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**ANALYSIS AND EVALUATION OF FINANCIAL  
PERFORMANCE OF STORA ENSO**

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I hereby declare that I have compiled the thesis independently and all works, important standpoints, and data by other authors have been properly referenced, and the same paper has not been previously presented for grading.

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## **ABSTRACT**

For long term sustainability the investigation of financial performance of any company is essential. Accounting tools facilitates the respective community to evaluate the financial performance and helps to make effective decisions for the sake of the organization in the future. The most frequently used accounting tools is the financial ratio. Consequently, the persistence of this thesis is to investigate the financial ratios affected by return on assets and return on equity of paper manufacturing companies based in Finland.

To conduct this study, the potential data was collected from the annual reports of six leading companies, i.e., Stora Enso, UPM-Kymmene, Valmet, Metsa board, Kemira, and Ahhlstrom-Munksjo. To acquire the potential results, twenty years of data from 2002–2022 has been considered.

The independent variables of the study are cash ratio, debt to assets ratio, asset turnover ratio, fixed asset turnover ratio, inventory turnover ratio, working capital ratio, accounts receivable ratio, and research and development intensity. Similarly, the dependent variables were return on assets and return on equity. Concerning these variables (independent & dependent), the application applied to this study are pooled regression, fixed effects, and random effects.

The critical findings of this study show that the random effects model is better than pooled regression and fixed effects. Moreover, inventory and accounts receivable results in a positive effect on the return on equity because the variation of financial ratios on return on equity for the random effects is 78% while the accuracy of the respective variables is 76%. Similarly, the accounts receivable ratio results in a positive and significant effect on the return on assets as the variation of financial ratios on return on assets is 97.9% while the accuracy of the model is 97.7%. As a result, the higher accounts receivable ratio indicates that the organisation is effective in safeguarding of its assets.

**Keywords:** Financial performance, Financial ratios, Pooled regression, Fixed effects, Random effects, Finland

# INTRODUCTION

Financial performance is essential for the organization to achieve its goals. Accounting tools help evaluate financial performance and help make effective decisions for the sake of the organization in the future. One of the most widely used accounting tools is the financial ratio because the ratio can help to know about the financial performance of the organization. Erdogan et al. (2015) point out that the financial ratio is tremendously important to assess the growth and operations and compare the performance with the competitors. With the present information, the organization can predict future performance. A considerable amount of literature has been published on financial ratios and financial performance. We know about financial ratios largely based on quantitative research accounts by liquidity and solvency ratio. Although some research has been done on financial ratios, no studies have been found, including research and development intensity as one of the variables in the manufacturing sector.

In addition, most studies have been only carried out as econometric analyses. Similarly, this study evaluates the financial ratios and financial performance of manufacturing companies. In light of recent articles, Kivistö (n.d) outlined that the efficiency of UPM- Kymmene is better than Stora Enso. The study emphasizes that the largest turnover organization performs slightly less (Stora Enso) than the competitors. This gives an insight into measuring the Stora Enso and its performance in Finland. So, the central theme of the thesis is to evaluate the financial ratios of Stora Enso. Recently, there has been renewed interest in financial ratios, which have led to insights to measure return on assets and return on equity of paper manufacturing companies in Finland.

The first reason is that financial ratios, return on assets and return on equity are indispensable aspects of the organization. The second reason is there has been no detailed investigation of aspects of Stora Enso. The third reason is a notable lack of studies describing how financial ratios affect the return on assets and equity in paper manufacturing companies, especially in Finland.

In Finland, manufacturing is the second-largest sector contributing to the economy (Panagiota et al., 2022). Though recession hits the country a lot, a noteworthy boom of major manufacturing sites is developing the country. The boom is due to the digitization of production, automation, data interchange, etc. Most of the manufacturers are choosing Finland for four reasons. Costs level, human capital, distance, and business environment. Although manufacturing companies are getting good support from Finland, the overall contribution of the manufacturing companies is

14.46 of what? In 2020 (The World Bank, n.d). Of the top largest manufacturing companies highlighted, twenty companies dominate the manufacturing sector in Finland. Of these twenty companies, the highest turnover of manufacturing companies is considered. One of the largest manufacturers in Finland is Stora Enso, whose financial efficiency has been gradually decreasing for the last few consecutive years. As observed, it is essential to evaluate the return on assets, return on equity and financial ratios of Stora Enso. Moreover, recent development in the manufacturing sector in Finland has led to an interest in assessing the financial ratios of Stora Enso.

The study investigates the financial ratios affected by ROA and ROE of paper manufacturing companies in Finland.

The objective of the study is to evaluate the financial ratios of paper manufacturing companies for twenty years. It investigates the variation in financial ratios on return on assets and returns on equity of paper manufacturing companies in Finland.

1. What impact do the financial ratios have on return on assets in the paper manufacturing companies listed on the Finnish stock exchange for twenty years?
2. Is there an effect of financial ratios on the return on equity of paper manufacturing companies listed on the Finnish stock exchange for twenty years?

This study aims to determine the overall effect of financial ratios on return on assets and return on equity of paper manufacturing companies in Finland. To address this, the study takes the data from the six paper manufacturing companies listed on the Finnish stock exchange. The data can be accessed from the annual reports of respective companies for 20 years from 2002–2022.

The remainder of this thesis is structured as follows:

Chapter one begins by laying out the theoretical dimensions of the research and looks at how financial ratios affect the return on assets of manufacturing companies. In addition, it measures the financial ratios and their influence on the return on equity of manufacturing companies.

The second chapter examines the methods and application tools used to carry out the work.

The third chapter presents the findings of the research using econometric analysis.

The final chapter includes the implication of the findings for future research.

# LITERATURE REVIEW

## 1.1. Financial ratios

The financial condition of the organization could be revealed with the help of financial ratios (Fahmi, 2015). Many organizations compare their financial ratios with competitors because the ratios evaluate the financial performance and conditions of the organization (Pandey, Bhat 1988). The results of financial ratios exhibits the strengths and weaknesses of the organization. Identifying the strength and weaknesses could help the organization to know whether it is operating properly or if any action is required (Yalcin *et al.*, 2012; Mohammadi, Malek, 2012). Measuring the financial ratios could also offer information on the actual value of the organization (Rashid 2021). This ratio has the potential to explain the fundamentals of an organization irrespective of industry (Nadar, Wadhwa 2019). The financial ratio is of two types, namely normative and positive. The normative approach involves comparing the organization ratios with the standard values. In a positive approach the financial ratios can be used for forecasting purposes (Mohammadi, Malek 2012). So, the assessment outcome of financial ratio from these approaches exhibited the results from the owners' perspective (Khalad 2011).

The objective of the financial ratio is to predict whether an organization is performing in a healthy or unhealthy way (Amalia *et al.*, 2020). Also, it could help the stakeholder to make an effective decision (Nadar, Wadhwa 2019). The ratios showed the image of the organization. The ratio could be used as a future predictive tool (Andesfa, Masdupi 2019). So, most of the analysts, managers, investors, and stakeholders were using financial ratios to evaluate the financial condition of the organization (Laitinen 2018).

Management is using financial ratios to evaluate the performance of managers. The management offers a reward to the best performing managers. With the performance results, the management could measure the departments' performance, offer information to suppliers and creditors, assess the competitive position, and predict the potential of existing or new investors (Wijaya 2015). Financial ratios play an effective role in offering information to all stakeholders.

As observed, several studies investigated the financial ratios of manufacturing companies. The financial ratios covered mainly were solvency, activity, profitability, investment, earnings per



share, gearing ratio, firm size, market value ratio, and sales growth (Abbas 2019; Hanafi, dan Halim 2014; Marito, Sjarif 2020; Normiati, Amalia 2021; Borhan *et al.* 2014; Kariyawasam 2019). Research and development play a key role in manufacturing industries. Studies of research and development intensity have been dealt with financial performance. Research and development is an important asset in generating the firm's revenue and research and development intensity could predict improving firm performance (Erdogan, Yamaltdinova 2019). Higher research and development expenditure, the higher performance (Shamsuddin *et al.* 2012; Bednarek 2014). Although studies measure the effects, there remains a lack of evidence examining research and development intensity and financial ratios.

## **1.2. Financial performance**

Financial performance is the essential performance parameter. This says whether the respective company has succeeded in reaping revenue in the accounting period (Sucipto 2003). With the help of financial performance, the organization could reveal their achievement during the respective period (Fatihudin 2018). Assessing the financial performance revealed how effective the organization manages and controls its resources (Horne *et al.* (2001). Financial performance plays a key role in knowing the financial health of the organization (Matar, Eneizan 2018). The higher the financial performance, the higher efficiency in using the resources (Almajali *et al.*, 2012).

Financial performance could act as an important attribute in deciding the effectiveness of the business operation (Islam 2014). According to the studies (Şamiloğlu *et al.* 2017; Dadebo, Afolabi 2020; Madushanka, Jathurika 2018; Dahiyat *et al.* 2021; Ayoush *et al.* 2021; Lestari *et al.* 2021; Jihadi *et al.* 2021; Putri *et al.* 2020; Ajanthan 2013; Noor, Lodhi 2015; Manullang *et al.* 2020; Manyo, Ugwu 2013; Lismana *et al.* 2021; Efendi *et al.* 2019), ROA and ROE are represented as the outcome of financial performance. On the contrary, several studies documented the outcome of financial performance were Earnings per share, gross profit, net profit, operating profit and operating cash flow (Dahiyat *et al.*, 2021; Jihadi *et al.*, 2021). Recently, considerable literature has grown up around the financial performance outcome of return on assets and return on equity. So, this thesis attempts to evaluate the return on assets and return on equity of paper manufacturing companies in Finland.

Return on assets represents how much profits could be related to the total assets. This ratio helps to measure the effectiveness of the organization. The higher return on assets, the higher the efficient management of organization earnings (Al-Qudah 2016).

$$\text{Return on assets} = \frac{\text{Annual earnings}}{\text{total assets}}$$

Return on equity is how much income could be returned with the shareholder equity. The higher return on equity, the higher profits generated.

$$\text{Return on equity} = \frac{\text{Net income}}{\text{shareholder equity}}$$

### **1.2.1. Solvency ratio**

The solvency ratio offers information about the debts in the capital structure and the potential of cash flows to meet the expenses of the organization (Rahman, 2017). It represents repaying principal payments and benefits (Robinson et al., 2015). The solvency ratio is used to measure the organization's potential to meet its obligations in the long run (Baraja and Yosya, 2019). Much of the current literature on solvency ratios pays particular attention to debt to assets ratio, debt to equity ratio, and debt ratio Ayoush *et al.* (2021); Lestari *et al.* (2021); Putri *et al.* (2020).

The debt to assets ratio is the ratio between total debts to total assets. The ratio is less than one indicates the organization have more assets than debts. The higher ratio, the higher leverage.

$$\text{Debt to assets ratio} = \frac{\text{Total debts}}{\text{Total assets}}$$

The debt to equity ratio is the ratio between total debts to equity. The higher debt to equity ratio, the higher risk to lenders and investors.

$$\text{Debt to equity ratio} = \frac{\text{Total debt}}{\text{Equity}}$$

Table 1. Variable of Solvency ratio

Authors	Variables
Kariyawasam (2019)	The current ratio, earnings per share, gearing ratio, firm size, and market value ratio. Net profit margin
Ayoush <i>et al.</i> (2021)	Liquidity, solvency, and financial leverage. Return on equity and return on assets
Lestari <i>et al.</i> (2021)	Financial ratio: Quick ratio, debt to assets ratio, debt to equity ratio Financial performance: Return on assets
Putri <i>et al.</i> (2020)	Financial ratio: Liquidity and solvency ratio Financial performance: Return on equity

Source: Authors own table

Kariyawasam (2019) states that evaluating financial ratios could help the managers know about the organization's operations and growth with the competitors. Analyzing the financial ratios could help the organization plan for future performance. So, it was essential for the organization to analyze financial ratios. Some financial ratios were taken into account. In addition, financial performance was utilized, and so the aim was to investigate the association between financial ratios and financial performance. The financial ratios of the study were current ratio, earnings per share, gearing ratio, firm size, and market value ratio. Net profit margin considers the financial performance of the company. Next, the variables were assessed for the time of five years. The results indicate that the current ratio, firm size, and leverage are statistically associated with financial performance. Most importantly, the current ratio and firm size positively affected financial performance. Contrary to the outcome, leverage negatively affected financial performance.

Ayoush *et al.* (2021) focused on measuring the effect of liquidity, financial leverage, and solvency on the performance of automobile companies in Jordan. The independent variables were liquidity, solvency, and financial leverage. Performance was ROA and ROE. The assessment of variables was made over seven years. Multicollinearity tests were made to check the high cross-correlation between the variables. There was no multicollinearity in the variables. The outcome of the study revealed that liquidity, financial leverage, and solvency had a 63.4% effect and were statistically significant with ROA. The effect of variables on ROE was 67.6%, which was statistically significant. Financial leverage and solvency had the highest and least effect, respectively, regardless of performance.

Lestari *et al.* (2021) assert that evaluating the companies financial performance could direct the management to meet obligations. It also helped to achieve the goals of the organization. So, the author investigated the financial performance of manufacturing companies listed on the stock exchange in Indonesia. The aim was to investigate the liquidity and solvency ratio on financial performance. The investigation was quantitative. Samples were determined on the purposive sampling technique. The variables were the liquidity ratio of quick ratio, solvency ratios of debt to asset ratio and debt to equity ratio, and ROA of financial performance. Multicollinearity was checked for all the variables. All the variables were non-multicollinearity. From the analysis, it was clear that solvency ratios affected the financial performance, whereas liquidity ratios did not affect for five years.

Putri *et al.* (2020) The purpose of the study was to measure the liquidity and solvency ratio affected by return on assets and return on equity. The population was the companies listed on the stock exchange board in Indonesia. Samples were determined based on the purposive sampling technique. The liquidity ratio of current ratio, solvency ratios of debt to assets ratio, and debt to equity ratio had considered. Assessment of variables in regression analysis showed that the current ratio, debt to assets ratio, and debt to equity ratio had a negative effect on ROA. But current ratio and debt to equity ratio only positively affected ROE.

Table 2. Solvency ratio

Author	Objectives	Results
Kariyawasam (2019)	To investigate the association between financial ratios and financial performance	The current ratio, firm size, and leverage are statistically associated with financial performance
Putri <i>et al.</i> (2020)	To measure the liquidity and solvency ratio affected by return on assets and return on equity	The current ratio, debt to assets ratio, and debt to equity ratio had a negative effect on ROA. But current ratio and debt to equity ratio only positively affected ROE.
Ayoush <i>et al.</i> (2021)	To measure the effect of liquidity, financial leverage, and solvency on the performance of automobile companies in Jordan	Liquidity, financial leverage, and solvency had a 63.4% effect and were statistically significant with ROA. Financial leverage and solvency had the highest and least effect, respectively, regardless of performance.
Lestari <i>et al.</i> (2021)	To investigate the liquidity and solvency ratio on financial performance	Solvency ratios affected the financial performance, whereas liquidity ratios did not affect for five years

Source: Own Illustration

### 1.2.2. Liquidity ratio

The liquidity ratio helps determine the organization's ability to pay the debts at a particular time. It is an important measurement for lenders and creditors. There are three liquidity ratios: current ratio, quick ratio and cash ratio.

The current ratio is the ratio between current assets to current liabilities. The higher ratio, the higher capacity to pay the company obligations.

$$\text{Current ratio} = \frac{\text{Current assets}}{\text{Current liabilities}}$$

The quick ratio represents how the organization could pay their short-term obligations. The higher the quick ratio, the higher owns more assets than liabilities.

$$\text{Quick ratio} = \frac{\text{Current assets} - \text{inventories} - \text{prepaid expenses}}{\text{Current liabilities}}$$

Noor and Lodhi (2015) discussed how the liquidity ratio affects return on assets and return on equity. The independent variables were the current ratio, working capital ratio, and quick ratio, whereas the dependent variables were return on assets and equity. Applying the statistical tools to the variables revealed that liquidity had a negative association with return on assets and return on equity. So, the companies must focus on improving their financial performance and liquidity position to sustain themselves in the market.

Borhan *et al.* (2014) focus on investigating the financial ratios and their effect on the financial performance of companies. The financial ratios were considered liquidity ratios, leverage ratios, and profitability ratios of seven years. Multiple linear regression indicates that the current ratio, quick ratio, debt ratio, and net profit margin are positively and significantly associated with profitability ratios. Out of financial ratios, the current ratio and debt ratio had the highest effect on the financial performance of companies.

Ajanthan (2013) discussed how liquidity was associated with return on equity and return on assets. The association was assessed with the companies listed on the stock exchange in Srilanka. The companies were assessed for five years. The variables of liquidity ratios were current ratio, quick, and liquidity ratio. The outcome showed that the current ratio was positively associated with ROE,

whereas the current and quick were associated with ROA. So, there was an association of liquidity with the profitability of companies in Sri Lanka.

Jihadi *et al.* (2021) reported that Jordanian companies were concerned about the diminishing value of the level of liquidity. These diminishing values affected the financial performance of companies. So, it was essential to study how liquidity ratios are associated with the financial performance of companies. The variables of the study were liquidity ratios and financial performance. Liquidity ratios were current ratio, quick ratio, and cash and defense interval ratio. The financial performance indicators were gross profit, net profit, operating profit, operating cash flow, and return on assets. The study used the descriptive-analytical method to evaluate the relationship between the variables. Observation of results from the variables was that there was no relationship between liquidity ratios and gross profit, followed by the current ratio had a weak relationship with gross profit. Quick and defensive interval ratios are positively associated with operating cash flow margins. The current, quick, and cash ratios are positively associated with return on assets.

Dahiyat *et al.* (2021) reported that manufacturing companies played a key role in Jordan's economy because the industry contribution to GDP was 24.5%. Though industries were flourishing in Jordan, return on assets and earnings per share performance was modest. So, the purpose of the study was to measure the liquidity and solvency ratios of the financial performance of manufacturing companies. Manufacturing companies have been listed on the Amman stock exchange for ten years. Liquidity and solvency ratios were the independent variables, the size of the company was the control variable, and financial performance was the dependent variable. Return on assets and earnings per share is considered the financial performance. Next, checking multicollinearity was to remove high correlations among independent variables. In this study, there was no tolerance and VIF, so the variables were good for analysis. Analyzing the variables reveals that the effect of liquidity, solvency, and company size was 14.8% on return on assets. Liquidity, solvency, and company size affected 17% of earnings per share. Solvency and company size was statistically significant. The results were in line with the pecking order theory. As observed, liquidity was statistically insignificant with financial performance.

Madushanka and Jathurika (2018) discussed that the shareholders of manufacturing companies were concerned about liquidity. Liquidity had the power to determine the financial performance of the companies. So, the study investigated how liquidity was associated with ROA and ROE of

manufacturing companies in Sri Lanka. The Manufacturing companies have been listed on the Colombia stock exchange for five years. The study approach was quantitative. The variables of the study were liquidity ratios, ROA and ROE. Liquidity ratios were independent variables, and ROA and ROE as the dependent variables of the study. Measuring the variables revealed that the liquidity ratios effect on ROA was 6.2%, and ROE was 15%. Out of two liquidity ratios, the only quick ratio had a positive and statistical effect on ROA and ROE, but the others were insignificant. It is quite surprising to see that there was no relationship between the current ratio, ROA and ROE

Prasetyaningrum *et al.* (2022) evaluate the financial performance of manufacturing companies in Indonesia. The manufacturing companies listed on the Indonesian stock exchange were considered. These companies considered three years of quick ratio, current ratio, return on investment, net profit margin, and financial performance. These companies were selected based on the purposive sampling technique. The samples were measured through quantitative research. Assessment of variables revealed that the effect was 3.2% on financial performance and changes in financial performance increased the variables to 0.250.

Dadepo and Afolabi (2020) discussed the relationship between liquidity management and financial performance variables. Generally, the nature of the relationship might vary from one sector to another. Most of the studies ignored the existence of a relationship between variables. So the study evaluates liquidity management and its effect on financial performance. The liquidity management of current, quick, and cash ratios was considered. Return on assets was the financial performance of the study as the analysis revealed that cash ratio, quick and current ratio had a positive, weak, and moderate relationship with firm performance. Regression analysis indicates that the current ratio, quick ratio, and cash ratio affected firm performance by 37.7%. The current ratio is negatively associated with firm performance, and the outcome was lined with the tradeoff theory. Quick and cash ratios had a weak but insignificant firm performance, but the results aligned with the pecking order theory.

Table 3. Liquidity ratio

Author	Objectives	Results
Noor and Lodhi (2015)	To identify how the liquidity ratio affects return on assets and return on equity	Liquidity had a negative association with return on assets and return on equity

Borhan <i>et al.</i> (2014)	To investigate the financial ratios and their effect on the financial performance of companies	The current ratio, quick ratio, debt ratio, and net profit margin are positively and significantly associated with profitability ratios
Ajanthan (2013)	To evaluate how liquidity was associated with return on equity and return on assets	The current ratio was positively associated with ROE, whereas the current and quick were associated with ROA
Jihadi <i>et al.</i> (2021)	To study how liquidity ratios are associated with the financial performance of companies	There was no relationship between liquidity ratios and gross profit, followed by the current ratio had a weak relationship with gross profit. Quick and defensive interval ratios are positively associated with operating cash flow margins. The current, quick, and cash ratios are positively associated with return on assets.
Dahiyat <i>et al.</i> (2021)	To measure the liquidity and solvency ratios of the financial performance of manufacturing companies	Solvency and company size was statistically significant.
Madushanka and Jathurika (2018)	To investigate how liquidity was associated with ROA and ROE of manufacturing companies in Srilanka	The liquidity ratio effect on ROA was 6.2%, and ROE was 15%. Out of two liquidity ratios, the only quick ratio had a positive and statistical effect on ROA and ROE, but the others were insignificant.
Prasetyaningrum <i>et al.</i> (2022)	To evaluate the financial performance of manufacturing companies in Indonesia	The effect was 3.2% on financial performance, and changes in financial performance increased the variables to 0.250.
Dadepo and Afolabi (2020)	To discuss the relationship between liquidity management and financial performance	Cash ratio, quick and current ratio had a positive, weak, and moderate relationship with firm performance

Source: Own Illustration

### 1.2.3. Activity ratio

The ratio represents how effectively the organization manages and uses its resources (Annaria Magdalena et al., 2021). The ratio measures the potential of the organization using its existing resources to generate sales (Gitman, 2015). In other words, it states that the ratio can measure the liquidity of specific assets and how effectively they are managing assets (Bansal, 2014). The purpose of the ratio is to evaluate the effectiveness level of the organization. The highest is the ratio; the highest is the value of the organization (Gunadi et al., 2020). Kasmir (2018) Points out that assets turnover, working capital turnover, cash turnover, and fixed assets are the activity ratios.



Similarly, Warrad and Rania (2015) found total assets turnover ratio and fixed assets turnover ratio in activity ratios. In contrast, the accounts receivable turnover ratio was used in the studies by Manullang *et al.* (2020); Manyo and Ugwu (2013). In extension to this study, cash turnover, accounts receivable, and inventory turnover ratios were used Lismana *et al.* (2021); Amanda (2019). Some authors (Efendi *et al.* (2019)) have attempted to use the total assets turnover ratio as the activity ratio. The formula for all the activity ratios presents in the below table.

Table 4. Variable of activity ratio

Ratio	Description
Fixed assets turnover ratio	<p>The ratio represents how efficient the organization generates sales from the existing assets.</p> $\text{Fixed assets turnover ratio} = \frac{\text{sales}}{\text{average net fixed asset}}$
Assets turnover ratio	<p>It is the ratio of how could company sales are related to the value of assets. The higher ratio, the higher generation of revenue from its assets</p> $\text{Assets turnover ratio} = \frac{\text{sales}}{\text{average total asset}}$
Inventory turnover ratio	<p>It is how efficiently the organization converts the inventory to sales. The higher ratio, the higher sales</p> $\text{Inventory turnover ratio} = \frac{\text{Cost of goods sold}}{\text{average Inventories}}$

Source: Authors own table

The evidence in the section suggests that we use activity ratios are fixed assets turnover ratio, assets turnover ratio, and inventory turnover ratio. The use of quantitative studies is a well-established approach to measuring the activity ratios and financial performance Warrad and Rania (2015); Manullang *et al.* (2020); Manyo and Ugwu (2013); Lismana *et al.* (2021); Amanda (2019); Efendi *et al.* (2019). The criteria for selecting the companies was based on the conditions that they should be listed on respective stock exchange Manyo and Ugwu (2013); Manullang *et al.* (2020); Amanda (2019); Efendi *et al.* (2019). The ratios were normalized using the normality and multicollinearity test by Manullang *et al.* (2020), Lismana *et al.* (2021), and Efendi *et al.* (2019) as Warrad and Rania (2015) found that fixed assets turnover ratio and total assets turnover ratio affected return on assets. In the same vein, in their study, Efendi *et al.* (2019) mention that the total assets turnover ratio affected return on equity. In contrast, Lismana *et al.* (2021); Amanda (2019) point out that cash turnover, account receivable, and inventory turnover did not affect the return

on assets. Similarly, Manullang *et al.* (2020); Manyo and Ugwu (2013) found that only accounts receivable turnover did not affect the return on assets. The detailed description of individual studies is described below

Warrad and Rania (2015) reported that the industrial sector was the backbone of Jordan's economy. Companies that are following legal regulations should come under the industrial sector. There were no studies made to measure the ratios in the industrial sector. So the study identified the gap and examined the activity ratio and financial performance of companies in Jordan. The study variables were total assets turnover ratio and fixed assets turnover ratio. These variables were the independent variables, whereas the return on assets was the dependent variable. The regression analysis and analysis showed that the total assets turnover ratio had a 66.8% effect on return on assets. Next, the fixed assets turnover ratio had a 72.2% effect on return on assets. Most importantly, the variables were significant. So, the study concluded that the activity ratio had also influenced the financial performance of companies in Jordan.

Manullang *et al.* (2020) say that the effect of accounts receivable, current ratio, and debt to equity ratio on return on assets of manufacturing companies. These effects were measured on the descriptive method. So, the study picked out the manufacturing companies that should be listed on IDX. The time taken for the companies was three years for the study. The independent variables were accounts receivable, current ratio, and debt to equity ratio. Return on assets was the dependent variable for the study. Next, the variables were tested in the normality test. The test revealed that the data were normally distributed. There was no multicollinearity and heteroscedasticity. So, the study evaluating the variables showed that debt to equity ratio and accounts receivable had an insignificant effect on return on assets. In contrast, the current ratio had a statistical effect on return on assets.

In the article by Manyo and Ugwu (2013), the authors investigated how account receivable turnover affected the return on assets of Nigerian firms. The firms listed on the Nigerian stock exchange took into account. Regression analysis revealed that the accounts receivable turnover ratio had a negative effect on return on assets. So, managers should work on diminishing the receivables and inventory to increase the return on assets of the firm.

Lismana *et al.* (2021) state that the study focused on finding out how cash turnover, accounts receivable turnover, and inventory turnover on ROA. Quantitative methods could help to assess

the variables. The samples of the manufacturing companies were determined on the purposive sampling method. The company variables of three years were assessed. Next, the variables were passed through normality, multicollinearity, and autocorrelation test. These tests revealed that there was no problem with the datasets. So, regression was applied, and the outcome revealed that the ratios (cash turnover, accounts receivable, and inventory turnover) did not affect the return on assets.

Amanda (2019) discussed the effect of cash turnover, receivable turnover, inventory turnover, and current ratio on return on assets. IDX listed chemical manufacturing companies were considered. These companies were selected on the purposive sampling technique. The period of years was five. Evaluating the ratios indicated that the current ratio affected return on assets rest of the variables (cash turnover, receivable turnover, and inventory turnover) were insignificant

Efendi *et al.* (2019) reported that automobile companies were under stringent pressure to maintain quality, satisfy customers based on their needs, and sustain themselves in the market. The sustainability was based on the financial performance of the companies. To know the real performance, it was essential to measure how the debt to equity ratio and total assets turnover ratio affected the return on equity of automobile companies in Indonesia. The automobile companies listed on IDX took into account. Ratios were free from normality and multicollinearity. Total assets turnover ratio and debt to equity ratio affected return on equity by 45.2%. Specifically, the variables were significant with return on equity.

Table 5. Activity ratio

Author	Objectives	Results
Warrad and Rania (2015)	To examine the activity ratio and financial performance of companies in Jordan	The activity ratio has also influenced the financial performance of companies in Jordan.
Manullang <i>et al.</i> (2020)	To investigate the effect of accounts receivable, current ratio, and debt to equity ratio on return on assets of manufacturing companies	Debt to equity ratio and accounts receivable had an insignificant effect on return on assets. In contrast, the current ratio had a statistical effect on return on assets.
Manyo and Ugwu (2013)	To investigate how account receivable turnover affected the return on assets of Nigerian firms	The accounts receivable turnover ratio had a negative effect on return on assets

Lismana <i>et al.</i> (2021)	To focus on finding out how cash turnover, accounts receivable turnover, and inventory turnover on ROA	The ratios (cash turnover, accounts receivable, and inventory turnover) did not affect the return on assets
Amanda (2019)	To discuss the effect of cash turnover, receivable turnover, inventory turnover, and current ratio on return on assets	The current ratio affected return on assets rest of the variables (cash turnover, receivable turnover, and inventory turnover) were insignificant
Efendi <i>et al.</i> (2019)	To measure how the debt to equity ratio and total assets turnover ratio affected the return on equity of automobile companies in Indonesia	Total assets turnover ratio and debt to equity ratio affected return on equity by 45.2%

Source: Own Illustration

### 1.3. Conceptual framework

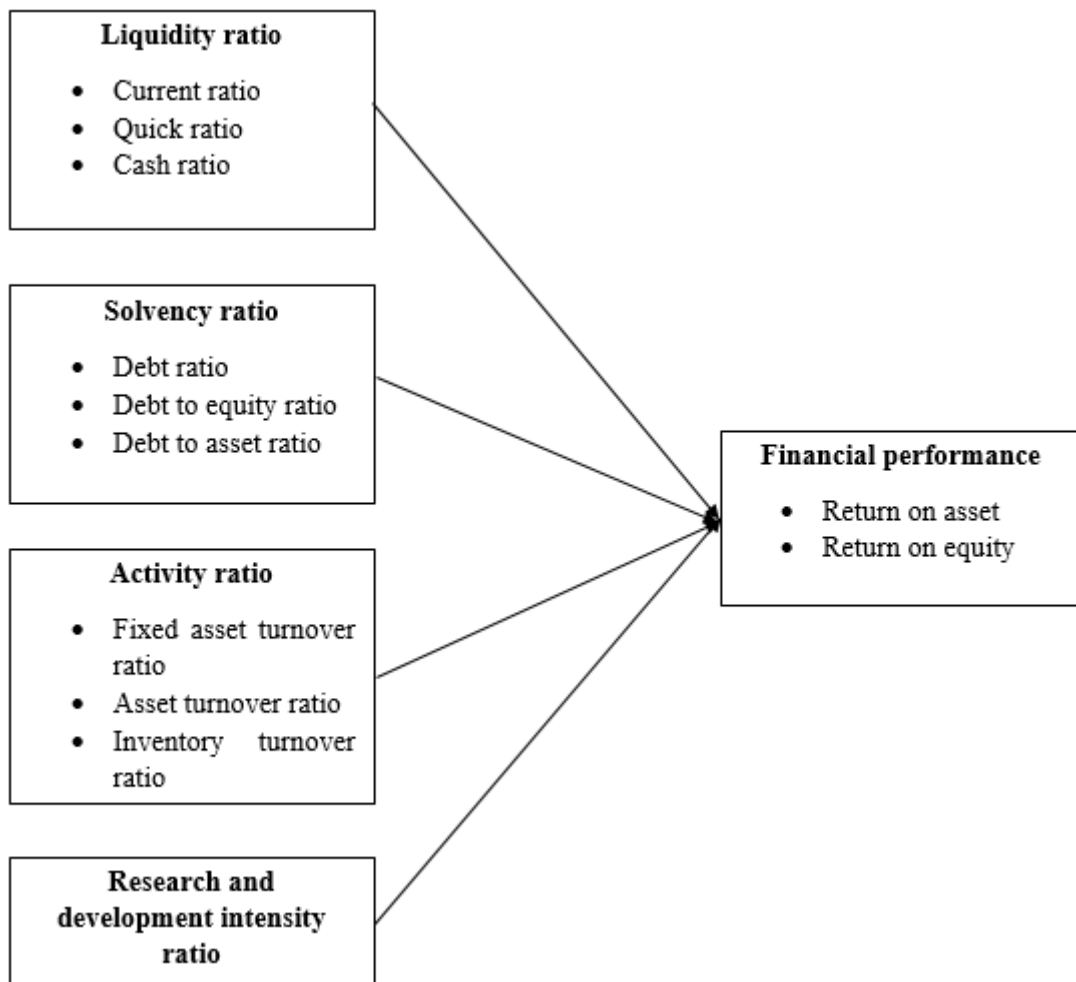


Figure 1. Conceptual framework

Source: Own Illustration

The figure illustrates that the independent variables are liquidity, activity, and solvency ratios. The dependent variables of this study are a return on assets and a return on equity. The liquidity ratio of the current ratio, quick ratio, and cash ratio is considered. Activity ratios of fixed assets turnover, assets turnover, inventory turnover, and accounts receivable turnover ratio takes into account. Although many studies took the liquidity and solvency ratio, this work differs in how it includes research and development intensity and financial ratios. In addition, it is not yet clear the impact of research and development intensity on return on assets and returns on equity. So, this study evaluates the financial ratios, research and development intensity on ROA and ROE.

## 1. RESEARCH METHODOLOGY

The population is the paper manufacturing companies in Finland. There are six leading paper manufacturing companies in Finland. The respective companies are UPM-Kymmene, Valmet, Metsa board, Kemira, Ahhlstrom-Munksjo and Stora Enso. The criteria for selecting the sample is that the company should be listed on the Finnish stock exchange.

. The selection of the sample is based on a judgemental sampling technique. Of the six companies, five companies take into account. The five companies are UPM-Kymmene, Valmet, Metsa board, Kemira and Stora Enso.

Stora Enso: Stora Enso Oyj is a well-known manufacturer organization in Finland. They are familiar with owning private forests in the world. They are specialized in producing renewable products. The purpose of the organization is to do good for the people and the environment. They focused on transforming non-renewable materials with renewable products. The values of the organization are to lead and do what is right. The organization is traded in Nasdaq Helsinki and Nasdaq Stockholm. As of December 2021, the workforce of Stora Enso Oyj is twenty-two thousand and ninety-four(Annual report, 2021).

UPM-Kymmene: The organization is a familiar forerunner in the forest industry. It is one of the third largest pulp and paper manufacturing companies globally. In 2021, the approximate workforce of UPM-Kymmene will be 17,000 in 46 countries. The organization is involved in producing consumer paper in an eco-friendly way. The strategy is to develop materials and process the material to prevent the society from climate change. They also focus on developing alternatives to a fossil-based material. The target of the organization is to reduce carbon dioxide emissions by 80%. As of 2021, the sales of UPM-Kymmene are 12,04,10,167.05 Euro (annual report, 2021)

Valmet Oyj: The organization is familiar in Finnish. They are involved in developing and supplying technologies and automation systems and services for paper, pulp and energy industries. The organisaiton aims to become a global champion in offering services to customers. As of

2021, 13,598 professionals work in the organization in 30 countries. In 2021, the average sales of the organization will be 4,54,65,643.03 euros (Annual report, 2021).

Kemira Oyj is a global company serving the customers of pulp, paper, industry, and water customers. The organization is involved in meeting the fast-developing 'Future of paper' with chemists to gain a competitive advantage in the market. Presently, the organization has a workforce of 5000 employees. The annual revenue of the organization is 2.7 billion euros.

Ahlstrom-Munksjo is offering solutions through fiber. With the help of technology and an innovative and entrepreneurial culture, they explore new materials and new applications. They are involved in producing baking papers. The organization has a workforce of 7800 employees in 14 countries. The net sales of the organization are 3.1 billion Euros.

Data collection methods: Liquidity ratios, solvency ratios, activity ratios, research and development intensity, return on assets and return on equity gathered from the annual reports of respective companies. The ratio of twenty years takes into account (2002-2022).

Multicollinearity problem: The study has developed two models for measuring financial ratios. In Model 1, the dependent variable is the return on equity, whereas the return on assets is Model 2.

Model1: The values of multicollinearity reveal that the current ratio is 78.186, 77.462 is the quick ratio, cash ratio is 2.645, 187.756 for debt ratio, debt to equity ratio is 14.599, 7.265 for debt to asset ratio, 180.312 is asset turnover, 3.799 is fixed assets turnover, 17.776 is inventory turnover, working capital turnover is 1.096, accounts receivable turnover is 3.318 and research and development to sales ratio is 1.331. The values higher than ten indicate a higher problem. In this study, higher collinearity exists in the current ratio, quick ratio, debt to equity ratio, assets turnover, and inventory turnover ratio. So, all the complex variables were removed from this model. Therefore, the finalized variables are cash ratio, debt to assets ratio, fixed assets turnover ratio, working capital turnover ratio, accounts receivable turnover ratio and research and development intensity.

Model 2: Multicollinearity values of current ratio are 78.186, quick ratio is 77.462, 2.645 for cash ratio, the debt ratio is 187.756, debt to equity ratio is 14.599, debt to assets ratio is 7.265, assets turnover ratio is 180.312, fixed assets turnover ratio is 3.799, inventory turnover ratio is 17.776,

working capital turnover ratio is 1.096, accounts receivable turnover ratio is 3.318 and research and development to sales ratio is 1.331. Multicollinearity problem is high in current ratio, quick ratio, debt ratio, debt to equity ratio, assets turnover ratio and inventory turnover ratio. So I drop the variables. Finalized variables are cash ratio, debt to assets ratio, fixed assets turnover ratio, working capital turnover ratio, accounts receivable turnover ratio, and research and development to sales ratio.

Hausman test: It is used to evaluate the consistency of the predictions with the pooled OLS. The panel analysis uses to measure the feasibility of the models. The hypothesis for the model1 and 2 presents below

Table 6. Hausman test

Particulars	Hausman test
Model 1	0.2191
Model 2	0.6364

The hypothesis for Model1:

H0: Random effect model is better than the fixed effect model

H1: Fixed effect model is better than the random effect model

The p-value for model 1 is 0.21, which is greater than the 5% level of significance. So, the null hypothesis is accepted, and so the random effect model is better than the fixed effect model

The hypothesis for Model 2:

H0: Random effect model is better than the fixed effect model

H1: Fixed effect model is better than the random effect model

The p-value for model 2 is 0.6364, which is greater than the 5% level of significance. So, it observes that the random effect model is better than the fixed-effect model.

The Hausman test suggests that the random effect model is the best-suited model for return on assets and equity. So, the interpretation of random effects for two models presents in the subsequent section.



## Autocorrelation

Auxiliary regression including lagged residual:

	Coefficient	std. error	t-ratio	p-value
C	0.0587459	0.0336361	1.747	0.1556
Cash ratio	0.0641326	0.0286736	2.237	0.0890 *
Debt to asset ratio	0.0262599	0.0103165	2.545	0.0636 *
Fixed asset turnover	-0.0174664	0.0113223	-1.543	0.1978
Working capital turnover	-0.000299393	0.000128912	-2.322	0.0809 *
Account receivable turnover	-5.25024e-05	7.10473e-06	-7.390	0.0018 ***
R&D to sales ratio	-0.598003	0.249049	-2.401	0.0743 *
uhat (-1)	0.415298	0.0635952	6.530	0.0028 ***

n = 95, R-squared = 0.5724

Wooldridge test for autocorrelation in panel data -

Null hypothesis: No first-order autocorrelation ( $\rho = 0$ )

Test statistic:  $t(4) = 6.53034$

With p-value =  $P(|t| > 6.53034) = 0.00284049$

According to the results, the p-value is lesser than the 5% significance level. So it concludes that the variables have no serial autocorrelation problem.

Normality: The test for the null hypothesis of normal distribution reveals the chi-square as 326.795, and the p-value is 0.000. The p-value is lesser than the 5% level of significance. So, it concludes that the data is normally distributed.

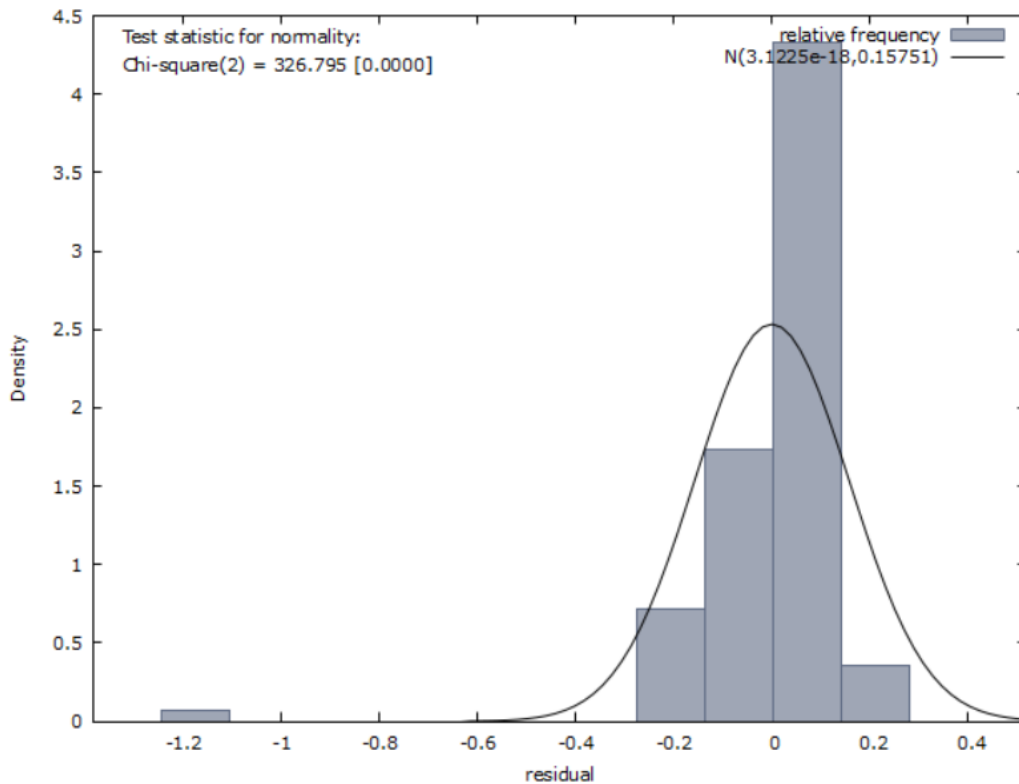


Figure 2: Normality  
Source: Own calculation

Statistical tools: The study was run the statistics descriptive statistics, correlation, pooled OLS, fixed effects and random effects using E-views.

Model specification: This section describes two models of industry analysis. One model is with return on assets and the second model is a return on equity. A detailed description of the model specification presents below.

### Industry analysis

The main intention of applying econometric analysis is to determine whether financial ratios affect the return on assets and return on equity. The effects measure the paper manufacturing industry in Finland. In the present study, the dependent variables are returned on assets and return on equity. Financial ratios are the independent variable of this study. With the help of variables, fixed effects and random effects are conducted. OLS regression model differs among individuals. Each individual might have pre-requisites on its own. The equation of the fixed effect model is as follows

$$y_{it} = x_{it}\beta + v_i + \mu_{it}$$

$y_{it}$  = Return on assets; Return on equity

$x$  = independent variables (financial ratios)

$\beta$  is the coefficient

$\mu$  =error term

$v$  = unobserved firm effect

$i$  = paper manufacturing companies number; and

$t$  =time

Random effect models specify that the independent variables have a fixed association with the dependent variables across all observations. The equation of the random effect model is as follows

$$y_{nt} = b_{0nt} + \sum_{k=1} b_k x_{knt} + \varepsilon_{nt}$$

and,

$$\varepsilon_{nt} = u_n + v_t + w_{nt}$$

In this sector, we are interested in specifying the models related to OLS, fixed and random effect models. The application of techniques and their results describes in detail in the next chapter.

## **2. EMPIRICAL ANALYSIS**

This section aims to outline the results of financial ratios, research and development intensity and return on assets and return on equity. The average value of dependent and independent variables shows in descriptive statistics. OLS regression uses to determine the effect of financial ratios on return on equity and return on assets of Stora Enso. The pooled OLS regression reveals the financial ratios and their effect on dependent variables of paper manufacturing companies in Finland. Lastly, the fixed and random effects of paper manufacturing companies in Finland are described. In the sub-sections, we describe the analysis in detail.

### **2.1. Organization Analysis: Stora Enso**

The financial ratios, return on assets, and return on equity of twenty years are assessed with the descriptive statistics and OLS regression model. As described in the previous chapter, dependent variables are return on assets and return on equity. Liquidity ratio, solvency ratio, activity ratio and research and development intensity. After determining the variables, descriptive statistics shows the observation of ratios for twenty years. Next, the assessment of descriptive statistics was carried out using E-views. The description of the outcome is shown in the subsequent section.

#### **2.1.1. Descriptive statistics**

As observed in Table 6, the average return on assets for Stora Enso was 0.0496 or 4.96% with the precision of 0.0849, which shows that the organization has to improve the usage of assets to generate profits. The average return on equity for the Stora Enso was 0.0246 or 2.4%, with a standard deviation of 0.0403, indicating that Stora Enso is less effective in utilizing equity capital. So, they are poor in making decisions related to unproductive assets.

The average values for independent variables of cash ratio, debt to assets ratio, assets turnover ratio, fixed assets turnover ratio, inventory turnover ratio, accounts receivable ratio, and research

and development intensity were 0.3416, 0.6964, 0.7455, 1.4961, 3.1 and 0.0073 respectively. The standard deviation for cash ratio was 0.1841, debt to assets ratio was 0.2323, 0.1012 for assets turnover ratio, 0.3915 for fixed assets turnover ratio, 2.4526 for inventory turnover ratio and research & development intensity was 0.0073. The cash ratio of Stora Enso indicated that the organization is more on current liabilities rather than cash and cash equivalents. The average debt to assets ratio represented that the organization is safe because they have more assets than debts. The assets turnover ratio of Stora Enso is less than the standard limit (1), so it shows that the assets turnover ratio is not good because assets failed to produce revenue for the organization. The fixed assets turnover ratio of Stora Enso is more, so it is clear that the organization is not investing more in fixed assets. The ratio represents that revenue and turnover are looking, but no capital investment is involved for Stora Enso. The inventory turnover ratio should be between 4-6 indicates a good indicator.

In contrast with the standard limits, Stora Enso has a low inventory turnover ratio. Due to the low ratio, the sales of the organization are very slow. The slow sales increase additional expenses to the organization in terms of outdated, high storage costs, delays in replacing the items and more. The description of mean, standard deviation, Jarque bera test and probability shows below

Table 7. Descriptive statistics: Stora Enso

Particulars	Mean	SD	Jarque-Bera	Probability
Return on asset	0.0496	0.0849	5.4474	0.065
Return on equity	0.0246	0.0403	3.9987	0.135
Cash ratio	0.3416	0.1841	0.562	0.755
Debt to assets ratio	0.6964	0.2323	3.0342	0.219
Assets turnover ratio	0.7455	0.1012	4.299	0.116
Fixed assets turnover ratio	1.4961	0.3915	1.0876	0.58
Inventory turnover ratio	3.1	2.4526	3.2602	0.195
Research and development intensity	0.0073	0.0017	3.0754	0.215

Source: Own Illustration

Jarque-bera test reveals whether the data is normally distributed or not. If the probability value is greater than 0.05, the data is normally distributed. From the twenty observations, return on assets and return on equity have the probability values of 0.065 and 0.135, respectively. The p-value of the dependent variable is higher than the threshold limit (0.05). So, it shows that the dependent variables data is normally distributed. For independent variables, the p-value of cash ratio, debt to

assets ratio, assets turnover ratio, fixed assets turnover ratio, inventory turnover ratio and research and development intensity is higher than 0.05. So, all the stated variables are normally distributed.

## 2.2. Industry analysis

This section provides a little more detail about the econometric analysis of paper manufacturing companies in Finland. The analysis includes descriptive statistics, correlation, pooled OLS, fixed effects, and random effects. An overview of the econometric results shows in the subsequent section.

### 2.2.1. Descriptive statistics

The table shows the twenty-year observation (2002-2022) and the evaluation of descriptive statistics of five paper manufacturing companies and their financial ratios, return on equity and return on assets. The average return on assets and return on equity of paper manufacturing companies in Finland were -0.005 and 0.022940, respectively. The average value of the cash ratio was 0.25 or 25%, with a standard deviation of 0.228. The average and standard deviation of the debt to assets ratio was 0.2357 or 23.57% and 0.544. The averages of activity ratios such as assets turnover ratio, fixed assets turnover ratio, inventory turnover ratio, working capital turnover ratio and accounts receivable ratios were 1.2690 with 4.05, 1.9738 with 0.7061, 2.6310 with 10.188, 5.8113 with 17.217 and 142.79 with 462.48 respectively. Finally, the mean and standard deviation of research and development intensity for twenty years were 0.0024800 and 0.0098406, respectively.

Table 8. Descriptive statistics: Industry analysis

Particulars	Mean	SD	Minimum	Maximum
Return on asset	-0.005	0.3462	-3.331	0.55900
Return on equity	0.022940	0.17221	-1.2360	0.23100
Cash ratio	0.25215	0.22866	-0.21700	1.0740
Debt to assets ratio	0.23579	0.54416	-4.3240	1.0000
Assets turnover ratio	1.2690	4.0595	-5.4660	40.653
Fixed assets turnover ratio	1.9738	0.7061	0.63800	3.8630
Inventory turnover ratio	2.6310	10.188	-61.277	10.625
Working capital turnover ratio	5.8113	17.217	-46.463	84.429
Accounts receivable ratio	142.79	462.48	0.64400	2588.3

Research and development intensity	0.0024800	0.0098406	0.0000	0.095000
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Source: Own Illustration

### 2.2.2. Correlation

As the correlation table 8 shows, the independent and dependent variables are financial ratios and return on equity of paper manufacturing companies in Finland. Financial ratios are liquidity, activity, solvency, and research and development intensity. The analysis results show that the cash ratio, debt to assets ratio, and inventory turnover ratio are moderate and statistically significant with return on equity. The assets turnover ratio, fixed assets turnover ratio, and accounts receivable ratio are negative and significant with return on equity. So, the correlation analysis presents a clear picture that changes in cash ratio, debt to assets ratio and inventory turnover ratio are associated with the changes in return on equity of paper manufacturing companies in Finland.

Table 9. Correlation between financial ratios and return on equity

Particulars	r-value (Sig.)
Cash ratio and return on equity	.297** (.000)
Debt to assets ratio and return on equity	.352** (.000)
Assets turnover ratio and return on equity	-.297** (.000)
Fixed assets turnover ratio and return on equity	-.333** (.000)
Inventory turnover ratio and return on equity	.848** (.000)
Working capital turnover ratio and return on equity	-.005 (.958)
Accounts receivable ratio and return on equity	-.371** (.000)
Research and development intensity and return on equity	.031 (.760)

Source: Own Illustration

As observed in table 9, it is clear that debt to assets ratio, assets turnover ratio, and inventory turnover are statistically significant with the return on assets of paper manufacturing companies in Finland. Among these significant ratios, debt to asset ratio and assets turnover ratio was strongly associated with return on assets. Contrary to this, cash ratio, working capital turnover ratio, and research and development were positive and insignificant with return on assets. Fixed assets turnover ratio and accounts receivable ratio was negative and insignificant with return on assets. So, the correlation analysis suggests that any changes in debt to assets ratio, assets turnover ratio, and inventory turnover ratio are associated with the changes in return on assets.

Table 10. Correlation between financial ratios and return on assets

Particulars	r-value (Sig.)
Cash ratio and return on assets	.154 (.125)
Debt to assets ratio and return on assets	.840** (.000)
Assets turnover ratio and return on assets	.988** (.000)
Fixed assets turnover ratio and return on assets	-.184 (.067)
Inventory turnover ratio and return on assets	.413** (.000)
Working capital turnover ratio and return on assets	.014 (.888)
Accounts receivable ratio and return on assets	-.191 (.057)
Research and development intensity and return on assets	.018 (.859)

Source: Own Illustration

### 2.2.3. Results of models

In this section, two models are developed and evaluated by pooled regression, fixed effects, and random effects. The first model considers the independent and dependent variables as financial ratios and returns on equity. Financial ratios and return on assets are the independent and dependent variables in the second model. The description of the results of Model 1 and Model 2 is shown in Table 11 and Table 12.

Table 11. Result of model1

Particulars		Pooling Model (1)	Fixed effects Model (1)	Random effects Model (1)
Constant	Coefficient	-0.0160488	-0.049	-0.022
	Std. error	0.0456229	0.047	0.044
	t-ratio	-0.3518	-1.03	-0.512
	p-value	0.7258	0.30	0.6095
Cash ratio	Coefficient	-0.0143021	0.04	-0.008
	Std. error	0.0469243	0.05	0.04
	t-ratio	-0.3048	0.81	-0.17
Debt to assets ratio	t-ratio	0.7612	0.41	0.86
	p-value	-0.000152267	-0.068	-0.07
	Coefficient	0.0377923	0.049	0.04
	Std. error	-0.004029	-1.39	-1.53
Assets turnover ratio	t-ratio	0.9968	0.16	0.12
	p-value	0.00342780	-0.04	-0.004
	Coefficient	0.00474330	0.005	0.005
	Std. error	0.7227	-0.81	-0.820
Fixed assets turnover ratio	t-ratio	0.4717	0.41	0.4144
	p-value	-0.00731211	0.007	0.002
	Coefficient	0.0174128	0.017	0.016
		-0.4199	0.39	0.12



	Std. error	0.6755	0.69	0.90
	t-ratio			
Inventory turnover ratio	p-value	0.0166708	0.018	0.017
		0.00120263	0.001	0.001
	Coefficient	13.86	14.22	15.18
	Std. error	3.74e-024 ***	0.000**	0.000**
	t-ratio			
Working capital ratio	p-value	-0.000466318	-0.001	-0.0009
		0.000529287	0.0005	0.000504
	Coefficient	-0.8810	-2.23	-1.93
	Std. error	0.3806	0.028**	0.0560**
	t-ratio			
Accounts receivable ratio	p-value	6.91699e-05	8.78E-05	6.87E-05
		2.71913e-05	2.67E-05	2.54E-05
	Coefficient	2.544	3.288	2.70
	Std. error	0.0127 **	0.016**	0.0083
	t-ratio			
Research and development intensity	p-value	0.679561	10.25	10.48
		0.974909	4.19	4.04
	Coefficient	0.6971	2.44	2.59
	Std. error	0.4875	0.017**	0.0112**
	t-ratio			
	p value			
R square		0.749	0.85	0.78
Adjusted R square		0.727	0.80	0.76
F(8,91)		33.98359	15.47	39.26
P value (f)		3.57e-24	0.000**	0.000**
Durbin Watson		1.269	1.84	1.53

Source: Own Illustration

Pooling interpretation for Model 1: Model 1 considers return on equity the dependent variable. The independent variables are Cash ratio, debt to assets ratio, assets turnover ratio, fixed assets turnover ratio, inventory turnover ratio, working capital ratio, accounts receivable ratio and research and development intensity. From the table, it is clear that the coefficient of determination is 0.749. It indicates that cash ratio, debt to assets ratio, assets turnover ratio, fixed assets turnover ratio, inventory turnover ratio, working capital ratio, accounts receivable ratio and research and development intensity can explain the variation in return on equity. F test in the model evaluates the independent variables and their effect together or simultaneously on return on equity. The probability value is lesser than the 5% level of significance. So, all the independent variables simultaneously affect the return on equity. T-test will determine whether independent variables have an individual or partial effect on return on equity. It considers all the independent variables are constant. So, the interpretation for each variable shows below

If the independent variables are Cash ratio, debt to assets ratio, assets turnover ratio, fixed assets turnover ratio, inventory turnover ratio, working capital ratio, accounts receivable ratio and research and development intensity constant, the constant value is -0.016

The coefficient value of the cash ratio was -0.014, indicating that the cash ratio negatively affects the return on equity. The probability value of the cash ratio is 0.7612 ( $p > 0.05$ ). So, it finds no significant effect of cash ratio on return on equity.

The debt to assets ratio has the coefficient value of  $-0.000152267$ , representing that it negatively affects return on equity. The probability value of the debt to assets ratio was 0.9968 ( $p > 0.05$ ). There was no significant effect of the debt to assets ratio on return on equity.

The coefficient value of the assets turnover ratio was 0.00342780, indicating that the assets turnover ratio positively affects return on equity. The probability value of the ratio was 0.4717 ( $p > 0.005$ ). So, it was clear that the assets turnover ratio positively affects return on equity, and it was not statistically significant.

The fixed assets turnover ratio has the coefficient value of  $-0.00731211$ , representing that the ratio negatively affects return on equity. The probability value of the ratio was 0.6755 ( $p > 0.05$ ). As observed, the fixed assets turnover ratio has a negative and insignificant effect on return on equity.

The coefficient value of the inventory turnover ratio was 0.0166708, representing that the ratio has a positive effect on return on equity. The probability value of the inventory turnover ratio was  $3.74e-024$  ( $p < 0.05$ ). So, it shows that the inventory value has a positive and significant effect on return on equity.

The accounts receivable ratio has the coefficient value of  $6.91699e-05$ , indicating that the ratio positively affects return on equity. The probability value of the ratio was 0.0127 ( $p < 0.05$ ). As observed in the table, the accounts receivable ratio has a positive and significant effect on return on equity.

The coefficient value of research and development intensity was 0.679, representing that the ratio positively affects return on equity. The probability value of the ratio was 0.4875 ( $p > 0.05$ ). So, it

finds that the research and development intensity has a positive and insignificant effect on return on equity.

Overall, model 1 suggests that inventory turnover and accounts receivable ratios have a positive and significant association with return on equity. The negative and insignificant effects of ratios on return on equity were cash ratio, debt to assets ratio, fixed assets turnover ratio, and working capital ratio. Although negative observed, assets turnover ratio and research and development intensity have a positive and insignificant effect on return on equity.

Fixed effects and random effects: In this model, inventory turnover ratio and research & development intensity positively and significantly influence return on equity. It states that an increment in inventory turnover ratio and research & development intensity will increase return on equity. The working capital ratio has a negative and significant influence on return on equity. In contrast, other ratios do not affect the return on equity at a 5% significance level. Random effects show that the ratios (cash ratio, debt to assets ratio, assets turnover ratio, fixed assets turnover ratio, inventory turnover ratio, working capital ratio, accounts receivable ratio and research & development intensity) can be able to explain 78% of the total variation in return on equity. F-value is 39.26, and the p-value is significant at 5%. So, overall, model 1 represents a good fit.

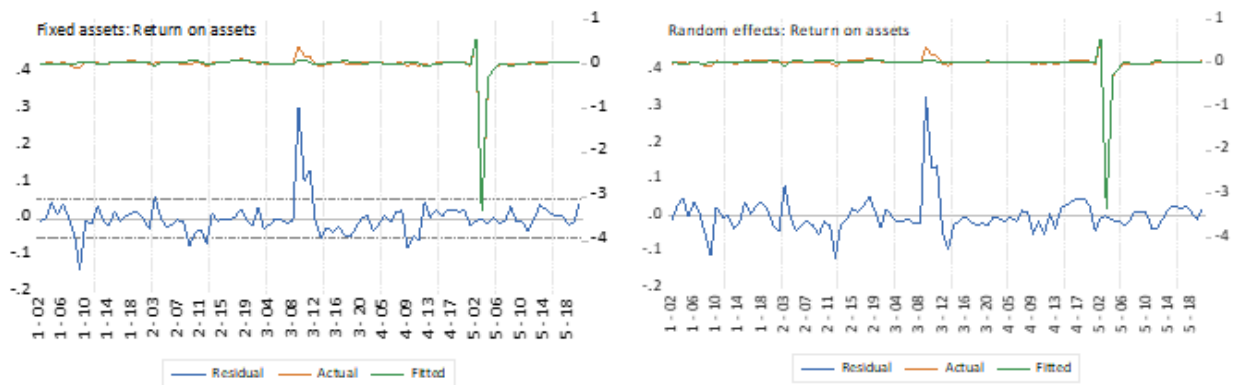


Figure 5: Fixed and Random effect model 1  
Source: Own Illustration

Table 11. Result of a model (2)

Particulars	Pooling Model (2)	Fixed effects Model (2)	Random effects
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				Model (2)
Constant	Coefficient	0.0881173	0.07	0.091
	Std. error	0.0264572	0.03	0.02
	t-ratio	3.331	2.37	3.23
	p-value	0.0013 ***	0.02**	0.017
Cash ratio	Coefficient	0.0253937	0.04	0.019
	Std. error	0.0272119	0.03	0.029
	t-ratio	0.9332	1.13	0.68
	p-value	0.3532	0.25	0.49**
Debt to assets ratio	Coefficient	-0.0369383	-0.052	-0.061
	Std. error	0.0219161	0.034	0.031
	t-ratio	-1.685	-1.53	-1.95
	p-value	0.0953 *	0.12	0.05**
Assets turnover ratio	Coefficient	-0.0884814	-0.09	-0.09
	Std. error	0.00275068	0.003	0.003
	t-ratio	-32.17	-22.68	-24.88
	p-value	1.72e-051 ***	0.000**	0.000**
Fixed assets turnover ratio	Coefficient	0.0134943	0.018	0.015
	Std. error	0.0100979	0.012	0.010
	t-ratio	1.336	1.47	1.412
	p value	0.1848	0.14	0.1615
Inventory turnover ratio	Coefficient	0.000127845	0.000247	0.000345
	Std. error	0.000697416	0.000880	0.000745
	t-ratio	0.1833	0.280328	0.462878
	p-value	0.8550	0.7801	0.6446
Working capital ratio	Coefficient	-0.000247269	-0.000388	-0.000391
	Std. error	0.000306938	0.000360	0.000338
	t-ratio	-0.8056	-1.077	-1.156064
	p value	0.4226	0.2852	0.2509
Accounts receivable ratio	Coefficient	-1.67427e-05	-2.09E-05	-2.12E05
	Std. error	1.57685e-05	1.84E-05	1.68E05
	t-ratio	-1.062	-1.130	-1.259
	p-value	0.2911	0.262	0.2113
Research and development intensity	Coefficient	-0.678218	1.86	2.36
	Std. error	0.565359	2.89	2.70
	t-ratio	-1.200	0.64	0.87
	p value	0.2334	0.52	0.38
R square		0.979142	0.98	0.979
Adjusted R square		0.977309	0.97	0.977
F(8,91)		533.9874	151.68	518.61

P value (f)	5.64e-73	0.000**	0.000**
Durbin Watson	1.327	1.464	1.422

Source: Own Illustration

Pooling interpretation for Model 2: Model 2 has independent and dependent variables. The dependent variable of the model is the return on assets. The independent variables are Cash ratio, debt to assets ratio, assets turnover ratio, fixed assets turnover ratio, inventory turnover ratio, working capital ratio, accounts receivable ratio and research and development intensity. The coefficient of determination of this model is 0.979, representing that independent variable (Cash ratio, debt to assets ratio, assets turnover ratio, fixed assets turnover ratio, inventory turnover ratio, working capital ratio, accounts receivable ratio and research and development intensity) can be able to explain the variation of the dependent variable. F-test indicates that the value is 533.9874 ( $p=5.64E-73<0.05$ ), representing the effect of Cash ratio, debt to assets ratio, assets turnover ratio, fixed assets turnover ratio, inventory turnover ratio, working capital ratio, accounts receivable ratio and research and development intensity simultaneously have on return on assets. Next, the t-test determines whether the independent variables have an individual or partial effect on return on assets.

The independent variables are Cash ratio, debt to assets ratio, assets turnover ratio, fixed assets turnover ratio, inventory turnover ratio, working capital ratio, accounts receivable ratio and research and development intensity. These independent variables have a coefficient of 0.088. If the independent variables are constant, the return on equity represents 0.088.

The cash ratio has a coefficient of 0.025, indicating the positive effect of the ratio on return on assets. The P-value of the cash ratio is 0.3532, which is greater than 5%. So, it observes that the cash ratio has a positive and insignificant effect on return on assets.

The coefficient value of the debt to assets ratio is  $-0.0369383$ , representing the negative effect of the ratio on return on assets. In addition, the p-value of the debt to assets ratio is 0.0953, which is lesser than the 1% level of significance. The debt to assets ratio is negative and significantly affects the return on assets.

The assets turnover ratio has the coefficient value of  $-0.0884814$ , indicating the negative effect on the return on assets. The p-value of the ratio is  $1.72e-051$ , which is lesser than the 5% level of

significance. So, it finds that the assets turnover ratio has a negative and significant effect on return on assets.

The coefficient value of the fixed assets turnover ratio is 0.0134943, representing the positive effect on the ratio on return on assets. The p-value of the assets turnover ratio was 0.1848, which is greater than the 5% level of significance. As the value indicates, the assets turnover ratio has a positive and significant effect on return on assets.

The inventory turnover ratio has the coefficient value of 0.000127845, indicating that the ratio positively affects return on assets. The p-value of the ratio was 0.8550, which is greater than the 5% level of significance. So, the inventory turnover ratio indicates the positive and insignificant effect on return on assets.

The working capital ratio coefficient value was  $-0.000247269$ , indicating the negative effect on return on assets. The working capital ratio and its p-value were 0.4226, which is greater than the 5% level of significance. As the value indicates, the effect of the working capital ratio was negative and insignificant on return on assets.

The accounts receivable ratio has the coefficient value of  $-1.67427e-05$ , representing the negative effect with return on assets. The p-value of the accounts receivable ratio was 0.2911 ( $p > 0.05$ ). So, the accounts receivable ratio has a negative and insignificant effect on return on assets.

The coefficient value of research and development intensity was  $-0.678218$ , indicating the negative effect on return on assets. The p-value of the intensity was 0.2334 ( $p > 0.05$ ). AS the value indicates, the research and development intensity effect on return on assets was negative and insignificant.

In model 2, the accounts receivable ratio was positive and significant with return on assets. In contrast, the debt to assets ratio and return on assets were negative and significant at 1%. The cash, fixed assets turnover, and inventory turnover ratios have a positive and insignificant effect on return on assets. The ratios (Working capital ratio, accounts receivable ratio, and research and development intensity) have a negative and insignificant effect on return on assets

Fixed effects and random effects: In this model, the cash ratio has a positive and significant influence on return on equity. Increment in cash ratio will increase return on equity to 0.019 units. On the contrary, the debt to assets ratio and assets turnover ratio has a negative and significant influence on return on assets. Fixed assets turnover ratio, inventory turnover ratio and research and development intensity have a positive and insignificant influence on return on assets. Accounts receivable and working capital ratios have a negative and insignificant influence on return on assets as the random effect model shows that the variation of independent variables (cash ratio, debt to assets ratio, assets turnover ratio, fixed assets turnover ratio, inventory turnover ratio, working capital ratio, accounts receivable ratio and research & development intensity) can be able to explain 97.9% variation in return on assets. The f-value is 518.61, and the p-value is lesser than the 5% significance level ( $p < 0.05$ ). So the independent variables have the simultaneous influence of the independent variables to return on equity proved statistically significant. Therefore, model 2 represents a good fit

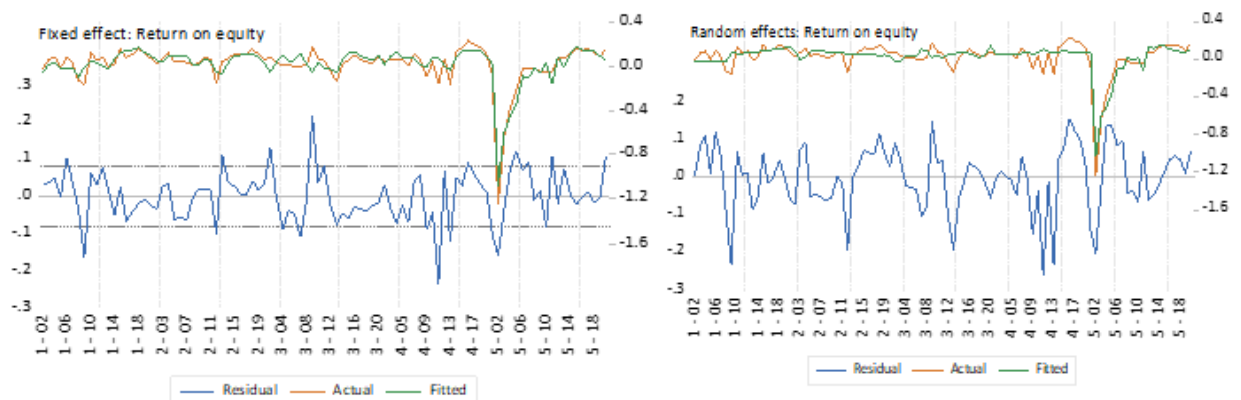


Figure 6: Fixed and Random effect model 2  
Source: Own Illustration

### 2.3. Summary of findings & Discussion

The previous section established the models, applied econometric analysis, and evaluated the outcome. In this section, we are comparing the findings of the study with the previous empirical studies. The discussion has been described in detail.

H1: Cash ratio is associated with return on assets

This thesis measures the cash ratio as cash and cash equivalents in current liabilities. The random effect results showed that the cash ratio was associated with return on assets at a 5% significance level. These results confirm the association between the cash ratio and return on assets (Ajanthan, 2013). In addition, Jihadi *et al.* (2021) support that the quick ratio is associated with the return on assets. Madushanka and Jathurika (2018) found a positive association with the quick ratio of return on assets. The quick ratio and return on assets were integrated positively (Ajanthan 2013). On the other hand, Lestari *et al.* (2021) reported that the quick ratio did not associate with return on assets. In these results, the association between cash ratio and return on assets was weak and significant. Dadepo and Afolabi (2020) showed that the association was moderate and significant. In contrast to this, pooling and fixed effects models were likely to show that there was no association between cash ratio and return on assets. [1]Sugiarto and Acc (2015) Research confirms that cash ratio has a negative relationship with return on assets. This results showed that quick ratio had a negative link with return on assets Noor and Lodhi (2015). As observed, the nature of the weak association of the variables is somewhat surprising given that other research shows them to be positive, strong and significant.

H2: A debt-to-asset ratio is related to a return on assets.

The debt to asset ratio measures total debts by total assets. As the random effects model showed that the debt to asset ratio was negative and statistically significant, with a return on assets of 5%. Pooled results indicated that the association between the variables was negative and significant at 1%. In contrast, there was a negative relationship between debt to asset ratio and return on assets. In accordance with the present results, a previous study demonstrated that there was a negative link between debt to asset ratio and return on assets (Putri *et al.* 2020).

H3: The asset turnover ratio is associated with the return on assets.

The asset turnover ratio measures sales by average total assets. As observed from the random effects model, the asset turnover ratio had a negative association with the return on assets. Similar to this model, pooling and fixed effects had a negative link but were significant. This study has been unable to demonstrate that asset turnover ratio has an association with return on assets (Warrad and Rania, 2015).

H4: The fixed asset turnover ratio is related to the return on assets.

The fixed asset turnover ratio calculates sales as a percentage of average net fixed assets. In the random effects model, the fixed asset turnover ratio had no link with the return on assets. Similar



observations were found in the pooling and fixed effects models. In contrast to earlier findings, however, a link between fixed asset turnover ratio and return on assets was observed (Warrad and Rania 2015).

H5: The inventory turnover ratio is related to the return on assets.

The inventory turnover ratio calculates the cost of goods sold based on average inventories. The random effects model showed that there was no link between inventory turnover ratio and return on assets. Similar observations were found in the pooling and fixed effects models. These results confirm the idea of no association between the variables Lismana et al. (2021).

H6: The working capital ratio is related to the return on assets.

The random effects model results showed that there was a negative link between working capital ratio and return on assets. Pooling and fixed effects model indicated that working capital ratio negatively associated with return on assets.

H7: The accounts receivable ratio is associated with the return on assets.

Accounts receivable ratio calculates sales divided by accounts receivable. As observed from the random effects model, no association existed between accounts receivable ratio and return on assets. This study confirms that there was no link between accounts receivable and return on assets. Lismana *et al.* (2021); Manullang *et al.* (2020). Amanda (2019) found that the accounts receivable ratio and return on assets were insignificant when compared to the findings of other studies. receivable ratio was negative in association with the return on assets. Manyo and Ugwu (2013) found that there was a negative association between accounts receivable ratio and return on assets. Overall, H7 is rejected by all three models (pooling, fixed effects, and random effects).

H8: Research and development intensity is associated with a return on assets.

As observed from the random effects model, there was a positive association between research and development intensity and return on assets. The outcome was insignificant. The pooling model stated that negative association and insignificant association were observed. In contrast to this, a positive association was found between research and development intensity and return on assets.

H9: The cash ratio is associated with the return on equity.

From the random effect model, it was found that the link between liquidity ratio and return on equity was negative and insignificant. Similar results were observed in the pooling model. In

contrast to the fixed effects model, the cash ratio was weak and insignificant. These results are in line with those of previous studies by Lestari *et al.* (2021). Ajanthan (2013) showed that the cash ratio had no association with the return on equity. However, the findings of the current study do not support the previous research by Ayoush *et al.* (2021); Madushanka and Jathurika (2018).

H10: The debt-to-asset ratio is related to the return on equity.

As shown in the model results, the debt to asset ratio had no link with the return on equity. All three models said that no association existed between the variables. Although these results differ from published studies by Putri *et al.* (2020); Noor and Lodhi (2015), they are consistent with those of the negative link between debt to asset ratio and return on equity.

H11: The asset turnover ratio is associated with return on equity.

Efendi *et al.* (2019) found that asset turnover ratio had an association with return on equity. This differs from the findings of a random effect model that shows a negative link with return on equity. A similar negative association was found in the fixed effect model. After pooling, the results were positive and insignificant.

H12: The fixed asset turnover ratio is related to the return on equity.

The pooling model showed a negative link between fixed asset turnover ratio and return on equity. The random and fixed effect models indicated that the fixed asset turnover ratio was positive and insignificant with regard to return on equity. These results are inconsistent with those of Warrad and Rania (2015), who found an association between fixed asset turnover ratio and return on equity.

H13: The inventory turnover ratio is associated with return on equity.

The random effects model showed that the relationship between inventory turnover ratio and return on equity was weak and significant. The pooling and fixed effects models indicated that the relationship was weak and significant. Overall, all the three models were significant.

H14: The working capital ratio is related to the return on equity.

The random effect model indicated that the working capital ratio and return on equity were weak and significant. The pooling model showed the relationship was weak and insignificant. The fixed effect model indicated that the working capital ratio was weak and significant with regard to return on equity.

H15: The accounts receivable ratio is associated with the return on equity.

From the random effect model, the account receivable ratio was insignificant with regard to return on equity. The pooling model and fixed effect model indicated that the accounts receivable ratio and return on equity were significant.

H16: Research and development intensity is associated with a return on equity.

As the random effect model indicated, research and development intensity was positive and significant with a return on equity. The fixed effects model also had a similar outcome with regard to return on equity. In contrast to this, the pooling model had no association with research and development intensity or return on equity.

Some of the other observed results of organization analysis stated that less effective in utilize equity capital likely to affects the profit of the Stora Enso. Liquidity (cash ratio) ratio showed that the organization was effective in meeting the debts. Solvency ratio (Debt to assets ratio) implied the information to the investors that organization was safe and it has a lower risk. Assets turnover ratio indicated that the organization failed to use assets in reaping revenue. The poor inventory turnover ratio was the main reason for incurring additional expenses for the organization.

## CONCLUSION

The study aimed at investigating the financial ratios affected by return on assets and return on equity of paper manufacturing companies in Finland. The panel data used for this thesis was from the annual reports of the respective organisations. The samples were paper manufacturing companies, and the data covered twenty years (2002–2022). The independent variables of the study are cash ratio, debt to assets ratio, asset turnover ratio, fixed asset turnover ratio, inventory turnover ratio, working capital ratio, accounts receivable ratio, and research and development intensity. The dependent variables were return on assets and return on equity. These variables are decided on the basis of previous literature studies.

After deciding the variables, pooled regression, fixed effects, and random effects are measured. The variation of financial ratios on return on equity for the random effects is 78%, respectively. The accuracy of the respective variables is 76%. As the model suggested, inventory and accounts receivable had a positive effect on the return on equity. Next, the variation of financial ratios on return on assets is 97.9% and the accuracy of the model is 97.7%. As the model suggested, the accounts receivable ratio had a positive and significant effect on the return on assets. Overall, the model indicated that the accounts receivable ratio had an effect on the return on assets and return on equity of paper manufacturing companies in Finland. So, the study concludes that the higher accounts receivable ratio indicates that the organisation is effective in safeguarding the assets of the organization.

The implications of this observation are discussed in further detail. Paper manufacturing companies must pay attention to cash ratios in order to increase sales in the sector. the sales of the organisation will increase the profitability. As previously observed, the debt-to-asset ratio influenced asset return. So, it is suggested to reduce the debts of paper manufacturing organisations and increase their total assets. The cash ratio, debt to assets ratio, and inventory turnover ratio all have an impact on return on equity. The paper manufacturing companies have to create the best possible financial performance strategy by giving more importance to selected financial ratios (cash ratio, debt to assets ratio, and inventory turnover ratio). It is advisable to give attention to

managing debts and regulating the usage of external funds in financing the expansion and future operations to generate profits for the selected companies. The companies have to have an effective policy that should be followed to make effective use of resources and generate profits. Increasing profits will give investors confidence to make future investments in the organization.

Future research should be devoted to extending the research period to generalising the results. Adding more periods and increasing the sample size may improve the effectiveness of the model. Further research recommends using price earning ratio, price book value, and how it influences return on assets and return on equity.

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## Appendix 1. Non-exclusive licence

company	Current ratio	Quick ratio	Cash ratio	Debt ratio	Debt to equity ratio	Debt to asset ratio	Asset turnover	Fixed asset turnover	Inventory turnover	Working capital turnover	Account receivable turnover	R & D to sales ratio	Return on equity	Return on asset
1	1.425	0.958	0.468	0.439	0.781	0.439	0.534	0.830	4.569	7.563	8.846	0.008	0.118	0.066
1	1.435	0.997	0.574	0.495	0.979	0.495	0.491	0.730	4.672	6.788	9.957	0.012	0.071	0.036
1	1.231	0.754	0.300	0.506	1.026	0.506	0.668	1.032	5.011	14.941	10.377	0.010	0.118	0.058
1	1.350	0.852	0.359	0.477	0.914	0.477	0.816	1.843	4.444	9.524	9.223	0.010	0.151	0.079
1	1.126	0.680	0.205	0.490	0.959	0.490	0.853	1.745	5.212	26.930	10.409	0.008	0.104	0.053
1	1.213	0.763	0.319	0.529	1.123	0.529	0.795	1.607	5.010	15.364	11.254	0.008	0.080	0.038
1	1.313	0.807	0.298	0.564	1.294	0.564	0.812	1.602	5.069	11.826	10.172	0.007	0.150	0.065
1	1.412	0.963	0.462	0.605	1.534	0.605	0.795	1.685	5.118	7.929	8.497	0.006	0.020	0.008
1	1.668	1.208	0.661	0.612	1.580	0.612	0.785	1.713	5.327	5.040	8.383	0.006	-0.010	-0.004
1	2.037	1.465	0.728	0.596	1.477	0.596	0.757	1.536	5.283	3.953	6.310	0.006	0.083	0.034
1	1.655	1.106	0.409	0.542	1.181	0.542	0.844	2.127	4.578	6.013	6.602	0.004	0.057	0.026
1	1.749	1.175	0.432	0.520	1.084	0.520	0.790	1.959	4.375	5.349	6.342	0.005	0.123	0.059
1	1.435	0.945	0.340	0.553	1.237	0.553	0.772	1.843	4.264	7.855	6.553	0.006	-0.169	-0.076
1	1.430	0.820	0.150	1.000	2.166	1.000	0.901	1.935	-0.314	9.241	6.966	0.007	-0.129	-0.059
1	1.656	1.032	0.304	1.000	1.997	1.000	0.774	1.660	-0.231	5.653	5.743	0.007	0.023	0.012
1	1.508	0.904	0.182	1.000	2.167	1.000	0.659	1.120	-0.201	6.752	5.314	0.007	0.088	0.041
1	1.243	0.717	0.086	1.000	2.338	1.000	0.729	1.327	-0.151	13.283	121.544	0.007	-0.012	-0.005
1	1.586	0.936	0.101	1.000	2.008	1.000	0.755	1.271	-0.149	7.765	77.040	0.007	0.086	0.043
1	1.227	0.784	0.055	1.000	2.243	1.000	0.678	1.222	0.018	14.625	66.698	0.007	0.059	0.026
1	1.816	1.244	0.399	1.000	2.233	1.000	0.702	1.137	0.102	5.723	52.582	0.007	-0.019	-0.008
2	2.130	1.484	0.632	0.386	0.630	0.144	0.555	1.154	3.977	3.519	7.435	0.000	0.119	0.073
2	2.706	1.968	0.988	0.371	0.589	0.131	0.577	1.234	4.149	2.890	7.814	0.000	0.060	0.038
2	2.511	1.759	0.845	0.317	0.463	0.081	0.695	1.512	4.681	3.727	8.378	0.000	0.105	0.072
2	2.242	1.423	0.443	0.300	0.429	0.054	0.749	1.710	4.028	4.208	7.102	0.000	0.153	0.107
2	1.824	1.214	0.333	0.337	0.509	0.067	0.766	1.702	4.850	5.649	6.918	0.000	0.112	0.074
2	1.813	1.230	0.430	0.408	0.689	0.136	0.705	1.535	4.632	5.225	7.209	0.000	0.107	0.063
2	2.048	1.332	0.326	0.440	0.787	0.199	0.714	1.528	4.930	5.036	7.060	0.000	0.115	0.065
2	1.965	1.286	0.350	0.473	0.898	0.215	0.695	1.597	4.760	5.118	6.989	0.000	0.068	0.036
2	1.935	1.311	0.370	0.490	0.960	0.243	0.689	1.614	5.072	5.060	7.192	0.000	0.045	0.023

2	1.889	1.213	0.237	0.501	1.004	0.252	0.702	1.595	4.919	5.749	7.358	0.000	-0.151	-0.075
2	1.527	0.975	0.191	0.514	1.058	0.055	0.654	1.613	6.307	7.376	5.026	0.000	0.061	0.030
2	1.828	1.098	0.151	0.485	0.943	0.021	0.646	1.523	5.879	6.054	5.373	0.000	0.079	0.041
2	0.647	-0.060	0.279	0.515	1.061	0.012	0.567	1.247	6.092	-13.933	5.338	0.000	0.026	0.012
2	1.857	1.116	0.181	0.738	1.252	0.034	0.912	1.663	6.209	6.042	5.612	0.000	0.015	0.009
2	1.371	0.816	0.098	0.674	1.057	0.037	0.943	1.624	6.446	11.187	5.844	0.000	0.029	0.018
2	1.292	0.771	0.083	0.496	0.985	0.036	0.693	1.542	6.784	14.236	6.048	0.000	0.046	0.023
2	1.358	0.823	0.107	0.527	1.115	0.012	0.602	1.278	6.443	11.129	5.655	0.000	0.035	0.017
2	0.774	0.251	0.040	0.667	2.011	0.011	0.702	0.965	2.883	-7.932	26.001	0.000	0.120	0.040
2	0.450	0.000	0.045	0.690	2.230	0.011	2.175	2.991	1.033	-8.276	84.414	0.000	0.063	0.019
2	1.492	0.903	0.194	0.518	1.152	0.042	0.681	1.269	6.685	1.264	6.758	0.000	0.015	0.007
3	0.862	0.491	0.167	0.742	2.881	0.047	0.178	0.638	1.586	-5.049	2.248	0.095	0.023	0.006
3	1.063	0.654	0.345	0.624	1.663	0.250	0.859	2.481	6.201	47.408	10.137	0.008	0.079	0.030
3	1.112	0.599	0.159	0.619	1.621	0.295	0.911	2.454	4.982	34.390	10.456	0.000	0.026	0.010
3	1.231	0.679	0.149	0.644	1.807	0.316	0.754	2.182	3.807	13.582	6.519	0.000	0.036	0.013
3	1.333	0.858	0.414	0.571	1.329	0.226	0.823	2.344	4.571	9.963	7.607	0.000	0.064	0.027
3	1.380	0.889	0.454	0.634	1.736	0.247	0.970	2.732	6.369	9.399	8.318	0.000	0.099	0.036
3	1.355	0.848	0.343	0.661	1.954	0.267	0.973	2.657	6.694	10.509	10.282	0.000	0.056	0.019
3	1.152	0.697	0.252	0.653	1.880	0.230	0.974	2.573	6.817	22.568	10.024	0.000	0.017	0.006
3	1.178	0.731	0.254	0.647	1.831	0.228	0.732	1.895	5.523	14.901	6.761	0.000	-0.137	-0.049
3	1.689	1.063	0.395	0.712	2.468	0.381	0.898	2.580	6.347	6.122	7.566	0.000	-0.056	-0.016
3	0.172	-0.626	0.140	6.946	2.275	0.223	0.916	2.542	3.077	-0.574	0.732	0.000	0.056	0.171
3	0.211	-0.467	0.418	7.410	2.862	0.000	0.783	2.118	3.768	-0.705	0.701	0.000	0.073	0.189
3	0.189	-0.401	0.336	7.667	3.287	0.112	0.588	1.628	3.022	-0.497	0.644	0.000	0.167	0.390
3	0.858	0.537	0.074	0.632	1.718	0.274	0.935	2.140	7.415	-14.341	4.481	0.000	0.007	0.002
3	1.048	0.661	0.034	0.560	1.275	0.184	1.053	2.410	8.283	58.697	7.316	0.000	0.002	0.001
3	1.431	0.898	0.050	0.435	0.770	0.101	1.298	2.926	4.165	10.149	5.368	0.000	0.003	0.002
3	1.068	0.654	0.031	0.568	1.315	0.173	1.136	2.689	4.121	44.487	4.849	0.000	0.005	0.002
3	1.244	0.784	0.043	0.580	1.380	0.132	1.135	2.729	4.109	13.899	4.754	0.000	0.009	0.004
3	1.528	0.979	0.055	0.493	1.043	0.187	1.091	2.463	1.444	6.767	3.862	0.000	0.033	0.016
3	1.422	0.949	0.069	0.514	1.134	0.196	1.110	2.555	1.485	8.270	3.969	0.000	0.076	0.034
4	1.475	0.833	0.280	0.682	2.140	0.349	0.851	1.346	5.592	8.465	9.335	0.000	0.007	0.002
4	1.393	0.793	0.248	0.701	2.343	0.356	0.845	1.272	6.285	10.451	10.063	0.000	-0.083	-0.025
4	1.511	0.927	0.324	0.654	1.887	0.305	1.022	1.636	7.138	9.268	9.739	0.000	0.108	0.038

4	1.623	0.991	0.309	0.657	1.912	0.321	1.024	1.670	6.780	7.943	9.158	0.000	0.166	0.057
4	1.792	1.182	0.527	0.667	2.003	0.331	1.009	1.687	7.088	6.412	9.275	0.000	0.193	0.064
4	1.361	0.950	0.477	0.734	2.757	0.297	0.993	1.747	7.244	9.664	9.944	0.000	0.231	0.062
4	1.594	1.049	0.418	0.793	3.840	0.413	1.097	1.864	8.066	8.318	9.800	0.000	0.165	0.034
4	1.603	1.041	0.432	0.809	4.235	0.423	1.109	1.853	7.942	8.224	9.823	0.000	0.129	0.025
4	1.636	1.032	0.319	0.800	4.006	0.436	1.035	1.673	7.488	7.725	9.331	0.000	-0.159	-0.032
4	1.656	1.104	0.490	0.753	3.045	0.382	1.029	1.710	7.647	7.355	10.107	0.000	0.068	0.017
4	1.346	0.892	0.387	0.738	3.150	0.249	1.155	2.252	8.605	12.760	10.409	0.000	-0.157	-0.037
4	1.545	0.982	0.464	0.719	2.725	0.399	0.915	2.060	7.352	8.624	9.172	0.000	0.035	0.009
4	1.320	0.890	0.418	0.374	1.520	0.459	0.736	1.365	6.350	9.115	6.258	0.000	-0.099	-0.024
4	0.883	0.507	0.142	0.300	1.142	0.439	0.960	1.744	6.919	-26.058	8.400	0.000	0.064	0.017
4	0.906	0.533	0.190	0.288	1.007	0.413	0.836	1.519	6.421	-29.467	8.123	0.000	0.111	0.032
4	0.900	0.421	0.278	0.296	1.179	0.384	0.897	1.340	5.535	-29.801	6.316	0.000	-0.003	-0.001
4	0.938	0.533	0.209	0.272	1.007	0.341	0.852	1.506	6.349	-46.463	17.126	0.000	0.055	0.015
4	1.037	0.535	0.318	0.276	0.785	0.258	0.770	1.288	5.403	84.429	14.638	0.000	0.051	0.018
4	0.778	0.350	0.187	0.071	0.218	0.257	0.759	1.157	4.971	-11.233	11.979	0.000	0.061	0.020
4	1.080	0.518	0.173	0.480	1.393	0.353	0.803	1.169	5.774	50.392	11.653	0.000	0.046	0.016
5	0.935	0.714	0.331	0.594	1.462	0.256	0.687	1.819	7.378	-37.350	9.251	0.000	0.055	0.022
5	0.879	0.643	0.268	0.612	1.575	0.288	0.701	1.827	7.594	-22.465	10.947	0.000	0.157	0.061
5	0.879	0.641	0.154	0.634	1.736	0.281	0.725	2.097	7.168	-20.570	9.280	0.000	0.088	0.032
5	0.860	0.593	0.145	0.667	2.001	0.286	0.872	2.300	7.157	-19.160	8.476	0.000	0.123	0.041
5	0.810	0.564	0.084	0.699	2.321	0.255	1.064	2.562	8.177	-15.226	8.090	0.000	0.154	0.047
5	0.810	0.587	0.089	0.721	2.587	0.263	0.997	2.423	8.349	3.723	7.196	0.000	0.147	0.041
5	0.862	0.641	0.083	0.691	2.239	0.237	1.157	2.846	10.414	4.240	9.009	0.000	0.153	0.047
5	0.872	0.652	0.079	0.680	2.123	0.222	1.141	2.941	10.625	4.113	7.628	0.000	0.124	0.040
5	0.909	0.667	0.099	0.699	2.317	0.251	1.017	2.676	9.116	3.846	6.564	0.000	0.068	0.021
5	1.789	1.552	1.074	0.491	0.964	0.109	0.947	3.292	10.255	4.453	7.610	0.000	0.071	0.036
5	-1.322	-0.949	-0.189	-0.687	-2.190	-0.219	1.328	3.863	-8.330	1.758	651.184	0.000	-0.047	-0.015
5	-1.247	-0.899	-0.109	-0.692	-2.242	-0.167	1.350	3.505	-8.915	1.832	2588.250	0.000	-0.055	-0.017
5	-1.312	-0.941	-0.137	-0.706	-2.398	-0.214	1.358	3.307	-9.427	1.983	2340.667	0.000	-0.048	-0.014
5	-1.350	-0.973	-0.140	-0.617	-1.608	-0.166	1.254	3.241	-7.825	1.678	2459.375	0.000	-0.020	-0.008
5	-1.419	-1.043	-0.217	-0.586	-1.415	-0.169	1.289	3.415	-8.362	1.713	735.875	0.000	-0.012	-0.005
5	-1.434	-1.030	-0.149	-0.604	-1.527	-0.194	1.207	3.083	-7.772	1.680	661.080	0.000	-0.020	-0.008
5	-0.392	-0.284	-0.068	-3.730	-6.772	-0.335	2.681	3.239	-24.557	1.041	977.194	0.000	-0.233	-0.128

5	-0.277	-0.198	-0.049	-8.458	-10.433	-0.557	4.792	3.211	-33.260	0.893	953.981	0.000	-0.378	-0.306
5	-0.194	-0.137	-0.035	-88.755	-16.989	-4.324	40.653	3.179	-44.903	0.770	929.260	0.000	-0.638	-3.331
5	-0.133	-0.091	-0.025	14.513	-32.114	0.521	-5.466	3.144	-61.277	0.666	902.881	0.000	-1.236	0.559

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