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The Impact of Staff Costs and Equity on Financial Performance in Professional Ice Hockey:

An Analysis of Liiga and the SHL

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Abstract:

Ice hockey is one of the most competitive sports in the Nordic countries, both athletically and financially. As of recent years, there is a surplus of data but a lack of research on the correlation between the financial management practises and the financial performance of hockey teams. There are many variables and theories that affect the financial performance of the team. There are the broader practises of budgeting, revenue management, cost management and risk management. The more specific theories include, but are not limited to, Kulikova's and Goshunova's theories on how to calculate efficiency, Principal Component Analysis and Data envelopment analysis. The aim of this research was to investigate the relationship between staff costs, equity and revenue in the Finnish hockey league and the Swedish hockey league, and to which extent this relationship impacted the financial performance of the teams. This thesis covered all the 15 teams in the Finnish hockey league and all the 14 teams in the Swedish hockey league during the 2021/2022 season. The chosen method to calculate these to separate analyses was a regression analysis to see how staff costs and the equity of a team impacts the revenue, and how important the role of a baseline revenue is. The results showed us that in most cases both staff costs and equity had an impact on revenue, validating Kulikova's and Goshunova's theories on efficiency. The regression also laid out the importance of a good baseline revenue, while excluding staff costs and revenue.

Keywords: Liiga, SHL, regression, financial management

Contents

1 Introduction

From millions of viewers to thousands of players, ice hockey is one of the most competitive sports in the Nordic countries. Both the Finnish and the Swedish hockey leagues rank in the top 5 leagues worldwide, and it is no surprise (Helfrick, 2023). When dealing with a sport with a tremendous level of competition, the financial management practices of the teams and leagues play a big part in the development of the sport.

As in most sports around the world, there is almost a surplus on both sports statistical and financial data. Of course, the financial performance of the teams gets analyzed each year, if not each quarter, to see how they did in comparison to previous years. What has not been done, is the comparison of the financial practices themselves, both on and off the ice, of the Finnish and Swedish hockey leagues.

The Finnish and Swedish hockey leagues have been chosen for this study because they both countries have a long history with the sport, and already well-established leagues. While the Swedish hockey league has an older market with a larger turnover, the Finnish league is starting to close the gap, which has led to an even higher level of sport and financial competition (Aalto et al.)

The reason for choosing this topic is motivated by a personal passion in the sport, from both participation and spectatorship, and with the combination of my education in financial management, this research is something that can be useful for both the organizations, but also researchers interested in the financial management aspects of hockey teams.

1.1 Problem statement

The Finnish and Swedish hockey leagues originate from a principle to further public health but have now turned in to organizations in search of profit, also known as the "Americanization" (Backman & Carlsson, 2019). This has led to a higher level of competition as money is involved. There are many different aspects to running a successful hockey team, and one of the most important one is the financial management.

Despite the importance of financial management of a team, there is not enough research on the correlation between the financial management practices and the financial performance of the teams. The financial gap between the Finnish and Swedish hockey leagues is closing, but nobody knows why.

The research problem leads to the following questions:

1. What is the extent and nature of the relationship between staff costs and revenue in Liiga and the SHL, and to what level does this relationship impact the financial performance of hockey teams in these leagues?
2. How does the overall level of equity held by hockey teams in Liiga and the SHL influence their revenue and financial performance?

These research questions help investigate the significance of financial management practices of a hockey team, their effect on financial performance and their level of competitiveness.

1.2 Aim of the study

While recognizing the importance of financial management in hockey teams, the existing research falls short on studying the direct impact of these financial management practises on the actual financial performance of the teams. Furthermore, as the financial gap between Liiga and the SHL appears to be decreasing, a need arises to understand the underlying factors that are influencing this trend.

The aim of this study is to conduct a numerical analysis to investigate the correlation between financial management practises, more specifically cost management and equity management, and the financial performance of the teams in Liiga and the SHL. This research aims to provide awareness in to factors that drive these leagues and contribute to a deeper understanding of the financial management practises and the financial performance of professional ice hockey.

1.3 Demarcation

This thesis focuses on the financial management practices of hockey teams in the Finnish and Swedish hockey leagues. Due to the enormous amount of financial and sports statistical data in hockey, the only financial statement numbers that are used are the season 2021/2022 numbers. For a historical point of view, earlier years may be used for factors that affect the financial practices, leading to effects in the financial performance. The data collected and

referenced to only applies to the Finnish and Swedish hockey leagues but may give other researchers a general idea of financial management practices in hockey.

1.4 Definitions

SHL = Swedish Hockey League

Liiga = Finnish Hockey league

NHL = National Hockey League

Americanization = refers to how the Finnish and Swedish hockey leagues originate from a principle to further public health but have now turned in to organizations in search of profit

2 Theory

This chapter explains key theories, concepts, and models that are relevant to the study. Also, the theory part introduces key differences between the sports and countries.

2.1 Financial reporting and disclosure requirements in sports organizations and teams

All sports organizations and teams are required to disclose their financial reports to a certain extent. This may vary by country, sport, and league. The reason that teams are okay with it is to give the shareholders and fans more transparency on how the organization is run, and how it builds trust.

2.1.1 The Finnish hockey league

Most Finnish hockey league teams are owned by limited liability companies or registered associations, leading to them having legal requirements to disclose their financials (Tilinpäätöksen julkistaminen, n.d.). Only a few teams have bigger shareholders, who do not own a part of the team through a company.

This has led to the teams being very open about their financials, as the fans feel more involved with the team than to any other regular company. Due to the financial data being available for free to the public, numerous analytic reports have been made about the financial standings of the teams.

2.1.2 The Swedish hockey league

Most Swedish hockey league teams are owned by joint-stock companies, or limited partnerships, which are required by law to report their numbers (Astashova, n.d.). Like the Finnish hockey league, this makes the fans feel more involved in the sport as they feel like they can affect the team's success, for example, by attending matches.

2.2 Financial management practices and strategies used by sports organizations and teams

There are several different financial management practices and strategies used by sports teams and organizations to try to maximize their financial and athletic results.

2.2.1 Budgeting

Budgeting is an important part of managing a sports team. Like a non-sports organization, a hockey team needs to budget their resources for an upcoming season. As sports organizations have many sources of income, such as ticket sales, product sales, radio and tv deals etc. the management of the organization needs to be very focused on what they use their income on. On the outside it may seem the team is doing good, but there have been months of planning, calculating where money needs to be used, and what to avoid (Garge, 2020).

2.2.2 Revenue management

Sports teams and organizations have very diverse sources of income, which needs to be carefully managed to make sure the team can compete both financially and athletically.

Ticket sales are one of the biggest sources of income for a sports team. Without any viewers, the team cannot succeed in their financial and athletic goals.

2.2.3 Cost management

Cost management plays an important role in the management of professional sports teams and organizations, as it does for every corporation. Hockey being a team sport, the biggest cost are the players' salaries. Different countries and leagues have different rules, for

example, the National Hockey League having a salary cap to make the league more competitive, while the Finnish league does not have a salary cap (Dietl et al., 2009). This means the organization needs to plan their lineup tediously and carefully, and make sure they are getting the right results from the players whom they sign long-term deals with.

Materials and external services are also a significant cost that are mostly related to game events, which the clubs' parent companies purchase to organize the matches (Aalto, 2021)

2.2.4 Risk management

Risk management is a crucial step in planning a sports organization's financial management. Teams face significant risks, such as new rules, player injuries and economic situations. Proper risk management is important in ensuring that the team can navigate these obstacles effectively and to maintain their financial and athletic ability to compete. According to Fueller and Drawer's framework in their article *The application of Risk Management in Sports* for the Sports Medicine journal, the teams should always create a full risk assessment before trying to mitigate any risks. This includes researching the different financial factors, and determining what is an acceptable and unacceptable level of risk.

2.3 Financial performance measurement in sports organizations and teams

There are multiple ways to measure the financial performance of a sports organization, but it is usually done in comparison to the athletic part. For example, it is normal for financial managers to calculate how much winning a single point cost a team (Hur mår svensk elithockey? , 2022). The goal is to figure out your return on investment, but in this case the return can be points or goals.

2.4 Relevant previous studies

2.4.1 Studies done in Finland

As hockey is a very popular sport, there tends to a surplus of both financial and athletic analysis done. There has been interesting research done on for example, developing sports organizations ways to monitor their finance (Yrjänheikki, 2018).

There are also studies done on simply the profitability of a hockey organization in Finland, or even how financial success correlates to athletic success using Pearson's correlation formula (Kiviaho, 2022). Kiviaho's research used public data from hockey teams in Finland and in Sweden to try to calculate the correlation between, for example, the player budget and athletic success. The research concluded that there are many correlations between the financial result and athletic success, but due to the higher economic figure in Sweden and their correlation to Swedish teams' athletic success did not give a realistic picture when comparing to Finland. This means that there is a clear correlation between financial and athletic success, and that this research can be conducted using at least parametric methods.

2.4.2 Studies done outside of Finland

There are multiple studies on financial management practices, how they correlate with a team's athletic performance, and multiple different methods of doing these studies. Overall, most of the research is on the world's most popular sport Football, but the main theories of analyzing the financial data still applies.

To know what team succeeds in their financial management, you must look at the efficiency of the team, including the economic and athletic perspectives. According to Kulikova and Goshunova, the two main methods to calculate the efficiency are the parametric and the non-parametric methods. The parametric methods are theories that use regression analysis and deterministic correlation analysis, this includes both linear and non-linear regression models such as the Cobb-Douglas function. The objective of a parametric method is to identify and define what kind of relationship the variables have. The non-parametric method is more focused on the overall efficiency. This means that the evaluation relies on researching the inputs and outputs that represent the object that is being reviewed. Depending on the research object, you need to establish if a connection between the variables is important or not to know which of these two methods you need to use (Kulikova & Goshunova, 2014). Kulikova

and Goshunova's non-parametric methods to research the efficiency of professional football clubs concluded that absolute efficiency is a very rather phenomenon when you consider both the technical efficiency and scale efficiency, but it is still possible.

The principal component analysis, also known as the PCA, is a parametric method that helps to determine the relationship between variables. A principal component analysis simplifies data by transforming a group of observations into variables that are possibly correlated into sets of values of linearly uncorrelated values, also knowns as the principal components (Shu, 2016). Simplified, the PCA replaces original variables with a smaller set of variables that are not correlated which makes it easier to analyze the data, but only extract only more meaningful information. This means that the PCA method makes assumptions about the underlying data. Shu's analysis on the capital structure and related strategy for circular economy in corporations, which can also be applied to sports organizations came to the result that a PCA can successfully transform multiple variables in to one main component, and by doing this will significantly simplify the mathematical process. This means that using a small sample, combining it with a partial regression analysis can lead to a reflection of the overall situation.

By far the most popular non-parametric method is the Data Envelopment Analysis, also known as the DEA method. The DEA method uses linear programming techniques to establish a non-parametric frontier, which is essentially a way to represent the best possible outcome of the process without making any assumptions about the date beforehand (Pyatunin et al., 2016). This is a useful method when there is no clear understanding of the relationship between the inputs and outputs, for example, the financial result of a team and their athletic results. Pyatunin's research on the economic efficiency of European football clubs using the data envelopment analysis concluded that the theory is right. You can use DEA to calculate economic efficiency of a sports organization, which directly supports Kulikova's theory on non-parametric methods of efficiency measurement, but also Kiviaho's parametric research on financial and athletic success correlation, because the DEA method can be used together with Pearson's correlation method to identify variables that have the biggest impact on success.

At the same Pyatunin's research is proved, the disadvantages of this method are also discovered. They concluded that one might have to use the DEA Cross-efficiency method depending on the study object to remove unrealistic weights for the variables. The research showed that the richer the club is, the more potential they have to be economically efficient due to having access to more and better paying competitions and more streams of revenue.

The technique of order preference similarity, also known as TOPSIS is another relatively know theory regarding financial management (Shekhovtsov & Salabun, 2020). Essentially this theory is based on alternative selection, in this case calculating the shortest distance to the most ideal solution or objective. It can also be used to calculate the longest distance to the worst solution or objective. The TOPSIS method has been used with Spearman's rank correlation method to calculate the relationship between financial performance and athletic success, but it can be used for a lot more (Sakinc et al., 2017). By using the TOPSIS method a sports organization could be used to analyze their investments, and to prioritize investment opportunities on how well they perform against a set of criteria, such as its return on investment. This could be applied to both investing in stocks or investing in players and their performance.

 Like the TOPSIS method, Sakinc compared it to another method called the VIKOR method, which is way of distance measurement, but seeks to find a compromise solution. The result is that there were many similarities in the TOPSIS and VIKOR ranking systems, but the main difference was that indicating the best option to take and ranking the options were vastly different. Choosing the right method is crucial as the result are almost similar but with different starting data. Further research is needed to expand the knowledge in another similar research.

All the beforehand mentioned methods and theories are good ways to find the correlation between variables and an objective, but the most important part is to know what methodology to use in which situation.

2.5 Theories regarding baseline values and variables

There are other relevant theories that might explain how an athletic organization builds their revenue model, and how to identify financial distress. As most theories have a baseline value, variable or objective, it is important to take this into account.

Revenue diversification is a model that provides organizations a way to diversify their revenue (Yan, 2008). In other words, there is more than one way for an organization to accumulate revenue, especially a sport organization. For example, teams get income from ticket sales, but also from merchandise sales and sponsorships. This provides more stability for the team since they are not dependent on one source of revenue. Revenue diversification can be the foundation for an organization to grow their fundamental revenue. Should an organization fail to diversify their revenue, it could lead to disastrous results, depending on the sector where they operate in.

Brand equity theory suggests that it constitutes the organizations relationship between them and the consumer (Vaajoensuu, 2018). Meaning that the stronger and more established the brand, the stronger relationships are created between the organization and the consumer. A stronger relationship leads to customers being more willing to pay a higher price, for example, the team's merchandise or tickets. As the future of the revenue can rely on the brand equity, if an organization does not decide to develop this identity it can lead to a weaker stream of revenue.

Underperforming assets can lead to a negative baseline value. For example, if a team has invested in new facilities or player contracts but the team does not succeed in winning games or if the new facilities do not generate the expected revenue, it can negatively impact the baseline value.

Market saturation refers to how much of a product/service is available compared to the demand in a specific area. After this an organization cannot gain more of a market share without taking another organization's market share (Corporate finance institute, n.d.). This theory can also be applied to the world of sports, as the popularity of sport in a country compared to other sports plays an important part to the saturation. There are also many

factors that apply to the market saturation theory such as the seasonality of the sport and the general economic situation of the country in question.

3 Method

In this study, the goal is to analyse and compare the financial management practises of the Finnish and Swedish hockey leagues, and how they affect the financial management practises of both leagues.

To reach this goal, it is important to choose the right research method, because it will define how to collect and analyse the underlying data. It is also crucial to choose the right method to ensure the reliability and validity of the data, therefore the use of a regression analysis will be presented and justified as the main method of this research in the next chapter.

By using a regression analysis, the relationship between important financial variables can be researched, for example, revenue, expenses, profit, and ticket sales. The regression analysis a popular method for identifying and investigating relationships between key variables.

Overall, the choice of a suitable research method is important as it effects every factor of the research itself, including the analysis of the data, the validity and reliability of both the data and research and the ethics of the research.

3.1 Choice of method

For this paper, the quantitative research method of regression analysis has been chosen to research how the financial management practises of both the Finnish and Swedish hockey leagues affect the financial performance of the teams.

For a regression analysis, you need multiple independent variables, such as revenue, expenses, profit, and tickets sales. These are factors that the researcher suspects will influence the dependent variable, meaning the main factor the research is trying to predict or understand (Gallo, 2015). The dependent variable in this case is the financial performance and the independent variables will be staff costs and equity.

There are numerous other methods to describe or find correlation between different data sets, such as descriptive statistics or a simple correlation analysis, but for this research problem a regression analysis is a lot more applicable as descriptive statistics does summarize the data, it does not show any relationship between the variables. On the other hand, a correlation analysis does find the correlation between variables, but it is not as effective in explaining the relationship between them, more specifically the relationship between independent and dependent variables.

3.2 Research approach

The research was conducted by gathering financial data from the Swedish and Finnish hockey leagues during the 2021/2022 season. The data was collected from the teams official and public financial statements, the teams' websites, and other reliable sources of data. The study is conducted by using a regression analysis to research the correlation of independent variables and their effect on the financial performance of the teams. The data is recorded in a Microsoft Excel sheet where the regression analysis is done.

3.3 Analysis of the data

The data that has been collected from the league's financial statements, official websites and other reliable sources are compiled in a Microsoft excel sheet, and categorized into columns according to league, independent variables, and dependent variable. The data is analysed using Excel's regression tool to summarize the regression output, including all coefficients for each independent variable, the p-value to see if the relationship is statistically significant and the R-value to measure the strength of the correlation between the independent and dependent variables. By using this output, one can compare the Swedish and Finnish hockey leagues financial performance, based on the data gathered from their own and other reliable sources publications. It is expected that both staff costs and equity will have a positive impact on revenue for both leagues.

3.4 Validity and reliability

For this research validity and reliability are important factors. Validity refers to the research methods and instruments, and if they can be applied in this research. As stated previously, a

regression analysis can find the correlation between independent variables and dependent variables and analyse which independent have the biggest impact on the dependent variable (Writing the Methodology (Dissertation), n.d). As a regression analysis is a very popular method in the corporate world, it can also be applied to the Finnish and Swedish hockey teams due to the americanization of the leagues. So instead of considering the teams as just sports organizations, they can also be considered companies, which gives the research method more validity.

Reliability of research refers to if the research can be conducted again by somebody else using the same data and methods. As this is a quantitative study, this makes reliability an even more important factor. The data that is collected is free and public, which gives other researchers the ability to start from the same data, and if the same key independent and dependent variables are used, other research will come to the same conclusion (Writing the Methodology (Dissertation), n.d)

This study is done on relatively few observations. As Liiga only has 15 teams and the SHL only has 14 teams, it considered a relatively small pool of observations. This limits our ability to comprehend the most meaningful relationships but can give us some vital information on how the independent variables affect the dependent variables. Having a larger number of variables would lead to a more comprehensive analysis, but due to different hockey leagues being run using different strategies, for example, points playoffs, relegation etc. Liiga and SHL have been chosen. They are close to each other and the culture is relatively the same.

3.5 Addressing regression analysis challenges

When conducting empirical research, or more specifically a regression analysis, multiple challenges may arise. To be sure that the data that has been collected is valid and will reveal genuine and reliable results, test are formulated. If the study fails these tests, it will not reach its goal in answering the research questions.

Heteroscedasticity is one of the above-mentioned challenges. Heteroscedasticity makes some of the points in a data set have a larger impact on the result of the analysis. Because some of the points carry more weight, the conclusions a researcher can draw from it can be

biased which will lead to a non-trustworthy analysis, and the study might not accurately represent the whole dataset (Breusch & Pagan, 1979).

To overcome the problem of heteroscedasticity, there are multiple tests you can run. One of the more prominent ones is the Breusch-Pagan test (Breusch & Pagan, 1979). The test is run in the following steps:

1. Running a regression model according to the formula in Figure 1 using the numbers in Tables 1 and 2 separately since we need to run the test on both data sets.

Figure 1, Regression formula (Vasudev, 2018).

2. Obtaining the residuals, and calculating the squared residuals
3. Running a new regression, using the squared residuals as the dependent variable
4. Calculating the Chi-Square test statistic according to the formula in Figure 2

Figure 2, where n=total number of observations, r2_BP=R-square of the new regression model where the squared residual is the dependent variable

$$n(r2_{BP})$$

The result of this test is that for Liiga the observed Chi-Square value is 2.418, and for the SHL 2.321 which both fall within the parameters of the critical values of a Chi-Square

distribution with 2 independent variables and alpha being 0.05, making the data reliable and showing no evidence of heteroscedasticity.

3.6 Ethics

The ethicality of a research paper is very important to ensure that all data has been collected anonymously and it is stored safely. Due to the nature of this research paper, all the data that has been collected is public and free information from reliable sources, ethics does not play a big part as the data is available for everyone anytime. Also, as this research does not involve any human participants, only public sports organizations, ethics do not play a big factor in the assessment of their financial management practises and their effects.

4 Results

This paper researches the correlation between financial management practices and their effect on the financial performance of hockey teams. The data is presented by showcasing the different independent variables used, and their effects on the dependent variable. There is also a reflection on the similarities between the leagues, and of course the differences which will answer the research questions presented earlier. The regression analysis is calculated based on the numbers in table 1 and table 2.

Table 1, Teams in Liiga, dependent variable and independent variables

Team	Revenue	Staff costs	Equity
Ässät	5,159,818 €	3,327,192 €	405,608 €
Hifk	8,739,677 €	5,615,732 €	5,147,092 €
Hpk	5,225,659 €	3,494,440 €	2,400,556 €
Ilves	11,112,315 €	4,312,760 €	4,577,833 €
Jukurit	5,003,816 €	2,943,320 €	718,638 €
Jyp	6,013,418 €	3,361,734 €	365,730 €
Kalpa	6,690,243 €	3,601,866 €	679,387 €
Kärpät	11,386,438 €	5,971,633 €	8,188,098 €
Kookoo	5,530,798 €	3,305,506 €	1,708,951 €
Lukko	7,411,365 €	5,663,246 €	1,345,158 €
Pelicans	6,923,557 €	4,053,787 €	763,407 €
Saipa	4,691,733 €	3,126,546 €	1,250,209 €
Sport	5,231,603 €	3,407,183 €	30,324 €
Tappara	12,502,013 €	6,128,408 €	5,673,511 €
Tps	8,226,277 €	5,146,817 €	-986,099 €

Table 2, Teams in SHL, dependent variable and independent variables

Team	Revenue	Staff costs	Equity
Brynäs IF	SEK 162,548,000	SEK 99,246,000	SEK 39,122,000
Djurgårdens IF	SEK 132,748,000	SEK 88,137,000	SEK 18,170,000
Färjestad BK	SEK 190,557,000	SEK 105,257,000	SEK 130,267,000
Frölunda HC	SEK 188,938,000	SEK 95,804,000	SEK 66,168,000
IK Oskarshamn	SEK 83,590,000	SEK 52,674,000	SEK 16,694,000
Leksands IF	SEK 160,207,000	SEK 82,612,000	SEK 27,729,000
Linköping HC	SEK 148,098,000	SEK 88,176,000	SEK 4,248,000
Luleå Hockey	SEK 169,942,000	SEK 89,512,000	SEK 40,362,000
Malmö Redhawks	SEK 125,487,000	SEK 74,668,000	SEK 8,634,000
Örebro HK	SEK 140,663,000	SEK 83,746,000	SEK 13,940,000
Rögle BK	SEK 183,771,000	SEK 101,180,000	SEK 22,639,000
Skelletteå AIK	SEK 141,461,000	SEK 71,638,000	SEK 65,888,000
Timrå IK	SEK 98,394,000	SEK 65,537,000	SEK 3,641,000
Växjö Lakers	SEK 149,267,000	SEK 81,878,000	SEK 42,943,000

4.1 Descriptive statistics

Before doing a regression analysis, it is important to make sure you have a good foundation and to provide an overview of the data. In this chapter, descriptive statistics is provided, such as the mean and standard deviation of both leagues. These statistics will give us a deeper understanding of the data before performing the regressions, and give insights into the spread of data points in the set.

4.1.1 Mean

For Liiga, using the numbers provided in Table 1, the mean of the revenue is calculated to be 7,3MEUR, the mean of staff costs 4,2MEUR and the mean of equity as 2,2MEUR as shown in Table 3. These figures provide an overview of the financial situation within Liiga, setting the foundation for the forthcoming regression analysis.

For the SHL, using the numbers provided in Table 1, the mean of the revenue is calculated to be 148,3MSEK, the mean of staff costs 84,3MSEK and the mean of equity as 35,7MSEK as

shown in Table 3. These figures provide an overview of the financial situation within the SHL, and similarly to Liiga, sets the foundation for the forthcoming regression analysis.

Table 3, Mean of the variables, Liiga and SHL

	Revenue mean	Staff costs mean	Equity mean
Liiga	7,323,248.67 €	4,230,678.00 €	2,151,226.87 €
SHL	SEK 148,262,214.29	SEK 84,290,357.14	SEK 35,746,071.43

4.1.2 Standard deviation

For Liiga, using the numbers provided in Table 1, the standard deviation of the revenue is calculated to be 2,5MEUR, the standard deviation of staff costs 1,1MEUR and the standard deviation of equity as 2,5MEUR as shown in Table 4. These standard deviations offer insights into the variability in revenue, staff costs and equity within the Liiga dataset.

For the SHL, using the numbers provided in Table 1, the standard deviation of the revenue is calculated to be 30,5MSEK, the standard deviation of staff costs 14,0MSEK and the standard deviation of equity as 32,7MSEK as shown in Table 4. These standard deviations offer insights into the variability in revenue, staff costs and equity within the SHL dataset.

Table 4, Standard deviation of the variables, Liiga and SHL

	Revenue Standard Deviation	Staff costs Standard Deviation	Equity Standard Deviation
Liiga	2,473,385.66 €	1,107,536.44 €	2,478,630.96 €
SHL	SEK 30,536,621.40	SEK 14,018,209.65	SEK 32,726,285.59

4.2 Regression statistics

4.2.1 Liiga

The number of observations used for Liiga was 15, which includes every team that played during the 2020/2021 season. The R-squared value is calculated to be 0.798 or 79,8%, which is a relatively high number, indicating that the complete model is a good fit, and that the

chosen independent variables represent a good portion of the variation in revenue. The R-squared value suggest a strong relationship between the independent and dependent variables, but it is important to recognize that causality cannot be always inferred from a simple regression analysis alone.

Table 5, Liiga regression statistics

Regression Statistics	
Multiple R	0.893326418
R Square	0.798032089
Adjusted R Square	0.76437077
Observations	15

4.2.2 SHL

The number of observations for SHL was 14, which is 1 less than in Liiga. This includes every team that played during the 2020/2021 season, but not the teams that got promoted during the end of the season. The R-squared value is calculated to be 0.876 or 87,6%, which is an even higher number than for Liiga, indicating that the complete model is an even better fit for the SHL.

Table 6, SHL regression statistics

Regression Statistics	
Multiple R	0.935753315
R Square	0.875634267
Adjusted R Square	0.853022315
Observations	14

4.3 The variables

4.3.1 Liiga

Staff costs is expected to have a positive impact on revenue. The results in table 7 show that the coefficient for staff costs is 1.299, which means that for every increase in units in staff

costs, revenue is expected to increase by 1.299 units. This confirms the positive correlation of staff costs to revenue. The P-value for staff costs is 0.005. Since the P-value is lower than the chosen significance level of 0.05, it suggests that the relationship between staff costs and revenue is significant and that changes in staff costs are likely to have an impact on revenue.

Equity is expected to have a positive impact on revenue. The results in table 7 show that the coefficient for equity is 0.399, which indicates that for every unit increase in equity, a 0.399 increase is expected in revenue. The P-value for equity is 0.037. Since the P-value is lower than the chosen significance level of 0.05, it suggests that the relationship between equity is technically significant, but not as significant as staff costs. The positive results associated with higher staff costs and equity is consistent with Pyatunin's theory. As mentioned above in studies done outside of Finland, the research shows that the richer a club is, the more potential they have to be economically efficient due to having access to better players, more paying competitions and more streams of revenue.

Intercept, or revenue, has a much higher coefficient of 971663.833. This highlights the importance of the teams or leagues baseline revenue. The intercept is important since it suggests that even without any equity or staff costs, the revenue would still be remarkable. Interpreting the regression model, while staff costs and equity have coefficients of 1.299 and 0.399 respectively, it still shows that the baseline revenue is a more dominant factor. This is supported by, for example, the previously mentioned theories of revenue diversification and brand equity. The intercept is higher because the teams have also diversified their revenue to such as merchandise or sponsorships. Brand equity makes the sponsorships and merchandise sales even stronger, which contribute to the coefficient of the intercept.

Table 7, Liiga Variables, Coefficients and P-value

Variable	Coefficient	P-value
Intercept	971663,833	0,511
Staff costs	1,299	0,005
Equity	0,399	0,037

4.3.2 SHL

Staff costs is expected to have a positive impact on revenue. The results in table 8 show that the coefficient for staff costs is 1.765, which means that for every increase in units in staff costs, revenue is expected to increase by 1.765 units. This confirms the positive correlation of staff costs to revenue. The P-value for staff costs is 0.005. Since the P-value is lower than the chosen significance level of 0.05, it suggests that the relationship between staff costs and revenue is significant and that changes in staff costs are likely to have an impact on revenue.

Equity is expected to have a positive impact on revenue. The results in table 8 show that the coefficient for equity is 0.205, which indicates that for every unit increase in equity, a 0.205 increase is expected in revenue. The P-value for equity is 0.098 Since the P-value is higher than the chosen significance level of 0.05, it suggests that the relationship between equity and revenue in the SHL might not be statistically significant. Overall, the staff costs for both Liiga and the SHL indicate that there is a relatively strong relationship between it and revenue. For Liiga, equity also plays an important role, however, in the SHL the correlation between equity and revenue is not as straightforward. This might be because of different ownership structures, but more testing is needed to be sure.

Intercept, or revenue, has a much lower coefficient than staff costs and equity in the case of SHL as shown in Table 8. The much lower coefficient again signifies the importance of the baseline value mentioned in chapter 4.3.1. As the coefficient is negative, it can possibly be explained by the previously mentioned theories such as market saturation or underperforming assets.

Table 8, SHL Coefficient and P-value

Variables	Coefficient	P-value
Intercept	-7840246.578	0.714
Staff costs	1.765	0.000
Equity	0.205	0.098

5 Discussion

The aim of this study was to conduct an analysis to investigate the correlation between the financial management practices, more specifically cost management and equity management, and the financial performance of the teams in Liiga and the SHL. This chapter aims to answer the research questions provided in chapter 1.1.

A regression analysis was conducted separately for both Liiga and the SHL, and after that the results were analyzed. This was meant to highlight the importance of understanding financial management practices, both on and off the ice, that affect a hockey teams ability to compete financially.

5.1 Discussion of results

Staff costs is expected to have a positive impact on **revenue** in both Liiga and the SHL. The results provided in chapter 4 presents a positive correlation for both leagues and show a relatively strong relationship. Liiga's staff costs had a lower impact on the team's revenue, indicating that Liiga invests more in developing youth players, which is cheaper than acquiring already developed talent at a higher cost. The SHL's higher staff costs is also a result of being a larger country with more possible attendees, leading to more money to spend on acquiring said players. This highlights the importance of investing in personnel, including players and support staff to generate a healthy amount of revenue, affirmed by the previously mentioned cost management theories.

Equity is expected to have a positive impact on **revenue** in Liiga. The results provided in Table 7 show this correlation and supports the original presumption of a positive impact, even more than staff costs impact. The link between equity, staff costs and revenue is consistent with Pyatunin's theory. As mentioned above in studies done outside of Finland, the research shows that the richer a club is, the more potential they have to be economically efficient due to having access to better players, more paying competitions and more streams of revenue.

Equity is expected to have a positive impact on **revenue** in the SHL. The results provided in Table 8 show this correlation and again, supports the original presumption of a positive impact, but less so than for Liiga. Table 8 also lays out the P-value for equity, 0.098, which

was lower than the chosen significance level of 0.05. This might suggest a potential non-significance.

The results from the regression and the results for equity in Table 8 is supported by the previously mentioned theory on ownership structures. The SHL's more complicated joint-stock ownership structure might influence the impact of equity on revenue in a different way than it does compared to Liiga's ownership model. More testing is needed to be sure how equity influences revenue in the SHL.

Baseline revenue, which is represented by the **intercept**, has a much different coefficient in both leagues compared to their other variables. In Liiga, according to the numbers provided in Table 7, the intercept correlation is a strong and positive number, which is corroborated by the earlier theory of revenue diversification and brand equity. Diversified sources of income, positive brand recognition and a loyal fan base contribute to the baseline revenue significantly.

Table 8 lays out a negative number for the intercept correlation than in the case of SHL. The much lower coefficient again signifies the importance of the baseline value. As the coefficient is negative, it can possibly be substantiated by the previously mentioned theories such as market saturation or underperforming assets. Other external factors such as different strategies for fan engagement or specific ownership models might also contribute to different baseline values.

5.2 Discussion of methods

However, even if the study provided us results that show a correlation between the variables, too few observations were chosen. This results in the study not being as valid as a study with more observations about the same topic. With more observations spanning more years or more leagues would lead to a more insightful regression analysis and provide an even deeper understanding of the relationships between revenue, staff costs and equity. A more extensive set of data would have allowed for a more insightful regression, which would have led to a deeper understanding on how staff costs, equity and revenue interact over time.

6 Conclusions

The lack of comparative analysis done between Liiga and the SHL and why the gap between the leagues is closing is the main motivation for this study. Since the sport is continuously developing, both financially and athletically, it is necessary to examine the relationship between financial management practices closer.

This research paper, using a regression analysis, studies financial management practises affect the financial performance of teams. More accurately, how staff costs and equity impact revenue. The empirical evidence of this research shows us that there is a definite connection between the beforehand mentioned variables, but the correlation is not as strong for every variable as was predicted.

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8 Appendices

Appendix 1: Teams in Liiga including the variables used.

Team	Revenue	Staff costs	Equity
Ässät	5,159,818.00 €	3,327,192.00 €	405,608.00 €
Hifk	8,739,677.00 €	5,615,732.00 €	5,147,092.00 €
Hpk	5,225,659.00 €	3,494,440.00 €	2,400,556.00 €
Ilves	11,112,315.00 €	4,312,760.00 €	4,577,833.00 €
Jukurit	5,003,816.00 €	2,943,320.00 €	718,638.00 €
Jyp	6,013,418.00 €	3,361,734.00 €	365,730.00 €
Kalpa	6,690,243.00 €	3,601,866.00 €	679,387.00 €
Kärpät	11,386,438.00 €	5,971,633.00 €	8,188,098.00 €
Kookoo	5,530,798.00 €	3,305,506.00 €	1,708,951.00 €
Lukko	7,411,365.00 €	5,663,246.00 €	1,345,158.00 €
Pelicans	6,923,557.00 €	4,053,787.00 €	763,407.00 €
Saipa	4,691,733.00 €	3,126,546.00 €	1,250,209.00 €
Sport	5,231,603.00 €	3,407,183.00 €	30,324.00 €
Tappara	12,502,013.00 €	6,128,408.00 €	5,673,511.00 €
Tps	8,226,277.00 €	5,146,817.00 €	-986,099.00 €

Appendix 2: Teams in SHL including the variables used.

Team	Revenue	Staff costs	Equity
Brynäs IF	SEK 162,548,000	SEK 99,246,000	SEK 39,122,000
Djurgårdens IF	SEK 132,748,000	SEK 88,137,000	SEK 18,170,000
Färjestad BK	SEK 190,557,000	SEK 105,257,000	SEK 130,267,000
Frölunda HC	SEK 188,938,000	SEK 95,804,000	SEK 66,168,000
IK Oskarshamn	SEK 83,590,000	SEK 52,674,000	SEK 16,694,000
Leksands IF	SEK 160,207,000	SEK 82,612,000	SEK 27,729,000
Linköping HC	SEK 148,098,000	SEK 88,176,000	SEK 4,248,000
Luleå Hockey	SEK 169,942,000	SEK 89,512,000	SEK 40,362,000
Malmö Redhawks	SEK 125,487,000	SEK 74,668,000	SEK 8,634,000
Örebro HK	SEK 140,663,000	SEK 83,746,000	SEK 13,940,000
Rögle BK	SEK 183,771,000	SEK 101,180,000	SEK 22,639,000
Skellefteå AIK	SEK 141,461,000	SEK 71,638,000	SEK 65,888,000
Timrå IK	SEK 98,394,000	SEK 65,537,000	SEK 3,641,000
Växjö Lakers	SEK 149,267,000	SEK 81,878,000	SEK 42,943,000

Appendix 3: Regression statistics Liiga.

Regression Statistics	
Multiple R	0.89332642
R Square	0.79803209
Adjusted R Square	0.76437077
Observations	15

Appendix 4: Regression statistics SHL.

Regression Statistics	
Multiple R	0.935753315
R Square	0.875634267
Adjusted R Square	0.853022315
Observations	14

Appendix 5: Variable, coefficient, and P-value for Liiga.

Variable	Coefficient	P-value
Intercept	971663.833	0.511
Staff costs	1.299	0.005
Equity	0.399	0.037

Appendix 6: Variable, coefficient, and P-value for SHL.

Variables	Coefficient	P-value
Intercept	-7840246.578	0.714
Staff costs	1.765	0.000
Equity	0.205	0.098