

Auditor choice in real estate firms: a quality signal?

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Abstract

Purpose – Real estate is a capital-intensive industry for which the asset values tend to be highly volatile and uncertain. Transaction costs in the industry are therefore high, and transparency for investors may be low. The need to signal reliable estimates of property assets, in the communication to external stakeholders, can therefore be expected to be of extra importance in this sector. The purpose of this paper is to investigate how real estate firms use big four auditors to signal quality.

Design/methodology/approach – The authors use Swedish firm level data containing all limited liability real estate companies in the country to determine the determinants of big four auditors. The data set consists of 34,306 observations and is analyzed through logit regressions.

Findings – The results show that big four companies are primarily contracted by large and mature companies, rather than new firms or firms with volatile financial records, although the latter could be expected to have a large need to signal quality. The authors also find that firms listed on the stock market and firms targeting public use real estate are more inclined to use big four companies.

Originality/value – Real estate is a capital-intensive industry for which the asset values tend to be highly volatile and uncertain. Transaction costs in the industry are therefore high, and transparency for investors may be low. The need to signal reliable estimates of property assets, in the communication to external stakeholders, can therefore be expected to be of extra importance in this sector. No prior study of this area has been detected.

Keywords Auditor choice, Real estate companies, Signaling, Quality signal, Big four

Paper type Research paper

1. Introduction

Auditing is a central element of modern economy, with a fundamental contribution of increasing transparency and reducing transaction costs. Early literature on ownership and control can explain why firms voluntarily use external auditing to testify correctness of firm performance data (Jensen and Meckling, 1976). Ensuring this increased transparency is important both for society as a whole, as well as for individual firms themselves. Carey *et al.* (2013) highlight several internal benefits such as increased professionalism, improved company culture and continuous quality work. In business activities with many different stakeholders, the need to be able to communicate quality and results are of primary importance, and there is no reason to believe this need should decrease in the near future. On the contrary – the modern economy, with procurement and out-sourcing as standard features – the needs for firms to communicate with stakeholders is increasingly important. Also, companies with external auditing have significantly lower costs of debt (Minnis, 2011). As a result, auditing can be expected to provide not only value to the company and its shareholders, but also bring positive external value to society. One external benefit is put forward by Chen *et al.* (2014), who highlight that the information asymmetry between investors and the firm will decrease through audited financial information, and that investors



pay more attention to audited financial information than to non-audited information. Auditing can thus be a way to attract capital. For example, [Blackwell *et al.* \(1998\)](#) and [Minnis \(2011\)](#) conclude that using an independent auditor leads to lower interest rates for the company.

However, auditing is not just an automatized procedure and quality may differ between auditors and auditor firms. If it is assumed that auditing can provide internal value to the firm through information to the market, and audit firms may provide different levels of quality, this furthermore implies that the choice of auditor firm can be of strategical importance for a company ([Francis, 2004](#); and [Guedhami *et al.*, 2009](#)). This is problematized by [Lennox *et al.* \(2022\)](#) who state that the information in the auditor's report in itself is not of much importance, since the information already has reached the market before published in the annual report. But, in line with [Gutierrez *et al.* \(2018\)](#), they also conclude that the requirements of information in the auditor report gives the company managers incentives to continuously disclose more information than otherwise.

Quality in auditing has been addressed in different ways in the literature, but it is commonly perceived that the so called big four companies are considered as a sign of quality in auditing by the market. For example, [Kausar *et al.* \(2016\)](#) imply that using a big four auditing firm helps companies to signal trustworthiness towards external stakeholders. [Ettredge *et al.* \(2009\)](#) state that the larger size of big N companies allows for specialization in certain industries between auditors, and specialization allows for a better understanding of industry-specific complexities of, e.g. assessing asset values. However, though the relationship between high quality auditing, measured by using a big four auditing firm, and signaling quality to external stakeholders have been tested in several studies (see [Quamariyah, 2019](#) or [Habib *et al.*, 2019](#) for detailed literature reviews in the subject), most studies consider a specific owner form or all companies in a country. No study has pinpointed a specific industry, such as the real estate industry. We believe there are good reasons to target real estate companies specifically.

For certain sectors, the challenges of presenting fair values in financial reports are especially challenging. The content of real estate assets in firms is one such example, since estimating market values of real estate assets is a non-trivial task. Furthermore, there can be incentives to inflate or deflate such values for purposes of transactions or raising capital. Concern has been raised as to how we should ensure fair valuation in the real estate sector ([Nordlund *et al.*, 2022](#)). Real estate is a capital-intensive industry consisting of high values not least in terms of initial investment. In addition to this, and more importantly, the value of real estate is highly volatile and uncertain. This is due to the fact that properties are highly, if not perfectly, heterogeneous and there is a corresponding high level of asymmetric information. Properties are in general not traded on an everyday basis, and therefore market information on prices is scarce compared to many other markets. As a result of this, transaction costs on the real estate market are high, and transparency for investors may be low. As a result, the estimation of property assets value is more complex than in many other industries ([Nordlund *et al.*, 2022](#); [Mäki, 2020](#)). The complexity stems from asset values are based on expected future payments that are capitalized. If a building stands without tenants, its value will drastically decrease. Therefore, the auditing of a real estate company is not only of the company as such. It is also about the different buildings, their quality, as well as the contracts connected to the building and the tenants that have signed these contracts. The need to signal reliable estimates of property assets, in the communication to external stakeholders, can therefore be expected to be of extra importance in this sector ([Lorentzon, 2011](#); [Nordlund, 2008](#)). [Nordlund *et al.* \(2022\)](#) raises the need for more research in the field of quality auditing of real estate firms and the valuation of its properties in particular.

The real estate business has grown considerably over the recent years, and represent an important part of modern economies. Understanding the assessment of values in this sector,

and how quality may be communicated to stakeholder, is therefore of interest for the development of a sustainable real estate sector. The purpose of this paper is to examine the determinants of auditor choice in real estate companies, with a special emphasis on the type of auditing firms. We use firm data containing information on auditors to estimate determinants on the choice of auditors. The next section presents the theoretical and consequent hypothesis formulation, which is followed by a presentation of data and methods applied in the study. After that, the results are presented followed by a discussion.

2. Theoretical background and hypothesis development

Early theories on the separation of ownership and control emphasize the role of disciplining mechanisms, such as auditing (e.g. [Watts and Zimmerman, 1983](#)), in ensuring the viability of firm performance (see, e.g. [Jensen and Meckling, 1976](#); [Fama, 1980](#)). Contracting an external auditing thereby is a necessity for firms to show accuracy of financial statements and other information, thereby signaling credibility. Just like the firm itself, auditors are in turn exposed to market pressure and resort to “reputation” and their resistance to interests of certain actors or stakeholders.

Audit quality can, in its most simple definition, be considered as “either meeting or not meeting minimum legal and professional requirements” ([Frances, 2004](#)), but more generally as the ability to discover and report mistreatment. [Frances \(2004\)](#) furthermore suggests that audit failure is rare, and that audit constitutes a minor cost for companies, and that quality of audit in general can be considered quite good, since outright audit failures remain few. Nevertheless, audit quality does differ and evidence also suggests that there are differences in choosing auditors that are systematic between firms and industries.

[Frances \(2004\)](#) provides an early overview of audit differentiation and audit quality. Early research suggested that larger audit firms could have more incentives to provide high-quality auditing than smaller firms. The audit market has become increasingly dominated by a few large firms, typically described as “big four” companies who are present internationally in both developed and developing economies. The review concludes that there is plenty of evidence suggesting big four companies provide better quality audits, but that this could be explained by the endogenous forces that firms with good earnings hire high-quality auditors. For this study, this is an interesting finding. If there is a general notion that big four auditing is associated with higher quality, this could also be a reason for firms with a particular interest to signal quality, to use auditor choice as a signal to the market.

Agency theory has been widely adopted in studies regarding auditor choice ([Habib et al., 2019](#)) studying how the relationship between management and shareholders/owners are influenced by the selection of auditor firm. Applications are mainly done in relation to how agency problems arise in the context of separation of ownership and control ([Lennox, 2005](#)). Different relationships between management and shareholders/owners will affect the reporting of the company finance and activities. Typically, national legislation may force limited liability companies to provide annual reports. In addition to this, striving at signaling quality through high-quality auditing can be important both towards shareholders and to the market in general. Asymmetries arise for example between management, who hold extensive information on the firm and its activities, and the firm owners as well as shareholders. One of the few ways is by higher quality of annual reports performed by external auditors. Independent audit can be perceived as a way to assure that the financial information reported is trustworthy and accountable ([DeFond and Zhang, 2014](#)). Previous studies (e.g. [El Ghoul et al., 2016](#) and [Knechel et al., 2008](#)) also highlight that this information asymmetry is not only valid within the ownership structure but also between the firm and its stakeholders, as for example debt holders and suppliers.

When parties are aware that they do not hold the same information, there may be difficulties in providing high quality product and services, since actors with less information may know they have no way of distinguishing good quality from poor quality, and therefore assume an overall low quality. Signaling theory addresses this problem, and has developed into many different areas, especially with the voluntary disclosure of information. According to [Campbell *et al.* \(2001\)](#), the theory can be applied to company reports, indicating that firm who believe they perform better than other firms can signal this to investors to attract investment and improve their reputation. In their study on UK firms, [Porumb *et al.* \(2019\)](#) find that extended auditing provides relevant information for finance, and therefore fill a unique role in improving access to information. According to [Morris \(1987\)](#), the theory shows how the asymmetry can be reduced by allowing the party with more information to signal it to others. Although the theory was initially developed by Michael Spence in 1973 to explain the behavior of the labor market, signaling is a general phenomenon that can be applied in any market with information asymmetry.

The information asymmetry can thus be reduced by the fact that one party signals, that is, giving away the information to the other party. A positive reputation can then be created for the one who signals if the information is credible when one party gives away the information. The positive reputation that is created will lead the party with more information to leave it for its own gain ([Connelly *et al.*, 2011](#)). When it goes well for a company, they tend to signal more information to communicate their good performance to the market.

Signaling is thus an attempt by individuals or companies to reveal their information in a credible way. According to [Milgrom and Roberts \(1992, p. 505\)](#), if firms are conscious about how information is perceived by the market or stakeholders, the firm can use this knowledge to signal high quality of their products or services. It is however not always easy to disclose private information in a manner that signals high quality, not least since self-esteem statements are usually not credible. This creates motivation to credibly present the information you want to be aware of. [Datar *et al.* \(1991\)](#) conclude independent auditing to be a way to signal credibility of the financial statements. [Titman and Trueman \(1986\)](#) also predict that firms will use this kind of signaling to smoothen less favorable information, and keep up appearance towards stakeholders. For a signal to be effective, it needs to be well known and reliable. It often results in the signal to become costly to imitate or originating from a third party ([Fisher and Reuber, 2007](#)).

Although information asymmetry to some extent is present in all industries, the real estate market is characterized by especially high information asymmetries. [Muller and Riedl \(2002\)](#) uses UK investment property firms as being representative of high risk and high information asymmetry. They argue the complexity of both auditing the business of the firm together with the appraisal of the properties within the company adds on the complexity and makes it more difficult for different interest parties to get an insight of the firm. As this information asymmetry is considerable, a larger need for quality signaling are apparent.

To use an auditing firm is mandatory by law for limited liability firms in most countries, but a big four auditing firm could qualify to become an instrument of signaling; being a third company well known to the market and to society in general. Using a big four auditing firm can be considered to signal high quality since it signals a higher credibility ([Francis, 2004](#); and [Guedhami *et al.*, 2009](#)) and that the firm is willing to spend more to get a good audit ([Kausar *et al.*, 2016](#)). The separation between ownership and control for public listed companies enhances the need for an independent external audit (e.g. [Francis, 2004](#)). Publically listed real estate firms need to communicate their performance to a large number of external stakeholders, and investors would rely heavily on audited financial information. As a result, information and how information is perceived should be expected to be of higher importance for these firms than for non-listed firms ([Chen *et al.*, 2014](#)). We therefore expect them to be more likely to use an audit firm of the big four. The first hypothesis is therefore.

H1. Publicly listed real estate firms are more likely to use a big four audit firm

Furthermore, when firms are newly started, potential investors generally need to have a greater trust in the disclosures and prospectuses as the firm has shorter history to study (Titman and Truman, 1986; and Datar *et al.*, 1991). This also implies a greater need to signal credibility, and use a big four audit firm, for newly started firms. However, it may also be a higher financial burden for a young start-up to pay for a big four auditing firm, as compared to for more established firms who, on the one hand may have less to gain from this, but on the other hand may see auditing costs as relatively small, taking total costs into account. For example, Mäki (2020) conclude that small real estate firms tend not to use external valuers. Mäki (2020) also concludes that if the firm does not use an external appraiser, they more often use big four auditor. For Hypothesis 2, theory is inconclusive, and we see it as an empirical question which one of the two counter-acting arguments will dominate the business.

H2. Newly started real estate firms are more likely to use a big four audit firm

In his review of literature on audit choice, Qomariya (2019) stresses that factors both internal and external to the firm can affect audit choice. Internal factors are associated with the firm and its organization, and external factors are associated with the auditing firm. The long-time character and high levels of transaction costs of the real estate markets imply a general high-risk level of the associated industries. Real estate markets in many countries are also heavily regulated compared to many other markets, which may add an extra level of risk to the already high risk levels. One could of course argue that good regulations can help reduce risks, but for individual firms working with real estate, markets tend to be local and so are land regulations and implementations. Risk is furthermore a factor concluded to increase the likelihood to use a big four auditor firm. Datar *et al.* (1991) and Hughes (1986) both conclude that firms with greater firm specific risks will choose higher quality auditors. Firm specific risk can be divided in business and financial risk, and whereas the business risk to some extent can be considered to be similar across our sample, which contains the real estate business, the financial risk differs between firms.

However, certain parts of the real estate markets are more exposed to risk than others. According to Knechel *et al.* (2008) and Kaussar *et al.* (2016), firms with a larger need of external capital, in terms of debt financing, are concluded to use a big four audit firm. The real estate sector, although limited, is diverse and different firms will face different risk exposure. They will all have different credit and financial exposure and therefor different financial risks.

H3. Real estate firms with a higher financial risk are more likely to use a big four audit firm.

Previous studies have also concluded that firms with political connections are more likely to appoint a big four audit firm (Guedhami *et al.*, 2014; Habib *et al.*, 2017). Real estate firms that specialize in rental properties for public use need to have good relations with the public sector. Furthermore, public entities, such as local and regional government entities or government owned companies, are often regulated and need to fulfill certain rules in terms of procurement and contracting. Auditing is one area which are expected to be affected by such regulations.

H4. Real estate firms specialized in properties for public use are more likely to use a big four audit firm.

These four hypotheses will be tested using a dataset on all limited liability companies in Sweden classified as real estate companies as will be described in the subsequent section. We will perform hypotheses tests for full sample and different sub-samples depending on firm size, as a way to capture heterogeneous effects across the market.

3. Method and data

The empirical part is based on data from annual reports from the database Business Retriever. All companies, which are limited liability companies and as such obliged by law to publish annual reports, are classified according to the Swedish industry standard SNI, which is comparable to the EU standard NACE rev.2. Since our focus is real estate owner firms, firms coded with SNI 68 were downloaded, resulting in an initial dataset containing 54,503 firms. In order to avoid business cycle problems, data from 2015–2019 were downloaded and used for calculating average numbers over time. Recent years were also excluded to avoid exceptional development during the COVID pandemic. For firms younger than five years, average figures are calculated based on the available amount of data. The dataset contains name and information of auditing firms.

Furthermore, the dataset contains information of ownership hierarchies, which allows us to aggregate data and avoid using, e.g. firms that are created for administrative purposes as independent observations. The data has been aggregated to corporate level so that total values of the whole corporation are used in the analysis, leaving 34,306 observations for the dataset used in the analysis. There are some exceptions to using total values. First of all, starting years were defined as the starting year of the mother firm. Alternative measures, such as using average years for the corporations, were used for checking robustness, but did not change the results. For the dichotomous variables, the definition of which are presented in Table 1, the maximum value was used when aggregating the data. This implies that if any firm within a corporation has the required characteristics, the whole corporation is classified according to this.

Descriptive statistics are presented in Table 2. Statistics are presented for the full sample as well as for the subgroups of different firm sizes. Subgroup definitions are based on annual report figures on building and land assets. For measuring size in the regression models, different measures were initially tested, but due to high levels of correlations, the ones used in the analysis are number of employees and EBITDA expressed in absolute terms. EBITDA is defined as earnings before interest, taxes, depreciation and amortization, and expressed in units of thousand euros. Since the variable measuring number of employees is skewed, with most firms having few or no employees, the variable is transformed by taking the natural logarithm. The variable is first transposed by adding a value of 1 to all observations, in order not to lose observations.

The dichotomous variable listed is steadily increasing when we divide the data into subsamples. In other words, larger firms are to larger extent publicly listed, but even in the smallest subsample, containing the 50 largest firms, only about one-third of the firms are listed on the stock exchange. Still, most of the listed companies belong to the top 50 group.

The age of companies was initially captured through the use of two different variables. The first one is the number of years since the foundation of the firm, and the second variable is a dummy for firms younger than five years. After trying different specifications, the

Variable name	Definition
Big four	1 if the firm contracts any of the big four auditing firms, 0 otherwise
Young	1 if the firm was started no earlier than five years ago, 0 otherwise
Listed	1 if the firm is listed on the Stockholm stock exchange, 0 otherwise
Public purpose	1 if the firm owns more than three properties and more than half of their properties are healthcare and/or school properties

Source(s): Author's own definitions

Table 1.
Definition of
dichotomous variables

	Number of employees (ln)	EBITDA (TEUR)	Listed	Young (younger than 5 years)	Risk	Publ purpose
<i>Full sample (N = 34,306)</i>						
mean	0.351	90.155	0	0.236	13.715	0.011
p50	0	12.82	0	0	1.566	0
sd	0.707	635.585	0.015	0.425	83.854	0.104
min	0	-7479.479	0	0	0	0
max	8.092	56931.48	1	1	9369.5	1
<i>Top 1000</i>						
mean	2.062	19838.304	0.03	0.018	20.746	0.134
p50	1.974	3657.56	0	0	3.56	0
sd	1.909	84679.353	0.171	0.133	342.631	0.341
min	0	-1.81E+05	0	0	0	0
max	10.083	1.48E+06	1	1	10795.33	1
<i>Top 200</i>						
mean	3.5	81322.898	0.1	0.01	3.921	0.2
p50	3.956	26494.42	0	0	2.428	0
sd	2.155	1.74E+05	0.301	0.1	6.142	0.401
min	0	4598.64	0	0	0	0
max	10.083	1.48E+06	1	1	66.316	1
<i>Top 100</i>						
mean	3.853	1.41E+05	0.18	0	3.023	0.28
p50	4.417	57568.92	0	0	2.209	0
sd	2.293	2.30E+05	0.386	0	2.863	0.451
min	0	10453.64	0	0	0.015	0
max	10.083	1.48E+06	1	0	17.087	1
<i>Top 50</i>						
mean	4.527	2.41E+05	0.36	0	2.374	0.38
p50	4.917	1.25E+05	0	0	1.939	0
sd	2.258	2.93E+05	0.485	0	1.503	0.49
min	0	26822.26	0	0	0.015	0
max	10.083	1.48E+06	1	0	7.168	1

Table 2.
Descriptive statistics of
explanatory variables,
average values 2015–
2019, aggregated over
parent company

Note(s): Correlation matrix of the explanatory variables are presented in [Appendix](#)
High values expressed in exponential form
Source(s): Own calculations using data from Datscha and Business Retriever

dummy variable was found to provide a better fit. For the numerical variable, both the logged and un-logged variable formulations were used, but none of them provided much information to the model. In [Table 2](#), it is notable that the subsamples containing the largest firms contain no newly started firms, and that the total sample, quite as expected, has the highest share of new companies.

Financial risk is here defined as long term debt divided by equity ([Johansson and Runsten, 2005](#)). Given that this is a commonly used key performance indicator, it is reasonable to assume that this measure is also influencing stakeholders' overall evaluation of a firm's performance. Financial risk in general decreases as firm size increases. However, it is interesting to note that the full sample actually demonstrates lower financial risk measures than top 200, which we interpret as a result of this group containing a number of small but stable family firms or firms with small but stable assets.

Public interest real estate is a variable addressing whether the firm has properties used for publicly financed activities, such as education or health care. These types of properties imply that the tenants are public entities, which are often required to undertake procurement

processes and have formalized requirements for signing contracts. To enable this classification, a cross analysis between the two databases Business Retriever and Datscha were made. In Datscha, all property owners with education or health care properties were selected. All companies owning more than three education or health care properties, or having more than half of their property stock in this sector, were then classified as public purpose companies. These are quite specialized type of firms, as illustrated by the fact that only 1–2% of the firms in any of the groups are characterized to belong to this type of business. These firms have on average more employees, and are to a larger extent public listed and older than the overall sample.

4. Results

Since belonging to one of the big four auditing firms is defined as a dichotomous variable, logit models will be estimated. In order to account for the considerable difference in sizes between firms in the industry, we perform estimates on different subsamples defined by firm size in terms of their declared value of buildings and land. Table 3 presents results from the logit regressions.

The first overall finding is that firm size is positively influencing the choice of big four auditors. Number of employees show positive correlation with the number of employees for the full sample and top 1000 firms, implying that firms with more employees are more likely to contract any of the big four accounting firms. However, the finding is not stable across sample sizes. It matters for the full sample and also for the top 50 firms, but for two of the middle groups this does not have an effect.

The second measure, EBITDA, is also a size measure and measures the impact of economic size, in terms of financial results. This turns out statistically significant for several of the specifications, although the impact is very small. In economic terms, this implies that although there is a statistically significant effect that stronger results are correlated with the probability to contract any of the big four, there are in reality very large changes in results needed for the probabilities to change.

	(1)	(2)	(3)	(4)	(5)
Variables	Odds ratio	Top 1000	Top 200	Top 100	Top 50
ln_ast	1.330*** (0.0906)	1.217* (0.141)	1.151 (0.214)	1.337 (0.351)	2.418* (1.124)
EBITDA_adj	1.000*** (1.24e–06)	1.000* (1.30e–06)	1.000 (1.45e–06)	1.000 (1.56e–06)	1.000 (1.88e–06)
listed	4.751*** (3.081)	4.640*** (3.070)	7.142** (5.623)	7.150** (6.271)	10.86*** (12.83)
agefive_koncern	0.225*** (0.132)				
risk	0.993 (0.00589)	0.983 (0.0330)	0.990 (0.0845)	1.011 (0.179)	1.679 (0.779)
d_samfast	2.832*** (1.038)	1.051 (0.584)	0.335 (0.296)	0.358 (0.332)	0.380 (0.369)
Constant	0.00341*** (0.000400)	0.0136*** (0.00642)	0.0275*** (0.0250)	0.0173*** (0.0255)	0.000421** (0.00135)
Observations	34,306	982	198	100	50

Note(s): Odd's ratio, standard errors in parentheses. Dependent variable: big four. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source(s): Own calculations using data from Datscha and Business Retriever

Table 3.
Regression
results, logit

Both size variables suggest that there is a maturity effect present in the data. Rather than young, unknown firms needing to demonstrate results, firms that engage big four accountants tend to be large and mature firms by comparison. However, also in the smallest sample, with the top 50 companies in the industry, the size effect is measurable. It is in other words not necessarily the case that the largest companies automatically contract a big four auditing, and within this group, size still has a positive impact on the probability to select a big four auditing firm.

Being listed on the stock exchange market demonstrates a strong statistical effect. In the presented results, being listed is defined as 1 if any of the companies within a corporation is listed, and 0 otherwise. This implies that, in line with our first hypothesis, being publicly listed enhances the probability to contract a big four company. We interpret this as a need for the firm to signal quality and credibility to outside stakeholders, and overcome some of the agency costs and information asymmetries present in widely held companies. By this [Hypothesis 1](#) is accepted; a result that goes well in line with the result of [Chen *et al.* \(2014\)](#). In our data, the effect also increases over the sample size; implying that for the largest firms being listed is a strong indicator that firms will contract a big four auditing firm.

Younger firms are also less prone to contract a big four accountant than older firms. This variable can only be used for the full sample since the other subsamples do not contain any newly started firms. Also in this case, several measures of age have been tested, even if only one measure is presented here. First of all, aggregation of firm data into corporate level data has been done using both average and max values of age of the different firms in the corporation. Second, both continuous measures, measuring the number of years since the firms was registered, and a dichotomous measure distinguishing between firms younger than five years, have also been used. All measure reveals the same result; that primarily older firms in the sample engage with big four accountants. By this [Hypothesis 2](#) is rejected as we are unable to see a connection between younger firms and the use of a big four auditing firm as we would have expected due to [Datar *et al.* \(1991\)](#) discussion regarding younger firms greater need to signal credibility.

[Hypothesis 3](#) deals with the financial risk of firms, but the empirical findings do not support that there would be any such effect. However, as shown in [Table 2](#), risk tends to decrease over firm size, so it is possible that also this could become a maturity effect already controlled for firms that are not listed on the stock exchange are not obliged to show the fair value of their assets. Furthermore, assessing risk in the real estate sector may be extra difficult. As [Nordlund *et al.* \(2022\)](#) has raised concerns over, appraisal of real estate property is difficult since it relies on estimates and contains many uncertainties.

[Hypothesis 4](#) deals with firms active in public sector related real estate, for which we expect signaling through auditing firms to be of extra importance. In previous research there has been signs that firms with political connections may have especially strong reasons to use big four auditing firms ([Guedhami *et al.*, 2014](#); [Habib *et al.*, 2017](#)), and our results are in line with their findings. The results support this hypothesis for the full sample, and suggest a strong correlation between the two. However, for the largest firms this does not seem to matter.

5. Concluding discussion

Real estate is an industry with considerable levels of asymmetric information and high risks, as well as being a very capital-intensive industry. When it comes to auditing real estate companies, the level of complexity is high compared to many other industries since the underlying assets need to be assessed and there is a potential risk of distorting the values. The value of real estate is often estimated from discounted values of future rents, which by definition are uncertain. A good current example is changes in the retail sector and future demand for retail premises due to e-commerce, or changes in demand for office space in the

post-COVID era. Such structural changes in the economy can result in lower demand and vacancies, which imply a loss of rents and thereby lower property values. Even if premises may be converted, such changes are typically expensive. Furthermore, moving into a new type of real estate sector, e.g. turning offices into housing, implies not only different tenants but also different regulatory framework and market structures. There are certainly other industries with complex audits, but we believe that these complexities may differ and there is therefore a reason to make analyses of specific industries.

Previous research has indicated that choosing one of the big four auditing companies can be seen as a signaling device, in order to signal quality and credibility to outside stakeholders. However, our results suggest that it is primarily the older, more mature corporations who use big four auditing firms, despite the fact that these firms already should have a reputation built on long-term activities and financial success rates. Having many employees, as well as stronger average financial results, are both correlated with a higher likelihood to contract big four companies – but with a stronger effect for the full sample. Being recently established – no matter how this is measured – is strongly correlated with a tendency to not contract big four companies. For larger firms, the potential higher auditing costs associated with contracting a big four firms constitutes a very small part of total costs; a conclusion which is in line with previous research. In conclusion, we interpret this finding as a sign that the choice of auditor serves other purposes than signaling quality. Contracting well established auditing firms seems to be more a sign of the maturity of firms in the real estate sector, rather than a tool of signaling quality.

Similarly, our results indicate that firms listed on the stock exchange show considerably higher likelihood to use big four auditors than do other firms. A very small share of the sample constitutes listed companies, but the correlation with the choice of auditors is strong and stable. However, this share increases as we reduce sample size to include fewer and larger firms. This is especially interesting since these firms are typically larger and older than most other firms, but the significance remains after controlling for both size and age, and for the different subsamples. Our understanding of this is as stated above; from our results, we understand the choice of auditor as a sign of maturity. It is especially interesting to note that this effect not only remains, but also seems to be stronger, for the smaller sample of the largest firms.

However, there are empirical evidence of other features that call for the use of big four auditors. Different tenants imply different set of rules and demand structures. In line with our expectations, firms in the full sample that cater for public services, such as education and health care, demonstrate much higher tendency to contract big four auditors. These activities are in Sweden almost exclusively publicly financed and subject to procurement laws and regulations, making us expect auditing to be of high importance for stakeholders. However, this effect disappears when the focus narrows down to the largest firms in the industry. A possible explanation is that these firms have other ways to signal quality.

From a societal point of view, it is important to see that real estate companies not always behave as expected. In our understanding, the theories on signaling would suggest firms with strong incentives to send sign of quality, such as firms with a volatile financial record or new firms, to be more prone to contract big four auditors. We do not find any such signs; on the contrary, we find that firms with established financial records and long history to be more prone to use big four auditors.

For the full sample, we find a strong correlation with public use real estate. These are firms that act on markets that ultimately are financed by the public. However, the effect disappears as soon as smaller samples are being used, suggesting that audit choice may be a quality signal for small companies but not for larger companies. We suggest this could imply that larger companies have other ways of signaling quality than the choice of audit firm, so that audit choice can work as a substitute for documented long-term economic performance for small firms on the market.

The real estate market today, not only in Sweden, contains many public-private transactions that are of considerable importance for land use and development. Understanding how quality can be signaled and measured is a piece of the puzzle for understanding how private and public actors interact. For example, public land sales are important tools in developing urban areas, but the transactions and the underlying processes are not well known. In addition, real estate firms also address the private investors, e.g. through real-estate investment trusts (REITs), and understanding how signaling occurs for these different stakeholders would also merit some more attention. Finally, our results could also serve as input for more aggregate studies, in which real estate is just one sector of many, but where the specificities of the real estate market are important to understand in order to understand the whole market and its different sectors.

The study implies that the auditing industry need to consider that auditing may serve different purposes for different industries and firms. Smaller firms with public sector stakeholders and clients may have a stronger need to demonstrate auditorial quality, which in this study is proxied by choosing a big four audit firm. But in general, our findings do not support audit choice as an important signaling mechanism. Also, many firms within the real estate industry tend to have other ways to signal quality than to use a big four auditing firm. It can also be because the general quality of auditing in Sweden is high, and the extra value of choosing certain auditing firms may be quite limited. For large firms the extra cost is however limited. All in all, this implies that the real estate might not consider the company brand of the auditor firm as of high importance to signal quality towards its stakeholders.

Ultimately, understanding how quality in auditing can contribute to a more transparent market is of vital importance for the real estate industry at large, but even for the economy at large. Our study provides a piece in the puzzle of understanding the role of auditing, and quality signals through the auditing process, for the real estate sector. We think future studies should focus on how specialization of auditors in the real estate industry may contribute to such development, but also how the market as a whole should assess the extra value of industry specialized auditing.

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Appendix

Table A1.
Correlation matrix

	N. of employees (ln)	EBITDA	Listed	Young	Risk	Public purpose	Architect
N. of employees (ln)	1.0000						
EBITDA	0.2154	1.0000					
Listed	0.1355	0.3685	1.0000				
Young	-0.2361	-0.0220	-0.0114	1.0000			
Risk	-0.0492	-0.0045	-0.0042	0.0549	1.0000		
Public purpose	0.1048	0.0949	0.0778	-0.0710	-0.0019	1.0000	
Architect	0.0480	0.0098	0.0078	-0.0097	-0.0188	-0.0101	1.0000

Source(s): Own calculations using data from Datscha and Business Retriever

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