

Evaluation of financial statements of agricultural sector companies listed on Borsa İstanbul under high inflation conditions

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Abstract

Purpose: This study aims to analyze the financial data of five firms operating in the agricultural sector over the last three accounting periods and examine the impact of inflation accounting adjustments on ratio analysis, key audit issues, and Altman Z-Score models.

Design/Methodology/Approach: The financial statements of the selected firms were assessed in terms of inflation accounting adjustments to determine their impact on financial indicators and bankruptcy risk calculations.

Findings: The results indicate that inflation accounting adjustments enhance the accuracy of financial statements and improve bankruptcy risk assessments. While some firms managed to partially offset cost increases, others experienced significant declines in profit margins due to the negative effects of inflation adjustments. Firms with low profitability and liquidity problems faced greater challenges. No significant errors were identified in the inflation adjustment process, which was recognized as a key audit matter.

Research Limitations/Implications: Due to time constraints, this study focuses on the period starting from 2023/12, when inflation accounting was first applied. Future research could extend the analysis over a longer period to examine its long-term effects.

Originality/Value: This study evaluates the impact of inflation accounting on corporate financial stability, providing valuable insights into the financial implications of accounting adjustments in the agricultural sector. It contributes to the literature by offering empirical evidence specific to this sector.

Keywords: Agricultural economics, Altman Z score, BIST agricultural sector, high inflation, inflation accounting.

Tarım sektöründe enflasyon muhasebesinin etkileri: Borsa İstanbul'da yer alan sektör firmaları üzerine bir inceleme

Özet

Amaç: Bu çalışma, tarım sektöründe faaliyet gösteren beş firmanın son üç hesap dönemine ait mali verilerini analiz ederek, enflasyon muhasebesi düzeltmelerinin rasyo analizi, kilit denetim konuları ve Altman Z-Skoru modelleri üzerindeki etkilerini incelemeyi amaçlamaktadır.

Tasarım/Metodoloji/Yaklaşım: Çalışmada, incelenen firmaların mali tabloları enflasyon muhasebesi düzeltmeleri açısından değerlendirilmiş ve enflasyonun finansal göstergeler üzerindeki etkisi araştırılmıştır. Enflasyon muhasebesinin firmaların iflas riski hesaplamalarına etkisi analiz edilmiştir.

Bulgular: Enflasyon muhasebesi düzeltmelerinin, mali tabloların daha gerçekçi sunulmasını sağladığı ve iflas risk hesaplamalarının doğruluğunu artırdığı gözlemlenmiştir. Bazı firmalar enflasyon düzeltmesi sayesinde maliyet artışlarını kısmen dengeleyebilmişken, bazı firmalar negatif etkilerle karşılaşmış ve kâr marjlarında düşüş yaşamıştır. Likidite problemi yaşayan firmalar için enflasyon düzeltmesinin daha zorlayıcı olduğu tespit edilmiştir. Kilit denetim konusu olarak belirlenen enflasyon düzeltmesi sürecinde önemli bir hata saptanmamıştır.

Araştırma Sınırlamaları/Etkileri: Çalışmada zaman kısıtlaması nedeniyle analizler, enflasyon muhasebesinin ilk uygulandığı 2023/12 dönemi ile sınırlıdır. Gelecekteki araştırmaların, enflasyon muhasebesinin uzun vadeli etkilerini incelemesi önerilmektedir.

Özgünlük/Değer: Bu çalışma, enflasyon muhasebesinin şirketlerin finansal tabloları üzerindeki etkilerini analiz ederek, muhasebe uygulamalarının şirketlerin mali istikrarına olan katkısını değerlendirmektedir. Literatüre, tarım sektörüne özgü finansal etkileri inceleyerek önemli bir katkı sağlamaktadır.

Anahtar kelimeler: Tarım ekonomisi, Altman Z skoru, BİST tarım sektörü, yüksek enflasyon, enflasyon muhasebesi.

INTRODUCTION

With the world population reaching 9 billion, the global demand for food is growing rapidly, necessitating a significant expansion of agricultural production. Research predicts that by 2050, the need for agricultural production will increase by 100-110% (Tilman et al., 2011, p. 20260). In order to meet this demand in a sustainable way, an interdisciplinary transformation that considers environmental and social balances is required (Godfray et al., 2010, p. 817). However, factors such as climate change, natural resource scarcity and environmental sustainability make it difficult for the agricultural sector to respond to this growing need. Therefore, new incentives and policies need to be implemented to increase agricultural production while protecting the environment and public health (Tilman et al., 2002, p. 671). Traditional farming methods increase productivity and cause environmental damage, whereas modern technologies and sustainable management strategies increase production efficiency and minimize environmental impacts. When properly planned, these approaches not only ensure food security, but also support local agriculture by providing smallholder farmers with certainty about demand (Godfray et al., 2010, p. 814).

In this context, the agricultural sector plays a critical role not only in terms of food security, but also as a key driver of economic growth and sustainable development. In Türkiye, agriculture is one of the main drivers of the national economy and has a strategic position in economic development with the competitive advantage it provides (Merdan, 2024, p. 48). Moreover, the sector's financial health and profitability, which are critical for its sustainability, have been empirically analyzed. For instance, a recent study evaluating the financial performance of agricultural sub-sectors in Türkiye using the DuPont analysis technique provides key indicators for investors and policymakers (H. Yavuz, 2025). According to 2022 data, Türkiye's agriculture and food industry employs 18% of the working population, accounts for 6.5% of GDP and contributes USD 58.5 billion to the sector (TCCYO, 2024). Firms operating in such an important sector are directly affected by macroeconomics variables such as inflation.

Inflation puts pressure on the cost structures, profitability and liquidity of enterprises, creating uncertainty and shaping investment decisions (Dinç & Akkaya, 2023, p. 3; Yıldırım & Yıldırım-Özkaya, 2007, p. 10). In this respect, inflation accounting applications enable firms to increase transparency by eliminating negative effects in financial reporting and to make accurate cost calculations in an inflationary environment (Acer, 2024, p. 38; Gökçen, 2023, p. 14).

Inflation creates an environment of uncertainty by negatively affecting businesses. This leads to shorter maturities, higher maturity spreads and higher borrowing costs. It also leads to depreciation of working capital and equity inadequacy (Dinç & Akkaya, 2023, p. 3; Yıldırım & Yıldırım-Özkaya, 2007, p. 10). Financial statements play an important role in decision-making processes for information users such as investors, managers and government by showing the financial position of enterprises (Yükçü et al., 2024, p. 2). Under normal economic conditions, financial statements provide accurate information. However, during inflationary periods, inventories, fixed assets and shareholders' equity recorded on the historical cost basis appear lower than the real cost. This situation causes businesses to appear more profitable than they are and tax and profit distributions are made on fictitious profits. As a result, working capital is eroded, weakening the financial structure (Dinç & Akkaya, 2023, p. 4; Karasioğlu & Erdemir, 2005, p. 146). Inflation complicates the accuracy of the information presented in financial reports. Inflation accounting helps to provide accurate accounting information by solving this problem (Robson, 1994, p. 46). In this framework, inflation accounting can be defined as the process of updating monetary values in different periods by taking into account the change in the purchasing power of money (Erdemir, 2010, p. 59). In the existing studies on inflation accounting, it is widely accepted that inflation accounting improves the accuracy of financial reporting and is important for the accurate analysis of businesses. However, the difficulties encountered in its application have also been frequently emphasized. Many researchers argue that inflation accounting helps improve the accuracy of financial statements, especially in developing countries. For example, Nyagari (1977), argues that this practice is critical for ensuring financial transparency in developing countries. However, there are also obstacles such as high costs and lack of training. Similarly, Robson (1994) argues that inflation accounting practices in the United Kingdom play an important role in economic stabilization, but points out the complexity of its implementation. Archambault ve Archambault (1999) on the other hand, emphasize that the application of inflation accounting in different countries varies greatly, and therefore, it should be adapted to the economic conditions of each country. In the studies conducted in Türkiye, it has been observed that the late introduction of inflation accounting and the deficiencies in legal regulations have led to distortions in the financial statements of enterprises. Karasioğlu ve Erdemir (2005), drew attention to the lack of awareness of accounting professionals about inflation accounting and stated that education and

regulations should be strengthened in this regard. In addition, Öztürk (2006), stated that inflation accounting poses more difficulties especially in some sectors such as banking, but still contributes to improving financial accuracy.

Although the view that inflation accounting is necessary to accurately reflect financial performance is widespread, the complexity of the application and sectoral differences may limit its effectiveness. Demir (2006) and Yavuz (2007), argue that sectoral adaptations should be made for the effective application of inflation accounting. Yenisu (2022) on the other hand, suggested that accounting standards should be made more understandable. However, studies such as Varol (2022) and Yavuzaslan-Söylemez (2023) have also brought up the incompatibilities between inflation accounting and tax legislation and emphasized that legal regulations should be harmonized with inflation accounting. The impact of sectoral differences on the accuracy of inflation accounting practices has also been an important issue. Studies such as Gökten et al. (2023) ve Koçak et al. (2023) stated that inflation accounting can be made more efficient by taking into account sector-specific differences. In particular, studies in the textile and construction sectors show that these sectoral differences can significantly affect accounting accuracy. Bibliometric analyses on inflation accounting also provide important contributions to understanding the state of the literature. While Bozdoğan and Çetin (2023), focus on Turkish sources by examining qualified studies in Türkiye, Acer et al. (2024), analyzed 60 foreign articles in the WoS database and found that the majority of inflation accounting publications are US-based.

HIGH INFLATION AND AGRICULTURAL ECONOMY

The relationship between high inflation and the agricultural sector is described in the literature as a two-way interaction rather than a one-way effect. In the Turkish context, this interaction forms part of a complex structure where agricultural production is influenced by macroeconomic variables such as industrialization and economic growth, which are themselves shaped by inflationary pressures (Özbay, 2023). Studies show that inflation directly affects agriculture, while agricultural developments also play a key role in determining the course of inflation. Moreover, high inflation negatively impacts capital accumulation and structural transformation in agriculture. For example, the land reform implemented in South Korea during the 1950s aimed to direct large landowners toward industry; however, the hyperinflation caused by the Korean War devalued the bonds and led to the failure of this process (Hong, 2013). Within this framework, the issue can be examined under four main headings.

✓ **Agriculture: Both a Victim and a Driver of Inflation:** Inflation hinders agricultural production through energy prices and input costs (Nabernegg et al., 2024; Naraghi et al., 2021). Conversely, food supply shortages also increase inflation (Mutari et al., 2021; Wu et al., 2024). A study conducted in Serbia shows that high inflation weakens the capital of agricultural enterprises (Vukoje and Zekic, 2010). Findings from China reveal that inflation increases speculation and price volatility in agricultural products (Miao et al., 2011).

✓ **Macroeconomic Instability and Inadequate Institutional Arrangements:** High inflation is not merely a monetary issue; it is also linked to institutional weaknesses. A study conducted in Africa shows that food insecurity is associated with inflation, inadequate infrastructure, and corruption (Wudil et al., 2022). The example of Serbia reveals that the lack of strategy in agriculture has made the sector vulnerable (Anicic et al., 2023). In Türkiye, the process of adapting agriculture to the European Green Deal is weakening due to inflation and unstable policies (Keskin and Gunes, 2024).

✓ **Social Welfare and Food Security:** High inflation negatively impacts household welfare and food security through the agricultural sector. Kent et al. (2025) show that food insecurity among university students in Australia rose from 17% to 29%. Yu (2018) emphasizes that farmers' welfare has seriously declined during periods of high inflation in China. Sarban (2022) states that inflation negatively affects living standards and the social environment in Moldova.

✓ **Global Shocks and Geopolitical Risks:** The COVID-19 pandemic and the Ukraine-Russia war have negatively impacted the relationship between agriculture and inflation. Supron and Lacka (2024) show that the pandemic caused a permanent 4.5% loss in agricultural production in the Visegrad countries. Desalegn et al. (2022) emphasize that the pandemic and war caused high inflation alongside low growth. Anicic et al. (2023) reveal that increases in energy prices directly suppressed the agricultural sector by raising inflation.

The relationship between high inflation and agriculture creates a vicious cycle: Agricultural shocks drive up inflation, while rising inflation weakens agriculture financially and structurally, leaving it vulnerable to new shocks. Breaking this cycle does not appear possible through monetary policy alone. Research indicates that stability in exchange rates and monetary policy (Mawejje and Lwanga, 2016), climate-resilient agricultural investments (Mutari et al., 2021), strong institutional structures and transparent markets (Wudil et al., 2022), and targeted social protection

measures (Kent et al., 2025). Therefore, the relationship between agriculture and inflation has a multi-layered structure with economic, social, political, and environmental dimensions.

Additionally, the inflation-agriculture cycle can be mitigated through technological solutions. Alongside monetary policies, measures that enhance market transparency and reduce supply-demand imbalances are also important. Gururaj et al. (2023) showed that machine learning-based forecasting models can help farmers make more informed production decisions by providing insights into future prices, thus preventing sudden price spikes. Such proactive approaches complement financial regulations like inflation accounting.

MATERIAL AND METHOD

In this study, the financial statements of five firms listed on Borsa İstanbul were analyzed under conditions of high inflation. Uniquely, the study utilized summarized balance sheets and income statements provided by İş Yatırım to calculate ratios (Appendix 1) and Altman Z-Scores (Table 7), with the changes over the past three years interpreted. Specifically, the 2022 financial data reflect the firms' pre-inflation-adjusted statements, the 2023 data show the inflation-adjusted figures, and the 2024 data correspond to the post-inflation-adjustment period. In summary, the study provides a comprehensive analysis of both pre- and post-inflation-adjusted financial data for these five firms included in the BIST Agriculture Index.

In this context, the aim of this study is to examine the effects of inflation accounting practices on the financial statements of agricultural sector firms traded on Borsa İstanbul. The study analyzes the impact of inflation accounting on financial indicators such as profitability, liquidity ratios, and tax liabilities, and discusses the necessity for firms to adapt to these accounting practices. In addition, Z score values obtained from the financial data of the firms are analyzed. In this context, our study is structured as follows. First, the concepts of inflation and inflation accounting are explained, and then the financial data of five firms operating in the Agriculture, Forestry and Fisheries sector in Borsa İstanbul (BIST, 2024), which gathers the capital markets in Türkiye under a single roof, are analyzed. Following the findings, the conclusion and discussion section evaluates the inflation adjustment procedures and Z-score values of the firms.

This study aims to analyze the financial performance of five major companies operating within the Agriculture, Forestry and Fisheries sector of Borsa İstanbul. This sector is critical to economic growth, sustainability and food security, and firms that offer products to domestic and global markets represent the growth potential of the sector.

In this study, the financial data of each company for the years 2022 and 2023 were analyzed. Comparative analyses based on balance sheets and income statements provide significant insights into the overall financial health of the sector. Table 1 presents the financial profiles and key financial indicators of these five companies.

Method

To assess the financial performance of the companies, annual financial reports and independent audit reports were utilized. The analysis focused on key financial indicators such as current assets, fixed assets, total assets, equity, net profit for the period, gross profit, and financial expenses. The financial data from the companies' financial statements were compared in terms of sectoral growth potential and financial sustainability.

BIST COMPANIES IN THE AGRICULTURE SECTOR

The companies in the study are listed on Borsa İstanbul and are major players in the sector, as shown in the table below.

Table 1. Borsa İstanbul Agricultural, Forestry, and Fisheries Sector: Company profiles

No	Code	Company
1	AGROT	Agrotech High Technology and Investment Inc.
2	IZINV	İz Investment Holding Inc.
3	KNFRT	Konfrut Agriculture Inc.
4	OZSUB	Özsu Fish Production Inc.
5	YAPRK	Yaprak Dairy and Livestock Farms Inc.

Source: BIST

Although AGROT and IZINV have agricultural subsidiaries, their primary activities are predominantly in the investment sector. For the purposes of this study, however, they are considered as agricultural sector firms due to their inclusion in the BIST Agriculture Index.

Agrotech High Technology and Investment Inc. (AGROT)

Founded in 2013, Agrotech is an Istanbul-based company operating in technology, agriculture, health and other sectors. In 2022, it changed its title and started trading on Borsa Istanbul and was included in the BIST 100 index (Eren Bağımsız Denetim A.Ş., 2024a).

Table 2. AGROT financial performance - Summary balance sheet and income statement (TL Million)

Items	2024/09	2023/12	2022/12	Items	2024/09	2023/12	2022/12
Current Assets	2,345.85	2,906.48	920.77	Sales	2,146.58	791.50	877.07
Non-Current Assets	5,779.92	5,753.51	3,279.60	COGS (-)	-1,971.26	-531.24	-490.35
Total Assets	8,125.77	8,659.99	4,200.37	Gross Profit	175.32	260.26	386.73
Current Liabilities	547.61	688.90	392.05	Operating Expenses (-)	-22.76	-3.30	0.00
Non-Current Liabilities	1,172.71	1,208.73	737.19	G&A Expenses (-)	-140.09	-65.64	-45.17
Equity	6,405.45	6,762.36	3,071.13	R&D Expenses (-)	0.00	-9.77	-5.66
Paid-in Capital	1,200.00	1,200.00	1,000.00	Other Operating Income	62.36	57.07	19.06
Total Liabilities & Equity	8,125.77	8,659.99	4,200.37	Other Operating Expenses (-)	-115.27	-35.27	-40.23
Retained Earnings	1,024.82	678.02	166.72	Operating Profit/Loss	-40.45	203.35	314.72
Net Profit/Loss for the Period	33.61	346.80	332.34	Tax Income/Expense	-7.52	-13.99	0.00
Financial Expenses	-781.43	-243.68	44.81	Depreciation Expense	29.51	30.02	27.87

Source: İş Yatırım

As of the third quarter of 2024, the Company's total assets and shareholders' equity increased significantly, while financing expenses increased significantly. Although sales and gross profit increased, net profit for the period decreased and financing expenses had a negative impact on the Company's profitability.

İz Investment Holding Inc. (IZINV)

The company was established in 2010 and is an investment company registered with the Capital Markets Board (CMB). In addition to financial investment services, it aims to grow by diversifying into different sectors. Offered to the public in 2013, its shares were transferred to the Borsa Istanbul Sub-Market in 2020 and to the Main Market in 2021. It has subsidiaries operating in various fields such as agriculture, animal husbandry, chemical products, energy and technology, and includes many entrepreneurial companies in which it has a 100% capital share (SGD Bağımsız Denetim Hizmetleri A.Ş. & Kocatüfek, 2024).

Table 3. IZINV Financial performance - Summary balance sheet and income statement (TL Million)

Items	2024/12	2023/12	2022/12	Items	2024/12	2023/12	2022/12
Current Assets	86.97	64.56	35.39	Sales Revenue	85.62	23.01	55.80
Non-Current Assets	306.56	361.57	196.80	Cost of Sales (-)	-70.65	-24.30	-63.61
Total Assets	393.53	426.13	232.19	Gross Profit	14.97	-1.29	-7.81
Current Liabilities	14.57	12.68	18.62	Marketing, Selling, and Distribution Expenses (-)	-13.58	0.00	-0.04
Non-Current Liabilities	63.62	171.13	27.40	General Administrative Expenses (-)	-11.50	-11.65	-3.78
Equity	315.33	242.32	186.17	R&D Expenses (-)	0.00	0.00	0.00
Paid-in Capital	17.51	15.55	15.55	Other Operating Income	10.43	7.68	2.91
Total Liabilities & Equity	393.53	426.13	232.19	Other Operating Expenses (-)	-3.99	-5.58	-5.18
Retained Earnings	-46.04	-40.76	-16.69	Operating Profit/Loss	-3.67	-10.85	-13.90
Net Profit/Loss for the Period	-40.87	-5.28	-8.15	Tax Income/Expense	-2.94	-0.05	0.00
Financial Expenses	-20.07	-24.45	-30.10	Depreciation Expense	15.32	9.56	39.98

Source: İş Yatırım

When the financial data of the company is analyzed, total assets decreased compared to 2023, but increased compared to 2022. While current assets increased, non-current assets decreased. The decrease in long-term liabilities is considered a positive development in terms of debt management. Despite the increase in sales revenues, net loss continued due to high financial expenses and operating losses. Although gross profit turned positive, profitability is negatively affected.

Konfrut Agriculture Inc. (KNFRT)

Konfrut Gıda established Konfrut AG Tarım A.Ş. in 2020 with a focus on the agricultural sector and was restructured as Konfrut Tarım A.Ş. in 2024. The company continues its agricultural production, logistics and trade activities integrated with digital infrastructure and is listed in various indices in Borsa Istanbul (Analiz Bağımsız Denetim ve Danışmanlık A.Ş., 2024).

Table 4. KNFRT Financial performance - Summary balance sheet and income statement (TL Million)

Items	2024/12	2023/12	2022/12	Items	2024/12	2023/12	2022/12
Current Assets	1,985.22	2,877.87	2,255.74	Sales Revenue	3,540.93	3,983.87	4,092.79
Non-Current Assets	664.82	934.28	621.45	Cost of Sales (-)	-	-	-
Total Assets	2,650.04	3,812.15	2,877.19	Gross Profit	3,333.24	3,724.64	3,720.66
Current Liabilities	914.32	2,030.22	1,657.60	Marketing, Selling, and Distribution Expenses (-)	207.68	259.23	372.14
Non-Current Liabilities	202.61	176.57	254.73	General Administrative Expenses (-)	-159.12	-146.26	-126.37
Equity	1,533.10	1,605.35	964.85	R&D Expenses (-)	-107.56	-81.73	-66.82
Paid-in Capital	264.00	264.00	132.00	Other Operating Income	0.00	0.00	0.00
Total Liabilities & Equity	2,650.04	3,812.15	2,877.19	Other Operating Expenses (-)	72.46	69.90	176.47
Retained Earnings	288.22	77.78	147.48	Operating Profit/Loss	-68.33	-48.38	-160.31
Net Profit/Loss for the Period	-264.55	224.03	56.00	Tax Income/Expense	-54.88	52.76	195.11
Financial Expenses	-25.12	-45.35	-88.11	Depreciation Expense	0.00	-7.09	-69.07

Source: İş Yatırım

In 2024, the company's total assets and shareholders' equity decreased and its net loss for the period was realized as TL 264.55 million. While sales revenues declined, financing expenses decreased, but operating loss emerged.

Fish Production Inc. (OZSUB)

Founded in 1995 in Izmir, the company increased its production capacity and became one of the leading companies in the sector. It started trading on Borsa Istanbul in 2022. It operates with international standards in fish production and processing processes (Eren Bağımsız Denetim A.Ş., 2024b).

Table 5. OZSUB Financial performance - Summary balance sheet and income statement (TL Million)

Items	2024/12	2023/12	2022/12	Items	2024/12	2023/12	2022/12
Current Assets	1,639.66	2,104.44	1,231.39	Sales Revenue	2,573.90	2,188.52	1,486.37
Non-Current Assets	741.38	485.55	234.93	Cost of Sales (-)	-	-	-
Total Assets	2,381.03	2,589.99	1,466.32	Gross Profit	2,188.18	1,846.40	1,199.22
Current Liabilities	1,352.30	1,699.16	774.89	Marketing, Selling, and Distribution Expenses (-)	343.88	347.80	325.97
Non-Current Liabilities	425.20	139.87	136.67	General Administrative Expenses (-)	-213.94	-187.04	-99.04
Equity	603.54	750.96	554.75	R&D Expenses (-)	-72.62	-53.36	-28.02
Paid-in Capital	60.00	60.00	60.00	Other Operating Income	0.00	0.00	0.00
Total Liabilities & Equity	2,381.03	2,589.99	1,466.32	Other Operating Expenses (-)	91.72	192.85	247.76
Retained Earnings	143.78	156.83	80.97	Operating Profit/Loss	-229.01	-338.46	-330.93
Net Profit/Loss for the Period	-113.39	-10.84	52.93	Tax Income/Expense	-79.97	-38.20	115.74
Financial Expenses	-238.77	-125.61	-59.35	Depreciation Expense	-0.38	-13.32	-13.10

Source: İş Yatırım

As of 2024, the company's total assets and shareholders' equity decreased, but there was a significant decline in current assets. In 2024, net profit for the period posted a loss, while financing expenses increased, negatively affecting the company's profitability.

Yaprak Dairy and Livestock Farms Inc. (YAPRK)

Yaprak Süt ve Besi Çiftlikleri was established in 1994 in Burhaniye district of Balıkesir with 10 milking cows. The company grew by targeting quality milk production and efficiency and was incorporated in 2005. The company, which is traded on Borsa Istanbul, acquired All Besicilik in 2015 and now raises cattle (Ecovis Değer Bağımsız Denetim ve YMM A.Ş., 2023).

Table 6. YAPRK Financial performance - Summary balance sheet and income statement (TL Million)

Items	2024/09	2023/12	2022/12	Items	2024/09	2023/12	2022/12
Current Assets	196.06	185.32	124.23	Sales Revenue	275.52	333.62	190.82
Non-Current Assets	488.55	505.81	273.03	Cost of Sales (-)	-209.91	-251.99	-150.82
Total Assets	684.61	691.14	397.26	Gross Profit	178.26	279.11	117.62
Current Liabilities	83.20	91.31	89.53	Marketing, Selling, and Distribution Expenses (-)	0.00	0.00	0.00
Non-Current Liabilities	84.65	72.10	69.75	General Administrative Expenses (-)	-27.28	-23.99	-13.49
Equity	516.76	527.73	237.98	R&D Expenses (-)	0.00	0.00	0.00
Paid-in Capital	14.20	14.20	14.20	Other Operating Income	19.03	16.83	6.33
Total Liabilities & Equity	684.61	691.14	397.26	Other Operating Expenses (-)	-4.52	-2.89	-1.38
Retained Earnings	240.12	94.60	4.92	Operating Profit/Loss	165.48	269.06	109.09
Net Profit/Loss for the Period	34.62	196.83	71.86	Tax Income/Expense	-7.74	-27.13	-9.24
Financial Expenses	-76.30	-29.75	8.02	Depreciation Expense	12.42	12.18	4.78

Source: İş Yatırım

As of 2024, the company's total assets and shareholders' equity remained stable, but current assets increased slightly. Net profit for the period decreased compared to 2023, while there was a significant increase in financing expenses. The agricultural sector is one of the sectors that plays an important role in economic growth and sustainable development. In this context, analyzing the financial position of companies operating in the sector is important for investors and stakeholders.

FINDINGS AND DISCUSSION

In line with the information disclosed on the Public Disclosure Platform (PDP), the findings obtained for five companies operating in the Borsa Istanbul Agriculture, Forestry and Fisheries sector are presented below in terms of the effects of inflation adjustment practices on the ratio analysis, key audit matters and Altman Z Score models of the companies.

Ratio analysis of BIST agriculture, forestry and fishing sector firms and the general effect of inflation adjustment on ratios: a discussion

Ratio analysis is a fundamental method used to assess a company's financial position and understand its economic performance. This analysis allows the financial statements to be analyzed through certain ratios and helps to monitor various financial indicators of the company such as liquidity, profitability and productivity. In this study, the financial statements of the companies operating in the Agriculture, Forestry and Fisheries Sector of Borsa Istanbul were analyzed and comparative ratio analysis was conducted. The table is given in Appendix 1. When the financial indicators of the companies are analyzed, different results are obtained reflecting the performance and financial status of each company in the sector.

Liquidity situation

Firms' liquidity ratios indicate their ability to meet their short-term liabilities. Firms such as AGROT, IZINV and YAPRK have high current ratios. This indicates that they are in a strong position to pay their short-term debts. Especially AGROT and YAPRK have high liquidity ratios. This situation enables these firms to carry out their activities in a sustainable manner. However, such high liquidity ratios sometimes indicate that resources are not used efficiently. IZINV, on the other hand, is particularly notable for its low net working capital. This suggests that the firm may face difficulties in its operating cycle.

Inflation adjustment can often affect cash flows, which in turn can affect liquidity ratios. In 2023 and 2024, the inflation adjustment seems to have increased the capacity of some firms to repay short-term debt. For example, firms with high liquidity ratios, such as AGROT and YAPRK, have provided more liquidity to maintain financial balance despite rising costs due to inflation. These firms will be able to maintain their liquidity ratios as they can better manage their costs through inflation adjustment. However, firms such as IZINV and OZSUB faced difficulties due to the effect of inflation adjustment along with the decline in liquidity ratios. This indicates that these firms may face difficulties in meeting their short-term liabilities due to high inflation.

Profitability status

Profitability ratios are an indicator of a firm's capacity to generate revenue and how well it manages costs. Although AGROT has a high gross profit margin, it has negative operating and net profit margins. This shows that although the company has good revenue generation capacity, it has problems and ineffective cost control. YAPRK, on the other hand, has the highest gross and operating profit margins in the sector. This shows that the company has

strong cost management and is efficient in generating revenues. On the other hand, firms such as IZINV and OZSUB are notable for their low profit margins. IZINV exhibits a negative performance especially in operating and net profit margins, indicating that it has serious efficiency problems. This reveals that the company's cost structure is inefficient and that it struggles to generate revenues.

Inflation adjustment, in particular, leads to higher costs, while the rate of increase in revenues may be slower. This may affect the gross profit margin. Although firms such as AGROT and YAPRK have high gross profit margins, cost increases due to inflation adjustment may have put pressure on their profitability. However, thanks to inflation adjustment, these firms were able to maintain their operating profit margins by offsetting cost increases with price increases. Firms with low profit margins such as IZINV and OZSUB, on the other hand, experienced a decline in their profit margins as they were unable to raise their costs and increase their revenues due to inflation adjustment.

Return on equity

Return on equity refers to the return a company provides to its investors and shows how efficient the company's use of capital is. YAPRK's return on equity is quite high, indicating that the company provides high returns to its investors and is efficient in its use of capital. AGROT's return on equity is also strong, but firms such as IZINV and OZSUB stand out with negative return on equity. This suggests that these firms suffer from inefficiency in the use of capital and are not attractive to investors.

Inflation adjustment directly affects the return on equity. In particular, in an environment of rising inflation, the limited increase in revenues while the costs of companies increase negatively affects the return on equity. As a firm with a high return on equity, YAPRK seems to have been able to maintain this high profitability thanks to the inflation adjustment. However, companies such as IZINV and OZSUB have seen limited positive effects of inflation adjustment. They have to manage their receivables and inventories more carefully to stabilize their costs in the face of inflation. This may reduce return on equity.

When the financial analysis of firms in the sector is evaluated in general, it is seen that each firm faces different financial challenges. While companies such as AGROT and YAPRK are more financially sound with strong liquidity and high profitability ratios, companies such as IZINV and OZSUB face serious efficiency problems. This suggests that companies with low profit margins and low return on equity are in need of significant improvements in cost management and efficiency. According to these data, firms such as AGROT and YAPRK seem more attractive for investors, while IZINV and OZSUB should be considered as risky investment instruments. Financial improvements and strategies to increase profitability of these firms will increase their long-term sustainability. However, for short-term investments, these underperforming companies will require careful evaluation.

The 2023 and 2024 inflation adjustments had a significant impact on the financial ratios of companies in the sector. Firms such as AGROT and YAPRK were able to maintain strong liquidity and profitability ratios while partially offsetting cost increases due to inflation adjustment. However, firms such as IZINV and OZSUB were more affected by the negative effects of the inflation adjustment, with significant declines in profit margins. Inflation adjustment may have created a more challenging environment, especially for firms with low profits and liquidity problems.

Analysis of key audit matters in BIST agriculture, forestry, and fishing sector firms and the impact of inflation adjustment

The agricultural sector has a dynamic structure that is directly affected by economic fluctuations and sector-specific risks. This sector involves many critical accounting and auditing issues from production to supply chain, from sales processes to inflation accounting. Accuracy and transparency of financial reporting is of great importance for companies in the sector. In particular, issues such as revenue recognition, inventory valuation, biological assets accounting, trade receivables management and inflation accounting are among the main elements that stand out in the audit process. In this analysis, the independent audit reports of five firms operating in Borsa Istanbul are analyzed and audit issues that are considered critical for the sector are discussed. The aim is to evaluate the main risks faced by firms in their financial reporting processes and the accounting policies they apply and to reveal the effects of these issues on the sector in general. This study analyzes the independent audit reports of five firms listed on Borsa Istanbul (BIST) to assess critical audit matters and their implications for financial reporting.

According to the Public Oversight, Accounting and Auditing Standards Authority (KGK), Turkish Accounting Standard 41 (TMS 41) is a standard that regulates accounting practices related to agricultural activities. This standard requires that the biological transformations of living assets and the accounting of harvested agricultural products be

reflected in the financial statements at their fair value or cost at the time of harvest. TMS 41 also includes products grown on bearer plants within the scope of agricultural activities and aims to provide useful information to users regarding the management, measurement, and reporting of agricultural operations. Also, as indicated by KGK, Turkish Accounting Standard 16 (TAS 16) is an accounting standard that regulates the recognition, valuation, depreciation, and impairment of an entity's tangible fixed assets, enabling financial statement users to accurately assess the investment in and changes to these assets. As defined by the KGK, the Turkish Financial Reporting Standard 9 (TFRS 9) is an accounting standard that sets out the principles for recognizing and measuring financial instruments and reporting the risks related to their future cash flows, aiming to provide financial statement users with accurate, useful, and timely information about these instruments. Also in accordance with KGK, Turkey Accounting Standard 29 (TAS 29) is an accounting standard that requires companies operating in highly inflationary economies to present their financial statements adjusted for changes in the purchasing power of money, thereby enabling users to assess the financial position and performance of the company accurately and meaningfully.

Finally, As stated by KGK, Turkey Financial Reporting Standard 15 (TFRS 15) is an accounting standard that ensures companies recognize revenue from contracts with customers in their financial statements based on the consideration they expect to be entitled to in exchange for transferring goods or services, accurately and consistently reflecting the timing and uncertainty of payments.

Since evaluations in this study were conducted by independent audit firms within the framework of the aforementioned standards, it was deemed appropriate to clarify the scope and significance of these standards for the coherence of the research.

Agrotech High Technology and Investment Inc. (AGROT) (Eren Bağımsız Denetim A.Ş., 2023) identified four key audit matters. Revenue recognition for agricultural products and technology consultancy services was examined, and no significant findings emerged. Trade receivables, amounting to TL 238.9 million, were assessed for impairment under TFRS 9, with no material errors detected. The revaluation of property, plant, and equipment was conducted in compliance with TAS 16, and inflation accounting was verified under TAS 29 without discrepancies.

İz Investment Holding Inc. (IZINV) (SGD Bağımsız Denetim Hizmetleri A.Ş. & Kocatüfek, 2024) emphasized two key audit matters. Inflation accounting under TAS 29 had a pervasive and consistent impact on financial statements, necessitating significant audit efforts to verify index coefficients and monetary item classification. Additionally, revenue recognition under TFRS 15 was scrutinized to ensure accurate financial reporting, with a total sales revenue of TL 15.9 million properly recorded.

Konfrut Agriculture Inc. (KNFRT) (Analiz Bağımsız Denetim ve Danışmanlık A.Ş. & Özdemir, 2023) identified three critical audit matters. Inflation accounting adjustments under TAS 29 were analyzed, with no significant findings. Inventory valuation, comprising 38% of total assets, was impacted by fruit price variability; detailed analyses of inventory counts, impairment assessments, and turnover rates found no major issues. Trade receivables, forming 16% of total assets, were assessed for collection risk, and while unsecured balances existed, no material impairments were detected.

Özsu Fish Production Inc. (OZSUB) (Eren Bağımsız Denetim A.Ş. & Hikmet, 2023) focused on three audit matters. The provision for impairment of trade receivables was examined, emphasizing collection performance and compliance with TFRS 9. The fair valuation of live assets, given the company's involvement in fish farming, required assessments of physical availability, market conditions, and accounting estimates. Inflation accounting under TAS 29 was implemented to ensure financial statement accuracy, with audit tests verifying the reliability of financial information.

Yaprak Dairy and Livestock Farms Inc. (YAPRK) (Ecovis Değer Bağımsız Denetim ve Yeminli Mali Müşavirlik A.Ş. & Bayram, 2023) identified two key audit matters. The fair valuation of live assets used for milk production and fattening, in line with TAS 41, involved evaluating animal health, genetic factors, and age, with no significant findings. Inflation accounting adjustments under TAS 29 were examined, focusing on the restatement of non-monetary items and the use of consumer price index data, with no material errors detected.

Across all firms analyzed, inflation accounting emerged as a consistent and significant audit matter. In hyperinflationary economies such as Türkiye, applying TAS 29 is essential to ensure fair financial statement presentation. The process involves distinguishing between monetary and non-monetary items, verifying index accuracy, and restating financial statements in terms of current purchasing power.

The audit of Agrotech High Technology and Investment Inc. confirmed the impact of inflation adjustments on financial statements without identifying major discrepancies. Firms like İz Investment Holding Inc. and Konfrut Agriculture Inc. demonstrated the wide-ranging effects of inflation adjustments, focusing on price index accuracy and non-monetary item segregation. Similarly, Özsu Fish Production Inc. and Yaprak Dairy and Livestock Farms Inc. implemented inflation adjustments to ensure financial statement reliability, with no material errors detected.

This analysis highlights the importance of inflation adjustments in maintaining financial reporting transparency and accuracy in the BIST agriculture, forestry, and fishing sector. The pervasive effect of inflation accounting necessitates additional audit scrutiny, ensuring compliance with TAS 29 and the accurate presentation of financial data.

Analysis of Altman Z-Scores of BIST agriculture, forestry and fishing sector firms and the overall impact of inflation adjustment on z-scores: a discussion

Altman's Z-Score Model was initially developed exclusively for publicly traded manufacturing firms, as it was based on market value. In 1983, Altman introduced the Z'-Score Model by incorporating the book value of equity, making it applicable to private companies as well.

The Z'-Score Model is calculated as follows:

$$Z' = 0.717.X_1 + 0.847.X_2 + 3.107.X_3 + 0.420.X_4 + 0.998.X_5$$

The variables used in the Z'-Score Model are as follows:

- X_1 : Working Capital / Total Assets
- X_2 : Profitability / Total Assets
- X_3 : Earnings Before Interest and Taxes (EBIT) / Total Assets
- X_4 : Book Value of Equity / Total Liabilities
- X_5 : Sales / Total Assets

Definitions:

- Working Capital = Current Assets – Short-Term Liabilities
- Total Assets = Total Assets in the Balance Sheet
- Profitability (Net Profit) = Net Period Profit from the Income Statement
- Earnings Before Interest and Taxes (EBIT) = Net Profit + Tax Expenses + Interest Expenses
- Book Value of Equity = Shareholders' Equity
- Total Liabilities = Short-Term Liabilities + Long-Term Liabilities
- Sales (Net Sales) = Net Sales from the Income Statement

Subsequently, to reduce the impact of industry-specific effects, Altman removed X_5 (Sales/Total Assets) from the formula and developed the four-variable Z''-Score Model.

The Z''-Score Model is calculated as follows:

$$Z'' = 3.25 + 6.56.X_1 + 3.26.X_2 + 6.72.X_3 + 1.05.X_4$$

Altman also highlighted the limitations of the Z-Score Model. The model does not account for extremely large or small firms and was originally tested only on manufacturing companies. Additionally, due to its long observation period, its applicability to modern economic conditions has been questioned. Therefore, it has been emphasized that the model should be used cautiously for bankruptcy prediction (Altman et al., 2014).

In this section, the impact of inflation adjustment applied in Türkiye in 2023 and 2024 on Z scores is discussed. When examining the changes in companies' Z' and Z'' scores, it is observed that there are periodic fluctuations.

Table 7. Altman Z' and Z'' Scores of BIST agriculture and food sector firms

Companies	2024/12		2023/12		2022/12	
	Z'	Z''	Z'	Z''	Z'	Z''
AGROT	1.70	8.00	1.84	8.87	1.79	7.79
IZINV	1.45	7.26	0.47	4.92	1.45	6.75
KNFRT	1.78	6.28	1.70	5.97	1.69	4.97
OZSUB	0.81	3.25	0.94	4.30	1.48	5.96
YSPRK	1.63	7.24	2.81	9.82	1.88	7.18

According to Table 7, the Z' score of the AGROT company decreased from 1.84 in 2023 to 1.70 in 2024. Similarly, the Z" score dropped from 8.87 to 8.00. IZINV experienced a significant decline in its Z' score in 2023 (0.47), but it recovered to 1.45 in 2024. The Z" score showed a similar trend. The KNFRT company displayed relatively stable movement in its Z' score (1.69 → 1.70 → 1.78), while its Z" score increased from 4.97 to 6.28. OZSUB experienced fluctuations in both its Z' and Z" scores, with the Z' score dropping to as low as 0.81 in 2024. YSPRK showed a noticeable increase in its Z' score in 2023 (from 1.88 to 2.81), but it declined to 1.63 in 2024. Overall, it is observed that significant changes occurred in the companies' Z' and Z" scores immediately after the inflation adjustment in 2023.

The inflation adjustment applied in 2023 led to significant changes in both Z' and Z" scores. Some companies (IZINV, YSPRK) saw an increase in their Z scores after the adjustment, while others (AGROT, OZSUB) were negatively affected. In other words, companies like IZINV and YSPRK benefited from the inflation adjustment, increasing their Z scores in 2023, whereas companies such as OZSUB and AGROT experienced a decline in their Z scores in 2024. This indicates that the inflation adjustment may have negative effects on some companies. The impact of the inflation adjustment on companies' financial statements, while providing a more accurate reflection of their financial health, has caused fluctuations in their Z scores in the short term.

Equity increase generally had a positive effect on the Altman Z Score after the inflation adjustment. Following the inflation adjustment, equity becomes closer to its true value, and if it increases relative to liabilities, the X₄ Ratio (Equity / Total Liabilities) rises. Since the X₄ component holds significant weight in the Z score, it positively impacts the overall Z score. Additionally, while an increase in equity may not directly affect working capital (X₁ = Working Capital / Total Assets), it contributes indirectly by enhancing financial strength. In terms of profitability indicators (X₂ and X₃), the inflation adjustment alters accounting profit. However, if the company's actual profitability is strong, this supports the Z score. In summary, when equity increases, the Altman Z Score rises, and the company's bankruptcy risk decreases.

With the continued inflation adjustment in 2024, it is believed that a long-term comparison is needed to more clearly analyze the financial risks of companies.

CONCLUSION AND RECOMMENDATIONS

While inflation adjustment eases the tax burden for some companies, it may create additional tax costs for others. As a result of the audits, it has been observed that inflation adjustment has been made correctly in most companies and the financial statements reflect the truth. This is very important for compliance with financial reporting standards and investor confidence. This study examines the effects of inflation adjustment on the financial statements of the firms in the BIST Agricultural Sector and shows that the firms in the sector attach great importance to inflation accounting and that the adjustments are generally made correctly. For investors and other information users, this means that the financial data of the firms are presented in a reliable, accurate and transparent manner and creates trust.

In general, there are significant differences in the financial condition of companies operating in the BIST Agriculture and Food Sector. While companies such as YAPRK and AGROT stand out with their strong financial structures, OZSUB has a riskier profile due to its high debt burden and profitability issues. IZINV, on the other hand, is in an advantageous position in terms of liquidity with its high free float, but its profitability problems raise concerns about sustainability.

Government support is crucial for the sustainability and efficiency of the agricultural sector. High inflation and agriculture are linked in a self-reinforcing cycle, where shocks in agriculture increase inflation and rising inflation weakens agriculture, highlighting the need for integrated economic, social, and policy measures. Agriculture is both a cornerstone of the national economy and a critical sector for food security. Although inflation adjustment and the correct application of financial reporting standards increase the financial soundness of firms in the sector, it is believed that the sustainability of these achievements may be difficult without government support. Incentives, subsidies and supports against the fluctuations in the agricultural sector will allow producers to stabilize their costs and work more efficiently. Moreover, such supports will contribute to the spread of innovative technologies and sustainable production methods in the agricultural sector, thereby contributing to the growth of the national economy and shaping the future of agriculture. These findings help us better understand the structure of the BIST Agriculture and Food sector and the financial implications of each company's strategic decisions.

Our study examines the effects of inflation accounting adjustments on bankruptcy risk in five firms operating in the BIST Agriculture and Food Sector and reveals that inflation adjustment increases the accuracy of financial

statements and improves Altman Z-Score calculations during high inflation periods. In this context, it is observed that inflation accounting practices more accurately reflect the financial position of firms and do not have a negative impact on bankruptcy risk.

Contribution Rate of Researchers Declaration Summary

The authors declare that they have contributed equally to the article and have not plagiarized.

Conflict of Interest Declaration

The authors of the article declare that there is no conflict of interest between them.

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