

# The Nature of Underwriter Network in IPOs: A Layered Structure

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## **Abstract**

In repeated IPOs, underwriters build standing and accumulate knowledge on their underwriting services. One of great advantages of the top ranked underwriters is their relationship networks with other underwriters and institutional investors. This paper performs a careful examination of the underwriter syndicate and investigate the relationship of the structure of the syndicate in respect of IPO performance. Moreover, the pattern of the distribution in the size of syndicates is identified and significantly related to the IPO performance.

**Key word:** underwriter syndicate, network, IPO, random graph

**JET Classification:** G21, G24

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# 1 Introduction

It is an interesting but rarely mentioned question that based on what principle, a leading underwriter constructs the IPO syndicate. The further question is that why not take the business alone. Given the underwriting service commission fee of a certain IPO is somehow proportional fixed, it is natural to assume that in order to maximize its profit, investment banks should close the door for other investment banks for the same IPO once the offer has been made. As every new member is introduced, the IPO cake will be split into more and smaller pieces. If this is true, the lead underwriter has no incentive to introduce underwriters in its syndicate unless the members can be helpful. However, the question remains: what special talent does the member underwriter have while the lead underwriter does not and need to pay for that?

Most of the relevant research concentrate on the following areas. Based on the behavior finance theory, some researchers try to explain how the underwriters manipulate their affiliated analysts reports (McNichols, O'Brien, 1997, Irvine, 2003, Cliff, Denis, 2004). Some theories focus on underwriters' reputation could affect the IPO performance, such as the underpricing level and the aftermarket liquidity. Other theories explain how the underwriters use their networks and resources to win or keep their future underwriting appointments (Ljungqvist, Marston and Wilhelm, 2007). Up to my knowledge, few existing work has been done on the question how the underwriter syndicate is constructed and why some certain underwriters gather in one syndicate. The primary aim of this paper is to empirically identify the underlying mechanism of constructing the underwriter syndicate. We also aim

to set up measurements for syndicates and hence investigate into the potential impact on the IPO performance. We hope those measures show the key characteristics of the underwriter syndicate.

In exploring for the nature of the underwriter network, with the cutting edge technique of random network theory and simulation, this paper exhibits that the underwriters *de facto* are randomly connected with others, while separated into two groups. Underwriters normally do business with those in the same group. Underwriters in both group following the rule of the random network theory and the empirical distribution fits the simulation result. Further analysis reveals that the underwriting service provided by the two groups of underwriters leads to different outcome, which have substantial practical implication in the investment banking business.

In the following section we review literatures. In Section 3, we describe the data. The parameters and the overview status of the underwriting syndicates is presented in Section 4. The comparison and analysis of the two group underwriters are presented in Section 5 and Section 6 concludes.

## **2 Literature Review**

It seems that normally syndicates rather than single underwriter serve IPOs now, however, joint underwriting does not always take the dominant position. As documented by Ljungqvist, Marston and Wilhelm (2007), underwriting syndicates gained their dominant position around 1990 as increase in capital demand of issuers exceeds the capability of individual underwriters, which have been dominating the market for quite a while. With the syndicate,

the underwriters can take the risk together in the process of fund raising, meanwhile they share the revenue of the underwriting service.

The first remarkable joint underwriting case is in 1906. At that time, recorded by Carosso (1970), Goldman Sachs and Lehman Brothers began to build their long term exclusive comanagement relationship from underwriting for United Cigar Manufacturers and Sears, Roebuck & Co. In Modern underwriting syndicates, the lead underwriter plays a more important role than the co-underwriters, taking a greater proportion of underwriting fee as well, while the co-underwriters take equal shares of responsibilities.

The syndicates vary in size. In the detailed summary of 8,303 issuance between December 1st, 1993 and June 30th, 2002, LMW shows that the mean number of underwriters in one syndicate for common shares is 3.0, and non-convertible debt is 4.3.

## **2.1 Information Gathering**

Some claim the substantial reason of syndicate is information. It is reasonable to believe that better knowledge in market condition and investors' interest may help the syndicate to settle better deals in IPO, in terms of more accurate price and lower risk.

Among many proxies of the information hold by underwriter syndicate, the reputation is the most instinct one. R. Carter and S. Manaster (1990) first linked the underwriter reputation with the initial public offering, based on the theory similar to Rock (1986) that the greater IPO underpricing leads to a greater proportion of informed investor capital participating. They also claimed that underpricing is costly to the issuer.

Many papers continue focusing on the underwriter reputation issues. Carter and Dark (1993) examine the relationship between reputation of investment banks and the investors subscribing IPO shares. They find that performance of flippers in the IPO aftermarket varies in respect to two underwriter groups. In the underwriter class of lower reputation, the flippers are more likely to dominate the offerings as the reputation increase. In the higher reputation class, however, the dominance of flippers declines with reputation increase. Moreover, Carter, Dark and Singh (1998) discovered the reputation is relevant to the long term performance of the IPO shares.

In both of the papers, the authors use the Carter-Manaster scale to measure the reputation of the underwriters. Under Carter-Manaster scale, only the best reputable underwriter counts for the reputation of the syndicate. However, the reason of using a single underwriter to represent the whole syndicate is somehow groundless. Analysis based on this measurement may potentially misleading.

Logue, Rogalski, Seward and Foster-Johnson (2002) document the relationship between underwriter reputation and the market activities during the IPO process. They find that the underwriter reputation is significantly determinate to the pre-market underwriter activities, and weakly related to the aftermarket price stabilization, while the reputation is unrelated to issuer returns.

## **2.2 Bookrunners' Bargain**

The noteworthy strange feature in the underwriting business is that the gross spreads (fees) between single underwriter and syndicate underwriters are

insignificant. In US market, for a moderate size IPO, the fee is 7%. This is a phenomenon where some underwriter related literatures start from.

Beyond competing the underwriting fee, Hu and Ritter (2007) assume that the bookrunners (lead underwriters) compete for business on analyst coverage and offer prices. They find that the reasons for greater underwriter syndicates are the increasing issue size, reduction of IPOs decreased influence of analyst coverage and increased number of buyout backed IPOs. This assumption ultimately leads to the following conclusion: the benefits of multiple underwriters to an issuer include greater bargaining power in the way of higher file price ranges, high offer prices and less underpricing level. More benefits may include building a tightener commercial bank relationship for loans.

As the main concern is about managing underwriters, this research does not cover the role of the member underwriters of the syndicate.

### 3 Data

The data used in this paper is from Hong Kong Exchange for initial public offerings from November, 1999 to the end of 2005. The offer price, number of shares offered and the date of the first trading day of IPO shares are from the IPO prospectus from the public database of Hong Kong Exchange. Since trading prices are sometimes missing from either sources, the first day open trading price and trading volume are collected from Datastream and Yahoo! Finance (Hong Kong)<sup>1</sup>. The sector classification is according to the

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<sup>1</sup>Yahoo! Finance (Hong Kong): [hk.finance.yahoo.com](http://hk.finance.yahoo.com)

information from Datastream.

The period is a relatively quiet period. Except for the internet bubble, which is influential all over the world, no other significant bubble was recorded in Hong Kong market and the world financial market during this period. Internet bubble is much more moderate in Hong Kong market than in United States. By considering other industry sectors are not significantly affected by the internet bubble and the availability, the data during the internet bubble period, from 1999 to 2001, is as well included.

The data after 2005 is exclude from our research because of the potential influence of the blooming of IPOs in Mainland China and Hong Kong market. The regulations of the national holding stock changed, in the "Non-tradeable Share Reform" launched by China Securities Regulation Commission (CSRC), at the beginning of 2005 in mainland China, where the national holding shares played the determinant role<sup>2</sup>. As the consequence, the market situation had been changing dramatically since this point. (\*)

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<sup>2</sup>Nontradable shares is an distinguish feature of the Chinese ownership structure for listed companies and consequence of the stricted natioanl ownership. This nontradable proportion of shares represents the segmentation of Chinese domestic financial market. The nontradable shares entitle the holders the same voting and cashflow rights assigned to the tradable share holders. Chinese government has tried several times to reform this seperating ownership structure but failed until their latest attempt in 2005. It took almost a year to finish the emplementation of this reform until the end of March 2006. Partly because of the reform, China domestic and Hong Kong market started their blooming since 2005. (Bortolotti, Beltratti, 2007)

## 4 Measurement of the Underwriter Syndicate

The most complex problem is the measurement of the underwriter syndicate. Normally, in one syndicate, there are two roles. One role is lead underwriter and the other one is member of the syndicate. For example, in the IPO case of Sinocom Software Group Ltd, listing code 0299, there are 5 underwriters in the syndicate. As illustrated in Figure 1, Daiwa Securities is the lead underwriter. Guotai Jun'an Capital Limited and First Shanghai Securities are co-lead underwriters in this syndicate. The members are Japan Asia securities and UOB Kay Hian (HK).

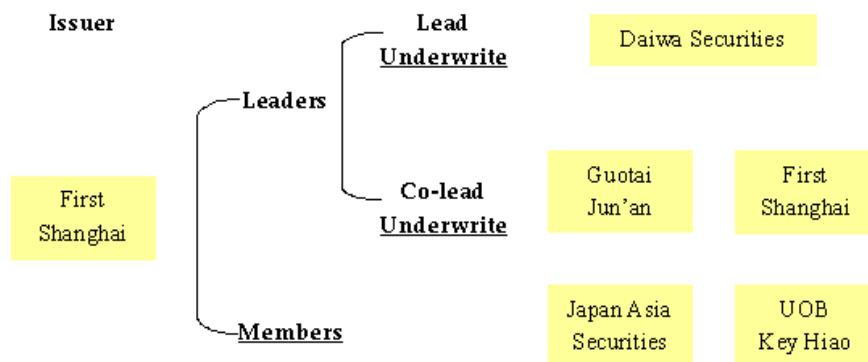


Figure 1 Underwriter Syndicate Structure: An Example

To investigate into related issues to underwriter syndicate, we are interested in the following questions. First, do the underwriters in an syndicate the have best connection to target investors? The term "target investors" refers to those who have shown their interest in the IPO firm, or have potential interested. As this kind of special interest is very difficult to capture,

the investors who have shown their interested in the same industry sector is regarded as the target investors in our research. Second, do the underwriters in the syndicate have a decent pricing knowledge of the issuing shares? In order to gain the pricing knowledge, the underwriters are supposed to have extensive experience in issuing shares, especially the shares in the same industry. Since the lead underwriter is responsible and have the right to settle down the offering price, it is thus an important question whether the lead underwriter has experience in underwriting the same industry firms. Third, is the lead underwriter able to conduct properly and lead the syndicate? A good leader can always be a guarantee for a better output, and vice versa. In this sense, we expect the lead underwriter has been experiencing more underwriting business than others in the syndicate and thus gain the ability from its experience to be a better leader.

#### **4.1 Rank Underwriters by Frequency**

To start investigating into those features, a measuring system should be established at the first place. By collecting the underwriters from every prospectus, the underwrite database is created. Table 1 shows the top 10 underwriters by the frequency of their appearance in the IPO cases, and the full rank list is in Appendix C.

Rank	Name	Freq
1	First Shanghai Capital Limited	137
2	Guotai Junan Securities (HK) Limited	113
3	Kingsway Sw Securities Limited	105
4	Tai Fook Capital Limited	93
5	Core Pacific - Yamaichi International (HK) Limited	93
6	Sun Hung Kai International Limited	92
7	Kingston Securities Limited	79
8	CSC Securities (HK) Limited	76
9	DBS Asia Capital Limited	71
10	Celestial Capital Limited	71

Table 1 Top 10 Underwriters by Frequency

The result of ranking by frequency is quite remarkable since the international big names, such as Goldman Sachs, Lehman Brother, Morgan Stanley or Merrill Linch, are not included in the top 10 list. Instead, the local investment banks, such as First Shanghai Capital Limited, Guotai Junan Securities (Hong Kong) Limited, and Kingsway Sw Securites Limited, take most of the positions in Top 10. Within the top 10 underwriters, the frequency of their cases drops quickly as the bottom one is only about the half of the top one.

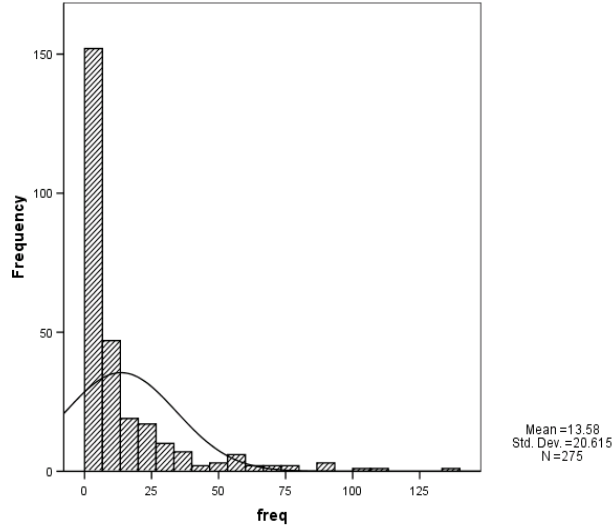


Figure 2 Distribution of Number of Cases Involved

By frequency, the distribution of the frequency of underwriters as well exhibits a surprising result. First Shanghai Capital Limited, which takes the first place in the ranking, has been involved in 137 IPO cases, which is more than a quarter of the whole sample. And the last underwriter in the top ten, Celestial Capital Limited, is also involved in more than one eighth of the whole cases. These figures show that the investment banking business is quite concentrated.

Since the underwriting business is non-exclusive, it is impossible to measure the market share of every underwriter. As the consequence, the Herfindahl-Hirschman Index (HHI), the indicator of the competition among firms in one market, does not apply. The distribution of the number of cases one underwriter involved is shown in Figure 2 by bar chart, and the black line stand for a normal distribution. Clearly the distribution is positively skewed and

have a greater kurtosis than normal distribution.

Industry Sector	Name	Freq
Electronic, Electrical Equip	Oriental Patron Asia Limited	7
	First Shanghai Capital Limited	7
	CSC Securities (HK) Limited	6
	Guotai Junan Securities (HK) Limited	5
	DBS Asia Capital Limited	5
General Retailers	Sun Hung Kai International Limited	4
	First Shanghai Capital Limited	4
	DBS Asia Capital Limited	4
	Dao Heng Securities Limited	4
	Tai Fook Capital Limited	3

Table 2 Industry Experts Underwriters (Part)

Table 2 shows the most active (top five) underwriters in two selected industries while the full list is in Appendix D. In Electronic and Electrical Equipment industry, for example, the frequencies of the underwriters in the top five are very close to each other. According to the full list of active underwriters in different industries, we define the underwriters in the top five most active underwriters in one industry as the "industry expert underwriter", since it is reasonable to believe that the most active underwriters in one industry is able to gain better knowledge from their experience. This is the one of the main properties of an underwriter.

**Definition 1** *If underwriter  $U_i$  is one of the industry expert in industry  $j$ , we define the expert property as follow.*

$$U_i(j) = 1$$

otherwise,

$$U_i(j) = 0$$

## 4.2 Industrial Coverage

Since one of the key competitiveness of the underwriter syndicate is that they have better knowledge of the market and thus are able to price the shares accurately, it is basic requirement that the members of the underwriter syndicate should be able to cover more investors. As we have assign the industry expert property of every underwriter, it is reasonable to believe that the syndicate with more industry experts in its team is of more knowledge about the market.

For a certain underwriting syndicate, we define the industrial coverage as follow.

**Definition 2** For a syndicate  $R_k(U_1, U_2, \dots, U_{kn})$ , the industrial coverage of the syndicate  $IC_k$  is

$$IC_k = \sum_{j=1}^{j_{\max}} \left( \sum_{ki=1}^{kn} U_{ki}(j) \right)$$

where  $j$  represents different industry. And for the same  $j$ , only the first  $U_{ki}(j) = 1$  is counted.

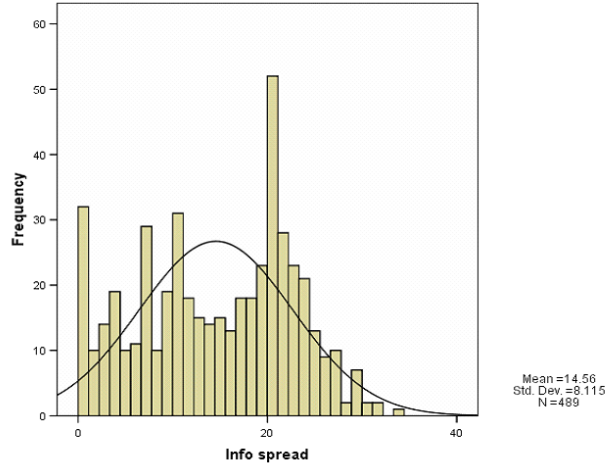


Figure 3 IS Distribution

Figure 3 illustrates the accumulated distribution of the industrial coverage of the underwriter syndicates. The average industrial coverage is 14.56 out of 34 industry sectors. Only very few syndicate achieve the industrial coverage more than 25.

### 4.3 Syndicate Expertise

In order to set the best offering price and investigate the market demand for equity from a certain industry, the syndicate is expected to be the expert in the same industry of the issuer. Otherwise, the syndicate does not understand the value of the shares they are selling and is not able to price the shares accurately, being exposed to the risk of the market.

**Definition 3** *If the most covered industry sector  $J$  of a certain syndicate is the same industry of the issuer, we define*

$$SS_k = 1$$

The most covered industry sector  $J$  for a certain syndicate  $k$  satisfies the following equation:

$$\sum_{ki=1}^{ki_n} U_{ki}(j) = \max\left\{\sum_{ki=1}^{ki_n} U_{ki}(j), j \in (0, j_{\max})\right\}$$

The Figure 4 demonstrates the statistic information about the industrial expertise of the underwriter syndicate. Among 489 syndicates, only 80 syndicates' expertise industry is not the same as the issuer's. However, dominate amount of underwriters choose to have the same expertise industry with their clients.

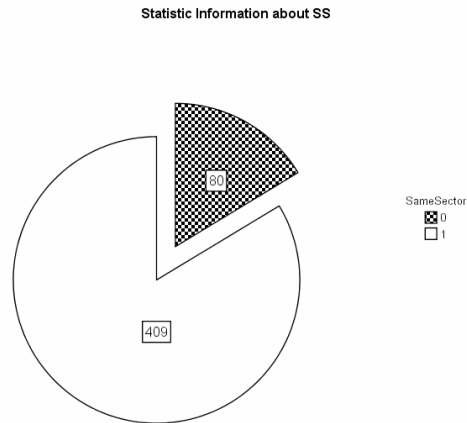


Figure 4 SS Distribution

## 4.4 Leaders Competence

There are normally two roles in a syndicate: member and leader. As a leader, the underwriter usually plays a much more important role than the members, taking a greater proportion of the commission fee as well. Of hundreds of the underwriters, what is the criteria of being the leader underwriter? The basic requirement should be as follow. First, the lead underwriter should be able to conduct the its role as the leader and introduce the relavent and helpful underwriter as the member of the syndicate. Second, the lead underwriter should be of reputation and its name should be able to signal the qualification of the IPO shares. Of the two requirements, it is practical to use the rank on the frequency list (Appendix C) representing the suitability and the reputation.

This is in accordacne to the previous observation by Hayes (1971). Hayes discovers that the investment banking industry is characterized by a intrinsic hierarchy. The privileged investment banks have considerable strength, particular in underwriting area. Further, he argues that an investment bank establishes its own reputation in following ways: the partner's reputation, capital strength of the bank itself, and power in the distribution of securities.

**Definition 4** *If the best ranked underwriter by frequency is the leader underwriter in a syndicate, we define*

$$BR_k = 1$$

*Otherwise,*

$$BR_k = 0$$

As shown in Figure 5, the "Best Ranked as Leader" group dominates syndicates. Only 27 syndicates out of 489 do not choose the best ranked underwriter as their lead underwriter. The proportion of the "Best Ranked as Leader" is even greater than the "Same Sector Property" group, suggesting the lead underwriter is of more importance in constructing IPO syndicate.

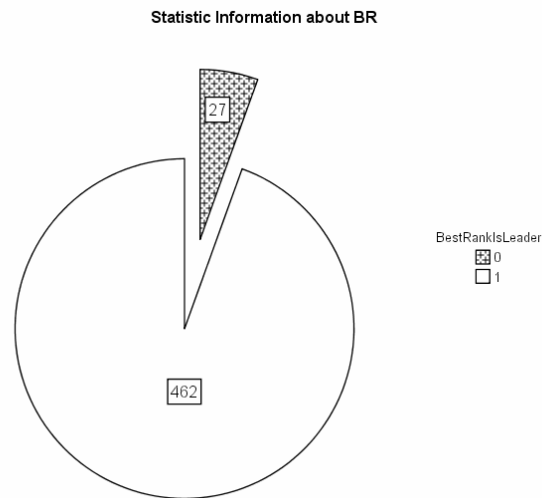


Figure 5 *BR* Distribution

## 4.5 Discussion

In all, the parameters, including industrial coverage (*IC*), same sector properties (*SS*) and best ranked as leader (*BR*) construct the basic framework

of the syndicate analysis. As the main concern of the syndicate is to underwrite the IPO shares, the underwriter syndicate is determinant to the IPO performance.

In order to understand the importance of the syndicate properties, we run regression tests on underpricing level ( $UP$ ) and oversubscription ratio ( $Over\ sub$ ), both of which are important measures of the IPO performance.

The underpricing level represents the mispricing of the IPO shares. Although some believe that a certain level of underpricing is necessary for many purposes, such as choosing target investors and stimulating secondary market liquidity, severe underpricing of IPO shares ultimately leads to the cost of issuer and turn out to be inefficient. Moreover, attempts to separate necessary underpricing level and the inefficient underpricing have never been successful in existing literatures. The underpricing level *per se* is used to represent the cost. As we can see in the Table 3 in the aggregate level, besides the liquidity shock by capitalization of the IPO, the variable  $SS$  is significantly influential to the underpricing level. The result suggests that the more industry experts in the syndicate leads to less mispricing of IPO shares.

The oversubscription is as well an important measure for an offering. A successful underwriter syndicate is supposed to be able to encourage enough investors in primary market and thus the oversubscription will be high. In Table 4, the oversubscription is significantly influenced by the variable  $BR$ , suggesting that strong leadership is the determinantal factor on the primary market performance.

Table 3  
Regression Tests on Underpricing Level

Industry Sector	Software & Computer Services		Personal Goods		Technology Hardware & Equip.		Media		Aggregate Level	
	Coef	StdError	Coef	StdError	Coef	StdError	Coef	StdError	Coef	StdError
Ln(CAP)	1.323 **	0.314	0.016	0.014	0.092	0.099	0.018	0.023	0.230 **	0.054
IS	-0.013	0.062	0.000	0.002	-0.022	0.022	0.001	0.004	-0.023	0.013
SS	<sup>a</sup>		<sup>a</sup>		<sup>a</sup>		<sup>a</sup>		-0.505 *	0.251
BR	5.547	3.316	-0.081	0.088	-0.322	0.665	-0.054	0.168	0.242	0.431
SyndSize	-0.096	0.096	0.012 **	0.005	0.112 **	0.035	-0.003	0.010	0.018	0.023
Cconst	-27.816 **	7.349	-0.244	0.295	-1.797	2.029	-0.171	0.461	-3.389 **	1.159
Sig.(2-tailed)		0.003 **		0.134		0.035 *		0.851		0.000
Adjusted R Square		0.234		0.091		0.207		0.060		0.040

\*\*Significant at 5% level

\*Significant at 10% level

<sup>a</sup>Variable is deleted because of being constant or having missing correlations in the specific industry sector

**Table 4**  
**Regression Tests on Over Subscription**

Industry Sector	Software & Computer Services		Personal Goods		Technology Hardware & Equip.		Media		Aggregate Level	
	Coef	StdError	Coef	StdError	Coef	StdError	Coef	StdError	Coef	StdError
Ln(CAP)	4.638	11.714	33.849	23.175	9.043	7.797	29.796	19.293	18.644	3.503
IS	0.168	1.802	2.369	3.752	-4.707	2.055	-0.414	3.447	1.019	0.826
SS	a		a		a		a		-4.762	16.217
BR	-125.996	86.223	-59.725	142.376	142.305	50.656	79.133	136.340	-89.434	26.274
SyndSize	0.423	2.688	2.100	7.702	-4.515	2.519	-14.288	8.815	-0.108	1.420
Const	58.706	261.446	-562.358	479.472	-161.119	160.128	-458.207	378.763	-230.121	74.690
Sig.(2-tailed)		0.523		0.334		0.012		0.203		0.000
Adjusted R Square		0.022		0.021		0.364		0.113		0.096

\*\*Significant at 5% level

\*Significant at 10% level

a variable is deleted because of being constant or having missing correlations in the specific industry sector

## 5 Underwriter Network Analysis

Until now, the structure of the underwriter network is unclear. Why and how the underwriters form syndicate is left in dark. This section focuses on the structure of the underwriter network by implementing the cutting edge network analysis techniques.

In a network, the nodes are connected to each other by the means of lines. In the underwriter network, the nodes are the individual underwriters and the links are defined as the pairwise connection when two underwriters cooperate in some syndicate. Among different types of network, the random graph is the most adaptive technique describing the underwriter network. Random graph theory has been implemented in many network analysis to describe the statistical properties of graphs, such as distributions of sizes, and typical average nodes distance.

The random graph has been implemented into a lot of social collaboration networks, such as board of directors of companies, co-ownership network of companies, collaborations of scientist and even movie actors. However, the traditional random graph can not fit the empirical data perfectly. An adapted random graph theory (Newman, Strogatz and Watts, 2001) is implemented in this paper, which has been proved powerful in exploring collaborative network.

Since the underwriter network is a collaboration network, to implement the random network analysis, it is necessary to adapt the collaborative relationship among nodes into a pairwise relationship. The detail of this adaptation is explained in Figure 6<sup>3</sup>.

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<sup>3</sup>The graph is adapted from Newman, Strogatz and Watts (2001)

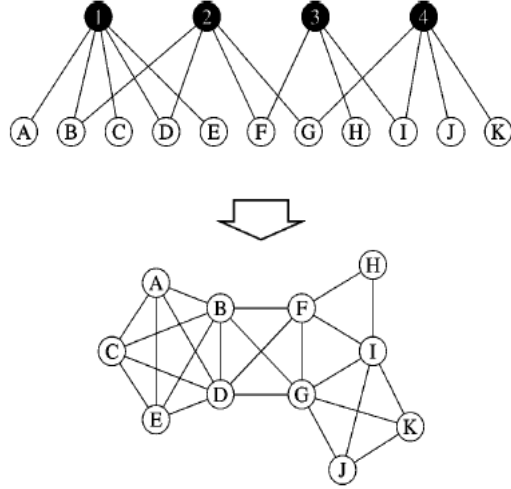


Figure 6 From Collaborative to Pairwise  
Network

## 5.1 The Random Graph with Arbitrary Degree Distribution

In random graph, we assume the existence of the link between two nodes is independent of the existence of the links between any other two nodes. As the consequence, the existence of the link is solely dependent on the probability  $p$ . For a network with  $N$  nodes and the average links from one node is  $z$ , then we have

$$p = \frac{z}{N-1} \approx \frac{z}{N} \text{ when } N \text{ is large}$$

For an individual node, the probability distribution  $p_k$  can be calculated as follow for the edges connected by  $k$  links.

$$p_k = \binom{N}{k} p^k (1-p)^{N-k} \approx \frac{z^k e^{-z}}{k!} \text{ when } N \text{ is large}$$

which is a typical Poisson distribution. Suppose we have a undirected graph of  $N$  nodes, and  $N$  is large. The generating function  $G_0(x)$  is defined as follow

$$G_0(x) = \sum_{k=0}^{\infty} p_k x^k,$$

where the  $p_k$  is the probability and the generating function  $G_0(x)$  represents the aggregate probability distribution of nodes with  $k$  connections. The generating function is normalized so that

$$G_0(1) = 1.$$

In this setting, one quantity result of interest, the distribution of size of groups is given by the paper. We can write the following equation for the probability  $r_z$  of having the  $z$  as the size of group<sup>4</sup>:

$$r_z = \frac{\gamma^z}{z!} e^{\mu(e^{-\gamma}-1)} \sum_{k=1}^z \left\{ \begin{matrix} z \\ k \end{matrix} \right\} [\mu e^{-\gamma}]^k, \quad (1)$$

where the coefficients  $\left\{ \begin{matrix} z \\ k \end{matrix} \right\}$  are the Stirling numbers of the second kind

$$\left\{ \begin{matrix} z \\ k \end{matrix} \right\} = \sum_{r=1}^k \frac{(-1)^{k-r}}{r!(k-r)!} r^z$$

and  $\mu$ ,  $\gamma$  are the average groups related for each node and the average size of groups.

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<sup>4</sup>The proof of equation (1) is in Appendix A, adapted from Newman, Strogatz and Watts (2001).

This random graph with arbitrary degree technique have been applied to many other social networks, such as worldwide web, collaboration graphs of scientists and Fortune 1000 company directors.

## 5.2 Empirical Results

Figure 7 illustrates the distribution of the size of the underwriting syndicate in our sample. In this figure, the distribution is clearly double peaked. The first peak is around the point when size equals 3, and the other one is around the piont where size equals 6 and 7. To clarify the double peak perperty and find out the peaks of this distribution, we perform analysis as follow.

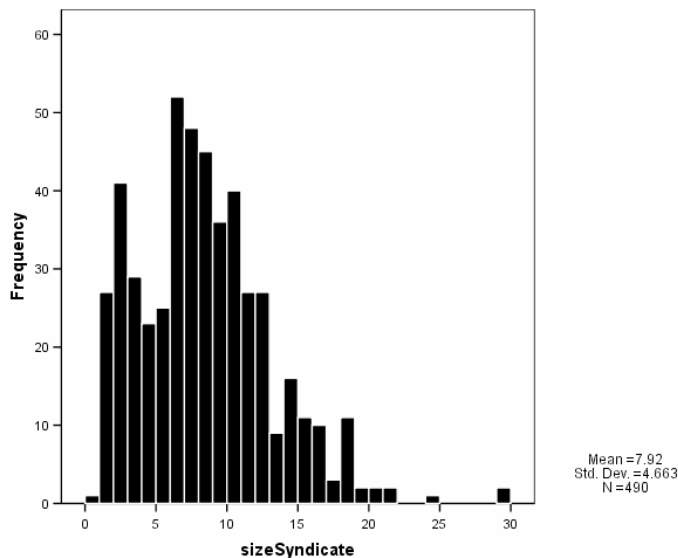


Figure 7: Distribution of Syndicate Size

First, we assume that the distribution is single peaked. By setting the parameters according to the data sample, the simulation result is shown as

follow in Figure 8. In the figure, the left axis represents the number of case for a certain syndicate size, while the right axis represents the probability for different syndicate size under the random graph settings. The single peaked simulation fits the empirical data well both at the left end of the graph and the right end of the graph, however, it does not fit the part of data when syndicate size is from 3 to 6. Consequently, we can not accept this simulation and need a further test on double peaked simulation.

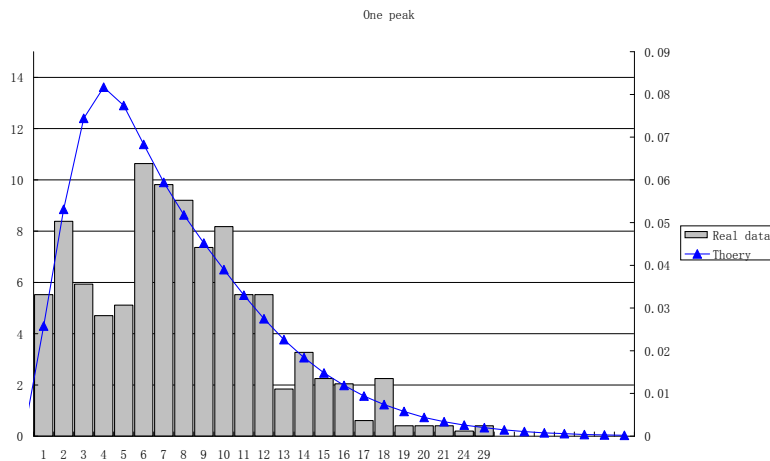


Figure 8: Single Peaked Simulation

In the double peaked simulation, the significant difference is that there are two semi-groups in this simulation. Assume that the two groups of syndicates are totally separated into two groups, say group A and B. Moreover, the separation means the following rule applies: the underwriter syndicates in group A act in a way which is independent from their peers in group B and vice versa.

Another important issue is to identify the right size of the group. Since it is clear that the separating line lies around at size 5, the following test helps to identify the exact position of the separating line.

*Define C=1 if Syndicate size>4, C=0 otherwise						
	Variables	Volume	OverSub	CapOffer	UP	
Kendall's tau_b	C	Correlation Coefficient	0.10328183 **	0.1092051 **	0.22408805 **	-0.0292289
		Sig (2 tailed)	0.00709729	0.00599997	0.000001	0.44956567
		N	455	0.10328183	490	455
Spearman's rho	C	Correlation Coefficient	0.12635329 **	0.13344413 **	0.273401 **	-0.0354874
		Sig (2 tailed)	0.00696281	0.0058647	0.000001	0.45017263
		N	455	425	490	455

**Define C=1 if Syndicate size>5, C=0 otherwise						
	Variables	Volume	OverSub	CapOffer	UP	
Kendall's tau_b	C	Correlation Coefficient	0.0600929	0.06986187	0.1716425 **	-0.0113391
		Sig (2 tailed)	0.11724566	0.07877451	3.6417E-06	0.76926336
		N	455	425	490	455
Spearman's rho	C	Correlation Coefficient	0.12635329 **	0.13344413 **	0.273401 **	-0.0354874
		Sig (2 tailed)	0.00696281	0.0058647	0.000001	0.45017263
		N	455	425	490	455

Table 5 Identifying The Separating Line of Two Groups

$C$  is the dummy variable representing different groups. In the first correlation test, it is assumed that the syndicates with size equal or smaller than 4 are in group A and the other syndicates are in group B. And in the second test, the group A contains the syndicates with size small than or equal to 5 and group B contains other syndicates. The correlation test indicates that in the first correlation test, the dummy variable  $C$  is significantly correlated with other identical variables associated with the syndicate performance.

The Volume refers to the volume of shares offered in the IPO. Capoffer is the capitalization of the IPO share with the offer price in primary market.  $UP$  is the underpricing level, caculated by the following equation:

$$UP = \frac{P_{open} - P_{offer}}{P_{offer}}$$

where  $P_{open}$  and  $P_{offer}$  refer to the first trading day open price and the offer price in primary market of a certain IPO. The variable  $OverSub$  represents the demand of the investors in primary market and is caculated as follow:

$$OverSub = \frac{N_{sub} - N_{offer}}{N_{offer}}$$

where  $N_{sub}$  and  $N_{offer}$  refer to the subscribed number of shares by investors and offered shares by issuer in primary market.

The seperating line is not only clear in the correlation test, but significant in the figures. The following figures illustrate the relationship between the size of the syndicate and other factors.

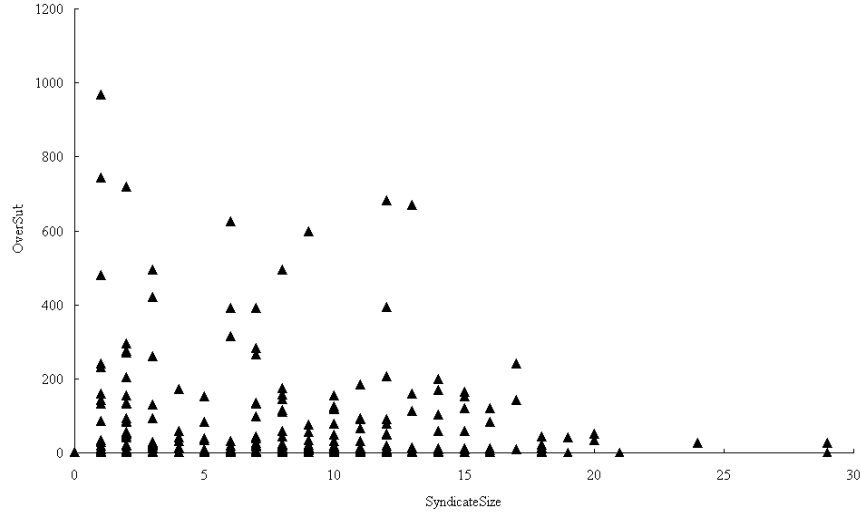


Figure 9 Oversub and Size of Syndicates

In Figure 9, the separation is clear. On the left hand of the line  $size = 5$ , the frontier of variable *OverSub* is decreasing along while size is increasing. However, on the right hand of the line  $size = 5$ , the trend of the frontier of *OverSub* is not as clear as it is on left hand. The maximum value of *OverSub* is in the left hand group. Since the variable *OverSub* represents the demand of the investors for the IPO shares, the distribution indicates the underwriter syndicate in the left hand is more likely to stimulate greater demand.

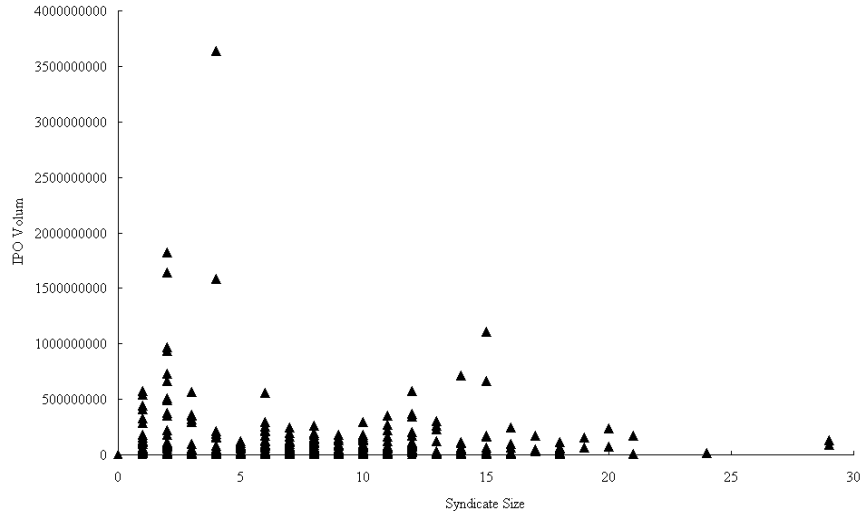


Figure 10 IPO Volume and Size of Syndicates

Figure 10 exhibit a surprising empiricial result. It is always claimed that the reason for underwriter syndicate rather than individual underwriter is that individual underwriter is not able to carry on a huge case. However, Figure 10 shows most huge cases, measured by IPO volume, are underwritten by smaller syndicates. There might be two reasons for this. One is that underwriters are now able to carry on great cases while the they are gathering for some other purposes. The other one is that there is a optimal syndicate size. If the size of syndicate beyond the optimal size, the underwriters fail to cooperate as they should be in the big syndicates.

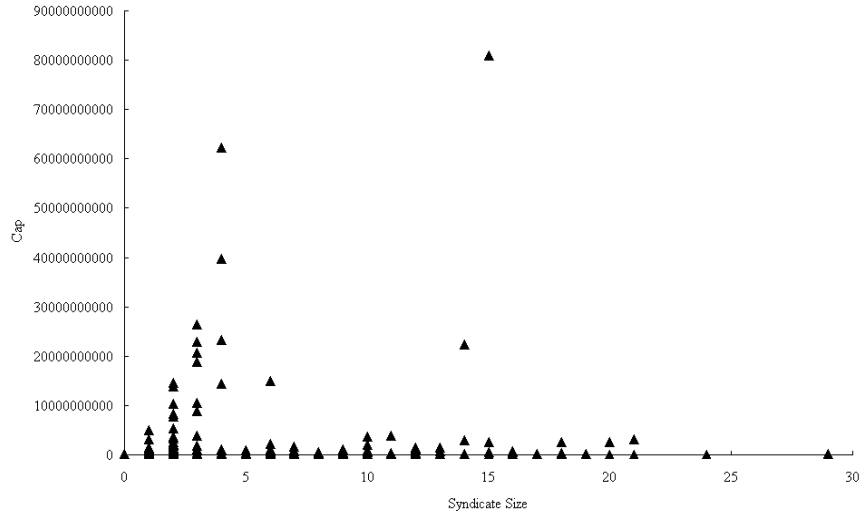


Figure 11 IPO Capitalization and Size of Syndicates

The separation is clear in Figure 11 that the capitalization's maximum limit before the line size equal to 4 rises with the increase of the syndicate size, and the capitalization drops sharply at the point size equal to 5. Except for some extreme cases around the point when size at 15, most of the IPOs with a greater syndicate (more than 5) are relatively small in term of capitalization.

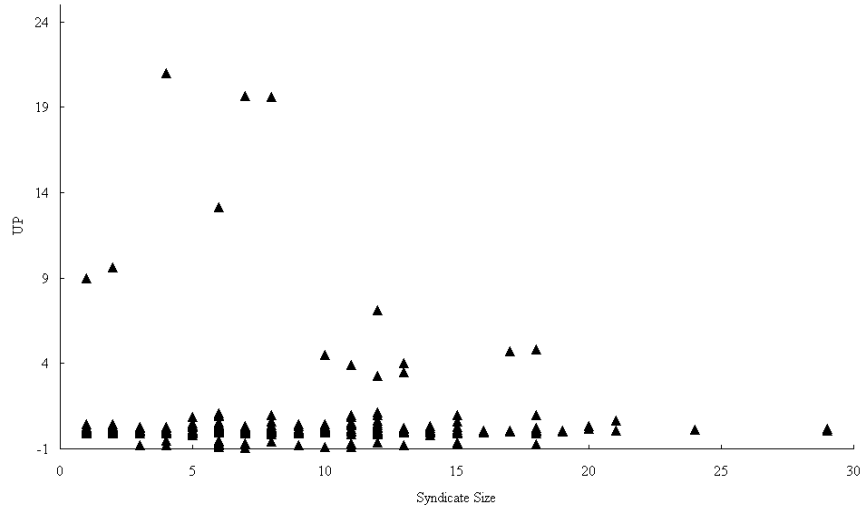


Figure 12 Underpricing and Size of Syndicates

As Figure 12 indicates, the size of the syndicate is not actually relevant to the underpricing level and the two groups of underwriter syndicates do not significantly influence the underpricing level. This result from the Hong Kong market is consistent with the previous observations documented by Logue, Rogalski, Seward and Foster-Johnson (2002).

As such, we simulate a double-peaked distribution and the detailed information about the simulation two-peaks distribution is presented in Appendix B. Figure 13 illustrates the distribution and it fits the empirical result.

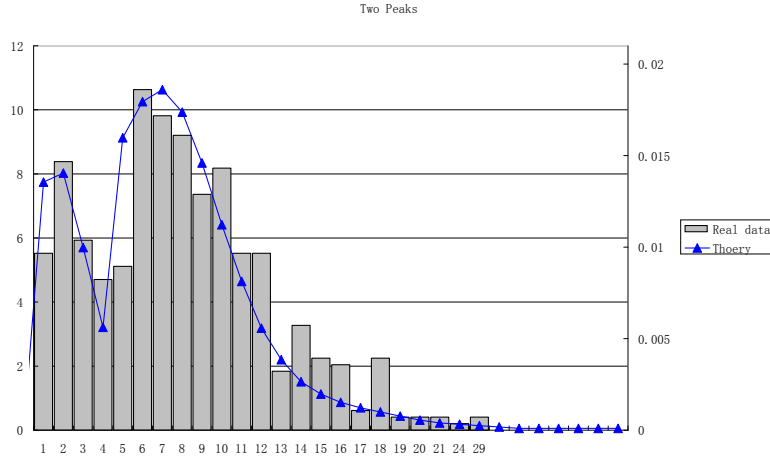


Figure 13 Double Peaked Simulation

### 5.3 Remarks

In this section, we investigate into two groups of syndicates in the underwriting business in Hong Kong market. Our analysis is further confirmed by the correlation tests and empirical figures. The two groups of underwriter syndicates do not only have different sizes, but also lead to significantly different performance outcomes. The two groups of syndicates differ from IPO sizes, both in term of volume and capitalization, and oversubscription ratio.

Beyond the two peaks, some questions remain unclear. First, is this phenomenon identical for Hong Kong market, or true for all mature financial markets, or even true for emerging markets? More data is needed to answer this question. Second, the mechanism of the dividen of the two groups of underwriter syndicates is still a puzzle. Is this the result of the action of long term market selection (as natural selection) or a representative example

of failing of cooperative game? Third, why bigger underwriters can not sufficiently use their information to set a more accurate price, as we predict by instinct?

## 6 Conclusion

In majority of the existing literatures, the underwriter syndicate have not yet been seriously investigated. As a consequence, up to my knowledge, no comparable result can be used as reference for the unique phenomenon about the different performance of two groups of syndicates. However, some research do mention the importance of the underwriter syndicate, such as Carter and Manaster(1990), Hu and Ritter(2007), emphasising the reputation of the syndicate, or the analyst resource. Meanwhile, the underwriter syndicate data is not widely available. In most of the available and widely used database, the data on the size of syndicate is not available. In some leading financial databases, only limited data in U.S. and Canada market is available.

In some earlier research, the underwriter reputation is tested for the IPO performance, such as after market liquidity, underpricing level, and the long term performance. However, those research usually pick out the most reputable underwriter in the syndicate or among the managing underwriters(lead managing underwriter and co-managing underwriters). The interactions among underwriter syndicate are neglected and other member underwriters are not taken into account. Based on the ambiguous definition of the reputation of the underwriter syndicates, the researches may lead to

imperfect outcomes.

This paper carefully examines underwriter syndicates and present detailed measurements of the syndicate. By implementing the detailed measurements, the IPO performance is retested and the result shows that some syndicate properties are robustly related to IPO performance.

Moreover, the distribution illustrates that there are groups of underwriter syndicates and the performance of the two groups differs significantly. Although the question that whether this grouping phenomenon is identical in Hong Kong market is not clear at the moment, the result demonstrates that one single underwriter can not represent the whole syndicate and the research based on underwriter syndicates but using one underwriter's properties instead of careful measurements might be potentially misleading. Afterall, the research shows that a perspective from underwriter syndicate is not only interesting, also necessary.

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## Appendix A. Single peaked distribution

Let us assume that in a undirected graph, every edge between any two vertices is independently present or absent of any other edges, and the probability of the independent present of the edge is  $p$ . If there is a graph with  $N$  vertices, the average number of edges between vertices should be  $z = p(N - 1)$ . If we define the number of edges connected to any particular vertex  $k$ , then the probability  $p_k$  should be

$$p_k = \binom{N}{k} p^k (1 - p)^{N-k} \stackrel{N \rightarrow \infty}{\simeq} \frac{z^k e^{-z}}{k!}.$$

Then the generating function  $G_0(x)$  for the probability distribution of vertex degree  $k$  should be defined as:

$$G_0(x) = \sum_{k=0}^{\infty} p_k x^k$$

Since the distribution  $p_k$  is assumed to be normalized, we have

$$G_0(x) = 1.$$

In this setting, the probability  $p_k$  is given by the  $k$ th derivative of  $G_0(x)$ .

In a poisson distributed graph, the distribution leads a standard random graph. As  $N$  is a large number,  $p = \frac{z}{N}$ .  $G_0(x)$  is given by

$$G_0(x) = \sum_{k=0}^N \binom{N}{k} p^k (1 - p)^{N-k} \simeq e^{z(x-1)}$$

Consider in a bipartite graph of  $M$  IPOs and  $N$  underwriters, we define the average number of IPOs involved for underwriters as  $\mu$ , and the average size of IPO as  $\nu$ , so we have

$$\frac{\mu}{M} = \frac{\nu}{N}.$$

Thus, we can define the generating function for the number of IPOs involved for underwriters  $f_0(x)$  and the size of IPOs  $g_0(x)$  as

$$f_0(x) = \sum_j p_j x^j \quad g_0(x) = \sum_k q_k x^k$$

Consider a poisson-distributed numbers of both  $f_0(x)$  and  $g_0(x)$ , we have

$$f_0(x) = e^{\mu(x-1)} \quad g_0(x) = e^{\nu(x-1)}$$

so  $f_1(x) = \frac{df_0(x)}{dx} = f_0(x)$  and  $g_1(x) = \frac{dg_0(x)}{dx} = g_0(x)$ . We find that the generation function for the graphs

$$G_0 = f_0(g_1(x)) = \exp[\mu(e^{\nu(x-1)} - 1)]$$

We can then perform derivative and setting  $x = 0$ . For the probability  $r_1$  of syndicate size 1, we find

$$r_1 = G_0'(x) = \mu\nu e^{-\nu} e^{\mu(e^{-\nu}-1)}$$

and for the probability  $r_2$  of syndicate size 2, we find

$$r_2 = G_0''(x) = \nu^2 e^{\mu(e^{-\nu}-1)} (\mu e^{-\nu} + \mu^2 e^{-2\nu})$$

So the probability  $r_z$  of syndicate size  $z$  should be

$$r_z = \frac{\gamma^z}{z!} e^{\mu(e^{-\gamma}-1)} \sum_{k=1}^z \left\{ \begin{matrix} z \\ k \end{matrix} \right\} [\mu e^{-\gamma}]^k \quad (2)$$

where the coefficients  $\left\{ \begin{smallmatrix} z \\ k \end{smallmatrix} \right\}$  are the Stirling numbers of the second kind

$$\left\{ \begin{smallmatrix} z \\ k \end{smallmatrix} \right\} = \sum_{r=1}^k \frac{(-1)^{k-r}}{r!(k-r)!} r^z.$$

## Appendix B. Double peaked distribution

Consider now we have two independent groups of underwriters, group  $A$  and  $B$ , where underwriters only cooperate with the underwriters within the same group. The average number of IPOs involved for underwriters as  $\mu_A$  and  $\mu_B$ , and the average size of IPO as  $\nu_A$  and  $\nu_B$  in group  $A$  and  $B$  accordingly. For the syndicate size  $z$ , we find the aggregate probability  $r_z$  as

$$r_z = \lambda_A r_{zA} + \lambda_B r_{zB}$$

where  $\lambda_A$  and  $\lambda_B$  are the proportion of IPOs in group  $A$  and  $B$ . The  $r_{zA}$  and  $r_{zB}$  can be derived from the equation (2).

## Appendix C. Overall frequency rank

Underwriter	Frequency	Underwriter	Frequency
First Shanghai Capital Limited	137	First Asia Financial Group Limited	19
Guotai Junan Securities (HK) Limited	113	Emperor Securities Limited	19
Kingsway Sw Securities Limited	105	Young Champion Securities Limited	18
Tai Fook Capital Limited	93	Sinopac Securities (Asia) Limited	18
Core Pacific - Yamaichi International (HK) Limited	93	Partners Capital International Limited	18
Sun Hung Kai International Limited	92	Anglo Chinese Corporate Finance Limited	18
Kingston Securities Limited	79	Sinpac Securities (HK) Limited	17
CSC Securities (HK) Limited	76	Pacific Challenge Capital Limited	17
DBS Asia Capital Limited	71	Japan Asia Securities Limited	17
Celestial Capital Limited	71	BCOM Securities Company Limited	17
Shenyin Wanguo Capital (HK) Limited	63	Christfund Securities Limited	16
SBI E2-Capital Securities Limited	62	AMS Corporate Finance Limited	16
BNP Prime Peregrine	60	Taiwan Concord Capital Securities (HK) Limited	15
South China Capital Limited	58	Pacific Foundation Securities Limited	15
JS Cresvale International Limited	58	Tanrich Securities Company Limited	14
Oriental Patron Asia Limited	57	Merrill Lynch Far East Limited	14
ICEA Capital Limited	56	Phillip Securities (HK) Limited	13
BOCI Asia Limited	54	Daiwa SBCM HK	13
Kim Eng Securities (HK) Limited	51	Yuanta Securities (HK) Company Limited	12
Barits Securities (HK) Limited	51	TingKong-RexCapital Securities International Limited	12
TIS Taiwan International Securities (HK) Limited	48	The Bank of East Asia, Limited	12
Phoenix Capital Securities Limited	41	Sino Grade Securities Limited	12
Polaris Securities (HK) Limited	40	New Japan Securities International (HK) Limited	12
HSBC Investment Bank Asia Limited	38	Karl-Thomson Securities Company Limited	12
KGI Asia Limited	36	ING Barings	12
GC Securities Limited	36	Goldbond Capital (Asia) Limited	12
Dao Heng Securities Limited	36	G. K. Goh Securities (HK) Limited	12
Sanfull Securities Limited	35	Credit Suisse First Boston (HK) Limited	12
MasterLink Securities (HK) Corporation Limited	35	Toyo Securities Asia Limited	11
CLSA Global Emerging Markets	34	OSK Asia Securities Limited	11
Worldsec Corporate Finance Limited	33	NSC Securities (Asia) Limited	11
Koffman Securities Limited	33	HT Securities Limited	11
CEF Capital Limited	33	Grand Vinco Capital Limited	11
Vickers Ballas Capital Limited	32	CITIC Capital Market Limited	11
Luen Fat Securities Company Limited	32	Asia Financial (Securities) Limited	11
UOB Asia (HK) Limited	31	Somerley Limited	10
Taiwan Securities (HK) Company Limited	31	Sinomax Securities Limited	10
Get Nice Investment Limited	30	ABN AMRO Rothschild	10
CM-CCS Securities Limited	30	Yuanta Brokerage Company Limited	9
Core Pacific - Yamaichi Capital Limited	28	Vermont Securities Company Limited	9
Hantec Capital Limited	26	UBS Warburgh	9
CAF Securities Company Limited	26	Prudential Brokerage Limited	9
Nomura International (HK) Limited	25	Ong Asia Securities (HK) Limited	9
Goldman Sachs (Asia) L.L.C.	25	First Securities (HK) Limited	9
China Everbright Securities (HK) Limited	25	China Merchant Securities (HK) Co. Limited	9
Wintec Securities Limited	24	Asia Investment Capital Limited	9
South China Securities Limited	24	Upbest Securities Company Limited	8
China International Capital Corporation (HK) Limited	24	Yicko Securities Limited	8
Quam Securities Company Limited	23	Wocom Securities Limited	8
CU Securities Limited	22	Uni-Alpha Securities Limited	8
Cazenove Asia Limited	22	Rexcapital (HK) Limited	8
Watterson Asia Limited	21	Jardine Fleming Securities Limited	8
VC CEF Capital Limited	21	FB Gemini Securities Limited	8
Morgan Stanley Dean Witter Asia Limited	21	Crosby Limited	8
Grand Cathay Securities (HK) Limited	21	China Southern Securities (HK) Limited	8
Ever-Long Securities Company Limited	21	Worldwide Finance (Securities) Limited	7
Deloitte & Touche Corporate Finance Limited	20	Platinum Securities Company Limited	7
YF Securities Company Limited	19	Mayfair Securities Limited	7
Shun Loong Securities Limited	19	IPO Securities Limited	7
Ka Wah Capital Limited	19	Interchina Securities Limited	7

Underwriter	Frequency	Underwriter	Frequency
ING Bank N.V.	7	Great China Brokerage Limited	3
e2 Capital Limited	7	Grand Investment (Securities) Limited	3
DL Brokerage Limited	7	Goodwill Financial Service ( Holding) Limited	3
Whole Win Securities Limited	6	Fuhwa Securities (HK) Co. Limited	3
Quest Stockbrokers (HK) Limited	6	Devonshire Securities Limited	3
Peace Town Securities Limited	6	Credit Lyonnais Securities (Asia) Limited	3
Lippo Securities Limited	6	Core Pacific Securities International Limited	3
Hung Sing Securities Limited	6	ASG Brokerage Limited	3
Guangdong Securities Limited	6	Advanced Partners Brokerage Limited	3
Deutsche Bank AG, Hong Kong Branch	6	Yicko GA Network Securities Limited	2
Citigroup	6	Worldvest Capital Limited	2
CCB International Capital Limited	6	Tiffit Securities (HK) Limited	2
Upsets Securities Company Limited	5	Thing On Securities Limited	2
Tung Tai Securities Co. Limited	5	Sun Delta Securities Limited	2
Stockwell Securities Limited	5	Success Talent Investments Limited	2
Salomon Smith Barney	5	South Capital Brokerage Limited	2
Open Offering Capital Limited	5	Paul Securities Limited	2
Liu Chong Hing Bank Limited	5	Pacific Pearl Securities Limited	2
JPMorgan	5	OUB Securities (HK) Limited	2
International Capital Network Limited	5	New Century Securities Limited	2
Gransing Securities Co. Limited	5	Macquarie Securities Limited	2
Coin Fall Limited	5	Lehman Brothers	2
CIMB-GK Securities (HK) Limited	5	Kay Hian Overseas Securities Limited	2
Bear Stearns Asia Limited	5	Honour Securities Company Limited	2
Baron Capital Limited	5	Hong Tong Hai Securities Limited	2
Altus Capital Limited	5	Genesis Global Strategies Limited	2
pacific foundation securities limited	4	Fulbright Securities Limited	2
Yu Ming Investment Management Limited	4	Friedmann Pacific Securities Limited	2
Standard Chartered Bank	4	Eagle Legend Securities Limited	2
Roctec Securities Company Limited	4	Dresdner Kleinwort Benson	2
Prudential-Bache Securities (HK) Limited	4	Delta Asia Securities Limited	2
Prime Securities Limited	4	Daewoo Securities (HK) Limited	2
Open IBN (HK) Limited	4	Cheung's Securities Brokers Limited	2
Onshine Securities Limited	4	Chelac Investment Company	2
New Universe Securities (HK) Limited	4	Chateron Corporate Finance Limited	2
KCG Securities Asia Limited	4	Business Securities Limited	2
Indosuez W. I. Carr Securities	4	Amsteel Securities (HK) Limited	2
Hooray Securities Limited	4	International Network Capital Limited	1
Hing Wong Securities Limited	4	Yue Xiu Securities Company Limited	1
Hani Securities (HK) Limited	4	Wellfull Securities Company Limited	1
First Sign Securities Limited	4	WAG Worldsec Corporate Finance Limited	1
EAA Securities Limited	4	Value Partners Limited	1
APC Securities Company Limited	4	V Six Securities Limited	1
Access Capital Limited	4	Troopers Securities Limited	1
Wing Hang Bank Limited	3	Tokai Tokyo Securities (Asia) Limited	1
Warburg Dillon Read	3	Times Securities Company Limited	1
Vinco Capital Limited	3	Tat Lee Securities Company Limited	1
Victorfield Securities Limited	3	Tartan Securities (Asia) Limited	1
VC Capital Limited	3	Tai Wah Securities Limited	1
Trustful Securities Limited	3	Sun Growth Securities Limited	1
TradingGuru.com Securities Limited	3	Stockmartnet Financial Services Limited	1
TISCO Securities HK Limited	3	Standard Bank Asia Limited	1
Standard Capital Limited	3	SPS Securities Limited	1
SG Securities	3	Shinko Securities (HK) Limited	1
Po Kay Securities & Shares Company Limited	3	SC Securities (Asia) Limited	1
Okasan International (Asia) Limited	3	Sassoon Securities Limited	1
Mansion House International Limited	3	President Securities (HK) Limited	1
Magnum International Securities Limited	3	OCBC Securities (HK) Limited	1
Kaiser Securities Limited	3	National Resources Securities Limited	1
Hui Kai Securities Limited	3	N M Rothschild&Sons	1

Underwriter	Frequency
Metro Capital Securities Limited	1
Malahon Securities Limited	1
Magusta Securities Limited	1
Lehin Securities Limited	1
Lee Tat & Co.	1
Kleinwort Benson Limited	1
Ke Capital (HK) Limited	1
J & A Securities (HK) Limited	1
Horwath Capital Asia Limited	1
Hing Wai Allied Securities Limited	1
Hang Seng Securities Limited	1
Grand Onward Securities Limited	1
Goldrich Securities Limited	1
GOA Securities Limited	1
Gateway Capital Limited	1
Gainwell Securities Limited	1
Fair Eagle Securities Company Limited	1
Eternal Pearl Securities Limited	1
Ernst & Young Corporate Finance Limited	1
Emperor Capital Limited	1
E*Trade Securities Co. Ltd	1
CSC Asia Limited	1
Chun Yick Securities Limited	1
Chow Sang Sang Securities Limited	1
China Insurance Group Securities Limited	1
Cheer Union Securities Limited	1
Capital Friend Securities Limited	1
Brighton Securities (HK) Limited	1
BOC International Holding Limited	1
Berich Brokerage Limited	1
Ample Capital Limited	1
Alta Finance Limited	1

## Appendix D. Industry expert underwriters

<p><i>Sector Electronic, Electrical Equip.</i>            Oriental Patron Asia Limited            First Shanghai Capital Limited            CSC Securities (HK) Limited            Guotai Junan Securities (HK) Limited            DBS Asia Capital Limited</p> <p><i>Sector General Retailers</i>            Sun Hung Kai International Limited            First Shanghai Capital Limited            DBS Asia Capital Limited            Dao Heng Securities Limited            Tai Fook Capital Limited</p> <p><i>Sector Leisure Goods</i>            First Shanghai Capital Limited            Oriental Patron Asia Limited            Kingsway Sw Securities Limited            JS Cresvale International Limited            BOCI Asia Limited</p> <p><i>Sector Household Goods</i>            Kingston Securities Limited            SBI E2-Capital Securities Limited            Kingsway Sw Securities Limited            Kim Eng Securities (HK) Limited            First Shanghai Capital Limited</p> <p><i>Sector Mobile Telecommunications</i>            Morgan Stanley Dean Witter Asia Limited            China International Capital Corporation (HK) Limited            Goldman Sachs (Asia) L.L.C.</p> <p><i>Sector Software &amp; Computer Services</i>            Core Pacific - Yamaichi International (HK) Limited            First Shanghai Capital Limited            Celestial Capital Limited            CSC Securities (HK) Limited            Vickers Ballas Capital Limited</p> <p><i>Sector General Industrials</i>            Sun Hung Kai International Limited            Kingston Securities Limited            Get Nice Investment Limited            First Shanghai Capital Limited            CAF Securities Company Limited</p> <p><i>Sector Personal Goods</i>            Tai Fook Capital Limited            Guotai Junan Securities (HK) Limited            Sun Hung Kai International Limited            Kingston Securities Limited            South China Capital Limited</p> <p><i>Sector Technology Hardware &amp; Equip.</i>            Kingsway Sw Securities Limited            Guotai Junan Securities (HK) Limited            First Shanghai Capital Limited            DBS Asia Capital Limited            CSC Securities (HK) Limited</p>	<p><i>Sector General Financial</i>            Kingsway Sw Securities Limited            Tai Fook Capital Limited            JS Cresvale International Limited            Guotai Junan Securities (HK) Limited            BOCI Asia Limited</p> <p><i>Sector Real Estate</i>            Watterson Asia Limited            Morgan Stanley Dean Witter Asia Limited            HSBC Investment Bank Asia Limited            Tanrich Securities Company Limited            Tai Fook Capital Limited</p> <p><i>Sector Travel &amp; Leisure</i>            Kingston Securities Limited            Yu Ming Investment Management Limited            Luen Fat Securities Company Limited            JS Cresvale International Limited            CSC Securities (HK) Limited</p> <p><i>Sector Industrial Metals</i>            Morgan Stanley Dean Witter Asia Limited            China International Capital Corporation (HK) Limited            TIS Taiwan International Securities (HK) Limited            Taiwan Securities (HK) Company Limited            Tai Fook Capital Limited</p> <p><i>Sector Pharmaceuticals, Biotechnology</i>            Guotai Junan Securities (HK) Limited            Kingsway Sw Securities Limited            First Shanghai Capital Limited            Core Pacific - Yamaichi International (HK) Limited            Polaris Securities (HK) Limited</p> <p><i>Sector Construction &amp; Materials</i>            Kingston Securities Limited            First Shanghai Capital Limited            Oriental Patron Asia Limited            Guotai Junan Securities (HK) Limited            CSC Securities (HK) Limited</p> <p><i>Sector Industrial Transportation</i>            ICEA Capital Limited            BNP Prime Peregrine            South China Capital Limited            Oriental Patron Asia Limited            Morgan Stanley Dean Witter Asia Limited</p> <p><i>Sector Oil Equipment &amp; Services</i>            Guotai Junan Securities (HK) Limited            Tai Fook Capital Limited            South China Capital Limited            Partners Capital International Limited            ICEA Capital Limited</p>
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*Sector Food & Drug Retailers*  
 BNP Prime Peregrine  
 pacific foundation securities limited  
 Wintec Securities Limited  
 UOB Asia (HK) Limited  
 Uni-Alpha Securities Limited

*Sector Support Services*  
 Kingsway Sw Securities Limited  
 SBI E2-Capital Securities Limited  
 CSC Securities (HK) Limited  
 Core Pacific - Yamaichi Capital Limited  
 BNP Prime Peregrine

*Sector Healthcare Equipment, Services*  
 Sun Hung Kai International Limited  
 ICEA Capital Limited  
 First Shanghai Capital Limited  
 Celestial Capital Limited  
 CEF Capital Limited

*Sector Industrial Engineering*  
 SBI E2-Capital Securities Limited  
 Sun Hung Kai International Limited  
 Tai Fook Capital Limited  
 Oriental Patron Asia Limited  
 Kingsway Sw Securities Limited

*Sector Automobiles & Parts*  
 The Bank of East Asia, Limited  
 Partners Capital International Limited  
 Kingsway Sw Securities Limited  
 Guotai Junan Securities (HK) Limited  
 First Shanghai Capital Limited

*Sector Banks*  
 Goldman Sachs (Asia) L.L.C.  
 HSBC Investment Bank Asia Limited  
 BOCI Asia Limited  
 UBS Warburgh  
 TingKong-RexCapital Securities International Limited

*Sector Media*  
 Tai Fook Capital Limited  
 First Shanghai Capital Limited  
 Sun Hung Kai International Limited  
 Kingsway Sw Securities Limited  
 CEF Capital Limited

*Sector Chemicals*  
 Sun Hung Kai International Limited  
 Kingston Securities Limited  
 First Shanghai Capital Limited  
 Core Pacific - Yamaichi International (HK) Limited  
 Yuanta Securities (HK) Company Limited

*Sector Food Producers*  
 Sun Hung Kai International Limited  
 Guotai Junan Securities (HK) Limited  
 Tai Fook Capital Limited  
 First Shanghai Capital Limited  
 Core Pacific - Yamaichi International (HK) Limited

*Sector Equity Investment Instruments*  
 Upbest Securities Company Limited  
 TIS Taiwan International Securities (HK) Limited  
 Shenyin Wanguo Capital (HK) Limited  
 Kingston Securities Limited  
 First Shanghai Capital Limited

*Sector Mining*  
 Merrill Lynch Far East Limited  
 Deutsche Bank AG, Hong Kong Branch  
 China International Capital Corporation (HK) Limited  
 China Everbright Securities (HK) Limited

*Sector Forestry & Paper*  
 VC CEF Capital Limited  
 Tai Fook Capital Limited  
 Sinopac Securities (Asia) Limited  
 Guotai Junan Securities (HK) Limited  
 GC Securities Limited

*Sector Beverages*  
 SBI E2-Capital Securities Limited  
 Pacific Foundation Securities Limited  
 Guotai Junan Securities (HK) Limited  
 First Shanghai Capital Limited  
 CAF Securities Company Limited

*Sector Nonlife Insurance*  
 Ka Wah Capital Limited  
 BNP Prime Peregrine  
 Worldsec Corporate Finance Limited  
 Shenyin Wanguo Capital (HK) Limited  
 Nomura International (HK) Limited

*Sector Life Insurance*  
 Morgan Stanley Dean Witter Asia Limited  
 HSBC Investment Bank Asia Limited  
 Goldman Sachs (Asia) L.L.C.  
 Deutsche Bank AG, Hong Kong Branch  
 Credit Suisse First Boston (HK) Limited

*Sector Fixed Line Telecommunications*  
 DBS Asia Capital Limited  
 China International Capital Corporation (HK) Limited  
 Wocom Securities Limited  
 Whole Win Securities Limited  
 Vermont Securities Company Limited

*Sector Electricity*  
 Morgan Stanley Dean Witter Asia Limited  
 Merrill Lynch Far East Limited  
 China Merchant Securities (HK) Co. Limited  
 BOCI Asia Limited

*Sector Oil & Gas Producers*  
 China International Capital Corporation (HK) Limited  
 BOCI Asia Limited  
 Worldsec Corporate Finance Limited  
 Tai Fook Capital Limited  
 Morgan Stanley Dean Witter Asia Limited