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**RESEARCH ARTICLE / ARAŞTIRMA MAKALESİ**

# Corporate Hedging and IPO Underpricing in Türkiye

## Türkiye'de Kurumsal Riskten Korunma ve İlk Halka Arzlarda Düşük Fiyatlandırma

**Yusuf Aytürk** [1], **Caner Akbaba** [2]

**Abstract**

The initial public offerings (IPO) phenomenon remains one of the most nebulous and sophisticated issues in the financial industry. Numerous studies in different countries provide significant evidence by addressing various aspects of underpricing of IPOs. Information asymmetry between investors and issuers is a prominent reason for the extent of underpricing. Issuers tend to disclose more information to reach a fair equilibrium price in the market. Hedging instruments are the most widely used financial risk management tools that can decrease information asymmetry. The relationship between corporate derivatives use and information asymmetry has been investigated through value relevance channels in secondary markets. However, researchers have recently started to analyse the impact of hedging using various markets, such as debt markets, mergers and acquisitions, and IPOs. Moreover, increasing interest in real assets and initial public offerings due to a high inflationary environment can provide further evidence for IPO underpricing, especially in emerging markets. For this purpose, this study investigates the impact of financial risk management using financial derivatives on short-term IPO performance (i.e., IPO underpricing) in the Turkish IPO market. Employing a sample of 287 Turkish IPOs between 2008 and 2023, we find that financial derivatives use negatively affects the level of IPO underpricing.

**JEL Codes:** G12, G32,

**Keywords:** Financial derivatives, Valuation, Initial public offerings, Underpricing, Türkiye

**Öz**

İlk halka arz olgusu finans sektöründeki en belirsiz ve karmaşık konulardan biri olmaya devam etmektedir. Farklı ülkelerde yapılan bir dizi çalışma, ilk halka arzlardaki düşük fiyatlandırmanın çeşitli yönlerini ele alarak önemli kanıtlar sunmaktadır. Yatırımcılar ve ihraççılar arasındaki bilgi asimetrisi, düşük fiyatlandırmanın en önemli nedeni olarak gösterilmektedir. Piyasada gerçeğe uygun fiyat dengesine ulaşmak için ihraççılar daha fazla bilgi açıklama eğilimindedir. Riskten korunma araçları, bilgi asimetrisini de azaltabilen ve en yaygın kullanılan finansal risk yönetim araçlarındandır. Kurumsal türev araçların kullanımı ve bilgi asimetrisi arasındaki ilişki ikincil piyasalarda genellikle değer ilişkisi aracılığı ile araştırılmıştır. Ancak, araştırmacılar son zamanlarda borç piyasası, birleşme ve devralmalar ve ilk halka arzlar gibi çeşitli piyasaları kullanarak riskten korunmanın etkisini analiz etmeye başlamışlardır. Ayrıca, yüksek enflasyonist ortam nedeniyle reel varlıklara ve ilk halka arzlara yönelik artan ilgi, özellikle gelişmekte olan piyasalardaki ilk halka arzların düşük fiyatlandırması için daha fazla kanıt sağlayabilmektedir. Bu amaçla çalışmamız, finansal türev araçlar aracılığıyla finansal risk yönetiminin ilk halka arzların kısa vadeli performansı, diğer bir deyişle Türkiye halka arz piyasasında ilk halka arzların düşük fiyatlandırılması üzerindeki etkisini araştırmaktadır. Sonuç olarak, çalışmamızda 2008 ile 2023 yılları arasında Türkiye'de gerçekleşen 287 ilk halka arzdan oluşan bir örneklem kullanarak, finansal türev araç kullanımının ilk halka arzlarda düşük fiyatlandırma düzeyini negatif yönde etkilediğini tespit etmekteyiz.

**Anahtar Kelimeler:** Finansal türev araçlar, Değerleme, İlk halka arzlar, Düşük fiyatlandırma, Türkiye

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## Introduction

Corporate hedging using financial derivative instruments is a widely used risk management tool in companies. The value relevance of corporate hedging in different markets has been investigated. Early studies (Allayannis and Weston, 2001; Bartram, et. al, 2011, and Panaretou, 2014) focused on the characteristics of hedgers and the effect of risk management on pricing in secondary markets. Recently, we observed research focusing on debt markets (Chen and King, 2014), initial public offerings (Qiao et. al, 2020), and mergers and acquisitions (Chen et. al, 2017). The main channels leading to the value relevance of hedging are tax advantage (Smith and Stulz, 1985), lower volatility (Leland, 1998), and a decreasing level of information asymmetry (Dadalt, et. al, 2002, DeMarzo and Duffie, 1995).

The value relevance of hedging has been investigated in the Turkish equity market using Tobin's Q approach (Ayturk, et. al, 2016; Danisman and Demirel, 2019). The IPO puzzle, i.e., underpricing issues in Turkish IPOs has been also widely analysed in Borsa Istanbul (Kiymaz, 2000; Durukan 2002; Bildik and Yılmaz, 2008; Oran et. al, 2013; Gökkaya and Açıkgöz; 2017; Avcı et al., 2020; Tanyeri et al., 2022; İlbasmış, 2023). Although studies have covered both the effect of corporate derivatives on firm value and the IPO puzzle, research has yet to comprehensively examine the effect of hedging on the IPO market in Borsa Istanbul, Türkiye. Following the reasoning of Qiao et al. (2020), it is worth studying the value relevance of hedging in a primary market setting where the level of information asymmetry is expected to be relatively high. Tobin's Q ratio is used as a proxy for firm valuation in secondary markets, whereas underpricing is a direct measure of value in IPO markets. This study examines the underpricing levels of hedgers and non-hedgers in the Turkish IPO market.

Earlier studies revealed that IPO underpricing is largely caused by significant information asymmetry regarding the issuer firm's value. Therefore, IPO firms intentionally underprice their offer prices to encourage uninformed investors of potential returns to purchase these shares (Rock, 1986). DeMarzo and Duffie (1995) and Dadalt et al. (2002) indicated that using financial derivatives or hedging instruments signals about the quality of financial reports and reduces information asymmetry between managers and investors. Reducing asymmetric information helps uninformed investors make better investment decisions. Furthermore, Breeden and Viswanathan (2016) stated that managers are likely to use hedging as a strategy to improve investors' understanding of managerial competence. This reduction in information asymmetry positively affects firm valuation; hence, the use of financial derivatives may generate higher firm value. Because an initial public offering is a value-determination process, an IPO firm that uses financial derivatives may be less exposed to asymmetric information whose offer price may be closer to the initial market price. As IPO underpricing is widely seen as a form of compensation for less informed investors to offset the risk of trading against those with superior information (Carter and Manaster, 1990; Cohen and Dean, 2005), issuers will be exposed to less underpricing by using financial derivatives. Consequently, we hypothesise that using financial derivatives reduces underpricing by decreasing information asymmetry in IPO firms.

Although the finance literature contains a large number of studies on the impact of hedging on firm value, there is a dearth of research on the impact of hedging on IPOs,

where firm value is critical to investors and firms. Because there is scant empirical evidence on how the use of hedging instruments impacts the extent of IPO underpricing, we specifically investigate the role of hedging instruments in reducing IPO underpricing using a sample of Turkish IPO data. We prefer to use Turkish IPO data to test our hypothesis for several reasons. Initially, the ownership structure among publicly traded firms in Türkiye is highly concentrated with family, corporate, or foreign ownership, while protection systems for small investors are relatively poor. The presence of highly concentrated ownership that results in a lack of transparency and disclosure practises, provides us with an appropriate ground to test information asymmetry in IPOs. Moreover, in terms of derivatives use, as Khediri (2010) clarifies, the control of a firm's equity by block shareholders may lead outside investors to believe that derivatives are used for purposes other than risk management and value maximisation, thus preventing them from fairly evaluating the hedging policies of Turkish firms. Secondly, Türkiye's geopolitical position, which is one of the most significant points that distinguishes Türkiye from other emerging markets, and the extreme volatility in macroeconomic indicators (especially inflation rates) create an environment that makes risk management crucial, and this situation directly affects the short-term performance of Turkish IPOs.

In the current research, we analyse 287 Turkish IPOs from 2008 to 2023 to test whether the use of hedging instruments reduces the level of IPO underpricing. After applying both univariate and multivariate analyses, we find strong evidence of the value relevance of hedging in the Turkish IPO market. Companies using financial derivatives have significantly lower levels of underpricing, which is a positive effect of hedging on firm valuation.

Our study is composed of five sections. The next section discusses the related literature and develops our main hypothesis. Section 3 describes data, variables, and main characteristics of the Turkish IPO market. Section 4 presents the main empirical results of univariate and multivariate analyses. Section 5 concludes the study.

## Literature Review and Hypothesis Development

Numerous theories have been developed in the finance literature to determine the factors that affect firm value. In this context, it is very imperative to reduce the information asymmetry between internal and external investors (Özcan, 2021). In this study, we hypothesise that using financial derivative instruments (hedging) decreases the level of IPO underpricing, in other words, using financial derivative instruments results in higher firm valuation and brings the offer price closer to the equilibrium market value by reducing information asymmetry.

The origins of corporate hedging theories can be traced to Modigliani and Miller's (1958) theorem, which asserts that in a perfect capital market, corporate hedging does not enhance corporate value because shareholders have individually achieved the same hedging outcomes. However, leaving aside the assumption of perfect capital markets, hedging is seen as beneficial in that it helps mitigate costs such as expected taxes, underinvestment, and financial distress that make future cash flows uncertain and difficult to predict (Nguyen and Liu, 2014). In addition, using financial derivative instruments, namely, hedging, plays a decisive role in influencing firm financing and investment decisions, ultimately affecting corporate value (Campello et al., 2011).

Different theories exist in the literature regarding why hedging impacts firm value. Smith and Stulz (1985) stated that risk management leads to a decrease in the present value of expected bankruptcy costs; thus, market imperfections benefit corporations in increasing firm value. DeMarzo and Duffie (1995) argued that one of the prominent tools to reduce asymmetric information is the use of hedging instruments, which can point not only to managerial competence and commitment to risk management but also to hedging reduce the variability of a firm's earnings. Thus, the use of hedging instruments reduces the noise in the information available to uninformed shareholders and enables them to make more informed portfolio decisions. Similarly, Dadalt et al. (2002) provided evidence that both using and the extent of hedging contribute to firm value by reducing information asymmetry.

There are also studies in the literature that examine the exact relationship between financial derivatives and firm value. Allayannis and Ofek (2001), Allayannis and Weston (2001), Kim et al. (2006), and Allayannis et al. (2012) reported strong evidence that employing derivatives for corporate risk management leads to significant value premiums.

Amount of research also used samples from the Turkish equity market to measure the impact of hedging on firm value. While hedging is usually considered a value-enhancing activity, studies in Türkiye exhibit mixed findings. Ayturk et al. (2016) examined Turkish non-financial firms between 2007 and 2013 and indicated that firm value appeared to be positively related to derivative use by employing Tobin's Q ratio. However, they could not report significant hedging premiums or discounts for the sample. Senol et al. (2017) examined 248 observations in Borsa Istanbul from 2008 to 2015, and they similarly did not obtain significant evidence regarding the impact of financial risk management on firm value. These findings were supported by evidence presented by Akpinar and Fettahoglu, (2016) and Danisman and Demirel (2019). Ayturk et al. (2016) attributed this result to two reasons; first is the lack of disclosure quality of derivative use leads to information asymmetry, and second, highly concentrated ownership among Turkish firms. Despite these findings, several studies have established a positive relationship between hedging and firm value. Ece and Sari (2020) conducted a study exploring how hedging impacts firm value in Türkiye. They analysed this relationship using two dependent variables: Tobin's Q and the natural logarithm of market value. Their findings revealed a statistically significant positive relationship between these firm value measures and derivative use. Demirci (2023) used data from 70 non-financial listed firms in Borsa Istanbul (BIST) between 2010 and 2021 to examine the effect of derivative use on firm value separately for smaller and larger firms. He found that derivative use is more beneficial for smaller firms than for larger firms in terms of enhancing value.

IPO underpricing is one of the most observed and controversial phenomena through which an issuer firm determines its offer price to be below its fair market value. Although IPO underpricing may provide higher returns for investors in the short term, it may result in higher company costs (Carter and Manaster, 1990). Starting from the 1970s, the IPO phenomenon has been examined throughout numerous research and has been explained by various theories (Logue, 1973; Ibbotson, 1975; Ritter, 1984; Rock, 1986; Ruud, 1993; Loughran and Ritter, 2004; Roosenboom, 2012; Zhou and Sadeghi, 2019; Mazumder and Saha, 2021); however, to date, there has been no

common agreement about the IPO underpricing phenomenon (İlbasmış, 2023). While a number of reasons have been proposed to explain the phenomenon of underpricing in initial public offerings, studies have focused on several theories involving various aspects of the relationships between issuer firms, investors, and the underwriters who assist firms in going public (Ibbotson and Ritter, 1995). On the other hand, Ritter and Welch (2002) states that theories addressing the IPO underpricing phenomenon fall into two categories: asymmetric and symmetric information. Theories based on asymmetric information have received substantial support and recognition in the IPO underpricing literature. Conversely, theories based on symmetric information have not been widely accepted as the main factor influencing underpricing. The first category is based on the information asymmetry among participants (investors and IPO firms) involved in IPO transactions. Rock's (1986) winner's curse model claimed that IPO underpricing arises from uneven information between investors. Informed investors subscribe to attractive IPOs, but uninformed investors demand all IPOs. IPOs that have a higher potential for higher returns can be oversubscribed by informed investors, but uninformed investors can end up with attractive IPOs with a few portions. Extending Rock's (1986) model, Beatty and Ritter (1986) argued that underwriters are better informed about the market than IPO firms, and underwriters maintain underpricing equilibrium in the market. They also demonstrate that the extent of underpricing rises with the level of ex ante uncertainty regarding firm value. Similarly, Benveniste and Spindt (1989) claimed that investors who hold optimistic views about a firm's value are reluctant to disclose this information during the book-building process because doing so would prompt underwriters to increase the offer price. The consensus in the literature is that ex ante uncertainty is fundamental to the IPO process, and increased uncertainty eventually results in greater IPO underpricing (Ljungqvist, 2007).

Signaling studies posit that underpricing is a useful way for investors to evaluate a company's quality and helps them make difference between high-quality and low-quality companies. It is assumed that an IPO firm knows more about its future cash flows than investors. To address this asymmetric information problem and signal the true value of the firm, the issuer offers shares at a deliberate discount and keeps some of the newly issued shares in its portfolio. This is inevitably the best strategy for low-quality issuers because these issuers cannot afford to leave money on the table during their IPOs (Welch, 1989; Grinblatt and Hwang, 1989; Allen and Faulhaber, 1989).

IPO underpricing is also one of the most observed and controversial phenomena in Türkiye like in other emerging markets. A number of studies have been conducted on short-term underpricing anomalies for years in Türkiye. Studies on IPO underpricing in Türkiye have generally been conducted using data from the Istanbul Stock Exchange (ISE) and Borsa Istanbul (BIST). These studies cover an extensive period from the early 1990s to the present. In those studies, factors that could have an explanatory factor on short-term IPO underpricing have been tried to pull out by using both the characteristics of companies that went public in Borsa Istanbul and other market factors. A significant amount of previous research on IPO underpricing in Türkiye has proved the existence of asymmetric information and signaling theory. A seminal study in this field is Kiymaz (2000), in which he investigated the performance of 163 IPOs for various industries from

1990 to 1996 and reported that the extent of underpricing on the first day was 13.1%. He asserted that key factors affecting underpricing include firm size, rising stock markets between the public offering date and the first trading day, institutional ownership, and self-issued offerings. These findings align with the theory of asymmetric information. Institutional investors are likely to decrease information asymmetry between the issuer and potential investors, thereby reducing the need for the issuer to set significantly lower offer prices to ensure a successful IPO.

In another study that sets out to determine underpricing for Turkish firms, Durukan (2002) supported the winner's curse hypothesis that underwriters deliberately discount the offer price to reward informed investors. Additionally, she claimed that lowering the level of uncertainty about IPOs results in lower returns. Size and age of the issuer firm were effective factors in IPO underpricing. Bildik and Yılmaz (2008) also revealed the existence of underpricing in IPOs from 1990 to 2000, and the factors of the number of investors and the earnings-to-price ratio are estimates of the initial underpricing of IPOs. Deliberate discount on offer price is determined as another prominent factor in IPO underpricing. Oran et al. (2013) presented that the only variable that explains underpricing in Turkish IPOs is the initial public offering discount, and they indicated that fair value estimates of underwriters were statistically different from the realised market values. Similarly, Tütüncü and Acar (2019) found that initial returns on IPOs are negatively associated with the deliberate discount rate implied by the underwriter. Moreover, Gökkaya and Açıkgöz (2017) examined 173 Turkish IPOs within the period 1998-2013 and set out that the extent of underpricing is determined by the ratio of institutional investors and foreign investors participating in the IPO and underwriter reputation. Avcı et al. (2020) analysed the IPOs in Borsa Istanbul between 2010 and 2019 and showed a statistically significant underpricing existence, consistent with the findings of previous studies in Borsa Istanbul. They also concluded that underpricing does not depend on the issuer's industry.

Additionally, some studies have delved into specific features of underpricing IPOs. For example, Yüksel and Yüksel (2006) indicated that trading volume has an impact on IPO underpricing. Küçükkocaoğlu (2008) compared three different methods of IPOs (book-building, fixed-price offer, and sale through the stock exchange). He found 11.47%, 7.01%, and 15.68% underpricing levels for each IPO method, respectively. He also provided a significant relationship between pre-IPO market returns and underpricing and argued that firms generally prefer "hot market" periods for IPOs.

Recent studies have contributed considerable evidence to the IPO literature. Tanyeri et al. (2022) analysed Turkish IPOs from 1990 to 2020 and found 9% IPO underpricing level on average, which is lower than in other emerging countries. Shares offered at fixed prices and by larger firms are subject to lower underpricing. They also display that the level of underpricing is impacted by the changing economic and regulatory situation in Türkiye. İlbasmış (2023) indicated that IPOs conducted during the COVID-19 pandemic exhibited greater underpricing. Conversely, an average IPO firm that is older, possesses more assets, generates higher proceeds, experiences higher trading volume on its first day, and is anticipated to have lower post-IPO volatility tends to have less underpricing at its initial public offering.

Beginning with the early study of DeMarzo and Duffie (1995), the positive effect of

corporate hedging on information asymmetry was demonstrated by Dadalt et al. (2002), Kim et al. (2006), and Allayannis et al. (2012). Reducing information asymmetry is one of the main channels through which the value relevance of corporate derivatives use can be explained, and this relationship is also valid in Türkiye (Akpinar and Fettahoglu, 2016; Danisman and Demirel, 2019; Ayturk et al., 2016). The IPO setting is a type of financial market that has an inherently high degree of information asymmetry, and high information asymmetry leads to underpricing phenomenon in IPOs, as stated by Beatty and Ritter (1986) and Benveniste and Spindt (1989). Based on the aforementioned theoretical arguments that the main denominator of IPO underpricing is information asymmetry and that derivative use (hedging) enhances firm value by lowering information asymmetry, we can argue that hedging reduces the level of underpricing in initial public offerings. Recently, Qiao et al. (2020) found that IPO firms using hedging experience lower price revisions and underwriting fees, supporting the argument that hedging reduces information asymmetry. Moreover, they provide strong evidence that hedging significantly decreases IPO underpricing, particularly for firms with higher informational opacity. In addition to short-term performance, for the long-term performance, Nguyen and Liu (2014) found that hedger IPO firms consistently outperformed non-hedgers over the 5-year period following the quotation. Following related studies, we propose a direct relationship between the use of financial derivatives and firm value in an IPO setting, and our study sets out to test the following hypothesis:

***Hypothesis:*** *Underpricing in initial public offerings is negatively associated with corporate hedging.*

## Data and Methodology

The current situation of the Turkish IPO market, the dataset, and the variables employed in this study are explained in this section.

### Turkish IPO Market

Pursuing the liberalisation programme at the beginning of the 1980s, Capital Market Law Number 2499 came into force to regulate and supervising capital markets in Türkiye. The new exchange market, the Istanbul Stock Exchange (İstanbul Menkul Kıymetler Borsası - İMKB), initiated operations on December 26, 1986. Following the publication of the new Capital Markets Board Law Number 6362 on December 30, 2012, Borsa Istanbul A.Ş. was established with the aim of consolidating all exchanges operating in the Turkish capital markets under one roof. In summary, IMKB was superseded by Borsa Istanbul with its registration on April 3, 2013.

The shift in global economic activity towards emerging economies has a greater impact on capital market transactions in these countries. In Türkiye, the development of capital instruments and the completion of regulatory infrastructure have paved the way for attracting more foreign investors to the market. Despite the financial crises of 2008, 2014, and 2017 and the COVID-19 pandemic, which affected the entire world in 2020, Borsa Istanbul continues to grow and increase its trading volumes. In fact, as of 2023, Borsa Istanbul, which facilitates the trading of shares for 539 companies, has achieved a market capitalisation of 338 billion US dollars. This significant market capitalisation reflects

the robust growth and investor confidence in the Turkish equity market. Additionally, trading volume reached 1.317 billion US dollars, positioning the equity trading volume to market capitalisation ratio at a leading 390%. This high ratio indicates a vibrant trading environment with substantial liquidity, which attracts both domestic and international investors and ensures efficient price discovery in the market (TSPB, 2024).

The rapid development of Turkish financial markets and the interest it has attracted has led to an increase in initial public offerings (IPOs), which allow companies to raise higher capital at minimum cost while improving corporate governance, transparency, and credibility. IPO figures for both global and Türkiye are provided in Figure 1.

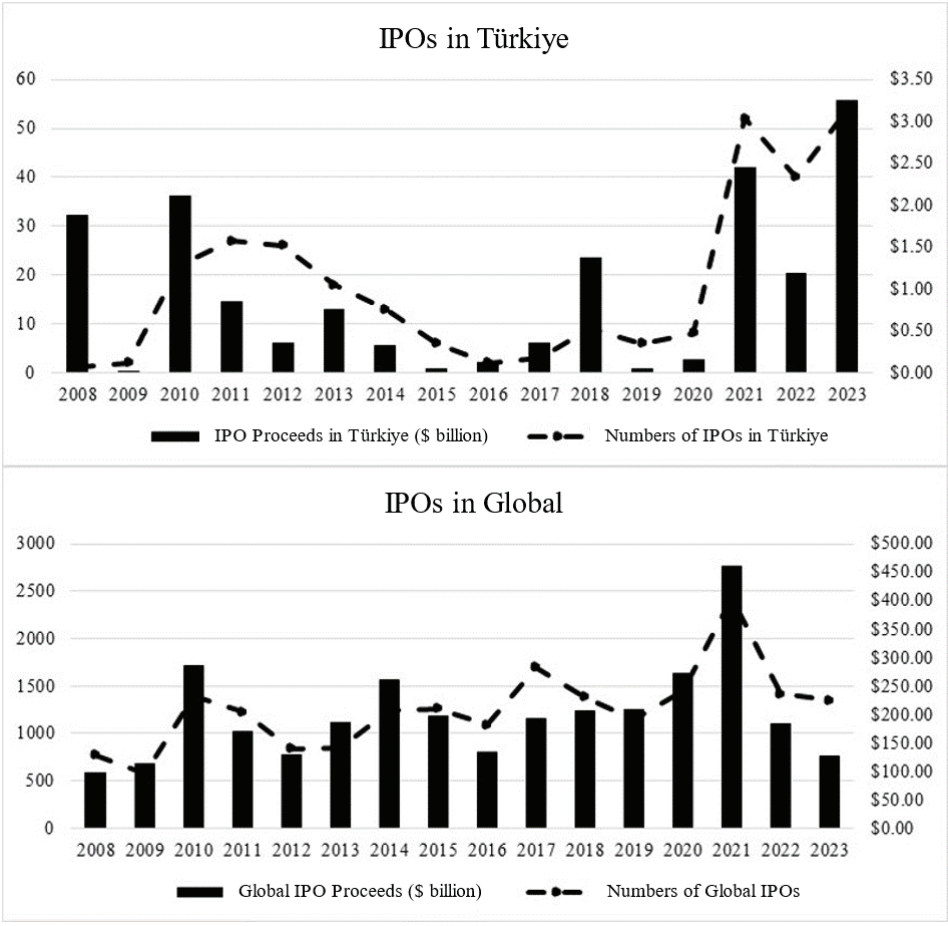


***Figure 1.*** IPO Trends in Türkiye and Global[1]

As seen in Figure 1, both numbers and the proceeds of IPOs fluctuated throughout the period 2008-2023. Although the number of initial public offerings decreased, especially after the 2008-2009 global crisis period, the number and size of public offerings increased

1 IPOs in global data were derived from the Global IPO Trends Reports issued by Ernst and Young from 2019 to 2024.

in 2010. However, concerns about global economic growth due to the Eurozone debt crisis and the downturn in equity markets profoundly affected global IPO activity in 2011 and 2012. In the subsequent period, increased confidence in the markets and a faster pace of fundraising ensured that companies' demand for IPOs continued to increase. From Türkiye's standpoint, it is noteworthy that an almost similar process was followed, but a significant slowdown in IPOs occurred, especially in the period between 2014 and 2018 due to economic troubles. Moreover, it is observed that the number of IPOs was procyclical, reaching its lowest level during the crisis years of 2001-2002, 2008-2009, and the year of the failed coup in 2016 (Tanyeri et al., 2022, p. 334). IPOs, which have slowed down due to the COVID-19 pandemic, experienced the most active period of recent years in the world and Türkiye in 2021 due to the launch of COVID-19 vaccines and government incentive programmes. Especially in Türkiye, the number of IPOs reached record levels. During this period, it is noteworthy that the IPOs of companies operating in the technology sector dominated IPO activities in terms of both the number of transactions and proceeds. Based on the report of Ernst and Young Global IPO Trends, after a stunning rise in both IPO volumes and proceeds in 2021 and in both 2022 and 2023, the preference for tight monetary policies and the uncertainties that emerged in the aftermath of the COVID-19 pandemic, along with rising inflation, indicates a sharp decline in IPOs globally. On the other hand, the increase in IPOs in emerging markets cannot sufficiently offset the lacklustre performance of large offerings in developed countries.

In comparison to the IPO activities over the past five years in Türkiye, the number and revenue of IPOs in 2023 have exhibited a remarkable surge, accounting for 4% and 3% of the global IPO market in terms of volume and proceedings, respectively. Türkiye's IPO market is experiencing an upsurge as companies with limited options for new financing sources due to hiking interest rates seek to leverage investors' eagerness for new high-yield issuances. Notably, nearly 100% of newly listed companies in Türkiye have surpassed their offering prices, achieving positive returns (EY, 2024).

The IPO process in Türkiye is divided into three main phases: deciding to go public, preparing for the IPO, and executing the final IPO process. One of the crucial stages is determining the IPO price. Setting a fair and reasonable IPO price is vital for the successful execution of the IPO and the subsequent performance of the shares. To determine this price, an underwriter prepares a price determination report that measures the company's value. This report outlines the valuation methods used based on a company's structure and operations in accordance with the International Valuation Standards (IVS). The price determination report is published along with the prospectus before the public offering. Additionally, intermediary institutions can provide their opinions on valuation methods, assumptions, and public offering prices on the Public Disclosure Platform (Borsa Istanbul, 2013).

Pursuant to the Capital Markets Board's Communiqué on the Sale of Capital Market Instruments numbered II-5.2, published in the Official Gazette dated June 28, 2013, and numbered 28691, three methods can be employed by underwriters for the sale of capital market instruments through public offering: *the book-building method, sales without book-building, and sales at stock exchange*. The book-building method refers

to collecting investor demands for capital market instruments being offered to the public and executing the sale of a portion of these demands that are fulfilled in accordance with predetermined procedures and principles. Under the book-building method, underwriters may prefer to offer shares by using either a fixed price, book-building with a price range, or book-building with price bids. The sales without book-building method is the sale of shares of public corporations, whose shares are not traded on the stock exchange, by offering their shares to the public by themselves or through underwriters at a certain price through a procedure to be determined in the prospectus. The sales method at the stock exchange refers to the sale of shares on the stock exchange within the framework of stock exchange regulations. IPO firms in Türkiye can use these three methods. However, previous studies have shown that the most preferred method among these methods is the fixed price method (Küçükkocaoğlu, 2008; Tanyeri et al., 2022).

## Dataset and Variables

Our data comprise 287 IPOs in Borsa Istanbul between 2008 and 2023. Although there were 290 IPOs in the period, 3 of them were filtered out due to a lack of information. We obtain data on offering specifics such as the offer value, closing prices, underwriter of the deal, IPO proceeds, deliberate discount rate, firm size, and hedge instrument from the Borsa Istanbul Datastore database (Borsa Istanbul, 2024) and IPO prospectuses declared in the Public Disclosure Platform (Kamuyu Aydınlatma Platformu, 2024).

We provide detailed descriptions of variables in our model through relevant literature (Beatty and Ritter, 1986; Ljungqvist and Wilhelm, 2002; Kiymaz, 2000; Durukan, 2002; Yüksel and Yüksel, 2006; Roosenboom, 2012) and their expected signs in terms of firm, IPO, and market-specific characteristics in Table 1. There are two dependent variables in our study: initial return on the 1$^{st}$ trading day (Underpricing) and 10$^{th}$ trading day (Underpricing, 10 days). We calculate the initial return of the offered share, which is underpricing as a percentage difference between the first trading day closing price and the offer price of the share [(1$^{st}$ trading day closing price – offer value)/ offer value)] (Durukan, 2002; Roosenboom, 2012). We calculate underpricing for the 10$^{th}$ trading day's closing price using the same equation [(10$^{th}$ trading day closing price – offer value)/ offer value)]. Companies in Borsa Istanbul are generally traded in three different stock markets, namely the Star, Main, and Submarket, depending on their size. Circuit breaker features are shaped according to these three markets. The circuit breaker threshold applied in the Star market, where IPO firms are typically traded, is 10%. In other words, a daily upside cap of 10% exists in Borsa Istanbul. Therefore, the underpricing level for the 10$^{th}$ day is also added as the main dependent variable in our regression analysis.

The main independent variable in our model that we employed to measure derivative use by IPOs is *Hedger*. As required by IFRS 7 Financial Instruments, companies must disclose the nature and extent of risks resulting from the use of financial instruments in their financial reports. In addition, IPO firms are required to accompany their last 3-year audited financial reports to their IPO prospectuses. We understand whether an IPO firm uses derivative instruments by examining these financial reports. Hereby, we define a firm as a hedger that uses derivative instruments; if it does not, we define it as a non-hedger. Following Qiao et al. (2020), we factor in year and industry fixed effects because

IPO underpricing seems more responsive to economic situations and there is a tendency to aggregate IPO underpricing within sectors.

Table 1
*Variables and Definitions*

| **Dependent Variables** | | |
|---|---|---|
| | **Definition** | |
| Underpricing | Underpricing is the initial return of the offered share as a percentage difference between the first trading day closing price and the offer price of the share [(1st trading day closing price – offer value)/ offer value)] | |
| Underpricing, 10 days | We calculate Underpricing, 10 days, as a percentage difference between the closing price of the share on the 10th day and the offer price [(10th trading day closing price of the share – offer value)/ offer value)] | |
| **Independent Variables** | | |
| **Firm Specific Variables** | **Definition** | **Expected Sign** |
| Hedger | Hedger is defined as an IPO firm reporting a hedging instrument in the last financial report before the IPO. It is a dummy variable that takes "1" for hedger and otherwise is "0". | – |
| Firm Size | In general, it seems easier to value larger IPO firms than smaller ones because their cash flows are more stable and predictable (Ritter, 1984; Beatty and Ritter, 1986). In our study, firm size is total assets derived from the balance sheet ending one financial year before the IPO. To mitigate the inflation effect that could distort results, most studies on Turkish companies' IPOs, including those by Kiymaz (2000), Durukan (2002), and Yüksel and Yüksel (2006), employed USD total assets. | – |
| Company Age | As a firm's age increases, the associated risk decreases, making predicting future cash flows and dividends more challenging for younger firms (Kim and Ritter, 1999). Firm age is the number of years from the date of establishment of the firm until the IPO date. We use the natural logarithm of one plus firm age as in Roosenboom (2012). | – |
| Industry | Industry indicates the sector in which the IPO firm operates. We use industry as a categorial variable for each IPO firm. | |
| | | |

| IPO Specific Variables | Definition | Expected Sign |
|---|---|---|
| Underwriter Reputation | The reputation of the marketing underwriter indicates the anticipated level of "informed" investor activity. Reputable underwriters are typically linked to lower-risk offerings. Thus, IPOs conducted by prestigious underwriters result in lower underpricing (Carter and Manaster, 1990). Underwriter reputation is the market share of the lead underwriter in a given year. Following the methodology of Ljungqvist and Wilhelm (2002) and Roosenboom (2012), market share is computed as the sum of gross proceeds from all IPOs led by the underwriter divided by the total proceeds raised during the year. | – |
| Participation | Following Roosenboom (2012), we define participation as the number of shares sold by existing shareholders divided by the number of outstanding shares before the IPO. In IPOs, as the share sales of existing shareholders increase, valuation estimates become less biassed and the extent of underpricing decreases (Oran et al., 2013). | – |
| Price Discount | Underwriters apply deliberate price discounts to set final offer prices and apply higher price discounts for riskier IPOs that have higher valuation uncertainty (Roosenboom, 2007). Offer price discount is the price discount applied by the appraisal obtained from the underwriter's price determination report. | + |
| Dilution Factor | IPO firms' desire to go public with a higher number of newly issued shares leads to more biassed valuations also results in lower underpricing (Roosenboom, 2012). The dilution factor is determined as the number of newly issued shares divided by the number of existing shares outstanding before the IPO. | – |
| Oversubscription | Investors who are unable to fully realise their subscription during an IPO may desire to realise their demand on the pricing day, thereby resulting in higher underpricing. As in Roosenboom (2012), we included the oversubscription variable in our model. The oversubscription rate indicates the number of times the IPO was oversubscribed. We calculate oversubscription by dividing the total number of shares demanded by the number of shares offered on the IPO. | + |
| IPO Size | The IPO proceeds are equal to the number of shares sold in the IPO multiplied by the offer price in USD terms. We use the natural logarithm of the USD proceeds. IPO size is expected to have a negative impact on underpricing because larger IPOs signal better performance of the issuer's projections and help reduce uncertainty (Klova 2017). | – |

| Market Specific | Description | Expected Sign |
|---|---|---|
| Post-pricing Market Volatility | During the post-pricing period, additional information may emerge from the secondary market, resulting in market volatility. Because IPOs are more sensitive to market volatility, investors may demand higher premiums to compensate for that risk. Following Roosenboom (2012), we calculate post-pricing market volatility as the standard deviation of daily BIST100 market index returns during the period between setting the offer value date and the first trading day of the offered share. | + |
| Post-pricing Market Return | Investors are more sentiment to market returns, and abnormal returns in the market make investors more eager to earn excess returns. Thus, in line with Roosenboom (2012), we include post-pricing market return in the model. We calculate post-pricing market return as the BIST100 market index buy-and-hold return during the period between setting the offer value date and the first trading day of the offered share. | + |

The summary statistics of the sample are presented in Table 2. The mean initial return (Underpricing) among our sample is 6.36% and at the end of the 10th trading day (Underpricing, 10 days) is 33.87%. As a 10% circuit breaker threshold applied in Borsa Istanbul, the initial return of the 123 IPOs in our sample was clustered under +/-10% initial return. The mean value of firm size (total assets) is reported as $221.26 million within the range of $0.55 million to $10,908.22 million. Company age is 17.30 on average; the oldest company is 68 and the youngest is just approximately 2 years old at the IPO date; thus, we can say that younger firms are more eager to go public than others. The mean value of the percentage of existing shareholder sales during the IPO (Participation) is 10.56%, and the capital increase rate (Dilution) is 26.59%. Summaries of other IPO-specific characteristics are as follows; the mean value of Underwriter Reputation is 10.50%, indicating that 10% of IPOs in terms of IPO size were underwritten by only one underwriter. The IPO size was $56.44 million on average, and the maximum value was $1,917 million. For the price discount, the mean value is 21.97%, implying that underwriters applied a 21.97% discount on the offer value before going public. The average oversubscription rate was 6.30 Furthermore, we realise that 60% of the IPO firms in our sample are clustered among 5 industries, and the remaining companies are allocated to other industries.

Table 2
*Summary Statistics*

| Variable | Obs. | Mean | Std. Dev. | Min. | Max. |
|---|---|---|---|---|---|
| Underpricing | 287 | 0.0636 | 0.0982 | -0.3094 | 0.5875 |
| Underpricing, 10 days | 287 | 0.3387 | 0.5315 | -0.4136 | 1.7059 |
| Hedger | 287 | 0.2230 | 0.4170 | 0.0000 | 1.0000 |
| Firm Size (million $) | 287 | 221.26 | 790.89 | 0.550 | 10,908.22 |
| Log of Firm Size | 287 | 7.7761 | 0.6486 | 5.7461 | 10.0378 |
| Company Age | 287 | 17.3067 | 12.3248 | 0.0194 | 68.4611 |
| Log of (1+Company Age) | 287 | 1.1449 | 0.3595 | 0.0084 | 1.8417 |
| Underwriter Reputation | 287 | 0.1050 | 0.1352 | 0.0019 | 1.0000 |
| Participation | 287 | 0.1056 | 0.1328 | 0.0000 | 0.9910 |
| Price Discount | 287 | 0.2197 | 0.0810 | 0.0000 | 0.5188 |

| Variable | Obs. | Mean | Std. Dev. | Min. | Max. |
|---|---|---|---|---|---|
| Dilution | 287 | 0.2659 | 0.2309 | 0.0000 | 1.9820 |
| IPO Size (million $) | 287 | 56.44 | 141.68 | 1.45 | 1,917.88 |
| Log of IPO Size | 287 | 7.3413 | 0.5567 | 6.1641 | 9.2828 |
| Oversubscription | 287 | 6.2980 | 14.1521 | 0.0000 | 130.4808 |
| Post-pricing Market Volatility | 287 | 0.0154 | 0.0086 | 0.0044 | 0.0510 |
| Post-pricing Market Return | 287 | 0.0048 | 0.0558 | -0.1952 | 0.1621 |

The number of IPOs, underpricing, and the sum of IPO size (proceeds) in USD terms from 2008 to 2023 is tabulated annually in Table 3. A significant increase in both the volume and size of IPOs, especially during the post-COVID-19 period, is clear, as more than 50 companies are going public every year during the relevant period. Allocation of IPOs throughout the years posits that the volume of IPOs is procyclical, with the number plummeting during crises and boosting during recovery periods.

Table 3
*Distribution of IPO Companies by Year*

| Years | # of IPO Companies | % | Underpricing (Avg) | Underpricin, 10 days (Avg) | IPO Size ($) | % | # of Hedgers |
|---|---|---|---|---|---|---|---|
| 2008 | 1 | 0.35% | 0.0044 | -0.0435 | 1,917,884,371 | 11.84% | 1 |
| 2009 | 1 | 0.35% | 0.1259 | 0.1748 | 6,174,189 | 0.04% | 0 |
| 2010 | 21 | 7.32% | 0.0523 | 0.1408 | 2,132,706,179 | 13.17% | 5 |
| 2011 | 27 | 9.41% | 0.0734 | 0.1284 | 843,780,846 | 5.21% | 6 |
| 2012 | 26 | 9.06% | 0.0395 | 0.1042 | 346,922,141 | 2.14% | 7 |
| 2013 | 18 | 6.27% | 0.0715 | 0.1024 | 757,260,243 | 4.68% | 2 |
| 2014 | 13 | 4.53% | 0.0239 | 0.03389 | 321,351,720 | 1.98% | 1 |
| 2015 | 6 | 2.09% | 0.0858 | 0.0618 | 37,766,492 | 0.23% | 1 |
| 2016 | 2 | 0.70% | -0.0700 | -0.0675 | 117,138,219 | 0.72% | 0 |
| 2017 | 3 | 1.05% | -0.0142 | 0.0144 | 462,502,638 | 2.86% | 1 |
| 2018 | 9 | 3.14% | -0.0619 | -0.0474 | 1,561,080,655 | 9.64% | 3 |
| 2019 | 6 | 2.09% | 0.0150 | 0.0565 | 45,541,185 | 0.28% | 1 |
| 2020 | 8 | 2.79% | 0.0854 | 1.0948 | 671,799,663 | 4.15% | 1 |
| 2021 | 52 | 18.12% | 0.0623 | 0.3061 | 2,483,517,602 | 15.33% | 15 |
| 2022 | 40 | 13.94% | 0.0896 | 0.5329 | 1,195,658,221 | 7.38% | 9 |
| 2023 | 54 | 18.82% | 0.0937 | 0.7313 | 3,296,478,048 | 20.35% | 11 |
| **Total** | **287** | **100.00%** | **0.0636** | **0.3387** | **16,197,562,410** | **100.00%** | **64** |

Table 4 compares the characteristics of hedgers and non-hedgers. There are 64 hedgers and 223 non-hedgers in the sample. In terms of both Underpricing and Underpricing 10 days variables, the difference between hedgers and non-hedgers is evident. As expected, the extent of underpricing will be lower for hedger IPO firms. Moreover, in line with the literature, we find that larger firms are more likely to hedge than others, where Table 4 reveals that hedgers have a higher mean value for total assets and IPO size (Géczy et al., 1997; Haushalter, 2000). Table 4 also indicates that older firms prefer to use derivatives more than young firms.

Table 4
*Characteristics of Hedgers and Non-hedgers*

| Variable | Hedgers | | | | | Non-hedgers | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Obs. | Mean | Std. Dev. | Min | Max | Obs. | Mean | Std. Dev. | Min | Max |
| Underpricing | 64 | 0.0406 | 0.0921 | -0.1595 | 0.3862 | 223 | 0.0703 | 0.0991 | -0.3094 | 0.5875 |
| Underpricing, 10 days | 64 | 0.2147 | 0.4693 | -0.3537 | 1.5891 | 223 | 0.3743 | 0.5438 | -0.4136 | 1.7059 |
| Firm Size (million $) | 64 | 486.29 | 1,494.26 | 4.52 | 10,908.21 | 223 | 145.21 | 382.29 | 0.557 | 3,952.76 |
| Log of Firm Size | 64 | 8.0873 | 0.6650 | 6.6557 | 10.0378 | 223 | 7.6868 | 0.6168 | 5.7461 | 9.5969 |
| Company Age | 64 | 20.1068 | 15.3243 | 0.2722 | 66.7611 | 223 | 16.5031 | 11.2312 | 0.0194 | 68.4611 |
| Log of (1+Company Age) | 64 | 1.2042 | 0.3535 | 0.1046 | 1.8310 | 223 | 1.1278 | 0.3601 | 0.0084 | 1.8417 |
| Underwriter Reputation | 64 | 0.1400 | 0.1574 | 0.0080 | 1.0000 | 223 | 0.0950 | 0.1267 | 0.0019 | 1.0000 |
| Participation | 64 | 0.1056 | 0.1164 | 0.0000 | 0.4783 | 223 | 0.1056 | 0.1374 | 0.0000 | 0.9910 |
| Price Discount | 64 | 0.2353 | 0.0820 | 0.0980 | 0.4960 | 223 | 0.2152 | 0.0803 | 0.0000 | 0.5188 |
| Dilution | 64 | 0.1936 | 0.1608 | 0.0000 | 0.6609 | 223 | 0.2866 | 0.2438 | 0.0000 | 1.9820 |
| IPO Size (million $) | 64 | 99.83 | 249.33 | 1.533 | 1.917.88 | 223 | 43.983 | 86.72 | 1.45 | 729.73 |
| Log of IPO Size | 64 | 7.5989 | 0.5561 | 6.1855 | 9.2828 | 223 | 7.2674 | 0.5356 | 6.1641 | 8.8632 |
| Oversubscription | 64 | 6.399 | 10.2842 | 0.0000 | 54.1448 | 223 | 6.2690 | 15.0997 | 0.0000 | 130.4808 |
| Post-pricing Market Volatility | 64 | 0.0145 | 0.0071 | 0.0054 | 0.0444 | 223 | 0.0156 | 0.0090 | 0.0044 | 0.0510 |
| Post-pricing Market Return | 64 | -0.0036 | 0.0518 | -0.1952 | 0.1087 | 223 | 0.0073 | 0.0568 | -0.1685 | 0.1620 |

## Empirical Results and Implications

The findings from univariate tests and multivariate models are presented in this section.

### Univariate Analysis

Our sample is grouped into two categories: hedgers (issuers with financial derivatives) and non-hedgers (issuers without financial derivatives). We tested the difference between means of underpricing levels for two groups to analyse whether they were statistically different from each other or not. Underpricing levels for the first day and the first 10$^{th}$ day are used. Two sample *t*-test results are presented in Table 5.

Table 5
*Univariate Analysis*

| Variable | Non-hedger Mean | Hedger Mean | Difference |
|---|---|---|---|
| Underpricing | 0.0703 | 0.0406 | 0.0297** |
| | | | *(2.1468)* |
| | | | |
| Underpricing, 10 days | 0.3743 | 0.2147 | 0.1596** |
| | | | *(2.1310)* |

The t-test values are shown in parentheses. Statistical significance at the 0.01, 0.05, and 0.10 levels are indicated by ***, **, and *, respectively. For clarity, the results of the Wilcoxon rank-sum and nonparametric k-sample tests are not reported. They are available upon request.

Our results show that differences for the first day and first 10th day underpricing levels are statistically significant at the 5% level. Wilcoxon rank-sum and nonparametric k-sample tests also indicate statistically significant differences for underpricing levels between hedgers and non-hedgers.

It can be seen that hedger firms have a 2.97% lower level of underpricing for the first day while it is 15.96% lower for the first 10th day. Univariate analysis results support our hypothesis that underpricing in IPOs is negatively associated with corporate hedging. As we defined earlier, underpricing means lower cost of equity for issuers or higher firm valuation. Our findings indicate that hedging is value-relevant and decreases underpricing in the Turkish IPO market. However, caution should be observed with univariate analysis results because they do not consider control variables. Therefore, further analysis of the data using multivariate analysis is required.

**Multivariate Analysis**

Univariate analysis indicates that underpricing is lower for issuers of financial derivatives. However, the effects of other variables on underpricing must be controlled. To test our main hypothesis regarding the relationship between underpricing and hedging, we run the following linear regression equation:

$$\text{IPO Underpricing Level} = \alpha + \beta \times \text{Hedger Dummy Variable} + \delta' X_i + \epsilon_i$$

IPO Underpricing Level is defined as the initial return of the offered share as the percentage difference between the 1st or 10th trading day closing price and the offer price of the share [(1st/10th trading day closing price – offer value)/ offer value)]. Hedger is defined as an IPO firm reporting hedging instruments in the last annual report before the IPO. Hedger Dummy Variable is a dummy variable that takes "1" for hedger and otherwise is "0". $X_i$ denotes the control variables of firm size, company age, underwriter reputation, participation, price discount, dilution factor, oversubscription, IPO size, post-pricing market volatility, post-pricing market return, industry, and year.

Table 6
*Cross-Sectional Regression Analysis*

| **Independent Variable** | **(1)**<br>**Underpricing** | **(2)**<br>**Underpricing, 10 days** |
|---|---|---|
| **Hedger** | -0.0119 | -0.1328 |
| | *(-0.87)* | *(-1.97)*** |
| **Log of Firm Size** | 0.0024 | 0.1269 |
| | *(0.13)* | *(1.68)** |
| **Log of (1+Company Age)** | -0.0243 | -0.0769 |
| | *(-1.20)* | *(-0.91)* |
| **Underwriter Reputation** | 0.1020 | 0.5007 |
| | *(1.58)* | *(1.68)** |
| **Participation Ratio** | -0.0088 | 0.1225 |
| | *(-0.16)* | *(0.76)* |
| **Price Discount** | -0.090 | -0.2629 |

| **Independent Variable** | **(1)**<br>**Underpricing** | **(2)**<br>**Underpricing, 10 days** |
|---|---|---|
| | *(-1.13)* | *(-0.79)* |
| **Dilution Factor** | -0.0483 | -0.1807 |
| | *(-1.36)* | *(-1.85)** |
| **Log of IPO Size** | -0.0689 | -0.3839 |
| | *(-3.17)**** | *(-4.05)**** |
| **Oversubscription** | 0.0003 | 0.0038 |
| | *(1.95)** | *(-1.31)* |
| **Post-pricing Market Volatility** | -1.7480 | -8.0178 |
| | *(-2.57)*** | *(-1.81)** |
| **Post-pricing Market Return** | -0.0350 | -0.2831 |
| | *(-0.38)* | *(-0.55)* |
| **Year Fixed Effects** | Yes | Yes |
| **Industry Fixed Effects** | Yes | Yes |
| **Number of observations** | 287 | 287 |
| $R^2$ | 0.2683 | 0.4122 |

*The relationship between IPO underpricing level and corporate hedging (our hypothesis) is tested. We now run the following regression:*

$$\text{IPO Underpricing Level} = \alpha + \beta \times \text{Hedger Dummy Variable} + \delta' X_i + \epsilon_i$$

*IPO Underpricing Level is defined as the initial return of the offered share as the percentage difference between the 1st or 10th trading day closing price and the offer price of the share [(1st/10th trading day closing price – offer value)/ offer value)]. Hedger is defined as an IPO firm reporting a hedging instrument in the last annual report before the IPO. Hedger Dummy Variable is a dummy variable that takes "1" for hedger and otherwise is "0". $X_i$ denotes the control variables of firm size, company age, underwriter reputation, participation, price discount, dilution factor, oversubscription, IPO size, post-pricing market volatility, post-pricing market return, industry, and year.*

*t-statistics are reported in parentheses. Statistical significance at the 0.01, 0.05, and 0.10 levels are indicated by ***, **, and *, respectively. Both year and industry fixed effects are included in the models. We use robust standard errors for heteroscedasticity and autocorrelation. Variance Inflation Factors (VIFs) were checked for multicollinearity. All VIFs are less than 5.*

Our findings from the two models are presented in Table 6. In the models, the main dependent variable is *Hedger*, which is theoretically expected to have a negative coefficient. *Hedger* has negative coefficients in both models, but the first one is not statistically significant, while the second is statistically significant for 10th day model. The Capital Markets Board of Türkiye has started to apply an equal distribution rule for individual investors and set a 10% upside cap for daily increases in Borsa Istanbul. Because of these two rules and unprecedented demand for IPOs from individual investors in Türkiye during 2019-2023, almost all IPOs after year of 2019 have 10% 1st day returns. More than half of our IPO data occurred during 2019-2023. The underpricing levels for IPOs after 2019 can be differentiated for the first 10th day underpricing levels. Therefore, we believe that the first 10th day underpricing level is a better measure for our sample of Turkish IPOs, and we focus on findings from Model 2.

Results of Model 2 indicate that *Hedger* has a negative coefficient of 0.1328 at the 5% significance level, implying that, on average, an issuer using a financial derivative instrument has 13.28% less underpricing than a non-hedger issuer. Considering an average IPO size of 221.3 million USD, our findings imply that, on average, issuers with financial derivatives have a 29.4 million USD higher valuation than non-hedger issuers.

Because of the estimated models, these findings support our hypothesis that using a financial derivative instrument decreases the level of IPO underpricing (higher firm valuation). Consistent with the current study of Qiao et al. (2020), we also find that

corporate hedging leads to higher firm valuation (lower underpricing) in the Turkish IPO market. Although they used the first-day underpricing level, Qiao et al. (2020) found a negative relationship between hedging measures (general hedging, interest risk hedging, and foreign exchange risk hedging) and the level of underpricing. Our findings are in line with the argument of Qiao et al. (2020) that hedging reduces asymmetry information and leads to a higher valuation. Nguyen and Liu (2014) found a positive relationship between currency risk management using financial derivatives and long-term IPOs. Chen et al. (2017) found a positive relationship between derivative usage and announcement return for an acquirer in cross-border acquisitions. These studies are also in line with our findings.

The main economic implication of our results is that shareholders of firms using financial derivatives can sell their new shares 13.28% more than non-hedgers in the Turkish IPO market. In other words, on average, existing shareholders of hedgers have 13.28% more cash inflows to their companies. On the other hand, new investors can earn 13.28% relatively more average return if they invest and hold a non-hedger firm's stock during the first 10 trading days in the Turkish IPO market.

In addition to the main dependent variable Hedger, we consider the effects of other control variables on the level of underpricing. Our estimated models indicate that there are limited explanatory variables for underpricing, which is also called an IPO puzzle. IPO Size is the only statistically significant variable in Model 2, with a negative coefficient of 0.3839. This finding indicates that underpricing level decreases as IPO size grows. In terms of the factors affecting underpricing, our findings indicate that very few variables have a significant effect, and these results confirm the existence of an IPO puzzle, which is consistent with previous Borsa Istanbul studies (Bildik and Yılmaz, 2008, Oran et al., 2013).

## Conclusion

Following the theoretical argument that the use of corporate derivatives increases firm value, this study examines the impact of derivative use on IPO underpricing. For this purpose, we employ a sample of Turkish IPO firms from 2008 to 2023. We analyse 287 IPOs in the relevant period. To investigate the impact of derivate use on underpricing, we used both univariate and multivariate data analyses. First, we divide our sample into two groups as hedger (uses derivative instruments) and non-hedger (does not use derivative instruments). We conducted both univariate and multivariate analyses. The results of the analyses provide evidence that the use of derivatives reduces the underpricing of the initial public offering in Türkiye. In addition, our research shows that IPO size, participation ratio, dilution factor, and Post-pricing Market Volatility significantly affect underpricing, which is in line with expected signs in the literature.

We determine that Turkish IPOs are underpriced by 6.36% for the first trading day and 33.87% for the $10^{th}$ trading day. The results of the univariate analysis indicate that hedgers are 15.96% less underpriced than non-hedgers for the first $10^{th}$ trading day. After controlling for other factors, multivariate analysis results show that the difference in underpricing level between hedgers and non-hedgers is 13.28% for the first $10^{th}$ trading day. In other words, on average, hedgers have a 13.28% higher valuation than non-hedger issuers in the Turkish IPO market.

These findings will contribute to the scant literature that compares the effects of using financial derivatives on IPO performance. Our study has important economic and financial implications. Economically, narrowing the gap between offer value and market price using derivatives contributes to a more efficient allocation of capital in the market, which enables firms to reach their financial needs by bearing lower cost of capital. For small investors, it is not easy to understand firms' risk profiles and risk management strategies. From a financial perspective, employing financial derivatives as a strategic instrument demonstrates a firm's improved sophistication in financial risk management and commitment to handling certain types of risks. Therefore, including derivative instruments in the IPO process will help uninformed small investors make better decisions among alternatives in the market by reducing asymmetric information. As a result, derivative use in IPOs not only represents advances in financial management but also contributes to broader market stability and economic growth. In the current research, we focus only on the impact of derivative use on short-term IPO performance. In future studies, it is worth investigating the effect of corporate derivatives on the long-term performance of IPOs in Türkiye. We used a dummy variable for corporate hedging. In future research, continuous variables can be calculated for general hedging and currency, interest rate, and commodity hedging.

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