

# Asymmetric Information and IPO Size of Newly Listed Chinese Companies



Anton Miglo, Associate Professor, School of Business  
Congsheng Wu, Professor, School of Business

(Acknowledgements: This project has been supported by UB Seed Money Grant 2012)

## Abstract

We build a model of an IPO for firms with private information about their earnings profile over time and test the model's predictions using a complete sample of newly listed Chinese companies between 1992 and 2007. The model predicts that IPO size is positively correlated with short-term operating performance that is not directly consistent with traditional theories. It also provides an explanation for negative correlation between debt and profitability that is not consistent with standard trade-off theory or signaling theory. The empirical results provide strong support for our model.

## The Model

Our model builds on pecking order, signaling and market timing theories of capital structure. In the model, we assume that managers representing initial shareholders raise capital for an investment project and where these managers may have private information about short-term as well as long-term earnings. Consider a firm that considers equity financing for a two-period investment project with cost  $C_t$  in period  $t=1,2$ . In each period the project may be successful or unsuccessful. In the latter case the cash flow equals 1 and in the former case the cash flow equals 0. A firm's insiders have private information about the probability of success in each stage. The firms are of two types, type **a** and type **b**, with respective probabilities of success  $\theta_{at}$  and  $\theta_{bt}$  in stage  $t$ .

We show that a separating equilibrium where type **a** issues more equity exists if  $\theta_{a1} > \theta_{b1}$  and  $\theta_{a2} < \theta_{b2}$  which means that firm issuing equity has higher probability of success in period 1 and lower probability of success in period 2.

Thus our model suggests a new motive for increasing IPO size that has not been explored in existing literature. When the firm knows that it will be high-profitable in the near future and low-profitable in the long-term, it may want to issue more equity. This is contrary to standard approach under asymmetric information when the horizon of insiders private information is short-term or investment is one-stage. In that case IPO size is negatively correlated with short-term performance. When investment is two-stage and information is long-term then two types of behavior may emerge, one consistent and one inconsistent with standard approach.

## Data and Summary Statistics

We obtain the universe of Chinese domestic A-share IPOs made from the start of 1992 to the end of 2007, from GTA's IPO database. The sample contains a total of 1,571 newly listed Chinese firms. The table below displays the number of IPOs by year and some summary statistics. The average offer price is yuan 8.0 (roughly one US dollar). The first-day return, calculated as the percentage difference between the first-day close price and the offer price, is 227.4%, meaning that Chinese IPOs are substantially underpriced. The gross proceeds from the IPO, on average, is yuan 705.1 million. The average number of employees at the time of the IPO is slightly over 2,000. It is well known that many of the IPO firms are state owned enterprises being privatized. State ownership before and after the IPO is, on average, 55.1% and 39.5%, respectively.

Year	N	Offer price (yuan)	First-day return	Offer size (yuan million)	Number of employees	State ownership before IPO	State ownership after IPO
1992	40	25.9	487.0%	594.5	3,672	21.7%	36.6%
1993	129	13.1	380.7%	273.1	3,005	46.5%	42.2%
1994	106	5.2	158.8%	154.0	2,997	54.5%	38.8%
1995	28	3.9	542.7%	200.4	3,933	49.2%	35.9%
1996	206	5.2	333.3%	130.9	2,248	49.4%	36.7%
1997	209	6.1	265.8%	323.3	2,652	65.2%	45.5%
1998	104	6.2	292.9%	383.8	3,432	76.0%	54.0%
1999	97	6.3	116.2%	522.1	2,969	70.2%	48.6%
2000	133	8.0	154.7%	611.7	1,883	70.6%	47.8%
2001	75	9.0	229.9%	764.7	9,340	68.0%	47.3%
2002	71	7.0	148.7%	752.4	2,797	67.4%	45.0%
2003	67	7.3	72.0%	705.1	2,002	58.6%	38.8%
2004	100	8.5	70.1%	361.1	1,705	39.9%	26.1%
2005	15	6.6	45.1%	384.2	2,761	41.2%	25.1%
2006	65	8.2	84.8%	1970.5	13,242	37.3%	26.2%
2007	126	11.5	193.1%	3878.7	14,236	27.0%	21.3%
Overall	1,571	8.0	227.4%	747.5	4,276	55.1%	39.9%

## Operating Performance

We measure the operating performance using three accounting measures: sales, net profit, and earnings before interest and taxes (EBIT). Panel A presents the means and medians from three years prior to and three years after the IPO. As can be seen from the medians, annual sales increase steadily, even after the IPO. Net profit and EBIT, on the other hand, seem to have peaked at the time of the IPO, and declined afterwards.

Panel A: Operating Performance from Year -3 to Year +3

		Year -3	Year -2	Year -1	Year 0	Year +1	Year +2	Year +3
Sales	N	1443	1490	1266	1542	1430	1368	1359
	Mean	1348.1	1633.3	1990.1	2609.5	1617.8	1443.8	1778.1
	Median	211.0	261.0	316.0	366.5	411.0	461.0	528.0
Net Profit	N	1428	1475	1253	1391	1391	1367	1359
	Mean	221.5	268.4	326.8	446.7	217.5	106.8	132.3
	Median	22.0	29.0	35.0	46.0	48.0	44.0	44.0
EBIT	N	1443	1487	1264	1542	1430	1368	1359
	Mean	299.0	393.3	458.4	570.2	319.8	150.0	170.5
	Median	29.0	36.0	44.0	56.0	60.0	54.0	53.0

## Operating Performance

Panel B: Year to Year Percentage Changes from Year-3 to Year +3

		(-3, -2)	(-2, -1)	(-1,0)	(0, +1)	(+1, +2)	(+2, +3)
Sales	N	1441	1238	1246	1416	1362	1354
	Mean	67.8%	37.6%	27.3%	28.2%	22.3%	23.6%
	Median	22.5%	18.7%	15.4%	16.1%	14.2%	14.4%
Net Profit	N	1426	1226	1145	1262	1277	1259
	Mean	93.4%	50.7%	35.0%	-5.1%	-42.7%	96.6%
	Median	24.3%	18.8%	24.0%	9.6%	1.8%	3.1%
EBIT	N	1439	1234	1246	1412	1316	1262
	Mean	97.8%	46.4%	56.5%	60.8%	-17.8%	51.0%
	Median	23.9%	18.0%	20.2%	10.7%	1.1%	3.0%

In Panel B, we report the year over year percentage changes in operating performance. In calculating percentage changes, we exclude those that have negative or zero starting values, as their results are meaningless. The results are similar. EBIT, for instance, increases at an annual rate of around 20% in the three years leading up to the IPO, but its growth rate drops to 10.7%, 1.1%, and 3.0% in the subsequent three years.

## Regression Model

The key prediction of our model of new issues under asymmetric information is that firms will sell more new shares when they expect higher short-term earnings or lower long-term earnings. To test this prediction, we run the following regression:

$$\text{Relative Offer Size} = \alpha + \beta_1 * \text{EBIT\_0Y1} + \beta_2 * \text{EBIT\_1Y2} + \beta_3 * \text{EBIT\_2Y3} + \gamma_1 * \text{State ownership} + \gamma_2 * \ln(\text{Sales}) + \varepsilon$$

where the dependent variable is the relative offer size of the IPO. The independent variables include the year over year percentage changes in EBIT in the three years after the IPO, defined as below:

**EBIT\_0Y1 = percentage change from year 0 to year 1**

**EBIT\_1Y2 = percentage change from year 1 to year 2**

**EBIT\_2Y3 = percentage change from year 2 to year 3**

The control variables include state ownership and sales. State ownership is the percentage owned by the state government after the IPO. Sales is the annual sales (measured in yuan millions), in logarithm, in the IPO year.

## Regression Results

Variables	(1)	(2)	(3)	(4)
Intercept	0.693 [8.54]***	0.719 [7.91]***	0.719 [7.58]***	0.684 [7.14]***
State ownership	-0.059 [-1.48]	-0.070 [-1.62]	-0.078 [-1.72]*	-0.049 [-1.07]
Ln(Sales)	-0.052 [-3.85]***	-0.053 [3.45]***	-0.052 [-3.24]***	-0.053 [-3.27]***
EBIT_0Y1	0.008 [1.82]*			0.011 [2.29]**
EBIT_1Y2		0.017 [3.31]***		0.073 [6.00]***
EBIT_2Y3			0.000 [-0.45]	0.000 [-0.25]
Adj. R <sup>2</sup>	0.01	0.02	0.01	0.04
F-value	7.83	9.47	5.50	10.92

The results show that relative offer size is negatively associated with sales, a proxy for firm size. This result implies that large firms have relatively lower offer size. State ownership prior to the IPO only marginally affects relative offer size, and the effect, if any, is negative.

More importantly, the coefficients of EBIT\_0Y1 and EBIT\_1Y2 are positive and significant statistically. The results suggest that IPO firms sell more shares relative to their assets when the EBIT growth is higher in each of the two years after the IPO.

## Summary and Conclusion

In this study we establish a theoretical model of new equity issues under asymmetric information. We discuss the implications on a firm's IPO size at the time of its IPO. The model's predictions are tested using a sample of newly listed Chinese firms. The results provide strong support for our model. Specifically, the IPO size is positively correlated with short-term earnings.