Sustainability of Analyst Recommendations in Multiple Lead Underwriter IPOs

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Abstract: Recently, a new organizational form of syndicate—multiple lead underwriter (MLU) initial public offerings (IPOs)—has emerged in IPOs. In addition to the increased deal complexity, lead underwriters in MLU IPOs face a new competition between them after underwriter selection, which is not present in single lead underwriter (SLU) IPOs. It is therefore questionable whether recommendations by analysts from lead underwriters of the MLU IPOs are as sustainable as those of the SLU IPOs. We examine IPO recommendations to capture how this new syndicate structure affects analyst behavior in terms of analyst optimism and investment value. In contrast to the popular conflict of interest perspective, our findings point to the notion that the new syndicate structure suppresses bias in recommendations and that reputation upholding incentive dominates pressure from competition. MLU-affiliated analysts are not more optimistic and provide more informative research coverage whose informativeness, however, fades away shortly after the recommendation releases. Our findings overall indicate the existence of sustainability in the MLU IPO recommendations.

Keywords: sustainability; multiple lead underwriter; IPO; analysts; recommendation

1. Introduction

“Joint and even triple-book-run equity deals have become the norm in recent years.”

– Britt Erica Tunick, Investment Dealers’ Digest (February 2004, p. 22)

Since 2000, a substantial portion of initial public offering (IPO) issuers have hired more than one lead underwriter—multiple lead underwriter (MLU) IPOs. MLU IPOs introduced increased deal complexity and new competition between lead underwriters even after underwriter selection to the underwriting business. For both single lead underwriter (SLU) and MLU IPOs, all potential investment banks compete for mandates in the syndicate before the underwriter selection. However, the lead underwriters in MLU IPOs compete even after the underwriter choice [1–5]. Increased competition in investment banking almost uniformly affects all investment banks, but the increased deal complexity and the competition in MLU IPOs after the selection are new and apply to MLUs only.

Analysts sometimes bias their research reports for trade generation instead of building and maintaining reputation through informative reports [6,7]. Competition suppresses bias in earnings forecasts [8]. Affiliated recommendations are however more optimistic, but such optimism is not revealed in earnings forecasts [9]. In this paper, we examine the effect of the new syndicate structure and the post-selection competition on analyst behavior in MLU IPOs using recommendations. MLU IPOs provide a good setting for testing how the new syndicate structure and the competition therein affects sustainability of analyst recommendations in MLU IPOs because such competition is not present in
single lead underwriter (SLU) IPOs. Competition among underwriters tends to occur mostly before underwriter selection in SLU IPOs, while competition continues beyond the underwriter selection in MLU IPOs [3]. An intriguing question is whether the new syndicate form and new competition affect optimism and sustainability in recommendations by MLU-affiliated analysts since affiliated optimism bias is well established in the literature. Specifically, we examine two aspects—analyst optimism and investment value in MLU LU recommendations (recommendations by LU-affiliated analysts in MLU IPOs).

Before 2000, it was extremely rare to have more than one lead underwriter in IPOs. The percentage of MLU IPOs among IPOs was less than 1% from 1980 to 1997 [10]. Since 2000, however, this rarity has now been becoming the “norm.” Our sample shows that the percentage of MLU IPOs rose from 17% in 2001 to 85% in 2010. General Motors’ IPO on November 17 2010 had the record high number of nine lead underwriters. Given that the fraction of MLU IPOs has been consistently more than 50% since 2005, it is highly plausible that most investment banking revenues from recent IPOs come from MLU IPO deals because multiple bookrunning has now been established as a dominant choice for going public.

Having multiple lead underwriters in the syndicate is a new organizational structure in equity offerings and introduces increased deal complexity, which is substantially driven by the changed market condition and the issuer’s demand [3,5,11]. The IPO market since 2000 turned bearish, with small numbers of IPOs each year compared to prior to 2000. The nullification of sections 20 and 33 of the Glass-Steagall Act through the Gramm-Leach-Bliley Act of 1999 invited commercial banks into the underwriting market as new competitors, which would have further fired up the unprecedented competition among investment banks to secure scarce IPO deals.

Over and above this increased competition in the underwriting market, a new dimension of competition has emerged between lead underwriters in MLU IPOs after underwriter selection, which is not present in SLU IPOs [1–5]. The issuer can prevent the “holdup” problem after the underwriter selection through the post-selection competition from having more than one lead underwriter [3]. In SLU IPOs, the current lead underwriter has an advantage in winning future underwriting mandates over other potential lead underwriter(s) [12] and would have a lower likelihood of being replaced by another investment bank after the selection in the current syndicate as long as it delivers an adequate level of underwriter services. However, it is not clear whether one of the lead underwriters in MLU IPOs will maintain (earn) the lead underwriter position in current (future) offerings by the current issuer after the initial syndicate formation because one less lead underwriter would not hurt IPO performance or delay the IPO process as much as in SLU IPOs. Unlike SLU IPOs, the other current lead underwriter(s) in MLU IPOs would have the same competitive edge in securing the position in future offerings. Furthermore, there is uncertainty on whether the future offerings would have the same number of lead underwriters. Therefore, each current lead underwriter would have a stronger incentive to compete in order to please the issuer for securing current or future business even after the selection [2]. James Cowles, global head of equity capital markets at Salomon Smith Barney, says that “Issuers get the full power of the distribution and research resources at two firms for the same fee as they’d pay for one” [1]. McGee in her article mentions “Having two firms as joint bookrunners also means the issuer retains the catbird seat even after the mandate is awarded.” Greg Stanger, CFO of Expedia Inc, stated that underwriters try really hard to win the mandate but they sometimes think that manifesting their ability is not that important once hired in SLU IPOs, while the continual competition for delivering value in the whole IPO process is so crucial in MLU IPOs [2].

Analysts play important roles in the financial system as an intermediary for information relevant to the investment quality of securities, which will ideally enhance informational efficiency in the markets [13,14]. The extant literature documents that analyst recommendations have investment value. However, conflicts of interest exist in certain groups of recommendations through underwriting relationship, trade/commission generating incentives, career concerns, or mutual fund affiliation. Conflicted analyst coverage would suffer a lack of informativeness because these recommendations are typically driven by information-irrelevant factors.
Investment banks compete on non-price dimensions rather than gross spreads or underpricing [15,16]. The literature indicates that analyst coverage is one of the most ideal candidates for the non-price dimensions of competition [17–19]. For example, analyst coverage is the most crucial determinant along with underwriter reputation in the selection of the lead underwriters [17]. Going public is not just for raising money but making market presence and enhancing visibility and where to go public is determined critically by how well an IPO is covered by analysts. A potential competing effect on analyst behavior arising from the issuer-underwriter relationship [20]. The new post-selection competition between lead underwriters due to multiple bookrunning, which is a different dimension of competition from the increased industry-wide competition in the IPO market, is highly likely to impact the analyst behavior in MLU IPOs.

Using 6950 IPO recommendations from January 2001 to December 2011, we examined analyst optimism and investment value in MLU LU recommendations. In the test of analyst optimism, we use univariate sorts and ordered probit estimations after controlling for factors that affect analyst accuracy and optimism. In the univariate analysis, MLU LU recommendations are relatively pessimistic but supportive for the issuer in that they are more reluctant to downgrade, compared to SLU counterparts. However, we found no evidence in the multivariate analysis that MLU LU recommendations differ (i) from all the other recommendations and (ii) from SLU LU recommendations using the ordered probit estimations using both rating levels and rating changes as a dependent variable. We found no evidence that MLU LU recommendations differ in the analysis of the sub-samples by regulatory changes, which is consistent with the prior literature. To control for potential endogeneity bias in the selection of MLUs, we estimate the average treatment effect using the treatment effects model. The results show that MLU LU recommendations are in fact less optimistic in the sub-sample analysis.

We implement two research designs for investment value. We use immediate market reactions using cumulative abnormal returns (CARs) for the short-term investment value and the calendar time portfolio approach for the mid-term investment value. We use lead underwriter-affiliated recommendations in SLU IPOs as our main benchmark, which is similar in spirit to prior studies [12,21,22]. In the evaluation of the short-term investment value, the short-term price reaction in the CAR approach shows that the MLU LU recommendations with Strong Buy and Buy ratings earn significantly more positive abnormal returns for the three-day event window, [−1, +1] compared to both SLU LU and all the other optimistic recommendations. The MLU LU recommendations with Underperform and Sell ratings also consistently earn significantly more negative abnormal returns. We further test from what category of recommendations this superior predictive value comes after classifying all recommendations into initiations, upgrades, downgrades, and reiterations. We find that the most informative value in MLU LU recommendations comes from rating changes, i.e., upgrades and downgrades. Our results qualitatively remain the same after several robustness checks such as endogeneity correction using two-stage least square regression (2SLS), timing of ratings, and piggybacking [23,24].

In the test of the mid-term investment value, the calendar time portfolio analysis indicates that MLU LU recommendations provide no significant abnormal returns and the other two groups—portfolios based on (i) SLU LU recommendations and (ii) unaffiliated recommendations—also show no meaningful abnormal returns in the one-month, three-months, six-months, and one-year holding horizons. Using all-star recommendations only, we find the same insignificant abnormal returns for all three groups. We consistently find no significant abnormal returns in several robustness checks. Such insignificance for the mid-term investment value is in accordance with a prior study whose sample period (2003 to 2010) heavily overlaps with our sample period [25]. They find that the informativeness of recommendations quickly fades away and post-recommendation return drift is not significantly different from zero anymore, contrary to prior findings. They argue that such insignificance is driven by the improved market efficiency due to the use of supercomputer and algorithmic trading, and the huge decline in transaction costs that enabled arbitrageurs to trade more to take advantage of mispricing opportunities. The insignificance in the mid-term investment value tests
Our findings indicate that MLU LU analysts in more competition-pressured investment banks provide more informative research coverage and reputation upholding incentive dominates pressure from competition. However, the informativeness fades away soon after the recommendation releases. It is well known that the investment banking industry is fiercely competitive, and our sample period is characterized as a bearish IPO market in the long history of the IPO market, with much fewer deals available compared to the pre-2000 period. Incentives to issue overly optimistic recommendations are usually higher cyclically in the hot IPO market with a high volume of deals; high deal volume would lead to higher underwriting-related compensations [26–28]. Our findings based on our sample period suggest that analysts’ incentives to establish and uphold their reputation would have been greater—consequently strengthening the sustainability in the analyst recommendations—than their incentives to generate economic profits for their employers by strategically manipulating their recommendations.

The rest of the paper proceeds as follows. In Section 2, we review the related literature and develop hypotheses. Section 3 describes data and sample characteristics. In Section 4, we provide summary statistics and empirical results. We present our findings and conclusions in Section 5.

2. Related Literature and Hypothesis Development

2.1. Prior Literature

This paper is related to two strands of literature: MLU IPOs and analyst behavior. MLU IPOs have hitherto received sparse attention from researchers, while the literature on analyst behavior is fairly rich. This lack of attention is in part because multiple bookrunning is quite new.

To the best of our knowledge, there are only three papers that extensively deal with multiple bookrunning as a main topic [3,5,29]. Based on a bargaining model, it is theoretically shown that the continuous competition among the lead underwriters after the underwriter selection leads to a higher equilibrium level of effort [3]. They find evidence using 532 IPOs in the 2001–2005 period that MLU IPOs with the enhanced bargaining power for issuers accomplish a higher offer price and lower underpricing [3]. They also document that MLU IPOs are associated with greater IPO size, lower all-star analyst coverage, and the increase in the buyout-backed IPOs. Using several pre-and post-IPO visibility measures for 809 IPOs from 2001 to 2010, it is shown that visibility is higher for MLU IPOs through more active pre-IPO media coverage, post-IPO analyst coverage including both overall and all-star analyst coverage, secondary market trading, and institutional ownership [5]. MLU IPOs have a significantly higher all-star analyst coverage. Another study shows that syndicate structure significantly impacts the IPO outcomes [29]. Using US IPOs from 2002 to 2014, they show that addition of additional lead underwriters is a result of bargaining dynamics between the issuer and the lead underwriters.

A plethora of academic research has addressed the conflict of interest issue in analyst coverage by asking whether a certain group of recommendations are more optimistic and have relatively better investment value. It is well established that analyst coverage has investment value [30–33]. Despite the documented predictive information on future returns from analyst recommendations, the literature has shown that a severe conflict of interest exists in the analyst coverage by affiliated investment banks [34–36]. Other sources for the conflict include career concerns, trading/commission generation, mutual fund affiliation, parent-subsidiary relationship, access to firm management, and bias between investment banks vs. brokerage firms [6,7,21,22,37–40].

While a number of studies find evidence that conflict arises from underwriting relationships through affiliated coverage, a group of studies focus on the impact of regulatory changes on analyst behavior [36,39,41,42]. These studies test the impact of regulatory changes such as Reg fair disclosure (FD), NASD Rule 2711, and NYSE Rule 472 on analyst optimism and find the confirmation of the
effectiveness in those regulations. They all observe a lower (higher) frequency of optimistic (pessimistic) recommendations after the regulations.

2.2. Hypothesis Development

2.2.1. Conflict of Interest Hypothesis

Competition for the lead underwriter mandate is cutthroat among investment banks [4]. Unlike in SLU IPOs, the competition among lead underwriters in MLU IPOs continue even after they are selected. Analyst behavior under the competitive pressure can in some cases be strategy-driven rather than information-driven, being tainted by economic or career incentives. It is widely held that rosy research is essential to increase the likelihood of retaining and gaining investment banking clients. The pressure analysts receive from the investment bank would be greater when the investment bank faces a greater competition [43]. Under pressure from the investment banking division, analysts likely misrepresent their true beliefs about the issuer for potential economic benefits. The new competition may force MLU-affiliated analyst coverage to be more optimistic than the traditional affiliated optimism in SLU IPOs, presumably in order to be at an advantage in competition and to pander to the issuer through optimistic research. In an extremely competitive and bearish IPO market, the incentive to be optimistic would be greater. Such pandering would result in more optimistic but less informative recommendations, which is detrimental to investors.

Poor coverage increases the likelihood of underwriter switching, supposedly as a punishment for the violation of the pre-commitment for aftermarket analyst coverage [18,44]. In a world of repeat business, switching is an intimidating threat for the current lead underwriter(s) and even more formidable threatening for the lead underwriters in MLU IPOs because the issuer can more easily drop one or more of the current lead underwriters due to the presence of other lead underwriter(s) in the syndicate that will smoothly run the IPO process and follow-on offerings. The potential threat of switching will make MLUs responsive to the issuer’s demand and is another driving force for the MLU optimism.

Lead underwriters in MLU IPOs after underwriter selection do things to please the issuer in order to avoid being demoted to a co-manager [3]. Lead underwriters have a natural incentive to please the issuer with more and unduly optimistic research coverage because unfavorable or lack of coverage may lead to switching or demoting. Therefore, excessive optimism is likely to appear in the MLU-affiliated analyst coverage, in the strengthened form of the classic affiliated optimism due to the new syndicate structure that generates further competition. We label this view as the conflict of interest hypothesis. Under this hypothesis, we expect MLU-affiliated analyst coverage to have higher optimism but inferior investment value because these analysts are optimistic for reasons not driven by information relevant to investment quality.

2.2.2. Reputation Upholding Hypothesis

In the presence of increased competition, MLU analysts may not be unjustly optimistic to uphold their reputation while providing more accurate and informative coverage because these investment banks are on average more prestigious and possess more all-star analysts compared to co-managers [3,5]. Prestigious underwriters garner sizable rewards for “maintaining their reputation assets” [45]. Analyst optimism is negatively related to the investment bank’s reputation [46]. Bulge bracket investment banks with “loyal” clients would place less pressure on their analysts, and studies have shown that aggressive research coverage has a detrimental effect on winning future underwriting mandates [20]. Incentives to issue overly optimistic recommendations are usually higher cyclically in the hot IPO market with a high volume of deals [26–28], while the IPO market in our sample period is univocally considered cold. Competition reduces analysts’ bias in earnings forecasts [8]. Further, those reputable investment banks may have a sufficient market power to resist optimistic research pressure.

In addition to the incentive not to be biased at the investment bank level, individual analysts have an incentive to build and uphold their reputation in the industry for objectivity and predictability in their informational reports. Such reputation mechanism provides a force to suppress biased coverage.
The analysts in MLUs are in general more accomplished, prestigious and, therefore, deemed to have a greater incentive to uphold reputation. Enhanced reputation at the analyst level leads to favorable career outcomes such as being nominated as an all-star analyst and moving to a bulge bracket investment bank with higher compensation [6,47]. All-star analysts and more prestigious investment banks exhibit less aggressive analyst behavior [20]. They interpret these findings as evidence for the reputation upholding mechanism for analysts and investment banks and for the certification function of the banks. They also argue that winning future underwriting mandates are determined mostly by prior issuer–underwriter relationships and underwriter reputation rather than the degree of optimism in research coverage, which would moderate the analyst’s incentive to be aggressive. The findings in these studies overall suggest little incentive for affiliated analysts to be biased.

Given that the investment banking industry is reputation-conscious [43] and the IPO market has significant information frictions, the credibility of investment banks becomes more important, as theory suggests, and more prestigious underwriters would be more sensitive to being biased to uphold their reputation they have built over time. To maintain all-star status, prestigious analysts have a stronger incentive to reveal their negative opinions on recommendations [20]. Also, more active access to management with more lead underwriters is likely to result in superior information as prior literature finds that lead underwriters have information advantage about the issuer with complementary or non-overlapping information skillsets of the multiple lead underwriters [48].

In times of scarce IPO deals, securing future deals becomes more important for the investment bank. Competition reduces bias [8] and mitigates the degree of optimism in the lead underwriter affiliated analyst coverage, but not in the co-manager affiliated coverage [49]. In the corporate debt offerings, there is a pro-competitive effect of the increased competition by the commercial bank entry into the debt underwriting market on underwriter spreads and yield spreads [50]. This strand of literature overall indicates that bank-level and analyst-level reputation can reduce analyst optimism in a bearish IPO market. Informativeness can also be improved, given more resources, access to management, and superior analysts in MLUs. We label this view as the reputation upholding hypothesis. Under this view, we expect superior investment value while analyst coverage is not more optimistic. For the same recommendation rating or change, we expect higher investment value in MLU LU recommendations.

It is not clearly predictable ex ante whether MLU-affiliated recommendations are more optimistic or more informative. Further, we cannot directly observe analysts’ motivations and incentives. Most analysts face a tradeoff between generating economic profits and career concerns in their coverage decisions. What we observe in the tests for optimism, immediate market reactions, and calendar time portfolio would be the net effect of these two offsetting forces in analyst behavior: pursuing potential economic benefits by potentially jeopardizing reputational capital vs. upholding analyst-level and bank-level reputation [12]. They find that even all-star analysts were more aggressive during the bubble period where economic incentives would have been much greater than the reputation upholding incentive. If an investment bank’s potential benefits are relatively larger for being optimistic than for being timely and informative, we will observe conflicted research coverage. Otherwise, more informative coverage will emerge in the aftermarket.

3. Data, Variable Descriptions, and Descriptive Statistics

3.1. Data and Sample

One of the major information sources for investors for newly public firms is recommendations. Unlike earnings forecasts, they provide explicit trading information- through rating levels and the recommendations in the first year after the IPO would have the largest price impact given that no prior public information is readily available. Compared to earnings forecasts, recommendations can be affected by multi-faceted incentives such as investment banking deal flows and trade/commission generation. Affiliated recommendations are more optimistic, but such optimism is not revealed in earnings forecasts [9]. This is in part because earnings forecasts can be verified in an objective manner, while recommendations cannot [42]. Without an indisputably reasonable benchmark or
reference return, assessing performance and bias could be highly controversial, which makes detecting bias difficult and complicated. Retail investors dominantly use recommendations for investment decision, and they do not properly adjust their reactions to biased analyst coverage, reacting literally to ratings [51]. Therefore, recommendations are more likely geared towards unsophisticated investors. Further, recommendations have more economic incentives to be biased. For these reasons, we focus on recommendations by examining optimism and investment value in order to capture whether and to what extent MLU-affiliated analysts with increased competition contribute to the information efficiency and functionality of the financial markets.

We begin our sample construction with Thomson Financial’s SDC New Issue database. We initially extract 3135 IPOs from 2001 to 2010. We begin from 2001 because MLU IPOs became significantly visible since 2001. Only US IPOs are included in our sample. Consistent with most research in the IPO literature, we exclude limited partnerships, closed-end funds, units, and real estate investment trusts. SDC has incorrect information for some IPOs, such as listing a few firms twice and inconsistent lists of manager roles. We deleted these duplicates. To resolve this listing inconsistency, we also manually checked the information on underwriter names and roles with the Edgar system on http://www.sec.gov by looking at section “Underwriting” or “Underwriters” of the S-1/A filings because the accuracy of underwriter roles is critical to the credibility of our results. The final sample includes 756 IPOs.

Analyst recommendations data are extracted from Thomson Financial Institutional Brokers’ Estimate System (I/B/E/S) from 2001 to 2011. Earnings forecasts data for analyst experience are also obtained from the I/B/E/S Detail History files. Consistent with earlier studies, we consider recommendations for one year after each IPO in our analysis. The number of recommendations for 756 IPOs is 6950 for the 2001–2011 period. All-star analyst data are obtained from the October issues of Institutional Investor. The All-American Research Team lists these all-star analysts each year.

We obtain aftermarket daily stock prices from 2001 to 2012 from the Center for Security Prices (CRSP) database in order to calculate periodic returns. For each recommendation, we monitor one-year price drifts. For a recommendation issued on 31 December 2011 for an IPO that went public on December 2010, we need stock prices from 31 December 2011 to 31 December 2012. Hence, our stock prices are from January 2001 to December 2012.

3.2. Variable Descriptions

For the rating tiers, we reverse the original coding of the recommendation levels in I/B/E/S for more intuitive interpretation, so that Strong Buy = 5, Buy = 4, Hold = 3, Sell (Underperform) = 2, and Strong Sell = 1. We define OPT (PESS) as an indicator variable that takes the value of one when a recommendation has a rating of Strong Buy or Buy (Underperform or Sell).

In our estimations, MLULUdummy is our key variable of interest because our main question is how the competition between lead underwriters affects their analyst behavior. It is an indicator variable that takes the value of one if a recommendation is issued by an analyst affiliated with the lead underwriter in the MLU IPO and zero otherwise.

We add following control variables to the estimation that are found in the literature to impact analyst accuracy and optimism: Ln(Analyst Firm Size), Ln(Analyst Experience), Issuer Size, All-Star Analyst, Prior Six Months Return, and VC-backed. Among these variables, Ln(Analyst Firm Size), Ln(Analyst Experience), All-Star Analyst, and Reputation serve as the proxies for analyst innate ability which is an unobserved variable [52].

Ln(Analyst Firm Size) is the natural logarithm of analyst firm size where Analyst Firm Size is the number of analysts in an underwriter is defined as the total number of analysts appeared in I/B/E/S for the underwriter to which an analyst belongs in the year of recommendation. Larger investment banks tend to have greater resources that enable analysts to generate more accurate recommendations and would be more reputation sensitive in terms of analyst optimism [6,41,53]. Larger investment banks have closer ties to the management of the firm, which would lead to more informative recommendations [53].

Ln(Analyst Experience) is the natural logarithm of analyst experience where Analyst Experience is measured in days in I/B/E/S (= a recommendation date by an analyst minus the date that the analyst
first appeared in I/B/E/S). Issuer Size is the natural logarithm of the market capitalization where the market capitalization is the product of the closing price and the number of shares outstanding on the 25th trading day. We use market cap as a proxy for firm size since it is market oriented and forward looking. Among other proxies of firm size, total assets represent the total resource of firms and total sales which is not forward-looking matters on the product market. The degree of information on the firm for analysts can be captured by the firm size and small firms have a greater initial price reaction to recommendations than do large firms. Further, larger firms tend to receive more coverage. All-Star Analyst is an indicator variable that takes the value of one if a recommendation is issued by an analyst nominated as an all-star analyst in the prior year of the IPO. This variable is included to capture the differential degree of the investors’ belief towards the informativeness in analyst coverage. Analyst reputation is related to the quality of the research coverage. All-star recommendations have larger abnormal returns and less optimism. An incentive for reputation building is stronger for all-star analysts who are known to have greater incentives to reveal negative information about the firm. All-star coverage increases investment banking deal flows, which would affect investment banks’ incentives to pressure their all-star analysts. Given that objective recommendations with investment value are critical to being nominated to the all-star teams, it is highly plausible for reputable analysts to reveal negativity in their reports. Reputation is the lead underwriter’s reputation obtained from Jay Ritter’s webpage. The average of the lead underwriters’ reputations is used for MLU IPOs. Prior Six Months Return is the cumulative market return for six months prior to each recommendation. Analysts tend to follow momentum in issuing recommendations and, therefore, we control for the prior market condition. VC-backed is an indicator variable that takes the value of one if an IPO is venture capital (VC) backed and zero otherwise. Analyst optimism would be influenced by market conditions and industries. In times of high issuance activity, the objectivity of analyst coverage is more likely tainted. To account for these factors, we include year and industry indicator variables. Industry fixed effects are constructed by the Fama-French 49-industry classification. We obtain the industry classification data from Kenneth French’s website [54].

Finally, in order to control for the endogenous relationship between MLULU-affiliated recommendations and their investment value, we introduce two instrumental variables—annual percentage and industry percentage of MLULURecs. The former (latter) is defined as the annual (industrial) average ratio of the number of recommendations issued by MLULU-affiliated analysts to the total number of recommendations. These variables are highly correlated with the first stage dependent variable (MLUdummy) but concurrently are not related to the main dependent variable in the second stage (Rating Tiers).

3.3. Sample Characteristics

3.3.1. Sample IPO Characteristics

Table 1 shows our IPO sample characteristics. The number of IPOs and proceeds by year are reported in Panel A. Compared to 1990s, the number of IPOs is quite smaller for all our sample years [10]. The number reached all-time low of 15 in 2008 and 34 in 2009, which coincides with the financial crisis. Although we have three-digit IPOs from 2004 to 2007, they all are even less than half of the minimum number of IPOs in 1990s, which reflects the bearish IPO market condition. The fraction of MLU IPOs was 17% in 2001 and its fraction consistently increased over time. In 2005, the fraction reached over 50% for the first time (52% MLU IPOs). In the last two years of our sample, we had 85% or more MLU IPOs. Since 2005, hiring MLUs is evidently the dominant choice in IPOs. Offer proceeds in 2001 were $303 million USD, but they plunged from 2002 and fluctuated with no established pattern until 2008. The proceeds made a big jump in 2009 and 2010 ($338 million USD and $382 million USD, respectively). The average size of the MLU IPOs is approximately three times bigger than that of the SLU IPOs ($293 million USD vs. $107 million USD). Except 2008, MLU IPOs were two times or more than two times bigger than SLU IPOs. In 2010 MLU IPOs were on average 5.5 times bigger ($437 million USD vs. $78.9 million USD). MLU IPOs are greater in size.
Table 1. Initial public offering (IPO) sample characteristics. Panel A shows the yearly breakdown of our sample IPOs. The sample includes 756 IPOs from 2001 to 2010 obtained from Security Data Company (SDC) Platinum Global New Issues database. MLU stands for multiple lead underwriter. SLU stands for single lead underwriter. Offer proceeds are the global number of shares times the offer price net of any overallotment option. Panel B reports IPO and analyst related characteristics. LUs stands for lead underwriters. CMs stands for co-managers. Underwriter Reputation is the lead underwriter’s reputation obtained from Jay Ritter’s webpage. The average of the lead underwriters’ reputations is used for MLU IPOs. VC-backed is an indicator variable that takes the value of one if an IPO is venture capital (VC) backed and zero otherwise. No. of Institutional Investors is the number of institutional investors from the Institutional Holdings (13f) database. Institutional Ownership is the fraction of shares owned by institutional investors from the 13f database. Hi-tech is an indicator variable that takes the value of one if an IPO’s SIC code belongs to the SIC codes for tech stocks in [35] and zero otherwise. NYSE, AMEX, and Nasdaq are the IPOs issued in each exchange. Analyst Experience is first measured in days in I/B/E/S ( = a recommendation date by an analyst minus the date that the analyst first appeared in I/B/E/S) and then converted in years. No of Firms Followed is the number of firms that an analyst issues at least one recommendation for a given calendar year.

Panel A. Number of IPOs and Offer Proceeds by Year

|       | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | Total |
|-------|------|------|------|------|------|------|------|------|------|------|-------|
| All IPOs | 58   | 48   | 46   | 131  | 114  | 122  | 123  | 15   | 34   | 65   | 756   |
| MLU IPOs | 10   | 11   | 13   | 49   | 59   | 66   | 69   | 11   | 30   | 55   | 373   |
| (17%)   | (23%)| (28%)| (37%)| (52%)| (54%)| (56%)| (73%)| (88%)| (85%)| (8%)  | (49%) |
| SLU IPOs | 48   | 37   | 33   | 82   | 55   | 56   | 54   | 4    | 4    | 10   | 383   |
| (83%)   | (77%)| (72%)| (63%)| (48%)| (46%)| (44%)| (27%)| (12%)| (15%)| (51%)|       |

Panel B. IPO and Analyst Characteristics

|                   | All     | MLUs    | SLUs    | t-Test |
|-------------------|---------|---------|---------|--------|
|                   | Mean    | SD      | Median  | Mean   | SD      | Median  | Mean   | SD      | Median  | MLUs vs. SLUs |
| IPO Characteristics|         |         |         |        |         |         |        |         |         |        |
| Number of LUs     | 1.69    | 0.9     | 1       | 2.4    | 0.81    | 2       | 1      | 0       | 1       | (33.72) ***|
| Number of CMs     | 3.17    | 2.65    | 3       | 3.29   | 2.45    | 3       | 3.05   | 2.8     | 3       | (1.25)  |
| Underwriter Reputation | 7.92  | 1.82    | 7       | 8.26   | 1.76    | 7       | 7.59   | 1.83    | 7       | (4.83)  ***|
Table 1. Cont.

|                      | VC-backed   | 48%          | 38%          | 57%          | (−5.35) | ***    |
|----------------------|-------------|--------------|--------------|--------------|---------|--------|
| **No. of Institutional Investors** |             | 40.31        | 30.74        | 32           |         |        |
|                      |             | 31%          | 35.06        | 44           |         |        |
|                      |             | 49.11        | 31.89        | 26           |         |        |
|                      |             | 30.74        | 22.99        | 28%          | (7.62)  | ***    |
| **Institutional Ownership** |             | 41%          | 44%          | 34%          |         |        |
|                      |             | 0.24         | 0.25         | 0.22         |         |        |
|                      |             | 50%          | 38%          | 28%          | (3.19)  | ***    |
|                      |             | 31%          | 44%          | 44%          | (−4.49) | ***    |
|                      |             |              |              |              | (−4.91) | ***    |
|                      |             |              |              |              | (9.41)  | ***    |
| **Hi-tech**          |             | 58%          | 50%          | 66%          |         |        |
|                      |             |              | 44%          |              |         |        |
|                      |             |              | 34%          |              |         |        |
|                      |             |              | 38%          |              |         |        |
|                      |             |              |              |              | (−1.23) | ***    |
|                      |             |              |              |              | (−8.88) | ***    |
| **NYSE**             |             | 28%          | 43%          | 14%          | (9.41)  | ***    |
|                      |             |              |              |              |         |        |
|                      |             |              |              |              |         |        |
|                      |             |              |              |              |         |        |
| **AMEX**             |             | 2%           | 2%           | 2%           |         |        |
|                      |             |              |              |              | (−1.23) | ***    |
| **Nasdaq**           |             | 70%          | 56%          | 84%          |         |        |
|                      |             |              |              |              | (−8.88) | ***    |
| **Analyst Characteristics** |             | 31.89        | 22.99        | 26           |         |        |
| **Analyst Experience** |             | 26           | 28%          | 38%          | (−5.35) | ***    |
|                      |             | 26           | 28%          | 38%          |         |        |
|                      |             | 26           | 28%          | 38%          |         |        |
|                      |             | 26           | 28%          | 38%          |         |        |
| **No of Firms Followed** |             | 4            | 4            | 4            | (−1.09) | ***    |

*, **, *** indicate significance levels at the 10%, 5%, and 1%, respectively. Panel B of Table 1 reports IPO and analyst characteristics of our sample. Compared to SLU IPOs, MLU IPOs on average have 1.4 more lead underwriters (2.4 vs. 1), 0.24 more co-manager (3.29 vs. 3.05), were more prestigious (8.26 vs. 7.59), had 19% less VC-backing (38% vs. 57%), 17.22 more institutional investors (49.11 vs. 31.89), and 6% more institutional ownership (44% vs. 38%). All these differences are significant at the 1% level based on t-tests, except the number of co-managers. VC-backed IPOs heavily invest in technology-intensive firms [56]. Given that MLU IPOs have a smaller fraction of Hi-tech IPOs (50% vs. 66%), it is plausible that MLU IPOs are less likely VC-backed. While SLU IPOs are dominantly listed in the Nasdaq (84%), MLU IPOs are split between NYSE (43%) and Nasdaq (56%). MLU-affiliated analysts are on average 0.27 year more experienced (or equivalently 98.55 days more) (7.18 vs. 6.91) and follow 1.75 less firms in a year (10.56 vs. 12.31).
3.3.2. Descriptive Statistics on Analyst Recommendations

Table 2 provides summary statistics of our sample recommendations. Based on all recommendations, Panel A shows the yearly breakdown and MLU vs. SLU classification of recommendation rating levels. Consistent with prior literature, majority of the recommendations are centered on Strong Buy and Buy ratings. When we combine Strong Buy and Buy (Underperform and Sell), the fraction of these ratings range 56.10% to 91.26% (0.49% to 5.96%). Strong Buy and Buy substantially decrease in the neighborhood of the changes in the regulatory environment regarding the disclosure requirements such as NASD Rule 2711, NYSE Rule 472, and the Global Settlement while Hold, Underperform, and Sell increase. The fraction of Strong Buy and Buy in 2001 was 91.26% but it dropped to 75% in the subsequent year and further all the way down to 56.1% in 2006. On the other hand, the fraction of Underperform and Sell was 0.49% in 2001, and it jumped to 2.72% in 2002 and up to 5.96% in 2006. Although Underperform and Sell experience a huge increase, they still comprise just a small fraction after the regulatory changes. However, Hold rating showed a substantial increase from 8.25% in 2001 to 22.28% in 2002 and stayed 28.37% or higher in all subsequent years. MLU IPOs consistently issued less Strong Buy and Buy (22.68% vs. 26.96% and 37% vs. 39.13%, respectively), and more Hold, Underperform, and Sell (35.58% vs. 31.15%, 2.4% vs. 2.05%, and 2.29% vs. 0.7%, respectively), suggesting that MLU recommendations, MLURecs, are relatively pessimistic compared to SLU ones, SLURecs.

Panel B of Table 2 is based on all-star recommendations only. Compared to an average analyst in our sample, all-star analysts on average issue more Buy, Hold, and Underperform (44.59% vs. 37.91%, 38.66% vs. 33.68%, 4.9% vs. 2.27%, respectively) while issuing less Strong Buy and Sell (11.34% vs. 24.52% and 0.52% vs. 1.61%, respectively). In comparison of MLURecs and SLURecs, Buy rating is more frequent for MLU all-star analyst coverage while all the other ratings are less frequent. MLURecs (SLURecs) have 47.33% (40%) for Buy rating. Both MLURecs and SLURecs have substantially lower ratings for Strong Buy than sample average (9.47% and 14.48%, respectively, vs. 24.52%).
Table 2. Descriptive statistics on analyst recommendations. IPO recommendations data are from I/B/E/S, and all-star analyst are identified from the October issues of Institutional Investor. The sample includes 756 IPOs from 2001 to 2010 obtained from Security Data Company (SDC) Platinum Global New Issues database. For each IPO, we consider recommendations issued up to one year after the IPO date. Therefore, our recommendations data range from 2001 to 2011. The I/B/E/S recommendations rating system has five tiers—Strong Buy, Buy, Hold, Underperform, and Sell. Panel A shows the yearly composition and rating tiers by IPO type. MLURecs (SLURecs) is the recommendations by analysts affiliated with multiple lead underwriter (MLU) IPOs (single lead underwriter (SLU) IPOs). For an easier exploration, the percentage of each recommendation tier is reported instead of the number of recommendations. The number of recommendations can be obtained by multiplying the percentage and Yearly Total in the year of interest. Panel B presents the classifications of all-star analyst recommendations based on MLURecs and SLURecs for each rating tier.

Panel A. Rating Tiers by Year and by IPO Type: All Recommendations

| Year | Strong Buy | Buy | Hold | Under-Perform | Sell | Yearly Total | Strong Buy + Buy | Under-Perform + Sell |
|------|------------|-----|------|---------------|------|--------------|-------------------|---------------------|
| 2001 | 48.06%     | 43.20% | 8.25% | 0.00% | 0.49% | 206 (2.96%)  | 91.26%            | 0.49%               |
| 2002 | 30.10%     | 44.90% | 22.28% | 2.21% | 0.51% | 588 (8.46%)  | 75.00%            | 2.72%               |
| 2003 | 27.04%     | 34.53% | 34.20% | 2.61% | 1.63% | 307 (4.42%)  | 61.56%            | 4.23%               |
| 2004 | 21.21%     | 35.86% | 38.76% | 3.03% | 1.14% | 792 (11.40%) | 57.07%            | 4.17%               |
| 2005 | 23.56%     | 35.87% | 38.08% | 1.92% | 0.58% | 1040 (14.96%)| 59.42%            | 2.50%               |
| 2006 | 19.88%     | 36.22% | 37.94% | 3.17% | 2.79% | 1041 (14.98%)| 56.10%            | 5.96%               |
| 2007 | 21.71%     | 39.51% | 34.23% | 2.36% | 2.20% | 1230 (17.70%)| 61.22%            | 4.55%               |
| 2008 | 23.91%     | 33.75% | 36.72% | 2.66% | 2.97% | 640 (9.21%)  | 57.66%            | 5.63%               |
| 2009 | 28.47%     | 35.94% | 32.38% | 1.42% | 1.78% | 281 (4.04%)  | 64.41%            | 3.20%               |
| 2010 | 26.93%     | 43.63% | 28.37% | 0.18% | 0.90% | 557 (8.01%)  | 70.56%            | 1.08%               |
| 2011 | 27.99%     | 35.82% | 31.72% | 3.36% | 1.12% | 268 (3.86%)  | 63.81%            | 4.48%               |

| MLURecs | 22.68% | 37.00% | 35.58% | 2.44% | 2.29% | 3968 (57.09%) | 59.68% | 4.74%               |
| SLURecs  | 26.96% | 39.13% | 31.15% | 2.05% | 0.70% | 2982 (42.91%) | 66.10% | 2.75%               |

| Total   | 1704   | 2635   | 2341   | 158   | 112   | 6950 (100%)  | 62.43% | 3.88%               |
| (%)     | (24.52%)| (37.91%)| (33.68%)| (2.27%)| (1.61%)| (100%)      |        |                    |

Panel B. Rating Tiers by IPO Type: All-Star Recommendations

| Year | Strong Buy | Buy | Hold | Under-Perform | Sell | Total | Strong Buy + Buy | Under-Perform + Sell |
|------|------------|-----|------|---------------|------|-------|-------------------|---------------------|
| 2001 | 44.59%     | 38.66% | 4.90% | 0.52% | 388   | 55.93% | 5.41%               |
| 2002 | 47.33%     | 38.27% | 4.12% | 0.82% | 243   | (62.63%)| 56.79%            | 4.94%               |
| 2003 | 40.00%     | 39.31% | 6.21% | 0.00% | 145   | (37.37%)| 54.48%            | 6.21%               |
3.3.3. Categorized Analyst Recommendations: All Recommendations

Recommendations are categorized into initiations, upgrades, downgrades, and reiterations in Table 3. In Panel A, all recommendations as well as MLURecs and SLURecs are classified into these four categories. The most frequent category is initiations: 67.68% for all recommendations (4704 of 6950 recommendations); 66.66% for MLURecs (2645 of 3968); and 69.05% for SLURecs (2059 of 2982). The proportion of initiation is 2.39% higher for SLURecs than for MLURecs, which is statistically significant at the 5% level. The other three categories hover around 10%. MLURecs are associated with more reiterations than SLURecs (10.21% vs. 8.28%).

Panel B of Table 3 reports the rating tiers by recommendation category. For initiations, the most dominant rating tier is Buy for All, MLURecs, and SLURecs. Overall, MLURecs appear to be a little bit pessimistic as in Table 1; MLURecs have a lower frequency for Strong Buy and Buy while having a higher frequency for Hold, Underperform, and Sell, which is in line with Panel A of Table 2. For upgrades, Strong Buy and Buy comprise about 80% for MLURecs and 91% for SLURecs, which also suggests relative pessimism in MLURecs. Strong Buy is the most dominant rating tier for both MLURecs and SLURecs (41.25% and 55%, respectively). For downgrades, Hold has the highest fraction for both groups; more than 70% of both MLURecs and SLURecs are downgraded to Hold. Downgrade to Sell is 11.58% for MLURecs while it is 2.39% for SLURecs, which is somewhat surprising. For reiterations, Buy and Hold are two most prevalent rating tiers and no recommendation is reiterated as Sell. A discernable difference is observed for Strong Buy; Strong Buy by SLURecs is approximately three times higher. Similar to Panel A of both Tables 2 and 3, Panel B overall suggests relative pessimism in MLURecs.
Table 3. Categorized analyst recommendations: Initiations, Upgrades, Downgrades, and Reiterations. The sample includes 756 IPOs from 2001 to 2010 obtained from Security Data Company (SDC) Platinum Global New Issues database. For each IPO, we consider recommendations issued up to one year after the IPO date. Therefore, our recommendations data range from 2001 to 2011. The I/B/E/S recommendations rating system has five tiers: Strong Buy, Buy, Hold, Underperform, and Sell. MLURecs (SLURecs) is the recommendations by analysts affiliated with multiple lead underwriter (MLU) IPOs (single lead underwriter (SLU) IPOs). Panel A categorizes analyst recommendations into four groups: initiations, upgrades, downgrades, and reiterations. Panel B shows distributions of rating tiers by each category. \( t \)-statistics are provided in parentheses for \( t \)-tests between MLURecs and SLURecs. *, **, *** indicate significance levels at the 10%, 5%, and 1%, respectively. In Panel B, we show rating tiers by MLURecs and SLURecs for each group of recommendation categories. Percentages are shown in parentheses for an easier overview.

### Panel A. Recommendation Categories.

|                  | Initiations | Upgrades | Downgrades | Reiterations | Total |
|------------------|-------------|----------|------------|--------------|-------|
| **All**          | 4704        | 717      | 877        | 652          | 6950  |
|                  | (67.68%)    | (10.32%) | (12.62%)   | (9.38%)      | (100%)|
| **MLURecs**      | 2645        | 417      | 501        | 405          | 3968  |
|                  | (66.66%)    | (10.51%) | (12.63%)   | (10.21%)     | (100%)|
| **SLURecs**      | 2059        | 300      | 376        | 247          | 2982  |
|                  | (69.05%)    | (10.06%) | (12.61%)   | (8.28%)      | (100%)|
| \( t \)-test (MLURecs vs. SLURecs) | (~2.11)** | (0.61) | (0.02) | (2.7)*** |       |

|                  | Initiations | Upgrades | Downgrades | Reiterations | Total |
|------------------|-------------|----------|------------|--------------|-------|
| All              | 1284        | 1924     | 1380       | 71           | 45    |
|                  | (27.30%)    | (40.90%) | (29.34%)   | (1.51%)      | (0.96%) |
| **MLURecs**      | 698         | 1050     | 818        | 46           | 33    |
|                  | (26.39%)    | (39.70%) | (30.93%)   | (1.74%)      | (1.25%) |
| **SLURecs**      | 586         | 874      | 562        | 25           | 12    |
|                  | (28.46%)    | (42.45%) | (27.29%)   | (1.21%)      | (0.58%) |
| \( t \)-test (MLURecs vs. SLURecs) | (~2.11)** | (0.61) | (0.02) | (2.7)*** |       |

|                  | Initiations | Upgrades | Downgrades | Reiterations | Total |
|------------------|-------------|----------|------------|--------------|-------|
| All              | 337         | 269      | 107        | 4            | 717   |
|                  | (47.00%)    | (37.52%) | (14.92%)   | (0.56%)      | (100%)|
| **MLURecs**      | 172         | 161      | 80         | 4            | 417   |
|                  | (41.25%)    | (38.61%) | (19.18%)   | (0.96%)      | (58.16%)|
| **SLURecs**      | 165         | 108      | 27         | 0            | 300   |
|                  | (55.00%)    | (36.00%) | (9.00%)    | (0.00%)      | (41.84%)|
Table 3. Cont.

| Downgraded to: | Strong Buy | Buy | Hold | Underperform | Sell | Total |
|----------------|------------|-----|------|--------------|------|-------|
| **All**        |            |     |      |              |      | 877   |
|                | 105        | 633 | 72   | 67           |      |       |
|                | (11.97%)   | (72.18%) | (8.21%) | (7.64%) | (100%) |       |
| **MLURec**     | 36         | 367 | 40   | 58           |      | 501   |
|                | (7.19%)    | (73.25%) | (7.98%) | (11.58%) | (57.13%) |       |
| **SLURec**     | 69         | 266 | 32   | 9            |      | 376   |
|                | (18.35%)   | (70.74%) | (8.51%) | (2.39%) | (42.87%) |       |

| Reiterated as: | Strong Buy | Buy | Hold | Underperform | Sell | Total |
|----------------|------------|-----|------|--------------|------|-------|
| **All**        |            |     |      |              |      | 652   |
|                | 83         | 337 | 221  | 11           | 0    |       |
|                | (12.73%)   | (51.69%) | (33.90%) | (1.69%) | (0.00%) | (100%) |
| **MLURec**     | 30         | 221 | 147  | 7            | 0    | 405   |
|                | (7.41%)    | (54.57%) | (36.30%) | (1.73%) | (0.00%) | (62.12%) |
| **SLURec**     | 53         | 116 | 74   | 4            | 0    | 247   |
|                | (21.46%)   | (46.96%) | (29.96%) | (1.62%) | (0.00%) | (37.88%) |

Panel B. Rating Tiers by IPO Type on Categorized Recommendations.
3.3.4. Lead Underwriter Affiliated Recommendations Only: MLUs vs. SLUs

Our main interest in this paper is to examine whether lead underwriter affiliated recommendations in MLU IPOs give rise to different analyst behavior driven by newly found competition between lead underwriters, compared to those in SLU IPOs. Therefore, we limit our attention to lead underwriter affiliated recommendations only in this section. Panel A of Table 4 shows rating tiers for all lead underwriter affiliated recommendations (AllLURecs) and lead underwriter-affiliated recommendations in MLU IPOs (MLULURecs) and in SLU IPOs (SLULURecs). Compared to Panel A of Table 2, AllLURecs have a much lower fraction of Strong Buy (14.43% vs. 24.52%), Underperform, and Sell while they show a higher percentage for Buy (47.89% vs. 37.91%) and Hold, which suggests that these affiliated recommendations tend to be conservative for buy recommendations but, however, these analysts are reluctant to issue sell recommendations. In comparison of MLULURecs and SLULURecs, conservatism is observed on the side of MLULURecs. MLULURecs have a lower rating frequency for Strong Buy (13.03% vs. 18.04%) while they have consistently a higher frequency for all the other rating tiers. When combining Strong Buy and Buy, we observe about 4% difference between the two groups (61.26% vs. 65.03%). Overall results are consistent with the notion that MLULURecs exhibit relative pessimism or conservatism compared to SLULURecs and to all the other recommendations.

All-star recommendations by rating tiers are reported in Panel B of Table 4. Compared to Panel A, affiliated all-star analysts have fewer Strong Buy with more Buy ratings (12.08% and 52.17%, respectively). In comparison of MLULURecs and SLULURecs, MLULURecs are more bipolarized in the rating spectrum system. MLULURecs have more buy (Strong Buy and Buy) and sell (Underperform and Sell) recommendations while having less Hold recommendations. Strong Buy and Buy (Underperform and Sell) are 64.78% (5.03%) for MLULURecs and 62.5% (2.08%) for SLULURecs. All-star analyst behavior exhibits quite the opposite picture to that of Panel A.

Panel C shows results based on categorized recommendations. What is immediately noticeable in the panel is that reiterations only are more frequent for AllLURecs, MLULURecs, and SLULURecs when compared to all recommendations in Panel A of Table 3. Reiterations would attract investors’ attention but have no incremental information in terms of investment value from the previous recommendations. The other three categories have consistently lower frequencies. In comparison of MLULURecs and SLULURecs, MLULURecs are associated with more initiation and reiteration—significant at the 5% level, respectively—and less downgrades—significant at the 1% level. Although MLULURecs have a lower frequency of upgrades, the difference is not statistically meaningful. Such differences imply that MLULURecs are more willing to issue recommendations (initiations and reiterations) but reluctant to downgrade, suggesting that MLULURecs are more supportive for the issuer. More analyst coverage tends to increase the investor base [57] and raise the recognition of the issuer’s presence in the market. The importance of analyst coverage has increased over time [55]. Analyst coverage is valuable to the issuer and, given the prevalent analyst optimism in affiliated analyst coverage documented in the literature [34,35], more initiations and reiterations with less downgrades should do nothing but support the issuer. Panel D of Table 4 has qualitatively the same story told in Panel C. MLULURecs are conservative but supportive: rating frequencies are generally skewed downward but with less propensity to issue low ratings.
Table 4. MLU vs. SLU recommendations: lead underwriter affiliated recommendations only. This table use lead underwriter affiliated recommendations only. IPO recommendations data are from I/B/E/S and all-star analyst are identified from the October issues of Institutional Investor. The sample includes 756 IPOs from 2001 to 2010 obtained from Security Data Company (SDC) Platinum Global New Issues database. For each IPO, we consider recommendations issued up to one year after the IPO date. Therefore, our recommendations data range from 2001 to 2011. The I/B/E/S recommendations rating system has five tiers: Strong Buy, Buy, Hold, Underperform, and Sell. AllLURecs is the recommendations by all lead underwriter affiliated analysts from both MLU and SLU IPOs. MLULURecs (SLULURecs) is the recommendations by analysts affiliated with the lead underwriter(s) in multiple lead underwriter (MLU) IPOs (single lead underwriter (SLU) IPOs). For an easier exploration, the percentage of each recommendation tier is reported instead of the number of recommendations. The number of recommendations can be obtained by multiplying the percentage and Total. Panel A shows rating tiers by IPO type. Panel B presents the classifications of all-star analyst recommendations based on MLULURecs and SLULURecs for each rating tier. Panel C categorizes analyst recommendations into four groups: initiations, upgrades, downgrades, and reiterations. Panel D shows distributions of rating tiers by each category. t-statistics are provided in parentheses for t-tests between MLULURecs and SLULURecs. *, **, *** indicate significance levels at the 10%, 5%, and 1%, respectively. In Panel B, we show rating tiers by MLULURecs and SLULURecs for each group of recommendation categories. Percentages are shown in parentheses for an easier overview.

|                | Strong Buy | Buy       | Hold       | Under-Perform | Sell      | Total | Strong Buy + Buy | Under-Perform + Sell |
|----------------|------------|-----------|------------|---------------|-----------|-------|------------------|----------------------|
| AllLURecs      | 14.43%     | 47.89%    | 35.32%     | 1.74%         | 0.62%     | 1608  | 62.31%           | 2.36%                |
| MLULURecs      | 13.03%     | 48.23%    | 36.07%     | 1.90%         | 0.78%     | 1159  | (72.08%)        | 61.26%               |
| SLULURecs      | 18.04%     | 46.99%    | 33.41%     | 1.34%         | 0.22%     | 449   | (27.92%)        | 65.03%               |

Panel A. Rating Tiers by IPO Type: All Lead Underwriter Affiliated Recommendations.

|                | Strong Buy | Buy       | Hold       | Under-Perform | Sell      | Total | Strong Buy + Buy | Under-Perform + Sell |
|----------------|------------|-----------|------------|---------------|-----------|-------|------------------|----------------------|
| AllLURecs      | 12.08%     | 52.17%    | 31.40%     | 3.86%         | 0.48%     | 207   | 64.25%           | 4.35%                |
| MLULURecs      | 11.32%     | 53.46%    | 30.19%     | 4.40%         | 0.63%     | 159   | (76.81%)        | 64.78%               |
| SLULURecs      | 14.58%     | 47.92%    | 35.42%     | 2.08%         | 0.00%     | 48    | (23.19%)        | 62.50%               |

Panel B. Rating Tiers by IPO Type: Lead Underwriter Affiliated All-Star Recommendations.

|                | Initiations | Upgrades | Downgrades | Reiterations | Total |
|----------------|-------------|----------|------------|--------------|-------|
| AllLURecs      | 1031 (64.12%) | 98 (6.09%) | 170 (10.57%) | 309 (19.22%) | 1608 (100%) |
| MLULURecs      | 748 (64.54%) | 67 (5.78%) | 106 (9.15%) | 238 (20.53%) | 1159 (100%) |
| SLULURecs      | 283 (63.03%) | 31 (6.90%) | 64 (14.25%) | 71 (15.81%) | 449 (100%) |

Panel C. Recommendation Categories of Lead Underwriter Affiliated Recommendations.
Table 4. Cont.

### Initiated as:

|                | Strong Buy | Buy   | Hold   | Underperform | Sell  | Total |
|----------------|------------|-------|--------|--------------|-------|-------|
| AllLURecs      | 189        | 505   | 329    | 6            | 2     | 1031  |
|                | (18.33%)   | (48.98%) | (31.91%) | (0.58%)  | (0.19%) | (100%) |
| MLULURecs      | 124        | 363   | 253    | 6            | 2     | 748   |
|                | (16.58%)   | (48.53%) | (33.82%) | (0.80%)  | (0.27%) | (72.55%) |
| SLULURecs      | 65         | 142   | 76     | 0            | 0     | 283   |
|                | (22.97%)   | (50.18%) | (26.86%) | (0.00%)  | (0.00%) | (27.45%) |

### Upgraded to:

|                | Strong Buy | Buy   | Hold   | Underperform | Sell  | Total |
|----------------|------------|-------|--------|--------------|-------|-------|
| AllLURecs      | 30         | 60    | 8      | 0            | 0     | 98    |
|                | (30.61%)   | (61.22%) | (8.16%) | (0.00%)  | (0.00%) | (100%) |
| MLULURecs      | 20         | 40    | 7      | 0            | 0     | 67    |
|                | (29.85%)   | (59.70%) | (10.45%) | (0.00%)  | (0.00%) | (68.37%) |
| SLULURecs      | 10         | 20    | 1      | 0            | 0     | 31    |
|                | (32.26%)   | (64.52%) | (3.23%) | (0.00%)  | (0.00%) | (31.63%) |

### Downgraded to:

|                | Strong Buy | Buy   | Hold   | Underperform | Sell  | Total |
|----------------|------------|-------|--------|--------------|-------|-------|
| AllLURecs      | 17         | 127   | 18     | 8            | 0     | 170   |
|                | (10.00%)   | (74.71%) | (10.59%) | (4.71%)  | (0.00%) | (100%) |
| MLULURecs      | 6          | 80    | 13     | 7            | 0     | 106   |
|                | (5.66%)    | (75.47%) | (12.26%) | (6.60%)  | (0.00%) | (62.35%) |
| SLULURecs      | 11         | 47    | 5      | 1            | 0     | 64    |
|                | (17.19%)   | (73.44%) | (7.81%) | (1.56%)  | (0.00%) | (37.65%) |

### Reiterated as:

|                | Strong Buy | Buy   | Hold   | Underperform | Sell  | Total |
|----------------|------------|-------|--------|--------------|-------|-------|
| AllLURecs      | 13         | 188   | 104    | 4            | 0     | 309   |
|                | (4.21%)    | (60.84%) | (33.66%) | (1.29%)  | (0.00%) | (100%) |
| MLULURecs      | 7          | 150   | 78     | 3            | 0     | 238   |
|                | (2.94%)    | (63.03%) | (32.77%) | (1.26%)  | (0.00%) | (77.02%) |
| SLULURecs      | 6          | 38    | 26     | 1            | 0     | 71    |
|                | (8.45%)    | (53.52%) | (36.62%) | (1.41%)  | (0.00%) | (22.98%) |

Panel D. Rating Tiers by IPO Type on Categorized Lead Underwriter Affiliated Recommendations.
4. Results and Discussion

In this section, we explore the analyst behavior in the MLU LU affiliated recommendations (MLULURecs). To assess to what extent the competition between LUs in MLU IPOs affects analyst behavior, we focus especially on analyst optimism and investment value of these recommendations. We first examine whether MLULURecs are more optimistic and then whether they are supported by post-recommendation outcomes—investment value. We consider investment horizons from several days up to one year because analysts do not set any specific time horizon for which their recommendations can be good in investment value. The assessment of the investment value is based on two approaches: short-term abnormal returns using immediate market reactions—three- to 10-day event windows—and mid-term abnormal returns using the calendar time portfolio approach—one month up to one year. There are several possible scenarios in terms of analyst optimism and investment value. Specifically, it would be consistent with the conflicts of interest hypothesis if MLULURecs are more optimistic but not supported in price responses ex post. It would support the reputation upholding hypothesis if MLULURecs are not more optimistic with higher investment value.

4.1. Analyst Optimism

When we use unaffiliated and SLU LU affiliated recommendations (SLULURecs) as our benchmark, our earlier results in Sections 3.3.2–3.3.4 suggest that MLULURecs are relatively pessimistic but supportive for the issuer. Even though these univariate analyses reveal pessimism on MLULURecs, a limitation is present in these analyses. Univariate analysis does not take into account critical factors such as firm-, analyst-, industry-, and year-specific information in each recommendation. To address such potential shortcomings, we examine analyst optimism issue in the multivariate framework after accounting for factors that may affect analyst accuracy and optimism.

To investigate whether MLULURecs are more optimistic in the multivariate framework, we estimate the ordered probit model with rating tiers as its dependent variable. As aforementioned, we reverse the original coding of the recommendation levels in I/B/E/S so that Strong Buy = 5, Buy = 4, Hold = 3, Sell (Underperform) = 2, and Strong Sell = 1. We also attempt to control for a potential endogeneity of the choice of MLULU by estimating the treatment effects regressions. To obtain the robust estimators, we cluster standard errors at the IPO level while allowing correlation among recommendations within the IPO. This clustering will allow correlation within IPOs, but observations will be independent across IPOs, which will incorporate firm-specific information such as IPO firm’s quality into the estimations [58]. In order to see the effect of regulatory changes on analyst behavior, we also perform sub-sample analysis by bifurcating our whole sample period into January 2001 to August 2002 (Pre-Reg) and September 2002 to December 2011 (Post-Reg). In addition, since our main interest is the behavioral differences of lead underwriter affiliated analysts between MLU and SLU IPOs, MLULURecs vs. SLULURecs, we estimate using lead underwriter recommendations only in the even-numbered models of Table 5.

Table 5 reports the results of the ordered probit estimations (OPM) and treatment effects models (TEM). OPM(1), TEM(1), OPM(3), TEM(3), OPM(5), and TEM(5) use all recommendations (All Recs), while the other even-numbered models use lead underwriter affiliated recommendations (LU Recs Only) only for analysis. In these even-numbered models, we compare MLU and SLU lead underwriter–affiliated recommendations. Coefficients for MLULUdummy are negative for models OPM(1) and OPM(5) and positive for all the other models. However, all these coefficients are not statistically significant. In the treatment effects regressions, coefficients for MLULUdummy are significantly negative for models TEM(1) and TEM(5), but they are insignificant for all the other models. In Table 5, we fail to find evidence for the existence of analyst optimism in MLU-affiliated recommendations. In fact, consistent with our earlier univariate sorts in Tables 2–4 suggesting MLU pessimism, MLULU provides less optimistic recommendations in the All Recs sample.
Table 5. Test for analyst optimism. This table reports the results of the ordered probit estimations (OPM) and treatment effects models (TEM). The dependent variable is rating tiers. For more intuitive interpretation, we reverse the original coding of the rating tiers in I/B/E/S so that Strong Buy = 5, Buy = 4, Hold = 3, Sell (Underperform) = 2, and Strong Sell = 1. We split our sample into Pre-Reg (pre-September 2002) and Post-Reg (post-September 2002). OPM(1), TEM(1), OPM(3), TEM(3), OPM(5), and TEM(5) use all recommendations (All Recs), while the other even-numbered models use lead underwriter affiliated recommendations (LU Recs Only) only for analysis. MLULUdummy is an indicator variable that takes the value of one if a recommendation is issued by an analyst affiliated with the lead underwriter in the MLU IPO and zero otherwise. Analyst Firm Size is the number of analysts in an underwriter is defined as the total number of analysts appeared in I/B/E/S for the underwriter to which an analyst belongs in the year of recommendation. Analyst Experience is measured in days in I/B/E/S (= a recommendation date by an analyst minus the date that the analyst first appeared in I/B/E/S. Issuer Size is the natural logarithm of the market capitalization where the market capitalization is the product of the closing price and the number of shares outstanding on the 25th trading day. All-Star Analyst is an indicator variable that takes the value of one if a recommendation is issued by an analyst nominated as an all-star analyst in the prior year of the IPO. Reputation is the lead underwriter’s reputation obtained from Jay Ritter’s webpage. The average of the lead underwriters’ reputations is used for MLU (multiple lead underwriter) IPOs. Prior Six Months Return is the cumulative market return for six months prior to each recommendation. VC-backed is an indicator variable that takes the value of one if an IPO is venture capital (VC) backed and zero otherwise. For the sake of simplicity, we do not tabulate coefficients on industry and year fixed effects indicator variables. Industry fixed effects are constructed by the Fama-French 49-industry classification. Standard errors for z-statistics are clustered at the IPO level to produce the robust estimators and are reported in parentheses. *, **, *** indicate significance levels at the 10%, 5%, and 1%, respectively.

| Dependent Variable: Rating Tiers | Pre-Reg 2001 to 2011 | Post-Reg Until August 2002 | Post-Reg After September 2002 |
|---------------------------------|----------------------|--------------------------|-----------------------------|
| All Sample Period               |                      |                          |                             |
| All Recs                        |                      |                          |                             |
| OPM(1)                          | −0.013               | −0.390                   | 0.065                       |
| TEM(1)                          | −0.76                | −0.43                     | −1.17                       |
| OPM(2)                          | −0.322               | 0.049                     | 0.491                       |
| TEM(2)                          | −0.86                | (1.51)                    | −0.26                       |
| OPM(3)                          | −0.010               | −0.358                    | 0.073                       |
| TEM(3)                          | −0.26                | (−0.82)                   | (−0.07)                     |
| MLULUdummy                      | −0.115               | −0.074                    | −0.220                      |
| Ln(Analyst Firm Size)           | −0.142               | −0.097                    | −0.005                      |
| Ln(Analyst Experience)          | −0.066               | 0.040                     | 0.155                       |
| LN(Issuer Size)                 | −0.006               | 0.040                     | 0.135                       |
| All-Star Analyst                | 0.042                | 0.030                     | 0.036                       |
| Reputation                      | −0.027               | −0.037                    | −0.227                      |
| Prior Six Months Return         | 0.027                | 0.017                     | 0.028                       |
| Mean                            | 0.065                | 0.049                     | 0.491                       |
| Median                         | −0.030               | −0.142                    | −1.18                       |
| Standard Deviation              | 0.26                 | 0.51                      | 0.94                        |


| LU Recs Only |                      |                          |                             |
| All Recs     |                      |                          |                             |
| OPM(4)       | −0.002               | −0.013                   | −0.010                      |
| TEM(4)       | −0.33                | −0.43                     | −1.17                       |
| OPM(5)       | −0.498               | 0.491                     | 0.491                       |
| TEM(5)       | (1.51)               | (−0.26)                   | (−0.07)                     |
| MLULUdummy   | −0.358               | −0.073                    | −0.227                      |
| Ln(Analyst Firm Size)           | −0.084               | −0.037                    | −0.028                      |
| Ln(Analyst Experience)          | −0.028               | 0.036                     | 0.023                       |
| LN(Issuer Size)                 | −0.099               | 0.211                     | (2.11)                      |
| All-Star Analyst                | 0.227                | 0.036                     | 0.036                       |
| Reputation                      | −0.108               | −0.084                    | −0.037                      |
| Prior Six Months Return         | −0.142               | −0.037                    | −0.028                      |
| Mean                            | 0.073                | 0.037                     | 0.028                       |
| Median                         | −0.030               | −0.142                    | −1.18                       |
| Standard Deviation              | 0.22                 | 0.51                      | 0.94                        |
### Table 5. Cont.

**Dependent Variable: Rating Tiers**

| Strong Buy = 5; Buy = 4; Hold = 3; Underperform = 2; Sell = 1 |
|---------------------------------------------------------------|
| All Sample Period Pre-Reg | Post-Reg |
| 2001 to 2011 | Until August 2002 | After September 2002 |
| All Recs | LU Recs Only | All Recs | LU Recs Only | All Recs | LU Recs Only |
| VC-backed | OPM(1) | TEM(1) | OPM(2) | TEM(2) | OPM(3) | TEM(3) | OPM(4) | TEM(4) | OPM(5) | TEM(5) | OPM(6) | TEM(6) |
| Inverse of Mill’s Ratio | | | | | | | | | | | | | |
| Intercept | 6.241*** | (10.82)*** | 5.671*** | (10.76)*** | 3.594*** | (2.65)*** | 0.984 | (0.49) | 6.396*** | (10.92)*** | 5.714*** | (11.69)*** |
| Industry Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Firm Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Pseudo R² | 0.0335 | 0.0788 | 0.0806 | 0.2225 | 0.0288 | 0.0676 |
| X² test | 413.89 | 219.71 | 59.78 | 23.04 | 314.27 | 169.41 |
| N | 6312 | 6205 | 1516 | 1511 | 419 | 410 | 73 | 73 | 5893 | 5875 | 1443 | 1438 |
The coefficients on Ln(Analyst Firm Size) and Ln(Analyst Experience) are negative and positive, respectively, although not significant in all models. These signs imply that leading investment banks measured by size are more reputation sensitive and their recommendations are relatively less optimistic, consistent with prior studies [8,41,53]. More experienced analysts tend to issue more optimistic recommendations during our sample period. All-Star Analyst and Reputation also have a negative coefficient in some of the models, suggesting that all-star analysts and analysts from prestigious investment banks are less optimistic. However, all these results on control variables are not very robust across models.

As a robustness check, we try two different dependent variables: three tier ratings and recommendation changes. Due to the regulatory changes in 2002, substantial investment banks switched from five-tier to three-tier rating system [33,36]. Recommendations under the three-tier rating scale are coded as {5, 3, 1} or as {4, 3, 2} for Buy, Hold, and Sell. For consistency and uniformity, we recode all recommendations into the three-tier scale by combining Strong Buy and Buy into Buy (coded as 3) and Underperform and Sell into Sell (coded as 1). We assign 2 to Hold. Prior literature indicates that recommendation changes are more informative and relevant to investment than their levels [30–32] while both the changes and levels have predictive value in generating investment returns [22]. We also construct a recommendation change variable by subtracting the previous rating tier from the current tier, which can range between −4 to +4.

Using these two alternative variables as a dependent variable, we run untabulated regressions with the same specifications in Table 5. Similar to the results on Table 5, we do not find any significant result from using these alternative dependent variables. The optimism test based on all these three measures suggests that there is no discernable optimism on the side of MLULURecs, in comparison to SLULURecs or other unaffiliated recommendations.

4.2. Short-Term Investment Value Based on Immediate Market Reactions

We examine immediate market reactions to capture short-term investment value using the cumulative abnormal returns (CARs) for various event windows, centered on the recommendation date. If investors think that MLULURecs are informative and credible, we should observe significant market responses. Otherwise, the market would discount these affiliated recommendations [35]. Therefore, in the absence of the conflict of interest, we expect that Strong Buy and Buy (Underperform and Sell) recommendations are associated with significantly positive (negative) price reactions. The market reaction to a recommendation is interpreted as informativeness and credibility in the sense that the recommendation has greater ability to move the price in the intended direction [7]. The CAR for a stock i is measured as

\[ CAR_{i}[-a, +b] = \sum_{i=-a}^{+b} (R_{it} - R_{mt}) \]  

where \( R_{it} \) is the date t return on stock i and \( R_{mt} \) is the date t return on the CRSP value-weighted market portfolio of NYSE, AMEX, and Nasdaq stocks.

Table 6 shows the ordinary least squares (OLS) and two-stage least squares (2SLS) estimations with CAR [−1, +1] as their dependent variable. We estimate 2SLS in order to control for the endogenous relationship between MLULUdummy and CARs. Our key independent variables of interest are OPT×MLULUdummy and PESS×MLULUdummy, which are interaction variables of OPT and PESS with MLULUdummy. OPT (PESS) is an indicator variable that takes the value of one when a recommendation has a rating of Strong Buy or Buy (Underperform or Sell). We include the same set of control variables as in Table 5 that are found in the literature to affect analyst behavior.
Table 6. Tests for Investment Value using Immediate Market Reactions. The table reports the results of the ordinary least square (OLS) and 2-stage least square (2SLS) estimations. The dependent variable is cumulative abnormal return (CAR) for the 3-day event window centered on the announcement date, CAR $[-1,+1]$ where $-1$ (+1) means 1 day before (after) the recommendation announcement date. OLS(1), 2SLS(1), OLS(3) and 2SLS(3) use all recommendations (All Recs) while the others use lead underwriter affiliated recommendations (LU Recs Only) only for analysis. OPT (PESS) is an indicator variable that takes the value of one when a recommendation has a rating of Strong Buy or Buy (Underperform or Sell). MLULUdummy is an indicator variable that takes the value of one if a recommendation is issued by an analyst affiliated with the lead underwriter in the MLU IPO and zero otherwise. Analyst Firm Size is the number of analysts in an underwriter is defined as the total number of analysts appearing in I/B/E/S for the underwriter to which an analyst belongs in the year of recommendation. Analyst Experience is measured in days in I/B/E/S ($=a$ recommendation date by an analyst minus the date that the analyst first appeared in I/B/E/S. Issuer Size is the natural logarithm of the market capitalization where the market capitalization is the product of the closing price and the number of shares outstanding on the 25th trading day. All-Star Analyst is an indicator variable that takes the value of one if a recommendation is issued by an analyst nominated as an all-star analyst in the prior year of the IPO. Reputation is the lead underwriter’s reputation obtained from Jay Ritter’s webpage. The average of the lead underwriters’ reputations is used for MLU (multiple lead underwriter) IPOs. Prior 6 Month Return is the cumulative market return for 6 months prior to each recommendation. VC-backed is an indicator variable that takes the value of one if an IPO is venture capital (VC) backed and zero otherwise. For the sake of simplicity, we do not tabulate coefficients on intercepts, and industry and year fixed effects indicator variables. Industry fixed effects are constructed by the Fama-French 49-industry classification. Standard errors for t-statistics are clustered at the IPO level to produce the robust estimators and are reported in parentheses. *, **, *** indicate significance levels at the 10%, 5%, and 1%, respectively.

|                  | All Recs |      |       |       | All Recs |      |       |
|------------------|----------|------|--------|--------|----------|------|--------|
|                  | OLS (1)  | 2SLS (1) | OLS (2) | 2SLS (2) | OLS (3) | 2SLS (3) | OLS (4) | 2SLS (4) |
| OPT×MLULUdummy   | 0.038    | ***   | 0.042  | ***   |
| (5.32)           |          |       | (5.44) |       |
| P(OPT×MLULUdummy)| 0.065    | ***   | 0.095  | ***   |
| (4.53)           |          |       | (3.70) |       |
| PESS×MLULUdummy  | -0.126   | ***   | -0.527 | ***   |
| (-3.83)          |          |       | (-6.99)|       |
| P(PESS×MLULUdummy)| 0.004   |       | 0.014  |       |
|                  | (0.93)   |       | (1.63) |       |
| MLULUdummy       | -0.023   | ***   | -0.017 | ***   |
| (-3.16)          |          |       | (-1.50)|       |
| P(MLULUdummy)    | -0.024   | **    | -0.053 | **    |
| (-2.09)          |          |       | (-2.09)|       |
| Ln(Analyst Firm Size) | -0.002 | ***   | 0.000  | ***   |
| (-0.26)          |          |       | (-0.07)|       |
| Ln(Analyst Experience) | 0.002  | **    | 0.000  | **    |
| (1.16)           |          |       | (-0.32)|       |
| Issuer Size      | 0.007    | **    | 0.007  | **    |
| (2.47)           |          |       | (1.25) |       |
| P(All-Star Analyst)| -0.011 | *    | -0.013 | *    |
| (-1.91)          |          |       | (-2.19)|       |
| All-Star Analyst | -0.009   | *     | -0.010 | *    |
| (-1.17)          |          |       | (-1.44)|       |

*Dependent Variable: CAR $[-1,+1]$
Table 6. Cont.

|                          | OLS (1) | 2SLS (1) | OLS (2) | 2SLS (2) | OLS (3) | 2SLS (3) | OLS (4) | 2SLS (4) |
|--------------------------|---------|----------|---------|----------|---------|----------|---------|----------|
| Reputation               | 0.000   | −0.001   | 0.007   | 0.008*** | 0.000   | −0.001   | 0.006   | *        |
|                          | (−0.04) | (−0.61)  | (2.34)  | (2.62)   | (−0.09) | (−0.92)  | (1.93)  | (1.99)   |
| Prior 6 Month Return     | 0.003   | 0.000    | 0.006   | 0.007    | 0.003   | 0.000    | 0.009   | 0.004    |
|                          | (0.15)  | (0.24)   | (0.28)  | (0.20)   | (0.02)  | (0.31)   | (0.17)  |          |
| VC-backed                | 0.006   | 0.007    | −0.007  | −0.007   | 0.006   | 0.006    | −0.007  | −0.006   |
|                          | (1.27)  | (1.40)   | (−0.94) | (−0.92)  | (1.24)  | (1.24)   | (−0.92) | (−0.86)  |
| Intercept                | −0.187  | ***      | −0.179  | ***      | −0.075  | −0.039   | −0.182  | ***      |
|                          | (−3.13) | (−2.99)  | (−0.92) | (−0.53)  | (−3.05) | (−2.98)  | (−0.60) | (−0.60)  |
| Industry Fixed Effect    | Yes     | Yes      | Yes     | Yes      | Yes     | Yes      | Yes     | Yes      |
| Year Fixed Effect        | Yes     | Yes      | Yes     | Yes      | Yes     | Yes      | Yes     | Yes      |
| Firm Fixed Effect        | Yes     | Yes      | Yes     | Yes      | Yes     | Yes      | Yes     | Yes      |
| N                        | 6158    | 6158     | 1449    | 1449     | 6158    | 6158     | 1449    | 1449     |
| F-tests                  | 3.07    | 3.21     |        | 2.63     | 3.5     |          |         |          |
| R2                       | 0.064   | 0.066    | 0.276   | 0.287    | 0.065   | 0.068    | 0.277   | 0.288    |
Note that MLULUdummy is potentially an endogenous variable, its interaction with OPT or PESS is also endogenous. With two endogenous variables, MLULUdummy and its interaction, we estimate two first-stage regressions in order to obtain the predicted values of them. We estimate the predicted value of MLULUdummy, \( P(\text{MLULUdummy}) \), by including all control variables in OLS regressions and two instrumental variables, annual percentage of MLULURecs and industry percentage of MLULURecs. The former (latter) is defined as the annual (industrial) average ratio of the number of recommendations issued by MLULU affiliated analysts (MLULURecs) to the total number of recommendations. We also estimate the predicted value of OPTxMLULUdummy or PESSxMLULUdummy by including two instruments interacted with OPT and PESS. We do not include Hold in the construction of PESS because investors should not buy or sell if this rating tier is taken literally. Although some analysts might use Hold in lieu of Underperform, Hold may truly mean Hold for other analysts. To create variables with less noise, we drop Hold from the construction of the variable, which should provide a cleaner separation between OPT and PESS.

Table 6 documents that, throughout model specifications, MLULU affiliated recommendations are significantly and positively correlated with CARs when they are optimistic but negatively correlated when pessimistic. In OLS (1) and 2SLS (1) of Table 6, the coefficients on OPTxMLULUdummy are 0.038 and 0.065, implying that MLULURecs with a rating of Strong Buy or Buy have a CAR of, on average, 3.8% (6.5%) more positive than all the other recommendations over the three-day event window. We tried several event windows such as \([-1, +3]\), \([-1, +5]\), and \([0, +2]\). All event windows show qualitatively same results with similar statistical significance. In OLS (2) and 2SLS (2) where only lead underwriter affiliated recommendations are used for analysis, OPTxMLULUdummy and its predicted value are significant with a positive sign, at the 1% level. These coefficients are not only statistically but also economically significant—4.2% and 9.5%, respectively. PESSxMLULUdummy, on the other hand, has consistently negative coefficients from OLS (3) to 2SLS (4). In OLS (3) and 2SLS (3) where the whole sample is used, MLULURecs with a rating of Underperform or Sell (PESSxMLULUdummy) have significantly lower CARs by 12.5% and 52.7%, respectively. Analysis using the LU Recs Only sample exhibits the same story, with the marginal effects of −13% in OLS(4) and −14.4% in 2SLS(4).

Compared to SLULURecs, MLULURecs show greater price reactions to both OPT and PESS recommendations, suggesting that the market perceives MLULURecs more informative and credible. The biased self-attribution theory suggests that investors tend to overreact when they obtain information relevant to their prior beliefs, which causes overreaction in stock price movements [59]. If investors believe that MLULURecs have better investment value, price reactions would be greater for both OPT and PESS—more positive and negative, respectively. Our findings in Table 6 are in line with the biased self-attribution theory.

Table 6 shows that MLULURecs have better investment value. In Table 7, we examine which rating categories contain such predictive value by constructing interaction variables of MLULUdummy with InitiationD, UpgradeD, and DowngradeD, all of which are an indicator variable that takes the value of one if a recommendation is an initiation, an upgrade, and a downgrade, respectively. The market reacts in an asymmetric fashion to rating categories and, therefore, the inferences not conditional on rating categories are subject to potential problems [12]. Again, we use OLS and 2SLS estimations with three-day cumulative abnormal returns as our dependent variable. Since MLULUdummy is potentially an endogenous variable, its interaction with InitiationD, UpgradeD, or DowngradeD is also endogenous. Similar to Table 6, we estimate two first-stage regressions to obtain the predicted value of MLULUdummy, \( P(\text{MLULUdummy}) \), and of its interaction terms. The annual percentage of MLULUs and industry percentage of MLULUs serve as instrumental variables for \( P(\text{MLULUdummy}) \). Instrumental variables for each interaction variable include two instruments interacted with InitiationD, UpgradeD, and DowngradeD.
Table 7. Rating category sources of short-term investment value. The table reports the results of the ordinary least square (OLS) and two-stage least square (2SLS) estimations. The dependent variable is cumulative abnormal return (CAR) for the three-day event window centered on the announcement date, CAR\([-1, +1]\) where \(-1 (+1)\) means one day before (after) the recommendation announcement date. OLS(1), 2SLS(1), OLS(3), 2SLS(3), OLS(5), and 2SLS(5) use all recommendations (All Recs), while the others use lead underwriter affiliated recommendations (LU Recs Only) only for analysis. InitiationD, UpgradeD, and DowngradeD are an indicator variable that takes the value of one if a recommendation is an initiation, an upgrade, and a downgrade, respectively. MLULUdummy is an indicator variable that takes the value of one if a recommendation is issued by an analyst affiliated with the lead underwriter in the MLU IPO and zero otherwise. Analyst Firm Size is the number of analysts in an underwriter as defined as the total number of analysts appeared in I/B/E/S for the underwriter to which an analyst belongs in the year of recommendation. Analyst Experience is measured in days in I/B/E/S (I/B/E/S = recommendation date by an analyst minus the date that the analyst first appeared in I/B/E/S. Issuer Size is the natural logarithm of the market capitalization where the market capitalization is the product of the closing price and the number of shares outstanding on the 25th trading day. All-Star Analyst is an indicator variable that takes the value of one if a recommendation is issued by an analyst nominated as an all-star analyst in the prior year of the IPO. Reputation is the lead underwriter’s reputation obtained from Jay Ritter’s webpage. The average of the lead underwriters’ reputations is used for MLU (multiple lead underwriter) IPOs. Prior Six Months Return is the cumulative market return for six months prior to each recommendation. VC-backed is an indicator variable that takes the value of one if an IPO is venture capital (VC) backed and zero otherwise. For the sake of simplicity, we do not tabulate coefficients on intercepts, and industry and year fixed effects indicator variables. Industry fixed effects are constructed by the Fama-French 49-industry classification. Standard errors for z-statistics are clustered at the IPO level to produce the robust estimators and are reported in parentheses. *, **, *** indicate significance levels at the 10%, 5%, and 1%, respectively.

|                  | All Recs | LU Recs Only | Dependent Variable: CAR\([-1, +1]\) | All Recs | LU Recs Only |
|------------------|----------|--------------|--------------------------------------|----------|--------------|
|                  | OLS(1)   | 2SLS(1)      | OLS(2)                               | 2SLS(2)  |
| MLULUdummy × InitiationD | 0.017 ** | 0.016 **     | 0.020 ***                            | 0.019 ** |
|                    | (2.18)   | (1.97)       | (2.78)                               | (2.39)   |
| P(MLULUdummy × InitiationD) | 0.052 *** | 0.056 ***    | 0.238 ***                            | 0.099 ***|
|                    | (4.67)   | (4.99)       | (6.50)                               | (5.05)   |
| MLULUdummy × UpgradeD | 0.002     | 0.000        | 0.002                               | 0.008    |
|                    | (0.04)   | (0.04)       | (0.54)                               | (0.92)   |
| P(MLULUdummy × UpgradeD) | 0.107    | 0.180        | 0.010 **                             | 0.025    |
|                    | (1.15)   | (1.61)       | (2.47)                               | (2.54)   |
| MLULUdummy × DowngradeD | -0.010    | -0.022       | 0.001                               | 0.011    |
|                    | (-1.30)  | (-0.54)      | (-0.27)                              | (-1.50)  |
| P(MLULUdummy)     | 0.078    | 0.107        | 0.180                               | 0.025    |
|                    | (1.11)   | (1.55)       | (1.61)                               | (0.36)   |
| Ln(Analyst Firm Size) | -0.001   | -0.002       | 0.001                               | 0.001    |
|                    | (-0.29)  | (-0.33)      | (-0.27)                              | (-1.50)  |
Table 7. Cont.

|                      | All Recs | LU Recs Only | All Recs | LU Recs Only | All Recs | LU Recs Only | All Recs | LU Recs Only | All Recs | LU Recs Only | All Recs | LU Recs Only |
|----------------------|----------|--------------|----------|--------------|----------|--------------|----------|--------------|----------|--------------|----------|--------------|
|                      | OLS (1)  | 2SLS (1)     | OLS (2)  | 2SLS (2)     | OLS (3)  | 2SLS (3)     | OLS (4)  | 2SLS (4)     | OLS (5)  | 2SLS (5)     | OLS (6)  | 2SLS (6)     |
| Ln(Analyst Experience)| 0.002    | 0.002        | −0.001   | 0.000        | 0.002    | 0.002        | −0.001   | −0.001       | 0.002    | 0.002        | 0.000    | −0.001       |
|                      | (1.28)   | (1.51)       | (−0.32)  | (0.08)       | (1.18)   | (1.30)       | (−0.78)  | (−0.36)      | (1.29)   | (1.31)       | (−0.33)  | (−0.40)      |
| Issuer Size          | 0.006**  | 0.006**      | −0.002   | −0.003       | 0.006**  | 0.005**      | −0.002   | −0.004       | 0.006**  | 0.005*       | *−0.003  | −0.001       |
|                      | (2.41)   | (2.14)       | (−0.69)  | (−1.06)      | (2.38)   | (1.98)       | (−0.80)  | (−1.27)      | (2.27)   | (1.94)       | (−1.21)  | (−0.20)      |
| All-Star Analyst     | −0.011*  | −0.013**     | −0.010   | −0.010       | −0.011*  | −0.013**     | −0.009   | −0.010       | −0.011*  | −0.007       | −0.009   | −0.011       |
|                      | (−1.83)  | (−2.07)      | (−1.06)  | (−1.12)      | (−1.83)  | (−2.12)      | (−1.06)  | (−1.16)      | (−1.80)  | (−1.18)      | (−1.11)  | (−1.23)      |
| Reputation           | 0.000    | 0.004        | 0.006**  | 0.002        | 0.000    | 0.005*       | 0.06**   | −0.001       | 0.000    | 0.000        | 0.006*   | 0.002        |
|                      | (−0.07)  | (−1.24)      | (2.02)   | (0.35)       | (−0.10)  | (−1.69)      | (1.97)   | (−0.21)      | (−0.14)  | (0.08)       | (1.90)   | (0.42)       |
| Prior Six Months Return| 0.003    | −0.008       | 0.006    | −0.005       | 0.004    | −0.010       | 0.011    | −0.006       | 0.000    | −0.011       | −0.007   | −0.023       |
|                      | (0.15)   | (−0.42)      | (0.22)   | (−0.15)      | (0.21)   | (−0.53)      | (0.39)   | (−0.21)      | (−0.02)  | (−0.59)      | (−0.26)  | (−0.84)      |
| VC-backed            | 0.007    | 0.011**      | −0.006   | −0.001       | 0.007    | 0.013**      | −0.006   | 0.002        | 0.006    | 0.005        | −0.007   | −0.004       |
|                      | (1.30)   | (2.06)       | (−0.80)  | (−0.08)      | (1.32)   | (2.42)       | (−0.29)  | (0.24)       | (1.26)   | (0.85)       | (−0.91)  | (−0.40)      |
| Intercept            | −0.183***| −0.126*      | −0.051   | 0.020        | −0.180***| −0.097       | −0.034   | 0.077        | −0.175***| −0.153**     | −0.015   | −0.043       |
|                      | (−3.06)  | (−1.83)      | (−0.61)  | (0.18)       | (−3.01)  | (−1.44)      | (−0.42)  | (0.72)       | (−2.93)  | (−2.26)      | (−0.19)  | (−0.38)      |
| Industry Fixed Effect| Yes      | Yes          | Yes      | Yes          | Yes      | Yes          | Yes      | Yes          | Yes      | Yes          | Yes      | Yes          |
| Year Fixed Effect    | Yes      | Yes          | Yes      | Yes          | Yes      | Yes          | Yes      | Yes          | Yes      | Yes          | Yes      | Yes          |
| Firm Fixed Effect    | Yes      | Yes          | Yes      | Yes          | Yes      | Yes          | Yes      | Yes          | Yes      | Yes          | Yes      | Yes          |
| N                    | 6158     | 6158         | 1449     | 1449         | 6158     | 6158         | 1449     | 1449         | 6158     | 6158         | 1449     | 1449         |
| F-tests              | 2.52     | 2.52         | 2.84     | 3.4          | 2.96     | 4.34         | 0.2839   |              |          |              |          |              |
| R2                   | 0.063    | 0.064        | 0.265    | 0.266        | 0.064    | 0.066        | 0.269    | 0.276        | 0.067    | 0.280        | 0.078    | 0.288        |
In OLS (1) and 2SLS (1) where all recommendations are used for analysis, the coefficients for both MLULU\text{dummy}$\times$InitiationD and its predicted value are 1.7% in OLS (1) and 2% in 2SLS (1), significant at the 5% and 1% level, respectively. When the LU Recs Only sample is used, the coefficients are 1.9% in OLS (2) and 5.2% 2SLS (2). The results show that analyst initiation by MLU-affiliated analysts have the significant and positive effects on CARs. OLS (3) through 2SLS (4) report that the market positively reacts to analysts upgrades of recommendations by MLU-affiliated analysts. When the All Recs sample is used in OLS (3) and 2SLS (3), the marginal effects of MLULU\text{dummy}$\times$UpgradeD and its predicted value on CARs are 5.2% and 23.8% and are statistically significant at the 1% level. Using the LU Recs Only sample provides the similar results, showing that the marginal effects are 5.6% in OLS (4) and 9.9% in 2SLS (4). OLS (5) through 2SLS (6) show that the market negatively reacts to downgrades of MLU recommendations. When the All Recs sample is used in OLS (5) and 2SLS (5), the coefficients on MLULU\text{dummy}$\times$DowngradeD are $-10\%$ and $-41.6\%$, respectively with significance at the 1% level. In the last two columns, OLS (6) and 2SLS (6), the effects of downgrades by MLULU affiliated recommendations are $-10.2\%$ and $-38.4\%$.

The short-term informativeness is conditional on the types of recommendations, and our results show that market reactions are greater for upgrades and downgrades than for initiations. Consistent with prior literature, most of the informativeness comes from recommendation changes—upgrades and downgrades [30–32]. If we loosely interpret the size of a coefficient as the informativeness, downgrades are more informative than initiations and upgrades.

In the test of short-term investment value, we conclude that, compared to both SLULURecs and all other recommendations, MLULURecs have better investment value and their informativeness mostly come from upgrades and downgrades. The findings in Tables 6 and 7 suggest that MLULURecs have superior predictive value in investment returns for both OPT and PESS ratings, which lends support to the reputation upholding hypothesis.

4.3. Mid-Term Investment Value Based on Calendar Time Portfolio Approach

We employ the calendar time portfolio approach to test whether MLULURecs have superior investment value for various mid-term investment horizons. We create two daily portfolios—a BUY and a SELL portfolio—following prior literature [22,41]. The BUY portfolio consists of all stocks whose recommendations are initiated, upgraded, or reiterated with a Strong Buy or Buy at the close of trading on the day. The SELL portfolio consists of all stocks whose recommendations are initiated, downgraded, or reiterated with Hold, Underperform, or Sell at the close of trading on the day. A stock will remain in the relevant portfolio unless it upgrades or downgrades out of the current portfolio. If a stock is recommended by more than one analyst on a particular day, that stock will appear multiple times as many in the portfolio on that day. The two portfolios are daily rebalanced. This portfolio approach avoids the potential upward bias in equal weighting [60]. Assuming an equal initial investment—for example, $1—for each stock, the date t portfolio return is given by

$$R_{pt} = \sum_{i=1}^{n_{pt}} x_{it} \times R_{it} \div \sum_{i=1}^{n_{pt}} x_{it}$$ (2)

where $R_{pt}$ is the portfolio return on date t; $n_{pt}$ is the number of recommendations in the relevant portfolio on date t; $x_{it}$ is the compound return on stock i from the close of the recommendation date to date t−1, which effectively works as a weight for stock i in the portfolio on date t; $R_{it}$ is the date t return on stock i.

We calculate the calendar time abnormal returns from the capital asset pricing model (CAPM), Fama-French three-factor model, and Carhart four-factor model [61,62]. The intercept, $\alpha_p$, represents an estimate of the daily abnormal return. Each model is given by

$$\text{CAPM} : R_{pt} - R_{ft} = \alpha_p + \beta_p(R_{mt} - R_{ft}) + \epsilon_{pt}$$ (3)
which analysts can have an edge as an information provider would be much shorter since 2000 because with no statistical significance. We also estimate abnormal returns for the calendar time hedged portfolio in untabulated regressions. We find no evidence that BUY and SELL portfolios based on UnaMLULURecs are more informative than SLULURecs in the short-term horizon, such superior informativeness quickly fades away in the prolonged investment horizons. The time horizon during which analysts can have an edge as an information provider would be much shorter since 2000 because of the improved market efficiency in the market. Such lower informativeness in the period of our sample is also reported in prior studies [25, 36].

Table 8 reports results on two portfolio groups—BUY and SELL—by four different holding horizons from the calendar time portfolio analysis. These portfolios are further grouped into MLULURecs, SLULURecs, and Unaffiliated. Unaffiliated is the recommendations by analysts not affiliated with the syndicates in either SLU or MLU IPOs. For i month holding horizon, a stock stays in the relevant portfolio for i months unless it is downgraded or upgraded out of the portfolio. After i months, the stock is removed from the portfolio unless it is reiterated before i months elapse. As a measure for abnormal returns, we report intercepts from three pricing models—Equations (3)–(5). For the BUY portfolio in Panel A, we find no significant result for any portfolio group and holding horizon. For the SELL portfolio in Panel B, we find weakly significant coefficients for the Unaffiliated portfolio for the three-month and six-month holding horizons. Based on the Carhart four-factor model, the Unaffiliated portfolio for the three-month holding horizon earns an abnormal return of about −0.89% (8.98 basis points; −22.63% when annualized). Shorting these stocks in the portfolio can produce significant abnormal returns. However, there is no statistically significant evidence of abnormal returns for MLULURecs and SLULURecs. We fail to find evidence that MLULURecs have investment value in the mid-term horizons and that MLULURecs have different predictive value from SLULURecs.

In untabulated analysis, we examine the calendar time portfolio analysis using all-star recommendations only. Results are qualitatively the same as in Table 8 for MLULURecs and SLULURecs with no statistical significance. We also estimate abnormal returns for the calendar time hedged portfolio where the portfolio strategy is to go long on the BUY portfolio and going short on the SELL portfolio in untabulated regressions. We find no evidence that BUY and SELL portfolios based on MLULURecs or SLULURecs provide significant abnormal returns. We also find no significant result for the portfolios based on Unaffiliated recommendations.

Such insignificance in the mid-term investment value tests is in agreement with prior work [25]. They examine the post-recommendation return drift (PRD) using both event study and calendar-time portfolio approaches, with durations of 20 (one month), 60 (two months), and 120 (six months) trading days. They find a general inexistence of PRD in the 2003–2010 period and attribute such insignificance to the improved market efficiency thanks to remarkably lower transaction costs that enabled high frequency trading using complicated algorithmic models and more trading by arbitrageurs. Their results are against the investor underreaction hypothesis [30, 32] in which investors underreact to new information from analysts, which results in a significant PRD. Their findings using the US data are confirmed with the international data of seven countries for the same sample period. The insignificance also lends support to the fact that the significant results in the CAR approach are not driven by overreaction. If overreaction existed, we should have observed significant return reversals for the portfolios based on MLULURecs.

In sum, these findings based on the calendar time portfolio indicate that, regardless of by whom recommendations are issued, the recommendations in our sample period are overall not significantly informative for generating abnormal returns in the mid-term investment horizons. Although we find that MLULURecs are more informative than SLULURecs in the short-term horizon, such superior informativeness quickly fades away in the prolonged investment horizons. The time horizon during which analysts can have an edge as an information provider would be much shorter since 2000 because of the improved market efficiency in the market. Such lower informativeness in the period of our sample is also reported in prior studies [25, 36].
Table 8. Daily abnormal returns of calendar time portfolio. The table presents average daily buy and hold abnormal returns from the calendar time portfolio for various holding horizons using all recommendations. After the holding horizon, the stock is removed from the portfolio unless it is reiterated or receives other relevant rating tiers to stay in the portfolio. Two portfolios are formed: buy portfolio and sell portfolio. The Buy portfolio is formed with recommendations that are initiated, upgraded, or reiterated as Strong Buy or Buy. The Sell Portfolio is formed recommendations that are initiated, downgraded, or reiterated as Hold, Underperform, or Sell. MLULURecs (SLULURecs) is the recommendations by analysts affiliated with the lead underwriter(s) in multiple lead underwriter (MLU) IPOs (single lead underwriter (SLU) IPOs). Unaffiliated is the recommendation by analysts not affiliated with the syndicates in either SLU or MLU IPOs. Abnormal returns are the estimated intercepts from three asset pricing models: Capital Asset Pricing Model (CAPM), Fama-French three-factor model, and Carhart four-factor model. Panel A (B) reports the results for the Buy (Sell) Portfolio. t-statistics are reported in parentheses. *, **, *** indicate significance levels at the 10%, 5%, and 1%, respectively. All returns are expressed in percentage.

| Panel A. BUY Portfolio | Portfolio | Intercept from: | Holding Horizon | CAPM | Fama-French 3F | Carhart 4F |
|------------------------|-----------|----------------|----------------|------|---------------|-----------|
| MLULURecs              | One year  | 0.0137         | (0.35)         | 0.0164 | (0.43)        | 0.0117 | (0.31) |
|                        | Six months| -0.0254        | (-0.45)        | -0.0233 | (-0.42)       | -0.0249 | (-0.45) |
|                        | Three months | 0.0454     | (0.64)         | 0.0475 | (0.68)        | 0.0519 | (0.75) |
|                        | One month  | -0.0104        | (-0.15)        | -0.0108 | (-0.16)       | -0.0075 | (-0.11) |
| SLULURecs              | One year  | -0.0264        | (-0.28)        | -0.0223 | (-0.24)       | -0.0155 | (-0.17) |
|                        | Six months| 0.0086         | (0.06)         | 0.0115 | (0.08)        | 0.0155 | (0.10) |
|                        | Three months | 0.0049     | (0.02)         | 0.0067 | (0.04)        | 0.0077 | (0.04) |
|                        | One month  | -0.4473        | (-1.15)        | -0.4444 | (-1.14)       | -0.4439 | (-1.12) |
| Unaffiliated           | One year  | -0.0041        | (-0.14)        | 0.0031 | (0.11)        | -0.0006 | (-0.02) |
|                        | Six months| 0.0077         | (0.19)         | 0.0144 | (0.36)        | 0.0069 | (0.17) |
|                        | Three months | 0.0485     | (0.83)         | 0.0555 | (0.97)        | 0.0443 | (0.79) |
|                        | One month  | 0.1037         | (1.35)         | 0.1138 | (1.51)        | 0.1111 | (1.48) |

| Panel B. SELL Portfolio | Portfolio | Intercept from: | Holding Horizon | CAPM | Fama-French 3F | Carhart 4F |
|-------------------------|-----------|----------------|----------------|------|---------------|-----------|
| MLULURecs               | One year  | -0.0023        | (-0.06)        | 0.0031 | (0.08)        | -0.0013 | (-0.03) |
|                        | Six months| 0.0168         | (0.31)         | 0.0204 | (0.38)        | 0.0145 | (0.26) |
|                        | Three months | 0.0449     | (0.58)         | 0.0521 | (0.67)        | 0.0316 | (0.40) |
|                        | One month  | -0.1042        | (-0.93)        | -0.0992 | (-0.89)       | -0.1320 | (-1.16) |
| SLULURecs               | One year  | 0.0323         | (0.34)         | 0.0381 | (0.41)        | 0.0430 | (0.45) |
|                        | Six months| -0.0305        | (-0.44)        | -0.0239 | (-0.35)       | -0.0188 | (-0.28) |
|                        | Three months | -0.0840     | (-1.14)        | -0.0777 | (-1.08)       | -0.0641 | (-0.90) |
|                        | One month  | 0.0107         | (0.08)         | 0.0147 | (0.11)        | 0.0087 | (0.07) |
| Unaffiliated            | One year  | -0.0340        | (-0.85)        | -0.0267 | (-0.71)       | -0.0277 | (-0.73) |
|                        | Six months| -0.0671        | (-1.73)        | * -0.0620 | (-1.64)       | -0.0677 | (-1.78) |
|                        | Three months | -0.0897     | (-1.86)        | * -0.0866 | (-1.82)       | * -0.0898 | (-1.85) |
|                        | One month  | -0.1058        | (-1.63)        | -0.1040 | (-1.63)       | -0.1059 | (-1.60) |
4.4. Further Tests

4.4.1. Initiations by Timing of Analyst Coverage

Initiations are more favorable [63]. Initiations are the most prevalent category of recommendations in our sample (67.68%). Initiations around the end of the quiet period are dominantly from affiliated analysts [12] and most affiliated and unaffiliated initiations both are concentrated in the first six months [39]. Initiations are most important because they are issued when the issuer-underwriter relationship is less established [28]. Given that one of the main reasons for going public is to establish visibility and market presence, the recommendations right after the IPO would be most valued by the issuer. In this section, we pay a special attention to initiations and the first six months.

Of our 6950 sample recommendations, 1771 (25.48%) are centered on four days from day 40 to day 43 after the IPO: 128 recommendations on day 40; 1201 on day 41, 325 on day 42, and 117 on day 43. Consistent with Bradley, Jordan, and Ritter (2008), 99.32% (1759 of 1771 recommendations) of the initiations are from affiliated analysts for these four days. For the first six months, 3463 of 4177 recommendations (82.90%) are initiations. MLULU affiliated analysts issued 2463 recommendations of which 129 (5.24% of 2463) had Underperform or Sell ratings. We replicate Tables 5 and 6 based on 3463 initiations using the same model specifications. In the replication of Table 5, we find no significant result. In the replication of Table 6, OPTxMLULUdummy and PESSxMLULUdummy are significant in both models similar to earlier results. Initiations in the first six months are not different from other rating categories in our sample.

4.4.2. Piggybacking

Several papers find that the informativeness of recommendations piggybacks on other information-related events in the neighborhood of recommendation dates [23,24]. We create a dummy variable that takes the value of one if a recommendation is issued during one week after an earnings announcement for the same IPO and zero otherwise. The number of recommendations made in the week after the earnings announcement is 1774 (25.53% of our sample recommendations). After dropping these recommendations, we obtain the qualitatively the same results.

4.4.3. Calendar Time Portfolio without Hold in SELL Portfolio

Seventy nine percent of the industry survey respondents agree that Holds should be interpreted as Sells [64]. We earlier constructed the SELL portfolio based on ratings of Hold, Underperform, and Sell. Retail investors react to ratings literally [51]. If Hold is taken literally, investors should not buy or sell shares. For this reason, we form the SELL portfolio based on Underperform and Sell recommendations only and perform the calendar-time portfolio analysis. The abnormal returns for all three portfolio groups—MLULURecs, SLULURecs, and Unaffiliated—are not significant. Leaving out Hold from SELL portfolio does not affect our earlier findings.

4.4.4. Calendar Time Portfolio with Rating Changes Only: Upgrades and Downgrades

Prior literature shows that rating changes are more informative than levels [30–32]. Our former calendar time analysis is based on all four categories of ratings—initiations, upgrades, downgrades, and reiterations. In this section, we used upgrades and downgrades only for the calendar time portfolio analysis. We consistently found no significant abnormal returns for all groups again. We also tested rating changes by all-star analysts but find no significant result. These results imply that the investment value of rating changes is not different from initiations and reiterations in the mid-term investment horizon.
4.4.5. Calendar Time Portfolio in the Pre-Reg and Post-Reg Periods

There was a structural break in the frequency of rating levels around the regulatory changes. The findings in the literature suggest that regulations are an influential factor in analyst behavior [36,41]. It is very likely that significant changes in the informativeness since then followed. To test such possibility, we split our sample recommendations into Pre-Reg and Post-Reg and employ the calendar time portfolio analysis. For the Pre-Reg period, we find no significant result. For the Post-Reg period, we find significant abnormal returns of 0.013% for 1 month holding horizon and 0.010% for the three-month holding horizon, significant both at the 10% level with p-values of 0.094 and 0.064, respectively, in the Unaffiliated BUY portfolio based on upgrades and downgrades only. We discuss results based on the Carhart model for brevity in this section. The CAPM and Fama-French models show qualitatively same results for the one-month and three-month holding horizons of the Unaffiliated SELL portfolio based on rating changes only. This finding is qualitatively the same as in Table 8.

5. Summary, Contribution, and Future Research

A new organizational form in the IPO syndicate—MLU (multiple lead underwriter) IPOs—and new competition between lead underwriters after underwriter selection have appeared, which is not present in SLU (single lead underwriter) IPOs [65]. It is plausible that this new structure with heightened deal complexity and increased competition will affect the lead underwriter affiliated analyst behavior in MLU IPOs through pressure and incentives. Using 6950 recommendations from January 2001 to December 2011 for IPOs in the 2001–2010 period, we attempt to capture how the newly emerged syndicate structure and competition affect the sustainability of analyst recommendations in MLU IPOs. Especially, we focus on two aspects—analyst optimism and informativeness.

On the one hand, increased competition may force even higher optimism over and above the traditional affiliated optimism in SLU IPOs. On the other hand, even in the presence of the increased competition, MLU analysts may not be more optimistic to uphold their analyst- and bank-level reputation because these investment banks and analysts are on average more prestigious. However, being more optimistic could be driven by either information or certain economic benefits with no information content. So, we compare the investment value of MLU-affiliated and SLU-affiliated recommendations in order to examine analyst optimism in MLU IPOs.

We find in the analysis of analyst optimism bias using both rating levels and changes that MLU LU analysts in general tend to be not more optimistic while being supportive for the issuer by exhibiting greater reluctance to downgrade, compared to SLU LU analysts. We find the qualitatively same result in the analysis after controlling for selection bias in the process of selecting MLUs.

We explore the investment value of the MLU LU recommendations using two approaches: the CAR event window approach to measure immediate market reactions and the calendar time portfolio approach to capture the mid-term investment value. The results based on the CAR approach show that MLU LU recommendations are more informative for both Buy and Sell rating categories with greater market reactions to the directions that these rating categories recommend. When recommendations are further classified into initiations, upgrades, downgrades, and reiterations, most informative recommendations are found in rating changes—upgrades and downgrades. Our results are robust to different specifications and endogeneity correction.

In the test of the mid-term investment value using the calendar time portfolio with various holding (investment) horizons, we find no evidence of abnormal returns for any group of recommendations, suggesting that informativeness quickly fades away. This insignificant result also suggests that the significant initial market reactions are not overreaction by irrational investors given the absence of subsequent reversal in returns.

This paper contributes to the rich literature on affiliated analyst optimism. First, our paper is one of the few papers that explore the new organizational form in the IPO syndicate and its relationship sustainability. Although a school of papers have addressed the conflict of interest in analyst coverage and this new phenomenon—MLU IPOs—has been pronounced over a decade, how the newly emerged
syndicate structure—MLUs—in IPOs affects a multiplicity of the issuer welfare remain unexplored. Therefore, we expect our findings to meaningfully enhance our understanding on the consequences of the structural change in the IPO syndicate. Second, MLU IPOs provide a unique setting where the effect of competition can be captured. The competition formulated in most previous studies is through the number of competitors in the whole market [8] and is determined exogenously while the competition in this paper is endogenously formed and is operationalized by a new organizational form. Competition in this paper cannot be operationalized by exogenous shock as in [8]. The effect of competition and analyst behavior are examined in a different spectrum from prior work. Finally, we provide new empirical evidence that captures how the new syndicate structure and the newly created competition among lead underwriters in MLU IPOs affect analyst behavior—analyst optimism and investment value. In a nutshell, MLU LU analysts create more informative recommendations presumably using superior information from better resources and on average better ability than their competitors while suppressing optimism to uphold reputation. However, the informativeness is short-lived. Unlike the popular conflict of interest view, our findings suggest that reputation upholding incentive dominates pressure from competition and that the new organizational structure and its newly emerged competition between lead underwriters therein facilitate more informative analyst coverage—which is consistent with the reputation upholding hypothesis—whose predictive power, however, lasts shortly as prior literature found [24].

We attempt to address analyst bias that may arise due to a new syndicate structure as comprehensive as possible in this study. No substantial prior research has been done in this area. In this respect, this paper makes a meaningful stride toward the underexplored area of the literature. There is, however, still a substantial amount of issues that can be explored to further our understanding on the implications of the new and readily prevalent IPO syndicate structure in relation to key metrics in the IPO literature. The most imminent issue to be addressed would be underpricing—first trading-day price runup [66]. How a syndicate with MLUs affects pricing accuracy or bias is highly intriguing since underpricing is arguably the single most studied but still puzzling topic in finance. Underpricing itself is driven by multifaceted incentives and forces and has huge economic consequences on IPO stakeholders and general investors in the market. Entangling the systematic effect of the new syndicate structure on IPO pricing is the one of the most imminent and meaningful tasks in the IPO literature. Another aspect of the MLU IPOs that future research needs to explore is to examine the mediating role of the relationship between lead underwriters. Relationship would make huge differences in terms of syndicate efficacy depending on whether syndicate formation is formed purely strategically or is simply based on reciprocity where a certain group of investment banks mutually invite to syndication over time to exchange favors and to form exclusivity for stable revenues. Examining the transition of syndicate structure from SLU to MLU or vice versa by tracking the same issuers over time would also help understand the economic and strategic motivations for the emergence of the MLU IPOs. Directing our attention to other various aspects of the IPO syndicate structure other than the number of lead underwriters would ascertain balanced understanding with a holistic perspective on the implications of the newly popularized syndicate structure for IPOs.

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