New Issues

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Contents

1 IPO anomaly

Ritter and Welch (2002) provide a review of IPO, which have some important things: why firms choose to IPO and review of 3 IPO anomalies.

Why firms go IPO?

- Life cycle: firms will stay private until an optimal size for going public
- Timing: when overvalued market

IPO anomalies (3):

1. Underpricing (offering price is lower than after-market price);
   (a) Hot issue market (IPO volume clustering);
   (b) and Long-run underperformance

IPO underpricing Underpricing is measured by $IPO\,underpricing = \frac{P_{mkt,day0} - P_{offer,day-1}}{P_{offer,day-1}}$. For example, the offering price is 10 in day $t = -1$ and the close price of first trading day (day $t = 0$) is 12.5. Then, the IPO underpricing is $(12.5 - 10)/10 = 25\%$.

In US, the IPO underpricing is around 18% on average from 1980 to 2015 in Ritter's web.

Why firms leave money on the table?

- Information asymmetry/signaling
  - Between investors: Winner's curve, underprice to keep good (but uninformed) investors
  - Between issuers and investors: leave good taste
  - Between underwriters and investors: Underwriter reputation matters (unreputable underwriters should leave more)
- Information acquisitions: to attract institutional investors during roadshow
- Lawsuit avoidance
- Cascades: investors quote based on other investors' quotes, so lower down price
- Propect theory: loss feeling is more extreme than winning feeling

Hot issue market We often see high volume IPO months follow by high volume IPO months. This is market timing: firms choose good times to IPO because cost of equity is cheap.

Long-run underperformance There are some reason to explain the long-run performance:

- Market timing: firms go public at high price, so future price is lower and stock performance is worse
- Pseudo market timing
- IPO lock up: venture capitalists sells stocks after lock-up period to withdraw their ownerships at firms and get profits. Thus, price drops because high supply.
- Low risk of beta: lower asymmetry after go public
- Model specification error: no *true* model to measure stock return is high or low

IPO underpricing and oligopoly market of underwriters Liu and Ritter (2011) consider the role of oligopoly market of underwriters and how this oligopoly market affects IPO underpricing

Idea *For issuers:* In addition to IPO proceeds, IPO firms also care about other non-price dimensions of IPO underwriting such as underwriter quality, industry expertise, and analyst coverage from influential analysts. A limited number of underwriters can provide these services so the IPO underwriting market is oligopoly.

The VC (venture capitalists) prefer the "all-star" underwriters so that after IPO, the stock price is stable until the end of *lock-up* period so that VC can quit and earn profits. This is called *analyst lust theory*.

For underwriters: In addition to IPO commission fee of 7%, underwriters can benefit from IPO underpricing in two ways: (i) allocate underpricing shares to investors and (ii) allocate underpricing shares to executives (spinning effect).

Model

For issuer side:

Issuers objective function: $\alpha_1 NetIPOproceeds + \sum_{i=2}^{n} \alpha_i X_i$ where $\sum \alpha = 1$. Besides the proceeds, issuers could receive non-price dimensions such as analyst coverage.

Among N underwriters, only 3 have an all-star analysts, which market value of being covered by all-star analysts is given by A. Issuers have different preference parameter θ over all-star analyst service, $\theta \sim Uniform[0;1]$.

An issuer's net surplus from going public at underpricing level U is:

$$M - U + \theta A$$

where M is market value of shares sold net the commission fee (spread) 7% to underwriters, U is underpricing money (what left on table), and θA is effect of all-star analyst coverage on perceived value A.

For underwriter side:

The profit underwriters earn: $\pi_k = (\gamma(U - \overline{U}) - C)D_k$

where $\overline{U}$ is dollar amount of underpricing needed to compensate investors for uncertainty of IPO issue valuation (assumed to be the same across issues); C is cost of providing all-star analyst coverage ($C = 0$ for other $N - 3$ underwriters); and D_k is demend for underwriter k services. A fraction γ of the incremental money of underpricing flows back to underwriters through indirect channels (from other firms or from executives, when allocate underpriced shares to them).

No collusion (noncooperation case)

If N is large, then the N-3 underwriters without an all-star analysts will not be able to ccharge $U - \overline{U}$ because they are in a perfect competitive market (large number of underwriters with homogenous services). They will set $U = \overline{U}$ so $\pi_k = 0$.

If the three underwriters with all-star analysts do not cooperate, **under Bertrand competition**, they will charge:

$$U = \overline{U} + (C/\gamma)$$

Under Cornot competition:

Aggregate demand: $\ddot{D} = 1 - \frac{\ddot{U} - \overline{U}}{A}$ so $\ddot{U} = A + \overline{U} - A\ddot{D} = A + \overline{U} - A(q_1 + q_2)$

$\pi_1 = (\gamma(\ddot{U} - \overline{U}) - C)q_1$

$\pi_2 = (\gamma(\ddot{U} - \overline{U}) - C)q_2$

At equilibrium, $q_1 = q_2 = \ddot{q}$ so $\ddot{q} = \frac{\gamma A - C}{3\gamma A}$

and $\ddot{U} = A + \overline{U} - 2A\ddot{q} = A + \overline{U} - 2A\frac{\gamma A - C}{3\gamma A} = A + \overline{U} - \frac{2}{3}A + \frac{2C}{3\gamma} = \frac{A}{3} + \overline{U} + \frac{2C}{3\gamma}$

Thus:

$$\ddot{U} = \frac{A}{3} + \overline{U} + \frac{2C}{3\gamma}$$

Under collusion

If three underwriters collude and charge the same underpricing $\mathring{U}$. Then, the aggregate demand for their service can be calculated by finding an issuer that is *indifferent between choosing an underwriter with or without and all-star anlyst*. It occurs when:

$M - \mathring{U} + \hat{\theta}A = M - \bar{U}$ (right-hand is surplus from allstar analysts; left-hand is from a normal one)

The aggregate demand is: $\mathring{D} = 1 - \hat{\theta} = 1 - \frac{\mathring{U} - \overline{U}}{A}$ so $\frac{\partial \mathring{D}}{\partial \mathring{U}} = 1 - 1/A$

The allstar underwriters choose $\mathring{U}$ to maximize their profits:

$\mathring{\pi} = (\gamma(\mathring{U} - \overline{U}) - C)\mathring{D}$

FOC: $\frac{\partial \pi}{\partial \mathring{U}} = \gamma \mathring{D} + (\gamma(\mathring{U} - \overline{U}) - C)\frac{\partial \mathring{D}}{\partial \mathring{U}}$

Replace $\frac{\partial \mathring{D}}{\partial \mathring{U}} = 1 - 1/A$ to FOC, we solve:

$$\mathring{U} = \overline{U} + \frac{\gamma A + C}{2\gamma}$$

If $\theta \sim e(1)$ with cumulative density function $E(\theta)$, what is D_k now?

Recall, when $\theta \sim Uniform[0;1]$ the cdf of θ is also equal to θ (not sure).

When $\theta \sim e(1)$, then $D_k = 1 - E(\theta)$.

Implications

1. Underpricing: Issuers that choose all-star underwriters are more underpriced: $\mathring{U} > \bar{U}$
2. Differential analyst influence implication: higher A, higher $\mathring{U}$
3. Coverage cost implication: higher cost to supply all-star analyst service, higher $\mathring{U}$
4. Analyst turnover and frequency implications: when all-star analyst turnover is high and frequency of IPO deals is low, the excess underpricing is lower
5. Underwriter concentration implication: underwriter concentration HHI increases as the effect of all-star analyst coverage A increases, so HHI and underpricing should be positively related
6. Analyst lust theory: effect is concentrated among IPOs with VC

2 Why firms issue shares?

2.1 Market timing, lifecycle, and near-term need for cash

DeAngelo et al. (2010) compare between market timing and lifecycle when firms choose to SEO.

1. Market timing predicts that firms choose issue stocks when they are overpriced (M/B and prior 3-year abnormal stock returns are high). As a result, stock issue is negatively related to future 3-year abnormal returns.

2. Life-cycle: number of years listed is negatively correlated with stock issue because mature firms do not issue more.

3. Short-term need for cash:

   (a) Without the SEO proceeds, 62.6% of sample issuers would run out of cash the year after the SEO, and 81.1% would have subnormal cash balances.

   (b) After adjusting for normal increase in cash due to asset growth, for each dollar raised in the SEO, the median issuer retains 0.6% in the year after SEO (i.e., 99.4% is spent)

   (c) About 10% of issuers have stockpiling from SEO proceeds

Their empirical results First, they run this model: $Pr(SEO = 1) = M/B + PriorReturn + FutureReturn + YearListed$

The results support both market timing and lifecycle: positive for M/B and Prior Return; negative for Future Return and Year Listed.

Second, they consider the cash balances in the year after SEO. Cash balance increases in the year SEO, but issuers typically quickly utilize the SEO proceeds. They compare the *pro forma* Cash (which assume that firms did not receive proceeds from SEO) before and after the SEO. Most of the firms will run out of cash if they do not receive money from issue proceeds. In one year after SEO, most issuers would experience an immediate cash shortfall even had they not increased capital expenditures following their SEOs (40.3% of issuers would run out of cash and 59.6% would have subnormal cash balances).

In conclusion, both market timing and lifecycle could not explain totally the motive of share issuance. Insteads, short-term need of cash seems to fit the findings in this paper.

2.2 Competitive effect of IPOs

Hsu et al. (2010) consider the *horizontal effect* of an IPO to its competitors. *How an IPO in an industry affect other firms in this industry?*

On average, a completed IPO decreases incumbent firms' stock prices but a withdrawal increases incumbents' stock price. After the IPO in their industry, firms experience poorer operating performance (lower sale/income growth, lower CE growth, and lower stock returns). This evidence shows a competitiveness effect.

Four hypotheses:

1. H1. IPO completed/filing have negative effect on CAR, IPO withdrawal has positive effect

2. H2. Post-IPO operating performance of incumbents is worse:

   (a) Dependent is Sale growth, CAPX growth, Operating income growth, Abnormal stock return

   (b) Right-hand side is IPO dummy

3. H3. Which factors affect IPO-announcement CAR of incumbents: leverage (-) and credit rating (+), VC backing (+), certification (issued by high-ranked underwriters, +), knowledge (in top quartile of R&D, +)

4. H4. Which factors affect incumbent firms survive after the IPO of its competitors

   (a) Probit model, $Y = 1$ when incumbents still exist 3 years after the IPO event of its competitors

   (b) Similar results as operating performance: leverage is negative, other factors above are positive to help incumbents survive

2.3 Past returns

A higher past return performance seems to affect share issue decision.

- First, past returns reflect improved investment opportunities, so firms need to be financed more
- Second, cost of equity is low (i.e., market timing) so firms choose equity rather than debt

Baker and Xuan (2016) explore how the relation between past return and share issuance could be affected by the new managers. The idea is that each managers consider the stock performance that is created by himself rather than from a predecessor. Thus, recent change in Tobin's Q has *greater impact* on share issuance of firms than change in distant Q (from the former CEO).

They compare two groups: firms with *actual CEO turnover* ($Turn = 1$) in past 12 quarters and *a non-turnover CEO with a random turnover date* (control group, $Turn = 0$). The model is:

$$\begin{aligned} EquityIssuance &= a + (b_1 + b_2 Turn)(Q_{i,t-1} - Q_{i,CEO}) \\ &+ (c_1 + c_2 Turn)(Q_{i,CEO} - Q_{i,t-13}) \\ &+ (d_1 + d_2 Turn)Q_{i,t-13} + eTurn \\ &+ fX_{i,t-1} + u_{it} \end{aligned}$$

The difference $b_2 - c_2$ captures how the effect of recent changes in Q on equity issuance compared to effect of more distant changes in Q. The results show that $b_2 - c_2$ all positive and significant, supporting the idea that recent changes in Q have a significantly stronger impact on issuing activity than changes prior to arrival.

An alternative explanation is a shift in firm strategy that breaks the link between past returns and current share issuance. But when they check the setting above but use the dependent variables are some important firm decisions (including change in cash, change in working capital, change in long-term assets, change in debt, change in retained earning, and change in other liabilities), the coefficient difference $b_2 - c_2$ is not significant. It rejects the shift in firm strategy hypothesis.

Reference points If the CEO turnover matter, the new CEO should have a reference-point bias to the *stock price at CEO turnover* (he remembers the moment he won the position). If he think about this reference point, his issuance decision should be mattered by this price (or the ratio between $offering\,price$ and $price\,at\,CEO\,turnover$). The discontinuity point of this ratio is one.

As predicted, the stock price at CEO turnover is discontinuous anchor for new CEOs when they issue stocks. There is a jump of 2.9% higher probability of issuing stocks at the ratio of one. There is no such pattern for control group.

The second reference point is the *prior offering price*. A new CEO doesn't care about the prior offering price of the former CEO, but the control group's CEOs do (because they made this decision). Thus, the non-turnover CEOs are reluctant to issue stocks at lower price than *prior offering price* (only 22%), but the new CEOs will issue more at lower price (45%).

2.4 Precautionary motives

While literature focuses much attention to market timing, a very interesting paper of David McLean (2011) propose the precautionary motive of share issuances. When precautionary motive is higher over time, firms tend to issue stocks in good times to save cash. As a result, cash saving from stock issuances increases over time. During 1970s, firms save \$0.23/\$1 share issuance, but over the most recent decade, the ratio is 0.6/1. However, he propose two contrasting hypotheses in this paper for this trend:

1. Precautionary motive
2. Market timing: firms issue when market is overvalued and share repurchase in undervalued. Thus, this hypothesis predicts that post-issuance stock returns decrease.

Saving cash from issue increases over time Saving rate from each source of financing (equity, debt, and internal) is estimated coefficient from this model:

$$\Delta Cash = \alpha + \beta_1 Issue + \beta_2 Debt + \beta_3 CF + \beta_4 Other + \beta_5 Asset$$

The coefficients are cents save per dollar of cash proceeds. Follow Fama-Macbeth, they estimate this model each year the get time series of coefficients to see its variation over time. While the coefficients of other sources seem unchanged, the β_1 increases over time, from 0.231 in 1970s to 0.6

in 2000s. It is consistent with more share issue trend over time, about 8 times compared to 1970s. The share issue is pro-cyclical, drop in recessions 1991, 2001, 2008.

Then they regress the cash saving rate on time trend (1970 is $Trend = 1$, and 2008 is $Trend = 38$), the coefficient of $Issue$ is 0.011 and significant, meaning that portion of share issue is saved as cash increase about $0.011/0.434 = 2.5\%/year$ relative to average 0.434 of coefficients $Issue's\, \beta_1$.

When they use $\Delta Cash_{t+1}$, $\Delta Cash_{t+2}$, and $\Delta Cash_{t+3}$ as dependent variable, they find similar results. It means that Issuers add more to their cash balances in subsequent years than do non-issuers. When sort based on amount of Issue, the highest issued firms accumulate much more cash than others.

Precautionary motive When they regress R&D, CF volatility, Dividend over time trend ($Trend$), all coefficients of $Trend$ support that precautionary motive is increasing: firms have more R&D intensity, higher CF volatility, and pay less dividend. Re-run above model with interactions of $Issue \times RD$, $Issue \times CFvol$, and $Issue \times Div$ show that cash saving effect is more pronounced in firms with high precautionary motive. They also use $PREC$ as first order of principal component analysis of three above mesure, the result is consistent.

Share issuance cost should be matter. When issuance cost is low, firms tend to save cash more if they have precautionary motive. Issue cost is measured by Amihud illiquidity (+ cost), Gibb spread (+), Amivest liquidity (- cost), Contraction (declined in GDP, +), Decline in industrial production (+).

Thus, they add interaction $Issue \times PREC \times IssueCost$ and find that the lower cost of issuance amplifies the cash saving effect. Consistently, when cost of issuance is low, firms issue more stocks: dependent is Share Issues, and key indenpent variable is $PREC \times IssueCost$.

Market timing The key prediction of market timing hypothesis is firms time the market when they are overvalued by issuing stocks. As a result, firms tend to underperform in post-issuance periods.

Market timing proxies include:

1. Share issuance return-predictability: $Issue$'s coefficient from regress monthly stock returns on lagged values of Issue, control for size, MB, momentum
2. First-day return for IPO (RIPO)
3. Number of IPOs (NIPO)
4. Investor sentiment index

First, we run the regression of these 4 variables on $Trend$. To reconcile with share issue and cash saving trend, we should see the coefficients of Share Issuance return-predictability is negative (more market overvaluation over time), while other three measures should see a positive trend. This prediction ensures that market timing makes firms issue more stocks over time. However, the results show

no significant for last three variables, while the Issue return predictability shows positive coefficient, contrasting the prediction.

If the market timing is true, when running regression with monthly stock returns as dependent variable, we should see the interaction of $Issue * Cash$ be negative, but the result is not significant. In addition, interaction of $Issue * PREC$ is positive and significant, supporting the precautionary motive.

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