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論文題目

The offering method selecting based on participant structure.

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Abstract

Since 1996, the auction utilized in the IPO market had been relatively less than the book-building in Taiwan. Especially the absence of auction method has occurred in 2005, while the amount of offering via book-building was raised over of offering via open offer again. Whether auction is dominated by book-building, even the fact is that an IPO by auction seems to involve a higher issue price and a lower under-pricing against by book-building in quite some empirical investigations. This paper develops a structural matching approach to discuss the price discovery ability and the initial trading volume based on the shareholder structure in the aftermarket. We find two main results: first, the retail investors represent a higher fraction of shareholders to lead a poor ability of price discovery; second, an over-subscribed offering would obviously yield greater initial trading volume in the aftermarket with a relatively higher clean price. Thus, our study supposes that a firm tending to catch financing via primary market seems to give up auction rather than book-building for a fairer pricing or possibly more proceeds through the strategic revision of price and the active shares allocation, as the case may be more retail investors within auctioned offerings.

I. Introduction

In the primary market, the main concern of all participants is that: “How much is the price?” Currently there are several existing methods to determine the offering price of an initial public offering (IPO), for instance, bookbuilding, auction, and fixed price. Since the offering price could be decided by difference approaches, it is an

obvious intuition that the firm which intends to go public should take a suitable choice of issue methods under self interest seeking, and even makes himself capture the maximum revenues. However, the strategic decision of offering price possibly falls into a dilemma between the under-subscription at the higher price and a wealthy lose at the lower price. The offering firm would suffer an unpleasant situation, which is resisted hardly, that is to select an investor-interested approach in a demand-oriented market rather than a better one for himself. The phenomenon resulting from price and mechanism induces many scholars to research and document the practical cases. They all attempt to summarize certain dispositions and characteristics of parties' financial behavior for certain incentive and goal. These investigations provide suggestions to reform details of the regulation effectively to make the market mechanism more faultless and more impartial.

The bookbuilding-like procedures were popular globally, as U.S. and France. It was also introduced into Taiwan in 1995 with discriminatory auction method together. Although auction-like methods have existed in other areas for a long time, as like in the U.K., Japan, and France, it seems to become rare rapidly in many primary markets. In recent decades, the institution of offering market in Taiwan was developed depend on market's features from simple fixed price to multiple offering methods, which were permitted to be a hybrid type consisting of two mechanisms. Similarly, it also appears that auction method is dominated by book building lately with an obvious trend and even disappeared in some years, drawing as figure 1. Following the case of rare auctioned-IPO exposed in quite some countries, many scholars propose why it is and where the optimal is via both theoretical and empirical arguments. For instance, Sherman (2005) has summarized the global premarket as:

> *The two countries in which auctions are still the primary IPO method are Israel and Taiwan. Bookbuilding is banned in Israel and it is restricted in*

Taiwan. Japan, France and Argentina abandoned auctions once unrestricted bookbuilding was introduced (although auctions are still used occasionally in France, especially on the unregulated over the counter market). Italy, Portugal, Singapore, Switzerland and the U.K. tried and then gave up on auctions even before bookbuilding was established locally. Bookbuilding spread around the globe in the 1990s, but it is not entirely accurate to blame it for the absence of auctions, since auctions have always run a distant second to the public offer (a.k.a. fixed price, open offer or universal offer) method for IPOs.

In addition to the overview of offering methods by Sherman, we also provide figure 1, a trend draw with years, to show the offering marker in Taiwan by data of Chinese Securities Association. Besides, Kaneko and Pettway (2003) find that the average of 481 auctioned IPOs had the lowest initial returns, lowest standard deviation and range of return, lowest wealth lost by issuing firms and the highest percentage of positive IR levels compared to the 357 OTC, 36 Mothers, and 76 NASDAQJapan issues using book building. Moreover, as regards the Euro premarket, Derrien and Womack (2003) study auction and book building processes in France and find evidence that the French-style auction is associated with less underpricing and less uncertainty of underpricing (lower variance of underpricing). Further, Lin, Lee, and Liu (2003) shows that retail investors win significantly higher proportions of IPO shares in auctions with negative initial returns. At the same time, the more shares won by institutional investors, the higher initial returns they earn. We aruge that the auction method appears to involve less underpricing, but it is still given up in the world. In addition, Lin, Lee, and Liu (2003) implies that the degree of underpricing involves the mainly members of certain offering method[1].

Following above, our study compares the bookbuilding procedure with the

[1] Even thought we argue that the members of IPO market participant appears to involve both underpricing and other points in an offering, we find less direct evidence in the literatures which we has known so far.

auction method based on different incentives between retail and institution investors. Further, we argue that the institution investors are more informed than retail investors. Due to the amount of informed investors within premarket participants, differential participant structure exists among offering approaches to bring divergence of aftermarket trading. In our study, the investors, all have fully information, can observe other's subscription and we ignore the existence of the underwriter. The bookbuilding process raised the road show about firm's value and potential to aggregate investors' information into the offering price before selling of issued shares, and the auction procedure is that the firm provided a lowest price for investors' upward bids. About allocation of shares, investors submit demand to the offering firm without power of final allocation in the bookbuilding, but yet, auction participants will be able to receive the number of shares they bided prior if the bid succeeded. As regards the pricing, the issue price of bookbuilding decided by the issuer through information consisting of quantity and price, which investors submitted, is different from of auction that equals to the lowest of those successful bids. And then, they are similar to offer shares at a uniform price respectively.

The remainder of this study is structured as follows. Section II supplies a model to describe two parts: first, the theoretical correction among prices and quantity in an IPO is known for both issuer and all investors; secondary, market price is a yield according to dynamic revision between selling and buying. We would discuss strategic decisions of issuers and investors to suppose the trend of offering method selection due to different incentive in section III. Finally, section IV summarizes and concludes.

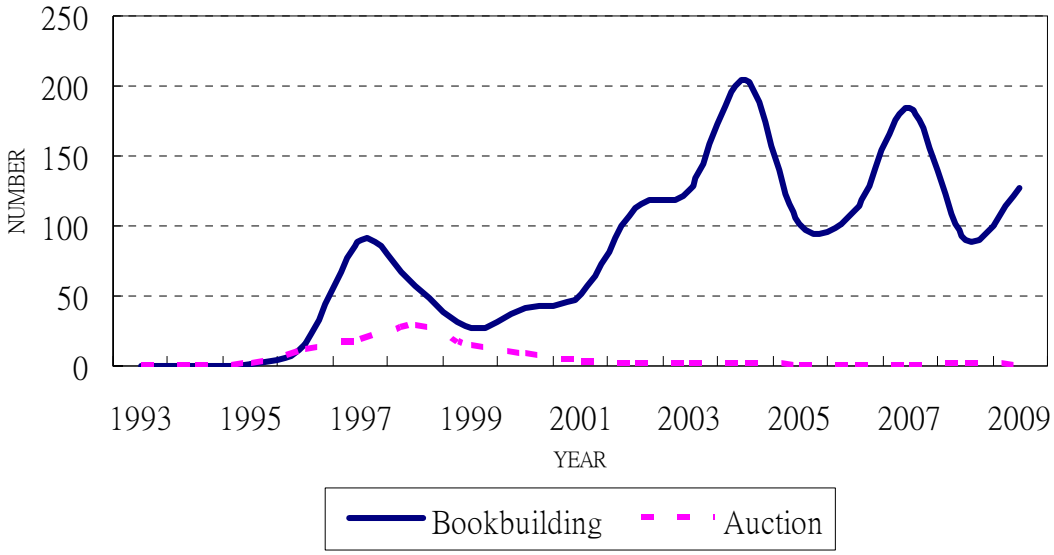

Figure 1

The amount of bookbuilding and auction methods with years in Taiwan

The solid line represents the trend of bookbuilding offering, and the dotted line represents the trend of auction offering from 1989 to 2009. The auctioned IPO is rare obviously relative to bookbuilding offering, especially during 2000s (**data form Chinese Securities Association).**

II. Model

1. Market framework

Whereas market participants decide how much to pay for an offering via the same theoretical equation, we suppose that a set of information of the offering firm could obtain certain quantity of investors to fund with individual capacity in this IPO(see figure 2). As the offering succeeded and provided a uniform price for subscription of each primary market investor whose submission was superior due to a higher price, other investors which received no shares in this IPO could purchase shares by paying more than the subscription price in the aftermarket. The secondary market participants with uncertainty relative to primary participants would tend to observe more information revealed from prior offering process and then evaluate an acceptable objective price (or expected price) reasonably to bid shares, but merely a

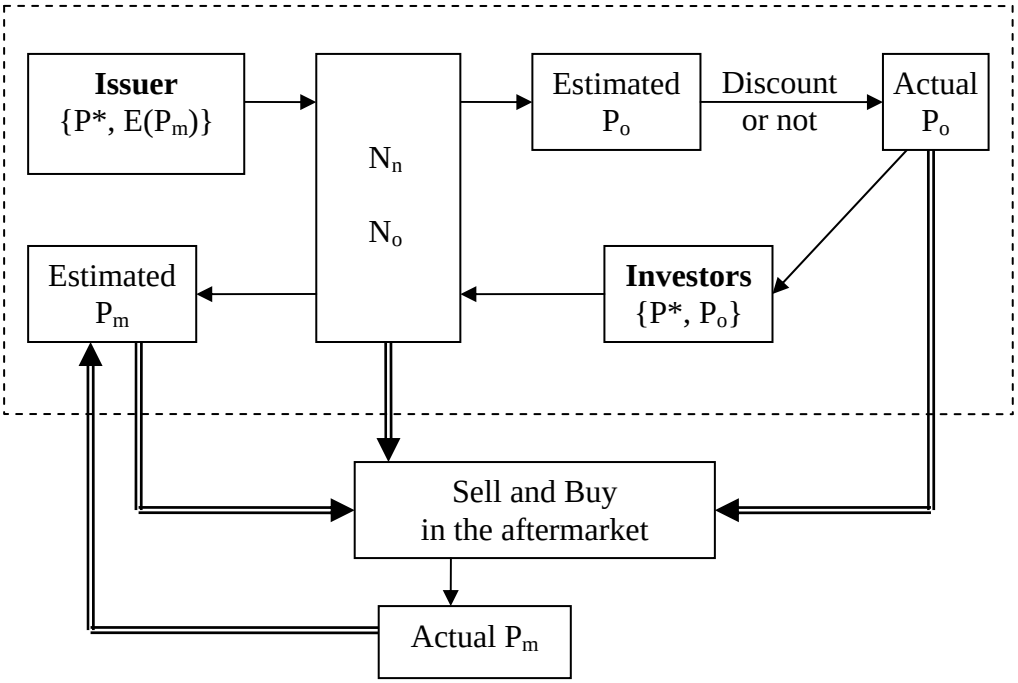

Figure 2
The process from offering to market-determined price

This figure plots both premarket and aftermarket in our environment. The issuer holds N_o shares at unknown actual value P* per shares, and he would like to offer N_n shares at offering price P_o per shares such that he can sell all of the original N_o shares at P_m per share in the aftermarket. Sequentially, all investors refer this offering information to buy in the premarket and trade in the aftermarket to lead to market-determined price.

part of them would raise a bid over the offering price. In another word, we attempt to design an approach which is able to extract information of the share price from all investors. The information about this IPO would attract a group of willingness participants both in the primary and secondary market. One part of them would hold shares by paying the uniform issue price, and the other would like to buy shares in the secondary market at a particular expected price which was possibly higher than what each shareholder paid.

$$\left(N_o + N_n\right)P^* = N_o P_m + N_n P_o \qquad (1)$$

In our environment, the offering firm holds N_o shares and considers to issue N_n new

shares at P_o per share such that gain N_oP_m by selling all original shares at P_m, while the expected net value for the post-IPO equals to $(N_o + N_n)P^*$ where P^* was the evaluated actual share price ex ante and P_m is the market price in the secondary market. We merely discuss a positive initial return such that $P_o < P^* < P_m$.

Implication 1:

A lower offering price would lead to a higher market price for an increasing actual price, and a slightly lower market price for a decreasing actual price. In addition, aftermarket price is higher than premarket price so that this firm has incentive to issue via IPO.

We assume that each investor calculated his own expected share price for this IPO by using the uniform issue price and individual disposition including particular favor and estimated actual value under both private and public information as below:

$$\left\{\hat{P}_i\right\}\frac{N_o + N_n}{N_o} - P_o\frac{N_n}{N_o} + \left\{\varepsilon_i\right\} = \left\{P_{m,i}\right\} \tag{2.1}$$

$$\hat{P}_i \equiv P^*\left|Info.\left(private_i + public_i\right)\right. \tag{2.2}$$

Further, we suppose that $\left\{P_{m,i}\right\}$ follows certain distribution (unknown) between $\min\left\{P_{m,i}\right\}$ and $\max\left\{P_{m,i}\right\}$.

In our environment, all market participants are rational, and amount of investors which stay in the primary market are larger than N. The primary market is a port of the secondary market where total M investors are. The offering would yield N shareholders in the primary market via successful subscription of their own bids. For the post-IPO, these N shareholders would sell shares to other investors. Those investors which hold no share against N shareholders are called “remaining investors”. Exactly, the remaining investors include both who submit no bid (or fail to bid) in the premarket and who would like to buy shares in the aftermarket.

An offering firm would declare that his actual value equals to P^* per share, and then investors raise both price and quantity to reveal their demand reflecting to this IPO information. We assume that each investor is allowed to buy only one share either in the premarket or aftermarket, in additional, our model constrains that each investor has only one chance to hold the share under current information. According to $\left\{\hat{P}_i\right\}\frac{N_o+N_n}{N_o}-P_o\frac{N_n}{N_o}+\left\{\varepsilon_i\right\}=\left\{P_{m,i}\right\}$, there are two sets of $\left\{P_{m,i}\right\}$ respectively produced by sellers (shareholders) and buyers (remaining investors).

Implication 2:
Certain information stream yields certain quantity of investors which have incentive to buy and sell with particularly subjective expected both price and quantity until next information stream imports.

2. Aftermarket matching process

In this step, we establish an algorithmic process to simulate clean price discovery. We suppose that information streams blend into the market step by step in spite of the overlapping information in fact. We treat the highest price as the reflected price due to each completely information extraction. It is a simple intuition that the market price would vary with information streams since of financial behaviors depend on immediate effect of aggregate information. In order to resolve such a continuous procedure, we reduce actual complexity from overlapping streams to simple discrete component. Hence, in our model, the information transmission is treated as multiple rounds of prompt view.

For selling and buying, the quantity with price is denoted as follow:

$$Q_j(P)=\int_P q_j(P)\,dP,\quad j=1,\ldots,K; \tag{3}$$

$Q_j(P)=$ the j-th accumulative quantity at the market price, *P*; and

$q_j(P) =$ the j-th quantity density at the market price, P.

The quantity density, $q(.)$, follows a certain distribution on a closed interval of price; and $Q(.)$, an integration of the quantity density, is the accumulative quantity with a condition:

$$Q_{Sell,0}\left(P_{m,0}\right) = \alpha N, \ 0 \le \alpha < 1; \text{ and} \tag{4.1}$$

$$Q_{Buy,0}\left(P_{m,0}\right) = \beta N, \ 0 \le \beta. \tag{4.2}$$

Whereas $Q_{Sell,0}\left(P_{m,0}\right)$ and $Q_{Buy,0}\left(P_{m,0}\right)$ represent the aggregate number of shareholders and remaining investors at price $P_{m,0}$ respectively, the integrated quantity of askers is nonnegative and less than total amount of outstanding shares. The clean price was found through a discrete process of information extraction which involves dynamic adjustment of both selling and buying curves responding with price. Selling quantity is given equal to αN at price, $P_{m,0}$, where α is a nonnegative fraction less than one, implies that a α fraction of total shareholders would be willing to sell shares to another investors. As regards bidders at price $P_{m,0}$, the number equals to βN, where β is not less than zero. If β equals to zero, we assume the subscription of offering is fully filled, else if β is less than one, the offering was under-subscription, and the other denotes an over-subscription offering.

Implication 3:
Following information exposed, a market price is indentified when ask quantity keeps matching with bid quantity, and otherwise, it is out of market.

Sellers, which are investors holding shares for the post-IPO, set lower limits of ask price according to the matching price. When a buyer bids at his willing price as same

as certain asker's lower limit, even higher, this buyer would become one of new shareholders through an ask-bid matching.

3. Retail and Institution investors

According to previous literatures, the shareholder structure significantly affects IPOs' under-pricing both in statistic and economy (see, e.g., Kahn and Winton, 1998; Smart and Zutter, 2003). Our study argues both under-pricing and initial trading volume resulting form differential shareholder structure via a designed model. All market participants are classified into two categories, as retail investors and institution investors. In this paper, we consider that retail investors trade only for return of under-pricing, but institution investors purchase shares for directly profitable initial return, in addition, and even for consequential proceeds via a potential high value or control rights. To extend above consideration, we assume that second order derivative of accumulative quantity of retail shareholders is smaller than of institution investors, but yet, their first order derivative are both greater than zero. Thus, on condition of a fixed number of total shareholders, the shareholders consisting of more retail investors contain more selling willingness at each possible market price between the same upper and lower limit price.

$$Q''_{in}(P) > Q''_{re}(P); \tag{5}$$

$$q_{in}(P) > 0, \quad \text{and} \quad q_{re}(P) > 0;$$

where

$q_{in}(P)$ = the willingness quantity density of institution investors at price P;

$q_{re}(P)$ = the willingness quantity density of retail investors at price P;

Implication 4:
Under positive initial return, all investors exactly know the actual price upon the

offering price. Retail investors concentrate more selling willingness in lower price area against possible actual value. By contrast, institution investors tend to sell at an enough worthy price which is higher relative to actual price.

Further more, the accumulative asks quantity is a combination of $q_{in}(P)$ and $q_{re}(P)$, as below:

$$q_{Sell}(P) = \omega q_{in}(P) + (1-\omega) q_{re}(P); \tag{6}$$

$$0 \le \omega \le 1;$$

4. The selling curve in the aftermarket

Assume that all shareholders sell shares at a price range where the upper limit price would be revised according to last market price which denoted the next lower limit price. After each matching discloses the market price, the selling curve could be redrawn by using the revised selling range. To describe as below:

$$Q_{Sell,j}(P_{m,j}) = \int_{P_{m,j-1}}^{P_{m,j}} q_{Sell,j}(P)\,dP \tag{7.1}$$

$$\int_{P_{m,S}} q_{Sell,j}(P)\,dP = N$$

$$P_{m,S} \in (P_{m,S,j-1}, P^{u}_{m,S,j})$$

$$P^{u}_{m,S,j} = \left(1 - \frac{\tilde{Q}_{m,j-1}}{N}\right) P^{u}_{m,S,j-1} + \left(\frac{\tilde{Q}_{m,j-1}}{N}\right) P^{u}_{m,B} \tag{7.2}$$

$Q_{Sell,j}(P)$ = the accumulated quantity of selling willingness at price P across jth matching;

$P^{u}_{m,S,j}$ = the upper limit price of selling via the jth revision; and

$P^{u}_{m,B}$ = the fixed upper limit price of buying.

$\tilde{Q}_{m,j}$ = the amount of the jth matching.

In our study, buyers' price information was fixed such that we can focus on variant of selling. And, we ignore the exceed investors who trade at an exceed price by defining the quantity on specific closed interval. In other words, for selling, a pair of price limit exists so that no one keeps share over the upper limit price and no one has incentive to sell share below the lower limit price. As regards revision of upper limit price, the new upper limit price is a simple weighted average consisting of last upper limit price and the remaining investors' upper limit price, where the weights are based on the quantity of current matching.

5. The buying curve in the aftermarket

Since we mainly discuss the differential sellers' structure, the buying curve is reductive university. Certain upper limit price exists since of the offering information and keeps frozen. And, as similar as selling upper limit, no remaining investor has incentive to purchase share over this upper limit price. And, the reduction of quantity density of buying willingness is uniform to equal to current matching quantity over the gap between the fixed upper limit price and the current market price, because the prior assumption is that each investor can buy a share fairly with the same purchasing opportunity if bid price is high enough.

$$Q_{Buy,j}\left(P_{m,j}\right)=\int_{P_{m,j}}^{P_{m,B}^{u}}\left[q_{Buy,j-1}\left(P\right)-\frac{\tilde{Q}_{m,j-1}}{P_{m,B}^{u}-P_{m,j-1}}\right]dP \tag{8}$$

$$P_{m,j}\in\left(P_{m,j-1},P_{m,B}^{u}\right)$$

$Q_{Buy,j}\left(P\right)$ = the accumulated quantity of buying willingness at price P after the jth matching;

6. The matching in the aftermarket

For the post-IPO, offering price is the lowest price for all investors, and then, the first market price, $P_{m,1}$, is revealed such that the amount of buying willingness is $Q_{Buy,0}\left(P_{m,1}\right)$ and the amount of selling willingness is $Q_{Sell,0}\left(P_{m,1}\right)$. At present, the amount of matching under current market price, $P_{m,1}$ (the first market price), is equal to the minimum of $Q_{Buy,0}\left(P_{m,1}\right)$ and $Q_{Sell,0}\left(P_{m,1}\right)$ as below:

$$\tilde{Q}_{m,j} = \min\left\{Q_{Buy,j-1}\left(P_{m,j}\right), Q_{Sell,j-1}\left(P_{m,j}\right)\right\}, \tag{9}$$

And, $\tilde{Q}_{m,1}$ remaining investors replace the $\tilde{Q}_{m,1}$ sellers to become new shareholders, moreover, resulting form trading at $P_{m,1}$, all shareholders have same incentive to sell shares at a more higher price than current market price. At the same time, the upper limit price of selling curve changes into $P^{u}_{m,S,1}$, which is possibly lower than $P^{u}_{m,S,0}$, to reform the selling curve. According to current trading volume, the reduction of buying curve is determined. Up to now, the first step is complete. As regards the other step, we operate in the same way until $P_{m,K}$ exists such that all of prices higher than $P_{m,K}$ are out of market. To illustrate:

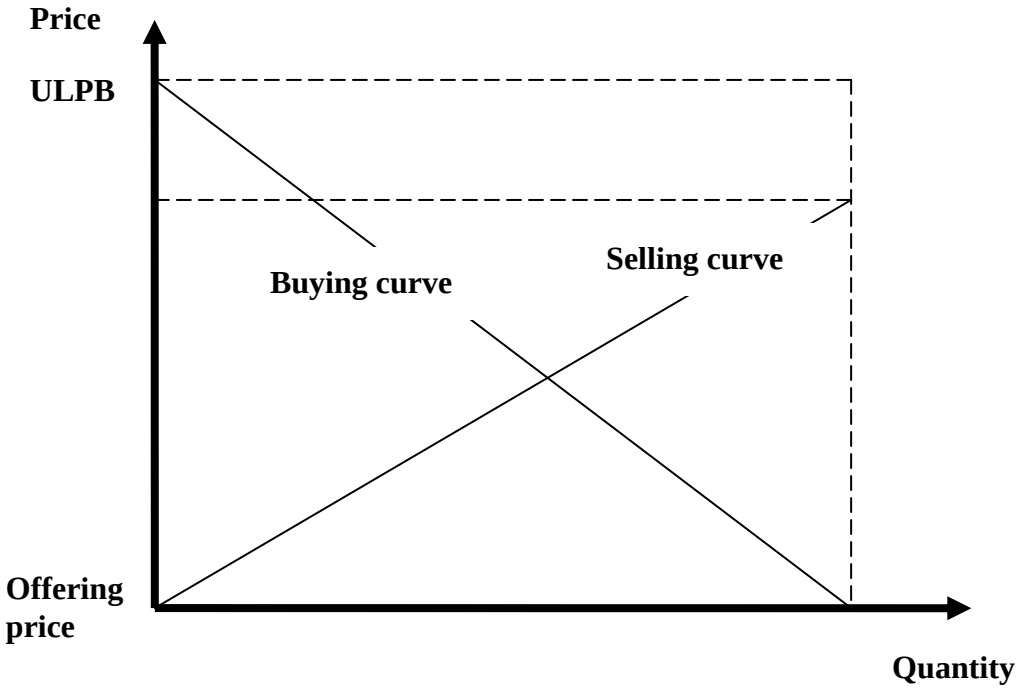

Figure 3-1

The adjustments of both selling curve and buying curve.

This figure plots the simple both selling curve and buying curve (hereafter referred to simply as SC and BC), where the horizontal axis represents the quantity while the vertical axis represents the market prices with the origin as offering price. Further, ULPB and ULPS denote the upper limit price of seller and of buyer respectively. The amount of total tradable shares is fixed as N.

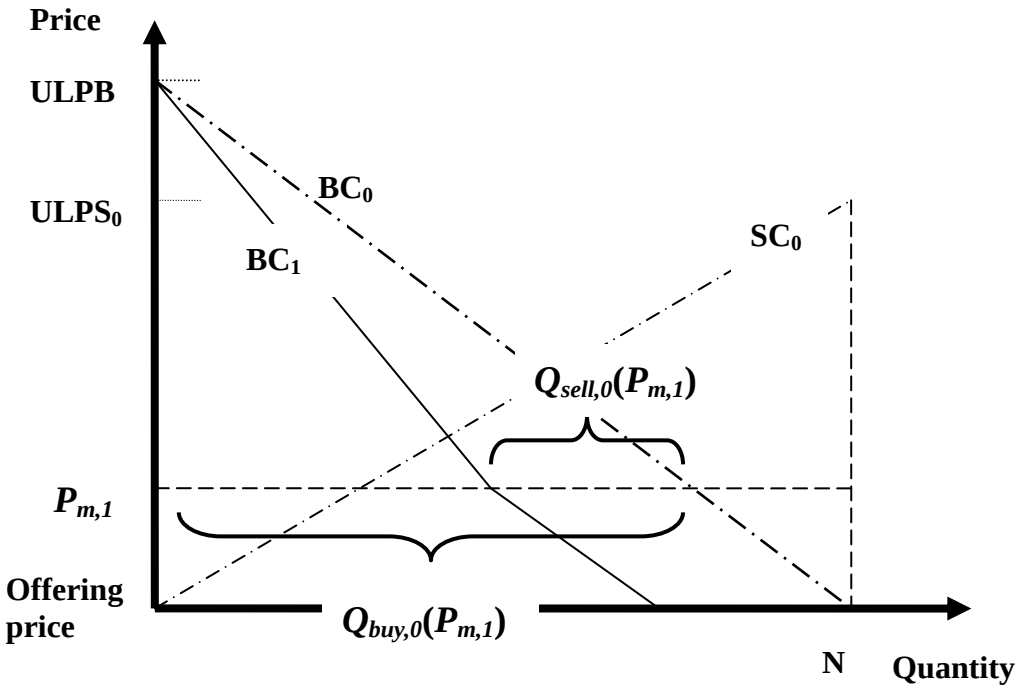

Figure 3-2

The adjustments of both selling curve and buying curve.

Following figure 3-1, the first market price is disclosed to cause $Q_{sell,0}(P_{m,1})$ sellers and $Q_{buy,0}(P_{m,1})$ buyers. The reduction of BC_0 resulting from matching lead to BC_1 shifting from BC_0. The dashed-dotted lines denote original both selling and buying curves while the solid line denotes the reformed buying curve.

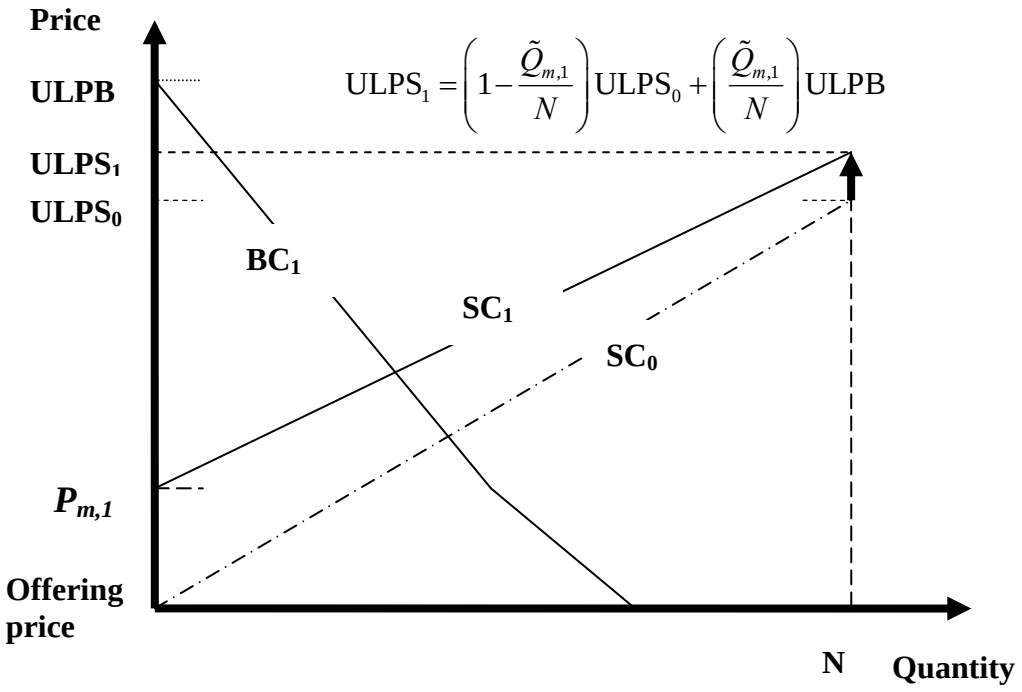

Figure 3-3

The adjustments of both selling curve and buying curve.

Following figure 3-2, the first market price is disclosed to cause $Q_{sell,0}(P_{m,1})$ sellers and $Q_{buy,0}(P_{m,1})$ buyers. The ULPS_0 is raised to ULPS_1, and the selling range shifts so that the original SC_0 is reformed as SC_1. Relative to figure 3-2, the solid line denotes the reformed selling curve. We also provide the determine formula of the updated ULPS on the top of this figure.

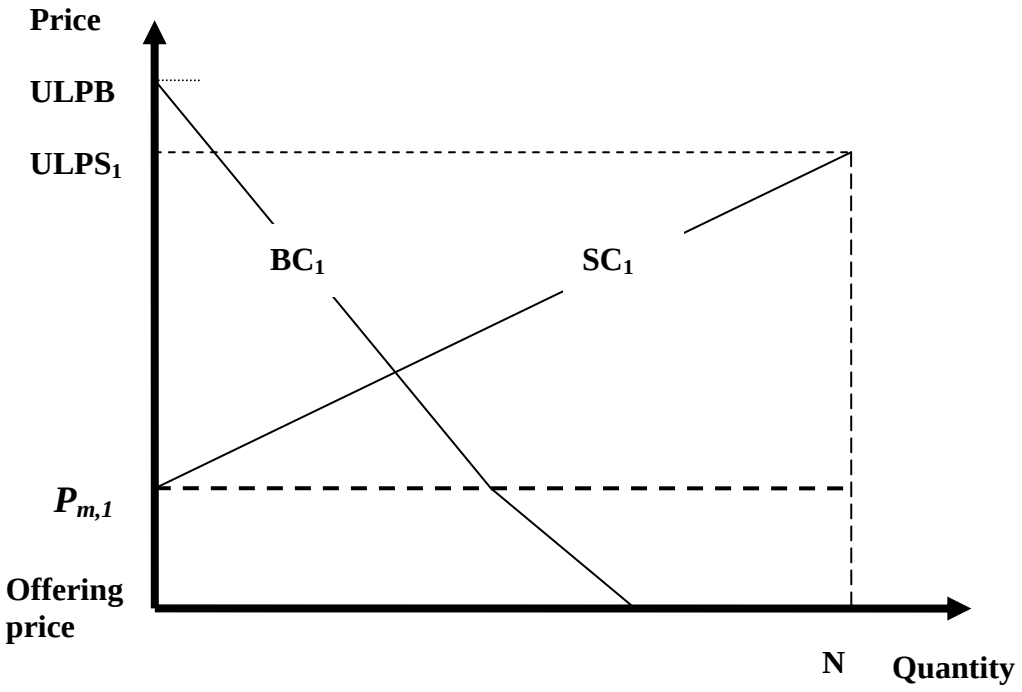

Figure 3-4

The adjustments of both selling curve and buying curve.

To summarize above figures, the first market price is disclosed to cause matching between selling and buying to result the reduction of buying curve and the selling range shifting. The sequential step is in the same way until the market price is out of market.

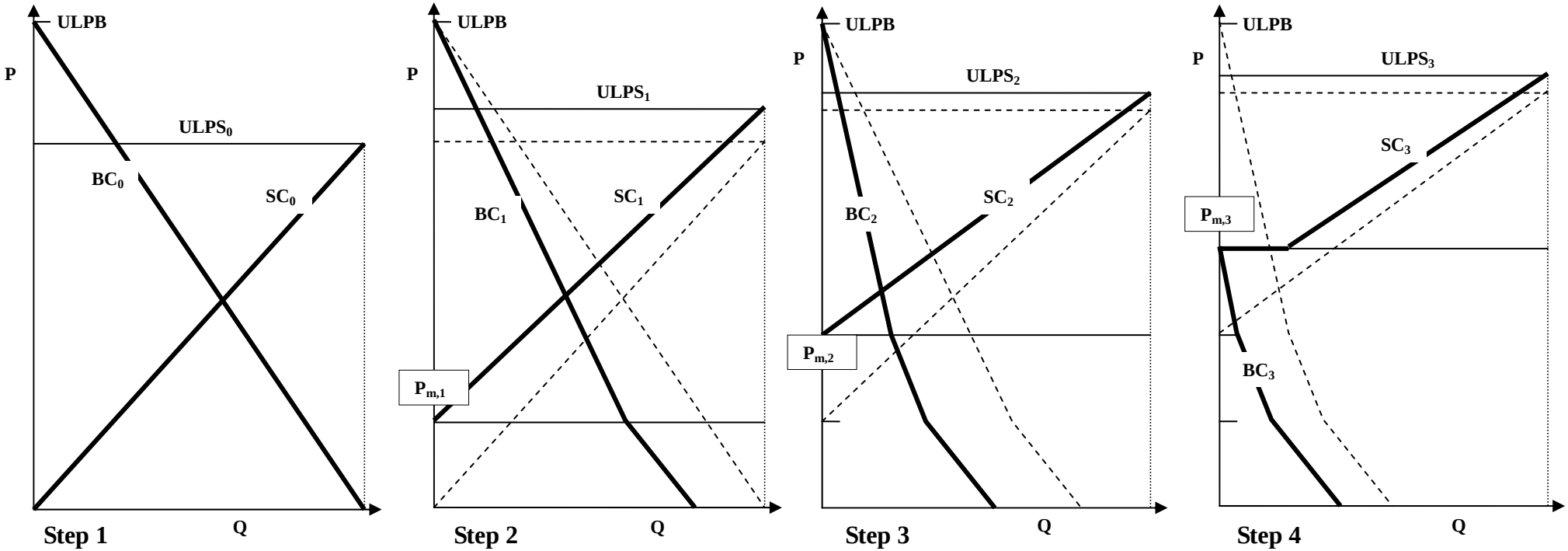

Figure 4

The complete procedure of market price seeking via information extraction

For the post-IPO, the selling and buying willingness exist based on price information of this offering. The market price keeps disclosed such that matching leads to both the reduction of buying willingness and the shifting of selling range, until no shareholder wants to sell share below the market price where the amount of buying willingness is zero. The 4th step represents the termination of price information extraction.

III. Simulation and Analysis

1. Simulation

Through computer programming to practice our model, we discuss four factors in IPOs as issue size, offering price, underpricing, and market price. It merits our particular mention that our model could show trading volume up. Although this volume does not stand for the entirely initial volume, we also treat it as the proxy of initial volume under the offering information. Moreover, we normalize both the actual value per share ex ante and issue size to one.

2. A special case

In order to fit virtually, we set that issue size which the firm proposes is one fourth of the original shares with an expect market price, 1.1. To illustrate via equation 1:

$$\left(N_o + N_n\right)P^* = N_o P_m + N_n P_o$$

$$N_o = 4,\ \ N_n = 1,\ \ P^* = 1, \text{ and } \ P_m = 1.1$$

Then, we have offering price equal to 0.6. Further, we refer the regulation of fluctuation of share price to set the new market price as 1.001 times of the last market price (i.e., $P_{m,j+1} = \left(1 + 0.001\right)P_{m,j}$). The selling curvature equals to 0, ± 1; ± 2, ± 3, ± 4 to be shown in table 1; ULPB as same as $ULPS_0$ is equal to the expected market price which issuer sets based on a fully subscription, where at the offering price the amount of remaining investors fits tradable shares. Across the model, this offering information receives market price, 0.8504, and volume, 0.6924, in addition, the underpricing is 0.3488. Sequentially, we also compare several cases respectively under $\pm 1\%$ change of ULPB, subscription, offering price, and issue size and then list results in table 3.

3. Analysis

In table 1, the result is consistent with our expectation ex ante. The higher curvature involving more institution (informed) investors leads to both higher market price and more underpricing but yet less volume.

Table 1
Different selling curvature

	Selling curvatures								
	-4	-3	-2	-1	0	1	2	3	4
market price	0.8228	0.8295	0.8361	0.8437	0.8504	0.8573	0.8642	0.8711	0.8781
underpricing	0.3158	0.3238	0.3318	0.3408	0.3488	0.3568	0.3648	0.3728	0.3808
volume	0.7426	0.7312	0.7190	0.7061	0.6924	0.6779	0.6626	0.6465	0.6296

This table lists the difference of selling curvatures which bring particular results in the same market. It is obvious that lower curvature lowers market price and reduces underpricing with higher volume.

In table 2, we show the one percent change of curvature up at different degrees of curvature including 0, 1, and 4. We find an obvious diversity across degrees but yet very slight impact in small changes. It is interesting that higher degree of curvature raises a visually negative impact in price relative to the lower degree..

Table 2
The one percent change of curvature

	Curvature=0		Curvature=1		Curvature=-1		Curvature=4	
	+1%	-1%	+1%	-1%	+1%	-1%	+1%	-1%
market price	~0	~0	~0	~0	~0	~0	~0	-0.102%
underpricing	~0	~0	~0	~0	~0	~0	~0	-0.260%
volume	~0	~0	-0.03%	+0.015%	+0.028/5	-0.014%	-0.129%	+0.129%

The 1% change of selling curvatures are shown up in this table. We find that merely higher degree of curvature affects market price and underpricing significantly in the few changes. It implies that one of two types is much more than the other to cause sensitive price impact.

In table 3, we summarize several points: first, the offering price change affects volume very slightly; second, unsurprisingly, underpricing is influenced by all factors as most by offering price and fewer by subscription; third, higher offering price raises market price. In our study, the apparent difference between auction and bookbuilding approach is that the offering price in the former would not be controlled by the issuer. We suppose that all market participants know higher offering price involving higher market price. Thus, we can compare the auction method (more retail investors) with the bookbuilding method (more institution investors) under differential offering price, as table 4.

Table 3
The one percent change of ULPB, subscription, offering price, and issue size

	ULPB		subscription		offering price		issue size	
	+1%	-1%	+1%	-1%	+1%	-1%	+1%	-1%
market price	+0.306%	-0.294%	+0.106%	-0.094%	+0.4%	-0.4%	+0.259%	-0.270%
underpricing	+0.860%	-0.860%	+0.287%	-0.287%	-1.720%	+1.720%	-1.147%	+1.147%
volume	+0.607%	-0.635%	+0.722%	-0.722%	~0	~0	+0.997%	-0.997%

We list the 1% change of ULPB, subscription, offering price, and issue size to identify the sensitivity of both price and volume induced by aftermarket and offering condition, while we fix both the expected market price and the actual price to revise offering price and issue size.

In table 4, we find that the firm via the offering method with more retail investors results absolutely larger volume, slightly lower market price, and strictly less underpricing. Even though more retail investors within an offering of high issue price bring a higher market price, the spread seems rare enough to make issuers less interested to utilize.

Table 4

The differential investors structure under the differential offering price

	same structure		more institution	more retail	more retail	more institution
	regular	price increased[2]	regular	price increased	regular	price increased
market price	0.8504	0.9355	0.8816	0.8943	0.8196	0.9766
underpricing	0.3488	0.3488	0.3848	0.3038	0.3118	0.3918
volume	0.6924	0.6924	0.6218	0.7573	0.7475	0.6049

This table presents the differential investors structure both in the regular case (lower offering price) and in the "price increased" case (higher offering price). Following previous results, we list simultaneously high offering price with more/less retail investors and low offering price with more/less retail investors.

IV. Summary and Conclusion

This paper attempts to investigate the strategic decision of offering approach for a firm which wants to catch the financing via primary market. At the present, two main offering mechanisms prevailing in the financial market are auction and bookbuilding. To review previous literatures, an auctioned offering involves less underpricing relative to bookbuilding on average. Since we watch out the auction failing in Taiwan, we discuss both the degree of underpricing and initial trading volume via a structural matching system for aftermarket based on divergence of initial shareholders' members. Our model mainly finds two results: first, lower price elasticity (higher quantity curvature) for sellers seems to lead higher market price via completely information extraction in spite of existence of information asymmetry between selling and buying; second, for an offering consisting of more retail investors with high issue price, higher market price involves rare positive spread (even negative) relative to low issue price with more institution investors and strictly less underpricing

[2] Price increased by investors means that issuer raises all of the expected market price, offering price, and actual price via information acquisition before IPO.

in spite of larger initial trading volume. Because of bookbuilding with more fractional retail investors, who would be uninformed to easily feel panic for volatility of stock price, we infer that offerings via bookbuilding method enable tradable shares possibly to be sold with lower price elasticity to yield more underpricing and relatively superior market price.

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