Market Condition and the Exit Rate of Private Equity Investments in Brazil

ABSTRACT

Exit is a crucial issue for private equity (PE) industry. Fund managers tend to time the market to exploit favorable market conditions and sell their equity stake at a higher price, generating higher return. In this article we investigate the magnitude of the impact of market condition in the exit rate of Brazilian PE deals. We use the hazard model and two proxies for hot market condition: the market price-earning ratio and the number of IPOs. Our results indicate that PE funds do market timing, and that the magnitude is higher when the proxy is price-earning ratio.

Key-words: Private Equity; Market timing; Hazard Model; Exit

TRACK: CORPORATE FINANCE

Market Condition and the Exit Rate of Private Equity Investments in Brazil

ABSTRACT

Exit is a crucial issue for private equity (PE) industry. Fund managers tend to time the market to exploit favorable market conditions and sell their equity stake at a higher price, generating higher return. In this article we investigate the magnitude of the impact of market condition in the exit rate of Brazilian PE deals. We use the Cox proportional hazard model and two proxies for hot market condition: the market price-earning ratio and the number of IPOs. Our results indicate that PE funds do market timing, and that the magnitude is higher when the proxy is price-earning ratio.

Key-words: Private Equity; Market timing; Cox Proportional Hazard Model; Exit

1. INTRODUCTION

Exit is crucial for private equity (PE) investors and managers. It is only after the deal is liquidated that investors receive their capital back, hopefully with a profit, and that successful fund managers receive performance fee and generate good track record.

There are basically 5 exit alternatives: (i) sale to another company, also known as trade sale; (ii) IPO and exit through the stock market; (iii) sale to another PE fund, also known as secondary sale or sponsor to sponsor; (iv) sale to the owner and (v) write-off. The first two alternatives: trade sale and IPO are considered the most successful ones, with higher returns (see Johan and Zhang, 2016; Zarutsky, 2010 and Giot and Schwiebachrer, 2007). Market condition influences significantly the number of deals and the return of Merge & Acquisition (M&A) and IPO activities. PE fund managers time the market for selling their investments in higher valuation periods (Cao, 2011).

In emerging economies hot market windows are shorter and less frequent than in developed countries, and therefore fund manager have even higher incentive to time the market. Brazil, for instance, had an IPO boom between 2004 and 2008, and 39% of the IPOs were backed by PE (Minardi et al., 2013). PE funds benefit from hot market windows to achieve more profitable exits.

However, we cannot analyze exit timing without taking into account the period that the PE fund holds the company in its portfolio. According to Cao (2011), investment return increases with the holding period, but at a decreasing rate. The holding period must be long enough for the fund implement the value creation thesis, but not too long that the exit occurs after the optimal time. A long holding period has a negative effect on the IRR (internal rate of return), and consequently on performance fee and track record. Besides that, PE funds have limited life, usually around 10 years. Too long holding periods may indicate difficulties in selling the deal, and consequently liquidity risk (Giot and Schwienbacher, 2007). Therefore, we should expect low exit rates for short holding periods, and high exit rates for long holding periods. As Private Equity funds intend to exit at a point in time, even if they are proprietary funds, eventually they will sell their stake in the portfolio company.

The objective of this article is to investigate how the stock market condition impacts PE exit rate. We use the hazard model to estimate the market condition effect on the exit rate, taking into account the holding period. We adopt two proxies for hot market: price-earning ratio and the number of IPOs in the Brazilian stock market. We control our analysis for deal's size, fund manager experience, fund strategy (buyout or growth), and year of investment.

This article contributes to the literature in promoting a better understanding of PE exit dynamic in Brazil. As far as we know, this is a pioneer analysis in Brazil. Understanding exit dynamic is an important issue for PE investors. They can incorporate it in simulation models, and predict better cash flow pattern and liquidity issues.

Our results indicate that PE fund managers in Brazil time significantly the market. Exit rate increases in 5 times in high valuation periods when compared to low valuation periods, and in 2 times in IPO windows when compared to moments when the windows are closed. In a through the cycle analysis, that takes into account both hot and cold market condition, there is a probability of 15% that a deal will have a holding period longer than 13 years. If we consider only hot cycles this probability drops to almost zero, and only cold cycles, this probability increases to 23% - 35%.

2. LITERATURE REVIEW AND HIPOTHESIS FORMULATION

PE funds are illiquid investments. They buy equity or quasi-equity securities of private companies. They are active investors, and they implement value creation thesis by monitoring the company's management through the board, and

by appointing talented executives and board members. Funds have limited life. They sell their stake on companies after holding it for a certain period, to amortize fund's shares and return the investor's capital, desirably with a profit. Most private equity funds have limited life around ten years, and consequently, the PE firm has to raise a new fund each three to five years to perpetuate its existence. In order to raise a new fund, PE firms need a successful track record. Because there is performance persistence in PE industry (Kaplan and Schoar, 2005), investors interpret past performance as skill. A deal's performance is observed only after its liquidation, and therefore good exits are crucial to generate track record for PE firms, to return the capital to investors and also to generate performance fee for the fund managers, known as carry. However, the pressure for a good exit may generate conflict of interests between investors, fund managers and company's shareholders.

Cao (2011) investigates the market timing hypothesis in a sample of Initial Public Offers (IPO) backed by Leverage Buyout (LBO) funds in the USA. LBO funds usually acquire control equity stake of companies that generate cash flows, but have operational inefficiencies and bad management. The acquisitions are highly leveraged transactions (sometimes debt-to-asset ratio higher than 80%). After implementing the restructuring program, the LBO fund sells their stake in the company through an IPO or to another company (Lerner, Leamon and Hardymon, 2012). The IPO operation backed by a LBO fund is called reversed leverage buyout (RLBO). According to the market timing hypothesis, in order to achieve higher selling price and higher return, LBO funds take advantage of hot capital market windows to bring companies to IPO, even before concluding the restructuring process. Therefore, market condition can create perverse incentives. By looking for a quick return, PE funds may use less time than necessary in the restructuring process, bringing immature companies to IPO. This phenomenon is called quick flips. The authors analyzed 594 RLBO issued between 1981 and 2006. They find evidences that under favorable market conditions, LBO funds tend to do more quick flips and to reduce portfolio companies' holding period. Stromberg (2008) analyzes a global sample of 30,000 LBO. He concludes that LBO financed by more experienced PE have shorter holding periods, but the companies with a holding period smaller than one year represents less than 2.9% of the sample.

Another perverse incentive is Grandstand. According to Gompers (1996), less experienced fund managers have an incentive to bring companies prematurely to IPOs, in order to acquire track record and raise new funds. This generate conflict of interest with PE fund investors (limited partners) and the new shareholders that will acquire shares in the Stock Exchange. Grandstand increases the underpricing, decreases the investment potential return and increases the risk for the new shareholder of buying shares of a poor performance company. The author analyzed 433 IPOs realized between 1978

and 1987, and find evidences supporting Grandstand. Companies backed by less experienced VC were younger at the IPO time and had a higher underpricing.

Giot and Schwienbacher (2007) point out that PE funds are concerned about the exit alternative and the time they will hold the company in the portfolio before selling it. They investigate the dynamics of the following exit routes: IPO, sale to strategic and write-off, as well as the holding period determinants. Their sample has around 6,000 VC deals. They use the competitive risk hazard model approach, and their results indicate that the exit rate for IPO is concave: it increases until the holding period reaches 1,000 to 1,500 days, and after that decays sharply. According to the authors, the fund selects quickly the candidates for an IPO, but if the listing in the stock exchange is not fast enough, the probability of bringing the company to an IPO decays sharply. For a trade sale, the exit rate achieves its maximum value after a larger holding period: around 2,500 to 4,000 days after the acquisition. According to the authors, this is in line with the notion that the sale to another company is a more universal exit channel. The authors also analyze the impact of market condition on the exit dynamics. Their results show that in a hot market condition, or when the IPO condition is more favorable, the exit rate is accelerated. Probably the funds are anxious to capitalize the best exit alternatives.

Jenkinson and Sousa (2015) investigate three exit alternatives for the European PE industry: IPO, trade sale and secondary sale, and three factors that determine the choice: market condition, fund structure and structure of the invested company. According to the authors, funds try to achieve the best possible selling price, and market condition generate different windows of opportunities to exploit it. If the IPO market is cold, the credit market is hot, and PE funds have a lot of dry powder (capital available for investing in companies), probably the most interesting exit alternative will be secondary sale. Therefore, if credit condition is favorable, the probability of exiting to a secondary sale increases. However, if there is a window of opportunity in the capital market, funds will tend to exit through IPOs. If the fund's life is closer to its expiration, there will be a pressure to exit. Masulis and Nataha (2009) find evidences in the Merge & Acquisition market that the acquirer company's return increases when the seller is a PE fund which life is close to the expiration. If the portfolio company is not mature enough for an IPO, the chances for a trade sale or a secondary sale increase. Funds are also specialized in different stages of the company life cycle. Funds focused on latter stage can acquire the equity stake of funds focused on earlier stage. Higher leveraged companies are target for other PE funds. More profitable companies and that need less monitoring are targets for IPOs, and the less profitable ones to an M&A.

Jenkinson and Souza (2015) find evidences that factors related to market condition are the most important determinants of the exit route. PE funds exploit windows of opportunities that are opened in different moments. PE tends

to choose IPO to anticipate an exit, since they signal to the market good performance, and consequently helps in raising a new fund. This is in accordance to the Grandstand theory (Gompers, 1996). However, if it is not possible to bring the company to an IPO in a reasonably short period, funds prefer to exit through another company or to another PE fund, sustaining the evidences of Giot and Schwienbacher (2007).

Based on literature review, we formulate the following hypothesis:

A hot stock market condition will increase the exit rate of investments

3.METHODOLOGY AND DATABASE

3.1. Econometric Model

We used the hazard model to determine the exit rate of PE funds in Brazil. This model is also known as duration model and as survival model (see Kiefer, 1988 and Greene, 2000 for more details). Giot and Schwienbacher (2007) and Jenkinson and Souza (2015) used hazard model to analyze the exit dynamics of VC funds. Gejadze et al. (2015) used hazard model to investigate what determines fund raising time, and Ljungsqvist and Richardson (2003) used hazard models to investigate the dynamic of the time the PE fund takes to invest in portfolio companies.

The central concept in a duration model is the conditional probability that an observation will fail in period T, given that it has survived t-dt periods, and it is called the hazard function, λ. In the case of PE exits, the hazard function is equivalent to the probability that the fund will sell its stake in a company in period T, given that the fund has been holding this company in its portfolio for t-dt periods. Therefore, the hazard function corresponds to the marginal exit rate.

As the conditional probability of exit will change with the investment duration (the holding period of the deal), the hazard is function of t, $\lambda(t)$, as in equation (1), where f(t) is the failure function and S(t) is the survival function.

$$\lambda(t) = \frac{f(t)}{S(t)} \tag{1}$$

The definition of duration requires an origin (initial time), a time scale and a precise definition of the event that ends the duration. In the case of PE exits, the origin is the day the fund realizes the investment and the event that ends the duration is the sale of the investment. We adopt semesters as time scale. Observations can fail only once, according to our hazard model. Therefore we considered only total sales, excluding partial sales.

For the companies that were sold, we observe the day the PE fund invested in it and the day the fund sold it. However, some companies were still in the fund's portfolio when we stopped our analysis, and we do not know for how much more time the PE fund will hold it in its portfolio. Therefore, the observations that have not had an exit until the day of the data collection stopped are right censored. In order to distinguish between censored and non-censored observations, we include an indication variable d, that assumes value 1 when the observation is not censored, and value zero if the observation is censored. Equation (2) express the log likelihood function.

$$\text{LnL}(\theta) = \sum_{i=1}^{n} d_i \ln f(t_i,\theta) + \sum_{i=1}^{n} (1 - d_i) \ln S(t_i,\theta) = \sum_{i=1}^{n} d_i \ln f(t_i,\theta) - \sum_{i=1}^{n} \Lambda(t_i,\theta) \tag{2}$$

Where d_i has value 1 if the deal had an exit and zero otherwise (right censored observation); θ is the vector of the parameter specification of the hazard distribution. The non-censored information contributes with the fail density term, that is, having being sold in t_i, $f(t_i,\theta)$, and the censored observation with the survival density term, that is, with the fact that they have not being sold in ti, $S(t_i, \theta)$. $\Lambda(t)$ is the hazard integrated function.

We adopt the parametric approach for the hazard model, λ, using the Weilbul distribution that is more general than Exponential distribution (Kalbfleisch and Prentice, 2002).

The Weibull basic hazard function is $\lambda_0(t) = p\theta t^{p-1}$, where θ is parameterized as $\theta_i = \exp(-px_i\beta)$. If p = 1, this function reduces to the Exponential.

The proportional effect of x in the conditional probability of ending a duration does not depend on the holding period. Therefore, the coefficients can be interpreted as the effect of x in the conditional probability of ending a duration.

The coefficient signal indicates the impact direction of the explanatory variable on the conditional probability of ending a duration. Thus, the hazard is rising if coefficient > 1, and declining if coefficient < 1.

3.2. Database and Variables

We collected the data in the Spectra Insper database, a partnership between Spectra Investments, a PE investor and Insper, a leading Brazilian institution of education and research. The information is based on PPM (Private Placement Memorandum), documents used by fund managers to raise new funds with institutional investors. PPMs contain information about characteristics of deals, funds and fund managers. Spectra protects the identity of fund managers, funds and deals.

We excluded write-offs from the sample, since the database does not contain information about the date the fund recognizes the loss. We also excluded deals realized before 1994, since it was a period characterized by high economic uncertainty and instability, and the PE industry was practically inexistent at that time.

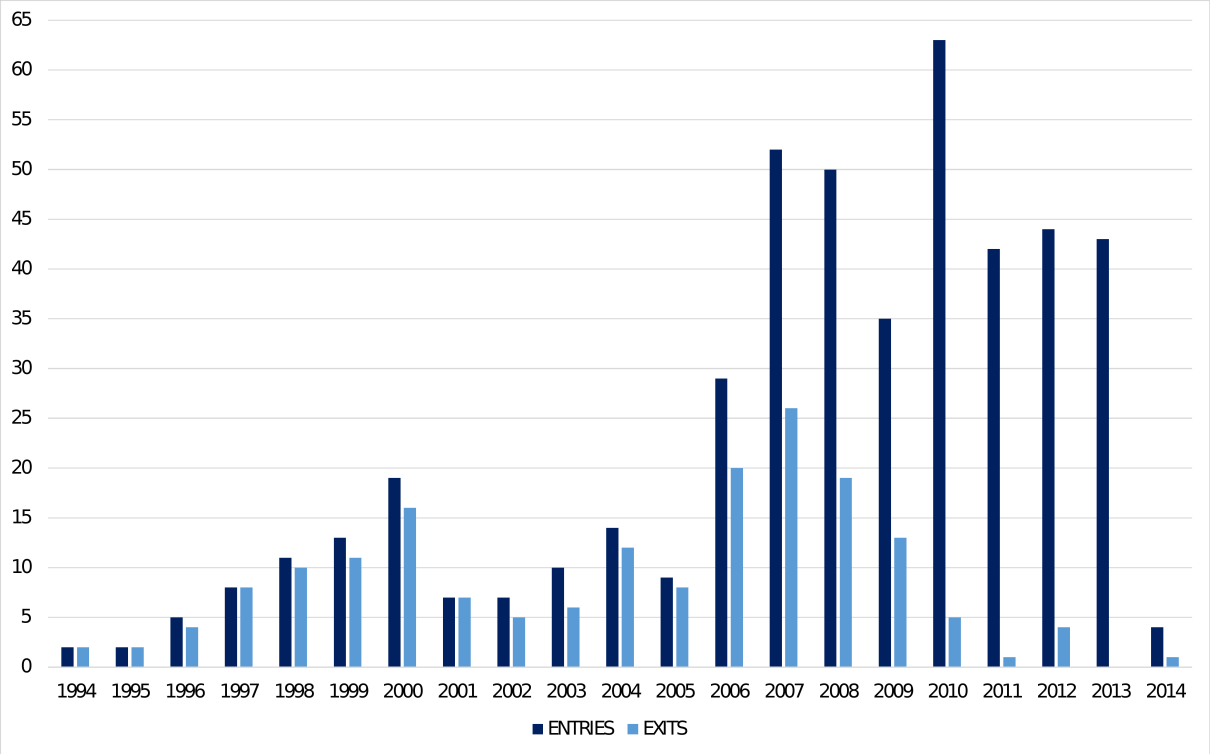
We classified as VC deal, investments in companies that did not reach the breakeven. The VC industry was rather underdeveloped in Brazil before 2010 (see Foster and Rhett, 2015), and most of the investments realized after that are still in the VC fund portfolio, or written off. The write-off rate of the deals realized before 2010 is also high. Therefore, we have relatively few exits observation with holding period information, and we preferred to exclude VC deals from the sample.

The final sample contains 459 PE deals invested between 1994 and 2014, of which 180 were fully liquidated. Figure 1 shows the number of investments and divestment according to the year of investment. We observe that almost all deals originated in 2006 or before were divested, and therefore not censored. Practically all recent deals (realized after 2011) are censored.

For the basic hazard model we used the following variables:

- d: variable that assumes value 1 if the investment had an exit (non–censored) and 0 if it is still in the fund's portfolio (right censored). We have 180 deals with an exit and 289 without an exit.
- t: Period in semesters the deal stays in the fund portfolio. For the non-censored observations, it corresponds to the holding period. We estimated it as the difference between entry date and exit day divided by 182.5 (365 days/ 2). Exit rate should increase with t. For the censored information, t was estimated as the difference between entry date and the last day data was collected: March 1st 2015.

Figure 1. Investments and divestments of PE funds according to the year of investment



We have two proxies for the market condition, our interest variable:

- HOT_PE: a dummy variable with value 1if the month of the exit is hot and 0 if it is cold. We classify a month as hot if the market price-earning ratio in that month is higher than the mean of the market price-earning ratios of the last 12 months, and cold otherwise. We estimate market price-earning ratio as the equal weighted average of the price-earning ratios of all stocks traded in the B3. There are 109 deals exited in hot months and 71 in cold months.
- HOT_IPO: a dummy variable with value 1 if the month of the exit has a number of IPOs higher than the average in the 3 previous months. There are 56 exits in hot IPO markets and 117 exits in cold IPO.

We used the following control variables:

- AGE: Experience of the PE firm at the time of the investment measured as the difference in years between the PE firm founding year and the year that the investment occurred.
- TICKET: Value in dollars of the investment made by the PE firm when acquiring the stake of the portfolio company. Information in Brazilian Reais were converted to US dollars using the PTAX (US Dollar-Brazilian Reais offer exchange rate disclosed by Brazilian Central Bank) in the day of the investment.
- CONTROL: Dummy variable that equals 1 if the PE firm has control stake in the portfolio company (buyout model) and 0 otherwise (growth model). We expect that control deals stay more time in the fund portfolio, since buyout funds usually pay control premium and should stay more time in the company to produce higher value and return.
- Dummy variables for the year of investments (for more details about Brazilian PE industry see Ramalho et al., 2011):
    - 1994-1997: when the PE industry started to have a significant activity, but fund managers were inexperienced, as well as the ecosystem was immature.
    - 1998-2001: in 1998 there were a significant Brazilian currency devaluation, that combined with lack of fund managers inexperience resulted in many unsuccessful exits. The industry call this period “nuclear winter”, because of the unfriendly environment for raising PE funds dedicated to Brazil.
    - 2002-2006: high liquidity in the world. Many PE firms raised funds, and IPO market window opened after 2004.
    - 2007-2010: 2007 had a boom of IPOs. There was a global crises in 2008, but Brazil was not severely affected, and the IPO window was not completely shut down, and funds dedicated to Brazil raised significant resources.

We expect that control deals stay more time in the fund portfolio. The entry price should be higher than in minority deals, because PE funds have to pay the control premium. Therefore, the implementation of value creation thesis should be more aggressive than in the minority model, and this probably requires larger implementation time

We expect that experience impacts positively the exit rate, as in Stromberg (2008). PE with higher reputation are more connected to investment banks and more experienced in the M&A and IPO activities. Therefore they should be able to exploit better windows of opportunities.

Deal size also may impact the exit time. Larger deals may be more difficult to sell to strategic buyers than smaller deals, but they may be easier to go for an IPO.

Table 1 contains a descriptive analysis of the variables and Table 2 shows the correlation matrix.

We can observe in Table 1 that the PE firm experience is higher in the censored sample. The reason is that, as we observe in figure 1, most of the censored deals were invested more recently, and were made by PE firms founded in the first (1994-1998) or the second industry cycle (1999-2002). Ticket size and fund manager experience (AGE) is significantly higher in COLD moments.

The maximum holding period in our sample is 25.7 years. Although the majority of the PE funds in our sample have finite life, there are some funds with proprietary resources and also funds affiliated to banks, which do not have finite life. This explains why some deals have holding period longer than 10 years.

In table 2, we observe a positive and significant correlation between size and experience. This is expected, since as PE firms gain reputation, they tend to raise larger funds and migrate to larger deals (See Metric and Yasuda, 2010). We also observe a significant negative correlation between experience and holding period, and a positive correlation between holding period and size and between holding period and control.

Table 1. Descriptive Analysis of variables

		Total Sample	Exit (non-censored)	Without Exit (censored)	HOT (High Price-Earning)	COLD (Low Price-Earning)	Mean Difference HOT-COLD (t-statistic)	HOT (high number of IPOs)	COLD (Low Number of IPOs)	Mean Difference HOT-COLD (t-statistic)
observations	number	469	180	289	109	71		56	117	
Holding period (semesters)	mean		9,0		8,8	9,3	-0.5	9,7	9,0	0.7
	std		6,1		5,9	6,4	(-0.6)	5,6	6,4	(0.7)
	maximum		0,3		24,9	25,7		24,9	25,7	
	minimum		25,7		0,3	1,3		0,3	0,8	
TICKET (US$ million)	mean	60,9	43,5	76,0	34,4	58,9	-24.5	26,5	51,8	-25.3
	std	84,8	70,6	93,1	43,2	91,6	(-2.1)	37,1	81,7	(-2.8)
	maximum	608,0	608,0	535,2	234,9	608,0	(**)	234,9	608,0	(***)
	minimum	0,2	0,2	0,7	0,5	0,2		0,4	0,2	
AGE	mean	7,4	5,3	8,7	5,3	5,4	-0.1	4,3	6,0	-1.7
(years)	std	6,8	5,2	7,3	5,7	4,5	(-0.2)	4,0	5,8	(-2.3)
	maximum	47,0	32,0	47,0	32,0	21,0		15,0	32,0	(***)
	minimum	-	-	-	-	-		-	-	
CONTROL	number	113	55	58	34	21		15	38	
	percentage	34,5%	33,5%	35,4%	33,0%	34,4%		28,3%	35,8%	

(**) and (***) means statistically significant at 5% and 1%.

Table 2. Correlation matrix of variables

	HoldingPeriod	HOT_PE	HOT_IPO	CONTROL	AGE	TICKET
HoldingPeriod	1	-0,04257	0,054144	0,1947446	-0,31697	0,054709
HOT_PE		1	0,136426	-0,014501	-0,0116	-0,16138
HOT_IPO			1	-0,075472	-0,15372	-0,16402
CONTROL				1	-0,00468	0,095697
AGE					1	0,270898
TICKET						1

4. Results

Figure 2 plots the cumulative basic survival function of PE deals. It is a through the cycle analysis. In the sample we analyzed, 70% of the deals were in the fund portfolio in the 10th semester, and 15% of the deals stayed in the fund portfolio after the 26th semester.

Figure 2. Basic cumulative survival rate of PE deals in Brazil – through the cycle analysis

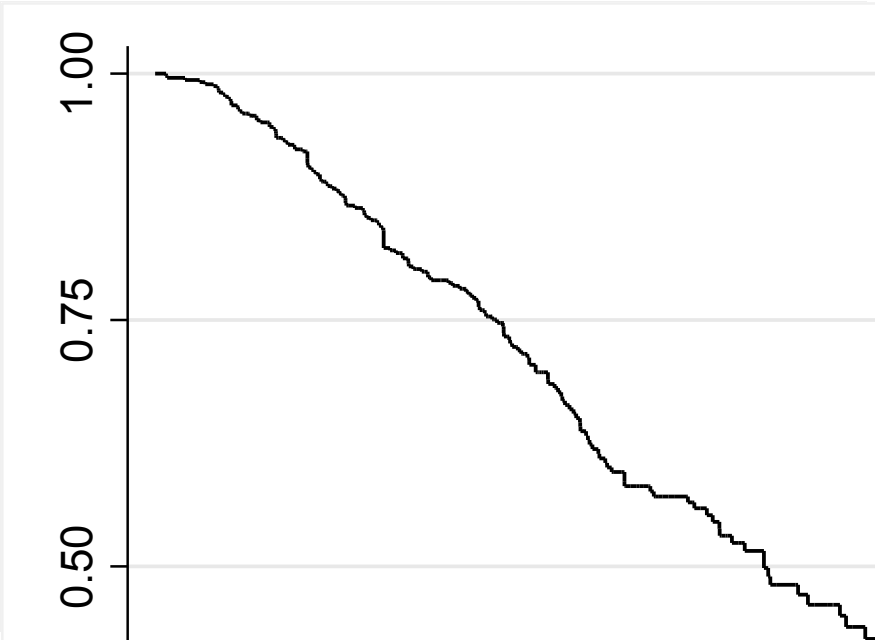


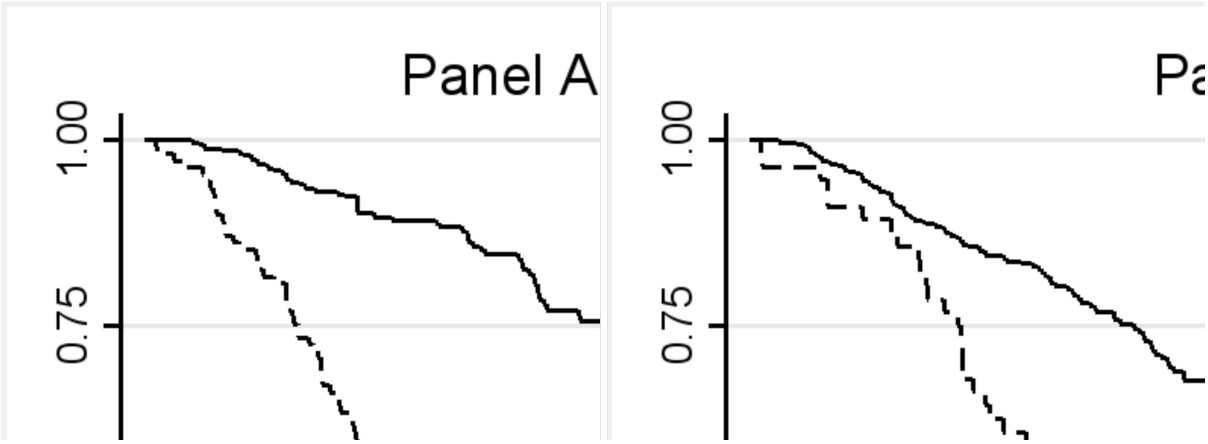
Figure 3 plots the cumulative basic survival function segregated by hot and cold markets. Panel A contains the analysis for high and low price-earning ratio, and Panel B for high and low number of IPOs. It highlights the importance of considering market condition on the liquidity of PE investments.

See in panel A that, if we have only favorable moments in terms of price-earning, the rate of deals that are in the fund portfolio in the 10th semester is 35%, and it increases to 85% if there were only periods of low price-earnings. In the 26th semester, the rate of deals in the fund portfolio is practically zero if we have only high price-earning moments, and 35% if we have only unfavorable market valuation.

In panel B we repeat the same analysis for hot and cold IPO windows. The chances of having a deal in the portfolio in the 10th semester after having only hot IPO windows is 23%, and only cold IPO moments is 77%. The chances of having a deal in the portfolio in the 26th semester if we had only hot IPO moments was practically zero, and 23% if we had only cold moments.

We found in our sample 7.2% of quick flippers: 13 out of 180 exits had holding period smaller than two semesters, of which 9 had exits in high price-earning month. When we check panel A in Figure 5, the rate of deals that stay in the fund portfolio for 2 semesters is 99% if the market has low price-earning, and 91.74% if the market is high price-earning. When we repeat the analysis for IPO, the difference in the survival ratio is smaller: 97.27% of the deals stay in the portfolio after the second semester if there is the IPO window is closed, and 94.64% if IPO window is opened. Therefore, we also find evidence that quick flippers increase with favorable market condition, specially if the market valuation is high.

Figure 3. Basic cumulative survival rate of PE deals in Brazil segregating hot and cold cycles



Our findings are in line with Giot and Schwienbacher (2007) and Jenkinson and Sousa (2015). PE fund managers take advantage of favorable market windows to sell their stake in portfolio companies. Consequently hot market condition accelerate PE exits, and increase the liquidity of the asset class.

Table 3 contains the results of the log maximum likelihood analysis adopting the basic hazard and the explanatory variables parametrized by the Weibull function according to equation (2).

The hazard ratio of 1 means that the variable does not affect the exit ratio. A hazard ratio higher than 1 means that the variable affects the hazard ratio positively, and lower than 1 that it affects negatively.

As we observe in models (1), (2) and (3), high price-earning ratio increases the exit rate in 5.43 to 8.83 times when compared to cold price-earning ratio. Hot IPO windows also have a very significant impact in the exit rate, but with a smaller magnitude: it increases around 2 to 3 times the exit rate.

We find a weak evidence that deals in which PE have control stake have a lower exit rate – the exit rate is reduced by 36% (100%-74%) when compared to minority stake deals. But we found significance only in model (1), and at 10%.

We do not find evidences that PE manager experience and deals' ticket size impact exit rate.

It is important to control for time effect. We find weak evidences that the first cycle of investments (1994-1997) had lower exit rates, but at a significance level of only 10%. Therefore, there is weak evidence that the immature PE ecosystem increased the holding period of deals. Also, deals invested in 2002-2006 had higher exit rates, and this effect was significant at 1% for models (4), (5) and (6). Probably this was due to the very positive economic environment for Brazil in the 2007-2010 period, and it was not completely captured by our market condition proxies.

Table 3. Hazard model analysis

The first line of each variable contains the hazard ratio, and the second line, into parenthesis, the standard error. HOT_PE is a dummy variable with value 1 if the month of the exit has a high price-earning ratio and 0 otherwise, HOT_IPO is a dummy variable with value 1 if the month of the exit has a high number of IPOs and 0 otherwise, CONTROL is a dummy variable with value 1 if the PE fund holds more than 50% of the equity stake and 0 otherwise, AGE is the age of the PE firm in the year the investment occurred, TICKET is the size of the investment in US$ and the other variables are time dummies to control the year the investment occurred.

	Models					
	(1)	(2)	(3)	(4)	(5)	(6)
constant	0.0034(***)	0.0033(***)	0.0019(***)	0.0057(***)	0.0051(***)	0.0033(***)
	(0.0018)	0.0016	(0.0008)	(0.0031)	(0.0026)	(0.0015)
HOT_PE	5.4312(***)	5.7423(***)	8.8311(***)			
	(1.3822)	(1.3522)	(1.8864)			
HOT_IPO				2.1010(***)	2.2986(***)	3.4308(***)
				(0,3523)	(0.3810)	(5132)
CONTROL	0.7425(*)			0.7935		
	(0.1245)			(0.1303)		
AGE	0.9912	0.9888	1.0057	0.9758	0.9738	0.9986
	(0.0182)	(0.0178)	(0.0139)	(0.0195)	(0.0188)	(0.0163)
TICKET	0.9907	0.9989		0.9988	0.9990	
	(0.0014)	(0.0014)		(0.0010)	(0.0010)	
1994-1997	0.3107(*)	0.4214	0.4477	1.030	1.2415	1.6638
	(0.2066)	(0.2657)	(0.2466)	(0.4911)	(0.5746)	(0.7683)
1998-2001	0.4895	0.6240	0.7586	1.2813	1.5044	1.9340
	(0.2804)	(0.3516)	(0.3801)	(0.5965)	(0.7018)	(0.8417)
2002-2006	1.5238	1.8227	1.7417	3.2651(**)	3.7402(***)	3.5908***
	(0.8448)	(0.9835)	(0.8180)	(1.5793)	(1.7997)	(1.5588)
2007-2010	1.2319	1.4422	1.6766	1.5669	1.8224	2.2771(*)
	(0.5952)	(0.6913)	(0.7045)	(0.7440)	(0.8634)	(0.9693)
n. observations	284	332	469	281	327	462
n. failures	145	155	180	142	150	173
wald chi-square	102.31	127.12	198.98	75.39	84.00	115.42
Log pseudolikelihood	-210.22	-244.33	-307.65	-229.16	-262.21	-342.74

(*), (**), (***) means statistically significant ant 10%, 5% and 1% respectively.

5. Conclusion

Our results support the hypothesis that PE fund managers time the market in Brazil, taking advantage of high valuation cycles to sell their investments. The magnitude of this market timing is higher in moments of higher valuation (increases exit rate in 5-8 times) than in moments of hot IPO windows (increases exit rate in 2-3 times). Therefore, PE investors have to consider market condition to estimate their liquidity risk: the rate of deals that stay in the fund portfolio is practically zero in an analysis that considers only hot markets, and 23%-35% in an analysis that considers only cold markets. Favorable market valuation condition also increase the chances of quick flippers. This is in line with the international evidences for the USA (Giot and Schwienbacher, 2007) and Europe (Jenkinson and Souza, 2015).

We also found a weak evidences that control deals stay more time in the fund portfolio than minority deals.

Due to data limitation, we concentrated our analysis to the holding period in general, not taking into account the exit path. Although some observations had information about the exit alternative (tradesale, IPO, sale to owner, secondary

sale, write-off), there were many missing data. Besides, we were not able to include write-offs in our sample because of missing exit data. This limitation did not allow us to run competing hazard models as Jenkinson and Souza, 2015 and Giot and Schiwnbacher, 2007.

This analysis about the exit dynamic is pioneering in Brazil, and it contributes to the emerging market literature of Private Equity. It also contributes to a better understanding of the exit dynamics, and important tool in liquidity analysis for private equity investors.

References

Cao, J. X. (2011). IPO Timing, Buyout Sponsors' Exit Strategies, and Firm Performance of RLBOs. *Journal of Financial & Quantitative Analysis*. 46, 4, 1001-1024.

Foster, G. and Morris, R. (2015). Movile's Executive Case: Brazil. World Economic Forum. Available at http://reports.weforum.org/new-models-for-entrepreneurship/illustrative-executive-cases/movile-executive-case-brazil/

Giot, P; Schwienbacher. (2007). IPOs, trade sales and liquidations: Modelling Venture Capital exits using survival analysis. *Journal of Banking and Finance*. 31, 679-702.

Gejadze, M., Giot, P. Schwienbacher, A. (2015) Private Equity Fundraising and Firm Specialization. Available at SSRN: https://ssrn.com/abstract=2083649

Greene, W.H. (2000). Econometric Analysis, Prentice Hall, New Jersey, 4ª ed.

Gompers, P. A. (1996). Grandstanding in the Venture Capital industry. *Journal of Financial Economics*. 42(1), 133-153.

Jenkinson, T. e Sousa, M. (2015). What Determines the Exit Decision for Leveraged Buyouts? Available at https://ssrn.com/abstract=1475912 or http://dx.doi.org/10.2139/ssrn.1475912

Johan, S., and Zhang, M. (2016). Private equity exits in emerging markets. *Emerging Markets Review*, 29, 133-153.

Kalbfleisch, J. D., and R. L. Prentice. (2002). *The Statistical Analysis of Failure Time Data*. 2nd ed. New York: Wiley

Kaplan, S. N and Schoar, A. (2005). Private Equity Performance: Returns, Persistence, and Capital Flows. *The Journal of Finance*. 60 (4), 1791-1823.

Kiefer, N.M. (1988). Economic Duration Data and Hazard Functions. *Journal of Economic Literature* XXVI, 646-679.

Lerner, J., Leamon, A. and Hardymon, F. (2012) Private Equity, Venture Capital and the Financing of Entrepreneurship. Willey. Nova York, USA.

Ljungqvist, A, Richardson, M. P. (2003) The Cash Flow, Return and Risk Characteristics of Private Equity. NBER Working Papers. 1.

Masulis, R. W. e Nataha, R. (2009. Venture Capital Conflicts of Interest: Evidences from Acquisitions of Venture Backed Firms. *Journal of Quantitative Analysis*. 46 (2). 395-430.

Metrick, A. and Yasuda, A. (2010). The Economics of Private Equity Funds. *Review of Financial Studies*. 23 (6), p2303-2341.

Minardi, A. M. A. F, Ferrari, G. L. e Tavares, P. C. (2013). Performances of Brazilian IPOs backed by Private Equity. *Journal of Business Research*. 66, (1), 448-455.

Ramalho, C., Furtado, C. Lara, R. (2011). A Indústria de Private Equity e Venture Capital no Brasil: 2º Censo. Available at http://bibliotecadigital.fgv.br/dspace/bitstream/handle/10438/8419/Private_Equity_e_Venture_Censo.pdf?sequence=1&isAllowed=y

Stromberg, P. (2008). The New Demography of Private Equity. Working paper. *Swedish Institute for Financial Research.*

Zarutskie, R. (2010). The Role of Top Management Team Human Capital in Venture Capital Markets: Evidence from First-Time Funds. *Journal of Business Venturing*, **25**, 155–172.