**Scientific Background: IPO Underpricing in an Era of Financial Giants**

IPO underpricing refers to a phenomenon where shares are sold in an initial public offering (“IPO”) at a price lower than the market price on the first day of trading. Cases of IPO underpricing have surged to unprecedented levels in recent years. Our proposed research aims to shed light on this phenomenon by revealing a fundamental antitrust problem within the primary capital markets. Our main hypothesis is that the domination exerted by a few large institutional investors over capital markets has empowered them with substantial negotiating power in IPOs. Such power, particularly if utilized collectively and perhaps collusively, can be leveraged by these investors to force lower offer prices in IPOs, leaving substantial value unrealized by issuers.

To validate our hypothesis, we intend to conduct an empirical study to examine the relationship between the joint participation of the largest, most dominant institutional investors in U.S. IPOs and the degree of underpricing. Our preliminary findings from an extensive dataset covering U.S. IPOs strongly support our hypothesis, indicating a significant positive correlation between the participation of the three largest institutional investors—BlackRock, Vanguard, and Fidelity—and IPO underpricing, especially during the last decade. We also intend to identify strategic points in the IPO process where strategic actions by institutional investors may lead to price distortions under the current regulatory environment. The final stage of our proposed research will include a comparative analysis of IPO underpricing across several countries, each of which employs different IPO pricing methods and has a different concentration of institutional investors.

The significance of this research extends to various domains. It fills a crucial gap in existing IPO underpricing theories by considering the meteoric rise of institutional investors: a consideration missing from the extensive literature on IPO underpricing. Our hypothesis on the potential existence of buyers’ cartels in capital markets is an important avenue of research, with significance within both in terms of corporate finance and antitrust literature. Furthermore, our research challenges the efficacy of the traditional book-building method in contemporary U.S. capital markets, pointing to its susceptibility to collusion among dominant institutional investors. This study also contributes to the intersection of antitrust law and capital markets, emphasizing the impact of institutional frameworks and structures on capital market competitiveness. By exposing the often-overlooked concentration of power among large institutional investors and its effect on IPO underpricing, our research also aims to offer normative recommendations to foster a more transparent and competitive IPO process.

**Research Program:** **IPO Underpricing in an Era of Financial Giants**

**I. Scientific Background**

Over the past few decades, the global stock markets have undergone significant transformations. Traditional retail investors have gradually ceded their positions to large institutional investors (Gilson & Gordon 2013, pp. 874-876; Çelik & Isaksson 2014, p. 54), who now have substantial ownership in listed equities worldwide (Franks 2020, pp. 7-8). This shift toward intermediated markets has been particularly pronounced in the U.S., where institutional investors own approximately two-thirds of the entire capital market (Lund 2022, p. 93). In a further shift, the asset management industry has become highly concentrated (Ben-David, Franzoni, Moussawi & Sedunov 2021), with a mere twenty-five institutional investors owning more than thirty percent of the U.S. capital market (Kahan & Rock 2019, pp. 939-940). Traditionally, scholarship has focused on the three largest index fund providers—The BlackRock Group (BlackRock), Vanguard Group (Vanguard), and State Street Global Advisors (State Street), which collectively manage 27.5% of the market capitalization of the S&P 500 stock index (Bebchuk & Hirst 2022, p. 1558) and are the largest shareholders of 88% of S&P 500 companies (Fichtner, Heemskerk & Garcia-Bernardo 2017, pp. 288-299). Recently, other scholars have noted that in terms of assets under management (AUM), Fidelity Investments (Fidelity) surpasses State Street, and is positioned to supplant it among the “big three” institutional investors. Combined, these three actors—BlackRock, Vanguard, and Fidelity—manage assets exceeding $22 trillion (Lund & Robertson 2023, p. 14).

The paradigm shift to intermediated markets, in which powerful institutional investors wield enormous influence over our capital markets and the companies participating in these markets, presents a myriad of economic, political, and social challenges (Bebchuk, Cohen & Hirst 2017; Azar, Tecu & Schmaltz 2018; Coates 2023; Brav, Malenko & Malenko 2023). A rapidly growing body of theoretical and empirical literature has begun to identify these challenges, exploring how recent market changes may lead to price increases (Azar, Tecu & Schmeltz 2018; Elhauge 2016; Rock & Bluminfeld 2020), shortcomings in monitoring and stewardship (Gilson & Gordon 2013; Lund 2018; Bebchuk & Hirst 2019; Hu, Mitts & Sylvester 2020), inequality (Goshen & Levit 2022), compliance failures (Chaim 2023), and sustainability problems (Christie 2021). However, the presence of giant institutional investors in twenty-first-century capital markets may also function in a wider context to inhibit disruptive effects and market distortions. Further research is needed in this area.

The proposed project responds to this imperative by revealing a fundamental antitrust problem in capital markets, specifically within the primary market in which companies issue new securities to public shareholders through initial public offerings (IPOs). Our central thesis is that the domination of a few large institutional investors over capital markets has empowered them with substantial negotiating power when participating in IPOs. This negotiating power, particularly if utilized collectively and perhaps collusively, may be leveraged by these investors to force lower offer prices in IPOs. This would explain the increasing levels of IPO underpricing documented in recent years. IPO underpricing—measured as the difference between the offer price and the stock’s closing price on the first day of trading—has reached unprecedented levels in recent years. Over the past decade, it averaged nearly 25% (Ritter 2022, pp. 11-12), with enormous sums being “left on the table” by issuers, totaling over $90 billion (Ritter 2023, p.3). We intend to show, both theoretically and empirically, that the participation of a core group of institutional investors in IPOs is linked to underpricing and introduce a novel theory explaining this correlation.

IPO underpricing has long been a focus of academic and journalistic attention, with an extensive body of research exploring its correlates (Ibbotson & Jaffe 1975; Rock 1986; Ibbotson, Sindelar & Ritter 1988; Grinblatt & Hwang 1989; Welch 1989; Welch 1992; Ritter 1998; Aggarwal 2000; Loughran & Ritter 2002; Aggarwal, Prabhala & Puri 2002; Aggarwal 2003; Corwin & Schultz 2005; Colaco, Ghosh, Knopf & Teall 2009). Yet, the vast majority of the existing literature has not fully grasped the primary drivers of underpricing (Katti & Phani 2016, p. 35). In fact, as we will demonstrate in the remainder of this section, some of the leading theories explaining IPO underpricing have limited applicability given current market conditions, economic trends, and the regulatory environment.

1. Information asymmetry theories

Over the years, researchers have identified and modeled information asymmetry as a crucial determinant of IPO underpricing (Baron 1982; Welch 1992; Rock 1986). One of the most prevalent theories in this area is Rock’s winner’s curse theory, which stipulates that IPO underpricing occurs because the winning bidder in an IPO auction typically overestimates the value of the stock. To avoid the curse of overpaying, the winning bidder may demand a lower price, leading to underpricing (Rock 1986).

However, Rock’s theory encounters significant limitations when applied to today’s capital markets. First, Rock’s theory is primarily relevant to situations with strict pro-rata allocation and is irrelevant to the book-building method (Ljungqvist 2007, p. 389). Today, in the U.S. and an increasing number of countries, underwriters bringing issues to the market usually follow a book-building approach (Sherman 2005, p. 615; Jovanovic & Szentes 2007, p. 1; Jagannathan, Jirnyi & Sherman 2015, pp. 285-291; Kati & Phani 2016, p. 41), which is designed to mitigate the magnitude of information asymmetry (Ljungqvist 2007, p. 391). Under this method, offer prices are conditioned on nonbinding pre-offer indications of interest, allowing prospective investors to place flexible bids within a predetermined price range (Kati & Phani 2016, p. 43).

Moreover, the prevalent assumption in the literature is that, under certain conditions, the book-building approach incentivizes investors to report any information they hold more accurately (Benveniste & Spindt 1989, pp.347-354; Benveniste & Wilhelm 1990, pp. 193-195; Spatt & Srivastava 1991, pp. 710-721). The incentive arises because under book-building, underwriters can allocate IPO shares in a discriminatory fashion, favoring investors who reveal positive information and bid aggressively, while allocating fewer (or no) shares to those who bid conservatively (Ljungqvist 2007, p. 390). Yet, the evidence shows that despite the prevalence of the book-building approach in the U.S., IPO underpricing has been persistent over the years and even surged dramatically during the last decade (Ritter 2023). Outside the U.S., countries that adopted the book-building method for public offerings, including Israel,[[1]](#footnote-1) have also experienced increases in IPO underpricing (Hanafi 2021; Lehmann & Weber 2021; Utami & Irawan 2022).

1. Principal-agent theories

Researchers have also explored the phenomenon of IPO underpricing in terms of two principal-agent relationships. The first is the relationship between issuers (the principals) and underwriters (the agents), while the second involves the managers of issuers (the agents) and post-IPO shareholders (the principals).

*The agency relationship between issuers and underwriters*. Principal-agent theories of IPO underpricing related to the role of underwriters mainly revolve around the argument that underwriters may misuse their discretionary powers in allocating shares during IPOs (Loughran & Ritter 2004, pp. 8-9; Ljungqvist 2007, pp. 396-397). This misuse can take the form of favoring specific bidders, mainly institutional investors with whom underwriters maintain business relationships as buy-side investors (Reuter 2006; Loughran & Ritter 2004).

The empirical evidence supports the idea that underwriters’ rent-seeking behavior contributes to IPO underpricing (Ritter 1984; Muscarella & Vetsuypens 1989; Ljungqvist 2003; Ljungqvist & Wilhelm 2003; Loughran & Ritter 2004; Griffin, Harris & Topaloglu 2007). However, there has been a lack of research on this rent-seeking behavior in terms of the ever-rising participation of institutional investors (Field & Lowery 2009, p. 493), who now account for approximately ninety percent of share allocation in IPOs,[[2]](#footnote-2) and the way that the growing domination of these investors over the primary market affects the behavior of rent-seeking underwriters. Additionally, while several agency framework IPO theories recognize the market power of underwriters (West 1965; Ritter 1984; Chalk & Peavy 1987) and the potential for collusion between underwriters and informed investors (Biais, Bossaerts & Rochet 2002), the rising market power of the institutional investors to whom underwriters sell shares in IPOs, and the potential for coordination among them, has been largely ignored. Our proposed project intends to address this gap in the research.

*The agency relationship between the managers of issuers and shareholders.* Another principal-agent relationship explored in the context of IPO underpricing, though to a limited extent, is that between the managers of issuers and their shareholders. Two main models with opposing perspectives are available. According to Brennan and Franks, underpricing serves as a means for the managers of issuers to entrench managerial control by allocating shares in a way that avoids large shareholders that may monitor management (Brennan & Franks 1997). This theory’s core premise is that because underpricing leads to excess demand, owner-managers can ration the allotment of shares to investors and reduce the size of new shareholdings held by large investors who are more likely to scrutinize rent-seeking behavior (Shleifer & Vishny 1986).

For several reasons, the Brennan and Franks model is not very useful in explaining underpricing in the current capital market. First, it only holds to the extent that outside investors do not assemble large blocks following the IPO (Linquinest 2007, p. 410). In recent years, institutional shareholders have bought increasingly large stakes in many public companies and emerged as close monitors and dedicated stewards of their portfolio companies (Fairfax 2011, pp. 115-116, 2-123; Mallow & Sethi 2016, pp. 392-400; Hamdani & Hannes 2019, pp. 983-992). Second, the unprecedented increase in the use of multi-class stock structures among newly listed companies (Aggarwal, Eldar, Hochberg & Litov 2022) shields owner-managers from public shareholders (Bebchuk & Kastiel 2017), rendering the Brennan & Franks model less applicable. Perplexingly, a recent study finds that IPO underpricing for multi-class stock is almost twice as large as for that of single-class companies’ stock (Tallarita 2018, p. 7), with multi-class issuers accounting for the vast majority of the most underpriced IPOs in history (Ritter 2022, p. 2). Finally, Brennan and Franks’ model applies to IPO mechanisms involving fixed prices and pro-rata allocation (Lionquisent 2007, pp. 411-412). The argument does not apply to a book-building regime, since issuers can discriminate against conservative investors and omit them from allocations, without having to underprice the offering.

An opposing model to that of Brennan and Franks suggests that owner-managers may try to limit their ability to obtain private benefits if agency costs cause IPO proceeds and stock market value to decline (Stoughton & Zechner 1998). By optimally rationing the allotment of shares to small investors, owner-managers can capture the benefits associated with better monitoring by large institutional shareholders. However, because monitoring is difficult to observe, a free-rider problem exists and large monitoring shareholders would require compensation in the form of underpricing and favorable allocation treatment (Stoughton & Zechner 1998; Linquisent 2007, p. 411). Although Stoughton and Zechner’s theory is more compatible with the current capital market structure, we would question the view that large shareholdings in a company are detrimental to the interests of institutional shareholders and thus require compensation, as giant institutional investors now hold significant equity stakes in many public companies (Bebchuk & Hirst 2019, p. 13).

1. Signaling theories

In the literature on IPO underpricing, signaling theories play a role in explaining the degree of underpricing. According to Ibboston, issuers aim to “leave a good taste” in the mouths of investors by deliberately underpricing the issue (Ibbotson 1975, p. 264). Underpricing, although costly, serves as a signal to investors and enhances the likelihood of successful future equity offerings on more favorable terms.

Signaling theories have been extended and empirically tested over the years, while also accounting for hot issue periods (Allen & Faulhaber 1989), projected cash flows (Grinblatt & Hwang 1989), and future seasoned equity offerings (Welch 1989). However, given the shift in the regulatory landscape and the development of information technology, which makes information distribution much faster and more accessible, many of the factual assumptions underlying signaling theories have been somewhat eased (Katti & Phani 2016, p. 40). Moreover, issuers now have a wider array of tools at their disposal to signal their true quality and avoid the need for underpricing (Ljungqvist 2007, pp. 400-401). One such tool is the use of sophisticated pre-IPO shareholders, such as venture capital (VC) funds, to perform a certification-of-quality role (Megginson & Weiss 1991; Lee & Wahal 2004)). Recent years have seen a dramatic increase in the number of VC-backed companies that go public. Between 2002-2022, 52% of all IPOs, and 70% of tech company IPOs, had VC backing (Ritter 2023, p. 3).

1. Behavioral theories

While most of the explanations for IPO underpricing are located within the rational actor framework, some scholars have explored this phenomenon from the perspective of irrational behavior. One prominent explanation within this domain is the information cascade model (Welch 1992). According to this model, investors make investment decisions sequentially: the bids of some investors are made only after observing the bids of earlier investors, disregarding their own information about the investment. This sequential decision-making leads to an informational cascade, wherein early investors gain market power and can demand underpricing as a benefit for committing to the IPO and initiating a positive cascade (Ljungqvist 2007, p. 413). Recent research on institutional investors’ voting behavior provides empirical documentation of the underlying mechanisms behind these cascades, including but not limited to information channels, peer effects, hedging, or a combination of the three (Nugerman et al. 2014, Dressler 2020; Dressler & Mugerman 2023).

The cascade theory of IPO underpricing is one of the very few that consider the potential interaction between bidders and the impact of this interaction on the offer price. We also intend to thoroughly explore this important aspect, which is often overlooked in the literature. However, there are several reasons why this theory may be less relevant in most regimes, including the U.S. First, it is less applicable in book-building regimes, where underwriters can maintain secrecy over the development of demand in the book (Ljungqvist 2007, p. 413). Moreover, cascades are less likely to form when investors can freely communicate with each other to learn about the entire distribution of signals (Linquistet 2007, p. 413; Welch 1992, pp. 699-702). The regulatory freedom and practical ease with which investors in the U.S. can communicate with each other during price discovery (Chaim 2023, pp. 56-57) and the growing evidence of their tendency to communicate about their investment decisions (Hong, Kubik & Stein 2005; Pool, Stoffman & Yonker 2015; Chemmanur, Huang, Xie & Zhu 2022) make the informational cascade explanation less probable. In fact, we believe that the likelihood of communication between institutional bidders during price discovery is now greater than ever. Many institutional investors are repeat players who interact with each other in numerous offerings (Brown & Kovbasyuk 2016). Some of these investors have recently taken similar stances on a variety of corporate issues (Opler & Sokobin 1995, p. 4; Chaim 2023, pp. 11-14), including those related to IPO companies (Sharfman 2018, pp. 1-6). Moreover, given the decreasing incentives for competition among prominent institutional investors (Bebchuk, Cohen & Hirst 2017, pp. 97-100), the cross-ownership of certain institutions in each other (Morenoff 2022), and the business relationships among them (Chaim 2023, p. 38), many institutional investors now have strategic reasons to coordinate with each other to force offer prices lower. These crucial factors, which we intend to carefully examine, are virtually absent from the theoretical and empirical literature on IPO underpricing currently available.

**II. Objectives and Expected Significance**

Objectives:

The proposed project will introduce a novel theory of IPO underpricing that addresses recent shifts in the capital market landscape. This theory identifies the escalating market power of a few major institutional investors as a primary driver of IPO underpricing. We aim to conduct theoretical and empirical analyses to reveal how the participation of these dominant market actors in IPOs exacerbates underpricing. We also aim to pinpoint key junctures in the IPO process where strategic actions by institutional investors are likely to occur. This research endeavor promises to make a substantial contribution to the field by enhancing our understanding of the underpricing phenomenon and exposing shortcomings in the current regulatory and economic climate. This, in turn, will enable us to offer normative recommendations aimed at fostering a more transparent and competitive IPO process in an era dominated by powerful financial giants. By shedding light on the pivotal role of institutional investors in IPO underpricing, we further aim to draw attention to an overlooked, troubling consequence of the increasing concentration of power in the hands of a core group of large institutional investors.

Significance:

Our proposed project will make significant contributions to legal scholarship. First, our theory aims to provide an important missing piece in the IPO underpricing puzzle. Despite the well-documented and persistent nature of IPO underpricing, there remains a gap in the contemporary understanding of this phenomenon (Katti & Phani 2016, p. 35; Ljungqvist & Wilhelm 2003, p. 723). The crux of the issue lies in the failure of the current theories to account for the meteoric rise of institutional investors (Goshen & Hannes 2019, pp. 304-308) and the growing participation of these investors in the primary market (Michel, Oded & Shaked 2018, p. 1303), including the role of some as repeat buyers in IPOs (Michel, Oded & Shaked 2018, p. 1303). We seek to add to the current literature by addressing these important market factors and shifting the spotlight to giant institutional investors with significant market clout.

Second, our theory underscores the importance of the institutional framework within which IPOs are conducted. We will demonstrate that the effect of this framework on the capital-raising process depends largely on the equity market structure. Specifically, we will call into question the efficiency of the traditional book-building method in modern U.S. capital markets. The book-building method was originally devised to facilitate price discovery in a cost-effective way, by enabling issuers and underwriters to incorporate collective market information from sophisticated institutional investors into the final offer price (Benveniste & Spindt 1989, pp. 343-362), aligning it more closely with the intrinsic value of the stock (Biais & Faugeron-Crouzet 2002). We intend to show that this process fails to serve its purpose when many of the key participants in the process are concentrated, interconnected institutional investors that possess collective market power over issuers and underwriters.

Third, the proposed project adds a significant dimension to the case law and literature analyzing the intersection between capital markets and antitrust law (Rock 1992; Piraino 2008; Waller 2011; Chaim 2023). Traditionally, policymakers and courts have either neglected or been reluctant to apply competition law principles to capital markets, upholding a somewhat incongruous separation between these two legal fields (Crane 2008). By demonstrating how anticompetitive conduct by powerful bidders in IPOs threatens the fundamental objectives of both antitrust law and securities regulations, we will provide economic and legal justifications for antitrust jurisprudence of capital markets to ensure competitive processes in these markets.

Fourth, our account aims to uncover a major peril associated with the growing power and concentration of institutional investors, complementing the existing literature that explores the market distortions and suboptimal economic outcomes caused by these capital market shifts (Gilson & Gordon 2013; Bebchuk, Cohen & Hirst 2017; Azar, Tecu & Schmeltz 2018; Schmeltz 2018; Bebchuk & Hirst 2019; Christie 2021; Azar, Marinescu & Steinbaum 2022; Goshen & Levit 2022; Brav, Malenko & Malenko 2023; Chaim 2023; Chaim 2023; Coates 2023). The potential capacity of dominant institutional investors to disrupt competition in the primary market, which we intend to show empirically, suggests that the focus of antitrust scholarship concerning institutional ownership should extend beyond product (Elhauge 2016; Azar, Tecu & Schmeltz 2018; Elhauge 2020; Rock & Bluminfeld 2020) and labor (Azar, Marinescu & Steinbaum 2022; Goshen & Levit 2022) markets, to encompass capital markets as well.

Finally, once we establish the explanatory power of our theory of IPO underpricing, we will be able to use it to formulate policy recommendations. We will advocate for a reform of the U.S. book-building process to make it less susceptible to the potential abuse of market power by dominant institutional investors. In this context, it is imperative to implement measures to impede strategic, collusive behavior during price discovery.

Our theoretical predictions and empirical findings on underpricing in book-built IPOs are expected to have a bearing on equity markets worldwide. In recent decades, sealed-bid IPO auctions have been abandoned in favor of the book-building method in many countries(Sherman 2005, p. 615; Jovanovic & Szentes 2007, p. 1; Jagannathan & Sherman 2015, pp. 285-291; Kati & Phani 2016, p. 41). Policymakers tend to focus on the advantages of registries but fail to explore their potential vulnerability to strategic behavior by large institutional investors. Hence, our proposed project should serve as a clarion call to policymakers outside the U.S., inspiring them to evaluate the utility of this method in their respective regions.

## III. Detailed Description of the Proposed Research

### A. Working Hypothesis

Our working hypothesis is the following: Large, dominant institutional investors utilize their collective market power to pressure issuers to sell shares in IPOs at a price lower than their intrinsic value. This helps to explain the unprecedented levels of IPO underpricing documented in the last two decades.

Our initial focus will be on BlackRock, Vanguard, and Fidelity, which are currently the three largest institutional investors in terms of AUM (Lund & Robertson 2023, p. 2). In that context, it should be noted that until recently, the three largest asset management institutions were BlackRock, Vanguard, and State Street (Bebchuk & Hirst 2022; Fichtner, Heemskerk & Garcia-Bernardo 2017, pp. 288-299). Yet, as Lund & Robertson (2023) have noted, in the last few years Fidelity has surpassed State Street Global Investors in assets under management (AUM), reaching $4.5 trillion compared to State Street’s $4.1 trillion. More importantly, with respect to our project of assessing institutional investors’ impact on IPOs, the importance of Fidelity is greater than that of State Street. First, in terms of equity under management (EUM), the gap between Fidelity and State Street is more marked: Fidelity has EUM of over $2.5 trillion compared to State Street’s $955 million (Lund & Robertson 2023. P. 14). Even the gap between Fidelity and the largest institutional shareholder, BlackRock, is not significant when comparing equity holdings: BlackRock holds $3.2 trillion of EUM compared to Fidelity’s $2.5 trillion (Lund & Robertson 2023, p. 14). Furthermore, when comparing actively managed mutual funds, which are more relevant to the IPO market—index funds typically do not invest in IPOs, as new issuers are not automatically added to market indices— Fidelity occupies an even more prominent position. Fidelity has $4.18 trillion in actively managed mutual funds, widening the gap from State Street, which manages only $1.23 trillion, and narrowing the gap from BlackRock, which has $5.7 trillion (Lund & Robertson 2023, p. 14). The dominance of Fidelity, especially with respect to its potential impact on the IPO market, leads us to focus on BlackRock, Vanguard and Fidelity and their joint impact on the underpricing of IPOs.

Our hypothesis of collusion between a group of powerful institutional investors builds on two previous scholarly findings in the field of corporate law and capital markets. First, several recent empirical studies have shown that a core group of large institutional investors exploit their collective power and influence over corporate America to promote anticompetitive behavior by their portfolio companies in markets in which the companies compete (Azar, Tecu & Schmaltz 2018; Azar, Raina & Schmaltz 2019). Our hypothesis extends the existing literature, demonstrating that these large investors may also use their collective power to promote anticompetitive behavior in markets in which they compete with each other.

Second, recent literature identifies signs of coordination among large institutional investors, who tend to vote in lockstep and synchronize their positions on a variety of environmental, social, and governance issues related to their portfolio companies (Rock & Rubinfeld 2022, p. 202; Bebchuk & Hirst 2022, p. 1565; Cook 2022; Chaim 2023, pp. 1-3). The observation that influential investors coordinate their positions as shareholders in the primary market may seem to suggest that coordination occurs in other contexts as well. In fact, there are reasons to think that collaboration in the primary market is more probable than elsewhere. In the secondary market, there are regulatory limitations on communication between shareholders that may trigger disclosure requirements, but there are no equivalent restrictions in the primary market. The absence of such restrictions on communications between bidders during price discovery makes this process a fertile ground for collusion. Historically, participants at this stage were permitted to communicate with each other to facilitate more accurate pricing. However, in modern capital markets, this communication may lead to a decrease in competition. When many of the bidders in IPOs are large, powerful institutional investors—many of which share ownership links or maintain mutual business relationships—that interact with each other in multiple offerings, the freedom to communicate may facilitate collusive behavior.

### B. Research Design and Methods

Our research will comprise three stages. The first and most important stage of our research is to examine the relationship between the joint participation of the three largest institutional investors (BlackRock, Vanguard, and Fidelity) in U.S. IPOs and the degree of underpricing. A positive correlation between the joint participation of these three financial giants will provide empirical support for the existence of collusion between these institutional investors, giving rise to a cartel of bidders in the primary market that depress offering prices.

In the second stage, we will examine whether additional market actors participate in this bidders’ cartel. Although many scholars tend to focus on the power of BlackRock, Vanguard, Fidelity and State Street (Fichtner, Heemskerk & Garcia-Bernardo 2017, pp. 288-299; Strine 2020; Bebchuk & Hirst 2022), some have also looked into the market power of other dominant institutional investors. For instance, Kahan & Rock (2019, pp. 939-940) have emphasized the power of the twenty-five largest institutional investors, something we also intend to explore in the context of IPO underpricing. Moreover, as we noted above, the size of AUM is not necessarily the only factor that reflects the potential influence of various institutional investors on IPO pricing. There are other relevant factors, such as the AUM invested in equities; the ratio between the institutional investors’ active and passive funds; the geographic concentration of these funds and their general investment strategies (including how sophisticated the funds are and whether they utilize “outside the box” strategies). Brown & Kovbaynuk (2016) have identified various institutional investors, which are not necessarily large in terms of AUM, as key investors in IPOs that may impact underpricing. Their focus was on those institutional investors with the highest rate of participation in IPOs.

When considering these various characteristics, we may detect other potentially powerful institutional investors that may influence the price of an offer, even if their AUM is significantly lower than that of the three largest institutional investors. For instance, based on Brown & Kovbaynuk (2016) and the features listed above, T. Rowe Price, J.P. Morgan Investment Management, Janus Capital, and PNC Bank could also potentially be part of a powerful cartel of bidders that induces underpricing. Many large pension funds, such as California Public Employee’ Retirement System (CalPERS), California State Teachers’ Retirement System (CalSTRS), and New York City Employees’ Retirement System (NYCERS), maintain close business relations with large mutual funds as sponsors, and we would also like to examine the possibility that these pension funds are also participating in the cartel.

We will use a similar strategy to the one used in the first stage to find additional cartel members and examine their influence on IPO underpricing. Logistic regression will be used to determine whether the participation of a few of these “suspect” institutional investors in concert with other cartel members we have already identified is correlated with an increase in IPO underpricing while controlling for the factors we have noted in the first stage. For the purpose of achieving this goal, we also intend to conduct informal interviews with investment bankers, accountants, and lawyers involved in the book-building process in order to identify potential cartel members that we should examine more closely.

In the third stage of our research, we aim to investigate how, depending on the IPO strategy used, the level of IPO underpricing increases when institutional investors identified as cartel members are participating. We anticipate that the presence of these investors will be associated with significantly greater underpricing, particularly in book-built IPOs, due to the susceptibility of book-built IPOs to strategic interactions among bidders.

The fourth stage will involve a comparative analysis of IPO underpricing across several countries, emphasizing the impact of institutional frameworks on underpricing levels. As part of this analysis, we will focus on outlier countries with notably high and low levels of underpricing. Specifically, our study will look at four countries, two within Europe and two outside. In Europe, we will examine Greece, which has an exceptionally high average underpricing of 50.8% (Ritter 2023), and Austria, which displays a remarkably low underpricing of 5.2% (Ritter 2023). Outside Europe, our analysis will include the United Arab Emirates, exhibiting an average underpricing of 186.4% (Ritter 2023), and Canada, where the average underpricing is only 6.8% (Ritter 2023). Our primary focus will be on the bidding mechanisms employed. In particular, we will examine whether these countries utilize the book-building method or alternative approaches and the specific characteristics of the bidding process in each system. Additionally, we will consider structural differences in their capital markets, including magnitude and concentration in the asset management industry. Our research will encompass countries that have transitioned from one bidding system to another, investigating how such shifts impact the magnitude of underpricing. For instance, we will draw insights from the Israeli case, where recent regulatory changes enabling widespread book-building in IPOs coincided with a marked increase in underpricing. This phase will culminate in policy recommendations derived from the collective findings of all three research stages. These recommendations will highlight optimal institutional settings that can effectively minimize underpricing while considering associated costs.

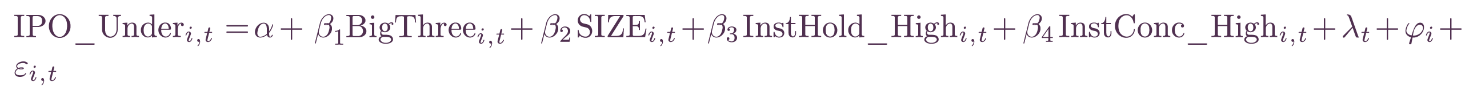
In each stage, our intention is to generate at least one article. Specifically, in the first stage, our goal is to produce two articles—one for a finance journal and one for a general law review. For the subsequent two stages, our primary aim is publication in legal journals, preferably peer-reviewed, although law reviews are also a viable option.

**C. Preliminary Results**

At the current stage of our research, we are conducting an in-depth analysis of the IPOs of U.S. companies that took place between 2002 and 2022. We have accessed comprehensive data from the Thompson Financial Securities Database Corporation (SDC) and have cross-referenced it with the Audit Analytics Initial Public Offerings (Audit Analytics) databases available on Wharton Research Data Services (WRDS) to obtain the closing stock prices at the end of the first trading day on the stock exchange. We have also incorporated data on the stockholdings of individual institutional investors, extracted from 13F filings available through Thomson Reuters. Additionally, we have gathered various firm-specific characteristics and accounting data from Compustat. Our final dataset comprises a total of 2,692 IPOs, encompassing all instances where we successfully gathered data from all relevant sources.

Our decision to begin the sample period in 2002 is informed by several considerations. Firstly, the last two decades, particularly the most recent one, have witnessed a significant uptick in institutional ownership of public equity (Bebchuk & Hirst, 2019, p. 5). This substantial increase in ownership by a few large institutional investors confers considerable influence and market power upon these investors within capital markets, potentially fostering a trend toward cartel-forming behavior. Secondly, our reliance on the Audit Analytics databases, which exclusively covers U.S. registered IPOs on major exchanges since 2000, necessitates the commencement of our sample period in 2002. It is worth noting that we deliberately exclude the dot-com bubble period characterized by exceptionally high first-day returns (Ljungqvist & Wilhelm, 2002). This exclusionary measure is undertaken to ensure the robustness and relevance of our analysis, focusing on a period less susceptible to extraordinary market conditions.

Formally, our primary regression specification, which we are currently estimating, can be represented as follows (Equation 1):



In this context, the dependent variable IPO\_Under (representing IPO underpricing) is formally defined as ((price - ipo\_price) / ipo\_price) \* 100, with “price” denoting the stock price at the end of the first public trading day on the stock exchange. The variable “BigThree” is a binary indicator, taking the value of 1 if all three major institutional investors known as the Big Three (BlackRock, Vanguard, and Fidelity) are involved in the IPO deal (have holdings in the company at the end of the quarter following the IPO); otherwise, it takes the value of 0. Additionally, “SIZE” signifies the natural logarithm of the implied valuation of the company in the IPO (measured in millions of U.S. dollars), computed as the product of the IPO price and the number of outstanding shares. “InstHold\_High” is a dummy variable equal to 1 if the total institutional holdings in the company at the end of the quarter following the IPO are greater than or equal to the median institutional holdings for all companies in our sample (above or equal to 24.88%); otherwise, it is assigned the value of 0. Similarly, “InstConc\_High” is a dummy variable, taking the value of 1 if the concentration of institutional holdings in the company, as measured by the Herfindahl-Hirschman Index (HHI), at the end of the quarter following the IPO is greater than or equal to the median HHI for all companies in our sample (above or equal to 16.45%); otherwise, it takes the value of 0. The parameter λ represents calendar year fixed effects, while φ represents industry fixed effects (using the Fama-French 12-industry classification). ε denotes the error term, which is robustly clustered at the industry level. Our primary focus lies in investigating the influence of the presence of all three Big Three institutional investors on IPO\_Under, specifically examining the extent to which IPO underpricing is affected by their participation in the IPO process.

Several preliminary regression specifications, based on Equation 1, are presented in Table 1. These preliminary findings indicate that when all of the big three institutional investors participate in an IPO, IPO underpricing experiences a significant increase of 13 percentage points. This result remains robust even after controlling for factors such as IPO size, high institutional holdings, and high concentration of institutional holdings, as well as accounting for year- and industry-fixed effects. Our preliminary results maintain their robustness when subjected to separate analyses for distinct time intervals—specifically, 2002-2012 and 2012-2022. Importantly, our findings display greater strength in the latter period (2012-2022), in accordance with the hypothesis positing a correlation between IPO underpricing and the escalation of institutional market power.

### E. Expected Pitfalls

Our proposed project faces several challenges. One of the main challenges is associated with obtaining information regarding the shares that institutional investors at the IPO stage. The book-building process is secretive and is designed to maintain the confidentiality of investors’ identities (Katti & Phani, 2016). Institutional investor bids in book-built IPOs are “propriety information that investment banks are loathe to reveal” (Jenkinson & Jones, 2004, p. 2309) and there is no publicly available information regarding the actual allocation of shares to the various bidders.

Our intent is to look into the 13F filings of institutional investment managers in the first quarter following the IPO. These filings include a reporting form in which institutional investors must disclose their equity holdings in all listed companies. The utilization of the information disclosed on 13F forms as a proxy for IPO allocation is a common practice in empirical studies on public offerings (Reuter 2006; Binay, Gatchev & Prinsky 2007; Brown & Kovbasyuk 2016). However, it may not necessarily reflect the allocation of shares in the IPO. Indeed, there are indications of a systematic gap between shares allocated to institutional investors in IPOs and their holdings a short period later (Field & Lowry 2009). Aggrawal (2003), for example, found that institutional investors flip 26% of their allocated shares on the first day of trading. Likewise, Chemmanur & Hu (2007) found heavy selling by institutional investors throughout the first month of trading. Brown & Kovbasyuk (2016, p. 4), on the other hand, found a high correlation (87%) between the disclosure of holdings on 13F forms and the actual allocation in IPOs. They also argue that post-IPO trading activity does not bias the measurement of IPO allocation through 13F disclosure.

Despite the limitations associated with using 13F filings, our methodology is more robust against bias due to the gap between IPO allocation and 13F holdings. This is largely because most studies that have found a systematic gap between the two indicate a one-directional gap: institutional investors tended to flip a large percentage of their initial allocation at the beginning of the trading in the market (Field & Lowry 2009; Aggrawal 2003; Chemmanor & Hu 2007). Thus, institutional investors may have held shares at the initial allocation stage which are not reflected in their holding disclosures in the first quarter. The opposite scenario is less probable (Chemmanor & Hu 2007). It should also be noted that the model in our study is based on a binary variable indicating whether all three major institutional investors held any shares at the time of the first quarterly disclosure after the IPO. As noted above, if an investor held shares according to the first quarterly disclosure, it most likely held these shares at the time of the IPO. The main reason we did not choose an alternative model—looking at the correlation between the aggregate size of the holdings of the giant institutional investors and underpricing, for example—is the potential gap between shares held in the IPO and those disclosed in the first quarter after the IPO. The latter would have suffered more from a systematic discrepancy between the size of holdings in the first quarter and the size of holdings in the IPO.

Another issue is the possible inclusion of additional control variables in our exploration of the econometric model (Eq. 1). As noted above, theoretical frameworks suggest that underwriters might use their position in the book-building process to favor certain business associates, especially institutional investors, through strategic stock allocations (referenced works: Ritter 1984; Benveniste & Spindt 1989; Ljungqvist 2003; Ljungqvist & Wilhelm 2003; Loughran & Ritter 2004; Griffin, Harris & Topaloglu 2007). This suggests a possible nuanced relationship between some underwriters and particular institutional investors, potentially influencing IPO dynamics. Currently, our dataset is subject to certain constraints, particularly regarding detailed information on the underwriters involved in each IPO. This aspect, along with other potential control variables, merits further investigation. The aim of this grant application is to access additional resources, thereby enriching our research database.

The third pitfall we intend to address is the possibility that there are additional market actors, also part of the bidders’ cartel, that induce IPO underpricing. The second stage of our research is designed to mitigate this concern, but it is not as robust as the first stage—we may miss some important institutional players that are also members of the cartel. We believe that by examining the features of other institutions, mentioned above, in addition to the AUM test—such as EAM, the institutional investors’ ratio of passive to active funds and geographic concentration, as well as the general correlation between the institutional investors’ participation in an IPO and underpricing—we reduce the likelihood of overlooking key members of the cartel. Informal interviews with central players in the primary market should also assist us in identifying potential cartel members.

**Preliminary Regression Results**

**Table 1: Financial Giants and IPO Underpricing**

The table presents the results of Ordinary Least Squares (OLS) regression analyses conducted on IPO Underpricing (IPO\_Under). IPO Underpricing is defined as ((price - ipo\_price) / ipo\_price) \* 100, with “price” representing the closing stock price at the conclusion of the first public trading day on the stock exchange. To mitigate the effect of potential outliers, we employ winsorizing on the raw IPO Underpricing data at the 1% and 99% levels. Our primary explanatory variable of interest is “BigThree,” which is a binary indicator equal to 1 when all three major institutional investors collectively known as the Big Three are engaged in the IPO deal (holding shares in the company at the end of the quarter following the IPO) and 0 when they are not involved. Among our control variables, “SIZE” represents the natural logarithm of the firm’s IPO market valuation, measured in millions of U.S. dollars. This valuation is computed as the product of the IPO price and the number of outstanding shares. “InstHold\_High” is a dummy variable set to 1 if the total institutional holdings in the company at the end of the quarter following the IPO are at least as large as the median institutional holdings for all companies in our sample (24.88% or more); otherwise, it equals 0. Similarly, “InstConc\_High” is a dummy variable with a value of 1 if the concentration of institutional holdings in the company, as quantified by the Herfindahl-Hirschman Index (HHI), at the end of the quarter following the IPO is greater than or equal to the median HHI for all companies in our sample (16.45% or higher); otherwise, it is set to 0. All model specifications incorporate calendar year fixed effects and industry fixed effects based on the Fama-French 12 industry classification. Columns 4 and 5 in the table present results from subsamples, with Column 4 focusing on the years 2002-2011 and Column 5 concentrating on the years 2012-2022. Standard errors are robust and clustered at the industry level, with significance levels indicated by asterisks: \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels, respectively.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **(1)** | **(2)** | **(3)** | **(4)** | **(5)** |
| BigThree | 13.60\*\*\* | 12.62\*\*\* | 13.05\*\*\* | 8.37\*\*\* | 16.67\*\*\* |
|  | (1.26) | (0.71) | (1.48) | (0.41) | (0.80) |
| SIZE |  | 0.72 | 0.72 | -0.07 | 1.48\* |
|  |  | (0.41) | (0.59) | (0.33) | (0.79) |
| InstHold\_High |  |  | -3.90 | -0.40 | -8.70\*\*\* |
|  |  |  | (2.47) | (1.22) | (2.28) |
| InstConc\_High |  |  | -4.00\*\*\* | -3.53\*\* | -4.54\*\*\* |
|  |  |  | (0.60) | (1.34) | (0.58) |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| Industry and year FE | YES | YES | YES | YES | YES |
| Observations | 2,692 | 2,692 | 2,692 | 1,414 | 1,278 |
| *R*2 | 0.0954 | 0.0960 | 0.1002 | 0.0913 | 0.0732 |

1. Yuval Zook, The Prevalent Method for Issuing New Companies on the Tel Aviv Stock Exchange, Talniri (April 2021), <https://www.talniri.co.il/marketnews/article.asp?mp=153&cat=4&id=102229>. [↑](#footnote-ref-1)
2. Understanding the IPO Share Allocation Process, Fidelity, https://www.fidelity.com/learningcenter/trading-investing/trading/ipo-share-allocation-process. [↑](#footnote-ref-2)