Analysis of the Relationship between Size and Returns in Private Equity

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ABSTRACT

We study in this paper the relationship between the size of funds and the related performance in the Private Equity industry. We show that for top quartile funds, an increase in size is associated with a decrease in performance. Furthermore, we show that this increase in fund size is also associated with an increase in performance of the lowest performing funds, leading to a less volatile spectrum of returns for larger fund sizes. Following this first analysis, we use System Dynamics techniques to visually represent the industry and hypothesize that these decrease in returns are led by manager’s lack of focus, the increased competition for these deals and an increase in risk-taking. The main driver we identify as responsible for this increase in fund size over the past decade is due to the increase in management fees in absolute value. Finally, we discuss potential strategies enabling fund managers to balance this desire to increase management fees whilst protecting the high returns sought by Limited Partners investing in their funds.

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1. Introduction & Outline

In the past two decades, Private Equity has undergone a fast-paced growth to become a key sector in the worldwide economy. Origins of Private Equity as firms can be traced back to the post World-War II era with firms such as the American Research and Development Corporation (ARDC) and J.H. Whitney & Co. However, techniques used in these firms, including Venture Capital, Growth Capital or even Leverage Buyout have been used for centuries. For example, in the late 1800’s, as the railroad network expanded drastically throughout the United States, a third of the rail mileage went through receivership; merchant banks such as J.P. Morgan stepped in, rationalized the capital structure and often put into place new management in order to recover from this distressed situation (Gordon, 2012).

In the 1980’s, Leveraged Buyouts took a preponderant part in this industry, with the first significant transactions being ran by Kohlberg, Kravis and Roberts as “bootstrap” investments for the Bear Stearns bank in which they became acquirer of firms that could not undergo an IPO but where looking to make an attractive exit. These years mark the beginning of the buyout-era, exemplified with the 31.1 B$ takeover of RJR Nabisco by the newly founded Private Equity firm KKR (Kohlberg, Kravis and Roberts). This remained the largest buyout for over 15 years. In the early 2000’s, LBO’s experienced dramatic growth and culminated with what is often referred to as the ‘Age of Mega-Buyouts’ during the 2005-2007 period where multi-billion dollar deals were announced within a very short period of time. The industry has suffered an important downturn following economic turmoil in 2007 but seems today to have recovered as we see deal activity increasing year-on-year.

This growth and expansion of the industry in the past decades has been accompanied by an increase in the size of funds that are managed by General Partners. This paper will try and provide a thorough understanding of the trend pushing Private Equity funds to get larger although it seems those funds provide less returns to investor. Indeed, it seems quite challenging to believe that several funds larger than 10B$ will be able to sustainably generate the high returns of at least 3 times Multiple of Money (MoM) investors are looking for within the current investment period of 5 years.

In a first part, we will evaluate the current fund returns for an investor in relation with their size. This section will focus on using statistical methods to better understand and grasp the relation between size and returns at a fund level. It will be critical in this part to measure those relations from an aggregate perspective in order to understand and take into account the competition and market dynamics. In a second part, we will use Systems
Dynamics modelling techniques to better understand the dynamics tying the investors needs and demands to the fund structure. We will try and better explain the evolution of fund structures over the past two decades. In a final, more forward-looking section, we will derive from this statistical and Systems Dynamics work new suggested fund strategies to maximize both fund returns and investor returns.
2. Evolution of Fund Sizes and Returns in Private Equity since 2000

In this section we will try and explore the relationship between size and returns and outline the trends shaping the industry since 2000 using data compiled by Pitchbook.

A. Sample Presentation

a) Overview

Our analysis will be built upon a sample of 1381 funds compiled by the online database Pitchbook. These funds are all defined as Buyout funds. In this paper, private equity investments will refer to buyout investments and will not include Venture Capital or any other asset class often referred to as Private Equity such as Growth Capital or Mezzanine investments. Funds sampled are larger than 100 million dollars, have a vintage year comprised between 2000 and 2014 and do not have any geographical restrictions. These funds have been categorized by size range for our analysis. The figure below presents the sample data by size and vintage year for data extracted as of Jan 28th 2015.
b) Details & Limitations

This distribution is to be kept in mind through our aggregated analysis. Indeed, although this sample seems to be in line with the evolution of Buyout capital being raised during the time period (see part B. a.), the over-representation of funds of vintages 2005, 2006 and 2007 could be a bias to our analysis given this period was a very fruitful one for private equity in terms of capital invested and capital raised.

Other limitations can arise from this sample. The way it is segmented per size might not be representative of distributions within these fund sizes. For example, in the 5B$+ size range, funds vary from 5B$ in size (4 funds, including Clayton Dubilier & Rice Fund VIII (2009)) to over 21B$ for Blackstone Capital Partners V (2006). Our analysis could be re-run with different size tranches. For the purpose of this analysis we will keep the following size pools:

- $100M to $249M: small-cap funds, usually local or sector-focused.
  e.g. Altra Private Equity Fund (2009), $101M fund based in Bogota, Colombia with a focus on buyouts in the Andean region.

- $250M to $499M: small-cap/ lower mid-cap funds, usually region focused funds and often sector focused.
  e.g. Water Street Capital Partners I (2006), $368M fund based in Chicago, IL, USA with a focus on buyouts in the healthcare sector.

- $500M to $999M: mid-cap funds, regional/continental funds, and more generalist funds with still some larger sector-focused funds.
  e.g. Orchid Asia V (2009), $650M fund based in Hong Kong with a focus on SMEs buyouts in China.

- $1B to $4.99B: large-cap funds, including continental funds of medium-sized Private Equity firms.
  e.g. Bain Capital Asia I (2007), $1B fund based in Hong Kong focused on buyouts cross-sector throughout Asia; Oak Hill Capital Partners II (2005), $2.5B fund based in Menlo Park, CA with a focus on US deals cross-sector.

- $5B+: mega-funds that appeared in early 2000’s, global/large-cap continental funds targeting cross-sector buyouts.
  e.g. Carlyle Europe Partners III (2007), $7.6B London based fund with European focus; Warburg Pincus Private Equity X (2007), $15B New-York fund with a global scope and cross-sector strategy.

In this paper, we will have a specific interest in better understanding the incentives and motivations of fund managers raising mega-funds.
B. Fundraising Activity & Fund Sizes

a) Increase in Mean Fund Size

We then investigate the fundraising activity during our timeframe to better comprehend the dynamics of the industry. The following figure illustrates the amount of capital raised per year in buyout funds.

![Capital Raised (M USD)](image)

Note: Data from Pitchbook extracted as of Feb. 10th 2015.

So far, these levels seem to map the distribution of our funds by size. The industry was at a peak in 2006 and 2007 before slowing down to early 2000's levels and picking back up. Overall, it appears that the capital raised is on an upward slope with capital raised in the past 3 years more than 3 times the level of capital raised in the first half of the past decade. What we now seek to understand is whether funds at an individual level have seen an evolution with respect to size. The following chart presents the evolution of the mean fund size and median fund size over the time period considered.
This analysis is key as it shows from a high level perspective some interesting points:

- Overall, the mean fund size between 2000 and 2014 appears to be cyclical but follows an upward slope. The Compounded Annual Growth Rate (CAGR) of the mean fund size over the period 2000-2014 is equal to 3.7% indicating that funds have been increasing in size. By comparison, over the same period of time inflation in the US grew at a slower compounded rate of 2.3%.

- The Median Fund size has also slightly increased overall the period but has been oscillating around the $400/450M level until 2011 (CAGR over the period 2000-2011 of 1.8%) before rapidly expanding to reach 690M$ in 2014. At this point, it would be premature to imply that the median size of fund is really increasing or if this trend is only temporary and will decline to 2011 levels in the near future. Hence, this trend would indicate that rather than seeing funds increasing in size, a portion of the fund sample has been increasing over the years at drastic levels. It is on these funds that we will concentrate our work.

b) Underlying Reasons for Increase in Fund Sizes

Intuitively, this appears to be in contradiction with the promise of Private Equity. This trend could be justified by the fact that General Partners are raising funds with lower performance objectives that still outperform more liquid markets for which Limited Partners are ready to invest. This could be indicated by the fact that Private Equity firms are paying higher prices for similar deals and consequently diminishing Limited Partners
returns. The chart below suggests that this might be the case as it is line with the evolution of the mean fund size.

![Median Deal Size per Year](image)

Alternatively, this increase in the mean fund size could imply that the available pool of investments that can generate the high returns sought by investors has grown in line with the capital raised. To evaluate this last point, we will seek to compare the evolution of capital raised with the total market capitalization of US stocks, as a credible proxy for analysing the Private Equity industry. Data is collected using the World Bank Data that defines the indicator as follow: “Market capitalization (also known as market value) is the share price times the number of shares outstanding. Listed domestic companies are the domestically incorporated companies listed on the country’s stock exchanges at the end of the year. Listed companies do not include investment companies, mutual funds, or other collective investment vehicles. Data are in current U.S. dollars.” (The World Bank, 2015)

![Total US Market Capitalization (in kB$)](image)

Note: 2013 data was not available; 2014 data source: S&P Capital IQ, Net Advantage – Total Market Value of S&P500
This chart seems to suggest that indeed, capital raised by Private Equity managers has increased at a faster pace than the available pool of investments. Another clearer view of observing this trend is by observing the following chart, which presents the evolution of Capital Raised in Private Equity and total market capitalization indexed to 100 in 2000.

From this chart, we can very visibly see the bubble in Private Equity that occurred in 2006 and 2007; the capital raised grew over four fold between 2004 and 2007 when the total market capitalization grew by only 22% over the same period of time. Furthermore, post-2010, capital raised grew again faster than market capitalization. Overall, if we compare the period on aggregate, market capitalization has grew at a compounded annual growth rate of 1.8% when Capital Raised grew at a rate of 3.1%.

This evolution seems to indicate that rather than seeing an increase in Private Equity opportunities, Private Equity funds have been paying higher prices and thus potentially sacrificing returns to investors, if we consider the returns in 2000 to be the basis year. It should be noted here that this relies on the assumption that seems to be verified that the investment horizons have not changed since the early 2000's and that managers invest all committed capitals in deals. Funds are still raising funds with an investment horizon of 5 years and exiting them in 10 to 15 years. Based on our analysis, it would seem that at least a portion of Private Equity funds are becoming larger and larger and have thus been seeing decline in returns as the potential investment pool has not grown at the same pace. To test this hypothesis that as funds become larger, performance decline, we will compare results for different quartiles on the 2000 to 2014 period.
C. Evolution of Returns

a) Returns Aggregated at a Fund level

First, observing the returns per fund size over the period we can observe that the median IRR is pretty flat at around 9%. However, based on Schoar’s work (Kaplan & Schoar, 2003) we could investigate whether top performing funds in each fund size category show similar performance. Indeed, according to this initial analysis (that has been since then been mitigated), returns net of fees for investors outperform public equities only for top performing funds. Aggregating the data collected on Pitchbook for median IRR as of February 2015 with returns data as of the most recent quarter we observe the following results for performance per quartile in the industry:

This chart is very interesting as it seems size and performance levels in the top performing funds are negatively correlated. Performance difference is almost equal to 5 basis points (bps) from funds in the 100M-249M$ range (Median IRR of ~21%) down to 16% for larger funds. The top performing funds are in the lower mid cap range as we observe a median IRR of close to 25% for funds of size 250M$ to 499M$.

Several factors could explain this correlation and we will use System Dynamics tools later in this paper to illustrate the reasons pushing funds to grow and present the side-effects pushing performance down. At this stage, we can hypothesise that the following reasons are the main drivers pushing performance down when funds grow in size:
• **Lack of focus & Loosening of Investment Criteria:** as Fund Managers increase their fund size but do not grow teams at same pace and with the need to invest an increasing amount of capital, managers will tend to loosen their diligence work focus and invest more easily in some riskier or less attractive deals.

• **Scarcity of Deals:** the limited number of large cap deals pushes fund managers to compete harshly for potential targets and end up paying important premiums for acquisitions.

• **Increase in Risk-Taking:** the two effects combined above with the increase in nominal value of management fees returns, will provide comfortable situations to managers that could be tempted to take-on riskier investments on behalf of their investors, ultimately leading to poorer performance on aggregate. Although usually higher risks are associated with higher expected returns, the hypothesis we make here is that this assumption holds only when managers take part in deals whilst being aware of this increase in risk. With the increase in fees, managers will invest in riskier deals without carefully measuring and quantifying this risk thus leading on aggregate to poorer performance.

It is also interesting to note from this chart that, on aggregate, size does not have an important impact on performance. The median IRR for different fund sizes is quasi-flat at around 9% over 2000-2014. We can also observe from this chart that returns are much riskier for smaller funds as the spread between the lowest performing quartile and top quartile for the median IRR is equal to 28.1 points for funds in the $100M-$249M range up to 30.4 points for funds in the $250M-$499M range when it is only 12.7 points for mega-funds. This is significant information, as it seems that investors could be attracted to go for larger funds that would reward them with potentially less returns but compensated by less risk.

Before analysing such trends, we test whether this drop in performance could be linked to an increase in amount of dry powder. Indeed, we measure returns to total capital committed and not to total capital invested. One could make the hypothesis that the drop in performance that followed the increase of fund sizes could be due to the fact that they are investing less of their capital committed. In Bain & Company's latest Global Private Equity (Bain & Company, 2015), the following analysis is ran:
We can observe that in the Buyout funds, dry powder has considerably increased between 2003 and 2006 but has then stabilized in the 400-500M$ range. This tends to show that although a portion of this drop in returns could be explained by this increase in dry powder, flat levels of dry powder since 2005/2006 mitigate this factor. We can confidently make the hypothesis that returns have been dropping with the increase in size and those cannot be solely attributed to an increase in dry powder that has been in place for almost a decade now.

We now seek to further understand the trends behind these performances by studying persistence.

b) Returns at Firm level: Analysis of Persistence

So far, we have established that a trend industry is pushing funds to become larger. We have also observed that for top performing funds this growth is associated with a decline in returns. We have detailed some hypothesis that could explain this decline in performance. We now seek to establish the performance and dynamics not at a fund level but at a Firm level. Can we segment Private Equity firms by the size of their funds over time or is their dynamics within the industry pushing managers to change fund sizes of subsequent funds based on performance of precedent funds?

In their paper, Steve Kaplan and Antoinette Schoar (Kaplan & Schoar, 2003) argue that funds performing strongly will be more likely to raise subsequent funds and that those will
be larger than those funds that do not perform. Furthermore, they argue that funds started in booming periods, such as the 2005-2007 period will be less likely to raise subsequent funds, indicating that those would be performing more poorly. Based on this argument, we can make the claim that mega-funds with preceding smaller funds are the ones held by top performing managers. The chart below illustrates the evolution of fund sizes for 3 managers that are amongst the most renowned for past track record: Bain Capital, Carlyle Partners and Hellman & Friedman.

![Fund Size Evolution of 3 Key PE Players (2000-2014; in M$)](chart)

However, we have also observed in our sample that the median IRR for all quartiles was quasi-flat. Could one argue that for larger funds an IRR median of 9% is sign of stronger performance than an IRR median of 9% for small-cap funds? We have also outlined that as funds became larger, risk diminished. Thus, the investor’s incentive to continue investing in larger funds is that on the one hand funds managers raising such funds usually have a strong track-record and, although returns seems less important, they also appear to be more secure.

However, are these funds still capable of outperforming comparable investments that are more liquid? We will now try and explore the reasons pushing funds to raise mega-funds in the context we have explored so far. Now that we have some hypothesis on the reason why these funds are raised, we seek to explore incentives for the managers and then in a later part, we will try and explore new fund strategies.
3. A System Dynamics Approach to Fund Size Evolution

In this second part of our analysis, we will use System Dynamics methods and tools to outline the lifecycle of a Private Equity firm and visually represent the mechanisms leading to a growth in fund size. We will also place ourselves from the perspective of a Limited Partner to understand better their incentives in the Private Equity ecosystem.

A. Introduction to System Dynamics

a) Concepts

Professor Jay W. Forrester developed system Dynamics as a field at the MIT Sloan School of Management in 1956. According to MIT Sloan’s website, “This discipline combines the theory, methods, and philosophy needed to analyze the behavior of systems” (MIT Sloan School of Management, 2015).

John Sterman in his work (Sterman, Business Dynamics, Systems Thinking and Modeling for a Complex World, 2000) provides an extensive presentation of the field and outlines the motivations underlying the use of this method. System Dynamics is a method used to better apprehend learning in complex environments. The use of these tools enables to perceive the causes and effects of policy and decision-making in environments such as businesses or at macro-levels when studying propagation of diseases and epidemics. Most often, it is hard for managers, investors or any other stakeholder in the business world to evaluate the intended and unintended consequences of a particular decision. We will use System Dynamics tools to represent the dominating factors pushing the Private Equity industry trends with a particular focus on the dynamics of fund size. These methods will also enable us to understand sources of these trends and ultimately to design more effective fund structures and strategies.

b) Tools

Academic works present an extensive view of the field, the tools and the research in system thinking and modeling. For our work, we will be using mainly two key elements of the field: Causal Loop Diagrams and Stock & Flows.

i) Causal Loop Diagrams

Causal loop diagrams are the basis of the field. Sterman defines this tool as a “flexible and useful tool for diagramming the feedback structure of systems in any domain [...] Causal diagrams are simply maps showing the causal links among variables with arrows
from a cause to an effect” (Sterman, Business Dynamics, Systems Thinking and Modeling for a Complex World, 2000, p. 102).

This simple, yet powerful tool provides graphic representations of complex mechanisms and provides an outline for mental models. Furthermore, it indicates the relationships between different elements by providing polarities that indicate causal influence:

- **Positive polarities:** a positive polarity, represented by a + sign will indicate that an increase in the independent variable (cause) will lead to an increase in the dependent variable (effect)
- **Negative polarities:** a negative polarity, represented by a - sign will indicate the opposite relationship. As the independent variable increases, the dependent variable decreases.

The following figure is a simple example of a causal loop diagram used by Sterman to illustrate these concepts:

![Causal Loop Diagram](image)

This simple diagram illustrates very simple dynamics about the chicken population. The feedback loop on the left is denominated as a Reinforcing loop, which entails that at the end of the loop an increase (or a decrease) will lead ultimately in an increase (or a decrease) of this population. Alternatively, the loop on the right is a Balancing loop and depletes the population of chicken through killings in road crossing accidents. The overall evolution of chickens will depend on the strength and timing of both these loops and how they interact. If the reinforcing loop is dominant we will thus see an increase in the chicken population and inversely if the balancing loop dominates.

**ii) Stocks & Flows Maps**

Another key tool used in System Dynamics modeling is stocks & flows maps. Stocks and flows are defined as follows by Sterman:

- **Stock:** at the most simple level, stocks are accumulations, represented by rectangle boxes in modeling. Stocks are increased by inflows and depleted by outflows. Delays
in systems are created by the accumulation of the difference between the inflow and the outflow rate. As outlined by Sterman, "stocks are the source of disequilibrium dynamics" (Sterman, Business Dynamics, Systems Thinking and Modeling for a Complex World, 2000, p. 192)

- Flow: on the other hand, flows are the rate at which stocks are accumulated or depleted and are represented by arrows.

**B. One Firm View Model**

We now seek to build a dynamic vision of the Private Equity industry. At first, we will focus on the dynamics within a firm before enlarging our scope to encompass the market as a whole and the competition.

For our analysis, the key metric we want to understand is the size of Fund, i.e. the capital committed to the General Partner by Limited Partners. We can define this as a stock; it is the accumulation of capital raised from Limited Partners. This stock will be depleted or increased for every generation of fund.

The following model outlines the lifecycle of one Private Equity fund:

This high-level simplified model will enable us to represent and better understand the evolution of fund sizes based on our assumptions. The following loops have been established based from our initial analytical work and we will now explore them in details.
a) Reinforcing Loop R1: GP Fees

This loop outlines a simple yet key factor in the industry trends. As capital committed increases with time, management fees (a percentage of all capital committed) will increase in absolute value, driving the managers to further increase the target fund size in order to secure salaries and cash for daily operations of the firm. This reinforcing loop will have very strong effects on the overall dynamics of the fund size. Indeed, it provides comfort to managers that are able to secure sizeable income for themselves and their teams.

b) Reinforcing Loop R2: Track Record

This loop is one driven by the investor returns. As those start to see returns from their initial commitment, a track record for the manager will start being established. As the number of successful exits increases, the track record score will increase, enabling the managers to grow the appetite of Limited Partners to invest in its funds. We name this variable "Fundraising Success Rate" which is a factor variable between 0 and 100% that details how successful managers are able to reach their target fund size. We can also note
here that this loop occurs with delay, investors will not react to changes instantly and wait for trends to be outlined from a manager's performance before having a clear opinion on the manager. This is signalled in our diagram by a double bar on the arrow linking Track Record to Fundraising Success Rate.

c) Reinforcing Loop R3: Fundraising Appearances

This third reinforcing loop is driven by marketing reasons. Indeed, fund managers will tend to raise funds at least as large as the previous one. Raising smaller funds could and would be most certainly perceived as a weak signal to Limited Partners and especially new prospects, indicating that the performance of previous funds has not convinced existing investors to reinvest at the same levels in subsequent funds.

d) Balancing Loop B1: Investment Pace

We define the investment rate to be the pace at which managers invest the capital committed, and is measured in $ per year (or any other relevant unit of time). The investment rate is then simply defined as the ratio of capital committed and of the investment horizon. Usually, this horizon is 5 years. For simplicity, we assume that managers will invest equally throughout the lifetime of the fund. This assumption could be argued but seems to be reasonable given we are trying to model the size of funds throughout longer periods of times (at least 3 to 4 times the investment horizon). Thus as
the capital committed increases, the investment rate will increase, in turn depleting at a faster rate the pool of available capital for investments.

e) Balancing Loop B2: Return Investors

Once capital has been invested, it will generate returns, if any, through sales to strategic players, IPOs or secondary buyouts. A fraction of this capital invested will thus be returned to investors at a certain rate throughout the lifetime of the fund. As Capital Invested increases, we can assume that the rate of returns to investors in nominal value will increase. This return will then be balanced by the Performance variable that is in our case a variable defined by a table function outlined hereafter.

Our mean fund size for our sample is 1.1B$ and the median fund size is close to $500M. We will thus use the range 500M to 1B$ as our baseline for performance. It is important to emphasize here that our model will be focusing solely on top performing funds. Indeed, our analysis has shown that size and performance were linked clearly at a quartile level but not necessarily on aggregate. We thus set the performance to be equal to 1 for fund sizes from $500M to $999M. For the other fund sizes we will use our sample size ranges and the result of the analysis led in our first part to determine the increase or decrease in performance attached with the particular fund size. The baseline performance as an IRR is 22.07% for the top quartile. We then establish the performance levels for other fund size ranges proportionally to the top quartile IRR level. We therefore obtain the following table for our performance variable:
<table>
<thead>
<tr>
<th></th>
<th>IRR Q1</th>
<th>Adj. for Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>100M-249M</td>
<td>21.30%</td>
<td>0.97</td>
</tr>
<tr>
<td>250M-499M</td>
<td>25.60%</td>
<td>1.16</td>
</tr>
<tr>
<td>500M-999M</td>
<td>22.07%</td>
<td>1.00</td>
</tr>
<tr>
<td>1B-4.99B</td>
<td>21.30%</td>
<td>0.97</td>
</tr>
<tr>
<td>5B+</td>
<td>17.11%</td>
<td>0.78</td>
</tr>
</tbody>
</table>

In terms of modelling, this will mean that the rate of returns to investors will be weighted by this adjustment for performance variable. We will use a baseline performance level of 2x Multiple-of-Money to analyse the evolution of funds sizes. Indeed, in the context of one firm view we are interested in the dynamics pushing managers to change their fund size, thus it is more linked to the performance evolutions and not the performance in absolute value. This is a limitation of our model but we can make this assumption, as great swings in performance are not that common in the industry.

f) Balancing Loop B3: Return Managers

In parallel, a fraction of this return (the carry) will be returned to the fund managers. Similarly, this is a balancing loop: returns to the GP will deplete the Capital Invested stock whilst an increase in Capital Invested will lead to an increase in the rate of return to GPs (balanced by Performance). This will be measured in $ per year and the timeline defined by the variable Return Horizons (usually up to 10 years). However, it is important to note here, that by definition of the carry, the GPs will not always perceive the same fraction of a fund returns. Indeed, carry is usually an option based on the performance achieved on a deal basis. Most often, the distribution waterfall for returns specifies that investors hold preferred returns up to a hurdle rate (e.g. IRR of 8%). Once this threshold is reached, GPs will start receiving their share of returns (commonly around 20%).
Finally, this loop is the one we have outlined in our first part analysis. As the fund size increase, we will observe a decrease in performance for top performing funds. Concentrating our model only on this observation, we will observe that as fund size increases, performance declines. Thus driving the target fundraising down, as managers will try to protect themselves from bad publicity of a failed fundraising for their subsequent fund.

Our model is simplified as we have only connected Capital Committed to performance. However, as detailed in our first part, several intermediate steps connect the fund size to Performance, via several side effects that are not captured currently. The following causal loop diagram outlines the mental model that links the fund size to Performance. This is a more granular view trying to attempt explaining the drop in performance we observed for top performing funds that see an important increase in size.
These are the three main side effects we have derived: risk taking led by a more comfortable situation for the managers, scarcity of deals following an increase in competition for the fewer larger deals available on the market and lack of focus from teams that see their Assets Under Management grow at a faster pace than the size of teams. This last fact is subject to discussion and is solely based on general knowledge gathered from discussions with professionals in the industry. Finally, the bottom arrow outlines the correlation observed from persistence analysis, as funds perform stronger, managers will tend to raise larger funds, as illustrated by the loop B4 in our model.

h) Model analysis

Empirically, we have observed that fund sizes for top performing managers such as KKR, Bain Capital or Hellmann & Friedman have seen their fund sizes grow at a rapid pace. This trend is an indication that our reinforcing loops are driving most of the dynamics we observed regarding fund size. We can furthermore hypothesize that the management fee loop will be the strongest one. The appearance loop is strongly correlated to this loop but we can assume will be weaker than the management fee loop. Indeed, this loop is driven by marketing purposes and does not reward the managers other than with higher fees in nominal value.
Secondly, we can note here that the pace at which proceeds are returned to Limited Partners is a strong factor to include when explaining the evolution of fund sizes. By extending the investment horizon, fund managers will be able to balance side effects linked to an increase in fund size. Indeed, by extending the fund life, managers will not be faced with the strong deal scarcity observed and will not be pressured to invest the fund on deals they are not truly committed too.

Finally, balancing phenomenon explain mostly why funds that experience a drop in performance will see their fund size either stagnate or decrease. As returns to investors experience a drop, we will observe the build-up of a negative track record with much more power than a strong one. This will strongly undermine the fundraising success rate although managers, driven by the desire to get large management fees and maintain positive appearances, will still try to raise funds somewhat large and not properly synched with their past track-record. This will turn into bad PR for the manager; lower capital committed levels and could ultimately put the manager out of business. However, according to our model, intelligent managers could counter balance these effects by sizing appropriately their subsequent funds in order to get momentum and derive stronger future results enabling them to be on track to higher management fees once again.

We can therefore conclude from this model derived from a firm view that the increase in fund size observed over the past decade is driven by the desire to maintain high management fees in absolute value, the need to keep up appearances for marketing purposes to keep attracting new investors and the existence of top quartile funds consistently outperforming markets and building strong track-records enabling them to attract new investors although returns seem to decline over time.

C. Causal Loop Diagram: Market View

We will now investigate the evolution of fund sizes at an aggregate market level. The idea here is that this model will be an enlarged version of our previous model capturing dynamics not only at a firm view but also at a more broader market level so that we can understand the perspectives from a Limited Partner standpoint. The purpose of this section is much more informative as we will try and factor in broader market trends. The aim is not to give a very specific stock and flow structure but to build a comprehensive causal loop mental model to comprehend the industry as a whole. For this section we will adapt a model derived at MIT by Angel Sevil Esteban, MSMS ’12 in his paper Interaction Model of Private Equity and Venture Capital Developing Factors in Chile and Latin America (Esteban, 2012). The main conclusion of this paper is that development of PE is a continuous learning process, which could explain the trend showing that as managers gain in experience, more
and more capital flows to this asset class. Secondly, Esteban reaches the conclusion that success is the main driver of the development of the industry.

In this paper, Esteban derives the following causal loop model for the Private Equity industry in Chile.

![Causal Loop Model](image)

a) Model Outline

This model is targeting a specific geography in emerging markets. We can indeed see that variables such as “Governmental Fund Leverage Programs” or “Pro-Development Governmental Economic Policies” are country specific and will not be captured in a broader, more global vision of the industry. Adapting this model to capture trends for the industry globally, we build the following model:
b) Model Analysis

This simple model captures through six reinforcing loops the dominating trends in the industry.

- **R1: LP Short-Term Confidence**: as LPs observe an increase in the number of successful deals they will continue investing and committing an increasing proportion of their capital to Private Equity.
- **R2: PE Funds**: as observed previously, with the increase in number of successful exits, we will observe an uptake in the number of funds but most importantly in fund sizes.
- **R3: Track Record**: as the number of successful exits increases, the GP Track Record will become stronger thus enabling them to perform better in subsequent funds. With this increase in experience, they will perform better, as shown by persistence.
- **R4: Network effect**: as the GP Track Record gains in prestige and reputation, the manager’s network will grow stronger, giving them a prestigious image, thus enabling them to hold stronger positions when negotiating with either targets or buyers to maximize their returns.
- **R5: Financing**: as the number of deals conducted by the industry increases and we can see an uptake in the number of successful deals, financiers and creditors will be willing to give easier access to financing for subsequent deals. This has been clearly observed in the recent years with the leverage levels for deals falling drastically in
2007 following the subprime crisis and putting the activity of PE funds at a stop before reaching recently those levels observed before the crisis (Wirz, 2012).

- R6: LP Long-Term Confidence: similar to our first reinforcing loop, this loop is one that will be stronger than R1, as fund managers continue to successfully exit an increasing number of deals, the track record will become stronger, thus driving the LPs to commit to subsequent funds and build a relationship with the managers.

Finally, we can observe that in this model, the macro-economic factor has been oversimplified and reduced to one variable. This is a strong factor that will influence the industry at large but we believe that it will affect all General Partners similarly. The only notable exception is for funds with a specific sector focus that can navigate turmoil depending on their sector focus.

Overall, this second part had the aim of illustrating the industry dynamics to visualize the factors pushing top performing funds to grow in size whilst abandoning a significant part of returns to investors. We have concluded that several reinforcing factors and especially the drive to make management fees larger in absolute value are responsible for this increase in fund size. We have also discussed three main factors that seem responsible for the drop in performance we have observed: lack of focus, increase in risk taking and fierce competition driven by the scarcity of available deals for larger funds seeking to invest larger amounts per deal. We will now from these two parts try and evaluate new potential strategies that could lead managers to balance their desire for higher fixed income from management fees with the need to sustain high returns to their investors.
4. Finding Potential New Fund Strategies

In this final part, we will hypothesize strategies that could enable fund managers to protect returns whilst providing consequent management fees without adjustments to the existing fund term structure. Furthermore, we will try and construct strategies that also mitigate the effects of other strong effects outlined in our second part, such as macro-economic factors that seem to heavily impact the industry as a whole. First, we will explore the returns achieved by funds with geographical focus and then analyze returns for funds with a particular sector focus. Finally, we will build new long-term strategies for fund managers to try and balance fees and returns.

A. Geography Focus

So far, we have considered the Private Equity market as one industry without considering local markets or different investment strategies. We will now investigate returns for funds that operate with geographical scopes clearly delimited: country, regional or continental. Filtering out these funds by geography scope we analyse those returns as outlined by the Pitchbook database, for data extracted as of March 26th 2015.

For data availability reason, we will focus here on Regional funds in Europe, targeting different geographical regions: Northern, Western, Southern and Eastern Europe with vintage years running from 2000 to 2014 and again with fund sizes above 100 million USD. We observe the following median IRR for the different regions:

![IRR Median (in %, 2000-2014) by Geography (Europe)](chart.png)
From this chart, it appears clearly that a savvy investor will try and focus on investing in Northern Europe. One should however bear in mind that our sample is limited by its size (171 funds with over 130 in Western Europe). Although not the best statistical evidence, this analysis seems to confirm that returns are not distributed uniformly across geographies. Given the limitations of our sample it will prove difficult to pinpoint specific geographies using our sample data. We can note here that this analysis was limited by the data availability on the Pitchbook database, as we could not construct a sample with a more meaningful size to analyse returns per geographical scope.

However, several reports and literature papers illustrating these discrepancies in returns according to the fund geographies further support this inference. Bain’s latest report on Private Equity, for example, illustrates these findings in the following figure (Bain & Company, 2015):

We can observe on that chart that buyout funds focusing on the US market, the European market or Asian one have not performed in similar manners. For example, over the past 10 years, Asia Pacific focused funds have returned end-to-end IRR of 13% when European funds returned 16% and US 14%. This should not be an indication that savvy investors will invest only in Europe but that overall, markets do not follow the same dynamics, especially driven by macro-economic factors and Fund managers should construct local strategies to benefit at most from their understanding of the markets and benefit from intelligent allocation of the funds.
B. Sector Focus

Another trend that is visible in the sector from our sample is that as funds get larger, the geographical scope might still be constrained (most usually to a continent or a broad region such as South East Asia) but the sector focus is non-existent. Larger funds are most usually agnostic to sectors and try to balance their portfolio across sectors. This point is validated by Fund presentations of the largest managers. For example, we can find on KRR’s website, the presentation of their strategy. They announce that they seek to invest across geographies in the following sectors (KKR):

![Sector Focus Diagram]

However, Robert Cressy, Federico Munari and Alessandro Malipiero in there paper (Robert Cressy, 2007) *Playing to their Strengths?* Demonstrate that industry specialization of Private Equity firms adds 8.5% to the profitability advantage that exists within firms under LBO.

We can note here that this study was only run on a sample of 122 firms in the United Kingdom. However we can naturally hypothesize from this conclusion that PE managers will derive stronger returns from these additional operational gains. Thus, we can assume that sector focused funds tend to perform stronger based on this work.

The reasons pushing larger funds to operate cross-sector is quite straightforward as they need to have a scope large enough to invest the billion dollars under management they have and enables them to hedge risk across those sectors. Moreover, a too narrow focus can frighten the talent those fund managers need to recruit in order to perform. However this analysis shows that managers would be better off investing in sector focused funds. We
can hypothesize on the reasons driving performance. We can draw here a parallel with the business world where in some niches; firms will outpace the incumbent of the broader market. In this scenario, specific fund managers will develop high-quality knowledge and strong networks of managers and investors in this particular industry so as to benefit from information asymmetry and craft very focused deals that will generate higher returns.

C. New Strategies

In this final section, we will utilize those results derived previously in order to build new fund strategies. The aim here is not to change the “investment strategy” but more the way funds are structured so that they can generate strong returns for their Limited Partners whilst securing comfortable management fees. From our previous analyses two main strategies will come to mind: 1) Run multiple funds with different sectorial and geographical focus and 2) Grow at a slower pace the fund size in order to protect results whilst keeping a generalist approach to investment.

1) Sub-Segment Funds per Sectors & Geographies

From our System Dynamics approach of a fund life we have derived that management fees are the key driver for managers to increase the fund size along with marketing reason in order to protect the image of the fund. In order to protect this, managers could aim to build smaller vehicles with narrower focus in parallel. This would enable the following advantages:

- Higher returns on the long term by building specialized teams with a strong network on specific industry verticals. Funds could attract talent by enabling junior investment professionals to rotate through different funds and then specializing when reaching higher seniority, as in the management-consulting model.
- Broader spectrum of potential deals with ticket-size that can be reduced. To enable the investment in large deals, funds could build a co-investment vehicle that would only be used when investments are above a certain threshold.
- Broader spectrum of prospective Limited Partners. Indeed, such a fund structure could enable managers to not only target large, traditional mega-fund investors through the co-investment vehicle but also smaller, more focused investors with their industry vertical focused funds.
- Subsequent funds can see the scope of those investments restrained to more specific industries or to tap into new industries in order to protect returns from one fund generation to another and still see an increase in management fees.
Alternatively, we believe this set-up could be a more mature one as fees in this configuration would already be consequent and having 4/5 funds ran simultaneously offers the perspective to grow these funds without conceding a lot from a performance standpoint.

Moreover, an additional lever can be found with the possibility of setting up different vehicles across geographies and allocate funds dynamically based on the macro-economic setup at any given time. Indeed, the track-record or the image of a manager level will not be impacted as much by a downsizing of fund sizes due to macroeconomic reasons if it is only for one specific fund in a specific geography and/or sector rather than a global mega-fund.

2) Conservative Growth

This second option would be counter-intuitive to most managers and should be accompanied by clear communication on this topic to prospective investors. The idea here would be to size the funds reasonably and prevent themselves from growing at a fast pace to protect results. We have demonstrated in our analysis the benefits of staying a top-performing fund at a slower size. The strategy would thus be to retain existing investors in subsequent funds with the promise of high returns and a greater experience in this specific deal range. This would be a more risky strategy for the investor. Moreover, this “boutique” strategy could prevent attracting new investors to the fund.

Overall, this appears to be a more risky strategy from a marketing standpoint but would enable both LPs and managers to benefit from higher returns. According to our work, a mixture of both strategies would benefit to General Partners and their investors. The increase in fund size witnessed cannot be sustained and it seems reasonable to assume that funds that will not have to downgrade their fund size will appear to investors as wiser managers.
5. Conclusion

To conclude, we have shown throughout this work that a fast-paced increase in fund size could harm fund manager performance on the long term, especially for top performing funds. We have illustrated the dynamics of the industry using Systems Dynamics tool and observed the desired effects of an increase in fund size, notably management fees and marketing reasons alongside the side effects that lead to a drop in performance. Then, we have observed alternative fund strategies that seem to yield higher returns than the generalist approach, such as sector focus or dynamic allocation to geographic funds to follow macro-economic benefits. Finally, we have hypothesized on new strategies that fund managers could adopt to protect the promise of high returns usually sold to Private Equity investors. We have derived one strategy based on the idea of segmenting existing funds to tailor teams to geographies and sectors and one more “boutique” approach to create an exclusive fund with investors re-investing at high rates as the returns are kept high within their fund size range.

This exercise has been conducted at a very high-level but revealed that on the long-run, fund managers will have to tackle these issues as the growth in fund size is not sustainable with the macro-factors and the characteristics of this asset class. We have identified some levers that they could rely on but this will be a key factor to incorporate when building the next generation of funds.
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