Stockholm School of Economics
Department of Accounting and Financial Management
Bachelor Thesis
May 2021

Social and Financial Efficiency - A Fundamental Conflict

Does State Ownership Have an Effect on Tax Avoidance? Evidence from Sweden

Karl Bergquist Knutsson
24366@student.hhs.se

August Ehrenborg
24024@student.hhs.se

Abstract

Most shareholders view taxes as a cost, but in state-owned enterprises (SOEs), taxes are a direct payment to the owner, the state. This paper examines the association between state ownership and tax avoidance behavior in Sweden. To investigate this, a year- and industry-fixed effects regression model was used to study an unbalanced panel dataset consisting of Swedish firms between 2007 and 2019. We find significant evidence that Swedish SOEs engage in tax avoidance to a greater degree than non-SOEs with similar operating and financial characteristics, robust to various specifications. We contextualize our findings with theory such as corporate governance and principal-agent conflicts, highlighting the inherent contradictions of this particular ownership structure. The results are in line with previous research conducted in a European context, though in contrast with research in an East Asian context. However, to the best of our knowledge, the research question investigated in this study is the first of its kind.

Tutor: Milda Tylaite
Keywords: Tax avoidance; state-owned enterprises; corporate governance; agency conflicts; tax behavior; ownership structure

Acknowledgements

The greatest debt is owed to our supervisor Milda Tylaite, Assistant Professor at Stockholm School of Economics, for her insightfulness and guidance throughout our writing process.

Table of contents

1. Introduction

1.1 Background

Are state-owned enterprises (SOEs) less inclined to engage in practices aimed at minimizing the amount of taxes paid relative their non-SOE counterparts? The immediate instinct is yes, and recent studies from East Asia suggest as much (e.g. Adhikari et al., 2006; Bradshaw et al., 2019; Iswari et al., 2019). On the contrary, studies conducted in Spain and Italy show state enterprises to be engaged in more aggressive tax avoidance practices than their counterparts (Fernández-Rodríguez et al., 2019; Mafrolla, 2019)[1]. As a result of this contrast, this topic demands greater attention. How then might this phenomenon present itself in a Swedish context? In this study, we investigate the tax avoidance practices of Swedish state-owned enterprises.

In recent years, with an intensifying focus on corporate governance, tax avoidance has become an area of increasing interest. This growing scrutiny has manifested itself in intense media probes and public pressure, but also mounting legislative initiatives aimed at minimizing questionable tax practices. In public debate and media, the term tax avoidance tends to be used broadly, referring to different types of tax practices. It is therefore crucial to distinguish between illegal, outright tax evasion and legal tax avoidance which reduce the tax burden of a company. Tax evasion refers to practices such as understating tax amounts owed, not reporting income, or using tax havens, for instance. Legal tax avoidance refers to legitimate practices such as tax deductions, lawful accounting practices and tax shields. This study focuses on the latter.

Historically, taxation research has primarily focused on measuring how listed firms manage their tax expenses and taxable income relative their financial income. This has been an area of interest as listed firms experience pressure from capital markets to consistently report satisfying financial performance (e.g. Maydew, 1997; Badertscher et al., 2019). To achieve this, such firms tend to reduce their tax burden by lowering taxable income without reducing financial income. Such practices are commonly referred to as non-conforming tax avoidance. Recently, taxation research

[1] A similar study has been conducted in Germany, also finding SOEs to engage in more tax avoidance than non-SOEs, however it has not been published in a well-accredited journal, and we therefore choose to focus on the above two papers.

has evolved into including not only more types of firms, but also more sophisticated measures of tax avoidance. New measures aim to capture practices that lower both taxable income and financial income, referred to as conforming tax avoidance, not captured by most traditional measures.

Extensive literature suggests that ownership structure has a meaningful effect on firm performance and behavior (e.g. Boardman and Vining, 1989; Shleifer and Vishny, 1997). One ownership structure which has received particular scrutiny is that of state ownership, having been suggested to give rise to inefficient bureaucracy, weak managerial incentives, conflicting objectives and lack of competition (Boardman and Vining, 1989; Shleifer and Vishny, 1997). Further, research has shown that non-SOEs tend to perform better in multiple aspects, such as profitability, operating efficiency, output and dividend payments (Boardman and Vining, 1989; D'Souza and Megginson, 1999). Despite this, Sweden has a long history of state ownership stemming from a commitment to achieve social objectives by owning and operating companies (Riksrevisionen, 2017). These actualities create a fundamental conflict that takes place in state-owned enterprises and considering the state's dual role as a tax- and dividend-collector in SOEs, its implications on tax practices may be wide-ranging.

1.2 Purpose

Broadly speaking, investigating tax avoidance practices and its determinants is of relevance as engaging in it generally increases shareholder value, unless it becomes excessive, in which case it can become value destroying (Bradshaw et al., 2019). By specifically looking at state ownership as a determinant of tax avoidance, we investigate this shareholder value-aspect and simultaneously get insight into its contradictions in this particular ownership structure. On the one hand, the state wants to maximize value creation in SOEs which would entail minimizing taxes paid and maximizing profit, but on the other hand, it wants to promote social objectives, which entails prioritizing other activities over profit creation. Hence, the state, and by extension its enterprises, have incentives in direct conflict. Worthwhile to consider is the notion that the state is "de facto the largest minority shareholder in almost all corporations" by its significant claim on every firm's cash flow in the form of taxes, as articulated by Desai et al. (2007). As a result, the state plays a substantial role in firms' corporate governance activities - which includes tax practices - regardless of actual equity stakes, and its influence only increases with actual ownership.

Moreover, the contrasting incentives of tax avoidance practices in SOEs help emphasize constraints imposed on managers resulting from the ownership structure, adding to the broader research area of corporate incentives. Managers must weigh the financial benefits of exploring every avenue possible to minimize taxes paid, and thus maximize shareholder value, against the reputational costs of being scrutinized or even investigated for their tax practices.

Additionally, considering the declining share of state ownership in Sweden (Munkhammar, 2009; Regeringskansliet, 2020), this study may provide new insight into the implications of privatization. Privatization has been suggested to increase efficiency, but efficiency fundamentally depends on the purpose of the firm. A central reason for the state to hold ownership stakes in firms is to promote and achieve social objectives. Hence, there is a balancing act between efficiency in the eyes of the state and the general population on the one hand, and of other shareholders on the other.

Lastly, in relation to other studies on similar topics, this study not only provides insight on a previously unresearched country in and of itself, but also serves as a point of comparison with previous studies in East Asia and Europe. Its findings can also help illuminate the complexities of corporate governance in SOEs. If SOEs' tax avoidance practices are determined to be at an, in the view of the state, excessive level in Sweden, this study may help to highlight an area where insufficient attention with regards to corporate governance has been paid. Board representation, emissions and value chain sustainability are well-covered areas in corporate governance research, but how socially conscious ownership manifests itself in terms of tax avoidance has been paid less attention. Or, if the tax avoidance practices are comparatively low, it may serve to highlight the innately contrasting incentives of SOEs, perhaps pointing to an issue where contractual responsibilities to other owners with deviating interests are failed.

1.3 Contribution

This study makes contributions across a number of disciplines. While tax avoidance and its determinants such as size and profitability are well researched, state ownership as a principal-agent-government factor has been more neglected until recently (Hanlon and Heitzman, 2010). First, to the best of our knowledge, it is the first study of its kind investigating a Swedish context, and one of few investigating the topic in a European setting. Recent studies have investigated the issue in both a Spanish and an Italian context (Fernández-Rodríguez et al. 2019; Mafrolla 2019). Although

these studies have been conducted in a European setting, the research area has previously shown more interest for East Asia, and China in particular (e.g. Adhikari et al., 2006; Wu et al. 2012; Bradshaw et al., 2019). Interestingly, the East Asian studies have shown SOEs to be less aggressive in avoiding taxes, while the European studies have found the opposite. However, with regulatory, governance and social differences in mind, a Swedish setting offers a different context. Therefore, the results from this study are expected to be indicative and contribute to an understanding of tax avoidance for SOEs in countries with similar corporate governance settings as Sweden, such as the Nordics. Further, this research aims to contribute to an area which has been called upon as in need of further research. For instance, Hanlon and Heitzman (2010) ask for further studies on determinants of tax avoidance within an agency framework, and Bradshaw et al. (2019) ask for research into how institutional environments affect managerial tax reporting and behavior.

Second, state ownership is often associated with inefficiency, but this study highlights efficiency in the eyes of different stakeholders and their conflicting objectives. With regards to tax avoidance, the balance between prioritizing financial objectives on the one hand and social objectives on the other is raised into question. This issue is further amplified in SOEs where a variety of stakeholders have different priorities, and the firm has an obligation to maximize firm value which financially entails minimizing cash outflows, and by extension tax payments (Friedman, 1970). Thus, the study highlights the particular complexity of corporate efficiency with regards to state enterprises.

Lastly, this study contributes to links established by existing literature (e.g. Bradshaw et al., 2019; Desai and Dharmapala, 2006; Slemrod, 2004) between managerial incentives and tax avoidance, and can be read in the light of the established effectiveness of managerial incentives in improving performance (e.g. Garbers and Konradt, 2014). As the Swedish public sector does not use variable, performance-based salary structures for senior executives (Regeringskansliet, 2020), this study may illuminate yet another effect of the lack of incentive structures with regards to performance.

1.4 Delimitation

This study is limited to investigating Swedish limited liability companies (Aktiebolag*)* during the years 2007-2019, including data from 2006 due to the use of lagged variables in the regression model. Sweden is a sensible delimitation of this study as it has a relatively large number of SOEs per capita as well as a financial reporting system known for good transparency for these entities.

Further, this study does not attempt to investigate types of tax avoidance beyond corporate income tax, nor does it try to investigate managerial incentives for tax avoidance or differences between non-conforming and conforming tax avoidance. Lastly, the scope of the study is limited to investigating if any difference in tax avoidance between SOEs and non-SOEs exists and is therefore not investigating why such deviations may occur or any potential explanatory factors.

1.5 Disposition

The paper proceeds as follows. Section two covers previous theories and literature from the research area, followed by the development of the hypothesis tested in this study. Section three explains the research methodology, data collection, sample construction and models used. Section four presents descriptive statistics, regression results and robustness tests. In section five, the results, the study's limitations and the research method are analyzed. Section six concludes the study and lastly, section seven offers suggestions for potential future research.

2. Theory and literature review

This section broadly reviews past tax avoidance and taxation theory, its determinants, and its implications. First, it defines and examines different types of tax avoidance. It proceeds by looking at the institutional background of Swedish SOEs, the effects of ownership structure, agency problems, political connections and how these areas affect tax avoidance.

2.1 Theoretical paradigm

2.1.1 Definition of tax avoidance

Tax avoidance can broadly be defined as those decisions that reduce explicit taxes. However, there is no universally accepted definition of, or construct for, tax avoidance, creating a challenge in the research area (Hanlon and Heitzman, 2010). This implies that not all measures are appropriate for all research questions. In line with this, research on firm tax considerations tends to focus on specific aspects of tax avoidance and therefore uses differently defined and constructed measures to do so. The range of measures vary from traditional constructs of tax avoidance based on effective tax rates focusing on legal tax planning activities, i.e. exploiting weaknesses in the tax legislation, to measures covering illegal activities violating the legislation such as sheltering activities, often referred to as tax evasion. This study does focus on the reduction of any specific taxes, rather the aim is to broadly capture actions that affect explicit taxes. Therefore, this study defines tax

avoidance as the reduction of explicit taxes. This is consistent with the definition used by Hanlon and Heitzman (2010) and Dyreng et al., (2008) and incorporates all actions and transactions which in any way affect a firm's explicit tax liabilities. Determined by the aggressiveness with which they aim to reduce taxes, tax avoidance techniques can be broadly placed on a continuum with municipal bond investments that lower explicit taxes legally on one end, and tax evasion and sheltering on the other. This study then finds itself on the former end meaning that the techniques used in this study are not considered aggressive. However, as Hanlon and Heitzman (2010) highlight, much like art, the degree of aggressiveness for a certain technique is in the eye of the beholder.

2.1.2 Non-conforming tax avoidance

Past taxation research has primarily focused on publicly listed firms. In this literature, tax avoidance is measured using either the effective tax rate (ETR) or book-tax differences (BTD), primarily based on data obtained from the GAAP financial statements as tax returns are not publicly available. Examples of such measures would be the GAAP ETR, as used by Dyreng et al., (2010) and Bradshaw et al., (2019), the Cash ETR used by Dyreng et al., (2008) and Henry and Sansing, (2018) and book-tax differences, as used by Mills, (1998) and Wilson (2009). All of these measures are computed by dividing some estimate of tax liabilities by some measure of before-tax profits or cash flow, essentially identifying the average rate of tax per dollar of income or cash flow (Hanlon and Heitzman, 2010). Defining measures in the above way means that firms displaying a higher degree of tax evasion lower their taxable income relative their financial statement income or cash flow to a greater extent compared to firms displaying a lower degree of tax evasion. In this study, such practices are referred to as non-conforming tax practices (Badertscher et al., 2019). When researching listed firms, it is important to acknowledge the existence of capital market pressure as this has shown to increase engagement in non-conforming tax avoidance. (Badertscher et al., 2019). When capital market pressure is high, listed firms need to simultaneously report satisfactory results for shareholders and engage in income-decreasing earnings management to lower taxes. In doing so, they aspire to lower their taxable income but not their book income (Sanches-Ballesta and Yague, 2020). This helps explain why, as mentioned previously, non-conforming tax avoidance primarily has been used in past research, as much of this research simply was conducted on listed firms.

2.1.3 Conforming tax avoidance

As research into tax avoidance has broadened, the proxies used to measure it have broadened as well. Instead of only focusing on non-conforming strategies reducing the financial statement (book) income, Badertscher et al. (2019) investigate ways in which firms reduce their tax liabilities by engaging in transactions that reduce both the financial statement income and the taxable income. Such strategies are referred to as conforming tax avoidance. As a result of the above-described contextual implications vis-à-vis listed firms, conforming tax avoidance is not captured by most traditional tax measures. Understanding conforming tax avoidance is important because certain firms may exhibit high effective tax rates (or low BTD) and thus be concluded to not avoid taxes by an outside observer, whereas in fact they are relying on strategies undetected by traditional non-conforming tax avoidance strategies. To account for this, Badertscher et al. (2019) develop a broad measure based on the ratio of cash taxes paid to lagged total assets. This measure captures total tax avoidance, as well as non-tax operating decisions, and is specifically designed to capture conforming tax avoidance which can then yield a more complete understanding corporate tax avoidance determinants.

Accounting for conforming tax avoidance is of further importance when investigating non-listed firms, as they tend to adopt conforming tax strategies when capital market pressure is low (Penno and Simon, 1986). Generally, non-listed firms face lower capital market pressure compared to listed firms, creating different incentives (Shackelford and Shevlin, 2001). Further, non-listed firms are often smaller compared to listed firms and size has previously been linked to non-conforming tax avoidance. Lastly, non-listed firms are often less complex due to their size, the fact that they are not listed, and the fact that they might not have international operations to the same extent as larger firms, limiting their ability to report profits in lower tax jurisdictions. Accounting for this is important as it has been shown that lower complexity has been linked to difficulties in engaging in non-conforming tax avoidance (Gupta and Newberry, 1997; Wilson, 2009; Dyreng et al., 2010).

Therefore, when investigating samples of both listed and non-listed firms and firms of different sizes, both non-conforming and conforming tax avoidance strategies can and should be employed. Adding to this, Badertscher et al. (2019) find that, depending on whether non-conforming or

conforming tax avoidance strategies are studied, different results are discovered. It is therefore necessary to account for both in the measure of tax outcome used.

2.1.4 Institutional and corporate governance background for Swedish SOEs

State involvement in a market economy is motivated by so-called market failures. Such failures, for example an inefficient distribution of certain products or services in a free market, led the Swedish state to build up a significant portfolio of SOEs during the first half of the 20th century. However, starting in the 1980s, the Swedish government initiated a privatization drive. Despite this, it remains one of Sweden's largest business owners, with a portfolio amounting to SEK 37.2 billion in market capitalization that ranges from listed firms such as SAS and Telia to companies distinctly serving social objectives such as Samhall and SOS Alarm. The government's stated aim with owning companies is to create value and to, where applicable, fulfill social objectives, and as such, state-owned companies differ from other firms in a variety of ways (Regeringskansliet, 2020). For instance, Swedish SOEs are expected to exhibit exemplary behavior as enterprises and in their financial reporting, as Regeringskansliet states that Swedish SOEs should function as "standard setters" for other companies. Although tax practices are not explicitly stated in the guiding documents, an employee at the Swedish Ministry of Enterprises emphasized to us that SOEs should equally be considered standard setters with regards to tax practices[2]. Adding to this assessment is that a considerable proportion of the SOEs report an overview of their tax practices in their sustainability sections, which serves to show that they do not view taxes as a traditional expense (KPMG, 2019). In line with this, the Swedish Tax Agency (Skatteverket) has determined that tax practices are an issue of corporate governance (Skatteverket, 2016).

As most Western economies, Sweden has a well-developed and well-functioning market and regulatory landscape with protection and enforceable legislation for all stakeholders. These high standards of corporate governance facilitate tax collection and monitoring for the Swedish Tax Agency, limiting the opportunities for outright tax evasion. This is important as Handayani and Ibrani (2019) show that corporate governance levels do in fact affect aggressive tax actions, where higher corporate governance levels lead to lower tax avoidance. Desai and Dharmapala (2006) find

[2] Formal interview with an anonymous employee at the Swedish Ministry of Enterprises, 26th of April, 2021. Remote. Recording available.

similar results, and also show that a system of high tax rates, but weak enforcement, may increase diversion from the tax authority and that when corporate governance is weak an increase in the tax rate will, ceteris paribus, result in more diversion, lowering corporate tax revenues. When corporate governance is strong, an increase in the corporate tax rate will yield higher corporate tax revenues. In essence, high standards of corporate governance suppress the potential for managers to carry out opportunistic actions to avoid taxes and thus impacts tax avoidance (Handayani and Ibrani, 2019).

Further, Chircop et al. (2018) investigate whether a company's tax avoidance activities are affected by the social capital of the region in which they operate. They define social capital as "the mutual trust in society", something that has been shown to affect the level of corporate governance. They discover a significant negative correlation between social capital and tax avoidance activities, again indicating that the environment that firms operate in affects decision making and that tax payments can be regarded as a socially desirable action. For Swedish SOEs, the government has defined corporate governance as their responsibilities beyond what is required by legislation.

2.1.5 Ownership structure implications on tax avoidance

There exists an extensive literature confirming the effect of ownership structure on tax avoidance. Desai and Dharmapala (2006) show that the tax policy in place can have important implications for the development of corporate ownership patterns and further show that ownership patterns in turn can have a significant effect on tax avoidance. La Porta et al. (1999) find that controlling shareholders often have power over firms significantly in excess of their cash flow rights, highlighting the fact that ownership and firm control is more complex than simply looking at equity stakes. On this foundation, specific ownership structures have been investigated, confirming that taxation practices are affected by ownership structure. For instance, Chen et al. (2010) show that firms with concentrated ownership, such as family firms, may avoid taxes to a larger extent because the controlling owners benefit more from the savings. Conversely, family firms may neglect the possibility to engage in tax avoidance due to their long-term investment horizon and the indirect costs of tax avoidance such as reputational damage and potential suspicion from minority shareholders being incrementally larger than the potential benefits.

State ownership is of particular interest when investigating tax avoidance due the unique setting of one owner directly benefiting from the tax payments as a form of dividend, as discussed previously. Up to this point, state ownership structures and their implications on tax avoidance have mainly been investigated in East Asia. The issue is particularly well-researched in a Chinese setting, where results have found SOEs to engage in less aggressive tax avoidance activities than non-SOEs (e.g. Wu et al., 2012; Bradshaw et al., 2019). Studies in Indonesia and Malaysia have discovered similar results (Adhikari et al., 2006; Iswari et al., 2019). Remarkably, the effect of state ownership on tax avoidance has been comparatively neglected academically in a Western setting. Among the few studies of European SOEs, Fernández-Rodríguez et al. (2019) found Spanish SOEs to have lower effective tax rates than non-SOEs, and a study in an Italian setting found similar results (Mafrolla, 2019). However, SOEs in Spain are subject to special tax incentives, while Italian firms are owned at different levels of government, complicating any direct comparisons.

In addition to ownership structure affecting tax avoidance, if firms are listed or non-listed further affects the degree of tax avoidance as listed firms experience capital market pressure to report satisfactory results. Therefore, it is in their interest to only lower their taxable income, not their book income (Badertscher et al., 2013). As the vast majority of Swedish SOEs are not listed (only Telia and SAS), one can argue that capital market pressure does not exist to the same extent in Swedish SOEs as in listed firms and therefore shouldn't affect the decisions made in a significant way. However, during our interview, an employee at the Swedish Ministry of Enterprises who works with SOEs acknowledged that these firms face a similar pressure from the public[3].

2.1.6 Agency problems, managerial incentives, and their implications on tax avoidance

To most investors, taxes are considered a burden as they reduce profits, and it is therefore management's job to minimize the amount of taxes paid to maximize shareholder benefits. If tax avoidance is a worthwhile activity, then managers ought to make tax-efficient decisions as shareholders expect managers to act on their behalf and focus on profit maximization. This would include pursuing any opportunities to reduce tax liabilities, as long as the incremental benefit exceeds the incremental cost, creating a potential agency problem (Hanlon and Heitzman, 2010).

[3] Formal interview with an anonymous employee at the Swedish Ministry of Enterprises, 26th of April, 2021. Remote. Recording available.

However, tax avoidance in and of itself is not a reflection of an agency problem. Agency problems occur when ownership and management roles are disconnected in firms, as the principal – the owner – delegates decision-making authority to the agent – the manager (Jensen and Meckling, 1976). These parties may have conflicting incentives, an issue that becomes exacerbated by information asymmetry (Handayani and Ibrani, 2019). Most commonly, agency problems where managers are expected to act in the best interest of owners are described as affecting firms with traditional ownership structures, where all stakeholders have a one-dimensional profitability purpose. When one owner has additional goals, the issue becomes more complex. Due to the extensive number of stakeholders in SOEs, such as investors, voters and taxpayers, agency problems are more likely to emerge (Paulsson, 2006; Wang and Yung, 2011). Building on that, a fundamental issue with state ownership is the so called "credibility issue". As SOEs by extension are owned by taxpayers, naturally there is a very large distance between the owners and managers of the firms making it difficult for the owners to have complete information regarding how the firms are operated. In SOEs, management will have to consider the often-conflicting goals of profitability, what is in their own best interest, and what is best for society. The broad and subjective definition of the social objectives only amplifies the issue.

The theoretical framework for understanding corporate tax avoidance within an agency framework was laid by Slemrod (2004), Chen and Chu (2005) and Crocker and Slemrod (2005) as most literature prior to these studies assumed that firms made reporting decisions without agency considerations. When investigating state ownership, incorporating an agency context is crucial as a "specially decided social assignment exists when [SOEs] have a mission decided by the Riksdag to conduct activities that wholly or partly aim to generate effects other than financial returns for the owner" (Regeringskansliet, 2020). This could potentially create conflicting incentives for managers as financial profit and fulfilling the social assignment defined for SOEs must be weighed against each other, as the opportunity to maximize both may not exist. Choosing then to fulfil their social assignment would align with the parliament's mission but it would contradict the traditional corporate mission to maximize profit for the shareholders. In line with this, previous research has found tax avoidance to be socially irresponsible and indicative of reputational concerns (Lanis and Richardson, 2012; Crocker and Slemrod, 2005). This is telling of the contrasting incentives present in SOEs.

Further complicating the issue of tax avoidance in an agency context is the strength of managerial incentives in SOEs. Managerial incentives are important as they can be linked to non-conforming tax avoidance, as management compensation in certain firms is linked to the reported financial results (Penno and Simon, 1986). Linking management compensation to financial results incentivizes managers to report good financial results, whereas to lower their tax burden, they need to report low taxable income. In Sweden, SOEs are characterized by their rejection of variable compensation plans relatable to the performance of the enterprises (Regeringskansliet, 2020). Hence, managers in SOEs tend to have weak incentives to maximize profits, which has been shown to be an important determinant of SOEs relative inefficiency (D'Souza and Megginson, 1999). In addition, Shleifer and Vishny (1994) argue that fundamentally, bureaucrats control SOEs, and their major objective is achieving political goals, not profit. Therefore, SOEs may incentivize managers to achieve these social objectives over maximizing profit, although empirical evidence for this is limited. This mechanism would suggest that SOEs may engage in less tax avoidance than non-SOEs, with more traditional incentives.

2.1.7 Political connections

Political cost theory, detailed by Watts and Zimmerman (1978), suggests that the visibility of larger firms causes them to face greater government scrutiny and more intense regulatory actions. Taxes are part of these political costs imposed upon larger firms due to their visibility and power, factors that arguably can be extended to SOEs. State-owned firms are more well-known and hence more visible, increasing the scrutiny they face.

Recent studies have investigated how political connections affect tax aggressiveness and enforcement (e.g. Kim and Zhang, 2016; Lin et al., 2018). Lin et al. (2018) examine whether board of directors' political connections weaken tax authorities' effectiveness in restricting tax avoidance in China and find that these ties indeed significantly undermine tax compliance. In relation to Sweden, this paper is different in that it (1) investigates a politically controlled economy, and (2) focuses on informal connections. Moreover, research indicates that political connections benefit individual firms in a wide range of ways. These include a higher propensity for government bailouts, more beneficial tax treatment (Faccio, 2006), and higher firm value (Fisman 2001). In particular, the higher propensity for government bailouts may be significant in the context of this

study, as SOEs can be hypothesized to overlook value-increasing tax avoidance practices due to the expectation of a government umbrella. In line with this, Zhu and Yang (2016) find that state ownership in China is associated with higher risk-taking, as companies know their credit is guaranteed by the state.

2.2 Hypothesis development

As discussed, research into tax avoidance in SOEs is a recently developing research area and has mostly focused on emerging economies (e.g. Adhikari et al., 2006; Bradshaw et al., 2019; Iswari et al., 2019). However, to the best of our knowledge, no study has examined this in a Swedish setting and very little research has focused on Western settings and countries with higher standards of corporate governance. Based on this, three main arguments surface which provide reasons to investigate SOE tax avoidance in a Swedish context, and drive the hypothesis investigated:

(1) The degree of tax avoidance is greatly dependent on the corporate governance setting in which the firm operates, as higher levels of corporate governance leads to lower tax avoidance (Handayani and Ibrani, 2019). However, previous studies on SOEs and tax avoidance in countries with lower standards of corporate governance find evidence that although corporate governance may be low, the level of tax avoidance by SOEs is lower relative non-SOEs (Bradshaw et al., 2019; Iswari et al., 2019) while the opposite is true for countries with higher corporate governance (e.g. Fernández-Rodríguez et al., 2019). Therefore, there exists a contradiction regarding the expected association between state ownership and tax avoidance in Sweden between the corporate governance literature on the one hand, and past research on state ownership and tax avoidance in countries with governance similarities to Sweden on the other.

(2) Multiple different ownership structures have been shown to impact tax avoidance (see Section 2.1.5) and as specifically shown by Chen et al. (2010), firms with concentrated ownership may be more inclined to avoid taxes as the controlling shareholder benefits more from such savings, but may simultaneously be less inclined as they suffer more from potential reputational concerns. This is an especially important aspect when investigating SOEs in Sweden as out of the 46 SOEs, all but five are fully owned by the state (Regeringskansliet, 2020). Chen et al.'s (2010) research would then in theory imply a theoretical contradiction as to the inclination for Swedish SOEs to avoid taxes relative countries where state ownership is more diluted.

(3) The state is a de facto minority shareholder in all firms through its claims on firms' taxes. When the state then also holds an actual ownership stake in the firm, a principal-agent

problem surfaces with regards to the management of taxes between the state and the other stakeholders. This scenario implies that SOEs should be less inclined to avoid taxes as one of their principal shareholders disproportionately benefits from not doing so.

Based on the above-mentioned arguments – the corporate governance setting, ownership structure, and principal-agent problems - stated formally, the hypothesis investigated is:

H*1: Swedish SOEs exhibit lower levels of tax avoidance relative Swedish non-SOEs.*

In short, we expect that Swedish SOEs will exhibit a lower prevalence of tax avoidance relative non-SOEs as they have a political and social incline toward not engaging in tax avoidance to both enhance their image as obedient taxpayers and to avoid public controversy, and thus to make tax decisions favorable to the state but costly to other shareholders. Evidently, the topic and the broader research area are defined by contradictions, however we suggest that the arguments suggesting a lower inclination for tax avoidance among Swedish SOEs outweigh the arguments against. Although this hypothesis contradicts findings from studies in Spain and Italy and would be in line with results from East Asia, the limited nature and scope of previous research cannot yet be considered to have established a standard in the field.

3. Methodology

This section outlines our data collection process and presents the sample construction procedure and its characteristics. Seeing as the sample construction processes differ between SOEs and non-SOEs, each process is described separately. Lastly, the regression model is presented.

3.1 Data collection process

The data to test our hypothesis are obtained from the Serrano database distributed by the Swedish House of Finance. The Serrano database provides historical organizational and financial data on Swedish firms based on financial statement data from the Swedish Companies Registration Office. Our data includes observations from the time period 2007-2019 with firms individually identified by their organization number, allowing for the construction of an unbalanced panel dataset. The full dataset encompasses observations between 1997-2019 but has been delimited for this study as the Swedish private companies' taxation law was substantially changed in 2006. In 2006 the so

called 3:12 rules were introduced which makes this a reasonable delimitation as Alstadsæter and Jacob (2016) show that this modification led to extensive income shifting across income bases, affecting firms' tax behavior in a significant way.

3.2 Sample construction

3.2.1 SOEs

The treatment group consists of all Swedish State-Owned Enterprises. As of 2019, there are 46 SOEs in Sweden (Regeringskansliet, 2020). To guarantee comparable, applicable and sufficient data, certain companies are removed from the sample. First, only firms incorporated in Sweden are included, removing three firms. Second, firms which are not incorporated as limited liability companies (Aktiebolag) are removed as their operating and financial characteristics are significantly different, removing four additional firms. This yields a final sample of 39 SOEs, amounting to 383 firm-year observations. See Appendix 1 for a list of all Swedish SOEs.

3.2.2 Non-SOEs

The selection of the control group has been carefully considered to make sure an appropriate sample is selected to test the hypothesis. The initial control group consists of all Swedish corporate entities. Foreign firms are removed as the study does not look to analyze the trouble firms go through to avoid paying taxes, for instance by transferring funds between countries. Seven adjustments are made in order for the control group to have as similar characteristics as possible as the treatment group, with the exception of ownership structure. An important distinction to make is that Swedish SOEs are subject to the same tax regulations as all limited liability companies, thus it is not necessary to control for. (See Table 1 for summarized sample selection criteria).

First, to avoid dormant companies affecting the results, companies with zero employees are excluded. Dormant companies are often used by their owners for purposes other than conducting operational activities, potentially leading to deviating tax conduct. In addition, included firms need to be considered actively operating for the same reason as dormant companies. Specifically, we define a firm as actively operating corresponding to Swedish House of Finance's definition, which is if:

- Net sales > SEK 10 thousand or if
- Other operating income > SEK 10 thousand or if
- Financial income > SEK 10 thousand or if
- Financial expenses > SEK -10 thousand or if
- The dividend amount > SEK 10 thousand or if
- Total assets > SEK 500 thousand

Second, firms with unusual reporting periods are removed to mitigate any possible matching issues arising from time differences, such as regulatory or market requirements. An unusual reporting period is defined as any reporting period in which the fiscal year does not correspond to the calendar year. Third, to isolate normal tax behavior for each observation, firms that undergo a fusion, bankruptcy, liquidation or reconstruction process are excluded as such events may significantly limit the ability to conduct business as normal which could affect tax behavior beyond the scope of this study. Removing such firms may lead to survivorship bias, however this risk is arguably smaller than the risk of abnormal tax practices present when including firms in financial distress. Fourth, only independent firms with complete control of their tax management are included. Hence, subsidiaries to groups are removed as their tax behavior is affected by decisions on group level. In line with this, only consolidated financial statements of parent companies in groups are included. Fifth, observations in the control group that do not belong to one of the Serrano industry groups which correspond to an industry group of a SOEs (see Appendix 2) are removed. This is done to avoid industry-distorting effects when comparing the treatment and control groups. Industries have differing tax regulations, and research has shown tax practices vary among industries (Dyreng et al., 2008). Industry-distorting effects are further controlled for by including industry fixed effects in the regression. Sixth, firms with observations for the years 1997-2006 are removed. Seventh, observations with missing data on the key variables - *Cte_BVA* (the tax proxy), *Size*, *Sales_NOA*, *Leverage*, and *ROA* - are removed as complete data on these is necessary for valid results. These are considered key variables as past research has shown them to be the determinants with the highest explanatory value (e.g. Hanlon and Heitzman, 2010).

To isolate the effect of state ownership on tax avoidance between our control group (non-SOEs) and our treatment group (SOEs), a matched sample is constructed between them (see Appendix 3 for full matching results). The results indicate that the matching was successful, as the only variable

with a significant difference between two groups is *PPE_ratio* (further discussed in section 4.1). Conducting a matched sample also solves the issue of our final sample consisting of a significantly greater number of non-SOEs (control) relative SOEs (treatment). Matching is conducted using propensity score matching with 1 to 1 nearest neighbor matching within caliper (0.5 times the variable standard deviation). This is done to adjust for observable pre-treatment differences between the treatment group and the control group. A nearest possible match requirement is made on all control variables in the regression (Equation 1), including year and industry. Multivariate matched sampling is known to be one of the most robust methods for reducing biases in observed covariates (Rosenbaum and Rubin, 1985), and matching on standard determinants of tax avoidance serves to isolate the effect of state ownership.

Finally, all variables are winsorized at the 1st and 99th percentiles to limit the potential impact of outliers on the result and to mitigate any small denominator problems.

Table 1. Sample selection criteria.

Criteria	Lost observations	Observations
Full sample: number of Swedish limited liability companies for the period 1997-2019:		931,639
Firms with 0 employees & non-actively operating firms:	*-383,734*	547,905
Firms with unusual reporting periods:	*-9,357*	538,548
Firms having undergone a fusion, bankruptcy, liquidation, or reconstruction during any year:	*-43*	538,405
Subsidiaries to a group:	*-69,186*	469,219
Number of Swedish limited liability companies with desired industry code from Serrano:	*-26,682*	442,537
Firms with observations only for years 1997-2006:	*-82,664*	359,873
Missing data points on one or more regression variables:	*-316,642*	43,231
Matched sample in number of firms		**307**
Matched sample in firm-year observations		**720**

Using the 43,231 observations, a one-to-one nearest neighbor matching is conducted. Consequently, the final sample consists of 39 unique firms in the treatment group and 268 unique firms in the control group. This brings the total number of matched sample firm-year observations for both groups to 720. The sample selection criteria can be seen in Table 1 above.

It would have been desirable to account for listing status of the included firms as capital market pressure differs between listed and non-listed firms which in turn affects tax avoidance. However, this is not possible in the Serrano database and listing status is therefore not controlled for. Nevertheless, manually examining the matched sample shows that a vast majority of the firms are non-listed, indicating that listing status is unlikely to affect our results.

With regards to the inclusion of firms in heavily regulated industries, such as financial services and utilities, previous research is divided. Many studies (e.g. Gupta and Newberry, 1997; Bradshaw et al., 2019; Dyreng and Hanlon, 2019) choose to exclude financial and utility firms in the sample selection, whereas others (e.g. Zeng, 2011) include them in their studies. As this study will conduct matching between firms in the control and treatment groups on industry, industries not represented in the treatment group are excluded. (Industry distributions for the matched sample can be seen in Appendix 4). Valuable insights can still be drawn with regards to financial and utility firms, and as the study does not directly aim to show differences among industries, rather between ownership structures, such firms are included in the sample. Further, concerns over regulatory differences between industries are mitigated by matching on industry and controlling for industry fixed effects.

Past taxation research is also split on the value of including loss-making firms in the sample, although recent literature has shown a tendency to include both profit- and loss-making firms (e.g. Henry and Sansing, 2018; Kovermann, 2018). Excluding loss-making firms can lead to biased results, and Henry and Sansing (2018) find that when including loss-making firms the opposite results from what previous research has found are achieved. This is explained by their results finding that on average, firms are tax-disfavored, meaning that cash taxes paid exceed the product of the firm's pre-tax income and statutory tax rate. Early measures of corporate tax avoidance, e.g. effective tax rate, lack an economic interpretation for firms with negative pre-tax income and negative current tax expense. However, the approximation of cash taxes paid as a proxy for corporate income tax mitigates this issue. Loss-making firms and negative taxes paid tend to have a distorting effect on tax management, but exclusion of such firms can lead to results that don't fully capture the reality of all firms, only capturing the reality for profit-making firms. It can also reduce our sample considerably. Hence, we choose to include loss-making firms in our study.

3.3 Regression model

To assess the association between state ownership and tax avoidance, a multivariate regression model with an unbalanced panel dataset is regressed on a binary state ownership variable (*SOE)* as well as a selected number of control variables. A regression model estimated with panel data has several advantages over models with cross-sectional or time-series data. Particularly, a simple-pooled cross-section time-series will not provide consistent and unbiased parameter estimates as long as the unobserved firm-specific characteristics are correlated with the explanatory variables included. In that case, the model is misspecified, causing the simple-pooled model to suffer from omitted variables bias. This can be mitigated by using a fixed-effects model which accounts for individual firm heterogeneity via firm-specific constants in the model, which will capture the effects of unmeasurable or unobserved firm characteristics which vary by firms, but are relatively stable over time for a unique firm (Gupta and Newberry, 1997).

A Hausman specification test is conducted in order to determine whether random or fixed effects should be included in the regression. The results suggest that fixed effects should be used as opposed to random effects as a correlation between the error term and the independent variables is identified (Hausman and Taylor, 1981). The result (Prob>chi2 = 0.0000) indicates that the model is statistically significant (see Appendix 5 for full results). The outcome of using fixed effects is that the time-invariant characteristics are assumed to be unique for each observation, and should therefore not be correlated with the characteristics of other observations.

To study the association between state ownership and tax avoidance, the following fixed effects regression models is estimated:

$$\begin{aligned} Cte\_BVA_{it} = \beta_0 + \beta_1 \times SOE_{it} + Industry\_FE + Year\_FE + \beta_2 \times Size_{it-1} + \beta_3 \times Loss_{it} + \\ \beta_4 \times Sales\_Growth_{it-1} + \beta_5 \times Sales\_NOA_{it-1} + \beta_6 \times Leverage_{it-1} + \beta_7 \times ROA_{it-1} + \\ \beta_8 \times PPE\_ratio_{it} + \beta_9 Intangibles\_ratio_{it} + \beta_{10} \times Cash\_ratio_{\_it} + \alpha_i + u_{it} \end{aligned} \quad (1)$$

Cte_BVA is the dependent variable which measures the overall tax outcome. The state ownership variable (*SOE*) is our main independent variable and refers to a binary variable which equals one for SOEs and zero for non-SOEs. Fixed effects for industry and year are included. Control variables for *Size, Loss, Sales_Growth, Sales_NOA, Leverage, ROA, PPE_ratio, Intangibles_ratio* and

Cash_ratio are included to mitigate the risk of our results being driven by other factors than state ownership. α_i is a fixed firm-specific component and u_{it} is the error term.

3.3.1 Dependent variable

In previous research, views on how to measure taxes vary greatly but a majority of research has employed tax expense (GAAP ETR) or current tax expense (current ETR). When studying listed companies, this is a suitable approach as a majority of listed companies agree that GAAP ETR is a more important metric as opposed to cash taxes paid (Graham et al., 2013). However, when studying non-listed firms, the consensus is the opposite. For non-listed firms, cash taxes paid is considered a better taxation metric (Badertscher et al., 2019). This is consistent with findings that non-listed firms experience lower capital market pressure relative listed firms, allowing them to focus more on reducing taxes paid rather than reporting higher profits (Shackelford and Shevlin, 2001). Interestingly, Dyreng et al. (2010) argue that cash taxes paid is a more suitable proxy for listed firms as well seeing as it is less affected by discretionary accounting measures.

Based on this and given that our treatment group consists primarily of non-listed firms, cash taxes paid is deemed the most appropriate measure to capture the taxation behavior investigated. Even so, Swedish firms reporting under K2 or other simplified reporting standards are not required to report a cash flow statement and several firms in our sample fall in this category. To account for this, a proxy for cash taxes paid will be calculated based on numbers reported on the income statement. We argue that for our sample, the most appropriate proxy for cash taxes paid is the reported tax expense on the income statement. Based on this, when calculating cash taxes paid for firms with consolidated financial statements it is necessary to adjust for the effect of untaxed reserves on the tax expense. Consolidated firms may allocate up to 30% of their pre-tax income to untaxed reserves each year, thereby reducing the current year taxable income. This must then be re-allocated, at the latest, six years later. This allocation/re-allocation is reported before income tax and therefore affects the reported income tax expense. To account for this, adjusting for the change in untaxed reserves for firms with consolidated financial statements is necessary. Firms not belonging to a group (independent firms) do not have this option and the reported tax expense is therefore found to be the most accurate proxy for cash taxes paid. The proxy should thus be calculated differently for firms with consolidated financial statements and independent firms.

Hence, this is the most appropriate proxy for cash taxes paid possible for our data, however as we use data from the income statement, our proxy for cash taxes paid will be called the current tax expense.

For firms that have consolidated financial statements, cash taxes paid should be approximated as:

$$Current\ tax\ expense_{it} = Income\ tax_{it} - \Delta untaxed\ reserves_{it} \times statuatory\ tax\ rate_{it} \quad (2)$$

However, untaxed reserves are already accounted for in the Serrano database as income tax for consolidated firms is automatically adjusted for appropriations. Therefore, cash taxes paid is approximated in the following way for both independent and consolidated firms:

$$Current\ tax\ expense_{it} = Income\ tax_{it} \quad (3)$$

As per the definition above, the measure used is the reported tax expense and we acknowledge that this is an approximation of cash taxes paid. For instance, firms may have used loss carryforwards to reduce the cash tax payment or there may be accruals that do not land in untaxed reserves but in fact reduce the cash tax payment. The actual cash tax payment may therefore potentially differ, however, there is no way to identify this in our data set. Thus, the measure can be considered a proxy for the current tax expense which is the closest approximation of cash taxes paid possible for our sample. Past research examining the effect of state ownership on tax avoidance in China has used both current tax expense and cash taxes paid as tax proxies, achieving identical results (Bradshaw et al., 2012; Bradshaw et al., 2019). This is an indication that the approximation is valid and will not achieve significantly different results than a non-approximated cash taxes paid proxy would. Finally, the statutory tax rate has changed twice during our sampling period, from 28% to 26,3% in 2009 and from 26,3% to 22.0% in 2013. This is controlled for by including year fixed effects in the regression, ensuring that the results are not affected by changes in the statutory tax rate.

Much of previous taxation literature has focused on profit measurements as their measure of tax avoidance by defining the measurement as either scaled by and/or dependent on some alteration of profit (e.g. Dyreng et al., 2008; Law and Mills, 2017; Bradshaw et al., 2019), as discussed in Section 2.1.2. However, such measures do not capture conforming tax avoidance which is a

necessity since our sample consists primarily of non-listed firms (Badertscher et al., 2019). To account for this sample composition, the measure used needs to capture both conforming and non-conforming tax avoidance. Second, this study does not exclude loss making firms. The two above arguments suggest that the scalar used should capture both conforming and non-conforming tax avoidance whilst also enabling the inclusion of loss-making firms.

Therefore, both market value of assets (MVA) and book value of assets (BVA) are considered upon deciding how to scale current tax expense, as these measures are defined for both conforming and non-conforming tax avoidance. Using alternative scalars such as these have only recently been adopted by the accounting literature (Henry and Sansing, 2018; Badertscher et al., 2019). However, using measures of assets can be considered a good proxy for firm size and as pointed out by Henry and Sansing (2018), size is more stable and harder to manipulate than for example pre-tax income, making it a suitable scalar. Further, they also find that assets have a stronger correlation with their measure of tax avoidance, implying that the results are driven by the level of tax avoidance to a greater degree than the scalar, which is desirable to achieve valid results. Additionally, using a measure of firm size as a scalar allows for a measurement that is defined for both profit and loss observations, necessary in our study. Book value of assets was chosen over market value of assets as generally, MVA is not available for all firms whereas BVA is (Henry and Sansing, 2018). Second, MVA also includes the value of internally developed intangible assets such intellectual property arising from R&D whereas BVA does not and this bias is controlled for in our study by including the control variable *Intangibles_ratio*. Alternative proxies for firm size were considered, such as sales or number of employees, but since our sample encompasses a variety of firm types, using lagged values for book value of assets was concluded to be the most suitable measurement.

Based on the above arguments, the dependent variable *(Cte_BVA)*, is defined as:

$$Cte\_BVA_{it} = \frac{Current\ tax\ expense_{it}}{BVA_{it-1}} \tag{4}$$

The measure is defined such that when the firm pays taxes, the numerator is positive. This is turn means that a *Cte_BVA* value closer to zero indicates that the firm is paying less taxes relative its size as opposed to a firm with a greater value.

3.3.2 Main independent variable

State ownership *(SOE)* - Dummy-variable equal to one if the firm is owned by the state and equal to zero for the rest of the firms, i.e. firms not owned by the state. The coefficient for SOE should have a significant positive value if *Hypothesis 1* is proved to be correct. A positive coefficient would suggest that the treatment group, SOEs, pay more corporate income taxes relative their size as opposed to the control group, non-SOEs. Conversely, a significant negative value would suggest that SOEs pay less corporate income tax than non-SOEs relative their size.

3.3.3 Control variables

The control variables are theoretically motivated and in line with findings in prior taxation literature, serving to control for factors beyond ownership that affect tax avoidance. As suggested by Law and Mills (2017), our control variables can be categorized into three broad groups. The first group controls for firm operations and profitability (*Loss*, Sales*_NOA, Leverage, ROA*), the second group controls for firm size and growth opportunities (*Size, Sales_Growth, Cash_ratio*), and the third group controls for differences between book and tax reporting environments that can influence corporate income tax (*PPE_ratio, Intangibles_ratio*). We also control for industry and year fixed effects. Below are definitions of each control variable.

Size (*Size)* – Defined as the lagged natural logarithm of assets. Swedish tax law groups firms into size-categories based on turnover and the number of employees or total assets, making this a reasonable definition. Previous research is ambiguous with regards to the association between firm size and effective tax rate, however it having an effect has been established (Zimmerman, 1983; Gupta and Newberry, 1997). Further, it has been proven that larger firms enjoy economies of scale in tax avoidance making it important to control for size (Cheng et al., 2012)

Loss *(Loss)* – Dummy-variable equal to one if the firm reported a negative net income during the year in question. According to Henry and Sansing (2018), deleting loss observations could systematically overstate the extent of corporate tax avoidance in the population leading to biased results, justifying the inclusion of and controlling for loss-making firms.

Sales growth (*Sales_Growth)* – Defined as the percentage change in sales from the previous year. Growth has been included as a control variable since multiple studies have found it to have an effect on tax avoidance (e.g. Dyreng et. al., 2010; Gupta and Newberry, 1997). Further, growth

firms may have more opportunities to avoid taxes by making investments in tax-favored assets (Chen et al., 2010).

Sales to net operating assets *(Sales_NOA)* – Defined as the natural logarithm of sales divided by lagged NOA. This measure accounts for operating efficiency differences among firms. Firm decisions may be classified either as non-tax operating decisions (e.g. spending more on wages, R&D, or advertising) or tax operating decisions (spending simply to reduce taxable income). To account for this, Badertscher et al. (2019) use sales divided by net operating assets as a proxy for performance and efficiency, thereby accounting for performance differences.

Leverage (*Leverage)* – Defined as long-term liabilities divided by equity where both are lagged. Leverage has been shown to be one of the most important factors in lowering effective tax rates (Stickney and McGee, 1982). Additionally, firms with higher leverage already enjoy a tax shield from their debt, which according to Bradshaw et al. (2019), may be associated with a differential tendency for incremental tax avoidance.

Return on assets *(ROA)* – Defined as net income divided by lagged total assets. Higher ROA indicates higher profitability, which in turn implies lower levels of loss carry forward. Controlling for ROA is therefore necessary, as more profitable firms tend to have higher ETRs. Studies have shown that SOEs are operationally less efficient, and failure to control for this would therefore distort the true effect on tax avoidance (Boardman and Vining, 1989). Further, more profitable firms have stronger incentives to engage in tax planning, which ROA controls for (Chen, 2010; Bradshaw et al., 2019).

Property, Plant, & Equipment ratio *(PPE_ratio)* – Defined as the gross PP&E divided by total assets at the end of the year. Capital intensive firms are affected more by different treatments of depreciation expenses for tax and financial reporting purposes, making it important to account for PP&E (Chen et al., 2010; Law and Mills, 2017).

Intangibles *(Intangibles_ratio)* – Defined as intangible assets divided by total assets at the end of the year. Intangible assets are typically subject to different expensing rules and a faster depreciation making investing in them a suitable tool for tax management purposes. This controls for differential book and tax treatment of intangibles assets and captures systematic differences between firms (Chen et al., 2010; Hanlon and Heitzman, 2010). This also controls for internally developed assets which are excluded from our proxy by scaling with BVA as opposed to MVA.

Cash *(Cash_ratio)* – Defined as cash and cash equivalents divided by total assets at the end of the year. Controlling for cash accounts for the otherwise present mismatch between cash tax payments and earnings results. To manage earnings firms must repatriate more cash than they otherwise would have done which then means that investing cash becomes a tangible, operating decision compared to a pure accounting one (Dyreng et al., 2010; Hanlon and Heitzman, 2010).

4. Results

This section presents descriptive statistics for the variables in the regression model followed by a presentation of the regression results. Lastly, the results from the robustness tests are presented.

4.1 Descriptive statistics

Table 2 displays descriptive statistics for the variables in the main regression for both the treatment group (SOEs) and control group (non-SOEs). Notably, looking at the dependent variable *Cte_BVA*, the treatment and control group have a mean value of 0.004 and 0.015, respectively, indicating a lower mean for SOEs as opposed to non-SOEs. The difference between the two groups is significant at the 1% level and may be a primary indication that there are differences in tax avoidance between them. The most notable observation apart from the dependent variable in Table 2 is the mean difference of 0.123 on *Size* between the treatment and control group. This is the only control variable where the two groups are significantly different in the matched main sample, and the difference is significant at the 10% level. No other variables are statistically different, indicating that the matching was successful.

As expected, since the treatment and control groups are constructed using matching, the descriptive statistics are similar between the two groups. An important consideration with regards to the matching procedure conducted in the sample construction (Section 3.2.2) is that the descriptive statistics of the matched sample may not be representative of the full population of firms. However, this only affects the control group as the entire population of firms in the treatment group is included. To investigate the impact the matching has had on the control group, descriptive statistics for the initial sample can be seen in Appendix 6. Comparing the descriptive statistics of the control group before and after matching, some variables change significantly, although this is expected and adds validity to running the main regression on a matched sample. However, the group's overall descriptive statistics remain similar.

Table 2. Descriptive statistics

	---- Treatment Group ----			---- Control Group ----			
Variables	n	Mean	SD	n	Mean	SD	t-test
Cte_BVA_{it}	383	0.004	0.013	337	0.015	0.027	6.9755***
$Size_{it-1}$	383	10.828	1.050	337	10.705	0.799	-1.7479*
$Loss_{it}$	383	0.300	0.459	337	0.306	0.461	0.1565
$Sales\_Growth_{it-1}$	383	0.208	1.367	337	0.160	1.034	-0.5329
$Sales\_NOA_{it-1}$	383	15.908	52.646	337	18.278	60.060	0.5643
$Leverage_{it-1}$	383	4.298	8.703	337	4.343	8.074	0.0714
ROA_{it-1}	383	0.058	0.130	337	0.057	0.196	-0.1261
PPE_ratio_{it}	383	0.233	0.284	337	0.207	0.286	-1.2159
$Intangibles\_ratio_{it}$	383	0.010	0.017	337	0.011	0.032	0.7090
$Cash\_ratio\_{it}$	383	0.223	0.240	337	0.223	0.234	0.0032

Notes: The symbols *, ** and *** indicate significance levels for 10%, 5% and 1% levels respectively.

4.1.1 Pearson correlations

Pearson correlations are investigated to determine whether any of the explanatory variables in the regression exhibit a statistical association with one another which will help determine if further tests are required to investigate multicollinearity. The results can be found in Appendix 7. It can be inferred that *Cte_BVA* has a number of correlations significant at the 1% level, potentially explained by some of the control variables being inherently incorporated into the tax proxy. Furthermore, several of the control variables are in fact correlated with one another, indicating that further tests for multicollinearity are necessary to ensure that the correlations do not affect the results. This is further discussed in Section 4.3.1.

4.2 Regression results

The results from the main regression model defined in Section 3.3 are presented in Table 3. The model is defined as to estimate the effect of state ownership on *Cte_BVA*. The effect of *SOE* is statistically significant on a 1% level with a coefficient of -0.01085, a t-statistic of -8.45 and a standard error of 0.00128. This can be interpreted as SOEs, ceteris paribus, paying 1.085 percentage points lower corporate income tax in relation to their BVA relative non-SOEs. Notably, this contradicts our hypothesis that SOEs pay more corporate income tax than non-SOEs.

Table 3. Regression results from main test with fixed effects

Dependent variable: **Cte_BVA**			
Variables	Coefficients	t-statistics	Std. Err.
SOE_{it}	-0.01085	-8.45***	0.00128
$Size_{it-1}$	-0.00019	-0.22	0.00088
$Loss_{it}$	-0.00438	-2.77***	0.00158
$Sales\_Growth_{it-1}$	0.00036	0.68	0.00053
$Sales\_NOA_{it-1}$	0.00002	1.16	0.00001
$Leverage_{it-1}$	-0.00012	-1.52	0.00008
ROA_{it-1}	0.06310	13.83***	0.00456
PPE_ratio_{it}	0.00096	0.39	0.00246
$Intangibles\_ratio_{it}$	-0.00851	-0.32	0.02657
$Cash\_ratio_{\_it}$	0.00948	3.25***	0.00292
N	720		
Adj. R-squared	0.3789		

Notes: The symbols *, ** and *** indicate significance levels for 10%, 5% and 1% levels respectively. Industry and year fixed effects are included.

Observing the control variables, *Size, Loss, Leverage and Intangibles_ratio* have negative coefficients whereas *Sales_Growth, Sales_NOA, ROA, PPE_ratio,* and *Cash_ratio* have positive coefficients. A negative control variable can be interpreted as it leading to lower current tax expense relative book value of assets, and vice versa for a positive control. For example, a larger firm will avoid taxes more than a smaller firm, ceteris paribus. Significance levels vary between the controls, *Loss, ROA* and *Cash_ratio* are significant at the 1% level while the six other controls are not significant. The adjusted R^2 value within the matched sample was 0.3789, indicating a fairly high explanatory power of the model. The results are analyzed in Section 5.1.

4.3 Robustness tests results

This section contains the results from two robustness tests. First, we investigate heteroscedasticity, serial correlation and multicollinearity using robust standard errors clustered at firm level and a VIF-test. Second, the regression is performed using a different dependent variable – *GAAP_ETR*.

4.3.1 Test of heteroscedasticity, serial correlation and multicollinearity

To investigate the robustness of the main regression, two statistical tests are performed. First, to test for heteroscedasticity and serial correlation, the regression is run using clustered robust

standard errors to investigate how sensitive the results are to the standard errors (Table 4). Second, as the Pearson correlation test indicated a statistical association between several variables, a variance inflation test (VIF) is performed to investigate multicollinearity (Appendix 8).

Table 4. Regression results with fixed effects and clustered robust standard errors

	---------- Main test ----------			---------- Robustness test ----------		
Dependent variable	**Cte_BVA**			**Cte_BVA**		
Variables	Coefficients	t-statistics	Std. Err.	Coefficients	t-statistics	Std. Err.
SOE_{it}	-0.01085	-8.45***	0.00128	-0.01085	-6.77***	0.00160
$Size_{it-1}$	-0.00019	-0.22	0.00088	-0.00019	-0.25	0.00076
$Loss_{it}$	-0.00438	-2.77***	0.00158	-0.00438	-2.12**	0.00207
$Sales\_Growth_{it-1}$	0.00036	0.68	0.00053	0.00036	1.38	0.00026
$Sales\_NOA_{it-1}$	0.00002	1.16	0.00001	0.00002	1.14	0.00001
$Leverage_{it-1}$	-0.00012	-1.52	0.00008	-0.00012	-1.89*	0.00006
ROA_{it-1}	0.06310	13.83***	0.00456	0.06310	3.78***	0.01671
PPE_ratio_{it}	0.00096	0.39	0.00246	0.00096	0.33	0.00292
$Intangibles\_ratio_{it}$	-0.00851	-0.32	0.02657	-0.00851	-0.17	0.05072
$Cash\_ratio_{\_it}$	0.00948	3.25***	0.00292	0.00948	2.34**	0.00406
N	720			720		
Adj. R-squared	0.3789			0.4048		

Notes: The symbols *, ** and *** indicate significance levels for 10%, 5% and 1% levels respectively.
Industry and year fixed effects are included. Robust standard errors were clustered on organizational number.

Heteroskedasticity refers to the inconsistent variability of a variable across the range of a data set. While it does not affect the coefficient-estimates, it is necessary to test for in order to determine the coefficients' dependence on standard errors, and hence whether the significance levels are incorrect due to biased estimates of standard errors (White, 1980). To alleviate these concerns, to ensure that homoskedasticity holds, and to correct for any potential serial correlation, the regression is run with robust standard errors to obtain unbiased standard errors. Serial correlation refers to when a variable and the lagged version of the same variable are correlated with one another over periods of time. Failure to identify serial correlation can result in an overestimation of the t-statistics due to an underestimation of the standard errors, as shown by Bertrand et al. (2004). Looking at the result for the independent variable *SOE*, the unadjusted standard error is slightly understated at 0.00128 in the main regression compared to 0.00160 with robust standard errors. Most importantly, however, the significance level remains unchanged at 1%. For the other variables, the result is mixed with the standard errors understated for the variables *Loss*, *ROA*,

PPE_ratio, Intangibles_ratio and *Cash_ratio* and overstated for the variables *Size, Sales_Growth,* and *Leverage*. The standard errors did not change for *Sales_NOA.* Overall, it can be determined that neither heteroskedasticity nor serial correlation has a significant effect on the model.

Multicollinearity refers to the presence of a significant correlation between two or more explanatory variables in a regression model. Multicollinearity does not necessarily imply that the model is invalid, although it may distort the results. It can affect the interpretation of the results as the correlated variables' explanatory value will be divided between them, hence making the true explanatory value difficult to extricate. Therefore, variance inflation factors (VIFs) are calculated on equations 1 and 5, presented in Appendix 8. The results display slightly varying VIF-values, although all the variables have values below 1.65 and the mean VIF was 1.22 for both equations, suggesting that multicollinearity has not affected the results in a significant way. The results from the above two tests are analyzed in Section 5.2.

4.3.2 Test with alternative tax proxy

As described in Sections 2.1.1-2.1.3, several proxies can be used to measure tax outcome. To add robustness to the study and validate the main results, the dependent variable (*Cte_BVA*) in the main regression (Equation 1) is substituted with a different dependent variable that measures tax outcome, the effective tax rate. As discussed previously, there are different ways of calculating ETR, such as the GAAP ETR or the Cash ETR. GAAP ETR is used for this robustness test, since without access to cash flow statements, it is not possible to define Cash ETR. GAAP ETR is defined as the total tax expense (current plus deferred tax expense) divided by pre-tax accounting income (adjusted for special items) (Dyreng et al., 2010), although it is important to remember that the tax expense on the income statement is not equivalent to actual taxes paid but instead an accrual accounting estimate based on the financial accounting earnings reported. In essence, GAAP ETR captures how much taxes a company pays relative its profit (Bradshaw et al., 2019). It is important to distinguish that GAAP ETR is a more traditional tax proxy and therefore only captures non-conforming tax avoidance, as opposed to our original proxy which also captures conforming tax avoidance. Capturing both types is more suitable for our sample as it contains primarily non-listed firms of different sizes. However, to test the robustness of the model, it is desirable to perform the same regression with a different measure that has been used extensively in previous research. This

test is conducted to investigate if using a different method of measurement yields the same result, thereby increasing the robustness of the main test, as it would suggest multiple proxies can be used and still achieve the same result. Hence, *GAAP_ETR* is used as the dependent variable in the regression on the same treatment and control group as used in the main test. The modified fixed effects regression model can be seen in Appendix 9. The expectation is that using *GAAP*_ETR will confirm the findings from the main test. However, since *GAAP_ETR* is not as suitable a measure as *Cte_BVA,* there is a potential risk that the results are less significant. The results are presented in Table 5 below. The coefficient on *SOE* in the main test with *Cte_BVA* is -0.01085, compared to -0.49259 in the robustness test with *GAAP_ETR*. The t-statistic also changes from -8.45 to -2.21 respectively and the significance level decreases from 1% to 5%. Notably, the adjusted R^2 is reduced significantly from 0.3789 to 0.0709. These results are analyzed in Section 5.2.

Table 5. Regression results from robustness test using GAAP_ETR as dependent variable

	---------- Main test ----------			---------- Robustness test ----------		
Dependent variable	**Cte_BVA**			**GAAP_ETR**		
Variables	Coefficients	t-statistics	Std. Err.	Coefficients	t-statistics	Std. Err.
SOE_{it}	-0.01085	-8.45***	0.00128	-0.49259	-2.21**	0.2231
$Size_{it-1}$	-0.00019	-0.22	0.00088	0.97965	6.47***	0.1515
$Loss_{it}$	-0.00438	-2.77***	0.00158	0.15795	0.58	0.2738
$Sales\_Growth_{it-1}$	0.00036	0.68	0.00053	0.09108	1.00	0.0909
$Sales\_NOA_{it-1}$	0.00002	1.16	0.00001	0.01211	4.80***	0.0025
$Leverage_{it-1}$	-0.00012	-1.52	0.00008	-0.00006	-0.00	0.0147
ROA_{it-1}	0.06310	13.83***	0.00456	0.31721	0.40	0.7874
PPE_ratio_{it}	0.00096	0.39	0.00246	-0.06438	-0.15	0.4337
$Intangibles\_ratio_{it}$	-0.00851	-0.32	0.02657	3.60363	0.79	4.5811
$Cash\_ratio\_{it}$	0.00948	3.25***	0.00292	-0.55599	-1.10	0.5041
N	720			720		
Adj. R-squared	0.3789			0.0709		

Notes: The symbols *, ** and *** indicate significance levels for 10%, 5% and 1% levels respectively.
Industry and year fixed effects are included.

5. Analysis and discussion

In this section the results are analyzed beginning with the hypothesis and the control variables, followed by an analysis of the robustness tests. We then analyze limitations to the study and the research method.

5.1 Main regression

5.1.1 Hypothesis

Our hypothesis posits that Swedish SOEs engage in tax avoidance to a lesser degree than Swedish non-SOEs. In the result from the main regression, the independent variable *SOE* has a coefficient of -0.01085 and a t-statistic of -8.45 leading to a rejection of this hypothesis on a 1% significance level. Indeed, the findings suggest that significant support exists for Swedish SOEs engaging in tax avoidance to a greater degree than non-SOEs, contrary to our expectation. The specific area of research is still not comprehensively researched, however the results are generally consistent with previous research in similar contexts (Fernández-Rodríguez et al., 2019; Mafrolla 2019), strengthening the reliability of the conclusions regarding the main independent variable *SOE*.

The adjusted R^2 value of 0.3789 suggests that the explanatory power in the main test can be considered high in comparison with previous studies. For example, Bradshaw et al. (2019) had R^2 values of 0.12 and 0.10 for their respective dependent variables ETR and CETR. Potential explanations for the high explanatory power relative previous studies could be that the data is winsorized, eliminating extreme observations, or that that model is overfit in relation to the number of observations. To further analyze the results, we estimate the relative explanatory value of the *SOE* variable by looking at the incremental R^2 (indicated by the change in R^2 when removing the specific variable) and standardized coefficients. The incremental R^2 of the *SOE* variable is 6.16 percentage points. Comparing this with the incremental R^2 of our control variables identified by past research to be the most important determinants of tax avoidance such as *Size, Sales_NOA Leverage,* and *ROA*, *SOE's* incremental R^2 is higher than all variables' except *ROA* (16.53 pp). This suggests that the *SOE* variable's explanatory value of tax avoidance levels in Sweden is fairly high. Several previous studies also find ROA to be among the most important variables in explaining tax avoidance, increasing the validity of our results (e.g. Bradshaw et al., 2019). However, as incremental R^2 may not sufficiently characterize the economic interpretation, we also estimate standardized coefficients for all variables in line with Bradshaw et al. (2019). This also allows for direct comparisons between the variables. The standardized coefficient for the *SOE* variable is -0.2524, which can be interpreted as *SOE* having a strong association with tax avoidance. This value is higher than the standardized coefficients for all the control variables except *ROA,* which has a value of 0.4833. Taken collectively, these findings confirm that the *SOE*

variable provides significant explanatory value for the results (see Appendix 10). Further, to ensure that the results are not driven by one industry group, the main regression is also run without the two largest industry groups 40 (Finance & Real Estate) and 60 (Corporate Services), collectively accounting for ~60% of the industry distribution (see Appendix 4). Both regressions yield the same directional results, indicating that the findings are not dependent on these industry groups.

The results of this study can be interpreted in the context of two groups of previous research. Wu et al. (2012) were among the first to study this research question, doing so in a Chinese context, and found SOEs to be less aggressive in their tax avoidance practices. These results have been replicated in numerous studies in an East Asian context, but to the best of our knowledge, the only similar studies conducted in a Western context (Fernández-Rodríguez et al., 2019; Mafrolla 2019) have achieved the opposite results. This study's results are in line with the latter's, showing SOEs to engage in a greater degree of tax avoidance than their counterparts. More research is needed to confirm these two groups, however, as the limited number of studies cannot be considered representative for the settings. Nevertheless, this study's results confirm not only the association between state ownership and tax avoidance, but also that its effects likely differ depending on the governance context.

5.1.2 Control variables

As discussed in Section 3.3.3, the control variables are theoretically motivated based on findings in previous research and determined on the basis of the research question. Therefore, the lack of significance is not a problem in and of itself. The control variables could have been removed to achieve a parsimonious model, however their inclusion is deemed necessary in order to prevent the omission of alternative explanations of tax avoidance. Furthermore, the lack of significance on several control variables can be attributed to the matching of the control and treatment groups on the same variables. As a result of the matching, the differences between these groups on these variables is limited, as seen in the matching results in Appendix 3 and the t-test shown in Table 2. Looking at the control variables from the main test, *Loss*, *ROA* and *Cash_ratio* are significant at the 1% level whereas *Size*, *Sales_Growth*, *Sales_NOA*, *Leverage*, *PPE_ratio* and *Intangibles_ratio* did not have a significant effect on the dependent variable. When analyzing the variables in the groups suggested by Law and Mills (2017), some trends can be identified.

For the variables controlling for operations and profitability, the positive coefficients on *Sales_NOA* and *ROA* are expected since firms with higher performance and efficiency, which in turn leads to higher profits, have higher taxes relative their book value of assets. An alternative explanation could be that firms that do not engage in tax avoidance are generally less profitable (Gupta and Newberry, 1997; Fernandes-Rodriguez et al., 2019). Further, *Loss* and *Leverage* also control for performance and efficiency and their negative coefficients are in line with previous research that has shown that profitability has a positive effect on firms' tax burden, motivating the negative coefficient on *Loss*. Additionally, funding a firm using debt yields interest expenses which for one, are tax deductible and two, create an interest tax shield as opposed to funding using equity and paying dividends to shareholders which are not deductible, explaining the negative coefficient on *Leverage* (Gupta and Newberry, 1997). In short, the controls for operations and profitability have divergent, but expected effects.

When controlling for the second group - firm size and growth opportunities - past research has been ambiguous with regards to the association between *Size* and taxes. Siegfried (1974) reports a negative association in line with our study, Gupta and Newberry (1997) reports a positive association and Shevlin and Porter (1992) find no association. Indeed, our findings do not find this variable to have a significant effect on tax avoidance, although the negative sign is in line with political cost theory, suggesting that larger firms avoid taxes to a greater degree than small firms (Dyreng et al., 2008). The alternative controls for firm size and growth opportunities, *Sales_Growth* and *Cash_ratio,* both display positive coefficients. The positive coefficient on *Sales_Growth* may suggest that high-growth firms invest less into avoiding taxes (Rego, 2003). As our dependent variable approximates actual taxes paid, it is expected that *Cash_ratio* is positively correlated with the dependent variable. A possible explanation is that to manage earnings and reduce the tax burden, firms must reinvest more cash than they ideally would have liked leading to lower cash balances (Dyreng et al., 2010). In summary, controls for firm size and growth opportunities have divergent coefficients, however *Cash_ratio* is the only significant variable.

Lastly, *PPE_ratio* and *Intangibles_ratio* control for differences between the book and tax reporting environments, however the sign of their coefficients differ. PP&E reducing the amount of taxes paid is well-established in tax avoidance literature, as investments and depreciation are expenses

on the income statement, reducing the taxable income, suggesting a negative coefficient is to be expected (Chen et al., 2010; Law and Mills, 2016). Our study's positive coefficient contradicts this, although its lack of statistical significance limits our ability to draw any conclusions regarding its effect. As for *Intangibles_ratio*, past research finds intangibles to have a positive effect on their dependent tax variables, contrary to our result (e.g. Gupta and Newberry, 1997; Chen et al., 2010). However, as our data set is limited with regards to intangibles for numerous firms, the variable is included to control for its effects on firms with sufficient data. In short, the controls for differences between book and tax reporting environments yielded divergent coefficients compared to previous research, however neither of the controls were significant in our test.

5.2 Robustness tests

In the first robustness test, fully robust standard errors are included in the main regression and VIF levels are examined. The results from including fully robust standard errors suggest that the calculated standard errors in the main test on the variables *SOE, Loss, ROA, PPE_ratio, Intangibles_ratio* and *Cash_ratio* are found to be understated, overstated for the variables *Size, Sales_Growth,* and *Leverage,* and unchanged for *Sales_NOA*. This can be derived either from the presence of heteroscedasticity in the dependent variable and/or serial correlation. Possible explanations for this could be that the number of unique firms in the sample are less than the number of firm year observations. Further, there appears to be a firm specific pattern where the dependent variable and the lagged version of itself have a relationship with one another over the time period. However, while taking this into consideration, the significance level for our hypothesis is stable at 1%, suggesting that neither has a significant effect on the results. The variance inflation factor test indicates that all VIF-values for the main regression are below 1.65 with a mean VIF of 1.22. While there is no universally accepted level, Wooldridge (2012) suggests values below 10 are acceptable while others argue the acceptable level depends on the study (O'Brien, 2007). Nevertheless, the VIF-test suggests that multicollinearity has not significantly affected the results.

In the second robustness test, the proxy for tax avoidance from the main test (*Cte_BVA*), is substituted with *GAAP_ETR* as the dependent variable. This yields a coefficient of -0.49259 with a t-statistic of -2.21 significant at the 5% level for the independent variable *SOE*, compared with the main regression's coefficient of -0.01085 and t-statistic of -8.45 significant at the 1% level. Although the significance level is reduced, the directional results from the main test are confirmed.

Notably, the adjusted R^2 is reduced substantially to 0.0709, suggesting that our original model better captures the intended research question. Using this alternate proxy allows us to discern between conforming and non-conforming tax avoidance in the main test, as the fact that the results remain significant with the new proxy suggests that a large portion of the tax avoidance in our main test is non-conforming. Although the proxy is not optimal as discussed, it is encouraging that the results are similar. It also indicates that the sample is appropriate for use with multiple tax proxies. A VIF test was also conducted on the regression using *GAAP_ETR* to check for multicollinearity. The results are almost identical to the VIF test on the main regression using *Cte_BVA* with all VIF-values below 1.65 and mean VIF of 1.22, indicating that multicollinearity did not have a significant effect on the altered regression (Appendix 8).

5.3 Limitations

This study is subject to a number of limitations. As with most studies, the most crucial risk is the potential of omitted variable bias. However, our regression includes theoretically motivated control variables that past research has found to be the most important determinants of tax avoidance, mitigating the risk as far as the field knows thus far. Further, the data originating from the Serrano database limits the study in several of ways. For instance, cash taxes paid is arguably the best proxy to capture corporate income tax for our sample. However, since no cash flow statements were available for most firms, the tax proxy had to be calculated based on income statement figures. Therefore, the proxy used to measure tax avoidance cannot be defined perfectly as cash taxes paid but instead it is the closest approximation to cash taxes paid possible based on available data. Nevertheless, past studies have used both our approximation and actual cash taxes paid as proxies and achieved identical results, which we argue indicates that our results are valid (e.g. Bradshaw et al., 2012). In addition, the dataset has incomplete data on certain variables, such as intangibles, which previous research has found to be determinants of tax avoidance, potentially limiting the variable's and by extension the model's explanatory power and accuracy. Lastly, as the definition of our tax avoidance proxy focuses primarily on non-listed firms, we had to use book value of assets as our scalar as opposed to market value of assets. Book value may not always represent the fair market value of an assets which could create skewed results for firms in certain industries as opposed to firms in other industries. With these limitations in mind, the study and its research method can be analyzed from three perspectives to evaluate its overall merit.

First, the validity of the research method affects the ability to draw correct conclusions and can be evaluated on the basis of the relevance of the data and the models used in testing the hypothesis. The data as such is relevant to measure the hypothesis, and the models are well-developed to capture the association between state ownership and tax avoidance. The potential of omitted variable bias is reduced by removing firms with missing data on key variables, and using only Swedish firms ensures consistent regulation and overall conditions. Further, while the tax proxy used is well-covered in previous literature, the main factor impacting the study's validity is that the proxy approximates CTP, as cash flow statements are not easily accessible for non-listed firms and not available in our data set. However, achieving similar results with a different proxy in the robustness test lends credibility to our findings.

Second, in terms of the reliability of our study, we believe that our results are replicable, in large part due to the reliability of the data and the structure of the research method. The data used comes exclusively from Serrano, which in turn collects its data from the Swedish Companies Registration Office. As numerous firms were removed as a result of our sample selection criteria, there is a risk of selection bias, as systematically removing observations may involve removing relevant taxation patterns, leading to a non-random sample. However, the sample size of the control group prior to matching (43,231 firms), along with the long time period (2007-2019), limits the risk of bias in the sample. Finally, the reliability of the references used is high, and most authors as well as journals are well-known in the field.

Third, the comparability of our study is somewhat restricted in three ways. First, there is limited previous research focusing on non-listed firms and their engagement in both conforming and non-conforming tax avoidance. Second, the entirety of this research area is in an early stage in the accounting literature. Third, as the tax proxy used in this study has to the best of our knowledge not been used in previous literature, it is acknowledged that it has not undergone the same validation and evaluation as more frequently used taxation proxies. While the novelty in these three areas leads to a fairly limited number of comparable studies, limiting the overall comparability of our study, the broader research method is extensively based on previous taxation research and customized to the specific sample, enhancing the comparability. While one of the study's purposes is to compare results with findings in other countries, comparisons require similar conditions.

6. Conclusion

The conducted study aims to uncover potential differences in the degree of tax avoidance between state-owned enterprises and non-state-owned enterprises. Using financial data available for all Swedish firms, we develop a tax-proxy and use this to run a firm fixed-effect regression model. Based on this, we show that Swedish SOEs engage in tax avoidance to a greater degree than non-SOEs. The results from the main regression are significant on a 1% level, and the negative association is robust to various specifications. As this research question has not previously been investigated in Sweden, there are no direct comparisons to be made to confirm our results. However, the results can be viewed in a broader perspective. This issue has previously been investigated in two settings: East Asia and Europe. Studies in China, Malaysia and Indonesia have shown SOEs to engage in less tax avoidance than their counterparts with other ownership structures (e.g. Bradshaw, 2019; Wu et al., 2012; Iswari et al., 2019; Adhikari et al., 2006). Meanwhile, studies in Spain and Italy have shown SOEs to engage in a greater degree of tax avoidance than their counterparts, consistent with our results (Fernández-Rodríguez et al., 2019; Mafrolla, 2019). Hence, our results in a Swedish context can be considered to add to this contrast between geographic regions and governance settings.

That Swedish SOEs engage in tax avoidance to a greater degree than non-SOEs may have several implications to the direct stakeholders. Arguably the biggest implication is in terms of signalling, publicity and public opinion. Tax avoidance in SOEs can at its worst be viewed as an expropriation of wealth from the state. As a majority shareholder, the state should prefer receiving pay-outs in taxes over dividends, as it receives all taxes but only a proportion equal to its equity stake in dividends. In firms with traditional ownership structures, tax avoidance is favourable to shareholders, but in SOEs, tax avoidance is in fact costly to the majority shareholder. Concurrently, as most SOEs are non-listed, the state does not benefit from stock price appreciation, which would be a traditional reason to engage in tax avoidance on behalf of shareholders. The fact that SOEs avoid taxes to a greater degree than non-SOEs, despite their social objectives and their role as standard setters, is controversial. Indeed, that SOEs despite these facts engage in tax avoidance is a finding that the government will likely find controversial. Since taxes are considered a part of corporate governance, these results should not be viewed differently than if SOEs, for example, were found to have higher emission levels than non-SOEs, which would generate scrutiny. While

it is beyond the scope of this study, direct stakeholders will likely want to understand what has caused this pattern of tax avoidance, whether it is lack of regulatory supervision, individual misconduct, structural problems, or some other factor. Consequently, the findings could be an important incorporating factor for future internal decision-making in Swedish SOEs and at the Swedish Ministry of Enterprise.

The findings may also be of interest to indirect stakeholders, including other states who wish to get a better understanding of the implications of state ownership, academics interested in the implications of ownership structures on corporate governance practices, and to firms dealing with external pressure regarding CSR activities interested in seeing how SOEs comply with it. Moreover, in light of principal-agent problems and tax avoidance as an area of corporate governance, the study helps display the complexities of these areas when it comes to state-ownership. Our findings show that despite the state's description of taxes as a part of corporate governance, it has been paid insufficient attention at firm level. This may be explained by the nature of SOEs which exacerbates traditional agency problems, as the principals (by extension the public) are significantly detached from the agents (SOE executives), with politicians acting as middlemen. As a result, tax avoidance practices may be affected more meaningfully by corporate governance and agency-problems in SOEs than in traditional firms.

Finally, the study brings interesting insight into the privatization debate where one of the main arguments opposing state-ownership is that it leads to inefficiency and bureaucracy. Since our results suggest that SOEs engage more in tax avoidance than non-SOEs, our findings contradict this view of financial inefficiency with regards to taxes in SOEs. On the other hand, our results bring into question the social efficiency of SOEs in terms of tax avoidance, yet guiding documents provide no direction on how to handle such efficiency conflicts. When it comes to efficiency, corporate governance, and thus tax avoidance, is increasingly an issue of competition, but many SOEs are not subject to competition in the same way as most firms. This is particularly interesting as it is provocative that the state itself would engage in tax avoidance since it, in essence, is both the collector and the regulator of taxes. Other stakeholders may consider the findings to be indicative of special treatment, whether due to better understanding of regulations, stronger political connections, or simply lower capital market pressure. As, to the best of our knowledge,

tax avoidance in Swedish SOEs has not been investigated previously, this study provides additional insight and nuances to this debate.

7. Further research

The results highlight the need for future research in the broader research area. First, further research is necessary into the suitability of different tax proxies when investigating similar samples, recognizing that the proxy used can be improved further. This could be done by investigating similar samples using different proxies to ensure that the results are not dependent on the choice of proxy, but a result of the underlying sample. Second, as discussed extensively in previous sections, this area of research has been relatively neglected in Western countries that share regulatory, socio-economic, and corporate governance similarities to Sweden. It would therefore be of interest to replicate the study in such countries, preferably starting in the Nordics as these countries share many governance similarities with Sweden. The results from such research could provide more comprehensive and impactful data which could be used to make more generalized and systematic conclusions with regards to the effect of state ownership on tax avoidance. Additionally, future studies could take a broader approach and look at several markets simultaneously. This could potentially show how state ownership in general affects tax avoidance, and could also serve to include exogenous shocks in order to deduce the actual effect of state ownership. Hitherto, an insufficient number of similar studies have been conducted to be able to draw systematic conclusions with regards to the effect of specific governance settings, as in each study, complexities and inconsistencies complicate any direct comparisons. Third, the underlying reasons why SOEs engage in tax avoidance were excluded from the scope of this study. Research yielding insight into potential explanations such as incentive structures in SOEs, political connections, or in-house regulatory expertise could provide better understanding of the determinants of tax avoidance in this particular ownership structure. Such findings would bring further validity to the results as understanding the causes of this phenomenon increases the explanatory value of the results. Finally, it would be interesting to research the monetary impact of the discovered tax avoidance in absolute terms as this could yield a more measurable insight of the discovered phenomenon.

References

Adhikari, A., Derashid, C. & Zhang, H. (2006). "Public policy, political connections, and effective tax rates: Longitudinal evidence from Malaysia." *Journal of accounting and public policy*, 25(5): 574–595.

Alstadsæter, A., & Jacob, M. (2016). Dividend taxes and income shifting. *The Scandinavian Journal of Economics*, 118(4): 693-917.

Badertscher, B. A., Katz, S. P., & Rego, S. O. (2013). "The separation of ownership and control and corporate tax avoidance". *Journal of Accounting and Economics*, 56(2): 228-250.

Badertscher, B. A., Katz, S. P., Rego, S. O., & Wilson, R. J. (2019). "Conforming Tax Avoidance and Capital Market Pressure". *The Accounting Review*, In-Press.

Bertrand, M., Duflo, E., & Mullainathan, S. (2004) "How Much Should We Trust Differences-In-Differences Estimates?" *The Quarterly journal of economics*, 119(1): 249–275.

Boardman, A. E., & A. R. Vining. (1989). "Ownership and Performance in Competitive Environments: A Comparison of the Performance of Private, Mixed, and State-Owned Enterprises". *Journal of Law and Economics*, 32(1): 1–33.

Bradshaw, M., Liao, G. & Ma, M. (2012). "State Ownership, Tax and Policitcal Promotion: Evidence from China". *Tel Aviv University Accounting Research Conference*, September

Bradshaw, M., Liao, G. & Ma, M. (2019). "Agency costs and tax planning when the government is a major shareholder". *Journal of Accounting and Economics*, 67(2-3): 255-277.

Chen, S., Chen, X., Cheng, Q. & Shevlin, T. (2010). "Are family firms more tax aggressive than non-family firms*?". Journal of Finanial Economics*, 95 (1): 41–61.

Chen, K. P., & Chu, C. (2005) "Internal Control versus External Manipulation: A Model of Corporate Income Tax Evasion". *The Rand journal of economics*, 36(1): 151–164

Cheng, C.S.A., Huang, H.H., Li, Y., & Stanfield, J. (2012). "The effect of hedge fund activism on corporate tax avoidance". *Accounting Review*, 87 (5): 1493–1526.

Chircop, J., Fabrizi, M., Ipino, E. & Parbonetti, A. (2018) "Does social capital constrain firms' tax avoidance?" *Social responsibility journal.* 14 (3), 542–565.

Crocker, K. J. & Slemrod, J. (2005) "Corporate tax evasion with agency costs". *Journal of public economics*, 89(9): 1593–1610.

Desai, A. M., & Dharmapala, D. (2006). "Corporate tax avoidance and high-powered incentives". *Journal of Financial Economics, 79*(1), 145-179.

Desai, M. A., Dyck, A., & Zingales, L. (2007) Theft and taxes. Journal of financial economics. 84 (3), 591–623.

Dyreng, S., Hanlon, M., & Maydew, E. L. (2008). ”Long-Run Corporate Tax Avoidance”. *Accounting Review, 83*(1): 61–82.

Dyreng, S. D., Hanlon, M., & Maydew, E. L. (2010). ”The Effects of Executives on Corporate Tax Avoidance”. *Accounting Review, 85*(4): 1163-1189.

Dyreng, S & Hanlon, M. (2019) “Tax Avoidance and Multinational Firm Behavior.” *Working Paper*, Brookings Institution. Available at https://www.brookings.edu/wp-content/uploads/2019/12/Dyreng-Hanlon-12.14.19.pdf

D’Souza, J. & Megginson, W. L. (1999) “The Financial and Operating Performance of Privatized Firms during the 1990s.” *The Journal of finance (New York*). 54 (4), 1397–1438.

Faccio, M. (2006). “Politically connected firms”. *American Economic Review,* 96(1): 369–86.

Fernández-Rodríguez, E., García-Fernández, R., & Martínez-Arias, A. (2019) “Influence of Ownership Structure on the Determinants of Effective Tax Rates of Spanish Companies”. *Sustainability,* 11(5): 1441

Fisman, R. (2001). “Estimating the value of political connections”. *American Economic Review* 91(4): 1095–102

Friedman, M. (1970) “A Friedman doctrine - The Social Responsibility Of Business Is to Increase Its Profits”, *The New York Times*, Sept. 13, 1790

Garbers, Y., & Konradt, U. (2014). ”The effect of financial incentives on performance: A quantitative review of individual and team-based financial incentives.” *Journal of occupational and organizational psychology.* 87 (1), 102–137.

Graham, J. R., Hanlon, M., Shevlin, T., & Shroff, N. (2013). ”Incentives for Tax Planning and Avoidance: Evidence from the Field”. *The Accounting Review,* 89(3), 991-1023.

Gupta, S., & Newberry, K. (1997). ”Determinants of the variability in corporate effective tax rates: Evidence from longitudinal data”. *Journal of Accounting and Public Policy, 16*(1): 1-34

Handayani, D. Y., & Ibrani, E. Y. (2019) ”Corporate governance, share ownership structure and tax avoidance”. *International Journal of Commerce and Finance*, 5(2): 120–127.

Hanlon, M., & Heitzman, S. (2010). “A review of tax research”. *Journal of Accounting and Economics, 50*(2-3): 127–178.

Hausman, J. A., & Taylor, W. E. (1981). “Panel Data and Unobservable Individual Effects.” *Econometrica*, 49(6): 1377-1398.

Henry, E., & Sansing, R. (2018). ”Corporate tax avoidance: data truncation and loss firms”. *Review of Accounting Studies, 23*(3), 1042-1070.

Iswari, P., Eko, A.S., & Wahyu, W. (2019). “Political Connection and Tax Aggressiveness: A Study on the State-Owned Enterprises Registered in Indonesia Stock Exchange.” *Journal of international studies,* 12(1): 79–92.

Jensen, M. C., & Meckling W. H. (1976) “Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure.” *Journal of financial economics*, 3(4): 305–360.

Kim, C., & Zhang, L. (2016) “Corporate Political Connections and Tax Aggressiveness.” *Contemporary accounting research*. 33 (1), 78–114.

Kovermann, J. H. (2018). “Tax avoidance, tax risk and the cost of debt in a bank-dominated economy”. *Managerial auditing journal,* 33: 683–699.

KPMG (2019). “Tax Transparency I Sverige 2018-2019. En studie om svenska bolags rapportering av skatt som en hållbarhetsfråga”. Available at: https://assets.kpmg/content/dam/kpmg/se/pdf/skatt/2019/se-report-tax-transparency-sverige-2018-2019.pdf

La Porta, R., Lopez de Silanes, F., & Shleifer, A. (1999). ”Corporate Ownership Around the World”. *The Journal of Finance*, 54 (2): 471–517.

Lanis, R., & Richardson, G. (2012). “Corporate social responsibility and tax aggressiveness: a test of legitimacy theory”, *Accounting, auditing, & accountability*. 26(1): 75–100.

Law, K., & Mills, L. (2017). ”Military experience and corporate tax avoidance”. *Review of Accounting Studies*, 22(1): 141–184.

Lin, K. Z., Mills, L., Zhang, F., & Li, Y. (2018) “Do Political Connections Weaken Tax Enforcement Effectiveness?” *Contemporary accounting research*. 35 (4), 1941–1972.

Mafrolla, E. (2019). “Tax avoidance in government-owned firms: Evidence from Italy.” *Public money & management.* 39 (3), 186–192.

Maydew, E. (1997). “Tax-Induced Earnings Management by Firms with Net Operating Losses.” *Journal of Accounting Research*, 35(1): 83-96.

Mills, L. (1998). “Book-Tax Differences and Internal Revenue Service Adjustments”. *Journal of accounting research*, 36(2): 343–356.

Munkhammar, J. (2009). "Försäljning av statliga bolag under tre decenier". *Timbro*, 07.10.09. Available at: https://timbro.se/app/uploads/2017/01/000022.pdf

O'Brien, R.M. (2007). "A caution regarding rules of thumb for variance inflation factors". *Quality and Quantity*, 41(5): 673–690.

Paulsson, G. (2006). "Accrual Accounting in the Public Sector: Experiences from the Central Government in Sweden". *Financial Accountability & Management*, Vol. 22, pp. 47-62.

Penno, M. & Simon, D. T. (1986). "Accounting Choices: Public Versus Private Firms". *Journal of Business Finance & Accounting*, 13 (4): 561–569.

Rego, S. O. (2003). "Tax-avoidance Activities of U.S. Multinational Corporations". *Contemporary Accounting Research*, 20(4): 805-833

Regeringskansliet. (2020). "Verksamhetsberättelse för bolag med statligt ägande 2019", Regeringen.se. Available at: https://www.regeringen.se/rapporter/2020/06/verksamhetsberattelse-for-bolag-med-statligt-agande-2019/

Riksrevisionen. (2017). "Statligt ägda bolag med samhällsuppdrag – regeringens styrning", Riksrevisionen.se. Available at: https://www.riksrevisionen.se/rapporter/granskningsrapporter/2017/statligt-agda-bolag-med-samhallsuppdrag---regeringens-styrning.html.

Rosenbaum, P. R., & Rubin, D. B. (1985). "Constructing a Control Group Using Multivariate Matched Sampling Methods That Incorporate the Propensity Score". *The American Statistician,* 39(1), 33-38.

Sanches-Ballesta, J. P., & Yague, J. (2020). "Financial reporting incentives, earnings management, and tax avoidance in SMEs". *Journal of Business Finance & Accounting,* https://doi.org/10.1111/jbfa.12519

Shackelford, D. A., & Shevlin, T. (2001). "Empirical tax research in accounting". *Journal of Accounting and Economics,* 31(1), 321-387

Shleifer, A., & Vishny, R. W (1994). "Politicians and Firms". *The Quarterly Journal of Economics,* 109(4): 995–1025.

Shleifer, A. & Vishny, R.W. (1997). "A Survey of Corporate Governance". *Journal of Finance,* 52(2): 737-783.

Shevlin, T., & Porter, S. (1992) "'The Corporate Tax Comeback in 1987' Some Further Evidence." *The Journal of the American Taxation Association.* 14 (1), 58–.

Siegfried, J. J. (1974). "Effective average U.S. corporation income tax rates". *National Tax Journal*, *27*(2), 245-259.

Skatteverket (2016). "Uppdrag till Skatteverket om att uppmuntra att skattepolicyfrågor diskuteras i företagens ledning". Available at: https://www.skatteverket.se/download/18.361dc8c15312eff6fd31ed9/1477654542612/2016-10-28_Uppdrag+till+Skatteverket+om+att+uppmuntra+att+skattepolicyfra%CC%8Agor+diskuteras+i+fo%CC%88retagens+ledning+%282016-10-27%29+.pdf

Slemrod, J. (2004). "The Economics of Corporate Tax Selfishness". *National tax journal*, 57(4): 877–899.

Stickney, C. P., & McGee, V. E. (1982). "Effective corporate tax rates the effect of size, capital intensity, leverage, and other factors". *Journal of accounting and public policy*. 1(2): 125–152.

Wang, L., & Yung, K. (2011). "Do state enterprises manage earnings more than privately owned firms? The case of China". *Journal of Business Finance & Accounting*, 38(7): 794– 812.

Watts, R.L., & Zimmerman, J.L. (1978) "Towards a Positive Theory of the Determination of Accounting Standards." *The Accounting review*. 53 (1), 112–134.

White, H. (1980) "A Heteroskedasticity-Consistent Covariance Matrix Estimator and a Direct Test for Heteroskedasticity". *Econometrica*. 48 (4), 817–838.

Wilson, J. R. (2009). "An Examination of Corporate Tax Shelter Participants". *The Accounting Review*, 84(3), 969-999.

Wooldridge, J. (2012). "Introductory econometrics: A modern approach". 5th edn, Cengage Learnings.

Wu, L., Wang, Y., Luo, W., & Gillis, P. (2012) "State ownership, tax status and size effect of effective tax rate in China." *Accounting and business research*. 42 (2), 97–114.

Zeng, T. (2011) "Institutional environment, inside ownership and effective tax rate." *Nankai Business Review International*. 2 (4), 348–357.

Zhu, W., & Yang, J. (2016) State ownership, cross-border acquisition, and risk-taking: Evidence from China's banking industry. Journal of banking & finance. [Online] 71133–153.

Zimmerman, J. L. (1983). ”Taxes and firm size”. *Journal of accounting & economics*, 5(2): 119–149.

Appendix

Appendix 1: List of all Swedish SOEs

Company name	Organizational number	Company name	Organizational number
Akademiska Hus	556459-9156	Swedavia Airports	556797-0818
Almi	556481-6204	Sweden House*	-
Apoteket Prod. & Lab.	556758-1805	Swedfund International	556436-2084
Apoteket	556138-6532	Systembolaget	556059-9473
Arlandabanan Infrastructure	556481-2385	Telia Company	556103-4249
Bilprovningen	556089-5814	Teracom	556842-4856
Dramaten	556190-4201	Vasallen	556475-4793
Eurofirma*	-	Vattenfall	556036-2138
Green Cargo	556119-6436	Visit Sweden	556500-7621
Göta Kanal	556197-7587	Voksenåsen*	-
Infranord	556793-3089	Stiftelsen Industrifonden†	802009-0083
Jernhusen	556584-2027	Stiftelsen Norrlandsfonden†	897000-3003
Lernia	556465-9414		
LKAB	556001-5835		
Metria	556799-2242		
Miljömärkning Sverige	556549-4191		
Kungliga Operan	556190-3294		
Orio	556602-9277		
Postnord	556771-2640		
RISE	556464-6874		
Samhall	556448-1397		
Saminvest	559066-7605		
SAS	556606-8499		
SBAB†	556253-7513		
Svensk Exportredit	556084-0315		
SJ	556196-1599		
SOS Alarm Sverige	556159-5819		
Specialfastigheter	556537-5945		
Svenska rymdaktiebolaget	556166-5836		
Statens Bostadsomvandling	556329-2977		
Sveaskog	556558-0031		
Svedab	556432-9083		
Svenska Skeppshypotek†	262000-1046		
Svenska Spel	556460-1812		
Svevia	556768-9848		

*Eurofirma, Sweden House and Voksenåsen do not have organizational numbers in the Swedish Companies Registration Office (Bolagsverket)

†SBAB, Svenska Skeppshypotek, Stiftelsen Industrifonden and Stiftelsen Norrlandsfonden are not incorporated as Aktiebolag (LLCs)

Appendix 2: Serrano industry codes used for matching

Serrano Code	Industry Definition
10	Energy & Environment
15	Materials
20	Industrial goods
22	Construction industry
25	Shopping goods
30	Convenience goods
35	Health & Education
40	Finance & Real estate
45	IT & Electronics
50	Telecom & Media
60	Corporate services
98	Other
99	SNI07 missing

Appendix 3: Results from matching

	Mean			t-test		W(T)/ V(C)
Variables	Treated	Control	%bias	T	p > | t |	
$Size_{it-1}$	10.828	10.722	11.3	1.56	0.118	1.80*
$Loss_{it}$	0.300	0.332	-7.0	-0.95	0.341	.
$Sales\_Growth_{it-1}$	0.208	0.162	3.9	0.51	0.608	1.44*
$Sales\_NOA_{it-1}$	15.908	18.506	-4.6	-0.63	0.528	0.75*
$Leverage_{it-1}$	4.298	4.546	-3.0	-0.40	0.690	1.06
ROA_{it-1}	0.058	0.052	3.8	0.50	0.614	0.39*
PPE_ratio_{it}	0.233	0.191	15.0	2.09	0.037	1.03
$Intangibles\_ratio_{it}$	0.010	0.011	-5.8	-0.80	0.424	0.31*
$Cash\_ratio_{\_it}$	0.223	0.219	1.7	0.24	0.811	1.07

*If variance ratio outside [0.82; 1.22]

Appendix 4: Industry distribution in treatment and control group

Serrano Code	Industry Definition	Frequency	Percent (%)
10	Energy & Environment	27	3.75
15	Materials	35	4.86
20	Industrial goods	0	0.00
22	Construction industry	32	4.44
25	Shopping goods	47	6.53
30	Convenience goods	17	2.36
35	Health & Education	51	7.08
40	Finance & Real estate	174	24.17
45	IT & Electronics	0	0.00
50	Telecom & Media	37	5.14
60	Corporate services	257	35.69
98	Other	43	5.97
99	SNI07 missing	0	0.00

Appendix 5: Results from Hausman test

	---------- Coefficients ----------		
Variables	(b) fixed	(B) random	(b-B) Difference
$Size_{it-1}$	-0.00145	-0.00068	-0.00076
$Loss_{it}$	-0.00149	-0.00221	0.00073
$Sales\_Growth_{it-1}$	-0.00003	0.00013	-0.00015
$Sales\_NOA_{it-1}$	-0.00002	0.00000	-0.00002
$Leverage_{it-1}$	-0.00028	-0.00020	-0.00008
ROA_{it-1}	0.05076	0.06865	-0.01789
PPE_ratio_{it}	-0.00363	-0.00489	0.00127
$Intangibles\_ratio_{it}$	-0.01820	0.00871	-0.02691
$Cash\_ratio_{\_it}$	-0.00314	0.00896	-0.01210
Chi2	**42.63**		
Prob>chi2	**0.0000**		

Appendix 6: Descriptive statistics

Panel B: Control group in main test before matching

				---------- Quantiles ----------				
Variables	n	Mean	SD	Min	.25	Mdn	.75	Max
Cte_BVA_{it}	561249	0.025	0.029	-0.579	0.002	0.016	0.038	1.658
$Size_{it-1}$	561249	7.554	1.234	4.007	6.672	7.492	8.365	11.266
$Loss_{it}$	561249	0.159	0.366	0.000	0.000	0.000	0.000	1.000
$Sales\_Growth_{it-1}$	561249	0.078	0.654	-1.000	-0.082	0.019	0.126	11.042
$Sales\_NOA_{it-1}$	561249	8.747	22.747	-39.408	1.638	3.684	7.646	366.643
$Leverage_{it-1}$	561249	2.391	4.068	0.020	0.536	1.153	2.503	38.686
ROA_{it-1}	561249	0.010	0.166	-1.434	0.021	0.086	0.178	0.852
PPE_ratio_{it}	561249	0.212	0.258	0.000	0.011	0.082	0.361	0.913
$Intangibles\_ratio_{it}$	561249	0.002	0.015	0.000	0.000	0.000	0.000	0.219
$Cash\_ratio_{\_it}$	561249	0.324	0.270	0.000	0.084	0.265	0.519	0.985

Appendix 7: Correlation table

	Cte_BVA_{it}	SOE_{it}	$Size_{it-1}$	$Loss_{it}$	$Sales\_Growth_{it-1}$	$Sales\_NOA_{it-1}$	$Leverage_{it-1}$	ROA_{it}	PPE_ratio_{it}	$Intangibles\_ratio_{it}$	$Cash\_ratio_{it}$
Cte_BVA_{it}	1.0000										
SOE_{it}	-0.2519***	1.0000									
$Size_{it-1}$	-0.0552	-0.0651*	1.0000								
$Loss_{it}$	-0.3152***	-0.0058	-0.0131	1.0000							
$Sales\_Growth_{it-1}$	0.0052	0.0199	-0.0123	0.0116	1.0000						
$Sales\_NOA_{it-1}$	0.1092***	-0.0211	-0.6148***	-0.0231	0.0329	1.0000					
$Leverage_{it-1}$	-0.1036***	-0.0027	0.0808**	-0.0406	-0.0318	-0.0522	1.0000				
ROA_{it-1}	0.5056***	0.0047	0.0017	-0.4420***	-0.0426	0.0884**	-0.0911**	1.0000			
PPE_ratio_{it}	0.0720*	0.0453	0.0240	-0.0543	0.0341	-0.0773**	0.1576***	-0.0574	1.0000		
$Intangibles\_ratio_{it}$	-0.0306	-0.0265	-0.0593	0.0540	0.0370	0.0003	-0.0859**	-0.0620*	-0.0826**	1.0000	
$Cash\_ratio_{it}$	0.1553***	-0.0005	-0.0424	-0.0156	0.0019	0.0300	-0.1322***	0.1054***	-0.2932***	-0.0561	1.0000

Notes: The symbols *, ** and *** indicate significance levels for 10%, 5% and 1% levels respectively.

Appendix 8: Result from VIF test

	Dependent variable: Cte_BVA		Dependent variable: GAAP_ETR	
Variables	VIF	Tolerance	VIF	Tolerance
SOE_{it}	1.01	0.99199	1.01	0.99233
$Size_{it-1}$	1.64	0.60801	1.65	0.60638
$Loss_{it}$	1.26	0.79302	1.26	0.79324
$Sales\_Growth_{it-1}$	1.01	0.99178	1.01	0.99163
$Sales\_NOA_{it-1}$	1.65	0.60711	1.65	0.60522
$Leverage_{it-1}$	1.06	0.94249	1.04	0.96490
ROA_{it-1}	1.30	0.77187	1.30	0.77130
PPE_ratio_{it}	1.14	0.87695	1.11	0.89834
$Intangibles\_ratio_{it}$	1.03	0.96811	1.03	0.96952
$Cash\_ratio_{\_it}$	1.12	0.89061	1.11	0.89891
Mean VIF	**1.22**		**1.22**	

Appendix 9: Modified fixed effects regression model with GAAP_ETR as dependent variable

$$GAAP\_ETR_{it} = \beta_0 + \beta_1 \times SOE_{it} + Industry\_FE + Year\_FE + \beta_2 \times Size_{it-1} + \beta_3 \times Loss_{it} + \beta_4 \times Sales\_Growth_{it-1} + \beta_5 \times Sales\_NOA_{it-1} + \beta_6 \times Leverage_{it-1} + \beta_7 \times ROA_{it-1} + \beta_8 \times PPE\_ratio_{it} + \beta_9 Intangibles\_ratio_{it} + \beta_{10} \times Cash\_ratio_{\_it} + \alpha_i + u_{it} \quad (5)$$

Appendix 10: Incremental R^2 and standardized coefficients

Variables	Incremental R^2	Standardized Coefficients
SOE	0.0616	-0.2524
$Size_{it-1}$	0.0000	-0.0084
$Loss_{it}$	0.0066	-0.0938
$Sales\_Growth_{it-1}$	0.0004	0.0204
$Sales\_NOA_{it-1}$	0.0012	0.0442
$Leverage_{it-1}$	0.0020	-0.0472
ROA_{it-1}	0.1653	0.4833
PPE_ratio_{it}	0.0001	0.0127
$Intangibles\_ratio_{it}$	0.0001	-0.0100
$Cash\_ratio_{\_it}$	0.0091	0.1046
Full model R^2	**0.4048**	
N	**720**	