ORIGINAL PAPER

DOI: 10.26794/2587-5671-2025-29-3-45-58
UDC 336. 647(045)
JEL G14, G24, G32

IPO Underpricing Factors: Technology and Non-Technology Sectors in Terms of Information Asymmetry and Retention of Control Theories*

A.A. Galich, A.G. Mirzoyan
Lomonosov Moscow State University, Moscow, Russian Federation

ABSTRACT

This study investigates the relationship between the underpricing of company stocks in initial public offerings (IPOs) and the key factors associated with two dominant theories: information asymmetry and retention of control. The main objective of the study is to determine which factors considered by the two theories affect stock underpricing in the technology and non-technology sectors. Multiple regression models are used to identify the significant factors of underpricing for each sector, and the adjusted coefficient of determination is used to compare the explanatory power of the models of each theory. The sample includes 321 IPOs launched between 2000 and 2020 on the leading US exchanges NYSE and NASDAQ. The results show that in the technology sector, the significant predictors of underpricing are research and development (R&D) costs, the age of the company at the time of going public, and the Roll-up strategy. In the non-technology sector, the key underpricing factors are the proportion of publicly traded shares and the age of the company. It is concluded that the theory of information asymmetry demonstrates the greatest explanatory power in the context of the technological sector, which indicates the significant influence of information barriers on the formation of market prices. At the same time, in the non-technology sector, the predictive power of regression models was significantly lower, which indicates the need for further search and analysis of additional factors affecting the undervaluation of shares in this sector. Thus, this study contributes to a deeper understanding of IPO undervaluation mechanisms, emphasizing the importance of taking into account the specifics of different industry segments when analyzing and forecasting market processes.

Keywords: initial public offering **(**IPO); company; underpricing; uncertainty; profitability; issuer; information asymmetry

For citation: **Galich A.A., Mirzoyan A.G. IPO underpricing factors: Technology and non-technology sectors in terms of information asymmetry and retention of control theories. *Finance: Theory and Practice*. 2025;29(3):45-58. DOI: 10.26794/2587-5671-2025-29-3-45-58**

INTRODUCTION

2021 was a record-breaking year for initial public offerings (IPOs) since the dot-com boom of 2000, with a total of 2.436 companies entering global markets with a total issue volume of $ 459.9 billion.[1] Among various markets, the United States occupies one of the leading positions in the world in terms of IPO volume and the total value of outstanding shares. In 2021, 1.035 IPOs were conducted on the US stock market, which is 115.62% more than in 2020.[2]

However, there is an underpricing anomaly in IPO markets[3]: the price at which IPO shares were sold to early investors (the offer price) turns out to be lower than the price at which shares are subsequently traded on the market [1, 2]. This indicates an underpricing of the company at the pre-bidding stage compared to the market assessment. Underpricing the initial public offering can have serious consequences for the company and leads to significantly lower amounts of capital raised.

[1] EY.com. EY Global IPO Trends. URL: https://www.ey.com/en_gl/ipo/trends (accessed on 20.04.2023).

[2] Stock Analysis. IPO Statistics. URL: https://stockanalysis.com/ipos/statistics/ (accessed on 20.04.2023).

[3] Underpricing is used as a synonym for the yield of the first day of trading: the greater the underpricing, the higher the yield.

* The article was prepared on the basis of the final qualifying thesis "Factors of underpricing of initial public offerings in the American market" by A.A. Galich under the scientific supervision of A.G. Mirzoyan.

Among the many theories explaining this phenomenon, the theories of information asymmetry and theories of control retention, which have the greatest predictive power, stand out [2, 3]. However, when considering theories of underpricing, differences in underpricing factors between two main sectors are often not taken into account: technological and non-technological. This study contributes to the literature in the following aspects. First, by constructing separate models for technological and non-technological samples of companies, we find a significant difference in the factors of underpricing: the profitability of the first day of trading of companies in the technology sector is more influenced by variables related to the theory of information asymmetry, and for companies in the non-technological sector — by variables related to the theory of maintaining control. Secondly, we find differences in the ability of underpricing theories to explain underpricing in the two sectors. Variables related to information asymmetry theory can better explain the underpricing of technology companies. In relation to non-technological companies, the explanatory power of regression models turned out to be low for both theories.

The work is structured in the following way: the first part contains a review of literature on IPO underpricing theories. The second part describes the research methodology and the data used for the analysis. The third part is devoted to constructing statistical models and interpreting the results.

LITERATURE REVIEW

Despite a significant number of empirical studies investigating the phenomenon of underpricing, there is still no unified theory in the literature that explains the reasons for this underpricing of initial public offerings (IPOs). [4].

There are 4 blocks of the most popular theories of underpricing in the literature: theories of information asymmetry, institutional theories, theories of ownership and control, and behavioral theories. This paper considers two of the most common and applied in the analysis of underpricing: the theory of information asymmetry and the theory of control preservation [2, 3].

Theories of Information Asymmetry

Theories of information asymmetry are based on the assumption that there is a significant information imbalance in the IPO market between the parties to the initial public offering process.

The Signal Theory

The signal theory suggests that the information asymmetry between buyers and sellers is overcome by the signals given by the latter [5]. In relation to the IPO process, this means that certain characteristics of the company and the IPO process can act as signals to the market about the company's growth and development prospects. In order for the signal to be perceived, it must be observable and difficult to repeat for unpromising firms. For potential IPO investors, such signals may include: the Underwriter's rating, R&D costs, the fact of venture financing, and the age of the company.

Underwriter's Rating

Underwriters who have established themselves in the market tend to avoid participating in IPOs of unpromising companies in order to preserve their reputation in the eyes of investors [6, 7]. Thus, it is not necessary for an underwriter to underestimate the price of the initial offer in order to attract investors — his reputation allows him to ensure sufficient demand from investors, which, in turn, makes it possible to set a fair or even inflated share price during an IPO.

R&D Costs

Investments in research and development are one of the main sources of the company's competitive advantages [8]. Investing in R&D can serve as a signal of the company's great innovation potential and long-term growth prospects. However, investors face difficulties in assessing the likelihood of realizing this potential, which increases the degree of

uncertainty, makes it difficult to objectively assess the company's prospects and ultimately leads to a greater underpricing of the IPO [8, 9].

Venture Financing

A venture capital-backed IPO is an initial public offering of a company previously funded by venture investors. On the one hand, venture capital supports young and innovative companies, investing in which involves additional risk. The presence of venture capital investments in a company can cause an increase in the profitability of the first day of IPO trading, due to the deliberate underpricing of the issue price to provide investors with a risk premium [10, 11]. On the other hand, the availability of venture capital financing when going public can signal the reliability of a company, thereby reducing uncertainty for potential investors. Venture capitalists, as a rule, are the main shareholders of the company, holding seats on the board of directors [12]. Existing research shows that firms receiving venture capital achieve higher productivity growth [13], profitability, and operational performance after issuance [14].

Age of the Company

The age of the company at the time of the initial public offering affects the investment risks. Companies with a longer history of activity have a large amount of information, which makes them more attractive in the eyes of investors. For young companies, the degree of uncertainty associated with future development prospects is high, which is often accompanied by an increased level of investment risk and underpricing [15].

All of the above factors play an important role in determining the IPO price and allow companies with high potential to attract investors and obtain favorable terms for the placement of shares.

Hypothesis 1. The age of the company, the Underwriter's rating, and the availability of venture financing reduce the underpricing of IPOs, while R&D costs increase the underpricing of IPOs.

Theories of Maintaining Control

Theories of maintaining control explain the underpricing of ownership fragmentation when issuing IPO shares: an undervalued price allows attracting a larger number of small investors and avoiding the concentration of a significant share of the company's shares by a large investor [16]. However, companies may have a sufficient number of shareholders with large blocks of shares even before going public, in which case attempts to prevent the occurrence of blocking blocks of shares by lowering the price are pointless [17].

At the same time, there are other ways to ensure control over the company, such as issuing dual-class shares [18]. When issuing dual-class shares, one class is offered to the public and the other to company founders and executives. The class offered to the public has limited voting rights — 1 vote per share, or no voting rights, while the shares available to founders and executives provide more than one vote per share and thus provide control over the company. Managers of companies with dual-class shares have no incentive to lower the price in order to prevent the formation of a block of large shareholders in the primary IPO market [19]. The management control hypothesis implies that IPOs with dual-class shares have a lower degree of undervaluation than IPOs with single-class shares [20, 21].

Hypothesis 2. Companies that have issued dual-class shares have, on average, all other things being equal, a lower underpricing of IPOs than companies issuing single-class shares.

The share of shares listed on the stock market can be an indicator of the company's quality: managers with positive information about the company will signal this by selling only a small part of the company during the IPO [22]. One of the possible reasons why an increase in the company's free-float[4] share may lead to a greater underpricing is related to increased transparency and accessibility of information for investors [22, 23]. When most of the company's shares are in

[4] Free-float — the share of stocks issued in free circulation.

free circulation and available for sale, investors can assess its real value based on current market conditions and expectations. This leads to an increase in demand for the company's shares and, as a result, to an increase in the price on the first day of trading on the market [24].

The company's entry into the stock exchange is also possible in the form of a "Roll-up" transaction, which allows a group of small companies to combine their enterprises into one structure in order to place shares on the stock exchange. As part of the deal, the owners of the founding companies (the acquired companies) agree to sell their companies and receive payment from the proceeds from the initial public offering of shares of the newly created company. To acquire each founding company, a new company is created, which conducts an IPO. During such mergers, the organizational structure of all companies changes, which may create additional uncertainty in assessing future opportunities and, consequently, may lead to greater underpricing [21, 25]. Logran and Ritter [26] found that in the long run, combined companies show lower financial results than other IPO firms.

Hypothesis 3. The ratio of shares offered to the public to the total outstanding shares and the use of a "Roll-up" strategy positively affect the underpricing of IPOs.

Comparison of Technological and Non-technological Sectors

Depending on the sector under consideration, the undervaluation factors may vary: technology companies, as a rule, are more underestimated than others, since they involve a high level of risk and uncertainty [27]. Underpricing of technology companies may also be related to an attempt to attract the attention of large institutional investors, who, as a rule, are not interested in participating in IPOs of companies with a small market capitalization [28].

Descriptive statistics (Table. 1) Our sample of American IPOs from 2000–2020 shows that the tech and non-tech sectors differ significantly from each other in many ways: by age at the time of the IPO, the size of the company, and the financial performance of the company one year before the IPO. Tech companies have lower revenue at the time of their IPO and a greater underpricing, which significantly (at a 1% significance level) exceeds the underpricing of non-tech companies by 30 percentage points (*Table 1*).

Since tech firms are smaller, have a short history of activity before going public, and are associated with a high level of risk and uncertainty, we assume that the underpricing of technology companies can be explained to a greater extent by the theory of information asymmetry and related variables. For non-technological companies, the theory of ownership and control should be more applicable, since these companies are associated with less uncertainty and, accordingly, are less susceptible to information asymmetry between participants in the IPO process.

Hypothesis 4. Variables responsible for the theory of information asymmetry (R&D costs, venture financing, company age, underwriter rating) can explain a large proportion of the differences in underpricing in the technology industry, while variables related to the theory of ownership and control can explain non-technological ones ("Roll-up" strategy, dual-class stocks, the ratio of shares offered to the public to the total outstanding shares).

DATA AND METHODOLOGY

To collect the data, we used several sources of information (*Table 2*). A description of the variables used is given in the Appendix (*Table A1*). The sample included companies registered in the United States that listed on the NYSE and NASDAQ exchanges between 2000 and 2020. We excluded issues of depositary receipts, unit placements, and real estate investment funds (REITs) from the sample, as well as placements with an offer price below $ 5 per share, as these may not be attractive to institutional investors. Additionally, companies related to the financial sector were not included due to the specific nature of their financial statements. The final sample consists of 321 companies.

Table 1

Mean Values of Variables by Sectors

Variable	Technology	Non-Technology	Mean difference
Revenue, USD million	376.9	1021.5	–644.6**
Net debt, USD million	144.9	540.0	–395.1**
Underpricing	0.5	0.2	0.3***
Age (years)	13.9	20.4	–6.5***
Current liquidity	2.0	2.8	–0.8*

Source: Compiled by the authors.

Note: Number of observations for the technology sample — 118 companies, for the non-technology sample — 203 companies; *p < 0,1; **p < 0,05; ***p < 0,01.

Table 2

Data Sources

Data Type	Data Sources
The financial performance of the company prior to the IPO	Thomson Reuters Eikon and Cbonds website*
The IPO offer price, stock price at the opening and closing of trading	IPOScoop.com**
Details of the IPO transaction	Warrington College of Business Website ***

Source: Compiled by the authors.

Note: * Cbonds. URL: https://cbonds.ru/?show_main; ** IPOScoop.com. URL: https://www.iposcoop.com/; *** Warrington College of business. URL: https://site.warrington.ufl.edu/ritter/ipo-data/ (accessed on 20.01.2023).

Control Variables

The IPO offer price can serve as an indicator of an investment bank's assessment of demand for a company's shares, which, in turn, can influence investors' decision to purchase shares [21]. The size of the company, expressed in terms of assets, and the size of the total issue can signal to investors about the stability of the company, which means it can significantly negatively affect the profitability of the first day of IPO trading [29]. We also include financial indicators in the models, such as return on assets, book value per share, and current liquidity, which are often taken into account by investors when making decisions about investing in an IPO; these indicators in the literature act as proxy variables for a company's specific risk and can also significantly positively affect undervaluation [30, 31]. The number of IPOs conducted this year may indicate the general market sentiment of investors and lead to increased demand for IPO shares [32]. In the literature, linear regression analysis is most often used to analyze underpricing factors and test underpricing theories, where the dependent variable is the underpricing (profitability of the first day of trading) of an IPO [10, 33]. In this study, we also use regression analysis methods to test the hypotheses put forward.

Model Construction Results

Table 3 shows the results of the regression evaluation for each sector.

Belonging to the technology sector significantly (at a 1% significance level) increases the underpricing of IPOs by 0.193 percentage points (*Table 3*). Variables related to the theory of information asymmetry turned out to be significant predictors of underpricing: for technology companies, the availability of venture financing reduces underpricing by an average of 0.188 percentage points, all other things being equal. For technology companies, age significantly reduces underpricing, while for non-technology companies, age, on the contrary, significantly increases underpricing. This can be explained by the fact that for technology companies, age reduces uncertainty due to the availability of more information available. R&D costs significantly (at the 1% significance level) increase the underpricing of only technology companies. The ratio to the Underwriter's reputation turned out to be insignificant for both sectors. Thus, the first hypothesis is partially confirmed.

The share of free-float significantly (by 10% of the significance level) increases the underpricing of non-technological companies. Thus, Hypothesis 3 is partially confirmed. The issue of dual-class shares significantly (at a 10% significance level) has a positive effect on underestimating only non-technological companies. The direction of influence is opposite to expected, so Hypothesis 2 is not confirmed. To verify the stability of the results obtained, models with a different number of observations were evaluated (observations with the largest Cook distance value were excluded from the sample — influential observations), as well as models with consistent inclusion of variables of interest. Checking for the stability of the coefficient's significance over the "Dual-class shares" variable in models for the non-technological sector showed that the coefficient turns out to be insignificant when 10 influential observations are removed from the sample (p-value = 0.11), and the coefficient also becomes insignificant when evaluating models with sequential addition of variables of interest (*Table A2*). The coefficients before the Roll-up variables (p-value < 0.001), the logarithm of the company's age (p-value = 0.006) and the logarithm of R&D costs (p-value = 0.007) in the model for the technology sector proved to be consistently significant in relation to the removal of influential observations, and the significance remains with the consistent inclusion of variables of interest in the model (*Table 3*). The coefficient before the venture financing variable turns out to be insignificant when 5 influential observations are removed (p-value = 0.621), the coefficient estimate changes sign, which indicates the instability of the results obtained.

To analyze the ability of theories to explain underpricing, we evaluated models (*Tables 4, 5*), each of which includes only variables corresponding to one of the theories. The quality of the models was compared using adjusted R^2

Adding variables assumed by the theory of information asymmetry to the model increases the adjusted coefficient of determination by 5.5 percentage points — the adjusted coefficient of determination for a model that includes only control variables is 33.3%, and for a model that includes variables related to the theory of information asymmetry is 38.8% (*Table 4*). Accounting for uncertainty factors can improve the quality of the underpricing model of technology companies. Among the factors related to the theory of ownership and control, only the coefficient before the binary variable of the roll IPO turned out to be significant: the inclusion of this variable increases the adjusted coefficient of determination by 5.7 percentage points. Thus, we have obtained a comparable improvement in the predictive abilities of underpricing models. At the same time, the inclusion of variables assumed by both theories in the model increases the adjusted coefficient of determination by 12 percentage points.

For the sample of non-technological companies, the coefficient before the variable of the company's age turned out to be significant (*Table 5*). Variables related to the theory of ownership and control (dual-class shares and free-float) are significantly positively associated with underpricing. The

Table 3

The Results of Building Regression Model

Variable	Dependent Variable: Underpricing		
	All sectors	Technology	Non-technology
Information Asymmetry			
The technology industry	0.193*** (0.044)		
The logarithm of R&D costs		0.074*** (0.027)	
Venture financing		−0.188* (0.110)	
The logarithm of the company's age		−0.301*** (0.101)	0.062*** (0.022)
Ownership and Control			
"Roll-up" IPO		0.808** (0.316)	
Dual- class shares			0.082* (0.047)
Free-float			0.160* (0.093)
Observations	321	118	203
R^2	0.229	0.512	0.213
Adjusted R^2	0.217	0.471	0.188
F-statistics	18.974***	12.588***	8.819***

Source: Compiled by the authors.

Note: Standard errors are given in parentheses below the coefficients. All models use the same set of control variables, the list of used control variables is given in *Table A1*; *p < 0,1; **p < 0,05; ***p < 0,01.

adjusted coefficient of determination of the model increased by 2.7 percentage points when adding a variable related to the theory of information asymmetry, from 15.2% to 17.9%, and by only 0.4 percentage points when adding factors related to the theory of ownership and control. The percentage of explained variance in underpricing of companies in the non-technology sector remains low. By comparing the quality of the models of the two sectors, the theories of information asymmetry and ownership and control are better able to explain the underpricing of technology companies, which partially confirms Hypothesis 4.

HYPOTHESES TESTING RESULTS

As a result of the analysis, three hypotheses put forward (Hypothesis 1, Hypothesis 3, Hypothesis 4) out of four were partially confirmed (*Table 6*). In this paper, we mainly considered variables that act as signals of greater or lesser uncertainty for investors, on the basis of

Table 4

Testing Underpricing Theories on a Technology Sample

Variable	Dependent Variable		
	Underpricing		
	Information Asymmetry	Ownership & Control	All Models
Information Asymmetry			
The logarithm of R&D costs	0.074** (0.029)		0.074** (0.031)
Venture financing	−0.217* (0.132)		−0.208* (0.113)
The logarithm of the company's age	−0.295*** (0.096)		−0.310*** (0.093)
Ownership & Control			
"Roll-up" IPO		0.637* (0.344)	0.665*** (0.178)
Observations	118	118	118
R^2	0.425	0.416	0.490
Adjusted R^2	0.388	0.390	0.453
F-statistics	11.614***	15.983***	13.106***

Source: Compiled by the authors.

Note: Standard errors are given in parentheses below the coefficients. All models use the same set of control variables, the list of used control variables is given in *Table A1;;* *p < 0,1; **p < 0,05; ***p < 0,01.

which they make decisions about investing in an IPO. It has been shown that non-technological companies, on average, have a higher age and are associated with less uncertainty and risk at the time of the IPO, therefore, the factors studied in the work are not fully capable of explaining the underpricing of these companies.

CONCLUSIONS

The availability of venture capital financing and the age of the company are significant signals of the company's development prospects, which reduce uncertainty for investors and thereby reduce the underpricing of IPOs of technology companies. The age of a company has a multidirectional impact on companies in two sectors — it reduces the underpricing of technology companies and increases the underpricing of non-technology companies, which can be explained by the specifics of each sector. We did not find a significant impact of the underwriter bank's reputation on the underpricing of companies in both sectors. The underpricing of non-technological companies

Table 5

Testing Underpricing Theories on a Non-Technological Sample

Variable	Dependent Variable: Underpricing		
	Information Asymmetry	Ownership & Control	All Models
Information Asymmetry			
The logarithm of the company's age	0.058*** (0.017)		0.066*** (0.022)
Ownership & Control			
Dual- class shares			0.080* (0.047)
Free-float		0.148* (0.087)	0.159* (0.093)
Observations	203	203	203
R^2	0.195	0.173	0.222
Adjusted R^2	0.179	0.156	0.194
F-statistics	12.028***	10.356***	7.941***

Source: Compiled by the authors.

Note: Standard errors are given in parentheses below the coefficients. All models use the same set of control variables, the list of used control variables is given in *Table A1;* *p < 0,1; **p < 0,05; ***p < 0,01.

is significantly influenced by variables related to the theory of maintaining control: the proportion of shares issued and the type of shares issued increase the underpricing of IPOs. We found that two-class IPOs are, on average, all other things being equal, more undervalued than single-class issues. However, this result proved unstable to the removal of influential observations.

To test the implications of IPO underpricing theories, we evaluated the models for each sector and compared them with each other using an adjusted coefficient of determination. We have found that the factors associated with the theory of information asymmetry are better able to predict the underpricing of companies in the technology industry than the factors considered by the theory of maintaining control. The explanatory power of models built for companies in the non-technological sector turned out to be low even when taking into account all the factors considered by both theories of underpricing. This result indicates the need to consider additional factors that may influence the underpricing of non-technological companies.

This work contributes to theoretical and applied science by identifying factors of underpricing of IPOs for two sectors — technological and non-technological. In addition, differences in the ability of undervaluation

Table 6

Results of Hypotheses Testing

Variable	Hypothesis	Sector	Coefficient
Information Asymmetry Theory			
The logarithm of the company's age	H1 (+)	Non-technology	0.062***
The logarithm of R&D costs	H1 (+)	Technology	0.074***
Underwriter's rating	H1 (–)	–	–
Availability of venture financing	H1 (+)	Technology	–0.188*
Adjusted R^2 for the technology sector model (Table 4)	H4 (+)	Technology	0.388
Adjusted R^2 for the non-technology sector model (Table 5)		Non-technology	0.179
Theory of Ownership and Control			
Dual- class shares	H2 (–)	Non-technology	0.082*
The ratio of shares offered to the public to the total outstanding shares (free-float)	H3 (+)	Non-technology	0.160*
"Roll-up" IPO	H3 (+)	Technology	0.808**
The ratio of shares offered to the public to the total outstanding shares (free-float)	H4 (–)	Technology	0,390
Adjusted R^2 for the non-technology sector model (Table 5)		Non-technology	0.156

Source: Compiled by the authors.

Note: *p < 0,1; **p < 0,05; ***p < 0,01.

theories to explain the variability of the profitability of the first day of trading in the two sectors are shown. The results indicate the need to take into account the specifics of each sector when building models explaining the underpricing of IPOs.

The direction for further research may be to analyze the long-term impact of the discovered factors on stock performance after IPO. Considering the long-term results after the IPO will allow us to more accurately determine which of these factors have a positive or negative impact on the company, which would facilitate the development of more strategic recommendations.

REFERENCES

1. Ibbotson R.G. Price performance of common stock new issues. *Journal of Financial Economics*. 1975;2(3):235–272. DOI: 10.1016/0304–405X(75)90015-X
2. Yusup K.A. Underpricing or overvaluation? Theoretical review of initial public offering phenomenon. *VNU Journal of Economics and Business*. 2022;2(4):1–10. URL: https://dspace.uc.ac.id/bitstream/handle/123456789/7881/Plagiarism7881.pdf?sequence=5&isAllowed=y
3. Ljungqvist A. IPO underpricing. In: Eckbo B.E., ed. Handbook of corporate finance. Vol. 1: Empirical corporate finance. Amsterdam: North-Holland; 2007:375–422. (Handbooks in finance. Vol. 1). DOI: 10.1016/B 978–0–444–53265–7.50021–4
4. Daily C.M., Certo S.T., Dalton D.R., Roengpitya R. IPO underpricing: A meta-analysis and research synthesis. *Entrepreneurship Theory and Practice*. 2003;27(3):271–295. DOI: 10.1111/1540–8520.t01–1–00004
5. Akerlof G.A. The market for "lemons": Quality uncertainty and the market mechanism. *The Quarterly Journal of Economics*. 1970;84(3):488–500. DOI: 10.2307/1879431
6. Hu Y., Dai T., Li Y., Mallick S., Ning L., Zhu B. Underwriter reputation and IPO underpricing: The role of institutional investors in the Chinese growth enterprise market. *International Review of Financial Analysis*. 2021;78:101956. DOI: 10.1016/J.IRFA.2021.101956
7. Siwach P., Kumar P., Gupta V. Effect of Underwriter's reputation on performance of small business IPOs. *Finance: Theory and Practice*. 2023;27(6):54–66. DOI: 10.26794/2587–5671–2023–27–6–54–66
8. Lu C.S., Kao L., Chen A. The effects of R&D, venture capital, and technology on the underpricing of IPOs in Taiwan. *Review of Quantitative Finance and Accounting*. 2012;39(4):423–445. DOI: 10.1007/S 11156–011–0259–7
9. Zhou L.J., Sadeghi M. The impact of innovation on IPO short-term performance — evidence from the Chinese markets. *Pacific-Basin Finance Journal*. 2019;53:208–235. DOI: 10.1016/J.PACFIN.2018.10.010
10. Loughran T., Ritter J. Why has IPO underpricing changed over time? *Financial Management*. 2004;33(3):5–37. URL: https://haas.berkeley.edu/wp-content/uploads/Whynew.pdf
11. Butler A.W., O'Connor Keefe M., Kieschnick R. Robust determinants of IPO underpricing and their implications for IPO research. *Journal of Corporate Finance*. 2014;27:367–383. DOI: 10.1016/J.JCORPFIN.2014.06.002
12. Rosenstein J., Bruno A.V., Bygrave W.D., Taylor N.T. The CEO, venture capitalists, and the board. *Journal of Business Venturing*. 1993;8(2):99–113. DOI: 10.1016/0883–9026(93)90014-V
13. Croce A., Martí J., Murtinu S. The impact of venture capital on the productivity growth of European entrepreneurial firms: "Screening" or "value added" effect? *Journal of Business Venturing*. 2013;28(4):489–510. DOI: 10.1016/j.jbusvent.2012.06.001
14. Jain B.A., Kini O. Venture capitalist participation and the post-issue operating performance of IPO firms. *Managerial and Decision Economics*. 1995;16(6):593–606. DOI: 10.1002/MDE.4090160603
15. Isynuwardhana D., Febryan F.V. Factors affecting underpricing level during IPO in Indonesia Stock Exchange 2018–2019. *The Indonesian Accounting Review*. 2022;12(1):87–98. DOI: 10.14414/TIAR.V12I1.2660
16. Brennan M.J., Franks J. Underpricing, ownership and control in initial public offerings of equity securities in the UK. *Journal of Financial Economics*. 1997;45(3):391–413. DOI: 10.1016/S 0304–405X(97)00022–6
17. Field L.C., Sheehan D.P. IPO underpricing and outside blockholdings. *Journal of Corporate Finance*. 2004;10(2):263–280. DOI: 10.1016/S 0929–1199(03)00057–9
18. Field L.C., Karpoff J.M. Takeover defenses of IPO firms. *The Journal of Finance*. 2002;57(5):1857–1889. DOI: 10.1111/0022–1082.00482
19. Smart S.B., Zutter C.J. Control as a motivation for underpricing: A comparison of dual and single-class IPOs. *Journal of Financial Economics*. 2003;69(1):85–110. DOI: 10.1016/S 0304–405X(03)00109–0
20. Aggarwal D., Eldar O., Hochberg Y.V., Litov L.P. The rise of dual-class stock IPOs. *Journal of Financial Economics*. 2022;144(1):122–153. DOI: 10.1016/J.JFINECO.2021.12.012
21. Galich A., Mirzoyan A. The impact of uncertainty in the text of S-1 forms on IPO underpricing. *HSE Economic Journal*. 2024;28(2):248–275. (In Russ.). DOI: 10.17323/1813–8691–2024–28–2–248–275

22. Brealey R., Leland H.E., Pyle D.H. Informational asymmetries, financial structure, and financial intermediation. *The Journal of Finance*. 1977;32(2):371–387. DOI: 10.2307/2326770
23. Peng Y., Wang K. IPO underpricing and flotation methods in Taiwan — a stochastic frontier approach. *Applied Economics*. 2007;39(21):2785–2796. DOI: 10.1080/00036840600749417
24. Satta G. Initial public offerings in the port industry: Exploring the determinants of underpricing. *Maritime Policy & Management*. 2017;44(8):1012–1033. DOI: 10.1080/03088839.2017.1367968
25. Johnston J., Madura J. The performance of roll-up initial public offerings. *Studies in Economics and Finance*. 2002;20(1):1–11. DOI: 10.1108/eb028756
26. Loughran T., Ritter J.R. The new issues puzzle. *The Journal of Finance*. 1995;50(1):23–51. DOI: 10.1111/J.1540–6261.1995.TB 05166.X
27. Rahman J.M., Yang M. Effects of venture capital, R&D, and technology on IPO underpricing: Evidence from China. *Capital Markets Review*. 2021;29(2):13–28. URL: https://www.mfa.com.my/wp-content/uploads/2021/09/v29_i2_a2_pg13–28.pdf
28. Lowery M., Officer M.S., Schwert G.W. The variability of IPO initial returns. *The Journal of Finance*. 2010;65(2):425–465. DOI: 10.1111/j.1540–6261.2009.01540.x
29. Chen Y., Goya A., Zoloto L. Global board reforms and the pricing of IPOs. *Journal of Financial and Quantitative Analysis*. 2022;57(6):2412–2443. DOI: 10.1017/S 0022109021000223
30. Park H.D., Patel P.C. How does ambiguity influence IPO underpricing? The role of the signalling environment. *Journal of Management Studies*. 2015;52(6):796–818. DOI: 10.1111/JOMS.12132
31. Zhang Z., Neupane S. Global IPO underpricing during the COVID-19 pandemic: The impact of firm fundamentals, financial intermediaries, and global factors. *International Review of Financial Analysis*. 2024;91:102954. DOI: 10.1016/J.IRFA.2023.102954
32. Belyaev V.A. Analysis of the dynamics of IPO transactions in the banking sector. *Finance: Theory and Practice*. 2021;25(6):16–28. DOI: 10.26794/2587–5671–2021–25–6–16–28
33. Duong H.N., Goyal A., Kallinterakis V., Veeraraghavan M. Market manipulation rules and IPO underpricing. *Journal of Corporate Finance*. 2021;67:101846. DOI: 10.1016/J.JCORPFIN.2020.101846

APPENDIX

Table A1

Variable Description

Notation in Models	Description
IPO Characteristics	
Underwriter's rating	The rating of the lead underwriter, taken from the Logran and Ritter School [10], updated for 2021. The ratings are based on a scale from 0 to 9 and are based on a hierarchical system. In the current work, following Logan and Ritter [10], if there is more than one underwriter, the rank of the lead underwriter or the highest-rated underwriter is used
Offer price	**Offer price per share, USD**
Roll-up strategy (binary)	A binary variable equal to 1 if the company followed a Roll-up strategy during the IPO process, 0 otherwise
Company Financials	
The logarithm of total assets	Logarithm of the company's total assets for the year before the IPO, USD million
Return on assets	The return on assets of a company, calculated as the ratio of the company's net profit for the year before the IPO to the total assets of the company for the year before the IPO

Table A1 (continued)

Notation in Models	Description
The logarithm of current liquidity	The logarithm of the ratio of the company's current assets to the company's current liabilities one year before the IPO
The logarithm of capital expenditures	Logarithm of capital expenditures for the year before the IPO, USD million
Number of IPOs per year	The total number of IPOs conducted in the United States in the year the company went public
Net debt/EBITDA	The ratio of net debt to EBITDA for the year before the IPO
Book value per share	Book value of the company per share
EBITDA margin	EBITDA margin, calculated as the ratio of EBITDA to revenue for the year before the IPO

Source: Compiled by the authors.

Table A2

The Robustness of the Results to Successive Addition of Variables of Interest on a Sample of Non-Technology Firms

Variable	Dependent Variable:			
	Underpricing			
	(1)	(2)	(3)	(4)
Information Asymmetry				
The logarithm of the company's age	0.058*** (0.017)	0.063*** (0.018)	0.062*** (0.018)	0.066*** (0.018)
Ownership and control				
Dual- class shares		0.049 (0.049)	0.082 (0.052)	0.080 (0.051)
Free-float			0.160* (0.092)	0.159* (0.093)
Observations	203	203	203	203
R^2	0.195	0.201	0.213	0.222
Adjusted R^2	0.179	0.180	0.188	0.194
F-statistics	13.166	10.637	9.197	8.914

Source: Compiled by the authors.

Note: Standard errors are given in parentheses below the coefficients. All models use the same set of control variables, the list of used control variables is given in *Table A1*; *p < 0,1; **p < 0,05; ***p < 0,01.

Table A3

Table A3

The Robustness of the Results to the Sequential Addition of Variables of Interest on a Sample of Technology Firms

Variable	Dependent Variable: Underpricing			
	(1)	(2)	(3)	(4)
Information Asymmetry				
The logarithm of R&D costs	0.065*** (0.025)	0.067** (0.030)	0.074** (0.030)	0.074*** (0.027)
Venture financing		−0.023 (0.119)	−0.212 (0.133)	−0.188* (0.110)
The logarithm of the company's age			−0.291*** (0.098)	−0.301*** (0.101)
Ownership and Control				
Roll-up IPO				0,808** (0,316)
Observations	118	118	118	118
R^2	0.382	0.382	0.427	0.512
Adjusted R^2	0.348	0.343	0.385	0.471
F-statistics	11.272	10.148	12.078	8.338

Source: Compiled by the authors.

Note: Standard errors are given in parentheses below the coefficients. All models use the same set of control variables, the list of used control variables is given in *Table A1;* *p < 0,1; **p < 0,05; ***p < 0,01.

ABOUT THE AUTHORS

Anastasia A. Galich — Engineer, Department of Finance and Credit, Faculty of Economics, Lomonosov Moscow State University, Moscow, Russian Federation
https://orcid.org/0009-0001-1773-6378
Corresponding author:
nastyagalich02@mail.ru

Ashot G. Mirzoyan — Senior Lecturer, Department of Economics of Innovations, Faculty of Economics, Lomonosov Moscow State University, Moscow, Russian Federation
https://orcid.org/0009-0005-9275-0099
kell56@yandex.ru

Conflicts of Interest Statement: The authors have no conflicts of interest to declare.

The article was submitted on 29.09.2023; revised on 12.12.2023 and accepted for publication on 27.01.2024. The authors read and approved the final version of the manuscript.

Translated by N.I. Sokolova