UNIVERSITY OF GOTHENBURG

SCHOOL OF BUSINESS, ECONOMICS AND LAW

Residual value risk in car leasing - A case study on residual value measurements

Supervisor: Berit Hartmann

Master Degree Project in Accounting and Financial Management

Graduate School

Spring term 2021

Authors: Anton Karlsson & William Regnstrand

Table of content

List of tables and figures

Abstract

Background & Purpose: The lessor's risk of guaranteeing a residual value for a car has grown as leasing has emerged as a popular financing alternative. As there is no active market for such values, it is a matter of estimating a residual value with high measurement uncertainty. Prior research has focused on developing statistical models for estimating future residual values of cars. However, there is a lack of research which has had an operational perspective to the issue and examined how lessors actually handle the problem of estimating a reliable residual value. The purpose of this study is therefore to shed light upon how a lessor of cars practically handles residual value calculations.

Methodology: We have conducted a single case study on a large company active within financing of cars, referred to as Financier AB. The material consists of six online video interviews including five managers with relevant knowledge and different perspectives on the issue of estimating a residual value of a car.

Findings & Conclusions: In the study we draw several conclusions. We find that there is a lack of attention given to e.g., soft values in prior research, even though we demonstrate its relevance in practice. We also find that the case company does not use any statistical model when setting their residual values. This finding differs greatly from previous research in the area, where most researchers have developed different statistical models to estimate the residual value. From a fair value measurement perspective, we conclude that the residual value estimations vary between level 2 and 3 input depending on the leasing object and its position in the life cycle. Lastly, we conclude that there is a difference in objectives between earlier research encompassing residual value estimation and practice. Within earlier research, the objective has been to forecast a true future value of a car, while in practice the objective was to estimate a value which is workable from multiple perspectives.

Key words: Residual value risk, Car leasing, Fair value measurement, Automotive industry, Operational perspective

Acknowledgement

As the master thesis is finalized, we would like to take the opportunity to thank the ones who have helped us during the process.

First of all, we would like to thank all the managers at Financier AB. Without your participation, knowledge and invaluable insights, the conclusions in this thesis would not have been possible to reach. In particular, we would like to express our sincere gratitude towards the COO at Financier AB, who helped us to initiate this project and made it all possible.

We would also like to thank our supervisor, Berit Hartmann. Your guidance and relevant feedback have helped us along the way and increased the quality of our thesis. It has been inspiring having you as support through this project.

Gothenburg, 2021-06-09

…… ……...

William Regnstrand Anton Karlsson

1. Introduction

The first chapter provides an introduction to the background of the area. It is followed by a problem discussion where a research gap is identified and problematized. Subsequently, the purpose and research question of the thesis is presented. Lastly, the delimitations and the outline of the study is stated.

1.1 Background

Leasing has flourished as a popular way of financing assets, both for individuals and for businesses (Gleue, Eilers, von Mettenheim & Breitner, 2017; Johnson, Schneider & Waldman, 2014; Lessmann, Listiani & Voß, 2010; McKinsey, 2020a). The 2019 annual report by Leaseurope, the European Federation of Leasing Company Associations Leasing presents that leasing, as a form of financing for real estate and other equipment including vehicles, has grown by between 6-10 % annually in the last 5 years in Europe. According to the same report, leasing of passenger cars accounted for 51 % of all leasing in Europe 2019. Today, in the Swedish market, private leasing accounted for almost half of all new car sales to private customers (Ramnewall, 2020). Such large proportions of the total market manifest the extensive use of leasing and how important it is as a financing alternative for the automotive industry. However, for the lessors there are great risks with this form of financing, particularly the calculation of guaranteed residual values (Erdem & Sentürk, 2009; Lessman et al., 2010; Prado, 2009b). We examine the issue of residual value calculations through a single case study at a company, referred to as Financier AB. We contribute with an operational perspective regarding how this risk is being dealt with in practice which provides insights in how residual value measurement uncertainty is handled at an operational level.

The residual value risk has become more prominent as leasing has grown as a financing alternative and as the car industry is in a time of change (Kirkland, 2019). In recent years, the car industry has been characterized by a rapid pace of technological change, which has been distinguished by innovations in e.g., user systems and security (Capital Lease Group, n.d.; Kirkland, 2019). However, the biggest change is the development of substitutes for the traditional combustion engine (Capital Lease Group, n.d.; Kirkland, 2019). The rapid technological development has meant that the technology in a car that has been leased for 36 months can be outdated when it is returned. This is evident for Tesla which had an energy density in its batteries around 150 wh/kg in 2017 (Kristensson, 2018), while the corresponding figure during 2020 was 260 wh/kg (Jin & Yamazaki, 2020), an increase of

almost 75%. A lot is happening in the automotive industry and McKinsey (2020b) reports that the biggest technological shift waits around the corner. A rapid technological change would logically increase the depreciation rates of new cars as the technology becomes outdated faster. These signs can already be seen with electric cars. Halvorsson (2019) presents that an electric vehicle loses 56.6% of its original values in three years while the average car loses 38.2% of its original value in the same time period.

The rapid development has caused uncertainty and contributed to the assessment of residual values being unreliable, as estimating a car's residual value is a matter of predicting a future value at lease end. The leases we look at in this thesis are operating leases from the perspective of the lessor. In the chosen case company, the operating leases are classified as property, plant and equipment in accordance with IAS 16. In the balance sheet, the lessor has to determine the value of the asset. The value consists of the estimated residual value plus incoming leasing fees, discounted to the balance day (Financier AB annual report FY 2020). In line with IAS 16 and IAS 36 (IFRS 2021a; IFRS 2021b), these assets must be tested for impairment if there are indications that the recoverable amount is lower than the carrying amount. The recoverable amount is the highest of the assets fair value, less costs to sell, and value in use (IFRS 2021b). Estimating a residual value has a similar measurement problem as valuing an asset at fair value when there is no active market for the asset. The similarity is due to the residual value being a future value with no verifiability towards an active market. The valuation of a car's future residual value has similar measurement problems as fair value calculations but differs as it follows different and less specified regulations. In our research, due to the shown similarity, it makes sense to think in the structure of fair value measurements when looking at how a lessor of cars handles residual value calculations.

1.2 Problem discussion

Managing the risk in a financial agreement is fundamental for all lessors. As a company who provides leasing of cars, there is, similar to a loan, a counterparty risk which should be appraised and priced in order to set the leasing rate (Schmit, 2004). Furthermore, another critical risk to consider is the risk associated with the prediction of the leased car’s residual value after the contract has expired (Erdem & Sentürk, 2009; Lessmann et al., 2010; Prado, 2009b). The residual value risk is specifically tied to the leasing industry and emerges because the financing form involves a future repossession of the asset. In order to set leasing

rates, the lessor must forecast the residual value a few years in advance, depending on the length of the agreement (Lessman et al., 2010; Prado, 2009b).

The residual value prediction by the lessor constitutes the basis for the leasing rate as it at least must cover the depreciation rate of the car for the lessor to not make a loss on the lease agreement (Prado, 2009b). When a lease agreement expires, the car dealer repossesses the car and will likely want to sell or re-lease the car again in order to continue gaining a return of the asset. The residual value risk is, accordingly, the possibility that the predicted residual value is higher than the re-sale or re-lease price of the car at lease-end. As the residual value is a future value, the residual value setting is a matter of pricing today's technology in the future. The current speed of technological change within the automotive industry contributes to the residual value determination becoming a financial decision which is characterized by high uncertainty (Kirkland, 2019).

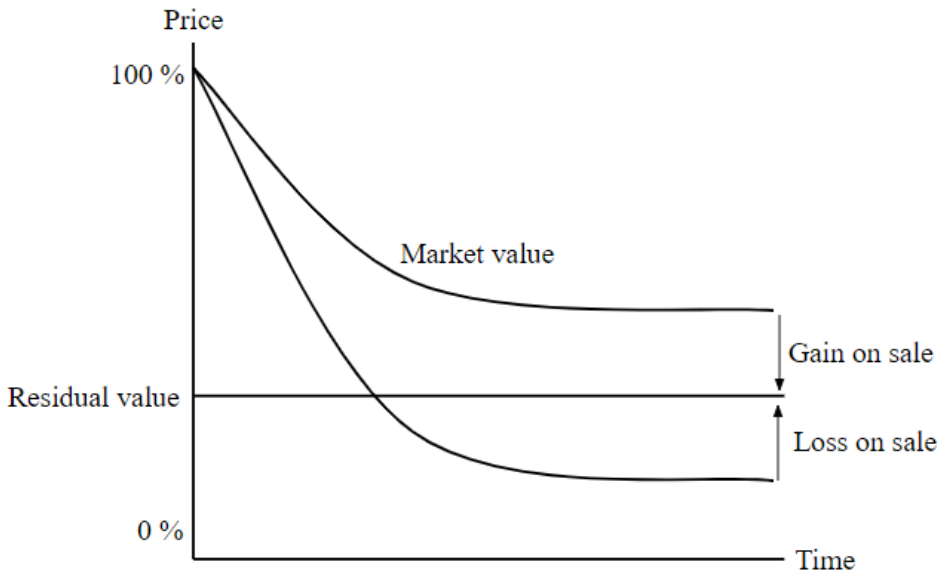

Figure 1. Residual value gain or loss (Prado, 2009a)

As the residual value estimation is about calculating a future value with no market verifiability, the measurement problem is similar to level 2 and 3 fair value calculations. However, the estimation of a future residual value is different as it follows different and less specified regulations. The use of fair value accounting literature in this thesis opens possibilities for analogous application and provides a new theoretical perspective on challenges and ways in which companies handle future value calculations. By looking at the residual value estimation in the context of fair value measurement, it could be argued that the

lessor has access to level 2 inputs for their estimation of residual values. There are no active markets for the future values of the cars but there are a lot of comparable transactions from earlier ended leases to proceed from. However, those cars do not necessarily reflect the cars of today, with respect to depreciation rate, due to the rapid technological development that has been (Halvorsson, 2019). This ambiguous reasoning puts the case of residual value estimations somewhere in the grey zone between level 2 and 3 valuation, when looking at it from a fair value perspective, a circumstance which makes it especially interesting to analyze.

Despite the evident risk for the lessor and that the residual value estimations are considered unreliable, there are surprisingly few studies that address how lessors actually deal with the issue of residual value estimations. Researchers have had a different approach towards solving the problem. They have presented forecasting models and ideas regarding how lessors should handle the issue of predicting future residual values in advance (Erdem & Sentürk, 2009; Lessman et al., 2010; Prado, 2009a). However, there is a lack of research which has had an operational approach to the issue and examined how lessors actually handle the problem of estimating a future residual value in reality. Consequently, there is a research gap which we intend to contribute to. By providing an operational perspective of the issue, new ideas and dilemmas, which quantitative research do not consider or recognize, might be introduced to the research field. These insights from an operational perspective contributes to filling the gap and serves well as a complement to existing literature.

1.3 Purpose of the study & research question

The purpose of this thesis is to shed light upon how a lessor of cars practically handles residual value calculations. Previous research has been focusing on theoretical model development, while no attention has been given to how the issue of residual value calculations is being dealt with on an operational level. The findings of this thesis are intended to provide insights regarding how the problem is being dealt with in practice, which will enable researchers to further investigate how the found procedure can be improved. Based on existing literature and a start-up interview with the case company we have found four categories which are used to focus the study to relevant areas. These are developed in section 2.3 and consist of input, regulations, tools and evaluation. In order to fulfill the purpose of this study, we seek to answer the following research question:

How does a lessor of cars handle residual value calculations with regards to input, regulations, tools and evaluation?

The structure of the thesis is as follows: In the theoretical review, earlier research regarding residual value estimations and the fair value measurement hierarchy is presented. In the following section the chosen methodology of the thesis is described. In the fourth section the empirical material is presented and given meaning to, followed by a discussion in the next section where the findings are presented in relation to existing research. Lastly, a conclusion is formed where the main contributions are presented along with a future outlook.

1.4 Delimitations

In this thesis we have chosen a research approach that comes with some delimitations. The first delimitation concerns the chosen research design of performing a single case study and thereby solely looking into one company. However, this delimitation was considered necessary in order to obtain the depth necessary to fulfill the purpose of the study. Secondly, the structured content analysis conducted in this thesis involves the development of categories which steer the focus of the study. Hence, the scope of the study is delimited by only looking at these categories of data. However, this delimitation was seen as unavoidable in order to be able to examine the categories profoundly. The categories were carefully chosen based on previous research, reasoning and a start-up interview with Financier AB, which speaks to the relevance and focus of the study. Throughout the study we have also reflected about the categories applicability and concluded that they work well and cover the area of interest.

2. Theoretical review

In this section earlier research on the field is presented. Firstly, previous research regarding residual value estimations is described. Secondly, the fair value measurement hierarchy is reviewed. Lastly, an analytical framework is developed and presented based on previous research, reasoning and a start-up interview with Financier AB.

2.1 Previous literature on residual value estimations

The uncertainty regarding the estimations of a future value for a car constitutes a problem for the lessors within the automotive industry, an issue which many researchers recognize (Erdem & Sentürk, 2009; Lessman et al., 2010; Prado, 2009b). Lessman et al. (2010) describe the issue regarding over- and underestimation of residual values as follows; if the lessor overestimates the residual value it will result in lower leasing rates being given to the lessees, which will economically hurt the business at lease-end when the re-sale price is lower than anticipated. If the lessor instead underestimates the residual value, leasing rates will be higher, which likely will prevent the customer from accepting the lease in the first place. This dilemma is what creates the relevance of this study and makes the residual value estimation crucial for the lessor.

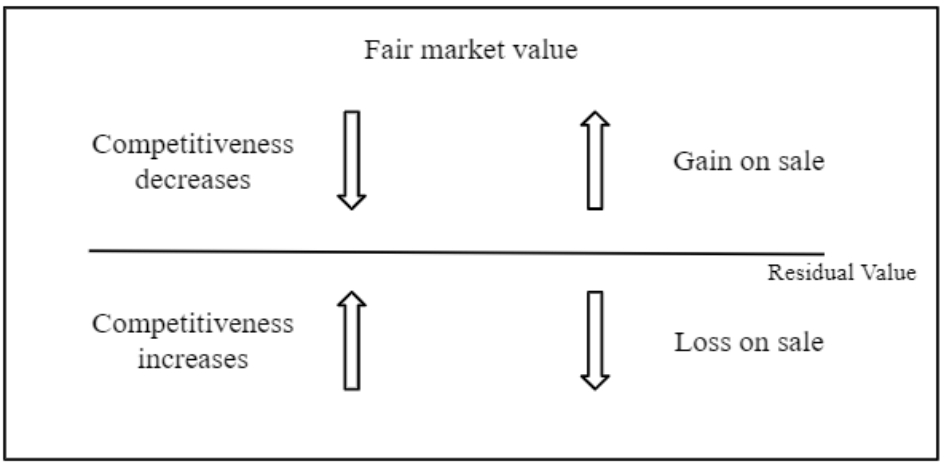

Figure 2. Dynamic benefits (Prado, 2009a)

The problematic situation has resulted in researchers attempting to develop tools to handle the problem. As the aim of the thesis is to provide insights regarding how residual value calculations are dealt with at an operational level, it is meaningful to understand with what kind of tools earlier research suggests that the residual value should be determined. Gleue et

al. (2017) presents one method that can be valuable in the process of determining a fair residual value. They point out the possibility of using comparable transactions from previously completed leases when setting the residual value. Handling the issue with the use of comparable transactions is in accordance with the procedure when handling a case of fair value with level 2. Other researchers have attempted to develop models that are intended to be used as decision support to the estimation of residual values of leased cars and by that, mitigate the residual value risk (Erdem & Sentürk, 2009; Lessman et al., 2010; Lessman & Voss, 2017; Prado, 2009b). Handling the issue with the use of modeling and assumptions is in accordance with the procedure when handling a case of fair value where only level 3 input is available. Erdem & Sentürk (2009), Lessman & Voss (2017) and Prado (2009b) all developed hedonic regression models which measure to which extent different car characteristics affect the residual value of the car. Lessman et al. (2010), on the other hand, used a forecasting tool which incorporated a support vector regression.

Existing literature on the field has brought up several different input parameters as useful when determining the residual value. Lessmann et al. (2010) presents the brand of the car, mileage and age as the most influential parameters on a car's residual value. Furthermore, they also explain that more deep-laid characteristics such as special-equipments, color and type of cushion can influence how the value of the car is developed. Further, Lessmann & Voss (2017) investigated different regression models that estimate residual values. They find that the forecast accuracy differs a lot depending on the model of the car and that there are many competing factors, such as mileage, engine type and special equipment that needs to be considered in the price prediction models. Overall, they find that the more factors a model considers, the more accurate the model is. Prado (2009b) concludes age, mileage and brand to be important factors. Furthermore, Prado (2009b) also presents equipment characteristics such as engine power and the number of seats as significant effects on the resale price of the car. Erdem & Sentürk (2009) find that the production year of the car is the most influential factor while characteristics such as the number of services, automatic transmission and black or grey color also affect the value of the car. Prado (2009b) also acknowledges that parameters which are considered as equipment of the car are subject to change over time due to changes in preferences and that luxurious interior and exterior parts become part of the standard equipment.

Baltas & Saridakis, (2009) reports that the range of different types of cars has increased in Europe, the vast majority of car brands have models in different market segments. This development has resulted in the consumer choice now being wider than ever. This ample set of different car types have prices that differ widely (Baltas & Saridakis, 2009). Andersson (2005), Reis & Santos Silva (2006) & Couton, Gardes & Thepaut (1996) finds that price variation is due to differences in horsepower, engine capacity and safety features. These researchers all used hedonic regression models to look at different car characteristics in order to explain the difference in price between cars. However, according to Baltas & Saridakis, (2009), one can, by looking at the car market, see that prices differ between segments and brands for otherwise equivalent cars. Baltas & Saridakis, (2009) conclude that car market segments, such as luxury or family cars, are heterogeneous enough to allow for price discrimination, where high-end segment involves a price premium for the car. Lastly, they conclude that the brand itself also affects the price structure of a car, where some manufacturers have a car-brand premium.

Lian, Zhao & Cheng (2003) argue that lessors need to evaluate both long run and short-term effects when deciding the residual value. Long run effects include factors such as brand appeal, quality and customer satisfaction while short term factors are e.g., quantity of the same kind of vehicles on the used car market and potential new models of the car that enters the market. Hence, Lian et al. (2003) argue that lessors need to take both car specific information as well as other factors such as supply and demand mechanism into consideration before setting the residual value. Jerenz (2008) shortly mentions life cycle, market demand and global trends as factors to consider. Jerenz (2008), Prado (2009b) and Lessmann et al. (2010) recognize that there is also a lot of implicit information that also affects the future value of a car. Any information that affects selling prices at the market would be of interest, macroeconomic information is therefore also informative when predicting the future residual value. However, these implicit parameters are not emphasized as the main focus of each of their studies.

Lessmann et al. (2010) recognize a thoughtful perspective on the matter. With too many factors which affect the residual value being available and due to our cognitive limitation of processing information, people will turn to simple heuristics to do the estimation. Resulting in the analysis becoming less comprehensive and not as informative as it could have been. What Lessmann et al. (2010) describes is a case of bounded rationality. The theory regarding

bounded rationality describes that when people are evaluating decisions, their rationality is limited by factors such as cognitive limitations and the time and resources available to make the decision (Simon, 1982). Therefore, humans seek to make a satisfactory decision rather than an optimal decision where all costs and benefits are accounted for. Lacetera, Pope & Sydnor (2012) reports that these kinds of simple heuristics lead to mispricing in the used car market. As the car apparently has a lot of factors which affect its future residual value, the perspective concerning cognitive limitation is valuable to recognize as a potential explanatory factor to what is found in the empirical material.

2.2 Fair value measurement hierarchy

Since we in this study, to some extent, use fair value measurements as a theoretical perspective on residual value estimates, it makes sense to describe the essence of fair value measurement regulation. The use of fair value measurement litterature, to theorise around the challenges and ways in which companies handle the future value calculation, is due to the residual value being a future value which shares some parts of the measurement problems with valuation at fair value. However, the residual value estimation is not specifically governed by IFRS 13 and these levels of inputs do not necessarily have to be used by the lessor. Due to the similarities, which will become apparent in the result of the thesis, between the fair value measurement input levels and how the case company values their leasing object, it makes sense to think in the structure of fair value measurements when looking at how a lessor of cars handles residual value calculations.

IFRS 13 (2021c) contains a fair value measurement hierarchy which classifies into three different levels of how to value an asset or liability at its fair value. The amount of available information for the specific asset or liability determines which level it should be valued at (IFRS, 2021c). As input is one of the key elements in this thesis it is important to understand how the verifiability of the input affects the reliability. Level 1 inputs are identical assets and liabilities that are traded on an active and liquid market which can be found at the date of measurement (IFRS, 2021c). If that is the case, the instrument is considered to have a reliable and fair market value and can be valued with level 1 input (ibid). According to IFRS 13 (2021c) level 2 inputs can be divided into four categories. The first category represents similar assets or liabilities in active markets with quoted prices. The second category includes quoted prices in non-active markets where identical or similar assets/liabilities are traded. The third category involves other kinds of inputs that can be attributed to the asset or liability,

such as interest rates or credit risks. The fourth category of inputs are observable market data. To determine the fair value of such instruments, estimation is needed and several parameters such as market conditions and comparable instruments have to be taken into account (Enahoro, Jayeoba, 2013). Level 3 inputs are assets and liabilities that are characterized by being illiquid (IFRS, 2021c). These inputs may include information that cannot be derived from observable market data (IFRS, 2021c). Furthermore, the estimates are usually made with some kind of model and since there is a lack of observable data, subjective judgment is often used to value these assets and liabilities (Enahoro & Jayeoba, 2013). Schmidt Bies (2005) argues that the valuation at fair value of non-liquid assets is unreliable due to the possibility of management bias in the models and judgments. Runesson, Samani & Marton (2018) further presents that there are expected estimation difficulties in thin markets where non-financial assets are valued with level 2 and 3 inputs. An example of how this portrays in a business setting is presented by Riedl & Serafeim (2011) who find that companies with greater exposure towards level 3 valuations get penalized with a higher cost of capital due to the increased risk.

Estimating a residual value has a similar measurement problem as valuing an asset at fair value when there is no active market for the asset. The similarity is due to the residual value being a future value with limited verifiability towards an active market. There are no quoted prices on any active markets for what the residual value of a specific car model with specific characteristics will be when its leasing agreement has expired (Lessman et al., 2010; Prado, 2009b). However, lessors have access to earlier predictions which are evaluable as those lease agreements have ended (Gleue et al., 2017). This would indicate that there are a lot of comparable transactions to draw from and hence, a matter of level 2 input. On the other hand, it could be argued that the cars which are being leased today are not comparable to cars a few years ago due to the differences in depreciation rates and are therefore a matter of level 3 input (Halvorsson, 2019). The estimation of a future residual value would therefore be seen as somewhere in between level 2 and level 3 valuation, in the context of fair value measurement.

2.3 Analytical framework

This thesis follows the process flow of a structured content analysis presented by Mayring (2008). The structure starts with defining an item for analysis, which in this case is the residual value estimation. Thereafter categories and the structure between them should be

defined and described, this is what is done in this section of the thesis. The categories we have defined and developed below are input, tools, regulation and evaluation. After the empirical material has been retrieved, the next step is to go through the material and extract the findings into the structure of categories. At this point in the framework by Mayring (2008) the category system is given meaning to, based on the retrieved empirical material. Lastly, the result is formated and presented.

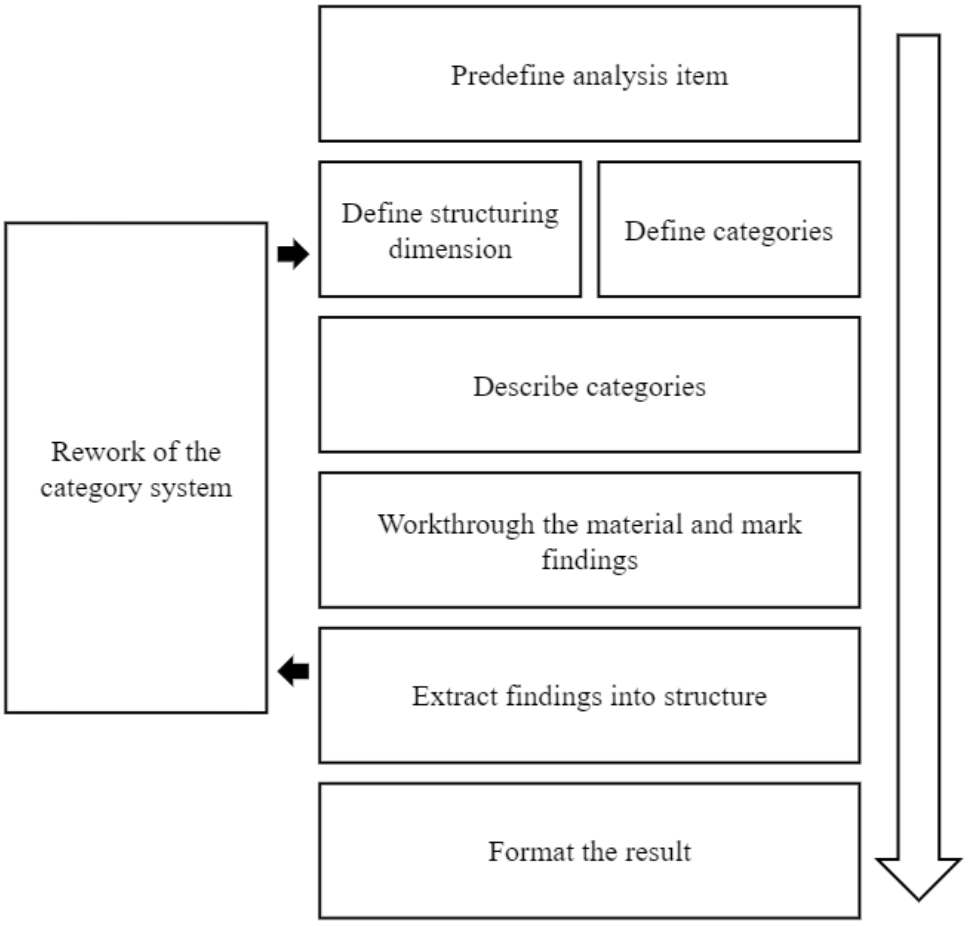

Figure 3. Process flow of a structured content analysis, Mayring (2008)

The categories and the structure between them will now be established and they will be referred to as the analytical framework. The framework represents our preconceived notion of what the residual value estimation process might look like within the case company. It is based on earlier research from the theoretical section, the start-up interview and logical reasoning regarding aspects that likely would be part of and affect the process.

2.3.1 Input

The first section of the model involves the input which is being taken into account for the estimation of the residual value of a car. The input can be seen as the main ingredient in the value estimation. The raw data and the parameters which are considered in the estimation will directly affect the subsequent procedure and finally, the output. The input also determines how reliable the output will be (Schmidt Bies, 2005; Riedl & Serafeim 2011). Thereby, it is relevant to have input as an initiating component in which the analysis and discussion will derive upon. As presented earlier in the theoretical section, there are a number of different car characteristics, both in terms of performance and design, that have proven to significantly affect the residual value of a car (Erdem & Sentürk, 2009; Lessman et al., 2010; Prado, 2009b). As the objective of the estimation is to conclude an accurate value of a car on the used-car market a few years in advance, macroeconomic market conditions are also a kind of input that is reasonable to consider. The information value of market conditions is strengthened by Lessman et al. (2010) and Prado (2009b). All these findings constitute a scientific motivation to include input as a factor in the framework for analysis.

2.3.2 Tools

When the company is going to carry out the valuation, they will certainly use different kinds of tools in order to make it as profound as possible. Tools can in this case be different valuation models based on the car specific input mentioned in the earlier stage, such as the regression models developed by Lessman & Voss (2017) and Prado (2009b). Comparable transactions from earlier ended leasing agreements could also be a relevant tool to use in the valuation, as suggested by Gleue et al. (2017). Both these two tools would logically be used as decision support to their estimation of future residual values. Gleue et al. (2017) further argues that corporations are inefficient in using their available in-house data. They argue that companies need to be better at structuring and integrating their data in order to make better business decisions. Therefore, such patterns also might be present at the case company.

Due to the absence of an active market for future residual values of cars and in accordance with the fair value hierarchy it is likely that the case company will include various assumptions as an ascending point in their procedure of estimating a residual value. These assumptions will probably constitute a larger part of the residual value estimation when dealing with new electric cars or equivalent objects.

Another kind of tool that could be used is various control mechanisms. They would logically be used to make sure that the set procedures are being followed and that the quality of the estimation turns out as intended. It is recognized among researchers that companies rely on several different control mechanisms (Abernethy & Brownell, 1997; Malmi & Brown, 2008). It is likely that control mechanisms are present at the case company in their estimation of residual values and are therefore of interest for the analytical framework of this study.

2.3.3 Regulations

The third factor of the process is regulations. Possible regulations constitute a framework and determine within what boundaries the valuation process itself can be shaped. Regulations must, by their nature, be complied with and are accordingly an influential factor regarding how the process of estimating a residual value is constructed. There is not much research on regulations within the context of residual value estimations, however, after the start-up interview with the case company, it became obvious that regulations are an important part of the processes and therefore it is considered important to include in the analytical framework.

Regulations in the case of residual value estimations may include both external and internal guidelines. Externally it could be legislation for how residual values should be treated. The introduction of Bonus Malus showed how substantially external regulation can affect market movements in the car market, and subsequently the lessor (Bergman, 2018). Regulations also concern financial reporting regulation such as how lessors should account for the residual values in their financial statements with e.g., impairments. As the lessor must comply with regulations, it is reasonable to believe that it influences their daily tasks as well. Internally it could be policies or a code of conduct which affect how the procedure should be run or how large risk or exposure they are willing to bear.

2.3.4 Output & Evaluation

The next stage in the framework is output, where a residual value is determined. Using data from the inputs along with support from the other categories, a residual value can be set. Output is only used in the analytical framework in order to understand the course of events, output will therefore not be analyzed further. After the contract has ended, the evaluation phase initiates.

The residual value is an important part for both parts of a contract, not least the lessor if the residual value is guaranteed. The lessor takes on a great economic risk when guaranteeing a residual value since it is a speculation of a future value of a car (Erdem & Sentürk, 2009; Jerenz, 2008; Lessmann et al., 2010; Prado, 2009a). There may be events affecting the residual value that the lessor cannot predict, hence, evaluation is an important part once the lease contract has ended. This is a phase where the lessor can evaluate why things went the way they did. What is concluded from this phase is taken into consideration for the next valuation of residual values.

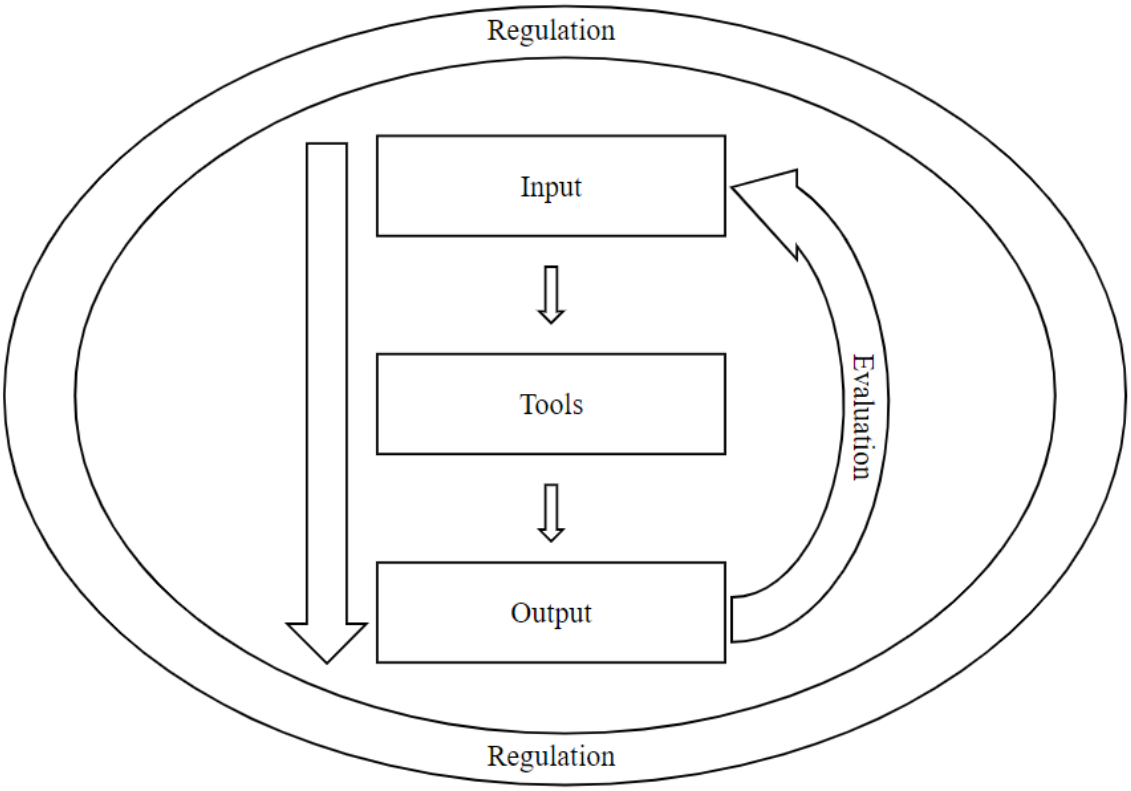

Figure 4. Analytical framework

3. Methodology

This section aims to describe and motivate the chosen methodology in the thesis. The chapter starts by explaining and motivating the research approach. Thereafter, the case company is described and motivated why it is a suitable research unit for this case study. This part is followed by a discussion of the data collection and interview selection. Subsequently, the procedure in which the empirical material will be analyzed and discussed is presented. Lastly, the quality of the research is discussed.

3.1 Research approach

This study aims to shed light upon how a lessor of cars, on an operational level, handles residual value calculations. A qualitative interpretive research approach was chosen for this thesis since it gave us the ability to understand and analyze the participant's view and reflections of complex situations in their social world (Bryman & Bell, 2015). Qualitative research focuses on the collection and interpretation of running text, oral explanations, and other non-numerical data (Bryman & Bell, 2015). It is commonly used in exploratory and descriptive research and values peoples' subjective experiences (Leavy, 2017). The chosen methodological approach was favorable since it created an opportunity to access in-depth answers from individuals who deal with the issue of residual values on an everyday basis. It also allowed us to organize and format the empirical data in a form which was deemed necessary in order to satisfy the purpose of the study.

To answer the purpose of the study, a single case study has been performed. A case study aims to provide in-depth knowledge of what is being investigated. It also investigates the phenomena of interest in its real-world context (Yin, 2014). Since the overall aim and the niche of this study was to provide an operational perspective of how residual value calculations are being dealt with in practice, a single case study was well suited for this purpose. Due to time constraints, it would have been difficult to include more companies in the study. Furthermore, there was a risk that the study would become one-dimensional if we investigated more than one company, as it could have prohibited us from investigating the issue profoundly, risking not being able to satisfy the purpose of the study. This approach is reinforced by Dyer & Wilkins (1991) who argues that a single case study generates higher quality content.

3.2 Research unit & design

The case study has been performed on a large company active within the financing of cars in Sweden and will be referred to as Financier AB as the identity of the company is not relevant to this thesis. The company has an ownership structure where a well-known car company owns 50 % of the company. The reasons why Financier AB is an appropriate company to perform a single case study on are multifold.

First of all, the company has a long history in the financing of cars. They have been active within the industry since the 1950s and they have offered leasing as a way of financing cars for a long time. They offer leasing as a product to customers in the business area fleet as well as to other customers seeking leasing as a financing alternative. The case company has offered financial leasing ever since the start in the 1950s, however, they started to offer operational leasing in the early 2000s. Operational leasing was of particular interest to us since that is where the case company offers guaranteed residual values in the contracts. The majority of their operational leasing agreements are found in the business area fleet, which means that managers within that business area have been of particular interest. Taking these factors into account, the company was seen as a suitable choice in the process of finding a lessor of cars with substantial experience in the area of interest.

Secondly, the company has succeeded in the transition from being at the office to working remotely. This made it possible for us to reach out to the company representatives. Subsequently, it was a decisive factor that we were able to conduct several interviews with people in management positions who are involved in the process.

A single case study was argued to be relevant considering that we have been investigating a practical question. The chosen method allowed the authors to retrieve in-depth information from relevant people in order to be able to satisfy the purpose of the study. In addition, it is argued to enhance both the structure and focus of the report. Furthermore, Yin (2014) means that a single case study is appropriate for reports looking into a case where the authors aim to study common situations in an organization.

3.2.2 Data collection

The utilization of a single case study design has enabled the authors to access large quantities of data from the case company. The retrieved data consisted of various primary and

secondary sources. The primary sources have consisted of semi-structured in-depth interviews with several managers at Financier AB AB. Secondary data sources have also been used and have consisted of documents on their website as well as internal documents. In order to ensure sufficient quality of the study, triangulation of data has been employed (Bryman & Bell, 2015; Yin, 2014). We interviewed several people at the case company and combined that data with internal documents to reduce bias in data and assure the overall quality of the study. Before collecting the empirical material, we had an initial interview with the Business Manager for the Fleet department who is responsible for the residual value estimations. This interview was held in order for us to get an initial understanding of the process, which helped us to structure the coming interviews.

3.2.2.1 Primary Data & Interview selection

The primary data was collected through interviews with several managers at the case company. All interviews were done through online video calls. We have interviewed several managers involved in the process of deciding residual values. The managers were chosen with the intention to provide a broad and nuanced picture of the residual value process at the case company. This approach is in line with Merriam (2009) who argues that the interview selection should be done purposefully. All interviews were based on the interview guide. However, since the interviewed persons were all managers for one area each, more focus has been put on that particular area of expertise in each interview.

The first interview was with the Business Area Manager for the fleet department who is the initiator of the case company's internal residual value estimation project. He has the internal responsibility of the residual value estimation process and was therefore able to provide us with an overview of their processes. Considering his role, he was also able to give reflective answers regarding how they reason when they determine residual values and the strategy which the process is based on.

Secondly, we have conducted an interview with the Group Manager Trading who is involved in the actual residual valuation process. He was therefore able to answer more detailed questions regarding how each step of the process is conducted and contribute with an even more practical view on the residual value estimation process. He was also able to answer questions regarding the issue and market- as well as model challenges.

Thirdly, we interviewed the Chief Risk Officer (CRO). As his role involves managing the risk in the company, he is concerned about the exposure that guaranteed residual values creates. He was able to provide answers about the risk parameters they take into account when they guarantee the value of a car in the future. The CRO was also able to provide insights about the regulations regarding residual values and how those effects and limits their processes.

We also interviewed the Chief Financial Officer (CFO) who was able to describe the challenges from a financial perspective related to residual value in car leasing. He was also able to provide insights regarding how they manage the risks in their financial statements with e.g., impairments.

Lastly, we conducted an interview with the Chief Operating Officer (COO) who is responsible for the credit assessment in the case company and was able to provide a good overall perspective on the bank's processes with interesting insights. We believed that these five persons have a lot of knowledge from different perspectives, which were of great help in gaining a good insight into how Financier AB AB handles the estimation of residual value of cars.

The interviews are specified in Table 1 below, where relevant information regarding each interview can be found, the interview guide is provided in the Appendix.

Interview	Date	Position	Length (min)
1	28/1 - 2021	Business Manager Fleet	30
2	19/2 - 2021	Business Manager Fleet	64
3	11/3 - 2021	CRO	60
4	19/3 - 2021	COO	50
5	19/3 - 2021	Trading Manager	60
6	8/4 - 2021	CFO	60

Table 1. Interview sessions with managers at Financier AB.

3.2.2.2 Secondary Data

The secondary data has consisted of internal documents and the case company’s financial reports. The internal documents were collected during the research process in relation to

interviews. One of the documents contains a selection of factors which Financier AB considers in their residual value setting. Another document contains a rough explanation regarding how Financier AB determines residual values. The internal documents have been used as a support to the primary data to strengthen the quality of the report.

3.2.3 Interview process

Before any interviews were conducted, we had a start-up meeting with the case company in order to get a deeper understanding of the company and its processes. The purpose of the meeting was to get an overview of which persons are involved in the processes of interest. The start-up meeting was considered necessary in order to establish a plan for when to hold the different interviews and what to focus on.

The thesis is based on semi-structured interviews. Semi-structured interviews are considered appropriate in case study research (Runeson & Höst, 2009). Furthermore, Bryman & Bell (2015) argues that a semi-structured interview approach is suitable for a case like this which investigates a specific topic. This interview structure was suitable since it provided us answers to the questions in the interview guide and at the same time gave the respondent great freedom to design their own answers and could thus convey their reality and reflections regarding the issue (Bryman & Bell, 2015; Martelli & Greener, 2018; Patel & Davidson, 2011).

Due to the current pandemic all interviews were held through online video calls. Doing the interviews on-site at their headquarters would have been optimal but we believed that online video calls were the best substitute to on-site interviews. Furthermore, we believed that the possibility to do online video calls made it easier to reach out to and get interviews with busy people in management positions.

The interview guide was prepared beforehand based on the analytical framework and was sent out to the respondents in advance in order to create opportunities for the respondent to answer as reflective and complete as possible, this approach is in line with Martelli & Greener (2018). All interviews were recorded after permission was given by the respondents. Recording the interviews provided a more accurate rendition of the interviews (Yin, 2014) and further strengthened the objectivity of the study. The interviews were held in Swedish since both we and the respondents were all native Swedish speakers. After each interview, we transcribed and translated the interviews. The translated material was also sent back to the

respective interviewee after each interview to confirm that the translation reflects the original version and that no misunderstanding had occurred. As case company specific information was of no value to the thesis, we decided to anonymize revealing information such as brand- and model names in the transcriptions. The interviews were held in the period between 28th of January and 8th of April.

3.3 Analytical process

In the analysis of the empirical data, we originated from the analytical framework developed in the theoretical section of the thesis. In the theoretical section, we started by developing categories which were mainly based on what areas previous literature covered. It was also based on logical reasoning together with insights from the first start-up interview with the case company. The categories and what we expected to find in each section were then described, examples regarding how they possibly could influence the residual value process were also presented. We also defined the structure and linkages between them. The categories were then tested on the interviews and in the result, we gave an operational meaning to each category. Lastly, when writing the discussion, we have, in accordance with Merriam (2009), gone back and forth between the empirical data and the research encompassing the issue.

Immediately after each interview, the transcribed material was translated. This was done in order to get a fair view of what was discussed during the interview. It was made with the belief that it would strengthen the overall quality of the material from the interview and avoid misconceptions in how things were framed during the interview. Once all interviews had been conducted and triangulated, we started to work through the interview material. The analytical process involved extracting relevant data from the retrieved material. The material was labelled into the different categories developed in the analytical framework. The objective with dividing the answers into different categories was to make it easier to see if any categories seemed to be more important than others and to distinguish important factors in each category. The data was then interpreted and described based on the analytical framework, which later served as the foundation for the discussion where the empirical material was discussed in relation to previous literature.

3.4 Research quality

To ensure the scientific quality of a study, reliability and validity is commonly used as measurements (Yin, 2014). According to Bryman & Bell (2015) and Jacobsen, Sandin &

Hellström (2002), it is most common to use these measurements in quantitative studies while trustworthiness is a better alternative when it comes to qualitative studies. Trustworthiness concerns the degree of confidence in the data, the method used, and the interpretations made (Connely, 2016). Trustworthiness is divided into four different criterions; credibility, dependability, confirmability and transferability (Bryman & Bell, 2015; Connely, 2016). According to Merriam (2009) trustworthiness also includes writing the thesis in an ethical manner. In order to achieve a high trustworthiness in the thesis, we followed recommendations, with regards to methodology, from established research articles and books.

As described in the Data Collection section, we used triangulation and searched for coherency between the primary and secondary data. This procedure of retrieving and verifying empirical data strengthened the credibility of the thesis (Bryman & Bell, 2015; Denzin & Lincoln, 2018; Yin, 2014). To improve the credibility of the thesis even further, we decided to use respondent validation in the process of retrieving empirical data. After each interview, the material was transcribed and translated into English. The material was then sent back to the research participant for him or her to review and make changes if anything was misunderstood. By doing so we were able to confirm that the empirical material reflected the true experiences and thoughts of the research participants. The chosen approach is recommended by Bryman & Bell (2015), Martelli & Greener (2018) and Merriam (2009) in order to increase the credibility in qualitative research. Respondent validation also helped us to stay neutral and objective between the answers of the research participant (Connely, 2016). Hence, the chosen technique also increased the confirmability of the study.

Dependability concerns the stability of the data over conditions and time. In order to improve dependability in a qualitative research study, Bryman & Bell (2015) and Connely (2016) recommend keeping records of what has been done and why it has been done in all phases in the research process. However, Bryman & Bell (2015) also notes that it is a very demanding process to do, and the popularity of the method therefore is fairly low. In order to cope with this issue and to strengthen the dependability to some extent, we have carefully explained the key process of the research methodology, namely whom to interview, what to observe and from which standpoints to analyze the empirical data.

Transferability refers to which extent the findings of the study are useful in other settings and can be generalized (Connely, 2016). A single case study was chosen as we wanted to understand a particular issue in depth. Qualitative researchers are also often criticized for

being difficult to generalize (Bryman & Bell, 2015). That a few people, in a certain organization and in a certain context should be able to speak for all other cases in other settings is questionable. This means that the scope of the findings in qualitative studies is argued to be somewhat restricted. However, some effort has been made in order to provide findings which are transferable to other similar settings. It was done by carefully describing the case company and which context it operates within. The managers interviewed and their relation to the issue has also thoroughly been described. The description helped understanding the nature of each respondent's answers and the differences between them. By providing a rich description of our case, someone in a receiving context could determine the similarities and the applicability (Merriam, 2009).

4. Empirical findings & analysis

In this section the empirical material is presented and given meaning to. The observations are based on the interviews conducted with managers at the case company. The findings are sorted based on the categories within the analytical framework in order to provide a structure which is easily followed.

4.1 Input

When Financier AB determines future residual values, they use a variety of different inputs (Business Manager Fleet, 2021-02-19; CRO, 2021-03-11; Trading Manager; 2021-03-19). They themselves recognize that there are an incredible number of parameters that come into play (CRO, 2021-03-11), in one of their internal documents it is described as a scientific field regarding how to estimate the correct value. Some parameters are directly linked to the car and its characteristics whilst others are more implicit. To begin with, the Fleet department, which internally are responsible for the residual value setting, base their estimations on the company's objectives and a budget with a performance goal (Business Manager Fleet, 2021-02-19, COO, 2021-03-19).

> *"They should be in line with the goals we set, I have a calculation model in my budget for how much money we should earn and that is what we should start from when we set the residual value."* - Business Manager Fleet, 2021-02-19

The budget forms the basis and determines a framework for within what limits their residual values can be set. The budget and the objectives of the company therefore becomes an important input to proceed from when setting residual values.

A large part of the input that has been looked at in the case company is car specific characteristics such as model, time of the leasing contract, miles, engine, gearbox, technology and other equipment (Business Manager Fleet, 2021-02-19; CFO, 2021-04-08; CRO, 2021-03-11; Trading Manager; 2021-03-19). The time of the leasing contract and the miles the car has been driven are key factors in the deprecation of a car while engine, gearbox, technology and other equipment are central parts of the car's performance and hence its residual value. The brand is also a very influential parameter (Business Manager Fleet, 2021-02-19).

> *"For example, for a CARBRAND we only get X % of its original value when we resell the car, while we get X % on a CARBRAND on average."* - Business Manager Fleet, 2021-02-19

Financier AB have learned from previous experience that certain car brands generally retain a higher percentage value, in relation to its new price, than other car brands do (Business Manager Fleet, 2021-02-19; CRO, 2021-03-11). As a result, the brand becomes part of the foundation when they determine residual values.

In contrast to the parameters above, which logically are central to the cars price at the second-hand market, there are also minor details which Financier AB considers as input in their estimates.

> *"In this world, you could control the details down to the smallest screw if you had the system for it, to my knowledge, those systems do not exist. But color is definitely a part of it. In premium cars, for example, it is very sensitive to what color it is,..."* - Trading Manager, 2021-03-19

The color of the car is stated to affect the car's value at the second-hand market and is a parameter that could be important when dealing with premium cars (Trading Manager, 2021-03-19). Financier AB also recognizes that the residual value estimation could be controlled down to the smallest details of a car with the right system, but to their knowledge those systems do not exist (Trading Manager, 2021-03-19).

Financier AB also highlights the importance of soft values that are related to the car when assessing its future market value (CRO, 2021-03-11; Trading Manager; 2021-03-19). For example, a manufacturer's warranty affects how attractive the car will be on the secondary market (Trading Manager, 2021-03-19).

> *"Then you must of course check for goodwill and guarantees in the product which also affects whether it is a good product that we can have good residual values on or is it a product where we have a general agent who does not have such a good reputation in the market."* - Trading Manager, 2021-03-19

The goodwill and reputation of the model and the brand are also soft values that Financier AB considers as influential to the value of the car (Trading Manager, 2021-03-19). Hence, they also take these types of elements into account when doing the estimation.

Where in the life cycle the car is positioned is also a parameter which has been mentioned as very important during the interviews (Business Manager Fleet, 2021-02-19). Whether it is a

completely new product or a product that is 4 years old makes a big difference in how Financier AB treats its future residual value (Business Manager Fleet, 2021-02-19).

> *"This is very simple, the residual value is governed by supply and demand. It is not harder than that. If you have a product that is in demand, you can get paid well if there are not that many to buy out there."* - Trading Manager, 2021-03-19

If Financier AB leases out a car model that is brand new and that has just become available to order, they know that when they get it back in 3 years, it will be one of the first cars of that model that is available on the second-hand market. This condition usually means that its residual value can be set a little higher than under more normal conditions (Business Manager Fleet, 2021-02-19). The opposite applies when it is a car that is at the end of its life cycle. For example, if the model is already 4 years old, it will be 7 years old when it is returned to Financier AB and will be sold at the second-hand market. In such a situation, it becomes relevant to set a lower residual value as there will probably be a fairly large supply of that product on the used market (Business Manager Fleet, 2021-02-19). In other words, there is a supply and demand mechanism that becomes highly relevant to keep in mind (Business Manager Fleet, 2021-02-19; Trading Manager, 2021-03-19).

The supply and demand factor is emphasized as a very important input and is contextualized in many different situations (Business Manager Fleet, 2021-02-19; Trading Manager, 2021-03-19). Financier AB explained that supply and demand considerations are especially important to deal with when they have larger customers ordering many identical cars at the same time (Business Manager Fleet, 2021-02-19).

> *"For example, we have a customer who changes all his company cars every three years. Then there are 100 white CARMODEL at the same time. We fine-tune that deal based on the conditions as it means that we also get back 100 white CARMODEL at the same time. Which then means that we will have an increased supply of white CARMODEL on the used market, which means that they are not as attractive."* - Business Manager Fleet, 2021-02-19

The essence of the quotation is that all these 100 cars will return to Financier AB and be sold on the second-hand market at the same time. The result of this is that there will be an extra large supply of that model on the market and prices will be squeezed. In order not to make a big loss on that deal, such aspects must be taken into account when setting the residual values for those cars (Business Manager Fleet, 2021-02-19).

Another situation where it also is extra important to concern the supply and demand mechanism, is when new regulations are entering the leasing market (Business Manager Fleet, 2021-02-19; Trading Manager, 2021-03-19).

> *"Everything that our politicians decide on in questions regarding what happens to benefit values, car taxes, fuel, etc. is a very important parameter to include."* - Trading Manager, 2021-03-19

Regulation can temporarily shift market demand and generate high peaks and low valleys (Business Manager Fleet, 2021-02-19). Since "Regulation" is such an important aspect regarding how Financier AB sets its residual values, it has its own section. Input related to regulations will therefore be discussed in more detail under that section.

Regarding the supply and demand mechanism, Financier AB emphasizes the importance of finding a balance between how many cars they lease out for a limited time period and how high residual values they can set for those cars (Business Manager Fleet, 2021-02-19).

> *"We can see when in periods there is a very large buying pressure on new cars such as now, a lot of cars are ordered thanks to the regulation that is in place. It is of course fun to sell a lot of cars but what we have to keep in mind is that in the long run all cars ordered will come back at about the same time for a limited period. This means that either we will have too high used-car stock during that period, which will result in us probably getting little less paid for those products. On the other hand when the buy pressure is lower it means that we will have a smaller inflow of used cars during the period that those cars come back, which makes us safer and it gets easier to perhaps push up the price."* - Business Manager Fleet, 2021-02-19

The quotation essentially means that a boosted car sale now would lead to a flooded second-hand market in three years, and vice versa. The balance between these two interlinked factors is a qualitative aspect which is important to consider in order to succeed when setting residual values.

The rapid development and the large expansion of electric cars at the market has temporarily created greater residual value risk for Financier AB for several reasons (Business Manager Fleet, 2021-02-19; Trading Manager, 2021-03-19). Firstly, the product requires an extensive investment in infrastructure, it is also clearly more expensive than comparable alternatives with a different driveline (Trading Manager, 2021-03-19). It is further a completely new product where there are limited statistics with comparable transactions and it is not really

known how the secondary market will react to it (Business Manager Fleet, 2021-02-19; Trading Manager, 2021-03-19).

> *"Yes, it has become more difficult based on the fact that no one really has the answer to how the second-hand market responds to electrification. It is a completely new world and a completely new infrastructure that needs to be taken care of. It is also a product that is significantly more expensive than the other cars."* - Trading Manager, 2021-03-19

These factors together make it difficult to assess how high the demand will be for three-year-old electric cars. Whether it is a fossil or electric driven car is therefore a major parameter in the residual value setting (Trading Manager, 2021-03-19).

The reasoning and the inclusion of soft values in the residual value estimation has been emphasized as a crucial part in order to set an accurate value (CRO, 2021-03-11; Trading Manager, 2021-03-19). In the interviews held it has been pointed out that the statistics only say a certain part and that soft values and qualitative aspects need to be considered (CRO, 2021-03-11; Trading Manager, 2021-03-19).

> *"The statistics say a certain part, if we say that a CARMODEL in 3 years will be worth X kr according to all possible tools, but everyone knows it will not be true, because the CARMODEL will get a new layout next year, and then we know that the old one will decrease in value. We must therefore take qualitative aspects into account, but of course we have as much support as we can."* - CRO, 2021-03-11

Qualitative aspects could be factors such as the manufacturer's reputation which was brought up earlier (Trading Manager, 2021-03-19). Information regarding a new layout on an upcoming model could also be input that would change the valuation of a car (CRO, 2021-03-11). The belief Financier AB themselves have developed about the product's future based on their extensive contact with car dealers in the market is also a parameter that is important to take into account (Business Manager Fleet 2021-02-19; CRO, 2021-03-11; Trading Manager, 2021-03-19). The assumptions and estimates Financier AB conclude from their market analysis, which is described in tools, are also included as input.

> *"There are a lot of assumptions you have to make. It is the same with, for example, diesel fuel prices. How will fuel prices look like in three years for a diesel car? They have probably increased which will press down prices and buyers will be forced into buying electrified cars… We document what assumptions we make. I would say it improves the reliability, but it is not measurable for an analyst. That is why we have experts in our residual value council, otherwise we could have had an AI robot that sets the values for us"* - Business Manager Fleet, 2021-02-19

These assumptions are made to a greater extent on cars where there is not much historical data to proceed from and they consider how attractive a specific model will be at the end of the agreement (Business Manager Fleet, 2021-02-19). In order to get to that assumption other speculative estimates have to be done such as how legislation regarding fuels will change. The assumptions are argued to be necessary and to improve the reliability of the residual value setting (Business Manager Fleet, 2021-02-19).

In addition to all this input, there are also strategic and competitive input factors that play a major role in what residual value is set on the cars Financier AB leases out (Business Manager Fleet, 2021-02-19). To begin with, Financier AB has a pricing strategy where they do not aim to be the cheapest as they do not offer the same product as the competitors, they offer their product and a little extra and the product should therefore be priced accordingly (Business Manager Fleet, 2021-02-19; CFO, 2021-04-08). This strategy of the company is naturally considered in their operations and therefore also the setting of residual values.

Financier AB also has a large influence in which cars are sold well and which are sold poorly on the market. For example, if they themselves do not believe in a model and set a low residual value on that car, the car will be expensive to lease and customers will not choose the model (Business Manager Fleet, 2021-02-19). Financier AB is thereby an important piece of the puzzle in order for their owner to sell a lot of their cars and keep their residual values at a high level (Business Manager Fleet, 2021-02-19). The owner's objectives are therefore taken into account when setting residual values. If a competitor would set a low residual value on a car of Financier AB owner's brand, Financier AB would react with a counter-offer with a higher residual value which would out-compete the competitors offer (Business Manager Fleet, 2021-02-19).

> *"The car manufacturers hate that we have this power factor. This is also why we are so important for OWNER, because we are their stress factor against the other fleet companies so that they will not be able to hamper OWNER's models. Because if they start doing that, then a counter-offer will come faster than the eye from our side that shows them at what levels the residual values should be. That's why CARBRAND has its finance company with FINANCIER, CARBRAND has FINANCIER and that CARBRAND has FINANCIER. They have to have a stress factor in the market to keep their own residual values at level, because it is incredibly important for their sales."* - Business Manager Fleet, 2021-02-19

Financier AB emphasizes that it is thanks to this power factor that each car brand has its own financing company (Business Manager Fleet, 2021-02-19). If each brand would not have its own financing company, other financing companies could set low residual values for their competitor's brands. Having a financing company is important to keep its own brand's residual values at a high level, which is important to generate sales (Business Manager Fleet, 2021-02-19).

4.2 Tools

In the residual value estimation process, Financier AB uses several different tools to support the process of setting an accurate residual value. They use comparable transactions, a weighted subjective assessment of other input and valuations from outside parties to support their decision making. They perform market screening and market analysis in order to gather information. Lastly, they have tools within both the first and second line of control.

The residual value process starts once a new model is ordered (CRO, 2021-03-11). After the new model is ordered Financier AB develops templates for the residual values for that particular model. The residual value council takes a closer look at the proposed templates and approves them. The case company stores all the information in a database that contains information about what applies to a certain brand and model which then acts as a foundation when setting residual values (CRO, 2021-03-11; Trading Manager).

When Financier AB is to determine a future residual value of one of their cars, they go ahead by using an external tool (Business Manager Fleet, 2021-02-19; Trading Manager, 2021-03-19). The tool they use is that they purchase valuations of forecasted residual values by a third party. All cars with an active agreement are included in the valuation report, however, Financier AB also buys reports of cars where a residual value has not yet been set to support decision making.

> *"We also take in objective assessments in the form of external valuations, what is their forecast value in 3 years for this car as an objective party."* - Business Manager Fleet, 2021-02-19

The valuation reports are bought to get an objective opinion about the estimated value of each specific car at the end of the contract (Business Manager Fleet, 2021-02-19). The valuation report is based on information about the car brand and model along with contract-specific information such as time and mile (Trading Manager, 2021-03-19).

The case company also uses an internal tool to combine with the external tool. The use of comparable transactions is a major tool in the residual value setting, that is, they look at the output from previous agreements on similar cars (Business Manager Fleet, 2021-02-19; CRO, 2021-03-11; Trading Manager, 2021-03-19). Comparable transactions as a tool to determine a value works well on established models where there is a sufficient amount of previous data (Business Manager Fleet, 2021-02-19). The reason for this is partly because some models tend to make a value loss which is at about the same percentage level as the previous year's edition (Business Manager Fleet, 2021-02-19).

> *"Statistics are not better than its data unfortunately. For example, with a CARMODEL or an old CARMODEL or a CARMODEL there is a lot of statistics, so the statistics would probably have been quite accurate. Then there are the new models entering the market, for example, all electric cars that come now there are no statistics at all. There are odd brands, for example CARBRAND which was a 1% brand six years ago is now a 3% brand. There are not many statistics on used ones yet, how should we value them?"* - Business Manager Fleet, 2021-02-19

In contrast, it does not work as well with odd models (Business Manager Fleet, 2021-02-19; CRO, 2021-03-11), or models with unusual characteristics such as odd color as there is not as much data on those types of cars (CRO, 2021-03-11). Accordingly, the more historical data available, the easier it will be to put a reliable residual value on a car (Business Manager Fleet, 2021-02-19).

> "*This is the case, for example with electric cars, since there are no statistics on electric cars, it becomes very speculative and a higher risk for such a product. Then it is based on what we believe and what the outside world thinks about the products and it will then be a different type of assessment of such a product."* - Business Manager Fleet, 2021-02-19

Electric cars also belong to a category of cars where you cannot use comparable transactions as the number of those are very limited. On these types of cars where it is not possible to use comparable transactions, there will be a lot of speculation and higher risk. (Business Manager Fleet, 2021-02-19; CRO, 2021-03-11).

> "*We are now in a period where we are switching to electricity, where it has been much more difficult to set residual values, there means a greater risk but then we set a larger margin*." - Trading Manager, 2021-03-19

When there is no or little available history from previous agreements, Financier AB acts defensively and sets low residual values and thus has a higher margin on each agreement.

(CRO, 2021-03-11; Trading Manager, 2021-03-19). This defensive strategy is being used to a higher degree as electric cars are becoming more and more popular.

Financier AB does not use any in-house statistical model as a tool to support their residual value setting (CRO, 2021-03-11). They have done regression analyzes on historical data and found that 5 to 10 variables can explain about 90% of the difference between the market value and the residual value (CRO, 2021-03-11). However, they have not tried this model when setting new residual values. The CRO emphasizes that there is a big difference between using the model on historical data and making a forecast in three years (2021-03-11).

> *"When you have to make a forecast in three years, no one dares to say that those variables are true for the future, because it is a picture of how it has been before. So, the question is whether you dare to use it to forecast ahead. So, there always is a risk of making statistical forecast models."* - CRO, 2021-03-11

All the information in the input section is therefore not structurally used (COO, 2021-03-19; CRO, 2021-03-11; Trading Manager, 2021-03-19). Instead, they conduct a consolidated intuitive assessment of all the parameters in order to conclude how the parameters combined affect the residual value (Trading Manager, 2021-03-19). As stated, the case company uses comparable transactions as a tool to see the history of a certain model when setting new residual values, but this is also not done in a structured way. (CRO, 2021-03-11).

> *"I do not know exactly to be honest but I would say that one factor is that residual value setting is too much "finger in the air" and too little data driven."* - COO, 2021-03-19

This way of handling all that data is thereby quite subjective. However, the case company has an ongoing project at the moment to structure all the available data that they have available and make it more data-driven. (CRO, 2021-03-11; Trading Manager, 2021-03-19).

> *"It is about putting together all the data I'm talking about. At the moment we do not have that composition, but it would have been easier for us. Right now a report comes in an excel file from a supplier, one input is a quote from a competitor and another input is web-based from a third-party. If you could gather all this information down in one portal where you can more or less press in a model / mile / time and come up with a proposal based on all this data would be wonderful."* - Trading Manager, 2021-03-19

The project aims to enable a balanced assessment of the valuation from each tool and the input they have available (Trading Manager, 2021-03-19). Right now, the problem is that all data is gathered in different formats and they want to find a way to assemble all this data into

one portal and come up with a residual value more structurally (Trading Manager, 2021-03-19).

The case company also uses other types of tools in order to gain information about the market. To start with, they look at competitors' prices on websites where companies can publish sales advertisements such as Blocket (CRO, 2021-03-11). Furthermore, the business manager for the fleet department explains that they also use other online websites where they can obtain the pricing of competitors in order to see how the case company's pricing relates to other actors (Business Manager Fleet 2021-02-19; Trading Manager, 2021-03-19).

Financier AB also analyzes the market conditions on an ongoing basis (Business Manager Fleet, 2021-02-19; CRO, 2021-03-11; Trading Manager, 2021-03-19). The market analysis does not aim to analyze different macroeconomic factors, such as interest rates, and draw a conclusion upon that (Business Manager Fleet, 2021-02-19; CRO, 2021-03-11). It is rather about finding the factors that can specifically affect the car market's supply and demand in order to make assumptions out of that (Business Manager Fleet, 2021-02-19; Trading Manager, 2021-03-19). Furthermore, representatives from the case company meet all large suppliers and dealers on a regular basis to stay up to date on future model programs that each brand is planning to release (CRO, 2021-03-11).

> *"Then we have our employees who work with these issues and meet all large suppliers and dealers to see what upcoming model programs look like, as it could have a huge impact on the residual value for a given model. For example, if you know that they will present a new CARMODEL in a year, how will today's CARMODEL be priced in three years?"* - CRO, 2021-03-11

Upcoming model programs are an important part of the residual value setting as a new version of a given model could have a substantial negative impact on the residual value of the existing model (CRO, 2021-03-11). The market analysis is done to create their own estimate of what the market will look like in the coming years, but also to get a sense regarding how successful a certain brand, model, engine or color will be. The market analysis is not completely structured, it is rather based on what information Financier AB has received recently (Trading Manager, 2021-03-19). The aspects which are considered important are brought up for discussion when the residual value council meets.

The market analysis is also about discovering the major trends in society. For example, the trend that some customers prefer to use a car rather than owning a car was brought up during

the interviews (CFO, 2021-04-08; COO, 2021-03-19). It was mentioned as a shift in consumer behavior that must be considered in the assessment as it could decrease future purchasing willingness (CFO, 2021-04-08; COO, 2021-03-19). It is anyhow mentioned that this kind of shift does not happen over a three-year period (COO, 2021-03-19).

Another tool that Financier AB uses to ensure that external and internal rules and policies are complied with, is a risk control function. The risk control function has two main objectives. Firstly, it is to monitor that all cars, individually, and in total, are within the limits set by the board e.g., a three-year lease must have a residual value under a certain percentage of the original value (CRO, 2021-03-11). Secondly, it is to review the company's processes and make sure that things are done appropriately.

Financier AB has two lines of control to ensure that the residual values are set appropriately (CRO, 2021-03-11). The first line of control consists of controls such as random checks, where car agreements are randomly controlled to see that they are set within the limits. It also consists of having duality in certain processes and issues. The second line of control is where the risk function monitors the risk limits that are set by the board (CRO, 2021-03-11). The CRO (2021-03-11) mentions activities such as controlling that the case company does not have guaranteed higher residual values than what is accepted as a share of total exposure, but also to make sure that each individual object is within its limits. The latter is controlled through a monthly report where all cars that go outside the set percentual limits are included (CRO, 2021-03-11).

> "*Then once it is set and when a customer orders a car, I get an alert through a monthly report. We do random tests and I control all the cars that stand out and go over the limits we have set. Then they have to explain to me what it is that makes these cars stand out. It may be that they are extra equipped or heavily discounted from the dealers, which means that our risk has not increased, the dealers have just given a more favorable price, while the resale value is still good."* - CRO, 2021-03-11

The risk control function communicates with the fleet department to examine why each car is outside the set limits. The CRO (2021-03-11) explains that cars can go outside their limits due to various reasons, one of which is that the cars are discounted from the car dealers. The discount does not necessarily mean a greater risk since the residual value may still be reasonable. Furthermore, the risk control function reviews the residual value setting process at the fleet department where they e.g., ensure that there is duality in some matters, that everything is documented, etc. (CRO, 2021-03-11).

4.3 Regulation

The regulations which affect Financier AB in their residual value setting process can be divided into both internal and external regulation. Through the interviews, it has become evident that Financier AB has its own policies and framework regarding the issue of estimating residual values.

> *Yes, there is a policy for how all this should be done and for which members should be included and the data that we should look at to produce residual values.* - Trading Manager, 2021-03-19

The policy states how they define residual value risk, what risk appetite they have, who is responsible for the area and also how to deal with it in regards to processes and routines (CRO, 2021-03-11). It also states which people at the company should be involved in the process and which type of data to look at (Trading Manager, 2021-03-19).

> *"We can only go outside that framework with the CEO's specific approval. But it is extremely rare that it is done. So in our policy, we have intervals that say where our residual values should be, in 24 months we must never set higher than X % and in 36 set higher than X %."* - Business Manager Fleet, 2021-02-19

Their internal policy also sets limits for how high residual values they may set on individual objects based on the time of the leasing contract (Business Manager Fleet, 2021-02-19; CRO, 2021-03-11). This limit may only be exceeded with the CEO's specific approval, which is very rarely done (Business Manager Fleet, 2021-02-19)

There is also a policy that regulates the total exposure which Financier AB are allowed to guarantee in residual values. This is internally referred to as their risk appetite and is set in relation to Financier AB total lending by the board (Business Manager Fleet, 2021-02-19; COO, 2021-03-19; CRO, 2021-03-11).

> *"No, we have had a sum before, but now we have a percentage of total lending instead. The board sets this and it is a more reasonable measure because it can increase and decrease as it is in relation to the lending."* - CRO, 2021-03-11

The ceiling is in percentage and is reviewed at least once a year (COO, 2021-03-19; CRO, 2021-03-11). The control tools described under the section "Tools" aim to ensure that Financier AB is within these individual and aggregate limits with regards to guaranteed residual values.

External regulations affect Financier AB and their residual value process in mainly one way. Financial reporting regulation regarding guaranteed residual values does not really affect their internal process (CFO, 2021-04-08).

> *"I think that even if the accounting rules did not exist, we would have nevertheless assessed values and made ongoing impairment tests, it is a big risk for us. So we had done it regardless of what the regulations said."* - CFO, 2021-04-08

For example, the regulations say that you regularly must test these leasing objects for impairment (IFRS, 2021b). However, Financier AB emphasizes that this is an ongoing check they would have made regardless of the existence of the regulations (CFO, 2021-04-08). They would regardless follow up on their guaranteed residual values as it is a great risk for them which they want to keep track of and evaluate continuously.

The way that external regulation affects Financier AB is through market-influencing regulation, which must be taken into account when setting residual values (Business Manager Fleet, 2021-02-19; Trading Manager, 2021-03-19). Market-influencing regulation can refer to anything from changes in benefit values for company cars and tax changes on both cars and fuel (Trading Manager, 2021-03-19).

> *"Cars with high carbon dioxide emissions receive a high tax, which affects purchasing power after 3 years when the car is to be sold. So that's an example."* - Trading Manager, 2021-03-19

As previously stated in the input section, external regulation is a parameter that affects how Financier AB sets residual values on their cars. One example of this is the regulation proposal regarding increased tax benefit value from 1 July 2021 and forward. This proposal could raise benefit values on cars by about 25% (Business Manager Fleet, 2021-02-19).

> *Here it is up to us to keep track of this and play it cool and not panic. Me and the trading manager, we are planning now, we see that we will get a lot of deliveries of new cars during April / May / June, which means that we will get extremely many used cars back, which everyone else will also get. So we probably have to, more or less, park some cars over the summer and sell them in the autumn instead, to benefit from market movements.* - Business Manager Fleet, 2021-02-19

This proposal will result in many people wanting to change their company car before 1 July 2021 and the demand will increase for a shorter period of time (Business Manager Fleet, 2021-02-19). The increased demand means that Financier AB also will get many used cars back in that period in three years, which will affect the price at the second-hand market where Financier AB sells them. This temporary peak in demand will likely be followed by a

corresponding period with lower demand right after the regulation comes into force. Analyzes about upcoming regulations, such as this one, are continuously made in order to be able to assess how to handle and benefit from these market movements in the best way (Business Manager Fleet, 2021-02-19).

During the interviews, external regulation has been mentioned as the absolute biggest uncertainty factor for Financier AB with regard to their residual values (Business Manager Fleet, 2021-02-19).

> *"It is laws and regulations that change all the time. We do not know the conditions on the market in 3 years, which is the biggest uncertainty for us. If we still had a mix with 70/30 diesel vs petrol engines, we would have had a fairly safe residual value risk because then we would have known what we were doing but now we see other alternatives and it is different initiatives all the time that push the market and buyers in different directions. So that, I would say, is the biggest uncertainty for us."* - Business Manager Fleet, 2021-02-19

Not knowing what the market will look like in 3 years' time and how regulated the cars they lease out today will be when they return makes external regulation an area that is closely monitored by Financier AB (Business Manager Fleet, 2021-02-19). They state that if the market had continued to look like it does now and if they had had a mix with only diesel and petrol cars, they would have felt quite safe with their set residual values (Business Manager Fleet, 2021-02-19). However, they are fully aware that a lot happens all the time and that it is important to be open to input and learn about the market along the way (Business Manager Fleet, 2021-02-19; CRO, 2021-03-11; Trading Manager, 2021-03-19)

4.4 Evaluation

Financier AB has a monthly evaluation based on the monthly impairment testing in their books (CFO, 2021-04-08). However, the final evaluation is done once the contract has expired and the output is examined in relation to the set residual value (CRO, 2021-03-11).

> *"The divestment phase speaks for itself, where the ultimate evaluation takes place, where we see how much we have earned from a certain object. This is taken into account in the next residual value estimation."* - CRO, 2021-03-11

Once the car is returned and sold the case company can see how much they have earned or lost on a certain object. The evaluation of the output of each certain object is taken into consideration when setting new residual values in the future (Business Manager Fleet,

2021-02-19; CRO, 2021-03-11; Trading Manager, 2021-03-19). It is further emphasized that it is important to understand what you are evaluating (Business Manager Fleet, 2021-02-19).

> *"It is dangerous to take the evaluation and look at how it went now in 2020. Then we draw conclusions directly from what we do today. There is a lag. The evaluation of 2020 is not the result of the residual values we set in 2020. It is the result of residual values we set in 2017. It is important to understand what you are doing. What we are looking at is the relationship between the price of the car when it is new, as opposed to what we can sell it for when it is used."* - Business Manager Fleet, 2021-02-19

The evaluation phase is rather special. As the cars usually are leased for a period of 36 months, it is important to have in mind that there is a time lag (Business Manager Fleet, 2021-02-19). Meaning, the evaluation of year X is the result of the residual values that were set in year X-3.

Both the CRO (2021-03-11) and the Business Manager Fleet (2021-02-19) emphasizes that the divestment phase can be improved. Improvements such as selling to the right channel at the right time were mentioned during the interview (CRO, 2021-03-11).

> *"We need to continue to improve our sales, how we handle the cars when they return, because that is where we also create the conditions to be able to maintain our residual values even more and become even more attractive. It is a competitiveness to be able to lie right and high. If you want to do that, it is still important to make money and then we have to do that through how we sell."* - Business Manager Fleet, 2021-02-19

These kinds of improvements are argued to be vital in order to become even more attractive to the customers. By improving the sales, the case company creates the conditions to set attractive residual values (Business Manager Fleet, 2021-02-19).

5. Discussion

In this chapter, the empirical material is discussed together and in contrast with the content of the theoretical review. The material is discussed and structured by the use of the analytical framework in order to provide a conclusion for the next section.

By studying Financier AB it could be found how the residual value setting is conducted at the case company and how it relates to the analytical framework. A table presenting the main differences and similarities, between the expected findings based on the analytical framework and the findings in this thesis, can be found below. The discussion follows the same chronological order.

Area	Expected findings	Findings
Input	The use of car characteristics	The use of car characteristics
	-	The use of soft values and human factor
	An objective to find the true residual value	An objective of finding a workable residual value
Tools	The use of valuation and control tools	The use of valuation, control and information gathering tools
	The use of statistical model as valuation tool	No statistical model, instead a combination of three tools
	The use of comparable transactions as valuation tool	One of the valuation tools
	The estimation can be seen as level 2 and 3 valuation	The estimation can be seen as a level 2 and 3 valuation depending on the leasing object
	The use of assumptions	The use of assumptions
Regulation	The presence of internal regulation	Internal regulation present through e.g., risk limits and policies.
	The use of external regulation as an input	The use of external regulation as an input
	Processes are affected by external regulation	Financial reporting regulation integrated in their own agenda

Evaluation	The presence of an evaluation	Both ongoing and a final evaluation present
	The use of the evaluation as an input	The use of the evaluation as an input
	-	The divestment phase affects how attractive residual values that can be set

Table 2. Summary of the main differences and similarities between previous research and practice

5.1 Input

The input used in the residual value estimations was, as expected, a major element in the residual value estimation carried out by Financier AB. To begin with, by studying Financier AB it could be detected that there are similarities between what input previous research claims that one should use and what kind of input that is used in practice. However, there are also a lot of substantial differences between these domains, which according to the empirical findings of this study are important to consider when estimating the future value of a car.

The vast majority of previous research regarding residual value risk within car leasing concerns car characteristics that can explain the future value of the car at the second-hand market (Erdem & Sentürk, 2009; Lessmann et al., 2010; Lessmann & Voss, 2017; Prado, 2009b). By studying how Financier AB in practice determines the residual values of their leasing objects it could be detected that there seems to be a general agreement between earlier research and practice regarding which car specific parameters that are influential. The empirical material retrieved from the interviews presents that Financier AB uses parameters such as model, brand, time of the leasing contract, miles, engine, equipment and gearbox in their estimations. All these parameters are also mentioned as influential factors of the car's future value by researchers such as Erdem & Sentürk (2009), Lessmann et al. (2010), Lessmann & Voss (2017), Reis & Santos Silva, (2006) and Prado (2009b). Furthermore, Erdem & Sentürk (2009) and Lessmann et al. (2010) presented that more detailed factors such as the color of the car also influence the resell value at the secondhand market. Financier AB recognizes that such details could be important when dealing with premium cars, in other cases they focus on other factors which they see as more influential. Hence, with reference to car characteristics, there seems to be a consensus between earlier research and practice about

which parameters that are informative and should be used when estimating a car's future value.

The brand of the car has been described, by both previous research, such as Lessmann et al. (2010) and the empirical material as an important component. The case company has noted that some brands retain a higher resale value, in percentage, than other cars. This finding complies well with what Baltas & Saridakis (2009) concluded in their study about why cars with the same characteristics differ in value, which was partly because some manufacturers had a car-brand premium. The car-brand effect might derive from soft values related to the brand. When estimating a future value of a leasing object, Financier AB considers factors such as goodwill, given warranties and the reputation of the manufacturer. As such factors are not controlled for by Baltas & Saridakis (2009), they might be a part of the brand premium.

Through the interviews it has become apparent that Financier AB emphasizes the importance of considering soft values and the human factor in their estimations. Jerenz (2008), Lessmann et al. (2010) and Prado (2009b) mention that qualitative input is significant, it is however not the area they put focus on in their research. Financier AB apparently declares it to be more relevant than earlier research recognizes it to be. This becomes evident when looking at the usage of soft values such as lifecycle and circularity.

First of all, Financier AB takes the lifecycle of the product into account in their estimation of future residual values. Jerenz (2008) also recognizes this factor as influential but does not emphasise it any further. We have found the lifecycle to be important out of two aspects. The first aspect regards the possibility that a new model will be released during the lease agreement and the effect it would have on the value of the current model. If the product is in the beginning of its lifecycle, there will presumably not be a release of a new model or a new layout in the product series during the length of the lease agreement. This creates stability regarding the future purchasing power at the second-hand market and the residual value can be set out of the current conditions. If the product, on the other hand, is at a later stage of its lifecycle and that it is reasonable to expect a release of a new edition, then it must be considered to be able to accurately estimate how attractive the model will be when it is returned. The second aspect of the lifecycle parameter concerns the supply at the second-hand market. A product positioned in the beginning of its lifecycle will be one of the first of its kind at the second-hand market when the lease agreement ends, resulting in a higher price and thereby a higher residual value can be set. A product at the end of its lifecycle will

instead be sold at a flooded second-hand market, resulting in a lower price. The residual value estimations should therefore be more defensive when dealing with products which have been at the market for a longer time.

Secondly, in the car leasing business, there is a circularity in the product flow which is not acknowledged in prior literature. The circularity essentially means that all products a lessor leases out also comes back. This factor is once again meaningful from a supply and demand perspective. A peak in sold leases today would also mean a peak in supply when the cars come back, as they are returned in the same time period due to standardized lengths of leasing contracts. Consequently, it is relevant to adjust the residual values in certain deals in order to not get economically harmed by supply injections caused by oneself.

In summary, these qualitative aspects are a matter of supply and demand, which is a factor that in fact is mentioned as influential by Jerenz (2008) and Lian et al. (2003). However, we have found that it seems to not be emphasized enough in relation to its relevance in practice. Altogether regarding qualitative input, it could be summarized as that prior literature seems to deal with the estimation of future residual values as if the market is static and is in a vacuum where the lessor itself has no own market impact. Our empirical findings contradict this and indicate that the market changes by both external and internal forces, which should be considered when estimating the residual value.

The difference between earlier research and practice regarding the use of soft values, might not be remarkable considering that earlier research on the subject is mostly of quantitative nature. Therefore, it makes sense to focus on parameters that are quantifiable, which the qualitative aspects may not be. However, the fact that previous research has focused on quantitative models indicates that there is a perception among researchers that those parameters are what is important regarding the valuation issue. Consequently, our research works well as a complement and contributes to the fairly unilateral research field.

Another interesting factor is that in practice it is not always about finding the true residual value, it is rather about finding a workable value. The lessors operate in a competitive environment and must naturally seek to ensure that the business survives. Thereby, there are budgets with performance goals to consider. There is also a price strategy and a signaling factor that is taken into account. As the case company is partly owned by a car manufacturer, their objectives are in line with its owners, to increase sales. The residual values could

therefore be set higher for the owners' brand, as a high residual value both results in a lower monthly cost for the customer but also indicates a qualitative car which does not depreciate in value as fast as other cars do. The lessor can of course not only base their valuation on this aspect as it would mean large losses on guaranteed residual values, but it is a factor to weigh in. That this aspect is not addressed in prior research is natural as the objective of research has been to find a true future value of a car. However, it is still an aspect that is interesting to highlight as it is a component of the real issue of how to determine residual values in practice.

5.2 Tools

We have through the study provided a number of tools that are important in the residual value setting process at Financier AB. The tools used at the case company contradicts to a large degree with the tools presented in previous research. The fact that the findings differ from previous research is interesting and is something that will be discussed in this section. When analyzing the findings, three different types of tools are identified, valuation tools, information gathering tools and control tools. Valuation tools are the prominent tools when setting residual values, hence, the focus in the discussion will be on these tools. Information gathering tools are tools used to gain information about the market. For example, the case company regularly meets all large suppliers to stay up to date on new models, they look at the price setting of competitors on sites such as Blocket etc. Control tools are used to ensure that the residual value setting is done appropriately. It consists of a risk control function that e.g., has systems that make sure that the case company stays within the set percentual limits and control processes to make sure that the employees work in accordance with their set guidelines and routines. This finding corresponds well with what researchers such as Abernethy & Brownell (1997) and Malmi & Brown, (2008) suggest.

When examining the valuation tools used at Financier AB, we have through the study provided some interesting results. The case company does not use any statistical model when setting their residual values. This finding differs greatly from previous research in the area where most researchers have developed different statistical models to estimate the residual value (e.g., Lessman et al., 2010; Prado, 2009b). The research in the area can be interpreted as moving towards finding an optimal statistical model for setting residual values. In reality, at the case company, a combination of tools is used. It seems like Financier AB have succeeded well with their current strategy of not using statistical models, however, as presented in the study, Financier AB does not make full use of all their in-house data and

have an ongoing project with the purpose of structuring their data and making it more data-driven. This finding is in line with Gleue et al. (2017) who concluded that corporations use their in-house data inefficiently and need to be better at structuring and integrating their data. One of the reasons why this project might be important is due to the aspect of cognitive limitation that Lessmann et al. (2010) recognized. Meaning, with too many factors influencing the residual value, the estimation might be based on simple heuristics rather than all the available data. As one of their tools is to make a subjective weighted judgement of other inputs it is likely that simple heuristics is used at Financier AB. By structuring the data and making it more data-driven, this problem is partly solved, resulting in a more profound estimation.

The CRO has emphasized that statistical models can be difficult to use when the aim is to forecast a future value based on historical data. What is interesting to analyze when looking at the big difference between the case company and previous research is the lack of critique towards statistical models when setting residual values. Statistical models are static and do not take changing market conditions into account, hence, a perfect model is only valid for the current market conditions. As provided in the study, there are many outside factors that can affect the market conditions, e.g., regulation, changed consumer preferences, new models etc. Therefore, simply looking at a statistical model without any external analysis should by all parameters taken into consideration be unusable.

Instead of a statistical model the case company uses a combination of valuation tools, they use an external valuation by an objective third party, comparable transactions and a subjective weighted judgement of other inputs. This approach of setting residual values, as mentioned above, differs from previous research treated in the study. The case company recognizes comparable transactions as an important valuation tool when setting residual values. Looking at previous research this is in line with Gleue et al. (2017) who also recognizes comparable transactions as an important tool. Financier AB argues that the more comparable transactions there are available for a car, the easier it is to set an accurate residual value. However, besides Gleue et al. (2017), a majority of the previous research that is reviewed in this study are based on statistical models that do not include comparable transactions. This is a finding that is interesting as comparable transactions are an important part of the case company's residual value setting.

Further, what can be seen is that cars with a lot of comparable transactions to use as input when setting the residual value can be equated with level 2 fair value measurements. As presented earlier in the study, level 2 measurements include quoted prices in non-active markets where identical or similar assets are traced (IFRS, 2021), which can be argued to be the case when there are a lot of comparable transactions available. However, there are cars that do not have sufficient historical data in order to value them with level 2 inputs. Examples of these types of cars are cars with an odd color or equipment, new car models and electric cars. As the residual value setting for these types of cars requires more subjective judgment and assumptions, it can be argued that the residual value setting can be equated with level 3 valuations. This is because the calculations are performed without comparable transactions and are instead based on models and subjective judgments. Schmidt Bies (2005), Riedl & Serafeim (2011) and Runesson et al. (2018) explain the reliability issues with level 2 and 3 valuations. The fact that Financier AB sets their residual values defensively indicates that they see the valuation of future residual values as fairly unreliable as well.

An interesting comparison between earlier research and practice can be made here. The fact that previous literature such as Erdem & Sentürk (2009), Lessman et al. (2010) and Prado (2009b) focus on the development of valuation models indicate that they see the issue of setting a residual value as a level 3 valuation. However, in practice it was clear that it varies between level 2 and level 3 valuation depending on the object that is leased out. This insight should therefore generate a larger focus on how comparable transactions within car leasing can be used to determine a reliable residual value.

5.3 Regulation

As regulations have not been mentioned to any notable extent in previous research concerning residual value estimation within car leasing, regulation will be discussed solely on the basis of the empirical material retrieved from the interviews.

Internal regulations were as expected present within the case company's residual value estimation process. They had established frameworks for within what limits the residual values could be set, which also becomes a parameter to consider when trying to estimate a future value of a car. There is thus again a difference between theoretically arriving at a true future value of a car and arriving at a workable value in practice. These limits are obviously not used in order to complicate the process, they were rather implemented to ensure that the

residual value risk did not become too great, and that the exposure it created was within the company's risk appetite.

Through the interviews, it has become clear that external regulation also is present in the valuation. According to the empirical material it is an input to consider as it affects both market movements in terms of supply and demand but also which cars that customers perceive as attractive. As mentioned earlier, regulation specifically is not addressed in previous research as an important element to consider in residual value estimations. The reason for this is probably due to, what has been discussed earlier, that it is difficult to take such factors into account in a quantitative model. This once again highlights the importance of including soft values and the human factor in the valuation. External regulation in particular will be of extra importance to consider since it is mentioned, by the person responsible for the residual value estimation process at the case company, as the biggest uncertainty for the future.

Another interesting subject regarding external regulation is financial reporting. In the interviews, it was stated that Financier AB's internal processes linked to the residual valuation were not significantly affected by financial reporting regulation. It is mentioned, for example, that regardless of the existence of the regulation, they would have carried out ongoing checks on the expected future values of their outstanding leasing objects. This is because it is a great risk for them and that it is in their own interest to keep track of it and evaluate it continuously. Hence, Financier AB does not feel constrained by the regulation. The regulation is rather perceived as integrated in their own agenda. This can either indicate that financial and management accounting is aligned and similar in its implementation in this situation. It could also indicate that the financial reporting regulation is quite wide, which allows the user to do as they see fit. If that would be the case, it would further imply incomparability in the financial statements between different lessors.

5.4 Evaluation

As described in the findings, the evaluation phase is special as there always is a time lag that needs to be taken into account before the final evaluation can be done. Once the contract has expired and the final evaluation can be done, the case company can analyze each contract and compare the set residual value towards the actual residual value at the end of the contract. This is where comparable transactions come in. Once the evaluation is done the case

company has an additional comparable transaction that can be added to their database. When that particular car model is leased out again the comparable transactions from previous agreements are used as decision support, which is in accordance with Gleue et al. (2017). This procedure is in line with the analytical framework that was produced in the literature review.

As mentioned, Financier AB has a monthly evaluation based on the monthly impairment testing in their books, in addition to the final evaluation. This can be interpreted as a precautionary action and it is also in line with what has been presented in the findings, that the case company acts defensively in many situations. Through the monthly reconciliation of individual leasing objects, Financier AB is enabled to take use of the latest data when determining the residual values of new cars of the same model. In this way the evaluation window becomes shorter and Financier AB can be more responsive to changes in the market.

When assessing the results from the evaluation phase, we have provided an interesting finding regarding how a separate internal process relates to the residual value setting. This internal process is the divestment phase, how good they are at divesting the cars when they come back affects how attractive residual values Financier AB can set and still be profitable. Being good in the divestment phase is therefore a competitive advantage. The fact that Financier AB business model puts them in a position where they have to sell the same product twice to two different market segments is interesting and not acknowledged in previous research. The case company cannot control what cars to sell on the secondhand market and that can be problematic. What is demanded on the secondhand market in year X does not necessarily need to correspond with the cars leased out in year X-3. Hence, putting the lessor in a constrained position where they need to match the demand of two different market segments.

6. Conclusion

This section presents the conclusion that is based on the reasoning in the discussion. The chapter is divided into two parts, the first part aims to provide answers to the research question and contribute to the identified gaps in existing literature. The second part contains implications, limitations and proposals for future research.

6.1 Empirical findings and theoretical contributions

We have through this single case study looked into how a lessor of cars handles residual value estimations at an operational level. We contribute to prior research by providing a practical view of the issue. The findings regarding input and tools partly confirms how previous research indicates that the issue of estimating residual values should be dealt with. However, mostly it provides depth and new insights from an operational perspective regarding how the issue actually is handled in practice. The study has resulted in the finding of key elements in the residual value setting which has not been widely discussed in prior research, but from now on ought to be included in the field of research.

In general, with regards to the input, we show that the car characteristics that are being recognized as important in earlier research, also are used in practice to determine the future residual value of a car. The car characteristics that are being used in practice and are reinforced by earlier research are e.g., model, brand, time of the leasing contract, miles, engine, equipment, gearbox and color. Hence, with reference to car characteristics, there seems to be a consensus between earlier research and practice about which parameters that are informative and should be used when estimating a car's future residual value.

We have on the other hand found that there is a lack of attention given to qualitative data in earlier research, even though it apparently is relevant in practice. It is evident that parameters such as lifecycle and circularity with regards to supply and demand are important to consider. These factors are not, by previous research, sufficiently emphasized in relation to its relevance in practice. Thus, seemingly there is a misunderstanding regarding which input is meaningful, between the ones who develop valuation models and the ones using the models. A gap which is inefficient when striving for improvements. Since the lack of attention to qualitative parameters probably derives from the chosen methodology of previous research, this study serves well as a complement to earlier literature. Consequently, we contribute with

the insight that these qualitative factors should be included in the research field to a larger extent.

Throughout this study it has become evident that there is a big difference in the tools used in practice compared to the tools presented in previous research. In this study we have found three different types of tools used in the residual value setting at the case company, valuation tools, information gathering tools and control tools. We can conclude that both previous research in the area and the case company uses valuation tools. However, the valuation tools differ from previous research which has focused on developing an optimal statistical model. The case company on the other hand do not use any own statistical models as they consider these types of models to be too static. Instead, they use a combination of tools, comparable transactions, external objective valuation and a weighted subjective assessment of other input.

What can be seen through a fair value measurement perspective is that previous research has focused on statistical models, indicating that they perceive that there is no level 1 or 2 input available and therefore conducting a valuation similar to a valuation at fair value with level 3 input. However, in practice it can be seen that input similar to level 2 input is available for some models and therefore also is relevant to consider in research. Hence, we contribute with awareness that statistical models are not the only valuation tool that can be used to estimate a residual value. Therefore, it makes sense for future research to have a wider focus when dealing with the issue of estimating residual values.

External and internal regulation was not mentioned in previous research but has through this study been highlighted as a factor which must be considered. It has been shown that external regulation creates temporary shifts in market demand and supply which in practice is a major input when estimating a future residual value. Another aspect concerning external regulation is that the case company does not feel constrained by financial reporting regulation. Instead, it is rather integrated in their own agenda. This gives indications that financial accounting, with regards to guaranteed residual values, is either similar to management accounting in its implementation or that the regulation is quite wide which allows the user to do as they see fit, which in that case damages comparability.

We have also found that internal regulation is present in practice and determines a framework for within what limits the residual values can be set. This differs from how the issue of

estimating residual values is handled in earlier research, where it is a matter of finding a true future value, while in practice it is a matter of finding a workable value from many different aspects. In practice, the company must determine a value which is financially sustainable for the company, meaning that the residual value risk should not be too great at the same time as the monthly fee still must be competitive. On top of that, internal limits, the pricing strategy and the signaling factor also need to be taken into account when the residual value is to be set. Thus, we have provided insights regarding new parameters which must be dealt with in reality when dealing with the issue of estimating residual values. The difference in objective between earlier research and practice is brought up under the section concerning implications.

In this study, we have observed that evaluation is an important process in the case company's residual value setting. The case company both have ongoing evaluations and a final evaluation at the end of the agreement when the car is sold and the output is available. It has been identified that selling the car is a process which itself affects the residual values. How good the lessor is in the divestment phase affects how attractive residual values that can be set to the customers. Once the evaluation is done, all the input from this stage is brought to the residual value setting to support decision making of new similar car models.

6.2 Implications, limitations & future outlook

We have concluded that there are numerous differences between earlier research and practice concerning how the issue of estimating residual values is dealt with. However, the difference is partly due to different objectives between earlier research and practice. Within existing literature, the objective has been to forecast a true future value of a car while in practice the objective is to estimate a value which is workable from multiple perspectives. Hence, to argue that previous literature does not acknowledge internal risk limits, pricing strategies and signaling schemes is not fair, as those factors are not part of their objective. However, these factors are still a part of the actual problem. Thus, if the goal of research within this area is to come up with a procedure of determining reliable future values of cars, then one can henceforth not ignore these factors.

This study can act as a groundwork for how an organization handles the issue of residual value estimation in practice, which will support future research in its focus. Since we have only looked at one company, there might be differences among organizations. Therefore, we

believe that there is a demand for more similar case studies in order to support the evidence of this thesis or to present differences which will broaden the research within this field.

Based on our analysis we conclude that there seems to be a gap between how researchers treat the issue and how it is treated in practice. The gap needs to be recognized and considered in order for upcoming research within the field to be relevant for the industry.

First of all, we suggest that future research should focus on valuation models which consider both quantitative and qualitative aspects. The car characteristics that are currently being used in existing literature are also used in practice, which indicates relevance in the parameters. Therefore, it makes sense to continue to use such parameters in the valuation models. However, based on the findings of our thesis, setting a residual value solely based on a statistical model seems to be unusable as there are multiple qualitative parameters affecting the residual value, and since the importance of these parameters change over time. A valuation model which considers both quantitative and qualitative aspects would therefore be more suitable and of true value for the industry.

Secondly, current research is handling the issue of estimating a residual value similar to a level 3 issue. We have on the other hand concluded that the residual value estimations vary between level 2 and 3 depending on the object. Therefore, we argue that a larger focus should be put on valuation methods with comparable transactions, instead of solely focusing on statistical modelling. Such research focus would be useful for the determination of residual values for leasing objects which are in a late stage of their life cycle and have been on the market for a long time.

References

Abernethy, M. A., & Brownell, P. (1997). Management control systems in research and development organizations: the role of accounting, behavior and personnel controls. *Accounting, Organizations and Society, 22*(3-4), 233-248.

Andersson, H. (2005), "The value of safety as revealed in the Swedish car market: an application of the hedonic pricing approach", The Journal of Risk and Uncertainty, Vol. 30 No. 3, pp. 211-39.

Baltas, G., & Saridakis, C. (2009). Brand‐name effects, segment differences, and product characteristics: an integrated model of the car market. Journal Of Product & Brand Management, 18(2), 143-151.

Bergman, M. (2018). Bonus-malus ger ryckighet på en stark fordonsmarknad. BilSweden. Available at: https://www.bilsweden.se/statistik/Nyregistreringar_per_manad_1/nyregistreringar-2018/bonus-malus-ger-ryckighet-pa-en-stark-fordonsmarknad.

Bryman, A., & Bell, E. (2015). *Business research methods* (Vol. 4th). Glasgow: Bell & Bain Ltd.

Financier AB. (2020). *Annual report FY 2020*

Capital lease group, n.d. *Technological Advancements in The Automotive Industry Shaping The Future*. Retrieved 8 January 2021, Available at: https://www.capitalleasegroup.com/news-and-updates/technological-advancements-in-the-automotive-industry-shaping-the-future/

Connelly, L. M. (2016). Trustworthiness in qualitative research. *Medsurg Nursing, 25*(6), 435.

Couton, C., Gardes, F. and Thepaut, Y. (1996), "Hedonic prices for environmental and safety characteristics and the Akerlof effect in the French car market", Applied Economics Letters, Vol. 3, pp. 435-40.

Denzin, N., & Lincoln, Y. (2018). *The SAGE handbook of qualitative research* (Fifth ed.).

Dyer, W. G., & Wilkins, A. L. (1991). Better stories, not better constructs, to generate better theory: A rejoinder to Eisenhardt. *The Academy of Management Review, 16*(3), 613–619.

Enahoro, J. A., & Jayeoba, J. (2013). Value measurement and disclosures in fair value accounting. *Asian Economic and Financial Review, 3*(9), 1170.

Erdem, C., & Şentürk, İ. (2009). A hedonic analysis of used car prices in Turkey. *International Journal of Economic Perspectives, 3*(2), 141-149.

Gleue, C., Eilers, D., von Mettenheim, H. J., & Breitner, M. H. (2017). Decision support for the automotive industry: forecasting residual values using artificial neural networks.

Halvorson, B. (2019). *Beyond Tesla, electric cars lose value faster than other vehicles.* Retrieved 8 January 2021, Available at: https://www.greencarreports.com/news/1123583_beyond-tesla-electric-cars-lose-value-faster-than-other-vehicles

IFRS. (2021a). *IAS 16 Property, Plant and Equipment.* Retrieved 7 June 2021, Avalaible at: https://www.ifrs.org/issued-standards/list-of-standards/ias-16-property-plant-and-equipment.html/content/dam/ifrs/publications/html-standards/english/2021/issued/ias16/

IFRS. (2021b). *IAS 36 Impairment of Assets*. Retrieved 8 January 2021, Available at: https://www.ifrs.org/issued-standards/list-of-standards/ias-36-impairment-of-assets/

IFRS. (2021c). *IFRS 13 Fair Value Measurement*. Retrieved 12 May 2021, Available at: https://www.ifrs.org/issued-standards/list-of-standards/ifrs-13-fair-value-measurement.html/content/dam/ifrs/publications/html-standards/english/2021/issued/ifrs13/

Jacobsen, D.I., Sandin, G. and Hellström, C. (2002). *Vad, hur och varför : Om metodval i företagsekonomi och andra samhällsvetenskapliga ämnen*. Lund: Studentlitteratur.

Jerenz, A. (2008). *Revenue management and survival analysis in the automobile industry.* Betriebswirtschaftlicher Verlag Gabler.

Jin, H., & Yamazaki, M. (2020, January 4). Tesla's Musk hints of battery capacity jump ahead of industry event. *Reuters.* Available at: https://www.reuters.com/article/us-tesla-batteries/teslas-musk-hints-of-battery-capacity-jump-ahead-of-industry-event-idUSKBN25L0MC

Johnson, J. P., Schneider, H. S., & Waldman, M. (2014). The role and growth of new-car leasing: Theory and evidence. *The Journal of Law and Economics, 57*(3), 665-698.

Kirkland, G. (2019). *How new technologies have changed the automotive industry*. Retrieved 8 January 2021, Available at: https://www.oponeo.co.uk/blog/how-new-technologies-have-changed-the-automotive-industry

Kristensson, J. (2018). *Energidensitet i elbilsbatterier – så har den utvecklats.* Retrieved 8 January 2021, Available at: https://www.nyteknik.se/fordon/energidensitet-i-elbilsbatterier-sa-har-den-utvecklats-6899136

Lacetera, N., Pope, D., & Sydnor, J. (2012). Heuristic Thinking and Limited Attention in the Car Market. American Economic Review, 102(5), 2206-2236.

Leaseurope, (2019). *Key Facts and Figures 2019*. Retrieved 4 January 2021. Available at: https://www.leaseurope.org/_flysystem/s3?file=Statistics/Facts%20and%20Figures/LeaseuropeFF_19.pdf [Accessed 5 January 2021].

Leavy, P., (2017). *Research design*. New York: Guilford Press.

Lessmann, S., Listiani, M. and Voß, S., (2010). *DECISION SUPPORT IN CAR LEASING: A FORECASTING MODEL FOR RESIDUAL VALUE ESTIMATION*. *ICIS*,.

Lessmann, S., & Voß. (2017). Car resale price forecasting: The impact of regression method, private information, and heterogeneity on forecast accuracy. *International Journal of Forecasting, 33*(4), 864-877.

Lian, C., Zhao, D., and Cheng, J. (2003) "A Fuzzy Logic Based Evolutionary Neural Network for Automotive Residual Value Forecast," in: Proc. of the Intern. Conf. on Information Technology: Research and Education, N. Ansari, F. Deek, C.-Y. Lin and H. Yu (eds.), Newark, NJ, USA, IEEE Computer Society, 2003, pp. 545-548.

Malmi, T., & Brown, D. A. (2008). Management control systems as a package—Opportunities, challenges and research directions. *Management accounting research, 19*(4), 287-300.

Martelli, J., & Greener, S. (2018). *An introduction to business research methods*.

McKinsey. (2020a). Subscribed to future auto finance yet?. Available at: https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/subscribed-to-future-auto-finance-yet

McKinsey. (2020b). Reimagining the auto industry's future: It's now or never. Available at: https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/reimagining-the-auto-industrys-future-its-now-or-never

Mayring, P. (2008). *Qualitative Inhaltsanalyse: Grundlagen und Techniken.* Beltz.

Merriam, S. B. (2009). *Qualitative research: A guide to design and implementation, revised and expanded from qualitative research and case study applications in education.*

Patel, R. & Davidsson, B. (2011). *Forskningsmetodikens grunder*. Lund: Studentlitteratur AB

Prado, S. (2009a) Hedging Residual Value Risk Using Derivatives. 2009-31 (2009). Web.

Prado, S. (2009b)The European Used-car Market at a Glance: Hedonic Resale Price Valuation in Automotive Leasing Industry. 2009-22.

Ramnewall, A., (2020, January 3). Unik Lista: Då Lönar Det Sig Att Leasa Bilen. *Dagens industri.* Available at: https://www.di.se/bil/unik-lista-da-lonar-det-sig-att-leasa-bilen/

Reis, H.J. and Santos Silva, J.M.C. (2006), "Hedonic price indices for new passenger cars in Portugal (1997-2001)", Economic Modelling, Vol. 23, pp. 890-908.

Riedl, E. J., & Serafeim, G. (2011). Information risk and fair value: An examination of equity betas. *Journal of Accounting Research, 49*(4), 1083-1122.

Runesson, E., Samani, N., & Marton, J. (2018). *Financial accounting theory : An accounting quality approach* (1st ed.).

Runeson, P., & Höst, M. (2009). Guidelines for conducting and reporting case study research in software engineering. *Empirical Software Engineering, 14*(2), 131-164.

Schmidt Bies, S. (2005). Fair value accounting. *Federal Reserve Bulletin, 91*(1), 26-29.

Schmit, M., (2004). *Credit risk in the leasing industry. Journal of Banking & Finance, 28*(4), pp.811-833.

Simon, H., (1982). Models of bounded rationality. Cambridge, Mass.: MIT Press.

Yin, R., (2014). *Case study research : design and methods.* 5th ed. London: Sage Publication.

Appendix

Interview Guide

- When did you start working at Financier AB?
- What is your professional background and study background?
- What is your role in the company?
- For how long has Financier AB offered leasing as a product?
- For how long time has Financier AB worked with guaranteed residual values in the leasing contracts?
- How would you describe residual value risk with regards to car leasing?
- How does the residual value risk arise in the company?
    - What does this mean for the company?
- Do you see any upside with residual value risk?
- How has the residual value risk changed over time in the company?
    - Has it always looked the same or has something changed?
- What is your role in relation to the residual value setting at the company?
- When you get a new model, how do you go about setting a residual value?
    - Does it look the same for all cars, is it different for different brands, models, etc.?
- What input do you use when setting residual values?
- How detailed is that input? Color, gearbox, etc.?
- Do you take market conditions such as interest rates into account?
- What tools do you have available when you set your residual values?
- Do you use valuation models when setting residual values?
    - If yes, how?
- Do you use a third-party valuation?
    - If yes, how?
- Do you use comparable transactions when setting residual values?
    - If yes, how?
- How do you ensure that the residual valuation is done correctly?

- Is there any internal regulation for how you proceed in the residual valuation?

- Do you have an exposure ceiling for how much guaranteed residual values you are allowed to take on?
    - Can the exposure and risk be too great?

- Who is responsible for the process?

- Which departments / persons are involved in the residual valuation?

- What does the collaboration between them look like?

- Are there any conflicts of interest, regarding the residual valuation, between the departments?
    - If yes, how would you describe them?

- Do you make any assumptions when setting residual values?
    - If yes, which ones and why?

- Is there any form of evaluation of the results from previously set residual values?
    - If yes, what does it look like?

- What have you learned from regarding residual value risk over the years?

- Are there any specific areas in which you see opportunities for improvement?

- Where are the biggest uncertainties in your way of handling this issue?