Retail And Sectoral Interdependence: Performance Analysis Of Retail And Its Performance Links With Other Sectors

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Abstract

Most financial studies conduct analyses within an industry, classifying top performers from poor performers and predicting future developments of the industry. Our work made a further supplement, using a comparative study not only cross firms within an industry but also across multiple industries. Firms from six industries are chosen (including Retail, Electronic Equipment, Food & Drink, Household, ICT, and Logistic) for their critical contributions to the national economy and data availability. We found there are sights of interdependence across these industries. Our work helps investors to determine better investment opportunities in an industry expecting rises from other inter-dependent industries to promote their financial results.

Research purpose:

The purpose of this research is to contribute to an understanding of the trends and impacts of the business from one industry to the other inter-dependent industries. The changes in result patterns of one industry came to dominate the changes in the second industry.

Research design, approach, and method:

We selected the Retail sector and 5 other industries (including Electronic Equipment, Food & Drink, Household, ICT, and Logistics) for interdependence analysis. The research selects common key performance indicators then employs correlation analysis and Granger test over such data to detect the possible interdependence between industries

Main findings:

We find clear correlation/movements of key performance indicators of the Retail sector with those of other 5 sectors, indicating strong sight of interdependence and forecastability.

Practical/managerial implications:

The retail sector is a dynamic ecosystem influenced by various industries, including Electronic Equipment, Houseware, Food and Drink, and Information and Communication Technology (ICT). Understanding the interdependence among these sectors is crucial for comprehending how they collectively contribute to retail performance and consumer satisfaction. This academic discussion explores the significance of research on this interdependence, emphasizing the reciprocal relationships that drive innovation, efficiency, and competitiveness in the retail landscape.

Keywords: *Cross-industry analysis, Financial performance, Granger Test*

1. THE RATIONALE OF STUDY

The retail sector is a dynamic ecosystem influenced by various industries, such as Electronic Equipment, Houseware, Food and Drink, and Information and Communication Technology (ICT). Understanding the interdependence among these sectors is crucial for comprehending how they collectively contribute to retail performance and consumer satisfaction. This academic discussion explores the significance of research on this interdependence, emphasizing the reciprocal relationships that drive innovation, efficiency, and competitiveness in the retail landscape.

In recent years, consumers tend to shift more to online buying as online shopping provides diversified access, broader ranges of products, and facilitated delivery (Adibfar, Gulhare, Srinivasan, & Costin, 2022). The pandemic appears to have permanently changed the trends of shopping, further pushing consumers from in-store shopping to online shopping, making the retails sector see drops in-store sales and rises in online sales (Febrilia & Warokka, 2021). The sudden rises in online buying have intensified the demands for the logistic infrastructure and transport firms to increase their capacity to

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get ready for such a swift shift and may have made the business of firms in such 2 sectors improved significantly (Gupta & Singh, 2024). To respond to such increased demands, more commercial logistics facilities need to be on the roads to transport and deliver orders, providing opportunities for logistics and transportation firms (Gupta & Singh, 2024). Online shopping also intensifies the demands for an updated technology and capacity ICT infrastructure (e.g., apps, RPA, internet capacity, 4G data, and so on) to facilitate online transactions (Szász, et al., 2022). As a result, we expect the Retails, the Food and Drink, Households, ICT, and Logistics, are increasingly intertwine with each other in a value chain, and consequently, their firms' financial performance are influenced by not only their industry-internal but also external factors to the firms. While much research has focused on firm-specific determinants of performance, such as management strategies, operational efficiency, and resource allocation, there is growing recognition that the performance of a firm is also shaped by the performance of other firms and industries. This interdependence of financial performance across industries is an important area of study, as it can provide insights into the broader economic ecosystem in which firms operate. This is the reason we select the topic "Retail And Sectoral Interdependence: Performance Analysis Of Retail And Its Performance Links With Other Sectors" for our research paper.

The research objective is to investigate the interdependence of financial performance across five key industries (including Electronic Equipment, Food and Drink, Houseware, ICT, and Logistics) with the Retail sector, and vice versal. These industries were selected due to their significant contributions to economic growth and their interconnectedness through supply chain, consumer demands, and technological advancements. By examining the financial performance of firms within and across these industries, we seek to uncover the nature and extent of performance interdependence. The research questions guiding this research are: (i) To what degree do the financial performance metrics of firms within an industry correlate with one another? (ii) How do the financial performance metrics of firms in the Retails industry relate to the performance metrics of firms in other 5 industries?

This study is clearly necessary. There clearly is a lack of multiple sector comparative and interdependent approaches. Few studies have taken an explicit cross-industry approach (such as Michael, Scott, & Arie, 2007; Donna & Rahmatallah, 2016; Milgrom & Roberts, 1990; Natividad & Rawley, 2015; Corrado, Loredana, & Gianluca, 2014). None have accounted for comparing Household, ICT, Logistics, and Retail sectors.

2. LITERATURE REVIEW

The covid pandemic is found to accelerate the shift towards e-commerce, with consumers increasingly purchasing online. Reports indicated that online sales in almost all sectors were projected to grow significantly as people adapted to new shopping habits during lockdowns. This shift benefited major retailers (like Amazon and Best Buy), which saw substantial increases in sales during this period. The retail business depends largely on the changing behavior of consumers and the sellers. Interdependence is discussed in the section below.

2.1. The multi-sector interdependence of performance

Interdependencies play a crucial role in shaping the evolution of industries, and understanding them is key to analyzing industry performance and the dynamics of shakeout (Natividad & Rawley, 2015). Wind and Thomas study the fundamental distinguishing characteristics of "business-to-business" organizational buying behavior has investigated the influence of several dynamic factors that shape how organizations interact in an increasingly interdependent environment (Wind & Thomas, 2010); They identified that interdependence can significantly affect and alter organizational buying behavior. In an increasingly digitalized and interconnected e-commerce, firms' buying behavior is driven by several factors. The first is the accelerating globalization via free trade agreements across nations; The second is Flattening Value Chains with reduction of Intermediaries, global Sourcing and Production (Donna & Rahmatallah, 2016; Ayyıldız & Gümüş, 2020). The third is the Technological Integration across and among supply chain partners that make better visibility, communication, and coordination. The fourth is Consumer Participation in various stages of the value chain, leading to more efficient and effective product/service design and delivery, and more agile and responsive sellers. Other key factors include Disruption of Value Chains, Intensifying Government Involvement, and Continuously Fragmenting Customer Needs (Rhoades & Heggestad, 1985). These interconnected drivers of interdependency, along with recent information and communication technological advancements (especially after the social distancing following global pandemic) have transformed the relationships within and between organizations that procure products and services to maintain competitiveness in their markets. These factors can interact with one another, amplifying their effects on organizational buying behavior. For instance, recent trends in globalization and the global pandemic have led to the formation of additional networks that disrupt traditional value chain relationships, prompting firms to diversify their partnerships (e.g., relying less on Chinese suppliers, outsourcing more to other suppliers in India, Vietnam, etc.). Moreover, increased government intervention in business operations—such as the escalating trade measures between the U.S. and China—raises operational costs and drives companies to seek lower-cost sources in emerging markets.

According to Michael, Scott, and Arie, interdependence can lead to a broader understanding of the complex interactions between industries and the broader economic landscape. Interdependencies in productive activities can significantly

impact the evolution of industries, as it creates barriers to firms to grow faster than its inputs and output resources could stand, and make it difficult for firms to discover valuable configurations of productive activities (Michael, Scott, & Arie, 2007). This is especially true in the case of positive interdependencies, also known as complementarities, where activities get joint benefits when performed together. On the other hand, negative interdependencies, or coordination costs, refer to the joint costs that activities incur when performed together. These interdependencies can significantly impact the efficiency and productivity of firms. The presence of interdependent activities can create barriers to a particular firm to perform and grow, as a firm's performance is depending on other firms' inputs and performance. It also leads to heterogeneity within an industry and across industries (Milgrom & Roberts, 1990; Corrado, Loredana, & Gianluca, 2014; Hartanto, 2023; Liu & Song, 2017; Michael, Scott, & Arie, 2007; Milgrom & Roberts, 1990; Rhoades & Heggestad, 1985) .

2.2. Industry performance assessment framework

In the context of comparative industry performance assessment, a robust measurement framework is essential for evaluating and enhancing operational efficiency across various sectors. The Supply Chain Operations Reference (SCOR) model has emerged as a pivotal tool for establishing performance metrics tailored to specific industries, highlighting the need for data networking, modernized tools and systematic training to improve production efficiency and reduce costs (Praharsi, Jami'in, Suhardjito, Reong, & Wee, 2021; Skandalis, Liargovas, & Merika, 2008). This adaptability underscores the versatility of the model for performance evaluation (Ayyıldız & Gümüş, 2020). Furthermore, the integration of advanced technologies, such as Industry 4.0, into operations strategies of firms has been shown to significantly enhance performance metrics across industries (Pansare et al., 2022) to stay competitive in a rapidly evolving digital environment, enabling firms from different sectors to identify and prioritize key performance indicators (KPIs) that are vital for their achieving operational success. In addition to the SCOR framework, other performance measurement systems have been proposed to address specific industry needs. For example, present a novel framework for industrial sustainability performance measurement that encompasses various sustainability pillars, thereby offering a comprehensive approach to performance assessment (Cagno, Neri, Howard, Brenna, & Trianni, 2019). This framework is particularly relevant for industries facing increasing pressure to demonstrate sustainability, as it provides a structured method for evaluating performance across economic, social, and environmental dimensions. Moreover, the importance of customizing performance metrics to fit the unique characteristics of specific industries cannot be overstated, highlighting the necessity of developing industry-specific metrics for capital project performance, which requires distinct project management approaches due to its unique operational processes (Hwang, Thomas, & Caldas, 2011); This tailored approach ensures that performance assessments are relevant and actionable, facilitating targeted improvements. Finally, the role of stakeholder engagement in the development of performance measurement frameworks is critical. Research by many scholars emphasizes the need for stakeholder discussions to validate metrics within the supply chain performance measurement of the industry, ensuring that the metrics reflect the realities of industry operations (Hartanto, 2023). This participatory approach not only enhances the relevance of the metrics but also fosters a sense of ownership among stakeholders, which can lead to more effective implementation of performance improvement initiatives. In summary, multiple comprehensive comparative industry performance assessment framework has been established while incorporating advanced technologies and stakeholder insights to develop customized performance metrics; This will enable industries to enhance their operational efficiency, sustainability, and overall performance in connection with the developments from other related sectors in the supply chain.

2.3. Performance metrics for industry performance assessment

As the competition is intense and grows, the performance evaluation (and benchmarking) has become an important continuous improvement tool for businesses in Households (Gerrie, 2021), ICT sector (Cook, Seiford, & Zhu, 2004), Logistics (Kuzmicz, 2015) , and Retail sectors (Goncharuk, 2008). Performance evaluations is to provide input for continuous improvement in three levels, including Strategic, Tactical, Operational (Wynn-Williams, 2005; Castro & Frazzon, 2017; Dattakumar & Jagadeesh, 2003; ACCA, 2014). According to Castro and Frazzon (2017), performance assessment is a strategic tool that continuously improves performance by identifying and adopting best practices, both internally and from industry leaders. It serves multiple purposes including identifying areas for improvement, analyzing competition, setting achievable goals, sparking innovation, ensuring quality, boosting customer satisfaction, achieving cost efficiency, and enhancing employee performance, all contributing to an organization's overall excellence (Singh.J & Singh.H, 2015; NGUYEN, et al., 2022).

Performance evaluation must cover 8 financial and non-financial dimensions/aspects (Hörisch, Freeman, & Schaltegger, 2014; Damodaran, 2007; Lebas, 1995; NGUYEN, et al., 2022), including: (i) business profitability, (ii) management efficiency, (iii) leverage, (iv) working capital, (v) capital adequacy, (vi) market value, (vii) brand performance, (viii) customer satisfaction. For a cross-industry analysis, financial ratios are crucial assessment tool to examine and assess the comparative business status of firms over a given period.

When comparing firms financially, analysts must identify and test various factors that potentially affect the financial performance of a firm in a specific industry (Liargovas & Skandalis, 2010). Our previous study on the Vietnam economy shows that different industries have different key factors; one factor having significant impact in one industry may not have impacts on other industries (NGUYEN, et al., 2022). Nevertheless, industries share some common factors/indicators for comparison, for example, firms with higher sustainability status are expected to get larger profits (ROA, ROE, Profit margin), higher growth rates (Sales revenue growth), and greater cash reserves (higher cash ratio), thus these indicators are commonly selected in comparative analysis (Artiach, Lee, Nelson, & Walker, 2010).

Different researchers have proposed various criteria for evaluating financial performance. Measuring economic sustainability of a firm is conducted through several key indicators, including profitability, liquidity, stability, and productivity (Latruffe, 2016), autonomy, solvency, liquidity, and financial efficiency (Barnard, Akridge, Dooley, & Foltz, 2012). Profitability is measured basing on metrics such as EBIT (Earnings Before Interest and Taxes), return on equity (ROE), return on assets (ROA).

Damoradan (2007), Bracegirdle (2019), Searcy (2011), and Goyal et al. (2013) propose different sets of criteria for determining the degree of financial performance, which include: (i) measurement units, (ii) sustainability which methodology focuses on, and (iii) the nature of the proposed indexes. Common financial indicators used to measure performance include Return on equity, cash flow ratios, and leverage ratios (Atkinson G. , 2000; Ilinitch, Soderstrom, & Thomas, 1998). To better understand and measure a firm's sustainability performance, some researchers suggest incorporating thresholds into composite indices to facilitate comparisons of economic sustainability levels among firms.

To measure firm's liquidity, major indicators include (i) *Current ratio* or *Quick ratio*; (ii) *Interest coverage.* To measure firms' Capital Adequacy, common indicators include (iii) Debt/Equity or (iv) Debt/Total Asset. To measure the Management Efficiency, common indicators include (v) *EBIT/Total Asset*, (vi) Receivable turnover; (vi) Payable Turnover; (v) days sales outstanding or Inventory turnover. Finally, to measure the earning ability, prevalent indicators include (vii) *ROA*; *EBIT margin*; (ix) *Return on capital employed (ROCE)*; and (x) Earnings per share (Lesakova & Lubica, 2017; Atkinson M. , 2012; Subramanyam & John, 2009);

2.4. Granger approach and its application in assessing interdependencies across multiple industries

The Granger causality test, named after Clive Granger, has emerged as a powerful tool for analyzing causal relationships in time series data. The Granger causality test operates on the premise that if a variable (let's call it X) can predict another variable (Y) better than Y can predict itself, then X "Granger-causes" Y. In other words, past values of X contain information that helps predict Y's future behavior. This temporal precedence—captured through lagged variables—forms the crux of the test. By examining the statistical significance of lagged variables, they discern whether one variable's past values provide meaningful information about another's future values. In an interconnected economic environment, understanding these causal links becomes increasingly critical for informing policy and strategic decisions. The robustness of Granger causality tests can accommodate instabilities, ensuring that the conclusions drawn are reliable (Rossi & Wang, 2019). This is particularly pertinent in multi-industry contexts where external factors may disrupt established relationships.

Researchers apply the Granger test to time series data representing sector's business indicators, such as revenue growth, return on assets, inventory turnovers, as well as economic indicators (e.g., GDP growth, inflation rates, or stock market indices). This statistical method is particularly useful in assessing interdependencies across multiple industries. This method is particularly relevant in the context of economic analysis, where understanding the dynamic interactions between different sectors can inform policy and investment decisions. By adapting the test to account for heterogeneous effects, employing robust methodologies, and considering sector-specific dynamics, researchers can gain valuable insights into the causal relationships that underpin economic interactions.

In the financial sector, Lee and Yang explore Granger causality in the context of financial markets, examining causal relationships across different quantiles. This approach highlights the significance of understanding how causal relationships can vary under different market conditions, which is particularly relevant when assessing interdependencies between industries that may be influenced by external economic shocks or varying market dynamics (Lee & Yang, 2014) . In the tourism sector, studies such as those by Liu and Song (2017) and Lean and Tang (2010) utilize Granger causality tests to investigate the relationship between tourism and economic growth, providing evidence of dynamic links between tourism and economic performance, suggesting that tourism can be a significant driver of economic growth in various contexts. Such findings underscore the importance of considering sector-specific interactions when employing Granger causality tests across multiple industries. In the energy sector, Atif and Siddiqi (2010) apply Granger causality to investigate the link between energy consumption and economic growth, revealing unidirectional causality from electricity consumption to economic growth. This finding illustrates how interdependencies can manifest in specific sectors, such as energy and economic performance, and highlights the necessity for tailored analysis when examining multi-industry relationships. Dumitrescu and Hurlin use a non-causality test tailored for heterogeneous panel data models, emphasizing

the importance of recognizing that causal relationships may not be uniform across all cross-sectional units. This is crucial when analyzing interdependencies among multiple industries, as it allows for the detection of varying causal relationships that may exist in different contexts or regions. Their findings suggest that the Granger causality test can be adapted to account for these heterogeneous effects, thereby enhancing its applicability in multi-industry analyses (Dumitrescu & Hurlin, 2012).

3. METHODOLOGIES AND DATA

3.1. Analytical frameworks and Selection of Indicators

Our study will analyze the predictive nature of various financial indicators across 6 industries. This paper concentrates on six financial ratios: (i) Valuation ratios, (ii) Profitability ratios, (iii) Growth rates, (iv) Liquidity ratios, (v) Efficiency ratios and (vi) Leverage ratios. Referring to literature review and experts' suggestions, we selected 10 indicators below to compare performance across industries.

- Firm's Profitability measures (Net Profit Margin; ROA);
- Firm's Cashflows measures (Net revenue; Cash return to assets);
- Firm's Efficiency measures (Fixed Asset Turnover; Total Asset Turnover; Inventory Turnover; Payable Turnover; Receivables Turnover);
- Firm's liquidity measures (Quick ratios).

By analyzing the relationships between various financial performance indicators, we aim to provide a comprehensive understanding of the interdependence of financial performance across industries.

3.2. Statistics Methods

To detect possible interdependence between industries, we conducted Correlation and Granger tests. First, for each performance indicator, we interpret the Pearson correlation coefficients between the performance figures of the Retails sector with other 5 industries (E Equipment, Household, ICT, Logistics, Retails, and Food & Drink) to understand the strength and direction of the relationships between the performance figures of these industries. The correlation coefficients (that measure the degree of linear association between two continuous variables) range from -1 to 1, with 1 is perfect positive correlation, -1 is perfect negative correlation, and 0 is No correlation; Values closer to 1 or -1 indicate stronger correlations. Significant (2-tailed) refers to the p-value, a statistical measure of significance; Signs ***, **, *, and · denote a p-value less than 0.001, 0.01, 0.05, and 0.1, indicating a statistically significant correlation at the 0.001, 0.01, 0.05, and 0.1 level. This means the observed correlation is unlikely to be due to chance. A correlation coefficient ranges between 0.3 and 0.5 indicate a moderate correlation between 2 variables, while above 0.5 indicates high correlation.

In addition, we used the Granger Causality test to determine whether or not one time series is useful for forecasting another. This test uses the Null Hypothesis (H_0: time series x does not Granger-cause time series y) and Alternative Hypothesis (H_A: time series x Granger-causes time series y). A time series variable is said to Granger-cause another variable if it is helpful for forecasting the other variable. The Granger Causality Test is a powerful econometric analytical method that can reveal the predictive nature of certain factors in a relationship (Dumitrescu & Hurlin, 2012; Donna & Rahmatallah, 2016; Dumitrescu & Hurlin, 2012; Lee & Yang, 2014).

The data collected was analyzed using SPSS software and R for descriptive statistics and Granger causal relationship.

3.3. Sample and summary statistics

This study conducts an empirical analysis using a sample of 156 firms across six industries: Equipment, Food & Drink, Household, ICT, Logistics, and Retail. The data were sourced from the audited annual reports available on Vietstock.vn, encompassing over 60,000 firm-year observations. The analysis covers a period from 2004 to 2023. A key advantage of utilizing data from audited annual reports is their reliability, accuracy, and consistency over time. Firms with minimal market share or incomplete data were excluded from the statistical analyses to ensure the robustness of the findings.

4. ANALYTICAL RESULTS

4.1. Overview

The Table below shows the correlation coefficient and significant degrees of Retail with the 5 industries in 10 indicators. It shows high degree of co-movement between the key performance metrics of Retails and those of other inudstries.

Table 1: Correlation across Retails with other 5 sectors

Industry/Indicator	**EE**	**FD**	**HH**	**ICT**	**L**
Net Revenue	.951**	.859**	.917**	.216	.880**
Cash return to assets	.342	.434	.218	.450*	.217
ROA	.358	.577**	.464*	.614**	.544*
Fixed Assets Turnover	-.003	.075	-.081	.040	.110
Total Asset Turnover	-.004	.597**	.679**	.758**	.229
Payable Turnover	-.433	-.130	-.235	-.124	-.145
Receivable Turnover	.801**	.151	.117	.155	-.505*
Inventory turnover	.380	.392	.122	.375	.075
Quick Ratio	.298	-.192	.522*	.317	.807**
N	20	20	20	20	20

***. Correlation is significant at the 0.01 level (2-tailed).*

**. Correlation is significant at the 0.05 level (2-tailed).*

The table below summarizes the Granger causal relationship between the 6 industries.

Table 2: The Granger causality of Retails to other 5 industries by Lag (Years) (Sig)

Industry/Indicator	Industry					Total Count
	E E	F D	HH	ICT	L	
Net Revenue	2(.), 3(*)	1(**), 2(.)		1(***), 2(*)	2(.)	4
Cash return to assets				1(.)		1
ROA		1(*), 2(.)	1(.)			2
Fixed asset turnover	2(*)	2(.), 3(***)	2(**), 3(***)	3(***)	2(*), 3(***)	5
Total Asset Turnover						
Receivables turnover	1(.)		2(*)			2
Payables turnover					1(.)	1
Inventory turnover	2(.)			2(*)		2
Quick Ratio	1(.)	2(.), 3(*)		2(*)	1(.)	4
Total Count	5	4	3	5	4	

(Note: EE: Electronic Equipment; FD: Food & Drink; HH: Household)

Table 3: The Granger causality of 5 industries to Retails by Lag and Significant degree

Industry/Indicator	Retails
Electronic Equipment	4
Net Revenue	1(**), 2(*)
ROA	1(.)
Total Asset Turnover	2(**)
Inventory turnover	1(**), 2(***)
Food & Drink	4
Cash return to assets	1(*), 2(.)
Inventory turnover	3(*)
Total Asset Turnover	2(*)
Quick Ratio	3(.)
Households	5
Cash return to assets	1(**), 2(*), 3(.)
Inventory turnover	2(***)
Net profit margin	2(*), 3(.)
Receivables turnover	1(.)
Total Asset Turnover	2(*)
ICT	3
Cash return to assets	1(.)
Net profit margin	1(*)
ROA	1(.)
Logistics	5
Cash return to assets	1(.)
Inventory turnover	1(.), 3(*)
Payables turnover	1(*)
ROA	1(**), 3(*)
Total Asset Turnover	2(*)
Total Count	21

4.2. Business cashflows

The business performance is reflected in 2 indicators, Net Revenue and Cash return to assets. Regarding *Net revenue*, the annual *Net revenues* of Retails was found to be highly positively correlated with those of 4 industries E Equipment, Food and Drink, Households, and Logistics (.95**, .86**, .92**, and .88**). In addition, the Granger test shows that the annual *Net Revenues* of Retails sector exhibit predictive potential for values of 4 other industries. Specifically, Retails' *Net Revenue* granger cause changes in the *net revenues* of E Equipment at a lag of 2 years, of Food and Drink at a lag of 1 or 2 years, of ICT at a lag of 1 or 2 years, and of Logistics at a lag of 2 years. Conversely, only E Equipment's *Net Revenue* coul d predict that of Retails. This strongly suggests the importance of Retails sector in driving *Net Revenue* of those industries, and indicates potential opportunities for collaboration and growth.

Regarding *Cash return to assets* (CTA), only the ICT saw a moderate positive correlation with Retails (.45*). The Granger tests show that CTA of Retails can be predicted by that of 4 industries Food & Drink, Household, ICT, and Logistics. Conversely, only the CTA of ICT could be predicted by CTA of Retails. These results highlight the Retails business performance as a good predictor for other industries.

EE: Electronic Equipment; FD: Food & Drink; HH: Household; ICT: Information and Communication Technologies; L: Logistics

Granger Test		Y					
Indicator	X	EE	FF	HH	ICT	L	Retails
Net Revenue	Retails	2(.), 3(*)	1(**), 2(.)		1(***), 2(*)	2(.)	
	EE						1(**), 2(*)
Cash return to assets	Retails				1(.)		
	FD						1(*), 2(.)
	HH						1(**), 2(*)
	ICT						1(.)
	L						1(.)

4.3. Profitability

The Profitability is reflected in 2 indicators, (i) Net Profit Margin and (ii) ROA. The correlation test shows *Net Profit Margin* (NPM) of Retails did not have a significant relationship with that of other industries. Similarly, the Granger tests show NPM of Retails did not have predictive potential for other industries. However, the NPM of Households and ICT granger cause changes in the NPM of Retails.

Regarding ROA, Retails saw significant moderate or high positive correlations with Food & Drink, Household, ICT, and Logistics (.58**, .46*, .61**, and .54*). In addition, Retails granger cause changes in Food & Drink and Household. Conversely, ROA of E-Equipment, ICT, and Logistics granger cause changes in Retails.

4.4. Efficiency

The analyses of (i) Fixed asset turnover, (ii) Total asset turnover, (iii) Inventory turnover, (iv) Payables turnover, (v) Receivable turnover suggest strong interdependence between Retails sector with other industries.

Fixed Asset Turnover (FAT): FAT of Retails did not show a significant correlation with that of other industries. However, the Granger tests show FAT of Retails granger cause changes in that of E Equipment, Food & Drink, ICT, Household, and Logistics at a lag of 2 or 3, indicating a predictive relation.

Total Asset Turnover (TAT): Strong positive correlation was observed between *Tot*al asset turnover of Retails with 3 industries E Equipment, Food & Drink, and Household (.60**, .68**, .76**).

Inventory Turnover (IT): The Retails' IT did not show any significant correlation with that of other industries. Nevertheless, granger test shows it Retails' IT can forecast changes in that of E Equipment and ICT at a lag of 2. Conversely, the E Equipment, Food & Drink, Household, and Logistics IT are found to have predictive potential for Retails' IT.

Payables turnover (PT): PT of Retails was found to have no significant correlation with that of other industries. The Granger test shows only the mutual causality/predictability between Retails and Logistics.

Receivables turnover (RT): Retails has high positive correlation with E Equipment (.80**) but moderate negative correlation with ICT (-.51**). Retails' RT can predict changes in RT of E Equipment and Households industries, but only Households' RT can predict that of Retails.

4.5. Liquidity

The liquidity of Retails shows a clear predictability for that of other industries. The *Quick ratio* of Retails shows moderate or high positive significant statistical correlation with that of E Equipment and Households and Logistics (.52* and .81**). The Granger tests show that the *Quick ratio* of Retails can predict changes of that in E Equipment, Food & Drink, ICT, an d Logistics.

5. CONCLUSIONS

In summary, the analysis indicates a strong interdependence between Retails and other industries; It underscores the importance of performance of Retails in boosting performance of other industries and vice versal.

Limitation: This research has major limitation that the analysis would be more representative if we could have collected more data. The quality of data source sometimes is problematic as vietstock.vn provides only limited data; If we had a larger base of historical observations, our research could be much more robust. Finally, although ratio analysis is widely used in practice, it has certain limitations, such as (i) Ratios do not address qualitative aspects like product quality, customer service; (ii) ratios largely look at the past, not the future; and (iii) Many firms are not comparable due to their size and asset specificities.

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