Indonesian Economic Review
Volume 6, Number 1, February 2026
E-ISSN .: 2774-8073; Page 231-243
DOI: https://doi.org/10.53787/iconev.v6i1.75
Available online at: https://iconev.org/index.php/ier

Analysis of the Relationship Between Inflation and Rice Prices in Tulungagung Regency in 2021–2022

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Abstract. This study aims to examine the relationship between inflation and rice prices in Tulungagung Regency during the 2021–2022 period. The data used is secondary data in the form of monthly inflation records and monthly rice prices obtained from official BPS publications. The research approach uses a quantitative method with Pearson correlation analysis to assess the direction of the relationship as well as the strength of the association between the two variables. The results of the analysis showed that the correlation value was 0.746 with a significance level of 0.000 (<0.05). These findings confirm that inflation has a significant and strong positive relationship with rice prices. Thus, an increase in inflation tends to be followed by an increase in rice prices during the study period. This study provides an empirical overview related to food price dynamics and the influence of regional macroeconomic conditions, especially on staple food commodities. The findings are expected to contribute to policy considerations in controlling inflation and maintaining price stability of essential food commodities at the regional level.

Keywords: Inflation; Macroeconomic Conditions; Pearson Correlation; Rice Prices; Tulungagung Regency.

1. INTRODUCTION

Indonesia is a country that is actively involved in international trade, and these activities contribute greatly to the development of the national economy. When the value of exports exceeds imports, national income increases thus driving economic growth. Among various sectors that support exports, the agricultural sector has an important role because it is the main indicator of economic development. This strategic value arises because the agricultural sector is not only concerned with improving the welfare of farmers at the micro level, but also meeting the food needs of the community as well as foreign exchange contributions from exports at the global level. However, throughout 2019-2023, Indonesia's agricultural export performance tended to be stagnant and was in the lowest position compared to the other three groups of non-oil and gas export commodities. Based on BPS data in the 2019–2023 Export Commodity Analysis, the processing industry dominated non-oil and gas exports with a contribution of 76.84%, followed by mining at 18.15%, while agricultural, forestry, and fishery commodities only contributed an average of 2.08%. In 2018, for example, mining grew by 20.5%, the processing industry by 4.01%, while the agricultural sector actually experienced negative growth of -6.54%. Interestingly, during the COVID-19 pandemic (2019–2020), only agricultural commodities continued to record positive growth of 5.29% and 14.02%, respectively, while other sectors experienced sharp contractions. However, when entering the new normal period in 2021–2022, agricultural export growth returned to the lowest. This

Received: December 31, 2025; Revised: January 23, 2026; Accepted: February 25, 2026; Published: February 28, 2026

condition shows that agriculture has a great opportunity to improve because it has proven to be more resilient to crises.

One of the important factors in encouraging agricultural exports is the availability of capital. The limited economic conditions of farmers often make it difficult for them to obtain financing. Working capital loans from banks are one of the instruments that can increase farmers' productivity. Various studies have found that working capital loans have a significant effect on increasing agricultural output, so that increasing credit distribution is expected to boost the export value of agricultural commodities. In addition to capital, inflation also plays a role in affecting export performance. Inflation in the agricultural sector is a concern in 2022–2023, when FAO recorded a price increase of 4.3% in early 2023. Research shows that in the long run, inflation can suppress agricultural exports because it reduces productivity and increases production costs. In addition, the exchange rate also affects the competitiveness of exports; exchange rate volatility has proven to have a negative impact on Indonesia's main agricultural commodity exports. Other factors such as the benchmark interest rate (BI Rate) also have a similar influence, where both short-term and long-term interest rates are found to have a negative impact on exports. (Amalia et al., 2025)

Historically, inflation has had a fairly complex impact on agriculture. Various literature reveals a number of reasons why inflation can reduce productivity, ranging from uncertainty in input prices, adverse relative price changes, to less effective policy responses. Although inflation in the United States in the 1970s did not show a significant impact on agricultural productivity, price instability and high interest rates still affected production decisions and exchange rate movements that affected export commodity prices (Johnson, 1980). In Indonesia, inflation is also a serious problem. Although by the end of the New Order inflation could be reduced to single-digit levels, the 1998 monetary crisis caused inflation to soar to more than 75 percent. This condition was exacerbated by the increase in poverty rates, so that Indonesia's inflation at that time was considered to be in the early stages towards hyperinflation (Atmadja, 1999).

To assess the welfare of farmers, the commonly used indicator is the Farmer Exchange Rate (NTP), which is a comparison between the price index received by farmers (output) and the price paid by farmers (inputs). The NTP $\geq$ 100 indicates a surplus and an increase in welfare, NTP = 100 means breakeven, while the NTP < 100 indicates a deficit and a decline in welfare.

The price of fertilizer, as one of the main components of production costs, is also very influential. In Indonesia, fertilizers are available in both subsidized and non-subsidized forms. The fertilizer subsidy policy aims to maintain food production and support farmers with limited

capital. However, some argue that the elimination of subsidies can encourage more efficient use of fertilizers and make farmers more independent.

In terms of production, the harvest area and rice production also fluctuate. Several studies show that the harvest area of field rice tends to fluctuate more than that of paddy fields, which are relatively increasing. Rice production is still considered unsatisfactory even though various efforts have been made. Infrastructure, especially irrigation, is one of the important factors that often face obstacles, such as uneven water distribution, water theft, and productivity gaps between upstream and downstream (Faridah Nurul & Syechalad Nur Mohd, 2016).

According to BPS data, Indonesia's rice productivity over the past ten years has shown a surplus condition. With a conversion rate of GKG to rice of 62.7%, the amount of rice produced in 2004 reached approximately 33.9 million tons and increased to 44.4 million tons in 2014, or an increase of 30.9%. After deducting post-harvest losses by around 3.3%, the rice that is actually available for public consumption is 39.8 million tons. Assuming an average per capita rice consumption of 114 kg per year and a population of 250 million people, the national rice demand of 28.6 million tons can still be met. Although the availability of rice shows a surplus, increasing production remains a priority as the population continues to grow, while the growth of rice production shows a slowing trend.

Efforts to increase crop yields, especially rice and corn, cannot be separated from various government policies. This is important considering that there are many obstacles that have the potential to suppress food productivity. These challenges include environmental damage and climate change, land conversion from agriculture to non-agriculture, limited infrastructure, small land ownership, weak national seed and nursery system, limited access to capital, high interest rates, and low institutional capacity of farmers and extension workers. With the complexity of these problems, comprehensive handling steps are needed through the implementation of programs that focus on achieving national food security. One of the efforts that the government often takes is the regulation of the Government Purchase Price (HPP) as a form of protection for farmers when prices fall during the harvest. However, the price of food commodities continues to fluctuate, where prices tend to fall during the harvest season and rise again when supply begins to decrease (Suryani et al., 2015).

Tulungagung Regency in East Java Province is an agricultural area that relies on the agricultural sector for the community's economy. The main food commodities produced are rice and corn. Based on BPS data in 2023, the production of rice, cassava, and sweet potatoes has decreased since 2020, while corn production has actually increased, especially in the southern region of the district. In Pucanglaban District, most of the farmers are elderly and the

involvement of the younger generation in agriculture is still very low. Before 2021, there was no special program for the capacity development of young farmers, both in terms of technical, managerial, access to financing, and marketing. Farmer institutions also do not involve many youth, so their contribution to regional agricultural development is still limited (24/Menkes/2022, 2022).

The income of rice farmers is influenced by several factors such as capital, land area, education level, number of workers, age, and the number of family dependents. Research (Saputra, 2012) using a simple random sampling method in Tambakrejo Village, Sumbergempol District, and involving a farmer family who owns land working in the agricultural sector. However, there are still various other variables beyond those mentioned that also have the potential to affect rice farmers' income.

The growth of rice yields in Tulungagung Regency shows an increasing trend. Based on data (BPS, 2024) The rice harvest area in 2023 reached 40,238.66 hectares, an increase of 707.41 hectares or 1.79% compared to 2022. Rice production in 2023 was 235,502.11 tons of GKG, an increase of 28,284.85 tons or 13.65% from the previous year. Meanwhile, the population's rice production in 2023 reached 135,983.67 tons, an increase of 16,332.25 tons compared to 2022 rice production.

Seeing these developments, it is important to conduct a more in-depth study of the relationship between inflation and rice in Tulungagung Regency during 2022–2023. This study aims to analyze the extent to which changes in inflation affect rice prices in that period. In addition, this study seeks to identify the direction of the relationship between the two variables, whether positive or negative, and assess the level of correlation strength, so as to produce a more comprehensive picture related to the dynamics of the economy and the agricultural sector in Tulungagung Regency.

2. LITERATURE REVIEW

Economic growth is a process that describes an increase in the production of goods and services over time. This process not only reflects the increase in output quantitatively, but also shows developments in economic structure, production efficiency, and people's welfare. One of the important factors that affect the dynamics of economic growth is inflation. Inflation can be interpreted as a state when there is a tendency to increase the prices of goods and services in general over a relatively long period, which arises due to an imbalance between the flow of goods and the amount of money in circulation in the economy (Montilano et al., 2021). If the

amount of money increases faster than the availability of goods and services, price pressures will arise as a result of the imbalance.

In the macroeconomic context, inflation is often considered an economic "disease" because it can have various negative consequences. High and uncontrolled inflation can disrupt the foundation of the economy, damage the business climate, hinder the production process, and reduce people's purchasing power (Djambak et al., 2008) When prices rise continuously, people's ability to meet the needs of life decreases, especially for the fixed income group. In addition, unstable inflation can create economic uncertainty. This uncertainty can affect people's decisions in consuming and investing. Business actors become hesitant to plan business development, while households become more cautious in spending their income. This condition can hamper overall economic activity and reduce long-term growth potential (Oktaviani et al., 2025). Thus, inflation control is an important aspect in maintaining economic stability and ensuring that the economic growth process can run optimally and sustainably.

The development of rice prices in Tulungagung Regency shows a pattern that is in line with the price trend at the East Java Province level. Price movements in this area are influenced by factors that also affect the provincial level, such as extreme weather conditions that have an impact on crop yields, increased fuel prices, and government policies related to food commodities. Based on data from (SISKAPERBAPO, 2025), the price of medium rice in Tulungagung moves according to the trend of provincial prices. On November 27, 2025, of the 13 districts/cities that reported medium rice price data in East Java, it was recorded that the average provincial price was in the range of Rp12,731 per kilogram. The highest price was recorded in Pasuruan Regency at Rp13,700 per kilogram, while the lowest price was in Jember Regency and Tuban Regency with an average of Rp12,000 per kilogram.

The term hypothesis comes from two words, namely hupo and thesis. The word hupo means "not sure of the truth", while thesis means a statement or idea. Thus, a hypothesis can be understood as an initial conjecture whose truth still needs to be proven through the research process (Hamdani & Sa'diyah, 2025). The hypothesis according to (Winarti et al., 2024) A hypothesis is a temporary statement or assumption whose level of truth is still low so it still needs to be tested further. Furthermore, hypothesis testing is a scientific procedure used to assess the truth of a claim regarding population parameters based on data from the research sample. The hypotheses compiled in this study are as follows:

Positive Correlation Hypothesis

H0 : There is no positive and significant relationship between variable X and variable Y.

H1: There is a positive and significant relationship between the inflation variable and the price of rice, meaning that the higher the inflation, the higher the price of rice, the price of rice also tends to increase.

Two-Tailed Correlation Hypothesis

H0 : There is no significant and positive relationship between variable X and variable Y.

H1: There is a significant relationship between inflation and rice prices, both in the form of positive and negative relationships. Thus, there is a link between inflation and rice prices in Tulungagung.

Hypotheses for Weak/Strong Correlations

(Aims to emphasize the strength level of the relationship).

H0 : The relationship between the X and Y variables is insignificant or at a very weak correlation level.

H1 : The relationship between inflation variables and rice prices is significant and is at a fairly strong correlation level.

3. METHODOLOGY

This study uses a quantitative approach with a correlation test analysis method to determine the relationship between inflation and rice prices in Tulungagung Regency in 2021–2022. The data used is secondary data in the form of monthly inflation data and monthly rice prices obtained from the official publication of BPS Tulungagung Regency. All data are time series with a total of 24 months of observations. Data collection is carried out through a documentation method by accessing published reports and statistical tables. Data analysis was carried out using SPSS software, through Pearson correlation test to determine the direction and strength of the relationship between the two variables. This test produces correlation coefficient values (r calculated) and significance values (Sig. 2-tailed) as the basis for decision-making. The criteria used were Sig. < 0.05 to determine the significant relationship and compare the r count with the r table to see the significance of the relationship. The results of the analysis were then interpreted to explain the level, direction, and significance of the relationship between inflation and rice prices during the study period.

4. RESULTS AND DISCUSSION

RESULT

Correlation Test

Correlation test according to (Claudia et al., 2025) is a statistical method used to measure the strength and direction of the linear relationship between two numerical or ordinal variables. This analysis results in a correlation coefficient value (usually denoted by *r*) that ranges from -1 to +1, where:

• +1: Perfect positive correlation (both variables move in the same direction).

• -1: Perfect negative correlation (the variable moves in the opposite direction).

• 0: No linear correlation.

Based on the results of secondary data processing from the Tulungagung Regency BPS and Inflation Data in 2021–2022 using SPSS, the following estimated results were obtained.

Table 1. Pearson Correlation Test Results.

Correlation Test	Batas Signifikansi	Correlation Coefficient Value (r Calculated)	Sig. (Nilai Signifikansi)	Information
Pearson Correlation	α = 0.05	0,746	0.000 < 0.05	There is a significant positive relationship

Source: (BPS East Java, 2023)

Interpretation of Results :

Based on Sig. Significance Value (2-tailed)

Based on the Pearson correlation output table presented, it is known that the Sig. (2-tailed) value between the Inflation variable and the Rice Price variable is 0.000, and this value is smaller than the significance limit of 0.05 (0.000 < 0.05). This shows that the relationship between the two variables is statistically significant at a 95% confidence level. In other words, the probability of this relationship happening by chance is very small, so it can be ascertained that there is a real relationship between Inflation and Rice Prices.

A significance value smaller than 0.05 indicates that a change in one of the variables is related to a change in the other, even though the direction of the relationship is not explained by the significance test itself. Thus, these results provide empirical evidence that in the study period, inflation movements have a meaningful relationship with rice price movements.

Based on the Value of the R calculation (Pearson Correlations)

Produces a calculated r value (Pearson Correlation) between Inflation and Rice Price of 0.746. This correlation value belongs to the category of positive correlation with a fairly strong strength. Furthermore, the value of the r calculation was compared with the r of the table at a

significance level of 5% with a total of 24 samples, which is around 0.404. Since the value of r calculated (0.746) is greater than the r of the table in a positive direction (i.e. 0.746 > 0.404), it can be concluded that there is a significant correlation between the variables of Inflation and Rice Prices.

A positive correlation direction indicates that the relationship between the two variables is moving in the same direction. So when the price of rice increases, the inflation rate also increases, and vice versa when the price of rice decreases, the inflation rate tends to decrease. These findings show a pattern of linear dynamics that corresponds to the general theory, which usually states that rising food commodity prices can drive inflation.

The correlation value in the category is strong enough to reflect that the relationship between the two variables is strong enough to show a meaningful relationship. It can therefore be concluded that Inflation and Rice Prices have a significant positive linear relationship, and variations in rice prices during the study period are significantly associated with variations in the inflation rate.

Hypothesis Results

The hypothesis of the results according to this study is formulated as follows.

H0 (Rejected)

There is no significant relationship between inflation variables and rice prices in Tulungagung Regency in 2021–2022.

H1 (Accepted)

There is a positive and significant relationship between inflation and rice prices in Tulungagung Regency in 2021–2022. This means that the increase in inflation is followed by the increase in rice prices, in accordance with economic theory and literature that states that the increase in the price of food commodities contributes to inflation, and inflation can encourage an increase in food prices**.** The explanation of the result hypothesis can be formulated as follows:

1. Inflation Theory states that rising prices of basic goods can be a driver of inflation, and high inflation encourages an increase in food prices (Montilano et al., 2021; Oktaviani et al., 2025).
2. Data on rice prices show that rice prices tend to follow the pressures of production, distribution, and macroeconomic conditions, including inflation (SISKAPERBAPO, 2025).
3. The discussion of the results of the correlation test shows a relationship that:
   Positive (r = 0.746) = the price of rice moves in the direction of inflation.

Significant (Sig = 0.000 < 0.05)= the relationship did not happen by chance.

The final hypothesis of this study shows that changes in inflation have a real relationship with rice price movements in Tulungagung Regency during the 2021–2022 period. Based on the results of statistical analysis and theoretical strengthening, it can be understood that whenever the inflation rate increases, rice prices in the region also tend to move up. This relationship pattern is positive and significant, which means that inflation fluctuations are not just a stand-alone macroeconomic phenomenon, but also affect the prices of staple food commodities such as rice. These findings are in line with the common understanding in economics that inflationary pressures usually flow to various sectors, including the food sector, so that the prices of basic necessities are also pushed up. Thus, the results of the study succeeded in proving that inflation plays a role as a factor that has a real contribution to the change in rice prices, and the hypothesis that there is a positive and significant relationship between the two variables can be declared acceptable.

DISCUSSION

The results of correlation analysis conducted on inflation and rice price data in Tulungagung Regency in 2021–2022 show that the two variables have a positive and significant relationship. The correlation coefficient of **0.746** gives an idea that the change in inflation is in the direction of the change in the price of rice. This means that when the inflation rate increases, rice prices tend to follow the same direction. The significance value of **0.000**, which is well below the 5 percent confidence level, corroborates that the relationship is not coincidental, but actually describes the empirical patterns that occurred during the observation period.

In economics, the relationship between inflation and food commodity prices is an inseparable discussion. Inflation is not just a general price increase, but also reflects economic pressures that arise from various sides—both on the demand and supply sides. Rice, as a basic commodity for the Indonesian people, has a large contribution to overall inflation. Therefore, when the price of rice increases, inflationary pressures will usually increase. This condition explains why the relationship between the two variables in this study shows a unidirectional pattern.

In 2021–2022, Indonesia is in the economic recovery phase after the COVID-19 pandemic. This transition period is marked by an increase in distribution costs, fluctuations in fuel prices, and adjustments in the price of consumer goods. These factors provide a boost to rising inflation and at the same time are balanced by rising food production costs. In the agricultural sector, the increase in input costs such as fertilizers, pesticides, and transportation

has a direct impact on food prices, including rice. With the increase in production costs, commodity prices at the consumer level will adjust so that producers can maintain business margins. This condition makes the relationship between inflation and rice prices more easily detected statistically.

Although the correlation of 0.746 indicates a fairly strong relationship, the figure has not yet reached a perfect correlation, so it can be concluded that there are still other variables that affect the price of rice. Factors such as rainfall, land conversion, plant pests and diseases, availability of irrigation water, and smooth distribution have an important role in determining price stability. In addition, various government policies—including the regulation of the Government Purchase Price (HPP), market operations by Bulog, and agricultural input subsidy programs—are also important determinants in maintaining the balance of rice prices.

The positive relationship between inflation and rice prices gives an idea that inflation has characteristics that are very sensitive to changes in food prices. Tulungagung Regency as an agrarian area is certainly inseparable from this dynamic. When yields decline or production costs increase, price pressures will more easily arise. This creates a circle of interconnectedness between local production systems and broader macroeconomic conditions. Thus, the increase in inflation is not only an indicator of rising prices in general, but also reflects the structural pressures experienced by the agricultural sector.

The findings of this study provide some important insights. First, the price of rice is not only influenced by market mechanisms, but also by macroeconomic conditions, especially inflation. Second, inflation stability has a great effect on food price stability, so inflation control can help maintain the affordability of rice prices for the community. Third, local governments need to pay attention to the dynamics of agricultural input prices and the efficiency of the distribution chain so that the increase in inflation does not have an excessive impact on rice prices.

Overall, the results of the analysis show that inflation has a fairly real role in driving rice prices in Tulungagung Regency. The relationship found is not only in line with economic theory, but also describes the empirical situation that occurred during the two years of observation. With this understanding, effective inflation control efforts, increasing agricultural production, and strengthening price stabilization are needed to ensure that rice prices remain at a reasonable and affordable level for the community.

5. CONCLUSION

Based on the results of the analysis of inflation and rice price data in Tulungagung Regency in 2021–2022, several conclusions can be drawn as follows:

1) Inflation has been proven to have a positive and significant relationship with rice prices. A correlation value of 0.746 indicates that there is a fairly strong relationship and moves in the same direction.
2) A significance level of 0.000 (<0.05) indicates that the relationship is statistically reliable and does not occur by chance. In other words, the change in inflation is significantly related to the movement of rice prices.
3) The positive direction of the relationship shows that rising inflation is in line with rising rice prices, in line with economic theory that inflation can drive up food commodity prices.
4) These results affirm the importance of controlling inflation as one of the efforts to maintain the stability of rice prices, which is a strategic commodity for the community.

LIMITATIONS

This research has several limitations that are important to note. First, the study only uses two variables, namely inflation and rice prices, so that other factors that can actually affect rice prices such as the amount of production, distribution conditions, fertilizer prices, weather, and government policies have not been included in the analysis. Second, the relatively short research period, which is only two years (2021–2022), makes the results obtained not able to describe long-term changes or seasonal patterns more completely. In addition, the analysis method used is only in the form of a correlation test, so the results of the study only show a relationship, not explaining cause and effect. This research also relies entirely on the data provided by BPS, so the accuracy of the results is greatly influenced by the accuracy of the data. Taking into account these limitations, further research is expected to add variables, expand the observation period, and use more in-depth analysis methods so that the results obtained can provide a more comprehensive picture.

REFERENCE

Atmadja, A. S. (1999). Inflation in Indonesia: The sources of its causes and control. Journal of Accounting and Finance, 1(1), 54–67. https://doi.org/10.18848/1447-9516/cgp/v11i02/37016

Badan Pusat Statistik Provinsi Jawa Timur. (2023). Rice data analysis of East Java Province 2020–2022. BPS East Java.

Badan Pusat Statistik. (2024). Rice harvest and production area in Tulungagung Regency 2023 (fixed figure). Central Statistics Agency of Tulungagung Regency. https://share.google/nroteBveDRdInkfFZ

Claudia, H., Rumengan, K. F. A., Wior, S. R., & Umboh, E. Z. (2025). Correlation test. StatistikaPendidikan.com, 1–4. http://statistikapendidikan.com

Djambak, S. (2008). Economy introduction: Inflation is a macroeconomic disease that can damage the joints of the economy, damage the productive climate, and weaken people's purchasing power. 23–38.

Faridah, N., & Syechalad, N. M. (2016). Analysis of factors affecting the exchange rate of farmers in the rice food crop sub-sector in Aceh. JIM: Jurnal Ilmiah Mahasiswa Ekonomi Pembangunan, 1(1), 169–176.

Hamdani, H., & Sa'diyah, H. (2025). Basic concepts for hypothesis preparation and theoretical studies in research. Journal of Linguistics and Social Studies, 2(2), 64–73. https://doi.org/10.52620/jls.v2i2.93

Johnson, D. G. (1980). Inflation, agricultural output and productivity. AgEcon Search, 1–18.

Montilano, S., Hasir, M., & Suriadi, L. O. (2021). The influence of poverty on economic growth in Indonesia. Journal of Economics and Development, 22(1), 45–49.

Oktaviani, S., Merdiyanti, K., Salsabilla, N., Syudaha, S., Imelia, I., Rahma, S., & Apriyanto, Y. (2025). Rising prices of basic goods affect inflation and political stability: A study of political economy in the Aur Duri Jambi market. Journal of Economic Equations, 4(1), 80–87. https://doi.org/10.22437/jeec.v4i1.45270

Peraturan Menteri Kesehatan Republik Indonesia Nomor 24 Tahun 2022. (2022). Bab I pendahuluan.

Saputra, D. P. (2012). Analysis of factors affecting rice farmers' income (Case study in Tambakrejo Village, Tulungagung Regency, East Java) [Undergraduate thesis, State University of Malang]. https://share.google/qaC0O8QDMSPHCGWVk

SISKAPERBAPO. (2025). Sistem informasi ketersediaan dan perkembangan harga bahan pokok. https://siskaperbapo.jatimprov.go.id/tren

Suryani, E., Hartoyo, S., Sinaga, B. M., & Sumaryanto, N. (2015). Estimation of elasticity of output supply and input demand in rice and corn farming business: Multiinput-multioutput approach. Journal of Agroeconomics, 33(2), 91–106. https://doi.org/10.21082/jae.v33n2.2015.91-106

Winarti, W., Chakim, M. H. R., Mulyati, M., Ramadhan, M. D., & Hakim, Y. F. (2024). Sustainable competitive advantage through smart retail technology. Indonesian Journal of Retail Management, 5(2), 157–173.