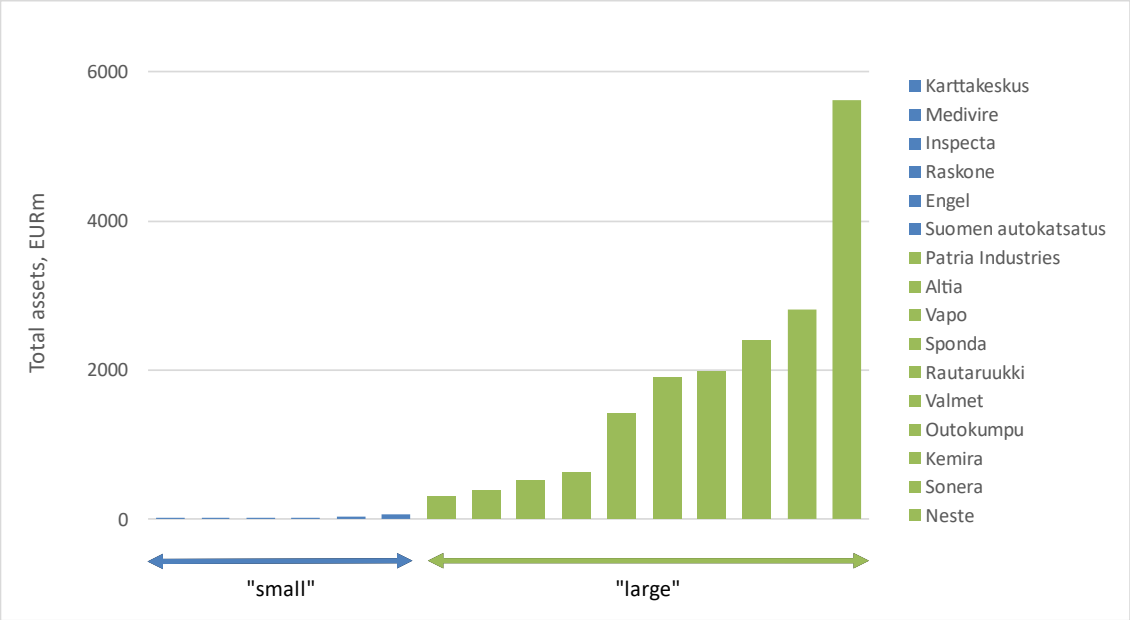

Figure 3. Subsamples Based on Size

The group “small” consists of companies with total assets of less than EUR 100 million. The group “large” includes all the companies with total assets greater than that. The smallest company in the “large” subsample is Patria (total assets EUR 318.1 million). The size limit is set arbitrarily, and different criteria for the subsamples could produce different test results.

4.3.1 Profitability

Changes in profitability are measured with three performance measures: operating income, ROS and ROA. The hypothesis is that privatization improves the profitability of

state-owned enterprises. Table 9 presents the Wilcoxon signed-rank test results for the full sample. The sample size, the mean values for three-year periods before and after privatization and the mean change are reported, and *Z*-statistics[24] and exact *p*-values[25] are provided for each of the performance measures. The last column shows the percentage of firms that performed as the predicted. All the performance measures are tested under the null hypothesis that the median difference between pre- and post-privatization is 0.

Table 9. Changes in Profitability

The first column shows the sample size and, in the parentheses, the number of privatizations, where the performance measure improved after privatization. The *mean before* refers to the three-year mean value for the performance measure prior to the privatization. The *mean after* is the mean value for the three-year period after the privatization. The *mean change* is the difference between the mean after and the mean before. Next, the *Z*-statistics and the statistical significance values are presented. The last column shows the percentage of firms that performed as the hypothesis predicted after privatization.

	N (in-creased)	Mean before	Mean after	Mean change	Z-statistic	Exact Sig. (2-tailed)	Percentage that changes as predicted
Operating income	16 (10)	51.798	60.472	8.674	-1.189[a]	0.252	62.5 %
ROS	16 (8)	0.081	0.103	0.022	-0.052[a]	0.980	50.0 %
ROA	16 (8)	0.037	0.055	0.018	-0.517[a]	0.632	50.0 %

a) based on negative ranks[26]

Table 9 shows no statistically significant results (where, $p < .05$) for any of the profitability performance measures. The test yields a *Z*-value of -1.19 for operating income, with an exact *p*-value of .252. ROS shows a *Z*-value of -0.05, which results in a *p*-value of .980. ROA has a *Z*-value of -0.51 and a *p*-value of .980. Therefore, the null hypothesis of no change cannot be rejected with any of the tests. The results do not indicate that privatization improves the profitability of state-owned enterprises. Although the tests do not show a statistically significant change in any performance measures, a slight increase can

[24] The Z-statistic is a measurement describing how similar the compared (before/after) distributions are. The statistical significance value is derived from the Z-statistic.

[25] An exact *p*-value is calculated using the true distribution, whereas an asymptotic *p*-value is calculated using an approximation of the true distribution. For small sample sizes, the exact *p*-values are more reliable.

[26] *Z*-statistic is based either on the rank sum of the positive differences (*W*+) or the rank sum of the negative differences (*W*-) of the matched pairs, depending on which has a lower sum of ranks.

be observed in the mean values. Also, operating income changed as predicted in 10 out of 16 firms (62.5 %). With ROS and ROA, 50.0 percent of the firms changed as predicted.

Table 10 presents the paired sample *t*-test results for ROA. The sample size, the mean value and the standard deviation are reported for the pre- and post-privatization periods and the change. The *t*-statistic, the degrees of freedom and the *p*-value are provided in the last three columns. Unlike the Wilcoxon signed-rank test, the paired sample *t*-test uses a null hypothesis, which states that the mean difference between pre- and post-privatization is 0.

Table 10. Paired Sample t-Test for ROA

N = 16	Mean before	Std. Dev. before	Mean after	Std. Dev. after	Mean change	Std. Dev. Change	t	df	Sig. (2-tailed)
ROA	0.037	0.057	0.055	0.075	0.018	0.071	0.992	15	0.337

There was no significant increase for ROA in the post-privatization period ($M = 0.06$, $SD = 0.08$) compared to the pre-privatization period ($M = 0.04$, $SD = 0.06$), $t(15) = 0.99$, $p = .337$. The test results are in line with the results from the Wilcoxon signed-rank test and do not indicate increase in the post-privatization ROA.

The subsample test results for operating income, ROS and ROA are presented in Table 11. There are a total of six subsamples: Large companies ($n = 10$), Small companies ($n = 6$), 1985 - 1999 ($n = 10$), 2000 - 2018 ($n = 6$), 1985 - 2003 ($n = 14$) and 1994 - 2018 ($n = 13$).

Table 11. Subsample Tests on Profitability

	N (in-creased)	Mean before	Mean after	Mean change	Z-statistic	Exact Sig. (2-tailed)	Percentage that changes as predicted
Operating income							
Large companies	10 (6)	81.666	93.717	12.051	-0.663[a]	0.557	60.0 %
Small companies	6 (4)	2.018	5.064	3.046	-1.572[a]	0.156	66.7 %
1985 - 1999	10 (5)	75.972	87.016	11.044	-0.459[a]	0.695	50.0 %
2000 - 2018	6 (5)	11.508	16.231	4.724	-1.992[a]	0.063	83.3 %
1985 - 2003	14 (8)	57.355	66.918	9.563	-0.847[a]	0.426	57.1 %
1994 - 2018	13 (9)	45.761	66.009	20.248	-1.992[a]	0.048[*]	69.2 %
ROS							
Large companies	10 (5)	0.102	0.121	12.051	-0.561[b]	0.625	50.0 %
Small companies	6 (3)	0.046	0.071	0.026	-0.734[a]	0.563	50.0 %
1985 - 1999	10 (4)	0.095	0.114	0.019	-0.459[b]	0.695	40.0 %
2000 - 2018	6 (4)	0.057	0.084	0.027	-0.734[a]	0.563	66.7 %
1985 - 2003	14 (6)	0.088	0.109	0.022	-0.220[b]	0.855	42.9 %
1994 - 2018	13 (8)	0.079	0.121	0.041	-1.013[a]	0.340	61.5 %
ROA							
Large companies	10 (5)	0.028	0.033	0.004	-0.051[a]	1.000	50.0 %
Small companies	6 (3)	0.053	0.092	0.040	-0.734[a]	0.563	50.0 %
1985 - 1999	10 (5)	0.030	0.039	0.009	-0.561[a]	0.625	50.0 %
2000 - 2018	6 (3)	0.050	0.081	0.031	-0.314[a]	0.844	50.0 %
1985 - 2003	14 (7)	0.041	0.052	0.011	-0.282[a]	0.808	50.0 %
1994 - 2018	13 (8)	0.043	0.073	20.248	-1.153[a]	0.273	61.5 %

a) based on negative ranks
b) based on positive ranks
*) $p < 0.05$

The subsample results are generally in line with the result from the full sample tests and do not provide evidence that privatization increases profitability. One exception is the "1994 - 2018" group, which yields statistically significant results for operating income (mean change = 20.25, Z = -1.99, p = .048). The result is based on the negative ranks, which indicates that operating income has improved in the post-privatization period. It is also notable that mean chance is positive in all the subsamples, and in only one test (ROS / 1985 -1999), less than 50 percent of the firms changed as predicted. With the group 2000 - 2018, operating income increased in five out of six firms (83.3 %), indicating that privatizations in this millennium have been successful by this indicator.

4.3.2 Operating Efficiency

The hypothesis is that privatization should improve operating efficiency. This is measured using two performance measures: real sales to employees and operating income to employees. Higher value reflects better efficiency here, and both nominator and denominator affect the outcome. Table 12 displays the Wilcoxon signed-rank test results for operating efficiency.

Table 12. Changes in Operating Efficiency

	N (increased)	Mean before	Mean after	Mean change	Z-statistic	Exact Sig. (2-tailed)	Percentage that changes as predicted
Real sales to employees	16 (11)	0.968	0.433	-0.535	-1.758[a]	0.083	68.8 %
Operating income to employees	16 (8)	0.173	0.107	-0.066	-0.517[a]	0.632	50.0 %

a) based on negative ranks

The tests do not yield statistically significant results for real sales to employees (Z = -1.76, p = .083) or for operating income to employees (Z = -0.52, p = .632). Therefore, the null hypothesis of no change cannot be rejected; the results do not indicate that privatization improves the operating efficiency of state-owned enterprises. Real sales to employees changed as predicted in 11 out of 16 firms (68.8 %), whereas with operating income to employees, eight out 16 firms (50.0 %) changed as predicted. Mean values show a decrease for both performance measures.

The chosen performance measures are slightly problematic in case the number of employees differs considerably between sample firms. If two firms have approximately equal sales figures, but one has significantly fewer employees, the changes in that firm's sales get more weight as the test examines change per employee. This seemed to result in some abnormal values in Sponda, with the average number of employees around 30 and relatively high sales figures. Without Sponda, the test would have shown significant results for real sales to employees (Z = -2.39, p = .015), suggesting an increase in the post-privatization performance. The mean change for real sales to employees 0.02, and 11 out of 15 firms (73.3 %) changed as predicted. Nonparametric tests are less sensitive to outliers than parametric tests but can still be affected by them, especially with smaller sample sizes. Although the chosen efficiency measures have weaknesses with a non-homogenous sample, they were included in the study to allow comparison to prior research utilizing them.

Table 13 presents the subsample test results for the operating efficiency dimension. Both real sales to employees and operating income to employees are tested with each of the subsamples.

Table 13. Subsample Tests on Operating Efficiency

	N (increased)	Mean before	Mean after	Mean change	Z-statistic	Exact Sig. (2-tailed)	Percentage that changes as predicted
Real sales to employees							
Large companies	10 (4)	0.275	0.168	-0.107	-0.051[b]	1.000	40.0 %
Small companies	6 (4)	0.002	0.005	0.003	-1.363[a]	0.219	66.7 %
1985 - 1999	10 (7)	1.422	0.555	-0.867	-1.376[a]	0.193	70.0 %
2000 - 2018	6 (4)	0.212	0.231	0.019	-1.153[a]	0.313	66.7 %
1985 - 2003	14 (10)	1.064	0.448	-0.616	-1.538[a]	0.135	71.4 %
1994 - 2018	13 (9)	1.156	0.495	-0.661	-1.433[a]	0.168	69.2 %
Operating income to employees							
Large companies	10 (7)	1.498	0.635	-0.863	-1.172[a]	0.275	70.0 %
Small companies	6 (4)	0.084	0.097	0.013	-0.363[a]	0.563	66.7 %
1985 - 1999	10 (3)	0.270	0.162	-0.107	-0.459[b]	0.695	30.0 %
2000 - 2018	6 (5)	0.011	0.015	0.004	-1.363[a]	0.219	83.3 %
1985 - 2003	14 (6)	0.195	0.119	-0.076	-0.031[b]	1.000	42.9 %
1994 - 2018	13 (8)	0.021	0.131	0.080	-1.153[a]	0.273	61.5 %

a) based on negative ranks
b) based on positive ranks

The results are identical to the full sample tests, and no statistically significant results were found. The mean change for real sales to employees was positive in only two subsamples (Small companies and 2000 - 2018). However, more than 50 percent of the firms changed as predicted with all the subsamples except with Large companies. Respectively, the mean chance for operating income to employees was positive with three of the six subsamples (50.0 %), and more than half of the firms changed as predicted with all the subsamples except 1985 - 1999. In general, the data does not provide evidence that privatization improves operating efficiency.

4.3.3 Output

The effects of privatization on output are measured using inflation-adjusted real sales as a performance measure. The hypothesis is that privatization will increase the output level of state-owned enterprises. Additionally, the effects of privatization are tested with relative values, where the tested mean values for sales are normalized so that the pre-privatization period's mean value equals 1. The purpose is to eliminate the significant size differences of the sample firms. This method can only be applied to performance measures, which cannot get negative values since normalizing a negative value to equal one would not make sense. Finally, a test is performed on GDP-adjusted sales to analyze if the potential changes in performance are driven by a general economic situation. The pre- and post-privatization sales data is normalized to the privatization year level for each company, using the year-on-year GDP change-%, released by Statists Finland. The CPI and GDP tables necessary for the normalization are provided in Appendices 2 and 3.

Table 14. Changes in Output

	N (increased)	Mean before	Mean after	Mean change	Z-statistic	Exact Sig. (2-tailed)	Percentage that changes as predicted
Real sales	16 (13)	1609.589	1606.264	-2.325	-1.913[a]	0.058	81.3 %
Real sales (normalized)	16 (13)	1.000	1.286	0.286	-2.327[a]	0.018*	81.3 %
GDP adjusted sales	16 (12)	1146.009	1038.981	-107.028	-1.603[a]	0.117	75.0 %

a) based on negative ranks
*) $p < 0.05$

The data does not indicate statistically significant change for real sales (Z = -1.91, p = .058) nor GDP-adjusted sales (Z = -1.60, p = .117). However, the test on relative real sales values shows a significant change (Z = -2.33, p = .018) with a positive mean change of 0.29. The test result is based on negative ranks suggesting that the post-privatization output has increased considering the magnitude and direction of the change in the sample companies. Real sales and real sales (normalized) changed as predicted in 13 out of 16 firms (81.3 %), and GDP-adjusted real sales changed as predicted in 12 out of 16 firms (75.0 %). The negative mean change in real sales and GDP-adjusted sales suggests that there are some SOEs where the sales have declined substantially after the privatization,

lowering the mean. The tests do not provide consistent evidence indicating that privatization improves output. However, the relative change in real sales does show a statistically significant increase. Using the relative values mitigates the effects of size differences in sample companies on the test results. As the results were mixed, more evidence is needed on the impact of privatization on output.

Table 15 shows the subsample test results for the output. The subsamples for large companies and small companies are tested using real sales as a performance measure. Normalization for size is not required since the companies are already divided into subsamples by size. The subsamples based on privatization year are tested using size-normalized real sales.

Table 15. Subsample Tests on Output

	N (increased)	Mean before	Mean after	Mean change	Z-statistic	Exact Sig. (2-tailed)	Percentage that changes as predicted
Real sales							
Large companies	10 (7)	2545.071	2524.064	-21.007	-1.274[a]	0.232	70.0 %
Small companies	6 (6)	50.451	76.596	26.144	-2.201[a]	0.031*	100.0 %
1985 - 1999 (normalized)	10 (8)	1.000	1.220	0.220	-1.376[a]	0.193	80.0 %
2000 - 2018 (normalized)	6 (5)	1.000	1.396	0.396	-1.782[a]	0.094	83.3 %
1985 - 2003 (normalized)	14 (12)	1.000	1.328	0.328	-2.229[a]	0.025*	85.7 %
1994 - 2018 (normalized)	13 (10)	1.000	1.286	0.286	-1.922[a]	0.057	76.9 %

a) based on negative ranks
*) $p < 0.05$

The Wilcoxon signed-rank test results for Small companies show significant increase for real sales ($Z = -2.20$, $p = .031$). All six of the sample companies had higher real sales after privatization. Also, the mean real sales increased significantly from EUR 50.45 million to EUR 76.60 million. The sample size was small, so these results should not be generalized to the privatization of all small companies. Nonetheless, the evidence is clear that in Finland, the privatization of smaller companies has led to an increase in real sales. For large companies, the results were not significant ($Z = -1.27$, $p = .232$), and the mean

change was negative. Subsamples based on privatization year show significant change for groups 1985 - 2003 (Z = -2.23, p = .025), with a positive mean change of 0.33 and 12 out of 14 companies (85.7 %) showing an increase in real sales. The results for the other subsamples were not statistically significant.

4.3.4 Employment

The change in employment is measured by counting the average number of employees per year. Privatization is anticipated to increase the number of employees. Again, additional tests are performed using relative change to eliminate the impact of size differences in the sample firms. The test results are displayed in Table 16.

Table 16. Changes in Employment

	N (increased)	Mean before	Mean after	Mean change	Z-statistic	Exact Sig. (2-tailed)	Percentage that changes as predicted
Number of employees	16 (10)	5023.833	5423.844	400.011	-1.138[a]	0.274	62.5 %
Number of employees (normalized)	16 (10)	1.000	1.198	0.198	-2.068[a]	0.039*	62.5 %

a) based on negative ranks
*) $p < 0.05$

The Wilcoxon signed-rank test shows significant results for the normalized number of employees (Z = -2.07, p = .039), with a mean change of 0.20 and the number of employees increasing as predicted in 10 out of 16 the sample firms (62.5 %) of the sample firms. As with the tests on real sales, without normalization, the results were not statistically significant (Z = -1.14, p = .274). This demonstrates that the nonparametric tests are not immune to nonhomogeneity or outliers.

Table 17 shows the subsample test results for employment. Following the pattern of the tests on output, subsamples based on company size are tested using absolute values. Subsamples based on privatization year are tested using relative values, where the mean before is normalized to 1. Table 17 presents the test results.

Table 17. Subsample Tests on Employment

	N (increased)	Mean before	Mean after	Mean change	Z-statistic	Exact Sig. (2-tailed)	Percentage that changes as predicted
Number of employees							
Large companies	10 (5)	7551.667	7880.333	328.666	-0.255[a]	0.846	50.0 %
Small companies	6 (5)	810.778	1329.694	518.917	-2.201[a]	0.094	83.3 %
1985 - 1999 (normalized)	10 (6)	1.000	1.199	0.199	-1.682[a]	0.105	60.0 %
2000 - 2018 (normalized)	6 (4)	1.000	1.198	0.198	-1.153[a]	0.313	66.7 %
1985 - 2003 (normalized)	14 (9)	1.000	1.237	0.237	-2.229[a]	0.025*	85.7 %
1994 - 2018 (normalized)	13 (8)	1.000	1.201	0.201	-1.712[a]	0.094	61.5 %

a) based on negative ranks
*) $p < 0.05$

Out of the six subsample tests, only group 1985 - 2003 show significant test results (Z = -2.23, p = .025), suggesting an increase in the number of employees. Although other tests did not yield a statistically significant outcome, all the subsamples show a substantial increase in means values. Also, in five out of six tests, more than half of the firms changed as predicted. Large companies' group was the exception with 5 out of 10 firms (50.0 %) showing an increase in the number of employees.

4.3.5 Summary of the Findings

To summarize the key findings and form a conclusion on the hypotheses, the results for the full sample tests are presented in Table 18. The conclusion for the tested hypothesis is based on the statistical tests on performance measures. Table gathers the results for each test, with the corresponding p-value. The final column shows whether the hypothesis is accepted or rejected.

Table 18. Key Findings

	Hypothesis	Performance measure	Sig.	Test result	Conclusion
H1	Privatization improves the profitability of state-owned enterprises.	Operating income	0.252	Accept H0	Rejected
		ROS	0.980	Accept H0	
		ROA	0.632	Accept H0	
		ROA / *t*-test	0.337	Accept H0	
H2	Privatization improves the operating efficiency of state-owned enterprises.	Real sales to employees	0.083	Accept H0	Rejected
		Operating income to employees	0.632	Accept H0	
H3	Privatization increases the output level of state-owned enterprises.	Real sales	0.058	Accept H0	Inconclusive
		Real sales (normalized)	0.018	Reject H0	
		GDP adjusted sales	0.117	Accept H0	
H4	Privatization increases the employment level of state-owned enterprises.	Number of employees	0.274	Accept H0	Inconclusive
		Number of employees (normalized)	0.039	Reject H0	

The test results suggest rejecting hypotheses H1 and H2. None of the statical tests yielded significant results for either profitability or operating efficiency. Based on this, it can be concluded that the data of Finnish privatizations between 1988 and 2018 does not provide evidence that privatization improves profitability or operating efficiency. The results for H3 and H4 are less conclusive since the tests on normalized data show significant results suggesting increased sales and employment levels. The absolute value tests suggest rejecting the hypotheses. The results on normalized data can be considered more credible than the results on absolute values: the significant size difference in sample companies may lead to biased results, giving more weight to large companies. Based on this, the hypotheses H3 and H4 can be accepted with reservation: there is evidence suggesting a link between privatization and increased output and employment levels in Finland, but further research is needed.

4.4 Robustness Analysis

To ensure the robustness of the findings, an appropriate statistical test was chosen carefully, following the best practices. The relatively small sample size and violations in normality resulted in selecting a nonparametric Wilcoxon signed-rank test. Nonparametric tests are generally more robust than the parametric alternatives, albeit less powerful. ROA appeared to follow a normal distribution and was tested additionally with the paired *t*-test. The two statistical tests yielded identical results.

The robustness of the results was tested with additional tests on subsamples. The first set of subsamples was formed based on the privatization year to analyze whether the results are uniform over time. The second set of subsamples was based on the company size and tested whether the results of the small companies differ from the results of the large companies. Only two of the full sample tests yielded significant results. The subsample tests produced mixed results and were not entirely in line with the full sample results. Considering this, the results should not be generalized to all privatizations. Instead, they provide ideas for future research. Especially since the sample size was relatively small, making the findings more vulnerable to type II errors.

5 CONCLUSIONS AND SUMMARY

5.1 Conclusions of the Study

The objective of this study was to answer to the research question: *Has privatization improved the performance of the privatized state-owned companies in Finland?* None of the performance measures for profitability or operating efficiency showed statistically significant change for the newly privatized firms in full-sample tests. The output and employment level results were inconclusive, showing an increase with normalized data but no significant change with absolute values. As discussed earlier, the results on normalized data can be considered more credible since absolute value tests are vulnerable to bias arising from the size differences. In other words, the answer to the research question is two-fold: *The data on privatizations in Finland between 1988 and 2018 suggests no improvement in profitability or operating efficiency, but there is some evidence suggesting an increase in output and employment level*.

These results differ from those of Megginson et al. (1994) and from Boubakri and Cosset (1998) and D'Souza et al. (2004), who also employ the same methodology. Megginson et al. document significant performance improvements in profitability, operational efficiency, output and total employment for their sample of 61 firms from 18 countries. They find the results generally robust also when the sample is partitioned into subsamples, including full/partial privatization, competitive/non-competitive industries and industrialized/developing countries. Similar results are found by Boubakri and Cosset with a sample of 79 firms from 21 developing countries and by D'Souza et al. with a sample of 129 share-issue privatizations from 23 OECD countries. While it is not possible to conclusively determine why the results are not in line with these studies, there are some potential explanations. To begin with, the small sample size sets its limitations resulting in relatively low statistical power, which may cause failure to reject the null hypothesis. In other words, there is a possibility that profitability and operating efficiency do not show increases due to the small sample size.

However, the results are in line with the analysis of Willner (2003) on privatizations in Finland. He concludes that Finnish SOEs have been relatively successful, and there is no evidence of improved financial performance in privatized companies. Finnish privatizations may have some unique characteristics, which have their implications for the conceived post-privatization performance. One this type of feature could be the pragmatic,

case-by-case approach to privatization in Finland. Consequently, privatizations often take place in atypical, transitional periods for the company. In a typical scenario, an SOE is in demand of additional capital due to some crisis or an investment opportunity. This capital is then raised through privatization rather than through government funding. The situation is essentially different in the countries with explicit privatization programs. Contrary to the case-by-case approach, with privatization programs, the motivation for privatization is not originated from the needs of a company. SOEs are privatized regardless of their performance and circumstances. Considering that this study focuses on short-to-medium-term effects, the difference in the motives behind privatization may affect the post-privatization performance.

Another explanation is that Finnish SOEs have already been forced to optimize their performance because of market competition or corporate governance practices. In those benchmark studies, most privatizations occur from the 1960s to 1980s, whereas most of the sample firms in this study were privatized from the 1990s onward. It is plausible that these SOEs were already facing increasing market pressure before privatization, compared to those privatized earlier.

It is also worth noting that not all the studies following the methodology of Megginson et al. document a significant performance improvement. Omran (2002) reports mixed results for a sample of 54 privatized SOEs from Egypt. Omran observes that the privatized companies exhibit significant increases in profitability and operating efficiency but a decrease in employment level and no significant change in output. To eliminate possible economy-wide factors, the results are compared with a matching control group. This is particularly important since the privatizations take place in a relatively short period of five years. The results generally show similar trends for the sample firms and the benchmark group, indicating that the changes are not likely to be related to privatization. While the evidence suggests that privatization leads to better performance under some conditions, it is also apparent that various environmental factors and circumstances affect the results.

5.2 Summary and Evaluation

The primary purpose of this thesis was to determine whether privatization has improved the performance of privatized state-owned companies in Finland. To achieve this goal, the study starts by providing a comprehensive presentation of the privatization theory. The main findings from recent empirical research are also exhibited. Emphasis is placed

on the related literature in Finland, as one of the main motives for the thesis was to analyze privatization specifically in a Finnish context.

The performance of the sample firms was tested following the methodology of Megginson et al. Performance was divided into four dimensions: profitability, operating efficiency, output and employment, and testable performance measures were chosen for each dimension. These performance measures were tested using the Wilcoxon signed-rank test to compare pre- and post-privatization figures. The results did not indicate improvement in profitability or operating efficiency. However, there was some evidence suggesting an increase in output and employment levels, which indicates that the newly privatized firms target growth. Finally, to set these results into a broader context, they were compared to benchmark studies employing the same methodology.

The results of this study should be treated with caution for several reasons. Some of these are related to the methodology and already acknowledged in the previous studies. Some arise from the settings of this thesis. D'Souza et al. (2004) list potential caveats concerning the chosen methodology, such as a sample selection bias, which refers to a theory of governments being inclined to privatize SOEs that are likely to benefit from it. This is naturally a desirable action, but it affects the possibility of generalizing the effects of privatization. This is not likely the case with the sample of this study, as the sample companies do not exhibit significant performance improvement.

D'Souza also notes the potential econometric issues related to endogeneity, omitted variables and outliers. In this study, particularly the outliers raise concerns, as the sample size is relatively small. Unfortunately, the chosen method did not allow a larger sample from Finnish data, as pre- and post-privatization figures needed to be comparable. A substantial part of Finnish privatizations has been mergers, ruling these companies out of the sample. In this respect, the chosen methodology may not have been optimal for analyzing the effects of privatization in Finland. The results were analyzed in conjunction with the benchmark studies employing a similar methodology to reduce this shortcoming. Nevertheless, the sample size limits the statistical significance of the results, and it is not possible to draw any general conclusions on the effects of privatization based on this study. These results add to the evidence from prior research.

In addition to the sample size, the relative heterogeneity of the sample firms proved problematic. The substantial difference in total assets between the smallest (Karttakeskus) and the largest (Neste) sample company biased the results, giving more weight to the large companies. This is a problem when comparing a financial ratio such as ROA. Higher

total assets cause changes in net income to appear relatively less significant. Naturally, these concerns are not limited to this study and are present whenever financial ratios are analyzed. This issue is reduced, to some extent, on account of the statistical method chosen. The Wilcoxon signed-rank test assigns ranks to the observations, which means that the value of test statistic depends on the mutual order of observations instead of the distance of observations. Data normalization was also employed to reduce the impact of heterogeneity in the sample.

While comparing the pre- and post-privatization performance offers valuable insights into the changes on a firm level, as opposed to regression analysis on the effects of ownership, it is not an entirely unproblematic approach. The observed time period per privatization was seven years, including three years after the privatization year. This is a relatively short period and potentially not long enough to exhibit the benefits of privatization. Companies may have long-term contracts with their clients covering longer than three years, and the terms of these contracts remain regardless of privatization. On the other hand, a longer observation period would make it even more challenging to isolate the effects of privatization from the data, with a multitude of factors affecting the performance. A longer period would also make it significantly more difficult to acquire comparable data from sample firms.

Privatization in Finland is almost always connected to a more extensive overhaul of the firm's strategies and operations. Privatization should be analyzed in this context rather than as an independent and isolated event. The development that leads to privatization typically begins much earlier. Consequently, the results of privatization are essentially the sum of the whole process. In some cases, privatization can be viewed merely as a side note to a more extensive reorganization of the company: the potential performance improvements could be achieved regardless of the ownership structure. Thus, the change in performance is not a result of a private owner's interest. This does not alter the fact that private owners have more incentive to ensure that performance is improved and, therefore, may have a crucial role in the success of the reorganization. Nor does this diminish the potential benefits of privatization itself. It only makes measuring them more complicated.

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APPENDICES

Appendix 1. Additional Information on the Sample Firms

This appendix provides additional information on the sample of privatized SOEs. Details on the firms' history and field of activity are intended to give the reader a more comprehensive view of Finnish SOEs and the privatization process. This section also reports possible measures taken at the company, before or after privatization, aiming at increasing performance. After all, privatization itself is not going to improve the company's performance. Potential efficiency gains come from the decisions and actions that occur at the time of privatization. An interesting detail is that the actions to increase efficiency have started before privatization in some cases. Thus, privatization can be seen as a culmination point of these actions, a consequence rather than a cause.

In some cases, there was only a limited amount of relevant information available. Annual reports used to be considerably less verbose than today, and especially with the smaller companies, the details were practically non-existent. The companies are presented in alphabetical order.

Altia

Altia's history goes back to 1888 when a yeast factory and spirit distillery were established in Rajamäki. The company was acquired in 1920 by a state-owned alcohol company Valtion Alkoholiliike. The company name was later changed to Alko. Altia was separated from Alko in 1999 when the company started operating as an independent, state-owned alcohol manufacturer and importer (Altia 2021b).

Altia was listed on the Nasdaq OMX Helsinki Stock Exchange in March 2018. The listing included a public offering and an employee issue, and it was oversubscribed. By the end of the year, the State's interest in the company was in 36.2 percent. The company is not considered to have a strategic interest, and the State's holdings were transferred to the state-owned investment and development company Vake (Altia 2019, 19). After the privatization, Altia's performance remained strong, with net sales and earnings increasing in 2019. The Covid-19 outbreak in 2020 had a negative effect on the company, lowering the sales figures. However, Altia's outlook remained positive, and in September, the company announced plans on a merger with Arcus, forming a new company, Anora Group.

The merger will create a wine and spirits brand house focusing on the Nordic and Baltic markets (Altia 2021a 5, 14).

Engel

Engel Group was founded in 1994 and operated in real estate services to property owners and users. The company provided services in the following areas: construction management, real estate, cleaning, security and care (Engel 2000, 56).

The year 1998 had been challenging for the company due to increased competition in the real estate services. Furthermore, the State Real Property Authority put its contracts out to tender, leaving Engel with around 80 percent of its prior contracts. A significant drop in market prices further complicated the situation. On the other hand, cleaning services, security services and construction management continued growing while profitability remained satisfactory. (Engel 1999, 34-35). The arrangements to widen the ownership base began in early 1998, and the formal decision on the new ownership structure was given in September. Investment funds managed by Leonia Group's MB Equity Partner became the new main owner with 45 percent of the shares, while the State remained a significant owner controlling 42 percent of the shares. The remaining 13 percent of the shares were sold to management and employees (Engel 1999, 4).

Following the privatization, the company focused firmly on growth while trying to maintain above-average profitability (Engel 1999, 35). The strategy was executed successfully, leading to rising sales figures in the three consecutive years. The growth was mainly organic, but the company also expanded its service provision and geographical coverage through corporate acquisitions. However, the rapid expansion reflected in the sales margins declining profitability temporarily in 1999 (Engel 2000, 57). In the following two years, the company managed to increase its profit levels, mainly through successful growth in cleaning services and through improved profitability in security services (Engel 2002, 49). ISS Group acquired Engel Group in July 2004 (ISS A/S, 64).

Inspecta

The history of Inspecta began in 1975 when the State of Finland founded the authority inspection body Technical Inspection Centre (Teknillinen tarkastuskeskus, TTK) for

power plants. In 1995, Technical Inspection Centre was transformed into a public utility.[27] Authority status was removed, and TKK focused on the inspection operations. Three years later, in 1998, the Finish market was deregulated, and TKK became state-owned limited company Inspecta (Inspecta 2014, 30-31).

After the deregulation, the State no longer had a special strategic interest in Inspecta. In June 2001, the Finnish Parliament approved the Government proposal (HE 192/2000 vp) giving the authorization to give up state ownership of the company (Eduskunta 2001). The privatization was carried out in 2002 when a Finnish investor group led by MB Funds acquired 100 percent of the company shares for €8.5 million after public tender proceedings (VATT 2010, 37, 40). At the time, Inspecta's turnover was around €18 million, and the new ownership initiated an ambitious growth strategy, which included new product and market segments and company acquisitions. This strategy proved successful, and in 2007 the company had achieved a turnover exceeding €110 million while maintaining a good level of profitability and employing more than 1,000 employees. In June 2007, Inspecta was sold to a British private equity and venture capital company, 3i, for an undisclosed amount (MB Rahastot 2021b).

Karttakeskus

Karttakeskus became an independent state enterprise in 1990 when it was separated from the Finnish Board of Land Survey. Its purpose was to offer services in the field of mapping and land survey for the Board of Land Survey. Karttakeskus also provided some services to other public administration organizations and the private sector (Karttakeskus 2013).

Government Institute for Economic Research (VATT) conducted a survey in 1991 on the role of state enterprises, also providing suggestions on the preferable ownership structure for certain companies. The services provided by Karttakeskus were not considered to be strategically important, requiring state ownership. On the other hand, Karttakeskus was financially stable, making it possible for the company to operate independently outside the state budget (Huttunen 1991, 13-14, 43). Consequently, Karttakeskus was turned into a state-owned Ltd. in January 1994 and finally sold to private investors in 1996. Today Karttakeskus is fully owned by Affecto Plc. and continues to

[27] Public utility = valtion liikelaitos

provide mapping services focusing on location intelligence dependent IT planning (Affecto 2017, 35; Karttakeskus 2013).

Kemira

The story of Kemira began in 1920 when Valtion Rikkihappo- ja Superfosfaattitehtaat was established to ensure the availability of fertilizers and sulfuric acid for the industry. The company has expanded its activities first by broadening the production base and later through corporate acquisitions and mergers. The name was changed to Kemira in 1970, before acquiring the paint manufacturer Tikkurila. At the end of the 1970s, Kemira was already a major chemicals company and had total personnel of 7000 (Kemira 2013).

The possibility of acquiring capital from the stock market was discussed in the 1960s and again in 1984. The government stance was not categorically against a public share issue, but it was not seen as necessary or realistic at the time. At the beginning of the 1990s, Kemira had suffered heavy losses and was even in danger of liquidation. Different solutions were considered, but eventually, the government agreed upon an initial public offering to raise equity (Ranki 2012, 236-239). Kemira was also forced to restructure its operations. This restructuring program was launched three years before the share issue and successfully cut the payroll cost by almost 30 percent. The reforms in the organization structure continued after the listing, and the financial conditions improved gradually. Naturally, also the general market conditions started getting better after the depression of the early 1990s (Pederson 2005).

Medivire

Medivire was founded in 1996 when VK-työterveys, a Finnish State Treasury budget unit responsible for the State's internal occupational healthcare, was incorporated into a limited company. Medivire was the largest operator in occupational healthcare in Finland, providing services to State organizations, such as Posti and VR. In February 2000, Medivire was sold to MB Funds, Solidium, Ilmarinen and the operative management. Proceedings to the State were around €10 million (Junka 2010, 38, 40; Medivire 2002).

MB Funds became the main owner, and later in 2004, it purchased the remaining State's minority share from Solidium. Under the new ownership, Medivire was turned

from an internal state service unit into a market leader in the competitive field of occupational healthcare services. The company focused strongly on growth, which affected the profitability of the first three years after the initial privatization. However, the strategy was successful, and by 2007 company's operational volume had almost tripled, and profits multiplied. Medivire was purchased by Terveystalo in August 2007 (MB Rahastot 2021c; Valtioneuvosto 2002, 23).

Neste

Neste was founded in 1948 to secure a supply of oil for the country's needs. In the beginning, the company's function was to import oil, which was then stored at a central storage facility at Naantali. Later, in 1957, the first refinery was built, and Neste expanded into refining crude oil. In the 1980s, Neste had to adjust its operations after the oil crisis, which had caused demand to fall and refining margins to drop. As a result, the company moved into petrochemicals and other fields, such as heating, coal and batteries (Neste Oil 2013).

Along with the end of bilateral trade with the Soviet Union, the economic recession affected Neste considerably in the 1990s. The company was making a loss leading to a growing debt burden. To get through the economic downturn, Neste was forced to cut costs and rationalize its operations, which led to withdrawing from petrochemicals. The company's financial standing was also strengthened when the government decided on a public offering to raise new risk capital. Neste was listed on the Helsinki Stock Exchange in November 1995 (Kansallisbiografia 2008a).

Outokumpu

The company was founded originally in 1910 upon discovering a copper ore deposit in Outokumpu, Northern Karelia. However, operations only really took off in 1924, when the State became the sole owner of the deposit. By the 1960s, Outokumpu had developed into a multi-metal company also including nickel, zinc and cobalt. As the outcome of continuing growth, Outokumpu was Finland's third-largest export company and the metal industry's largest exporter by 1980 (Outokumpu 2013).

The necessity and benefits of state ownership had been discussed a few times during the company's history. However, the possibility of giving up ownership became truly

topical by the end of the 1980s. The roots of the situation, which eventually led to giving up ownership, were in the generous pension benefits that the company had been offering to its employees. Depending on the work assignments, it was possible to retire with full benefits just after 20 years of service. This accumulated to a point where the pension costs were estimated to correspond to over 50 percent of the salaries. To solve this unsustainable situation and avoid approaching the financial crisis, the government decided in March 1987 on issuing shares to employees in exchange for the oversized pension benefits. The share issue and the subsequent public share issues successfully restored the competitiveness, although several lawsuits were also filed against the company (Ranki 2012, 224-225).

Outokumpu also went through a comprehensive reorganization during the late 1980s. Centralized management was replaced by a more autonomous organization allowing more independence to individual business units. In addition, some of the company's subsidiaries and divisions were restructured as independent corporations (Pederson 2001).

Patria

Patria is an international provider of defense, security, aviation life cycle support services, pilot training and technology solutions. Besides Finland, Patria operates in several locations, including Sweden, Norway, Belgium, Estonia and Spain, employing more than 3,000 people worldwide (Patria 2020, 3).

The history of the company began 100 years ago, in 1921, when an aircraft factory named *Ilmailuvoimien Lentokonetehdas* was founded in Suomenlinna to manufacture Hansa-Brandenburg aircraft under a license. Seven years later, the factory was transferred to the Ministry of Defense, and the name was changed to *Valtion Lentokonetehdas*. The present form of the company is a result of numerous transitional phases and mergers. The company was named Patria in 1997 when the State consolidated a substantial part of the Finnish defense industry into one company (Patria 2017).

In 2001, European Aeronautic Defense and Space Company EADS N.V. became a shareholder of Patria with a 26.8 percent stake. To the State the ownership in Patria was considered strategic, but as a company, it operated on economic grounds. The alliance with EADS was considered to improve Patria's opportunities to approach European and international defense markets. During 2001, the company implemented a structural reorganization and a new operating model, aiming for better profitability, internationalization

and improved key customer relations. These actions were relatively successful, and Patria's sales and profitability increased in the following years (Valtiontalouden tarkastusvirasto 2002, 111-116; Patria 2002).

Raskone

Raskone was founded in 1994 by combining the repair facilities of the Finnish Road Administration, subordinated to the Ministry of Transport and Communications, and those of the Water and Environmental Administration. The company's main operations were the maintenance and repair of duty vehicles and machinery through a service network covering the whole country. Raskone was fully owned by the State until March 2018, when the company was sold to Lease Deal Group (Valtioneuvosto 2008, 48; Valtioneuvosto 2018, 40).

There has been some controversy related to the privatization process of Raskone. An article on Suomen Kuvalehti (2019) claims that the company was sold for about half its fair value price. Furthermore, the owner of Lease Deal Group is also under investigation on suspected financial crimes related to Nuorisosäätiö. Prime Minister's Office responded to the article denying all accusations (Valtioneuvosto 2019). Lease Deal sold Raskone in 2021 for EUR 30.7 million to Relais Group. The selling price can be considered high compared to the purchase price of EUR 7.2 million. However, Raskone had increased its profitability significantly from 2018.

Even if the tendering process was carried out following the regulations, the State should aim for transparency in the privatization of SOEs to avoid any speculation. Raskone deal was carried out through the investment and development company Vake, which permitted to declare all tendering documents classified, essentially denying the possibility to review the process.

Rautaruukki

Rautaruukki is a large Finnish steel producer established in 1960 to provide materials for the shipyard and metal industries. After Outokumpu and Valmet, Rautaruukki was the third state-owned company to be listed on the Helsinki Stock Exchange in 1989. Seven years before the listing Rautaruukki had gotten a new CEO, Mikko Kivimäki. The

company had low profitability, and Kivimäki concentrated on enhancing performance and expanding activities abroad (Kansallisbiografia 2008c).
After the share issue, Rautaruukki continued the internalization and growing into new fields of activities, such as the construction business. By the end of the decade, Rautaruukki employed over 12,000 people, and nearly half were employed outside of Finland (Ruukki 2013).

Sonera

Sonera was a Finnish telecommunications company, fully owned by the State until 1998 when the company was listed on the Helsinki Stock Exchange. The company's history began in 1917 with the founding of the Finnish Telegraph Agency, which was later, in 1927, merged with the Finnish Post. The new Post and Telegraph agency continued under the state budget for more than 50 years. The events leading to the privatization began with the deregulation of the Finnish telecommunications service industry, which took place in the late 1980s and early 1990s. In 1994, PT Finland Group was created by incorporating post and telecom operations into a limited company. These services were divided into separate subsidiaries: Finland Post Ltd and Telecom Finland Ltd. In 1997, the Finnish parliament agreed on a de-merger and partial privatization of telecom operations to satisfy the capital requirements for international growth. The telecom company's name was changed into Sonera Ltd, and the initial share offering was carried in 1998, between October 9th and November 19th (PT Finland Group 1995 4-5, Sonera 2002, 42; Vesterinen 2009, 53, 181).

Sonera's listing in the stock exchange took place during the *dot-com bubble* drawing a large number of investors. On the first day of exchange trading, the share price increased 40 percent, and the price continued increasing in the following months, along with other dot-com shares. Sonera's rapid growth and global expansion culminated in 2000 into acquiring four UMTS mobile communications licenses in Germany, Spain, Italy and Norway. The company paid in total about €4 billion for these licenses. UTMS deals were financed through short-term loans, which Sonera intended to repay by selling its holdings in other companies, and in part, through external non-recourse financing that would be arranged for the license-holding company in Germany (Sonera 2001, 33). However, in 2001 the dot-com trend turned, bringing significant challenges for Sonera and the entire telecommunications sector. With the falling stock prices, it was no longer possible to pay

down the debt by selling its non-core assets. To finance the payments, Sonera arranged a Rights Offering amounting to €1 billion. In the following year, Sonera announced a write-down of €4.3 billion on its investments in UMTS licenses (Sonera 2002, 4, 28; TeliaSonera 2003, 53).

In 2002, Sonera was acquired by its Swedish competitor Telia. The decision to merge the companies was made public in March, and the merger was finalized in December. The acquisition was made possible by Sonera's weakened financial position and the falling stock price. After the merger, the State owned 19.4 percent of the new TeliaSonera corporation, while the Swedish state owned 46 percent (TeliaSonera 2003, 40-41).

In addition to the financial distress, Sonera was dealing with severe corporate governance and management culture issues. These harmful practices in leadership came to public awareness in 2002 when a whistleblower from inside the company published the book *How Sonera's Billions Were Lost on the Web*. The book included strong claims concerning risk analysis on the UMTS deals. It also described unlawful activity within the company, including illegal tracing and monitoring of phone calls made by its workers. This led to the arrest of Sonera's former CEO Kaj-Erik Relander, and six other company executives (Viinamäki et al. 2020, 56-58).

Sponda

Sponda is a real estate investment company founded by the Bank of Finland during the banking crisis in 1991. The company and was later transferred under the Ministry of Finance. Its original purpose was to take over and manage the real estate properties and equity portfolio held by the SKOP bank. The expansion of Sponda's ownership began in 1996 when Merita bank acquired 1/3 share of the company. Later, in 1998, Sponda was listed on the Helsinki Stock Exchange (Sponda 1998, 1-3). In 2012 government sold the remaining 14,9 percent of Sponda's outstanding shares to a Finnish group of investors (Valtioneuvosto 2013, 78).

The decision to broaden Sponda's ownership base was connected to revisions in the company's strategy. To compete against large international companies in the real estate markets, Sponda concentrated increasingly on growth. The company also narrowed its focus on real estate investment and sold its portfolio of securities for EUR 303.7 million. Sales profit amounted to EUR 87.8 million (Sponda 1998, 4, 14).

Suomen Autokatsastus

Suomen Autokatsastus (Finnish Vehicle Inspections) was founded in 1996, when Autorekisterikeskus, a government office responsible for vehicle inspection services in Finland, was made into a state-owned limited company. Vehicle inspection had been opened for competition two years earlier, in 1994. Suomen Autokatsastus expanded into international markets in 1997, through its affiliate company, Sia Scantest, in Latvia (A-Katsastus 2021a).

The privatization took place in 2003 when MB funds acquired the company and changed its name into A-Katsastus. MB Funds renewed the company strategy focusing on growth and internationalization. The competition level in the domestic market was high, resulting in a diminishing market share. In the following years, A-Katsastus became the second-largest operator on the Danish market and established operations in Russia. An existing network of inspection stations in Poland and Latvia was also expanded. During the three years under the ownership of MB Funds, the company's turnover was increased by more than 50 percent, profits were multiplied, and the share of international operations grew significantly. MB Funds sold A-Katsastus to Bridgepoint in 2006 (MB Rahastot 2021a).

Valmet

The origins of Valmet date back to 1944 when the State decided to group several weapons manufacturing facilities into one company, Valtion Metallitehtaat. The name was later changed to Valmet when the company form was changed to a joint-stock company (Ranki 2012, 252).

The initial sale of shares was preceded by a crisis in the shipyard industry, which eventually led to the liquidation of Wärtsilä Meriteollisuus. Valmet was a partial owner in Wärtsilä, and that caused heavy financial stress on the company. The Finnish government was unwilling to provide more subsidies to the industry and gave Valmet permission to seek capital from the private sector. This led to the initial public offering, and Valmet was listed on the Helsinki Stock Exchange in October 1988 (Ranki 2012, 259-262).

As a result of relatively poor performance in the 1970s, Valmet went through an extensive reorganization in the early 1980s, including layoffs and organizational restructuring. One significant change was to focus on manufacturing paper machinery. These

reforms positively affected the company's performance, and Valmet was profitable in the 1980s, even though tractor manufacturing remained unprofitable. The times became more challenging after the privatization. This was largely a result of the collapse of the Soviet Union and its consequences to the eastern trade (Kansallisbiografia 2008b).

Vapo

Vapo is an international supplier of local and renewable fuels, bioelectricity and bioheat, and environmental business solutions. The company operates in 11 countries and has approximately 1,000 employees (Vapo 2021, 1-6). Vapo's history began in 1940 when the State centralized all procurement of firewood and timber for state institutions to be handled by the Timber Office of the Board of Administration of Finnish State Railway. Timber Office was later turned into State Fuel Centre, and finally, in 1984, transformed into a limited company under the name of Vapo (Vapo 2000, 4).

The privatization process of Vapo started in 2000 when the State made a call for tenders to expand Vapo's ownership base and seek a Finnish strategic minority shareholder for the company. As a result of this process, a preliminary contract was made with Metsäliitto to sell one-third of the company shares. According to the agreement, Vapo would be jointly controlled by the State and Metsäliitto. However, the competition authorities imposed a condition on the deal, requiring Vapo and Metsäliitto to relinquish a part of their wood fuel activities to a new operator. This condition could not be fulfilled, making it impossible to move forward with the arrangement. The Ministry of Trade and Industry and Metsäliitto negotiated a new contract, which no longer included the type of joint control arrangement, which would require it to be notified to the competition authorities. This deal was finalized at the beginning of 2002. At the end of 2004, the State and Metsäliitto agreed on raising Metsäliitto's holdings in Vapo to 49.9 percent (Vapo 2002, 33; Vapo 2003, 9, Kauppa- ja teollisuusministeriö 2005, 23).

After the arrangements in the company's ownership, a new strategy was drafted for the Vapo Group, focusing on local biofuels, bioelectricity and heat, as well as in waste management and its technology. Vapo's financial performance continued strong during subsequent years, steadily increasing sales while maintaining profitability (Kauppa- ja teollisuusministeriö 2003, 23; Kauppa- ja teollisuusministeriö 2006, 24).

Appendix 2. Money Value Conversion Table

This appendix provides a money value conversion table, which was used in this study. Coefficients are published by Statistics Finland. The conversion takes into account inflation and the changeover from mark to euro.

Table 19. Money Value Conversion Table

Year	Coefficient 2020=1.000	Year	Coefficient 2020=1.000	Year	Coefficient 2020=1.000	Year	Coefficient 2020=1.000
1985	0.33877219	1994	0.24118875	2003	1.25151241	2012	1.05961038
1986	0.32703190	1995	0.23885018	2004	1.24917487	2013	1.04417223
1987	0.31547965	1996	0.23745935	2005	1.23851059	2014	1.03341702
1988	0.30072833	1997	0.23456931	2006	1.21707049	2015	1.03553792
1989	0.28214260	1998	0.23131840	2007	1.18728127	2016	1.03187125
1990	0.26595515	1999	0.22866083	2008	1.14098014	2017	1.02413688
1991	0.25541622	2000	0.22120781	2009	1.14088364	2018	1.01317684
1992	0.24894502	2001	0.21564362	2010	1.12713724	2019	1.00289594
1993	0.24381435	2002	1.26249378	2011	1.08937029	2020	1.00000000

Source: Tilastokeskus (2021b)

Appendix 3. Gross Domestic Product in Finland

The measures for the gross domestic product in Finland are provided in Table 20. The measures are published by Statistics Finland.

Table 20. Gross Domestic Product in Finland 1985-2020

Measures for 2018 - 2020 are estimates and may be revised later by Statistics Finland.

Year	Change in value, %	GDP at current price, EURm	Year	Change in value, %	GDP at current price, EURm	Year	Change in value, %	GDP at current price, EURm
1985	9.0	58245	1997	8.5	110807	2009	-6.4	181747
1986	7.6	62693	1998	8.7	120474	2010	3.5	188143
1987	8.0	67716	1999	5.3	126916	2011	5.2	197988
1988	13.3	76723	2000	7.5	136442	2012	1.5	201037
1989	11.9	85891	2001	6.0	144628	2013	1.6	204321
1990	5.9	90959	2002	2.7	148486	2014	1.3	206897
1991	-4.5	86899	2003	2.2	151749	2015	2.2	211385
1992	-2.4	84782	2004	4.6	158758	2016	2.9	217518
1993	1.1	85708	2005	3.7	164687	2017	4.0	226301
1994	5.9	90749	2006	5.0	172897	2018*	3.3	233696
1995	8.6	98549	2007	8.2	187072	2019*	2.8	240261
1996	3.6	102083	2008	3.8	194265	2020*	-1.3	237138

Sources: Tilastokeskus (2021a, 2021c)