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# Mutual Fund Participation in IPOs: Thai Evidence

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## ***ABSTRACT***

Underwriters and co-managers play an important role in IPOs, but because they often have affiliated mutual funds, concerns about conflicts of interest can arise. On the one hand, they can use this affiliation for the benefit of their asset management business (the information advantage hypothesis); on the other hand, they can use mutual funds under their control to support their IPO clients (the quid pro quo hypothesis). In this article, we find that the behavior of lead underwriter-affiliated funds in Thailand is more consistent with the information advantage hypothesis and co-manager-affiliated funds more consistent with the quid pro quo hypothesis. We also find further evidence of strategic placement of IPO stocks within fund family.

Keywords: Initial public offerings, Mutual funds, Conflicts of interest

JEL Classification Code: G23, G24

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## 1. Introduction

In initial public offerings (IPOs), underwriters (bookrunners) and their syndicates (co-managers) play an important role in price discovery and placement completion for their clients. However, many underwriters are part of financial conglomerates and often have affiliated asset management companies, leading to potential conflicts of interest, as a seller's representative who has detailed knowledge of the issue (or even private information) is also a candidate buyer. On the one hand, underwriters can use this information advantage for the benefit of their funds by allocating "hot" (underpriced) issues at the expense of their clients (Hwang, Titman and Wang, 2018; Ritter and Zhang, 2007). On the other hand, they can use mutual funds under their control to provide support for the benefit of their clients to win favors for future business (Hao and Yan, 2012). We refer to the first as the "information advantage" hypothesis and the second as the "quid pro quo" hypothesis.

The literature has placed a greater emphasis on the role of lead underwriters because of their greater involvement with clients throughout the IPO process and find that underwriter conflicts of interest can occur in many forms, such as placing hot IPOs with affiliated funds (Ritter and Zhang, 2007), receiving extra commission from funds in exchange for allocation (Reuter, 2006), awarding allocation to their "friends" (Hwang, Titman and Wang, 2018) or put worse-performing issues in affiliated funds (Hao and Yan, 2012). In this article, we analyze the lead underwriter-fund affiliation in the context of Thailand and provide new evidence on co-managers affiliation, which is uncommon in the IPO literature. While lead underwriters are better placed to exercise influence, Ljungquist, Marston and Wilhelm (2009) have shown that investment banks compete to become co-managers of syndicates in order to establish relationship. Using similar reasoning, co-managers may try to show their support to become lead underwriters in future deals by providing supporting for their clients' issues.

We investigate the information advantage hypothesis and the quid pro quo hypothesis using a sample of 202 IPOs in Thailand over the period from 2005 to 2016 and reported holdings of 348 open-ended equity mutual funds during the same period using both issue-level analysis and fund-level analysis. We choose Thailand for three reasons. First, much of academic evidence with respect to conflicts of interest involving asset management companies are largely U.S.-centric. Second, capital market participants in Thailand (and many developing countries) are few and concentrated: there are 52 unique lead underwriters and co-managers during the sample period, but the combined activities of the top five account for 85.1 percent of issues and 97.8 percent of proceeds during our sample period. While capital market relationship is important<sup>1</sup>, our research intends to shed light on the role of relationship in a concentrated market.<sup>2</sup> Third, Thai law allows for contributions to qualified open-ended equity mutual funds to be tax deductible in exchange for lockup period as long as seven years, providing affiliated fund managers with capital at their disposal, allowing us to test the quid pro quo hypothesis further.

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<sup>1</sup> A survey of institutional investors conducted by Jenkinson and Jones (2009) highlights the importance of relationship between investors and investment banks in IPO allocation.

<sup>2</sup> In Ritter and Zhang (2007), there are 361 different investment banks during their sample period of 1990 to 2001.

At the issue level, evidence with regard to affiliated fund holdings and initial returns is insufficient to distinguish between the two hypotheses, but investigation of longer-term returns reveals contrasting result to the U.S. finding of Hao and Yan (2012) that IPOs held by affiliated funds tend to perform worse. One limitation of the issue level analysis is that only the net effect of the two hypotheses can be discerned. Our main findings lie in the fund-level analysis, which provides deeper insight through examination of the types of funds more likely to hold IPO stocks. We find that lead underwriter-affiliated funds are more likely to invest in underpriced issues (consistent with the information advantage hypothesis), but the opposite behavior for co-manager-affiliated funds (consistent with the quid pro quo hypothesis). Certain fund characteristics can also shed light on the two hypotheses. Motivated by the stylized fact that IPO stocks tend to perform well, Gaspar, Massa and Matos (2006) find that fund managers tend to hold them in funds that are strategically more important to cross-subsidize performance and boost fund inflows. Following the same argument of strategic importance, we find that IPO stocks are more likely to be held by lead underwriters in funds that are older (which we interpret as more recognized, hence more important), supporting the information advantage hypothesis, and by both lead underwriters and co-managers in tax-deductible funds, which supports the quid pro quo hypothesis. Our findings suggest that relationship is an important part of capital markets, even in a concentrated one like Thailand.

The rest of this article is organized as follows. In the next section, we review research related to IPOs in Thailand and the two hypotheses related to conflicts of interest. In Section 3, we describe our data sources and sample construction strategy, as well as empirical methodology. Section 4 reports the result of the issue-level analysis and Section 5 the fund-level analysis. We conclude in Section 6.

## **2. Literature Review**

### **2.1 IPOs in Thailand**

The IPO literature is rich, vast, and widely researched. The main topics synthesized by Lowry, Michael and Valkova (2017) can be broadly classified into (1) whether firms go public to raise capital or for other reasons such as market timing, (2) how IPOs are priced, (3) how do IPOs perform in the long-run and (4) governance of newly public firms. In the context of Thailand, researchers have investigated factors behind valuation and underpricing (e.g. Boonchuaymetta and Chuanrommanee, 2013; Chorruck and Worthington, 2012; Lonkani and Firth, 2005; Sherif, Komenkul and Xu, 2016; Venkatesh and Neupane, 2005; Vithessonthi, 2008), post-issue stock performance (Sherif, Komenkul and Xu, 2016), agency cost and post-issue operating performance (e.g. Connelly, Limpaphayom and Siraprapasiri, 2004; Kim, Kitsabunnarat and Nofsinger, 2004), characteristics of speculative listing (Komenkul, Sherif and Xu, 2017) and survival of newly listed firms (Chatchavan, Krishnamurthy and Tian, 2012). Overall, evidence shows that Thai IPOs tend to be underpriced on average, not all firms are successful, and firms that are more vulnerable to agency problems tend to have worse performance post-listing.

In addition to issuer characteristics, government regulations and reforms can also affect underpricing and performance. Ekkayokkaya and Pengniti (2012) document a drop in underpricing

following a post-crisis reform aimed at increasing disclosure and corporate governance. Capital market regulations not directly targeted at fundraising can also have a spillover effect: Komenkul and Siriwattanukul (2016) find that underpricing increased after the temporary unremunerated reserve requirement to curb capital inflows was imposed in December 2006, most likely due to reduced participation by informed traders such as foreign and institutional investors.

Information asymmetry inherent in public offerings can lead to potential adverse selection issues, as theoretically shown by Rock (1986) and Beatty and Ritter (1986) and empirically demonstrated by Michael and Shaw (1994). The distinction between the informed and uninformed (insiders and outsiders) necessitates underwriters' important role in bridging the asymmetry and hence their reputation and prestige.<sup>3</sup> Contrary to international evidence, Boonchuaymetta and Chuanrommanee (2013) find that underwriter prestige is not related to underpricing in Thailand, citing regulatory restriction on the choice of underwriters as a reason. In a departure from existing literature in Thailand, in this article, we focus on issues arising from lead underwriter- and co-manager-issuer relationship and their potential conflicts of interest.

## 2.2 Conflicts of interest in IPOs

As lead underwriters both set the offering price and determine allocations, there are potential concerns about agency-type problems. On the one hand, lead underwriters can offer underpriced issues to their benefactors (the information advantage hypothesis); on the other, they can offload unattractive issues to certain investors to build relationship with clients (the quid pro quo hypothesis)<sup>4</sup>. Indeed, with detailed subscription of each investor in a sample of IPOs, Amihud, Hauser and Kirsh (2003) demonstrate that individual investors tend to receive larger allocations in overpriced IPOs. The conflicts of interest often center around investment by mutual funds because many lead underwriters also have affiliated asset management companies, and underpriced IPOs offer a way to boost returns, albeit at the expense of issuers.<sup>5</sup> Alternatively, mutual funds represent a substantial pool of capital that could absorb or even influence stock performance. Ratanabanchuen and Saengchote (2020a) show that Thai stocks that are more widely held by mutual funds tend to perform better during period of fund inflows.

Ritter and Zhang (2007) test the two hypotheses by examining IPOs whose lead underwriters have affiliated mutual funds and find that such funds are more likely to be allocated shares of hot IPOs during the Internet bubble period, supporting the information advantage hypothesis. Reuter (2006) also finds similar evidence, as a mutual fund family that pays more to an investment bank is more likely to be allocated IPOs that are written by the bank.<sup>6</sup> Gaspar, Massa

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<sup>3</sup> In the bookbuilding and information revelation hypothesis, lead underwriters can reward institutional investors for their information production in the form of underwriting, (Benveniste and Spindt, 1989; Sherman, 2000; Sherman and Titman, 2002).

<sup>4</sup> Ritter and Zhang (2007) refer to the two hypotheses as the nepotism and dumping ground hypotheses.

<sup>5</sup> The conflict can involve other benefactors, too. For example, Liu and Ritter (2010) find that IPOs of firms whose top executives received hot IPO allocation of other firms tend to be more underpriced, a practice referred to as "spinning".

<sup>6</sup> The same reason is also proposed by Loughran and Ritter (2002) as an explanation for IPO underpricing, as investors may engage in rent-seeking such as overpaying commissions in order to be allocated attractive IPOs, which in turn becomes indirect compensation for underwriters.

and Matos (2006) examine fund-level holdings and find that within a fund family, managers tend to hold IPOs in funds that are strategically more important for the family (that is, younger, higher fee, and high performing). Hwang, Titman and Wang (2018) further show that connection based on educational background can also lead to information advantage in allocation of underpriced IPOs and mutual fund performance. The advantage can also extend beyond initial allocation, as Hwang (2019) shows that lead underwriter-affiliated funds can avoid potential economic loss from their clients' class-action lawsuits.

On the other hand, researchers have found incidences of conflicts of interest that are detrimental to mutual fund investors. Cohen and Schmidt (2009) document that mutual fund families in the U.S. with 401(k) plans overweight the holdings of the sponsor firm's stock, as being named trustee comes with substantial inflows. Golez and Marin (2015) find that bank-affiliated mutual funds in Spain appear to provide price support for their parent banks' stocks, especially around seasoned equity issues and bad news. In a study specifically related to IPOs, Hao and Yan (2012) find that investment-bank affiliated mutual funds in the U.S. tend to underperform and are more likely to hold worse-performing clients.

### **3. Data and Methodology**

#### **3.1 Data and sample**

To construct our sample, we use Refinitiv SDC Platinum Global New Issues database to identify IPOs from 2005 to 2016, excluding all unit offerings and real estate investment trusts (REITs). Thailand has two equity markets: The Stock Exchange of Thailand (SET) and Market for Alternative Investment (mai).<sup>7</sup> We cross-check the SDC data with their IPO filings with the Securities and Exchange Commission (SEC) and drop IPOs with incomplete data, particularly with respect to information on their lead underwriters and co-managers. We supplement the listing data with stock returns data from Refinitiv Datastream for our analysis of IPO returns and drop any issues that cannot be matched to returns data. After this screening, there are 202 IPOs, with 103 in SET and 99 in mai; while the numbers are approximately equal, SET listings account for almost 90 percent of total proceeds due to their size differences. There are 43 unique lead underwriters during the sample period, but the top five lead underwriters account for a 37.6 percent of issues and two-thirds of proceeds.

Table 1 about here

Table 1 shows the distribution of IPOs and total proceeds during the sample period. The average relative offer size (computed as shares offered as percentage of total shares outstanding

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<sup>7</sup> SET is for larger companies with more than THB 300 million in paid-up capital, and mai for smaller companies with more than THB 50 million in paid-up capital. Listing requirements slightly differ between the two, mainly with regard to financial numbers, but there is no difference in terms of corporate governance and information disclosure.

post-issue)<sup>8</sup> is similar across the two markets at approximately 25 percent<sup>9</sup>, and the average initial returns (computed as the offer-to-close change in price on the listing and used as proxy of underwriting) are positive in both markets<sup>10</sup>. However, the initial returns are significantly higher in mai, likely due to the differences in size and hence greater concern about adverse selection. For longer-term returns, we use cumulative buy-and-hold abnormal returns relative to the Daniel, Grinblatt, Titman and Wermers (DGTW) (1997) benchmark, which is computed by first dividing listed stocks into terciles based on market cap and book-to-market ratio (BM), excluding the listed stock under consideration. Each listed stock is then matched to a value-weighted portfolio of stocks in the same size/BM tercile. Finally, the cumulative buy-and-hold return of the value-weighted benchmark is deducted from the cumulative buy-and-hold return of the listed stock. In this article, we use six months as the holding period to match the longest possible time between listing date and holdings report date.

We obtain fund-level reported holdings for IPO stocks from the Morningstar database. We screen for open-ended equity mutual funds that are active between 2005 and 2016 and exclude funds whose total net assets (TNA) do not reach THB 100 million by the end of the sample period. In the past, holdings are reported semi-annually on the anniversary of the fund's inception, but from December 2014, all funds are required to report their holdings at the end of each quarter. Consequently, we identify IPO holdings for listings prior to December 2014 using the next available reported holdings relative to listing date (so the maximum time between IPO and report date is six months), and for listings after December 2014, the end-of-quarter reported holdings. Because detailed allocation data for each IPO is not publicly available, we use reported holdings as proxy for initial IPO allocation, as also used by Ritter (2007), Reuter (2006) and Hwang, Titman and Wang (2018). There are 348 unique mutual funds belonging to 20 fund families, and 14 of them are affiliated with lead underwriters. Because Thailand's financial services sector during the sample period experienced several mergers and acquisitions, we manually check each lead underwriter, co-manager and asset management company for these changes and confirm using news reports to make sure affiliations are time sensitive. In their SEC filings, firms must specify the number of shares they allocate to institutional investors. However, we rely on mutual fund holdings in our analyses for two reasons: first, because we can conduct fund-level analysis using this detailed data, and second, because institutional shareholders classification is broad (e.g. pension funds, endowment funds, insurance companies and private funds) but the focus of our investigation is mutual funds.

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<sup>8</sup> The complement of this ratio is referred to as the share overhang (Bradley and Jordan, 2002) and retention ratio (Ekkayokkaya and Pengniti, 2012; Kim, Kitsabunnarat and Nofsinger, 2004) — that is, relative offer size of 25 percent is retention ratio of 75 percent. The importance of relative offer size in the presence of adverse selection is demonstrated by Leland and Pyle (1997).

<sup>9</sup> For Thailand, there are two listing requirements with respect to number of shares: the first is shares offered for sale (public offering), and the second is distribution of minor shareholdings (free float). For public offering, firms must offer at least 10 to 15 percent (depending on firm size) for sale at IPO, and for free float, non-strategic shareholders must account for at least 20 to 25 percent (also depending on size) of outstanding shares. Because many firms did not have non-strategic shareholders (e.g. general employees) prior to public offering, the offer size constraint tends to be non-binding.

<sup>10</sup> Evidence from Banerjee, Dai and Shrestha (2011) suggests that underpricing is a common phenomenon, with the 36 countries in their analysis all report positive initial returns.

## 3.2 Methodology

In this article, we investigate the role of lead underwriters through mutual fund participation at both issue level and fund level under the information advantage and the quid pro quo hypotheses. Following the model of Ritter and Zhang (2007), the two competing hypotheses can be tested by investigating the relationship between initial returns (IR) and participation by lead underwriter-affiliated mutual funds, conditional on the lead underwriter owning an asset management company. For the information advantage hypothesis, lead underwriter allocates underpriced IPOs to their affiliated funds, so we expect to see a positive relationship between initial return and affiliated fund participation. For the quid pro quo hypothesis, lead underwriters use affiliated funds to support cold IPOs, so we expect to see a negative relationship.

$$IR_i = \alpha + \beta AFH_i + \gamma X_i + \varepsilon_i \quad (1)$$

To test the two competing hypotheses, we estimate an OLS regression of the form specified in Equation 1 where AFH (affiliated funds report holding) is the main variable of interest and  $X_i$  is a vector of issue-related control variables. AFH is defined as a dummy variable which equals one when at least one mutual fund affiliated to the lead underwriter reports holding of the IPO stock within the next six months (or three, for IPOs after December 2014). Following the information revelation model of Benveniste and Spindt (1989) and the finding of Hanley (1993), we include price adjustment, which is computed as the percentage difference between the offer price and the midpoint of initial filing range. The natural log of institutional shares allocated is included as a proxy to control for private information not reflected in premarket demand and other public information that has been shown by Aggarwal, Prabhala and Puri (2002) to affect underpricing. Relative offer size is included to reflect signaling under adverse selection per Leland and Pyle (1977). Natural log of issue proceeds represents issue size, as large issuers tend to be less risky and thus less underpriced (Liu and Ritter, 2010; Ritter and Zhang, 2007). Based on the descriptive statistics in Table 1 where initial returns of stocks listed in mai tend to be higher, we include a dummy variable for listings in mai. Results from Ekkayokkaya and Pengniti (2012) and Komenkul and Siriwattanakul (2016) suggest that time-specific factors can influence underpricing, so for robustness, we include listing year fixed effects as additional control variable. In all specifications, we use robust standard errors to account for heteroskedasticity.

Table 2 about here

Descriptive statistics for the issue-level analysis are reported in Table 2. Initial returns are positively skewed with maximum value of 200 percent, because the maximum price increase (the price ceiling) on the first day in Thailand is capped at three times the IPO price, while the price floor is THB 0.01. The both raw and adjusted 6-month returns are also positive on average and positively skewed, partly because their calculations include initial return. Price adjustments are relatively uncommon in Thailand; of the 202 issues, 30 report an increase averaging 3 percent, and 5 report a decrease averaging -1.45 percent.



$$\ell = \log\left(\frac{p}{1-p}\right) = s_j + \beta_1 AF_j + \beta_2 AF_j * DIR_i + \beta_3 DIR_i + \delta_1 Z_j + \delta_2 X_i + \varepsilon_{ij} \quad (2)$$

For the fund-level analysis, we use a logistic regression specified in Equation 2 to investigate factors that are related to fund holding of the IPO stock. In this analysis, each observation is by issue-fund (for example, if at the time of listing, there are 150 active mutual funds, then that IPO will have 150 observations), and the dependent variable is a dummy variable ( $Y_{ij}$ ) equals one if the fund reports holding of the IPO stock, and the variable  $p$  represents the probability that  $Y_{ij} = 1$ . The subscript  $i$  represents issue and  $j$  represents fund, so  $Z_j$  is a vector of fund-level control variables, and  $X_i$  a vector of issue-level variables. The main variables of interest are AF (affiliated fund), which is a dummy variable which equals one if the fund is affiliated with the lead underwriter, and DIR (demeaned initial return).<sup>11</sup> Testing the hypotheses in the fund-level analysis is slightly different from the issue-level as we can interact the two variables to identify variations across funds for the same issue. For the information advantage hypothesis, we expect the coefficient on AF\*DIR to be positive, and the reverse for the quid pro quo hypothesis. As control variables, we include natural log of total net assets (TNA) at the fund level, and price adjustment, natural log of issue proceeds, relative offer size at the issue level. For this analysis, we include style fixed effects ( $s_j$ ) to account for natural tendency for some types of funds to avoid IPO stocks and cluster standard errors by fund.

The analysis at fund level allows us to conduct a more in-depth investigation by looking at characteristics of funds that are more likely to hold IPO stocks. Because mutual fund investors tend to asymmetrically rewarded funds with stellar returns with fund flows (e.g. Chevalier and Ellison, 1997; Huang, Wei and Yan, 2007; Sirri and Tufano, 1998), the information advantage/quid pro quo hypotheses can be tested by looking at where IPO stocks are held. Motivated by Gaspar, Massa and Matos (2006) who find that IPO stocks tend to be held in funds that are strategically more important and thus returns to such funds should be boosted by underpriced IPOs (the authors call this “cross-subsidization”), we include three fund-level variables that capture this incentive. The first is natural log of fund age (in months), motivated by the finding of Chevalier and Ellison (1997) that younger funds tend to exhibit greater performance-flow sensitivity. The second is expense ratio, motivated by asset management companies’ compensation model, and the third is year-to-date funds return, also motivated by the convex flow-performance relationship documented by Chevalier and Ellison (1997). Based on the results of Gaspar, Massa and Matos (2006), we expect to see a negative relationship between holding and fund age, and positive relationship for expense ratio and year-to-date returns.

In order to encourage long-term savings, the Thai government allows annual contributions to certain open-ended equity mutual funds to be tax-deductible.<sup>12</sup> In our sample, 95 of 349 funds qualify as tax deductible funds. In just a decade following its introduction in 2004, the total net assets of tax deductible funds account for over half of all equity funds’ total net assets. The competition for fund flow in this category can lead to returns-chasing strategy, as documented by

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<sup>11</sup> Initial returns are demeaned to control for listing year effects, similar to Hwang, Titman and Wang (2018).

<sup>12</sup> See Ratanabanchuen and Saengchote (2020b) for more details of the tax deduction policy.

Ratanabancheun and Saengchote (2020b). We add a dummy variable to identify tax deductible funds as the fourth aspect of investigation.

Table 3 about here

While the issue-level data is manually verified for each IPO, the fund-level data is considerably larger. Consequently, we winsorize all fund-level variables at 1 and 99 percent level by issue. Table 3 reports the descriptive statistics of the fund-level analysis. There are 54,884 issue-fund observations. The average expense ratio in Thailand is 1.7 percent, slightly higher than the U.S. as documented by Hwang, Titman and Wang (2018) at 1.23 percent.

## **4. Lead Underwriter Participation and IPO Returns**

### **4.1 Univariate analysis**

We first begin this section with a univariate analysis of mutual fund participation, issue proceeds, relative offer size and initial returns in Table 4. From the SEC filing data, 99 IPOs explicitly allocate their public offers to institutional investors; however, only 55 have reported holdings by at least one mutual fund. As explained earlier, one of the reasons we focus on holdings data in this article is because the classification of institutional investors is broad, but we want to specifically investigate mutual fund participation. Nevertheless, this does not preclude the possibility that some allocations to mutual funds are flipped. Under both classifications, the average issue proceeds for IPOs where mutual funds participate tend to be larger (in particular, the ones with reported holdings), but the average relative offer size are similar across the two categories. Figure 1 shows the relationship between IPO size and fund participation (defined as percentage of outstanding shares collectively held by mutual funds) as a scatter plot. However, unlike the U.S. result of Ritter and Zhang (2007), the average initial returns for IPOs where mutual funds participate are lower. The difference for the filing-based classification is 36.8 percent, while the holding-based classification is 26.2 percent, and both are statistically significant at the 1 percent level.

Table 4 about here

Moving toward the design of the multivariate analysis, we proceed with conditional comparison in which the sample only includes IPOs where the lead underwriter has an affiliated asset management company. Of the 96 issues that satisfy this condition, affiliated funds reported holdings in 20. The IPOs with reported holding tend to be larger and have lower initial returns of 21.7 percent, statistically significant at 10 percent, which is indicative of the quid pro quo hypothesis.

In Thailand, IPO participants can take both roles across different deals<sup>13</sup>, so it is possible that mutual fund price support – if and when it occurs – receives cooperation from co-managers as well. We create another dummy variable for fund affiliation but for co-managers instead. The

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<sup>13</sup> While the top five lead underwriters account for 37.6 percent of issues and 67 percent of proceeds, the combined activities of the top five participants in either role account for 85.1 percent of issues and 97.8 percent of proceeds, so it is possible that support by mutual fund is a combined effort that involves both underwriters and co-managers.

variable takes value of one when at least one co-manager has an affiliated asset management company; 178 issues satisfy this condition, where affiliated funds report holdings in 22 issues. The result with respect to issue size and initial returns is similar in direction to the lead underwriter sample but statistically insignificant.

## **4.2 Multivariate analysis**

Our multivariate analysis controls for determinants which may influence underpricing as documented in the literature. In column 1 of Table 5, we do not include listing year fixed effects and only the variable for listing in mai shows some statistical significance. When we add the fixed effects, the coefficient on issue proceeds is negative and statistically significant at 1 percent level, consistent with our expectation and the finding of Komenkul, Sherif and Xu (2016). The underpricing gap between stocks listed in SET and mai are statistically insignificant, as the difference is likely attributable to firm size. Price adjustment is also positively related to underpricing, consistent with Hanley (1993). Relative offer size is statistically insignificant and does not have the same sign as predicted. Similar to Ritter and Zhang (2007), the number of institutional shares allocated, included to account for control for private information, is statistically insignificant. However, the coefficient on AFH which we are most interested in is statistically insignificant in both specifications with very high standard errors, providing no support for either hypothesis. In column 3, we repeat the same regression as column 2, replacing the lead underwriter affiliation dummy variable with co-manager-fund affiliation, and the result (or the lack thereof) remains intact.

Table 5 about here

## **4.3 Longer-term returns**

Underpricing (with initial returns as proxy) is only one aspect where investors can profit from IPOs. For long-term investors like mutual funds, buy-and-hold return provides another way to evaluate performance. Affiliated funds can invest in better-performing IPOs due to their information advantage, as documented by Hwang (2019).<sup>14</sup> Unlike allocation of underpriced issue, this advantage needs not be harmful to issuers. In this part, we present a univariate analysis of the 6-month cumulative buy-and-hold returns, both raw and adjusted by characteristic-based benchmark of DGTW (1997). By construction, DGTW adjusted returns are mostly lower than raw returns. The result is presented in Table 6.

Table 6 about here

IPOs in Thailand on average have positive buy-and-hold returns, both raw and adjusted, and the magnitude is substantial. For IPOs that lead underwriters have affiliated funds, the result is reported in Panel A of Table 6. Affiliated holdings have higher returns, which would be consistent with the information advantage hypothesis, but the difference is statistically

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<sup>14</sup> Other types of business connections can lead to information advantage for mutual funds. For example, Duan, Hotchkiss and Jiao (2018) show that pension business relationship between mutual funds and their portfolio companies can lead to such advantage also.

insignificant. The result contrasts with Hao and Yan (2012), who find that IPOs held by affiliated funds tend to perform worse. The analysis for co-manager affiliation yields a similar result.

We also compare the returns of IPOs where lead underwriters do not have funds with IPOs where affiliated lead underwriters invest and find a sizable difference in DGTW adjusted returns at 33.5 percent which is statistically significant at 1 percent level. While not as clear as the comparison between affiliated IPOs held and not held, this is somewhat aligned with the prediction of the information advantage hypothesis. Usually, lead underwriters would have better access to private information than co-managers, so the absence of relationship in the co-manager sample as reported in Panel B of Table 6 provides some confidence in this interpretation.

## **5. Fund-Level Analysis of IPO Participation**

### **5.1 Determinants of fund holding**

The fund-level logistic regression analysis reported in Table 7 shows that fund size and IPO size are positively related to fund participation, similar to Hwang, Titman and Wang (2018). Following the reasoning of Reuter (2006), larger funds presumably have more bargaining power in IPO allocation from their valuable trading commission. Price adjustment is negatively related to participation, which is surprising, because in Beneviste and Spindt (1989) and Hanley (1993), issues with positive price adjustments should be in higher demand. It is possible that allocations for such IPOs end up in the hands of investors other than mutual funds, which would be consistent with conflict of interest from information advantage as well. Larger IPO size means there are more shares to buy, which would explain the positive relationship. Relative offer size, which represents positive signaling strategy under adverse selection and usually considered in the context of underpricing but not fund participation, is negatively related to participation, consistent with the prediction. Finally, stocks listed in mai tend to be less favored than stocks listed in main market. All control variables are statistically significant at 1 percent level and have consistent signs in all specifications.

For our main variables of interest, the result suggests that affiliation (AF) is an important determinant of allocation. As the role of lead underwriters and co-managers is to distribute shares to investors, it comes as no surprise that affiliated funds are on average more likely to hold their clients' stocks. For demeaned initial return (DIR), we are interested in the difference between affiliated and unaffiliated funds through the interacted variable AF\*DIR. The result shows that for lead underwriter-affiliated funds, they are more likely to invest when underpricing is high (consistent with the information advantage hypothesis), while for co-manager-affiliated funds, they are less likely to invest (consistent with the quid pro quo hypothesis). At the issue level, we are not able to find evidence of either hypothesis, but deeper investigation at the fund level allows us to discern the differences and our finding suggests that both hypotheses are supported.<sup>15</sup>

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<sup>15</sup> In Ritter and Zhang (2007), the hypotheses are not mutually exclusive. However, the issue-level analysis can only test which effect dominates. Our fund-level analysis allows for both hypotheses to be present at the same time. Jenkinson, Jones and Suntheim (2018) also find evidence that supports the coexistence of multiple conflicts of interest but use a different research design than ours.

## 5.2 Further investigation of fund characteristics

The cross-subsidization behavior documented by Gaspar, Massa and Matos (2006)<sup>16</sup> predicts that younger funds with higher fees and year-to-date returns are more likely to hold IPO stocks. In this analysis, we add three variables that correspond to the predictions and another tax-related variable that is specific to the Thai capital market. The regression already includes fund style fixed effects, which account for the natural tendency for particular types of funds to invest (or avoid) IPO stocks. The result of the augmented logistic regression is reported in column 1 and 3 of Table 8. The findings with respect to high fees and returns are consistent with the prediction, but it is worth noting that in Gaspar, Massa and Matos (2006), the IPO analysis is based on the average initial returns of IPOs allocated to particular types of funds, which is conditional on the funds holding IPO stocks in the first place. However, our analysis is whether individual funds hold a particular IPO stock, which is more similar to Hwang, Titman and Wang (2018). While our expense ratio result is consistent with theirs, the authors do not provide an explanation. For Thailand, we believe that the result may also be related to the investment approval process of fund managers. For a stock to be added to a fund's portfolio, the fund manager must obtain approval of the investment committee. Low-fee funds may have less resources to expend on research and thus are less likely to invest in IPOs.

The positive relationship between past returns and fund participation is previously undocumented at the fund level, but is consistent with the prediction of Gaspar, Massa and Matos (2006). Fund managers often have an incentive to create a “star” fund by subsidizing high performing funds, as Nanda, Wang and Zheng (2004) have shown that stellar performance of an individual star fund can attract inflows to the family as a whole.

For fund age, the result is opposite to our prediction and older funds are more likely to invest in IPO stocks. In Gaspar, Massa and Matos (2006), young funds are considered to have high strategic value, but age can also proxy for the length of relationship between the fund and other capital market participants, so it is possible that the result here captures the effect of connection. Finally, tax deductibility has no influence. The influential variables are all statistically significant at 1 percent level. The results are similar for both lead underwriter and co-manager affiliation, and earlier results with respect to initial returns and other control variables remain.

## 5.3 Fund characteristics and interaction effect

While the analysis of Gaspar, Massa and Matos (2006) is conducted at fund level, it does not explicitly link funds to lead underwriters and co-managers. We can extend the analysis through the interaction effect like what we have done for initial return and frame the investigation in the context of the information advantage/quid pro quo hypotheses. The results of the interacted logistic regressions are reported in column 2 and 4 of Table 8. For lead underwriter affiliation, the interacted fund age coefficient is positive and statistically significant at 5 percent level, but not for

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<sup>16</sup> We remind the readers that in Gaspar, Massa and Matos (2006), IPOs held by funds tend to have higher initial returns. However, in our sample, initial returns are lower while 6-month returns are higher, but the differences are both statistically insignificant. Nevertheless, the positive and statistically significant DGTW adjust returns make IPO stocks good addition to funds to boost returns.

co-manager affiliation. If we follow earlier interpretation of fund age as proxy for connection strength, then it is surprising that affiliated funds which should be already connected are more likely to participate in the IPO if they are older. For this interpretation to be true, we would expect to see no relationship (or even negative relationship) as affiliation replaces connection strength. Another possible interpretation is that fund age is a proxy for its recognition in the market. Then, taken together with the result from Table 6 that lead underwriter-affiliated IPOs that affiliated funds invest in have better performance on average, this finding would be consistent with the incentive for fund managers to boost the returns of their most recognized funds. The interaction effect would then represent the information advantage that fund managers have in affiliated issues, so they are more likely to use older funds to hold the stock. Weaker information advantage through co-manager affiliation would also explain the absence of relationship in column 4.

Affiliated funds are more likely to hold IPO stocks in tax exempt funds. Since the sign is the same for both lead underwriter and co-manager affiliation, it is likely unrelated to information advantage. A possible explanation is that tax deductible funds tend to experience positive inflows regardless of market conditions because investors can always obtain risk-free profit through tax deduction and contributions are subject to lockup periods of as long as seven years, so if mutual fund managers must buy IPO stocks for some reason, tax deductible funds represent dry powder that is almost always available. This helps explain the fund returns interaction result, whose coefficient is negative for both lead underwriter and co-manager affiliation, which contrasts with the star fund interpretation earlier. Ratanabancheun and Saengchote (2020b) find that relative returns (compared to their benchmarks) of tax deductible funds tend to be lower, so this negative relationship could be related to the incentive for fund managers to put obligated IPOs in tax deductible funds. In our analyses thus far, evidence seems to suggest that lead underwriters are more likely to conform with the information advantage hypothesis, and co-managers with the quid pro quo hypothesis, but given their joint responsibility in placing the issued shares, the finding in this part suggests that lead underwriters, too, play a role in providing IPO support.

## **6. Conclusion**

Underwriters and co-managers play an important role in IPOs, but because they often have affiliated mutual funds, concerns about conflicts of interest can arise. On the one hand, they can use this affiliation for the benefit of their asset management business (the information advantage hypothesis), which can be harmful for their IPO clients; on the other hand, they can use mutual funds under their control for the benefit of their IPO clients (the quid pro quo hypothesis).

Evidence in this article suggests that the concerns are not mutually exclusive in Thailand, but a more microscopic analysis at the fund level is required to discern the effect. While the issue-level analysis similar to Ritter and Zhang (2007) does not lend support to either hypothesis, the fund-level analysis suggests that lead underwriters, who tend to have better information advantage, are more likely to use that advantage to benefit their asset management business. Co-managers, on the other hand, are more likely to use their mutual funds to support their IPO clients. Motivated by strategic behavior of fund managers for the benefit of their fund family documented by Gaspar, Massa and Matos (2006) and Nanda, Wang and Zheng (2004), we also find evidence consistent with strategic placement of IPO stocks within fund family that corroborates our earlier findings.

As conflicts of interest often involve diversion of benefits from one party to another, a natural question that arises is why it occurs. For the quid pro quo hypothesis, the support by mutual funds may in part be enabled by the government policy that is intended to encourage capital market participation and long-term savings that inadvertently supply mutual funds with steady dry powder to support IPO activities.<sup>17</sup> Similar to competition among investment banks to become co-manager through research activities (Ljungquist, Marston and Wilhelm, 2009), affiliated co-managers may be vying for the position of lead underwriters by providing mutual fund support. For the issuers, disadvantaged IPOs may hurt them in the short run (although there is no evidence of that in our analysis), but they develop a relationship with underwriters that could help them with other capital market activities in the long run.<sup>18</sup> Our research suggests that even in a concentrated market, relationship is still an important currency in capital markets.

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<sup>17</sup> As of 2020, the program has been scaled back, but not because of reason mentioned in this article.

<sup>18</sup> Having good relationship with underwriters and financial advisors has been shown to positively influence capital market outcome. For example, Bao and Edmans (2011) show that investment advice quality can materially influence merger and acquisition returns.

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Figure 1: Mutual fund participation and IPO size

This scatter diagram shows the positive relationship between issue size (measured by the amount of issue proceeds) and mutual fund participation (measured as reported holdings as proportion of outstanding shares). IPO data is obtained from Refinitiv SDC Platinum Global New Issues database from 2005 to 2016, excluding all unit offerings and real estate investment trusts (REITs), and manually checked against SEC filing data. Stock holding data of open-ended equity mutual funds is obtained from Morningstar. We drop all funds that do not attain total net assets (TNA) of THB 100 million by the end of the sample period. We use holdings as of the next available report following listing date, which can be up to six months for listings prior to December 2014 and three months for subsequent listings, due to a change in reporting requirement.

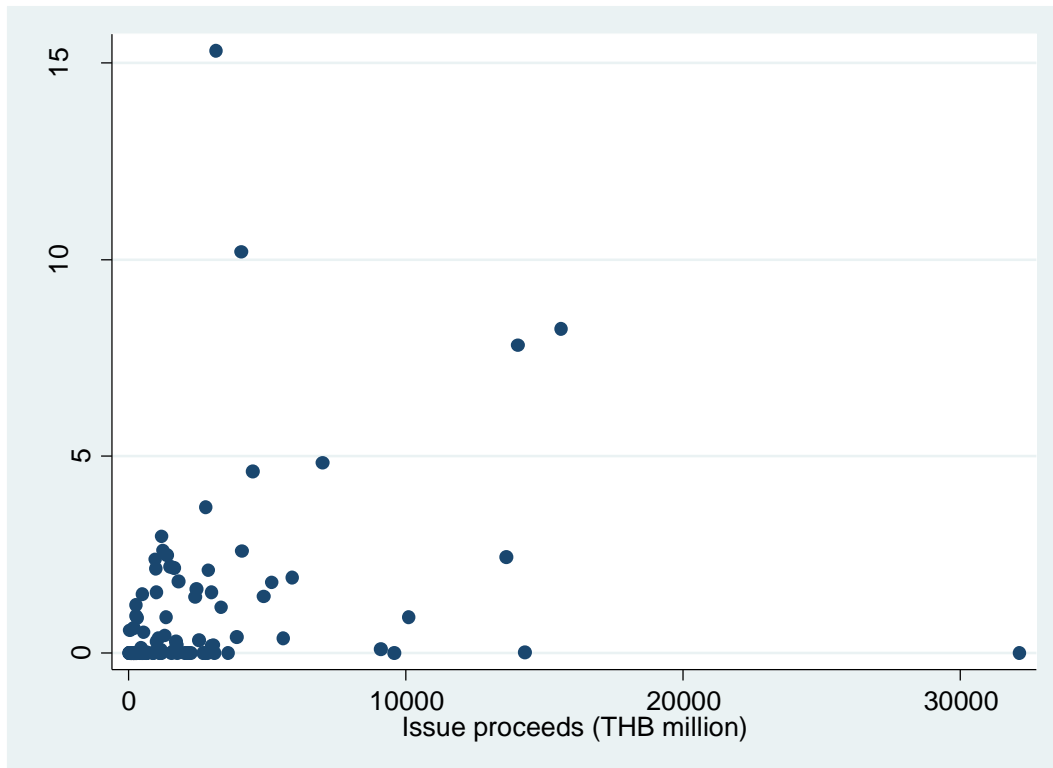


Table 1: IPO activities in Thailand

This table reports the descriptive statistics for IPOs in Thailand by listing year and market. In Thailand, there are two equity markets: The Stock Exchange of Thailand (SET) and Market for Alternative Investment (mai). IPO data is obtained from Refinitiv SDC Platinum Global New Issues database from 2005 to 2016, excluding all unit offerings and real estate investment trusts (REITs), and manually checked against SEC filing data, and merged with Refinitiv Datastream stock price data to compute returns. Relative offer size is computed as shares offered divided by total shares outstanding post-issue, reported in percentage. Initial returns are calculated as the percentage change from offer price to the end-of-day price.

| Year  | Number of IPOs |     |      | Total proceeds (THB mn) |        |         | Average relative offer size |      |      | Average initial returns |        |       |
|-------|----------------|-----|------|-------------------------|--------|---------|-----------------------------|------|------|-------------------------|--------|-------|
|       | SET            | mai | Both | SET                     | mai    | Both    | SET                         | mai  | Both | SET                     | mai    | Both  |
| 2005  | 15             | 9   | 24   | 6,170                   | 1,004  | 7,175   | 24.9                        | 24.2 | 24.6 | -0.86                   | -8.15  | -3.59 |
| 2006  | 8              | 1   | 9    | 39,843                  | 173    | 40,016  | 26.1                        | 29.6 | 26.5 | -2.56                   | -6.09  | -2.96 |
| 2007  | 4              | 3   | 7    | 963                     | 227    | 1190    | 25.3                        | 23.3 | 24.4 | 40.02                   | 32.92  | 36.98 |
| 2008  | 6              | 3   | 9    | 18,844                  | 375    | 19,219  | 28.6                        | 25.9 | 27.7 | -6.20                   | 25.24  | 4.28  |
| 2009  | 5              | 11  | 16   | 4,506                   | 1,362  | 5,868   | 24.8                        | 24.1 | 24.3 | 6.57                    | 16.29  | 13.25 |
| 2010  | 4              | 7   | 11   | 5,416                   | 699    | 6,114   | 20.9                        | 24.9 | 23.4 | 27.6                    | 50.62  | 42.25 |
| 2011  | 3              | 7   | 10   | 4,097                   | 1,160  | 5,258   | 25.7                        | 26.3 | 26.1 | 8.80                    | 91.35  | 66.59 |
| 2012  | 7              | 9   | 16   | 16,882                  | 2,136  | 19,018  | 28.2                        | 24.5 | 26.1 | 50.72                   | 91.01  | 73.38 |
| 2013  | 11             | 15  | 26   | 35,490                  | 8,017  | 43,507  | 26.9                        | 24.3 | 25.4 | 11.50                   | 90.37  | 57.00 |
| 2014  | 14             | 19  | 33   | 50,275                  | 9,160  | 59,435  | 24.3                        | 26.5 | 25.6 | 36.20                   | 120.98 | 85.01 |
| 2015  | 19             | 10  | 29   | 49,724                  | 3,907  | 53,631  | 26.5                        | 26.5 | 26.5 | 44.49                   | 59.43  | 49.65 |
| 2016  | 7              | 5   | 12   | 23,709                  | 1300   | 25,009  | 25.5                        | 25.7 | 25.6 | 44.41                   | 66.42  | 53.58 |
| Total | 103            | 99  | 202  | 255,919                 | 29,521 | 285,440 | 25.8                        | 25.3 | 25.5 | 23.34                   | 67.35  | 44.91 |

Table 2: Descriptive statistics of issue-level variables

This table reports the issue-level descriptive statistics for the variables used in Equation 1. IPO data is obtained from Refinitiv SDC Platinum Global New Issues database from 2005 to 2016, excluding all unit offerings and real estate investment trusts (REITs), and manually checked against SEC filing data, and merged with Refinitiv Datastream stock price data to compute returns. Initial returns are calculated as the percentage change from offer price to the end-of-day price. The six-month buy-and-hold returns are the cumulative returns of holding the IPO stock for six months assuming the investor can purchase at the offer price. DGTW adjusted returns are computed as the six-month buy-and-hold returns minus a characteristic-adjusted benchmark following the methodology of Grinblatt, Titman and Wermers (DGTW) (1997). The benchmark is computed by first dividing listed stocks into terciles based on market cap and book-to-market ratio (BM), excluding the listed stock under consideration. Each listed stock is then matched to a value-weighted portfolio of stocks in the same size/BM tercile. Issue proceeds is the amount of equity capital raised by the firm at IPO, reported in THB million. Relative offer size is computed as shares offered divided by total shares outstanding post-issue, reported in percentage. Price adjustment is the percentage in price from the mid-point of the price range at the time of initial filing to the final offer price. Institutional shares are the number of shares allocated to institutional investors in millions of shares as reported in the final SEC filing. Listed in mai is dummy variable which takes value of one for stocks listed in mai.

| Variable                  | Mean  | S.D.  | 5th pct | 25th pct | 50th pct | 75th pct | 95th pct |
|---------------------------|-------|-------|---------|----------|----------|----------|----------|
| Initial returns (IR)      | 44.91 | 60.43 | -18.52  | 1.71     | 22.68    | 64.67    | 200.00   |
| 6m buy-and-hold returns   | 54.4  | 81.2  | -31.5   | -2.5     | 31.2     | 87.9     | 217.1    |
| 6m DGTW adjusted returns  | 43.6  | 69.6  | -30.8   | -6.8     | 25.5     | 70.5     | 177.5    |
| Issue proceeds (THB mn)   | 1,413 | 3,297 | 62      | 160      | 300      | 1,200    | 5,599    |
| Relative offer size       | 25.52 | 5.68  | 17.00   | 22.35    | 25.00    | 27.78    | 35.00    |
| Price adjustment          | 0.60  | 2.16  | 0.00    | 0.00     | 0.00     | 0.00     | 4.62     |
| Institutional shares (mn) | 40.58 | 81.90 | 0.00    | 0.00     | 0.00     | 35.00    | 220.00   |
| Listed in mai             | 49.0% | 50.0% | 0       | 0        | 0        | 1        | 1        |

Table 3: Descriptive statistics of fund-level variables

This table reports the descriptive statistics for the 54,884 issue-fund observations in the sample. Stock holding data of open-ended equity mutual funds is obtained from Morningstar. We drop all funds that do not attain total net assets (TNA) of THB 100 million by the end of the sample period. Fund reports holding is a dummy variable which takes value one when a fund reports holding of the IPO stock in the next available holding report. We use holdings as of the next available report following listing date, which can be up to six months for listings prior to December 2014 and three months for subsequent listings, due to a change in reporting requirement. Fund affiliated with lead underwriter is a dummy variable that takes value of one for a fund in a given issue when the lead underwriter and the fund is part of the same financial conglomerate. Fund affiliated with co-managers is a dummy variable that takes value of one for a fund in a given issue when one of the co-managers and the fund is part of the same financial conglomerate. Fund age in months is calculated as the difference between the month of the report date and the inception date of the fund. For expense ratio, reported only at annual frequency in Morningstar, we use values of the previous year. Year-to-date returns are calculated as fund cumulative returns from the beginning of the year until the month before the listing date. Tax deductible fund is a dummy variable which takes value of one for funds that qualify under the government policy which allows fund contribution to be deducted from taxable income. Total net assets of the fund, computed as the closing market value of all securities owned by a fund plus all assets and minus all liabilities, is reported in THB million.

| Variable                              | Mean  | S.D.  | 5th pct | 25th pct | 50th pct | 75th pct | 95th pct |
|---------------------------------------|-------|-------|---------|----------|----------|----------|----------|
| Fund reports holding                  | 2.3%  | 14.8% | 0       | 0        | 0        | 0        | 0        |
| Fund affiliated with lead underwriter | 1.5%  | 12.1% | 0       | 0        | 0        | 0        | 0        |
| Fund affiliated with co-manager       | 2.8%  | 16.5% | 0       | 0        | 0        | 0        | 0        |
| Fund age (months)                     | 100.2 | 68.5  | 8       | 39       | 96       | 144      | 232      |
| Expense ratio (percentage)            | 1.69  | 0.56  | 0.72    | 1.32     | 1.79     | 2.05     | 2.36     |
| Year-to-date return (percentage)      | 8.09  | 11.48 | -6.92   | 0.00     | 5.15     | 15.05    | 30.49    |
| Tax deductible fund                   | 30.8% | 46.2% | 0       | 0        | 0        | 1        | 1        |
| Total net assets (TNA) (THB mn)       | 1,358 | 3,249 | 54      | 157      | 370      | 1,081    | 5,640    |

Table 4: Mutual fund participation in IPO

This table reports the average issue proceeds, average relative offer size and average initial returns for the 202 issues. Relative offer size is computed as shares offered divided by total shares outstanding post-issue, reported in percentage. Initial returns are calculated as the percentage change from offer price to the end-of-day price. We classify the IPOs by allocation to institutional investors using two methods. First, we use the final SEC filing to identify issues where shares are specifically allocated to institutional shareholders. Second, we use reported holdings by open-ended equity mutual funds from Morningstar. We also compare IPOs where there is at least one fund affiliated with lead underwriter or co-managers (separately) whether the affiliated fund report holdings in the IPO. We report the p-value of the difference between the IPOs where mutual funds do and do not participate under all definitions.

| Allocation to institutional investors         | Number of IPOs |     | Average issue proceeds (THB mn) |       |                  | Average relative offer size (percentage) |       |                  | Average initial returns (percentage) |       |                  |
|---|----------------|-----|---------------------------------|-------|------------------|--|-------|------------------|--------------------------------------|-------|------------------|
|   | No             | Yes | No                              | Yes   | p-value of diff. | No                                       | Yes   | p-value of diff. | No                                   | Yes   | p-value of diff. |
| From SEC filing                               | 103            | 99  | 281                             | 2,590 | <0.001           | 25.48                                    | 25.55 | 0.930            | 62.95                                | 26.14 | <0.001           |
| Mutual funds report holdings                  | 147            | 55  | 689                             | 3,348 | <0.001           | 25.45                                    | 25.71 | 0.789            | 52.05                                | 25.81 | 0.001            |
| Lead underwriter report holding and           | No             | Yes | No                              | Yes   | p-value of diff. | No                                       | Yes   | p-value of diff. | No                                   | Yes   | p-value of diff. |
| ...does not have affiliated fund              | 106            | 0   | 788                             |       |                  | 24.69                                    |       |                  | 42.04                                |       |                  |
| ...has affiliated fund                        | 76             | 20  | 1,482                           | 4,464 | 0.014            | 26.17                                    | 27.41 | 0.492            | 52.59                                | 30.93 | 0.070            |
| Co-managers (at least one) report holding and | No             | Yes | No                              | Yes   | p-value of diff. | No                                       | Yes   | p-value of diff. | No                                   | Yes   | p-value of diff. |
| ...do not have affiliated fund                | 24             | 0   | 1,980                           |       |                  | 27.03                                    |       |                  | 86.55                                |       |                  |
| ...have affiliated fund                       | 156            | 22  | 811                             | 5,063 | <0.001           | 25.45                                    | 24.36 | 0.359            | 41.45                                | 24.01 | 0.107            |

Table 5: Issue-level analysis of the information advantage / quid pro quo hypotheses

This table reports OLS regressions of IPO initial returns (IR) on affiliated funds report holding (AFH) for lead underwriter affiliation (column 1 and 2) and co-managers affiliation (column 3) and other control variables over the 2005 to 2016 period. The key independent variable AFH is a dummy variable which equals one when at least one affiliated fund reports holding of the IPO stock. Control variable of IPO characteristics throughout the regressions include price adjustment, the natural logarithm of institutional shares, relative offer size, the natural logarithm of issue proceeds, and dummy variable for stocks listed in mai. In column 2 and 3, listing year fixed effects are added. For column 1 and 2, we restrict the sample to IPOs where lead underwriters have affiliated asset management business. For column 3, at least one co-manager has affiliated asset management business. White robust standard errors are used and shown in parentheses. \*, \*\*, and \*\*\* denote significance at the 10%, 5%, and 1% levels, respectively.

| Affiliation                           | (1)<br>Lead<br>underwriter | (2)<br>Lead<br>underwriter | (3)<br>Co-managers                   |
|---------------------------------------|----------------------------|----------------------------|--------------------------------------|
| Affiliated funds report holding (AFH) | 12.28<br>(11.92)           | -0.539<br>(11.47)          | -4.68<br>(10.01)                     |
| Price adjustment                      | 1.52<br>(1.98)             | 5.05**<br>(2.22)           | 3.19**<br>(1.36)                     |
| Ln(Institutional shares)              | -5.48<br>(4.15)            | -2.91<br>(4.35)            | 0.25<br>(2.36)                       |
| Relative offer size                   | 0.142<br>(0.80)            | 0.256<br>(0.86)            | -0.739<br>(0.72)                     |
| Ln(Issue proceeds)                    | -6.25<br>(6.68)            | -21.96***<br>(7.47)        | -21.19***<br>(4.56)                  |
| Listed in mai                         | 22.18*<br>(13.14)          | -4.34<br>(12.33)           | -0.291<br>(8.34)                     |
| Intercept                             | 84.95**<br>(42.16)         |                            |                                      |
| Observations                          | 96                         | 96                         | 178                                  |
| Adjusted R-squared                    | 0.152                      | 0.323                      | 0.413                                |
| Listing year fixed effects            | No                         | Yes                        | Yes                                  |
| IPO Sample                            | Lead UW has<br>fund        | Lead UW has<br>fund        | At least one co-<br>manager has fund |



Table 6: Do IPOs that funds participate in outperform?

This table reports the averages of the six-month returns of IPOs held and not held by funds. We analyze both raw cumulative six-month buy-and-hold returns and DGTW adjusted returns. Column 1 and 2 report IPOs where lead underwriters (or co-managers) have affiliated funds, and column 3 are IPOs where they do not. Column 3 reports unaffiliated IPOs. We compute the average of the differences between affiliated IPOs where funds do and do not invest (column 1 minus column 2) and between invested IPOs and unaffiliated IPOs (column 1 minus column 3). We report the p-value of the t-test under the null hypothesis that the averages (individually) are zero. \*, \*\*, and \*\*\* denote significance at the 10%, 5%, and 1% levels, respectively.

| <i>Panel A: Lead underwriter</i> | [1]      | [2]      | [3]      | [1] - [2] | [1] - [3] |
|----------------------------------|----------|----------|----------|-----------|-----------|
| Underwriter has funds            | Yes      | Yes      | No       |           |           |
| ... which report holdings        | Yes      | No       |          |           |           |
| Number of IPOs                   | 20       | 76       | 106      |           |           |
| Average raw returns              | 76.37*** | 70.55*** | 38.60*** | 5.82      | 37.77**   |
| p-value                          | 0.001    | <0.001   | <0.001   | 0.783     | 0.047     |
| Average DGTW adjusted returns    | 65.03*** | 54.79*** | 31.50*** | 10.24     | 33.53**   |
| p-value                          | 0.008    | <0.001   | <0.001   | 0.563     | 0.045     |
| <i>Panel B: Co-managers</i>      | [1]      | [2]      | [3]      | [1] - [2] | [1] - [3] |
| Co-managers have funds           | Yes      | Yes      | No       |           |           |
| ... which report holdings        | Yes      | No       |          |           |           |
| Number of IPOs                   | 22       | 156      | 24       |           |           |
| Average raw returns              | 58.51*** | 49.91*** | 79.54*** | 8.60      | -21.03    |
| p-value                          | 0.008    | <0.001   | <0.001   | 0.633     | 0.435     |
| Average DGTW adjusted returns    | 59.46*** | 37.02*** | 62.02*** | 22.44     | -2.56     |
| p-value                          | <0.001   | <0.001   | <0.001   | 0.195     | 0.868     |

Table 7: Fund-level analysis of the information advantage / quid pro quo hypotheses

This table reports logistic regressions of fund holding on affiliated funds (AF), demeaned initial return (DIR), their interaction (AF\*DIR) and other control variables over the 2005 to 2016 period. Each observation in this analysis is issue-fund. The key independent variable AF is a dummy variable which equals one when the fund is affiliated with the lead underwriter (or at least one co-manager). In this analysis, initial returns are demeaned by listing year. Control variable of fund characteristic and IPO characteristics throughout the regressions include the natural log of total net assets (fund size), price adjustment, the natural logarithm of institutional shares, relative offer size, the natural logarithm of issue proceeds, and dummy variable for stocks listed in mai. In all regressions, fund investment style fixed effects are included. For column 1 and 2, AF is defined based on lead underwriter affiliation, and column 3 and 4, on co-managers affiliation. Standard errors are clustered at fund level are shown in parentheses. \*, \*\*, and \*\*\* denote significance at the 10%, 5%, and 1% levels, respectively.

| Affiliation                            | (1)<br>Lead<br>Underwriter | (2)<br>Lead<br>Underwriter | (3)<br>Co-<br>managers | (4)<br>Co-<br>managers |
|--|----------------------------|----------------------------|------------------------|------------------------|
| Affiliated fund (AF)                   | 0.8344***<br>(0.109)       | 1.0367***<br>(0.129)       | 1.0381***<br>(0.065)   | 0.7278***<br>(0.116)   |
| Affiliated fund x demeaned IR (AF*DIR) |                            | 0.0051**<br>(0.002)        |                        | -0.0070***<br>(0.002)  |
| Demeaned initial return (DIR)          |                            | 0.0003<br>(0.001)          |                        | 0.0029***<br>(0.001)   |
| Ln(Total net assets)                   | 0.1672***<br>(0.037)       | 0.1663***<br>(0.037)       | 0.1673***<br>(0.039)   | 0.1657***<br>(0.039)   |
| Price adjustment                       | -0.0289***<br>(0.006)      | -0.0316***<br>(0.007)      | -0.0393***<br>(0.006)  | -0.0480***<br>(0.007)  |
| Ln(Issue proceeds)                     | 0.9440***<br>(0.034)       | 0.9603***<br>(0.036)       | 0.9186***<br>(0.033)   | 0.9558***<br>(0.036)   |
| Relative offer size                    | -0.0149***<br>(0.003)      | -0.0147***<br>(0.003)      | -0.0115***<br>(0.003)  | -0.0110***<br>(0.003)  |
| Listed in mai                          | -3.7284***<br>(0.439)      | -3.7125***<br>(0.440)      | -3.6827***<br>(0.440)  | -3.7343***<br>(0.441)  |
| Observations                           | 54,884                     | 54,884                     | 54,884                 | 54,884                 |
| Pseudo R-squared                       | 0.271                      | 0.271                      | 0.278                  | 0.280                  |
| Style fixed effects                    | Yes                        | Yes                        | Yes                    | Yes                    |

Table 8: What types of funds are more likely to hold IPO stocks?

This table reports logistic regressions of fund holding on affiliated funds (AF), demeaned initial return (DIR), fund characteristics that are related to strategic behavior, and other control variables over the 2005 to 2016 period. Each observation in this analysis is issue-fund. The key independent variable AF is a dummy variable which equals one when the fund is affiliated with the lead underwriter (or at least one co-manager). The fund characteristics of interest are the natural log of fund age, expense ratio, year-to-date fund returns and a dummy variable for tax deductible fund. In column 2 and 4, the additional variables are interacted with AF. Control variable of fund characteristic and IPO characteristics throughout the regressions include the natural log of total net assets (fund size), price adjustment, the natural logarithm of institutional shares, relative offer size, the natural logarithm of issue proceeds, and dummy variable for stocks listed in mai. In all regressions, fund investment style fixed effects are included. For column 1 and 2, AF is defined based on lead underwriter affiliation, and column 3 and 4, on co-managers affiliation. Standard errors are clustered at fund level are shown in parentheses. \*, \*\*, and \*\*\* denote significance at the 10%, 5%, and 1% levels, respectively.

| Affiliation                            | (1)<br>Lead<br>Underwriter | (2)<br>Lead<br>Underwriter | (3)<br>Co-managers    | (4)<br>Co-managers    |
|--|----------------------------|----------------------------|-----------------------|-----------------------|
| Affiliated fund (AF)                   | 0.9482***<br>(0.131)       | -0.8552<br>(1.060)         | 0.7356***<br>(0.113)  | 1.5968***<br>(0.544)  |
| Affiliated fund x ln(Fund age)         |                            | 0.4696**<br>(0.225)        |                       | -0.0149<br>(0.094)    |
| Affiliated fund x Expense ratio        |                            | -0.2801<br>(0.221)         |                       | -0.3368**<br>(0.158)  |
| Affiliated fund x Fund return YTD      |                            | -0.0292***<br>(0.010)      |                       | -0.0452***<br>(0.008) |
| Affiliated fund x Tax deductible fund  |                            | 0.6822***<br>(0.263)       |                       | 0.3610**<br>(0.155)   |
| Affiliated fund x demeaned IR (AF*DIR) | 0.0046**<br>(0.002)        | 0.0032<br>(0.002)          | -0.0067***<br>(0.002) | -0.0083***<br>(0.002) |
| Ln(Fund age)                           | 0.4176***<br>(0.079)       | 0.3978***<br>(0.080)       | 0.4453***<br>(0.081)  | 0.4525***<br>(0.085)  |
| Expense ratio                          | 0.3662***<br>(0.094)       | 0.3748***<br>(0.097)       | 0.3902***<br>(0.097)  | 0.4425***<br>(0.104)  |
| Fund return YTD                        | 0.0209***<br>(0.003)       | 0.0232***<br>(0.003)       | 0.0199***<br>(0.003)  | 0.0274***<br>(0.004)  |
| Tax deductible fund                    | -0.0157<br>(0.107)         | -0.0592<br>(0.107)         | 0.0107<br>(0.108)     | -0.0398<br>(0.112)    |
| Demeaned initial return (DIR)          | 0.0017<br>(0.001)          | 0.0017<br>(0.001)          | 0.0041***<br>(0.001)  | 0.0038***<br>(0.001)  |
| Ln(Total net assets)                   | 0.1585***<br>(0.038)       | 0.1549***<br>(0.038)       | 0.1512***<br>(0.039)  | 0.1549***<br>(0.040)  |
| Price adjustment                       | -0.0299***<br>(0.008)      | -0.0298***<br>(0.008)      | -0.0452***<br>(0.008) | -0.0411***<br>(0.008) |
| Ln(Issue proceeds)                     | 0.9837***<br>(0.038)       | 0.9847***<br>(0.038)       | 0.9804***<br>(0.038)  | 0.9613***<br>(0.038)  |
| Relative offer size                    | -0.0115***<br>(0.004)      | -0.0114***<br>(0.004)      | -0.0074**<br>(0.004)  | -0.0084**<br>(0.004)  |
| Listed in mai                          | -3.9766***<br>(0.500)      | -3.9775***<br>(0.500)      | -3.9938***<br>(0.501) | -4.0412***<br>(0.502) |

|                     |        |        |        |        |
|---------------------|--------|--------|--------|--------|
| Observations        | 51,185 | 51,185 | 51,185 | 51,185 |
| Pseudo R-squared    | 0.289  | 0.291  | 0.298  | 0.301  |
| Style fixed effects | Yes    | Yes    | Yes    | Yes    |

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