Private Equity and IPO Performance

A Case Study of the US Energy & Consumer Sectors

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1 Introduction

An initial public offering (IPO) can be a pivotal moment for a company's financial success, and an exciting event for the firm and investors. However, the pricing and subsequent performance of an IPO's stock is still a topic that intrigues and confounds many in the financial world. As an investor, the concept of buying shares of a new public company is exciting, but do long-run returns hold up to the hype? Previous studies conducted by Jay Ritter (1991) have found that IPO shares exhibit abnormal short-run returns, followed by long-run underperformance. The reason for this phenomenon has been widely analyzed, leading to a multitude of hypothesis.

Using a three-year time frame, Ritter found that companies that went public significantly underperformed comparable public firms in similar industries, leading to his conclusion that in the long-run, IPO investments tend to do worse than the market. Over a three-year holding period, returns from 1,526 IPOs had an average return of 34.47% compared to a group of 1,526 companies similar in industry and size, which had an average return of 61.86% over the same period. Ritter theorized that investor sentiment about future growth opportunity is overly optimistic at the time of the IPO. He suggests that this may be the case because many firms go public near the peak of industry-related booms.

Instead of trying to explain the mispricing or underperformance of IPOs, we hope to examine the key determinants of IPO performance, specifically looking if private equity-backed firms perform better or worse after the IPO compared to those that are not backed by a financial sponsor.

It is important to first understand how private equity relates to initial public offerings. Private equity (PE) firms are financial intermediaries that raise capital for investment funds, using large amounts of debt (up to 80%) to buy companies (Kaplan and Per Strömberg, 2008). Due to the highly leveraged nature of these transactions, these investments carry considerable risk, yet these funds aim to produce above-average returns for investors. Indeed, gross of fees, investors in private equity funds tend to outperform the S&P 500; however, the industry maintains a one to two percent management fee and twenty percent "carry fee" over profits, yielding a net investor return slightly below the market (Gompers, Kaplan and Mukharlyamov, 2015).

Unlike a strategic buyer, a PE firm looks to exit the investment. This can be done via a sale to a strategic buyer, another PE firm (called a secondary), or through an IPO. After taking a company private, private equity firms utilize a combination of financial engineering, governance engineering, and operational improvements in order to profit from the purchased company (Gompers, Kaplan and Mukharlyamov, 2015). Among other strategies, a PE firm may add specific industry knowledge, provide equity incentives to management teams, maintain a smaller board, or cut company costs. In general, supporters of PE would claim that PE firms create value by partnering with the company and improving operations. This added value, in turn, may lead to greater company performance. Because our paper focused on IPO performance, we hypothesized that this increase in company performance would lead to greater capital gains later on. To that end, our paper

seeks to analyze how a private equity-backed company performs after an IPO in comparison to a company not backed by private equity.

Although there is no literature that addresses the questions that we aim to answer, there are several studies that have explored how underwriter and venture capital reputation affects IPO performance. Brav and Gompers (1997) find that firms backed by venture capital outperform firms not backed by venture capital in IPOs over a time span of five years after IPO, however only when returns are equally weighted. They discuss the fact that venture capital firms spend a lot of time and energy in analyzing information about new companies, which has positive signaling effects to the public when the firm chooses to invest in a company. This partially overcomes the "informational asymmetries that are associated with startup companies" (Brav and Gompers, 1997). However, one must question whether this hypothesis fully explains long-run performance, since such positive signaling is likely already priced into the initial IPO.

Krishnan, Ivanov, Masulis, and Singh (2011) find similar results, reporting that the relationship between long-run performance and IPOs backed by venture capital is positive and significant. The paper states that, "while more reputable VCs initially select better-quality firms, more reputable VCs continue to be associated with superior long-run performance, even after controlling for VC selectivity," a phenomenon due to post-IPO involvement of the VC firm. Such post-IPO involvement is also possible in private equity, although it may not always occur.

Dong, Michel, and Pandes (2011) evaluate a similar topic, finding that the quality and reputation of underwriters (as measured by market share) affect long-run performance of IPOs in a positive manner. Datta, Gruskin, and Iskandar-Datta (2015) look more specifically at venture-backed IPOs and reverse leveraged

buyouts, finding evidence that company restructuring during the private period when the firm is owned by a PE firm can lead to greater long-run performance. This is because PE firms can use management strategies to increase sales growth, thus leading to better stock returns post-IPO.

In this paper, we test whether private equity backing influences long-run performance of IPOs. Based on existing literature concerning venture capital and private equity, we believe that private equity-backed IPOs outperform non-PE backed IPOs. This paper analyzes the three-year post-IPO returns to investors of IPOs from 2008 to 2013. This time frame was chosen for two primary reasons. First, private equity is a cyclical industry, and while considerable amounts of research have been conducted on past cycles, there is not as much available research on trends since the '08 recession. Second, after the recession, the nature of private equity became more conservative, with PE firms not bidding as aggressively due to tighter credit markets and a fear of over-levering. We believe that these changes will allow us to discover new insights to add to existing literature. In our paper, we examine both the Energy Sector and Consumer Sector with two separate data sets. Through studying multiple industries, we hope to gain a wider view of how private equity backings affect IPO performance.

2 Data and Methodology

A. IPO Data Sample

For the purpose of this paper, we constructed a data sample of IPOs that took place in the US between 2008 and 2013 within the Energy and Consumer sector. Using Pitchbook, we filtered Energy companies by exit type and date, ending with a sample of 60 companies within the Energy Equipment, Exploration,

Production and Refining, and Energy Services subsectors. These particular subsectors were chosen arbitrarily to cut the data sample to a reasonable size, where data from other resources could be entered manually. Of these 60 companies, 32 were private equity-backed at the time of the IPO.

We then conducted the same process for companies within the Consumer industry. We chose the Consumer industry in order to expand our data scope, and because it tends to be somewhat stable, unlike many of the cyclical subsectors in Energy. Within the Consumer industry, we compiled a data set of 63 companies that had IPOs between 2008 and 2013. Of these 63 companies, 44 were private equity-backed at the time of the IPO. We also used Pitchbook and Center for Research in Security Prices (CRSP) to acquire the same IPO characteristics, as well as data on daily stock returns. Our data set excludes companies that are not listed on CRSP, as well as any firms that had unsuccessful IPOs.

B. Measuring Financial Performance

In contrast to preceding literature, much of which uses Return on Assets and the Market-to-Book ratio to measure performance, we chose to view the IPOs from an investor's point of view. As a result, we measured performance through holding period return, the total return on a stock or portfolio held over a specified period of time. Using CRSP, we compared this daily holding period stock returns to daily returns of the S&P 500, a common benchmark of the stock market. We then calculated excess daily returns by finding the difference between the daily stock return and the daily S&P return, for a total period of three years. We then converted our daily excess returns into a cumulative three-year excess return. This three-year excess return represented the excess return over the market that an investor would have earned by buying the individual firm's stock at the IPO and

holding for three years. It is this excess return that we will use as our dependent variable in our regression analysis.

$$\textit{Cumulative 3 Year Excess Return} = [(1+X_1)\ (1+X_2)(1+X_3)^*...^*(1+X_{754})(1+X_{755})] - 1$$

$$\textit{Where } X_t = \textit{Daily Excess Return, t Days After IPO}$$

$$= \textit{Daily Stock Return, t Days After IPO} - \textit{Daily S\&P Return, t Days After IPO}$$

We used excess returns over the S&P 500 in order to control for the difference in market conditions during our five-year time horizon of IPO data. For example, even though the market was still in the midst of the recession in 2008, our method accounted for this, and still shows how a particular company stock performed in relation to the overall market. As a result, our comparison of returns from IPOs that occurred in different years will be more controlled.

C. Regression Control Variables

When asking how a PE backing affects post-IPO stock returns, we started with a broader question: what are the factors affecting IPO performance? To examine a company's IPO, we looked at the model:

$$\textit{IPO Performance} = \beta_0 + \beta_1\ \textit{Deal Size} + \beta_2\ \textit{Firm Size} + \beta_3\ \textit{Firm Age} + \beta_4\ \textit{First Day Return} + \mu$$

Our model is formulated based on previous literature, specifically papers written by Durukan (2002), Krishnan, Ivanov, Masulis, and Singh (2011), and Dong, Michel, and Pandes (2011). As seen above, we must first control for the effects of issuer characteristics to isolate the effects of a PE backing.

Variables:

IPO Performance, the dependent variable, is measured by the three-year excess stock holding return over the market. We do not take the natural logarithm of this number, since many firms exhibit negative returns during this period.

Deal Size is measured in millions of US dollars, and is calculated by multiplying the offer price by the number of shares offered at the IPO. Another term for *Deal Size* would be gross proceeds. We will use the natural logarithm of IPO gross proceeds (Ln Deal Size). In general, *Deal Size* should positively correlate with *IPO Performance*, since stronger IPO issuers are largely better equipped to make larger IPO offers (Krishnan, Ivanov, Masulis, and Singh, 2011).

Firm Size is measured through the company's revenue in terms of millions of US dollars, and is recorded right before the IPO. Again, we will use the natural logarithm (Ln Firm Size).

Firm Age, measured in years, controls for the age of the company at the time of the IPO, and is calculated by finding the difference between the firm's founding year and the year of the IPO. We include this variable to account for the fact that older, more established firms with more experienced management, an extensive network of customers, and more tangible assets are more mature in their business cycle, and thus may exhibit lower growth. Following the techniques of Krishnan, Ivanov,

Masulis, and Singh (2011) and previous researchers, we will take the natural logarithm of 1 + firm age at IPO (Ln Firm Age + 1) in an effort to minimize skewness.

First Day Return captures the change in price on the first day of trading, controlling for excessive IPO demand. Jay Ritter (1991) has demonstrated that in general, IPOs tend to be underpriced by the investment banks. This often causes frenzy on the first day of trading. Therefore, *First Day Return* will control the situations where the initial price per share does not reflect true firm quality. Similar to *IPO Performance*, this variable is negative for many firms. As such, we will not take the natural logarithm.

While the equation above captures the variables affecting a company's IPO performance, we also included a dummy variable that tests whether private equity backing yields greater IPO performance. Thus, our model is shown below:

$$IPO\ Performance = \beta_0 + \beta_1\ Deal\ Size + \beta_2\ Firm\ Size + \beta_3 Firm\ Age + \beta_4 First\ Day\ Return + \beta_5 Private\ Equity + \mu$$

The independent variable *Private Equity* is equal to 1 for a private equity backing, and 0 otherwise. Through examining the coefficient on this particular independent variable, we aim to determine the influence of private equity on IPO performance. We expect this variable to have a positive, significant effect on the dependent variable.

D. Summary Statistics and Two-Way Relationships

Energy

The summary statistics of our raw data set for the Energy industry is shown below. As shown in the data table, 52% of the 60 companies in the data set are

Variable	Observations	Mean	Std. Dev.	Min	Max
IPO 3-yr returns (%)	60	0.14	1.00	-1.05	3.06
Deal size ($, mm)	60	297.68	408.012	2.8	2864
Firm size ($, mm)	60	1137.65	2970.06	0	20138.69
Firm age (years)	60	9.62	15.00	1	91
First day return (%)	60	0.02	0.04	0	0.29
Private equity	60	0.52	0.50	0	1

backed by private equity, while 48% are not.

Several two-way relationships should be explored in this data set. First and foremost, companies backed by PE firms exhibit better IPO performance than those firms not backed by PE. More specifically, the average cumulative three-year return, excess of the S&P, for all PE-backed companies is 0.41 (41%), while the equivalent number for the non PE-backed companies is –0.16 (-16%). Figure 1 demonstrates this trend, showing that the distribution of returns reaches a greater, positive number for companies backed by PE.

Figures 2, 3, 4, and 5 exhibit the two-way relationships between the dependent variable, *IPO Performance*, and the other control variables, including *Ln (Deal Size), Ln (Firm Size), Ln (Firm Age + 1),* and *First Day Return*. While Figures 2 and 3, the scatter plots comparing *IPO Performance* to *Ln (Firm Size)*

and *Ln (Firm Age + 1)* respectively, do not showcase any strong relationships between the variables, Figures 4 and 5 both indicate the presence of a trend. Figure 4, the scatter plot comparing *IPO Performance* to *Ln (Deal Size),* suggests a positive relationship between the two variables. Conversely, Figure 5 implies a negative relationship between *IPO Performance* and *First Day Return*. As we move forward with our analysis, we will see if these two-way relationships from the raw data hold up in our regression.

Consumer

The summary statistics of the Consumer data set show similar results, although the mean *Deal Size* and *Firm Size* are significantly larger for the Consumer Sector than they are for Energy Sector. The mean IPO three-year returns are also negative, in contrast to the positive value for the Energy Sector. As shown in the data table, 70% of the 63 companies in the data set are backed by private equity, while 30% are not.

Variable	Observations	Mean	Std. Dev.	Min	Max
IPO 3-yr returns (%)	63	-0.06	0.59	-0.99	1.48
Deal size ($, mm)	63	674.45	1989.30	2.05	15774
Firm size ($, mm)	63	4264.72	17089.81	232.47	135592
Firm age (years)	63	39.87	30.11	0	109
First day return (%)	63	0.01	0.04	-0.09	0.09
Private equity	63	0.70	0.46	0	1

As before, we examined the two-way relationships in the data. Once again, companies backed by PE firms demonstrate better IPO performance, which in this

data set, means that three-year returns are less negative. More specifically, the average cumulative three-year return, excess of the S&P for all PE-backed companies is -0.001 (-0.1%), while the equivalent number for the non PE-backed companies is –0.185 (-18.5%). Figure 6 confirms these results, demonstrating that the distribution of returns reaches a higher, positive number for companies backed by PE.

Figures 7, 8, 9, and 10 present the two-way relationships between the dependent variable, *IPO Performance*, and the other control variables, including *Ln (Deal Size), Ln (Firm Size), Ln (Firm Age + 1),* and *First Day Return* respectively. As in the Energy data set, the Consumer data set does not show any significant trends through these scatter plots. In all four cases, the relationship between the variables appears to be slightly positive, although the trend is almost negligible. Figure 8, the plot between *IPO Performance* and *Ln (Firm Size)* suggests the strongest positive relationship between the two variables. However, we need to examine results of our multiple regression analysis to fully understand the impact of all these explanatory variables.

E. The Independent T-test

After analyzing our regression results, we make use of the independent-samples t-test to further analyze our data. The t-test is designed to determine if the average of the dependent variable, in this case IPO Performance, is equal in two different groups. More specifically, it tests the null hypothesis that the means of the two groups are equal. In this paper, we utilize this test to establish whether the mean difference in IPO performance between companies backed by private equity and companies not backed by private equity is statistically significantly different from zero.

$$\textit{Difference in Group Means} = \bar{x}_{\textit{Non-PE}} - \bar{x}_{\textit{PE}}$$

where $\bar{x}$ = *average group IPO performance*

3 Results

Energy

Initial Regression Results

Observations	59
R-squared	0.145
VARIABLES	IPO Performance
Ln(Deal Size)	0.314*
	(0.168)
Ln(Firm Size)	-0.133
	(0.0903)
Ln(Firm Age + 1)	0.0135
	(0.136)
First Day Return	-1.967
	(3.107)
Private Equity	0.355
	(0.295)
Standard errors in parenthesis	
*** p<0.01, ** p<0.05, * p<0.1	

As indicated in our analysis of two-way relationships, *Ln (Deal Size)* has a positive correlation with IPO Performance, while *First Day Return* has a negative correlation with the same dependent variable. This is not surprising, as the scatter plots mentioned above initially showed evidence of these trends. In our initial hypothesis, we stated our expectation that *Ln (Deal Size)* would positively correlate

with *IPO Performance*, as stronger IPO issuers are generally better equipped to make larger IPO offers (Krishnan, Ivanov, Masulis, and Singh, 2011). The regression results confirm this hypothesis, as the coefficient on *Ln (Deal Size)* is statistically significant for the Energy Sector.

Beyond *Ln (Deal Size)*, none of our variables had statistical significance, leading to an inconclusive analysis. R-squared was 0.145, meaning that our independent variables explained just 14.5% of the variation in our data set. Even *First Day Return*, which exhibited a strong negative relationship with *IPO Performance*, thus confirming our scatter plot analysis, did not show statistical significance. The coefficient, however, is notable, due to its relatively large negative value of -1.97. With these results, one can hypothesize that firms are grossly overpriced because investors rightfully expect them to perform well. If this is the case, then the high initial price leads to a large negative first day return, but the supposedly strong firm ends up performing well in the long run.

Ln (Firm Size) had a negative coefficient of -0.133, which would indicate that larger firms do worse in terms of IPO performance. However, this value is not statistically significant, which precludes us from making that conclusion. *Ln (Firm Age + 1)* also lacked statistical significance, although the positive value of 0.0135 might otherwise imply that older, more established firms do better in the long run. While this is possible, it is also feasible that these mature firms exhibit less growth, which may hinder performance. As such, the inconclusive results are not inconceivable.

Finally, the independent variable of interest, *Private Equity*, had a positive yet statistically insignificant coefficient. The positive correlation confirms the implications of Figures 1, which compares the distributions of PE-backed and non-PE-backed firms in terms of IPO performance, and suggests that PE-backed IPOs

in the Energy sector perform better. However, despite the fact that the coefficient on our main variable was positive as expected, the lack of statistical significance means that we cannot reject the null that a PE backing has no effect on IPO performance. As a result, we do not have enough evidence to prove our hypothesis in the Energy sector.

Consumer

Initial Regression Results

Observations	63
R-squared	0.142
VARIABLES	IPO Performance
Ln (Deal Size)	-0.041
	(0.073)
Ln (Firm Size)	0.165**
	(0.070)
Ln (Firm Age + 1)	-0.009
	(0.085)
First Day Return	2.022
	(2.131)
Private Equity	0.123
	(0.171)
Standard errors in parenthesis	
*** p<0.01, ** p<0.05, * p<0.1	

Without finding statistical significance of the term *Private Equity* in the Energy data set regression, we turn to the Consumer data set. However, the

Consumer sector results were similar to the Energy sector results in that neither exhibited a lot of statistical significance, nor did they allow us to prove our hypothesis. Our R-squared value of 0.142 meant that our explanatory variables accounted for 14.2% of the variation in this data set. Once again, the coefficient on *Private Equity* was positive, confirming the implications of Figure 7, which indicates that PE-backed firms exhibit greater IPO performance. However, statistical insignificance precludes us from concluding that the *Private Equity* factor has a real effect on three-year returns.

Beyond the dummy variable *Private Equity*, the signs of the coefficients proved to be quite different from the previous regression. For example, *Ln (Deal Size),* measured in millions raised by the IPO, had a negative coefficient of 0.041 in the Consumer sector. While this result is surprising give our expectations as well as the results from the Energy sector, it is not statistically significant. In fact, the only statically significant variable was *Ln(Firm Size)*, which had a positive coefficient. When compared to the previous regression, this result is surprising, as the same variable had produced the opposite effect on the dependent variable.

Another difference from the last regression is that *Ln (Firm Age + 1)* had a negative coefficient, which would implicate that more mature firms exhibit less growth, and thus do not perform as well in IPOs. This result, while statistically insignificant, meets our initial expectations of this variable. Finally, *First Day Return* also showed an opposite result from before, exhibiting a large, positive coefficient. In contrast to the explanation of why this variable might display a negative coefficient, as it did previously, it is possible that the firms that beat market expectations on the first day simply continue to do so for three years. It is also likely that the large coefficient is the result of potential outliers.

Although we were not able to find statistical significance in our regression analysis (thus not allowing us to prove our hypothesis), the t-test allows for further analysis that may provide further insight onto our topic.

The results of our t-test are as follows:

Energy

Two sample t-test with equal variance

Group	*Observations*	*Mean*	*Std. Error*
0	29	-0.159	0.171
1	31	0.413	0.182
Combined	60	0.136	0.129
diff = mean(0) - mean(1)		-0.572	0.251
H_o: diff = 0	Degrees of freedom = 58		t = -2.279
H_a: diff < 0	H_a: diff != 0	H_a: diff > 0	
Pr(T<t) = 0.013	Pr(|T| > |t|) = 0.026	Pr(T>t) = 0.987	

Because the t-test analyzes the differences in means, this test confirms our findings that PE-backed IPOs outperform non-PE-backed IPOs in the Energy sector during three-year time span. The difference in means, calculated as the mean of non-PE-backed firms minus the mean of PE-backed firms, is -0.572, which is statistically significant given the degrees of freedom. The two-sided p-value, indicating the probability that the difference in means is either less than or greater than zero, is close to zero, providing enough evidence that we can reject the null hypothesis that there is no difference in means. As a result, we conclude that there is a statistically significant difference in IPO performance between firms backed by PE, and firms not backed by PE, results which confirm the findings of previous literature.

Consumer

Two sample t-test with equal variance

Group	*Observations*	*Mean*	*Std. Error*
0	19	-0.185	0.115
1	44	-0.001	0.096
Combined	63	-0.056	0.075
diff = mean(0) - mean(1)		-0.184	0.164
H_o: diff = 0	Degrees of freedom = 61		t = -1.121
H_a: diff < 0	H_a: diff != 0	H_a: diff > 0	
Pr(T<t) = 0.133	Pr(|T| > |t|) = 0.267	Pr (T>t) = 0.967	

Again, we can see that that PE-backed firms and non-PE-backed firms exhibit different group averages within the Consumer sector, as mentioned in a previous section. However, in contrast to the results of the Energy sector, the difference in means of the Consumer sector does not demonstrate statistical significance. The two-sided alternative is that the difference in means is either less than or greater than zero has a p-value of 0.267. This number does not allow us to reject the null hypothesis. Consequently, we cannot conclude that there is a statistically significant difference in IPO performance between firms backed by PE, and firms not backed by PE in the Consumer sector.

As a result of our varied t-test results, as well as our inconclusive regression analysis, we cannot, at this point, confirm nor deny our hypothesis that a company backed by a private equity firm will perform better over a three-year time horizon. There are several possible explanations for these results.

First, it is possible that backing by a private equity firm simply does not have an impact on IPO performance. As shown by Ritter's study, investing in

IPOs is generally not a winning strategy, as in the long run; IPO's tend to underperform the S&P 500. With this in mind, whether or not a company is backed by private equity may not make a significant difference. While our results in both the Energy and Consumer data set did show that private equity has a positive effect on IPO performance, the results were not statistically significant at the 95% confidence interval. Consequently, we cannot say that the correlation is equal to causation.

In addition, the prospect remains that the effects a PE-backing are already priced into the market. If this is the case, then companies backed by private equity should not exhibit significantly different returns from companies not backed by private equity.

Furthermore, our sample size may have not been sufficiently large. Even with two data sets, 123 companies could simply have not been enough to provide an accurate picture. With more data, we may have seen our independent variables explaining more of the variation in data, thus yielding larger R-squared values. In addition, with data sets of around 60 companies, it is possible that certain outliers could have had a larger impact on the regression results.

Moreover, our choice of industry and timing may have impacted our results. Energy is a volatile and cyclical industry that often moves in relation to oil prices and exogenous factors. Our results may have been more influenced by how the Energy Sector had performed during the time period of 2008-2016. This is especially true, as this was a particularly volatile time for the Energy industry and markets in general. While the Consumer industry is generally less volatile than Energy, the public's spending habits may have been impacted by the recession, even after the recession ended. As a result, the Consumer industry may have been adversely affected (more than that of the S&P 500), thus resulting in a deflation of

excess stock returns. Although our measurements of performance accounted for market conditions, they did not account for cyclicality of industries. It is possible that the entire industry followed such a strong trend that differences in IPO backings did not make a difference.

4 Conclusion

Ultimately, we were unable to reach any strong conclusions regarding the impact that private equity has on three-year IPO performance. Although we found statistical significance when we conducted a t-test on the Energy Sector data, this result is not enough to prove our hypothesis. As a result, we would not recommend that the average investor should invest in private equity-backed IPOs as an investment strategy. In contrast, in congruence with Ritter's findings, we would not recommend that a person should invest in IPOs at all as a strategy.

Moving forward, we hope to expand this study. Using more data from a wider range of industries, we believe that we would obtain a clearer picture about the effect of private equity on IPO performance.

5 References

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6 Figures

Energy

Figure 1: *Comparing IPO Performance Between Groups*

(0 = Non PE-Backed, 1 = PE-Backed)

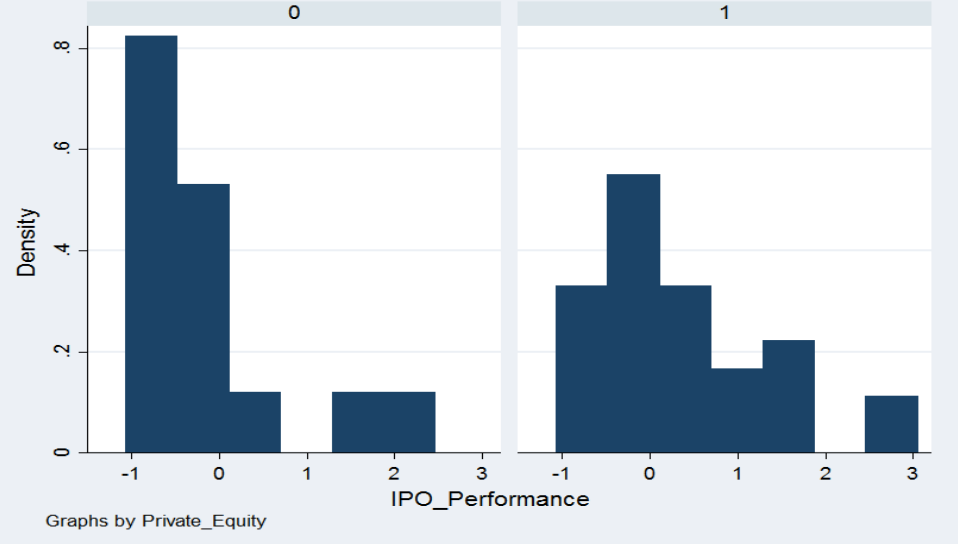


Figure 2: *IPO Performance vs. Ln(Firm Age+1)*

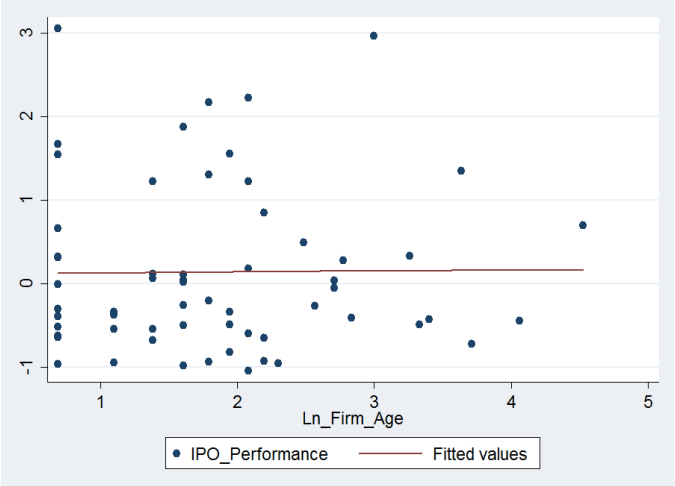


Figure 3: *IPO Performance vs. Ln(Firm Size)*

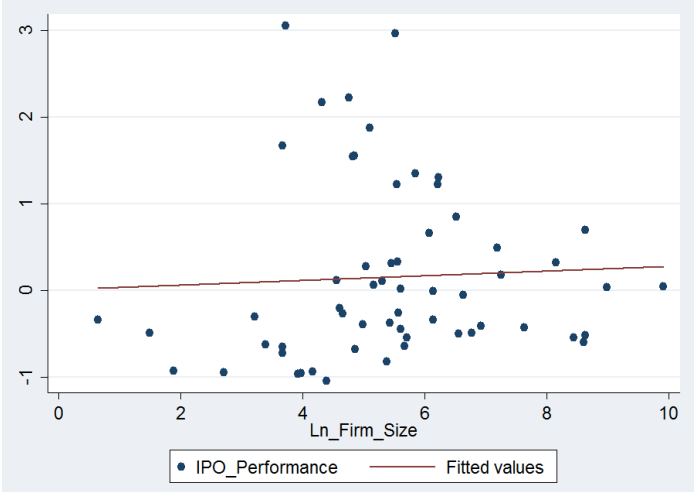


Figure 4: *IPO Performance vs. Ln(Deal Size)*

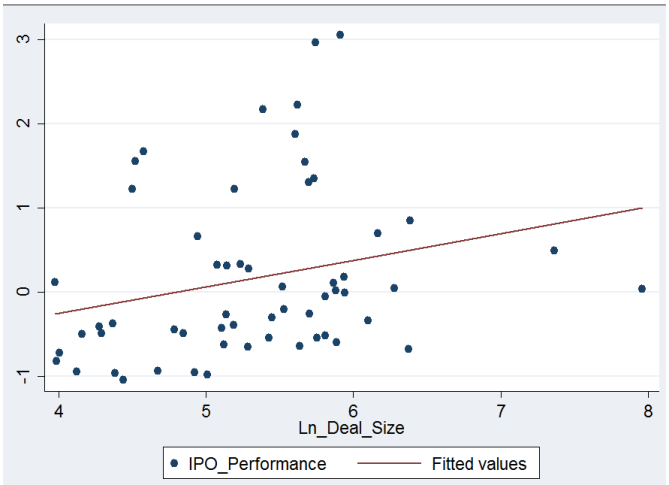
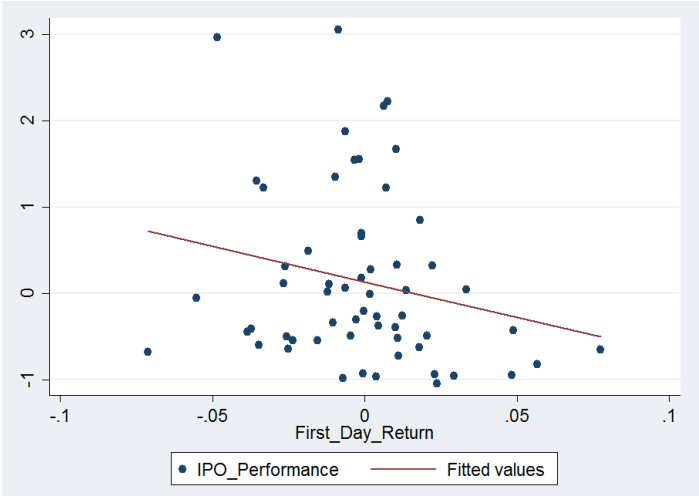


Figure 5: *IPO Performance vs. First Day Return*



Consumer

Figure 6: *Comparing IPO Performance Between Groups*

(0 = Non PE-Backed, 1 = PE-Backed)

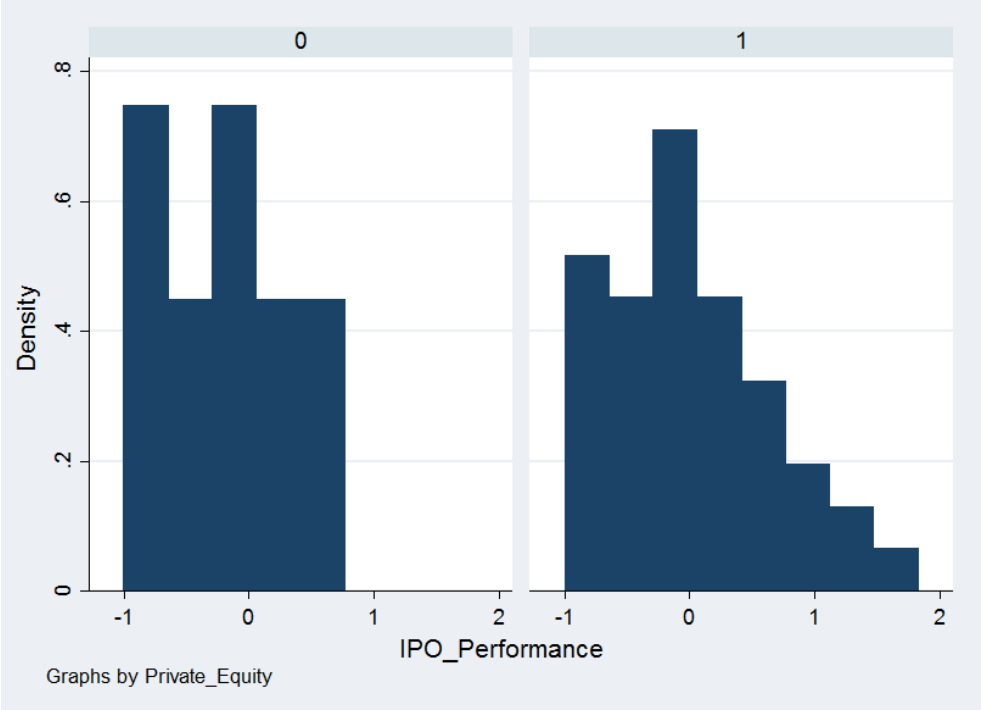


Figure 7: *IPO Performance vs. Ln(Firm Age+1)*

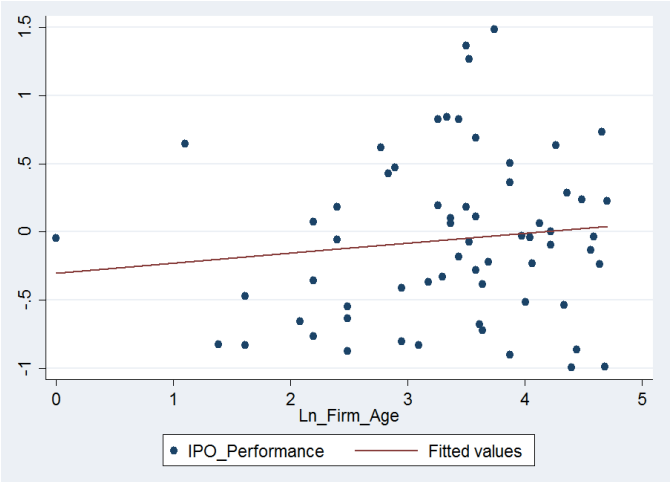


Figure 8: *IPO Performance vs. Ln(Firm Size)*

Figure 9: *IPO Performance vs. Ln(Deal Size)*

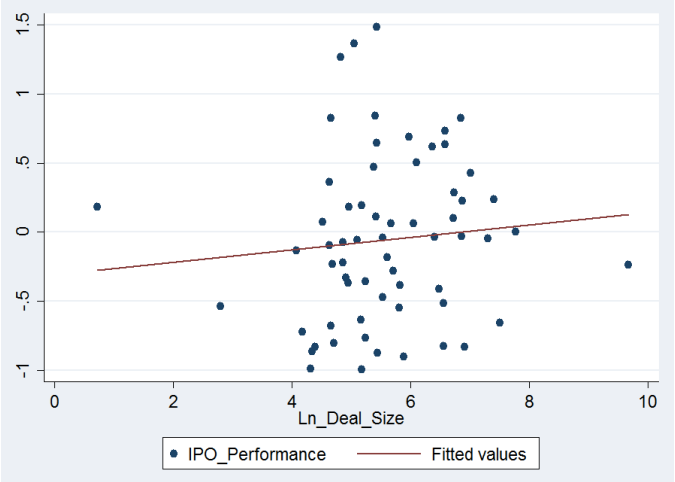


Figure 10: *IPO Performance vs. First Day Return*