Cash Management Strategies for Private Equity Investors

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Introduction

Committing capital to a private equity fund is different from buying a publicly-listed security. One central difference with private equity fund investing is that you do not invest all the money immediately, as when acquiring the share of an individual company or mutual fund. Instead, the money you choose to invest is contributed ("drawn" or "called" in private equity parlance) in periodic installments, typically over up to five years. For investors who are new to the asset class, and indeed for many experienced investors as well, this can pose a number of questions and challenges. How will I ensure I have adequate cash to hand when I am "drawn"? Is there an optimal way for me to invest the cash that has not yet been drawn? Overall, how do I make my entire cash management process as simple and efficient as possible?

The first goal of this paper is to explain the complexities surrounding the cash management of private equity investment programs. In particular, we are seeking to provide readers with a framework to help understand some of the most important cash flow implications of initiating a private equity investment program. As we will seek to demonstrate, we do not believe that any existing or prospective investor in private equity funds, whether an institutional investor or an individual, should be intimidated by this peculiarity of the private equity asset class – namely, that money is invested over time rather than via a single lump sum. In fact, we believe that investors who take the time to understand and weigh up the various options available to them will be much better placed to benefit from the potential rewards that private equity can offer.

The second goal of this paper is to provide readers with some pointers to help understand how best to manage the resulting cash requirements. Unsophisticated or poorly planned approaches to cash management can act as a significant performance drag on a private equity portfolio. A well-structured

funding strategy, on the other hand, has the potential to preserve capital to meet future "call" obligations while at the same time adding to the aggregate performance of the private equity program, and therefore to the performance of the investor's overall portfolio. We believe a better understanding of these issues can help investors more effectively manage their private equity allocations, and may result in greater comfort to increase, or indeed initiate, an allocation to the asset class.

This document is an educational guide aimed primarily at prospective private equity investors. The paper may also be of interest to investors in the early stages of an existing private equity program or to those intending to increase the size of their program. In particular, even experienced, sophisticated private equity investors may find the conclusions set out in Section 3 of this paper educational and, in some ways, unexpected.

We believe it may also be of interest to investors in listed private equity vehicles, Defined Contribution ("DC") retirement plan sponsors, and individual scheme members who may be considering including private equity within their pension plan investment portfolios. Whilst the responsibility for cash management within these portfolios will typically reside with professional fund managers, plan sponsors and scheme members may find this guide helpful in understanding the characteristics of these products, and come to independent conclusions regarding their quality and viability.

The paper is organized into three sections. We begin with a brief introduction to the lifecycle of a private equity fund, focusing on the types of cash movements an investor in a private equity fund can expect to experience. We also summarize the potential impact on private equity investors of failed cash management strategies.

Readers who are already familiar with the basic structure and cash flow profile of private equity funds may choose to skip this section.

In Section 2, we summarize how the composition of an investor's private equity portfolio affects the cash requirements it is likely to face, as well as introduce the basic trade-offs private equity investors face when deciding how to satisfy these obligations.

Finally, in Section 3, we seek to provide readers with some actual, concrete data to help them decide how to manage the cash demands of their private equity program. This section summarizes various scenarios, all based on historical data, that may help current and prospective private equity investors design their optimal cash management policies. We hope that the approach we follow in this Section provides an accessible, pragmatic and useful introduction to these issues.

1. An Introduction Into Private Equity Cash Flows

The Lifecycle of a Private Equity Fund

The life cycle of a private equity fund spans three partially-overlapping[1] periods:

1. Fundraising (typically lasting one to two years);
2. Investing (typically lasting three to five years); and
3. A period commonly referred to as the "harvesting" phase of a private equity fund, that generally lasts from three to five years, during which time the underlying investments within the private equity fund are sold.

During the **fundraising phase**, private equity fund managers (known within the industry as General Partners or "GPs") raise capital from investors (also known as Limited Partners or "LPs"). Investors make a binding capital commitment to a private equity fund that, unlike when buying a quoted security, is only "drawn" by the GP as and when it finds new investments to back. Once the GP has completed its fundraising process, the fund is deemed "closed" and no new LPs are admitted.

The second period – the **investment phase** – begins when the fund manager starts investing these capital commitments into new deals. As the GP sources deals, money is requested from the LPs to finance the investments. As a result, the binding capital commitment made by LPs during the fundraising phase only translates into an actual funding obligation as and when the GP requests cash from its LPs. This cash movement from LP to GP is generally referred to as an investor "call" or "drawdown". Most private equity funds will include a binding, legal commitment from the GP not to make any new investments once five years have elapsed since the date of the first investment or the date a LP first made a capital commitment to the fund.

During the final period – the **harvesting phase** – investments are sold, hopefully at a profit, and the cash generated from the sales is returned to the LPs[2]. These cash payments from GP to LP are typically referred to as "distributions". The private equity fund is terminated after the last investment is exited. At this point, the total cash profit generated by a LP from its commitment to the fund will be the cash payments made by the GP to the LP over the life of the fund (the distributions), less all the cash payments made by the LP to the GP (the calls/drawdowns).

It typically takes several years for all the cash is called and the original capital commitment made by the LP is fully funded – this refers to the point at which the LP has satisfied all of its obligation to provide the cash "promised" to the GP via the capital commitment. Prior to that date, it is the LP's responsibility to ensure that sufficient cash is available when required by the GP. To the extent that a LP has not yet satisfied all of its contractual cash obligation under its capital commitment to the fund, the outstanding balance is referred to as its remaining "unfunded" commitment to the GP.

The overall pattern of drawdowns is influenced by a number of factors to a different extent (see "What are calls used for?") depending on the maturity of the fund. While the specific arrangements vary fund by fund, a GP typically specifies a 10-year term, a five-year investment period, and charges management fees equal to 2% of commitments during the investment period, and 1% thereafter. Exhibit 1 illustrates an example of how a typical fund may draw cash over its life.

The Consequences of LP Default

This section explores why LPs in private equity funds are so focused on not missing a GP drawdown request: the reason is driven by the financial consequences faced by LPs should they fail to meet a drawdown request in time.

"What Are Calls Used For?"

In the first years of a typical private equity fund, most of the cash called by GPs is used to make new investments. After the end of the investment phase however, GPs can generally call cash only to pay for "follow-on" investments in currently held companies (e.g. if one of the companies needs additional cash to make a strategic acquisition). Throughout the fund's life, GPs can draw cash to fund management fees. Management fees are typically (though not always) included as part of the LP commitment (i.e. a draw for fees reduces the LP's outstanding commitment), and may be subject to a rebate after the end of the investment period. Exhibit 1 illustrates an example.

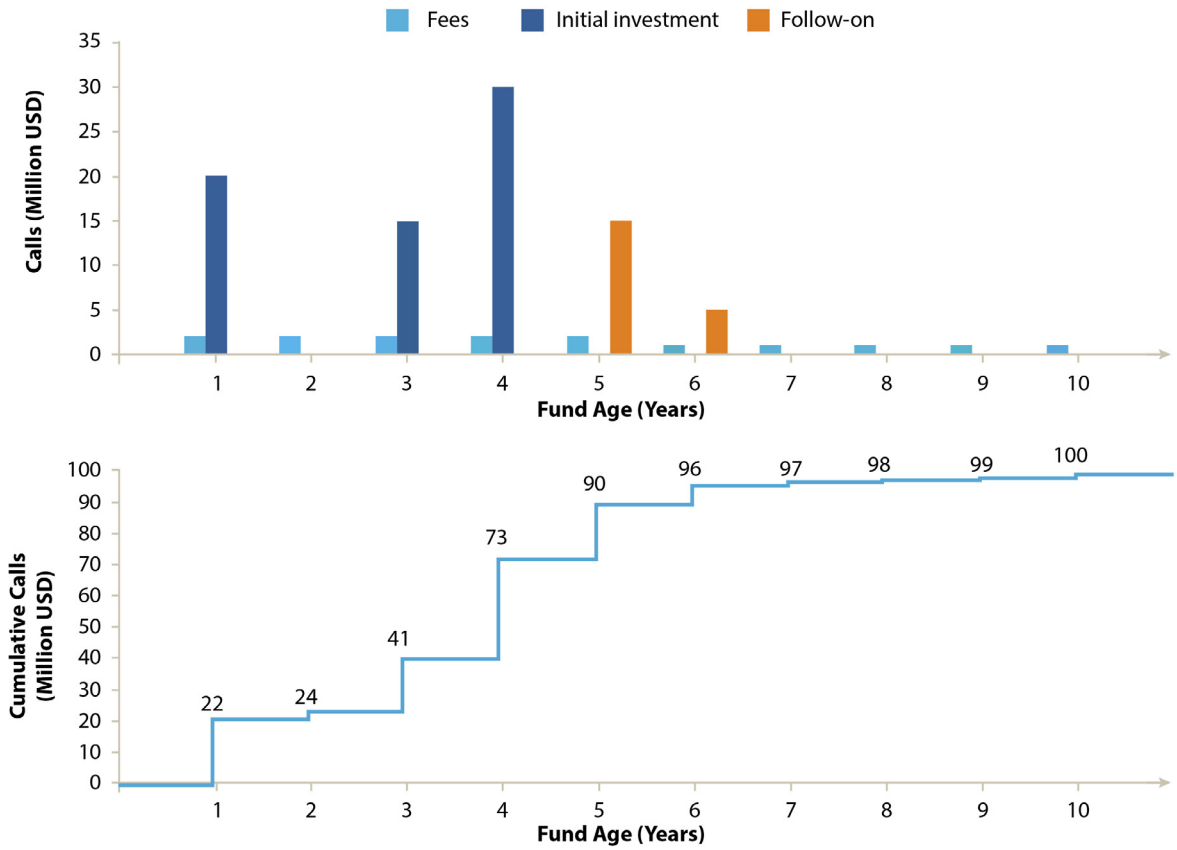

Exhibit 1: Capital Drawdowns Over a Fund's Life
Source: Pantheon

The obligation on the part of LPs to meet capital calls is a contractual one: they are legally bound to meet calls as and when requested by the GP[3]. No discretion is allowed on the part of the LP[4]. As a result, if a LP fails to abide by these obligations it will be in breach of the legal agreement entered into at the time the capital commitment was made.

If this occurs, a LP is likely to incur penalties, the severity of which will depend on the specific fund in question, the particular set of policies adopted by the GP, and the terms agreed to by the LP at the time of its commitment. In some cases, the LP will be subject to a penal rate of interest until such time as it is able to meet its cash obligation. Other, more severe penalties may include the LP being forced to sell its position in the fund to other investors, potentially at a steep discount to fair value, or the LP being forced to give up its entire stake in the fund and for its position to be carved up amongst the other LPs. This is a particularly penal, but not uncommon, remedy that can be very expensive for a LP if the default on a drawdown request occurs towards the end of a fund's investment period. By this time a LP may already have paid in significant amounts of cash to meet earlier drawdowns; as a result, all of this built-up value would be lost. Another consequence of a LP defaulting on a drawdown is that it would likely be excluded from committing to future funds raised by that GP; in practical terms, a GP is unlikely to welcome into a future fund with open arms a LP who in the past has been unable to satisfy its contractual obligations.

Setting aside the potential implications of defaulting on a drawdown request, the financial consequences of an ineffective cash management strategy can manifest themselves in other ways, in the form of LP distress. If a LP wishes to avoid default but does not have adequate cash to hand, in a funding emergency it may choose to generate the required amount of cash through a sale of other assets within its overall portfolio, if available. The quicker this cash is required, the more a LP may risk having to conduct a fire sale, with the resulting loss of value this can crystallize. For example, assets other than private equity assets may be less easy to sell precisely when calls within a LP's private equity program are received, so that these assets may be sold only at high discounts to their intrinsic worth.

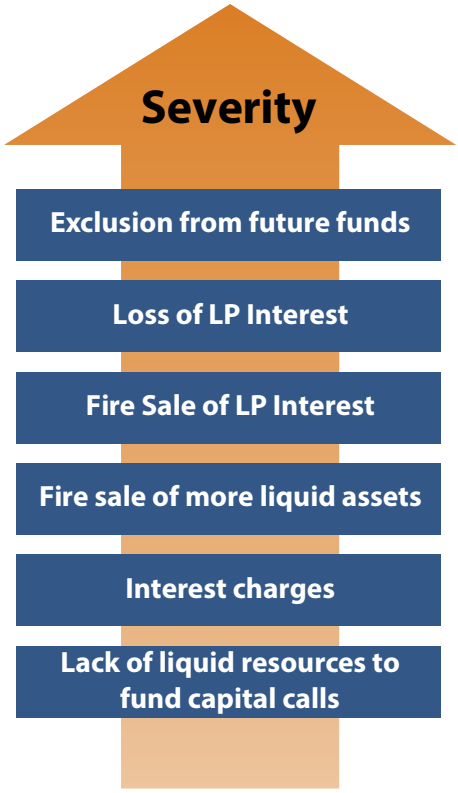

Exhibit 2:Consequences of Poor Management of Unfunded Commitments
Source: Pantheon

As a result, even if a LP manages to avoid defaulting on a call issued by one of its private equity GPs, we believe that any scenario whereby a LP is forced to take unplanned, emergency action in order to meet a drawdown request may result in a potentially significant loss of value. Exhibit 2 summarizes the hierarchy of potential consequences from poor management of unfunded commitments.

2. **Designing a Cash Management Strategy**

The need for a LP to manage cash stems from the mismatch between the original capital commitment and the subsequent pattern of calls. Over this period of time, the LP must be ready to meet capital calls – often with only a few days' notice – until all committed capital is drawn. The design – and optimization – by a LP of its private equity cash management strategy can be a complex process. There are two key considerations[5]:

1. The size and frequency of the capital calls the LP is expected to receive from its private equity program; and
2. The trade-off between a LP's desire to maximize the returns from its overall investment portfolio and the simultaneous need to minimize the risk of failing to meet a GP drawdown request.

This section explores each of these two aspects in turn.

The Size and Frequency of a LP's Expected Capital Calls

On the basis that LPs would prefer not to suffer any of the potential consequences of failing to meet a capital call, the first consideration for a LP when designing its cash management strategy is the expected size and frequency of the capital calls it will be subject to. We shall refer to this as the expected drawdown profile that a LP will face[6]. This drawdown profile is heavily dependent on the specific composition of the LP's private equity portfolio. No two private equity funds will look exactly alike: their particular mix of investments will result in different funding needs, and as a result different drawdown profiles. But setting aside differences caused by GPs investing in a specific set of companies that no other GP will match, can any broader conclusions be drawn about the type of drawdown profile a LP can expect from its private equity program?

Private equity portfolios can be diversified by increasing the number of funds per vintage[7], and/ or the number of vintages. However, the simplest form of private equity program consists of a single-vintage, single-fund portfolio. In this case, the typical drawdown pattern experienced by a LP[8] may look similar to the example represented by the orange line in Exhibit 3 below.

An investor in a single private equity fund can expect to have to meet drawdown requests mostly during the first five years as the fund makes its investments. Investors can then expect the size of call requests made by the GP to diminish. After the first five years, which in many funds coincides with the end of the fund's investment period, calls are typically issued only to fund follow-on investments and fees, as noted earlier.

Within these broad parameters however, the GP of a private equity fund retains considerable discretion. It is able to call capital on an as-needed basis, so the exact progress of calls, and therefore the drawdown profile that a fund's LPs will actually experience, will depend on many factors including the fund's

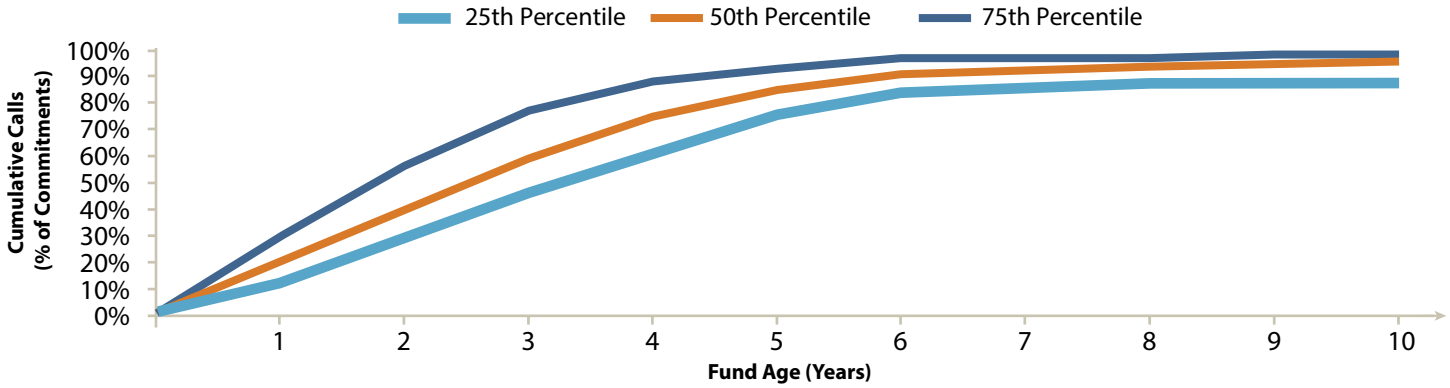

Exhibit 3: Drawdown Pattern of a Single-Vintage Single-Fund Portfolio[9]
Source: Pantheon

vintage, geography, investment strategy, as well as the particular style and philosophy of the GP[10]. In order to capture the variation in potential drawdown profiles that can be caused by these differences, Exhibit 3 also illustrates the 25th and 75th percentiles of cumulative calls.

The average call pattern of a single-vintage, but multi-fund, portfolio will be similar to that of its single-fund counterparts shown in Exhibit 3. The key difference a LP could expect in terms of likely capital calls from a multi-fund (but still single-vintage) portfolio versus a single-fund portfolio is a lower likelihood of an extremely fast, or extremely slow, drawdown profile. Because of the effects of diversification, an investor should expect the different funds within its portfolio to balance each other out to some degree, in terms of their respective drawdown profiles. As a result, the 25th and 75th percentiles (as shown in Exhibit 3) should be less far apart for a multi-fund portfolio, providing an investor with slightly more predictability regarding the overall cash demands it will face from its private equity program. However, since all the funds belong to the same vintage, their respective investment phases are likely to coincide very closely in terms of start and end dates. Therefore, because of this single-vintage concentration, the expected drawdown profile of this multi-fund portfolio may not differ markedly from the typical call profile of an individual fund.

The Impact of Vintage Diversification

Vintage diversification, on the other hand, has a sizable impact on the average drawdown pattern: capital deployment takes place over a longer period and is likely to be smoother. Exhibit 4 illustrates this point with a hypothetical example based on equally-weighted commitments to four funds over four vintages.

We will refer to this multi-fund, multi-vintage portfolio as "MFMV".

As with the multi-fund, single-vintage example, an investor in the MFMV portfolio is expected also to reap the benefits of fund-level diversification that should help mitigate the individual impact of a fund with an extreme (i.e. an unusually fast or unusually slow) drawdown profile. The key difference however lies in the "stepped" or smoothing effect derived from the multiple vintages. By overlaying funds with different vintages on top of each other sequentially, the investor is extending the timeframe over which it can expect to receive capital calls for new investments.

Of course, the MFMV portfolio may also benefit from other features, such as the additional investment diversification derived from making company investments over a longer period, which may reduce the risk that a LP's private equity portfolio will be exposed to an underperforming vintage. However, from a cash management perspective, it is the potential smoothing effect that is relevant. This effect is also likely to manifest itself during the harvesting phase: LPs in the multi-vintage portfolio should generally expect it to generate distributions over a longer period of time as compared to a single-vintage portfolio.

The Impact of Additional Commitments

Many LPs adjust the size of their private equity program "mid-flight", for example by increasing their allocation to the asset class, or making additional commitments in order to maintain a particular allocation relative to a broader portfolio. These additional commitments can be sporadic and unplanned, but they may be sizable relative to the LP's existing private equity program. They also introduce further complexities into the drawdown patterns. Exhibit 5 below illustrates the point with an example.

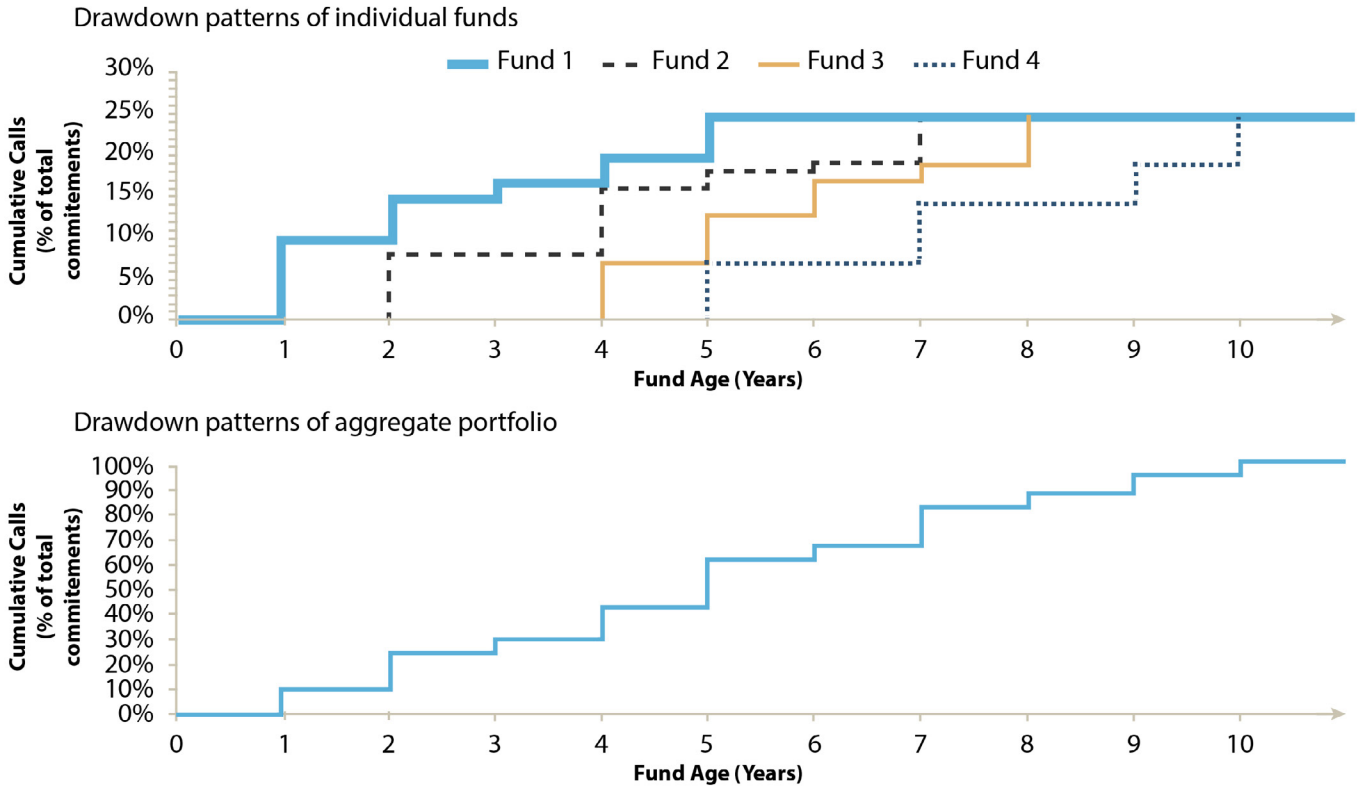

Exhibit 4: The Impact of Vintage Diversification on Drawdown Patterns[11]
Source: Pantheon

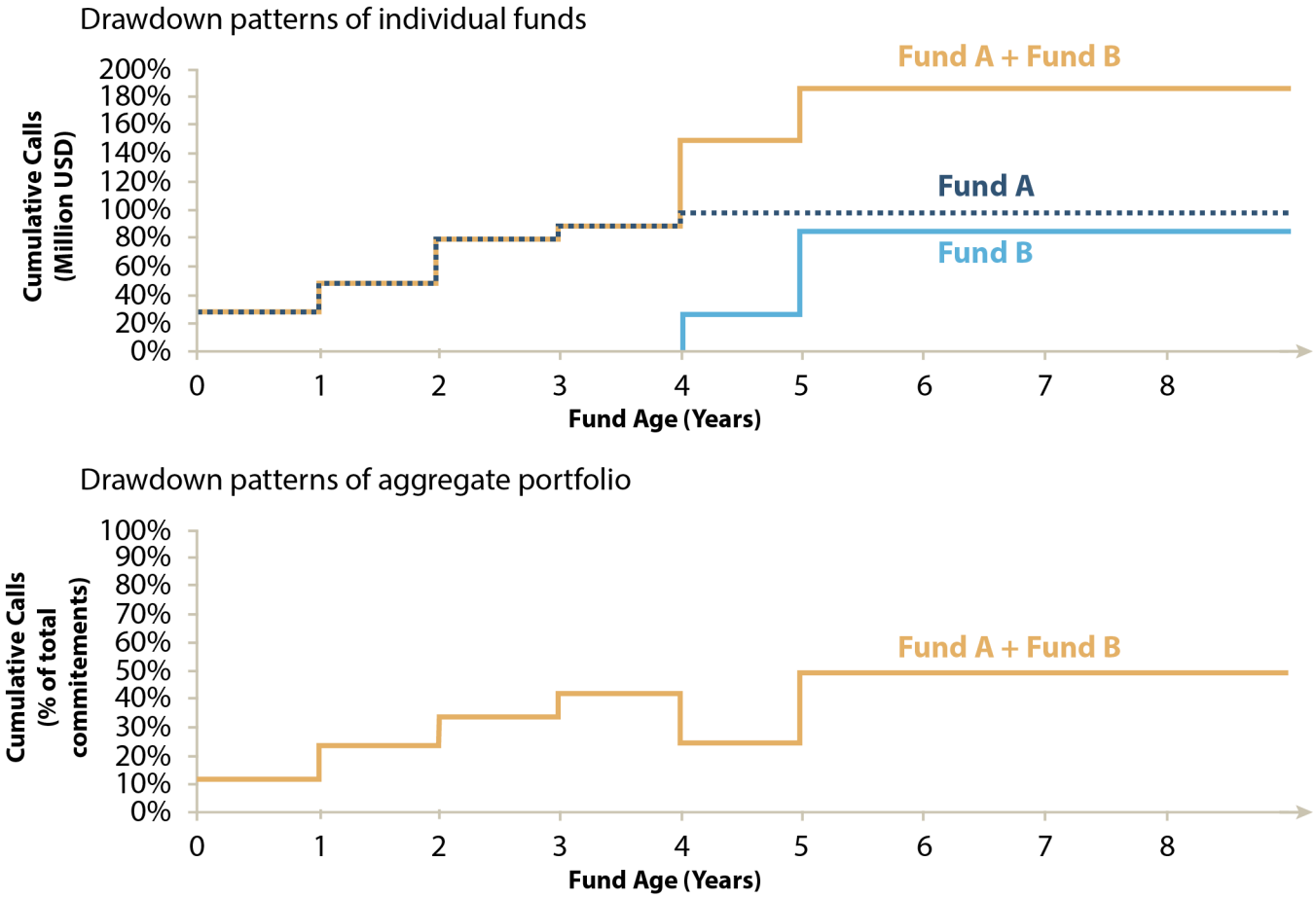

Exhibit 5: Increasing Commitments and Drawdown Patterns
Source: Pantheon

The graphic illustrates how a "mid-flight" increase in commitments affects drawdown patterns. The example is based on a hypothetical case where a private equity investor commits $100m to a private equity fund (fund "A") at time 0 and decides to increase its exposure to private equity by committing another $90m to a second fund (fund "B") after four years (figure on top). The figure illustrates the ensuing drawdown pattern in dollar terms by overlaying the calls issued by the two portfolios. The step-up in program size at year 4 causes a temporary decrease in the level of funded calls relative to total commitments: the figure at the bottom illustrates this point by drawing out the ratio of funded obligations to total commitments.

A significant increase of commitments by a LP to its private equity program is likely to have a number of ramifications on the drawdown profile that could be expected from the program overall.

A one-off, significant increase in commitments will obviously increase the total amount of calls that the LP can expect to receive. It will also extend out, over a longer period, the timeframe over which the LP will be subject to drawdown requests from its private equity portfolio. As soon as the additional commitment is made, the LP will experience an immediate increase in its overall unfunded obligations. In private equity terminology, its overall private equity program will have become less "funded": the percentage of the LP's aggregate capital commitments that have already been paid for via cash payments to GPs will decline. If the increase in commitments is made in a single year, then the corresponding increase in drawdowns resulting from this step-change in unfunded obligations is likely to be felt primarily over the course of the subsequent five years.

In Exhibit 6 we provide examples of the typical drawdown profiles associated with each of the three portfolio scenarios discussed above:

A. A single-fund, single-vintage portfolio;

B. A multi-fund, multi-vintage portfolio; and

C. A multi-fund, multi-vintage portfolio with a subsequent step-up in overall program size

As illustrated in the hypothetical profiles summarized in Exhibit 6, each of these three scenarios has the potential to result in markedly different drawdown patterns for a LP. This is a key factor for investors to consider and be attuned to when considering a private equity investment program.

Maximizing Returns vs. Minimizing Risk

Irrespective of the type and scale of private equity portfolio held by an investor, and therefore of the drawdown profile it might expect, the management of unfunded obligations (i.e. the future drawdowns that the LP remains exposed to at any point in time during a fund's life) involves a trade-off between maximizing returns and minimizing the default risk we described earlier. When a LP commits to a private equity program it faces an important decision. Given it has made a legally binding

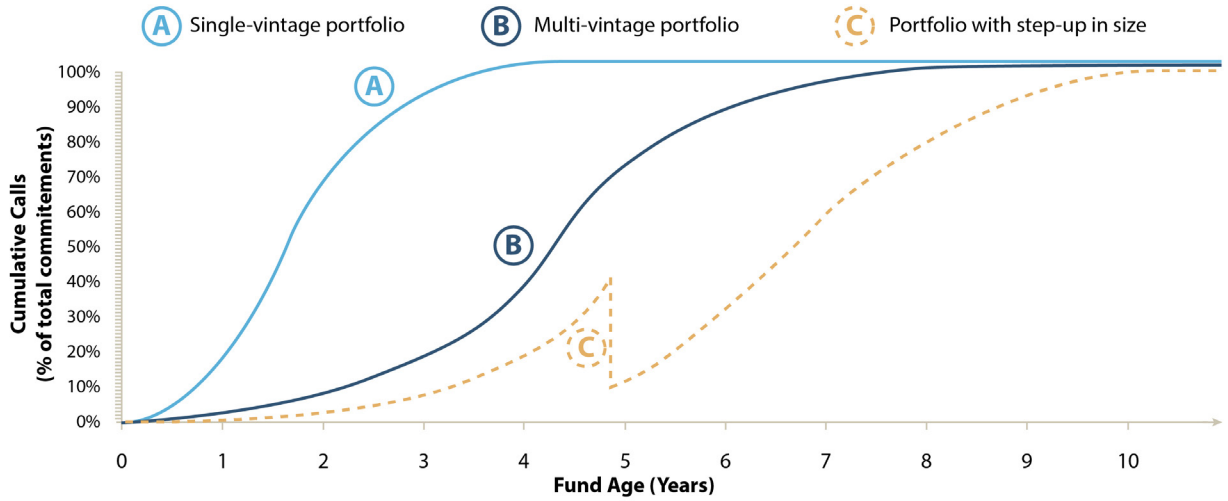

Exhibit 6: Overview of Drawdown Patterns[12]
Source: Pantheon

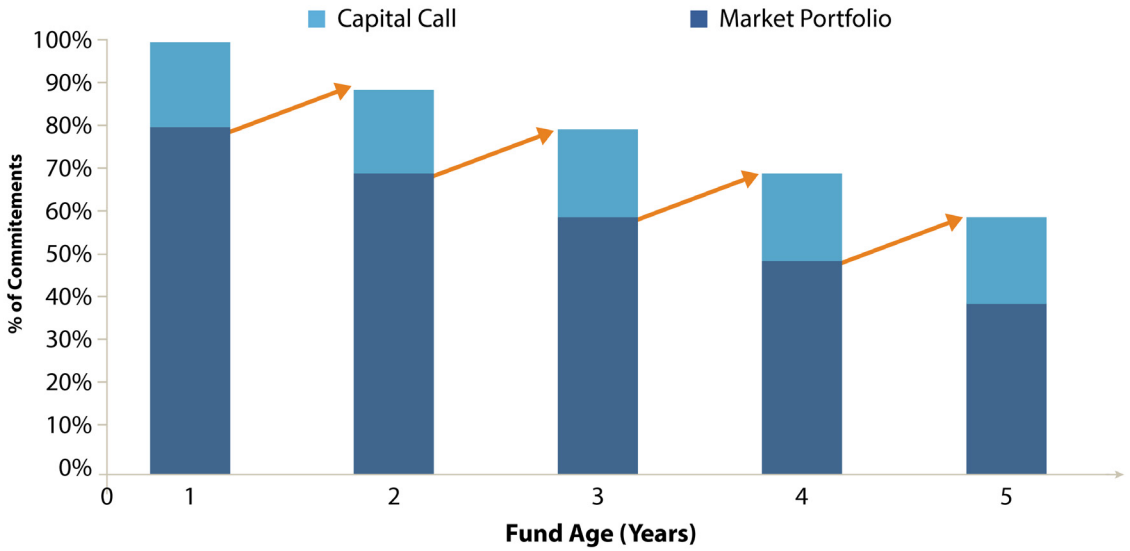

Exhibit 7: Management of Unfunded Commitments in Rising Markets
Source: Pantheon

commitment to its GPs to meet capital calls, as and when requested by these GPs, it needs to decide how to meet this obligation such that it has the requisite amount of cash on hand to meet periodic calls. This is one of the most important decisions private equity LPs face when managing their portfolios and, as we will see, it can have a significant impact on performance.

To help illustrate this point, suppose that a LP decides to invest all of the cash it has reserved for future drawdowns (the "Drawdown Reserve") into the public markets. At inception of a LP's private equity program, this reserve effectively amounts to 100% of the aggregate capital commitments it has made[13]. The LP pools this cash into a public equity portfolio, which we shall refer to as the LP's "Market Portfolio". Whenever one of its GPs issues a capital call, the LP liquidates a portion of the Market Portfolio, pays the cash to the GP, and keeps the residual amount invested in the public markets.

The performance of the Market Portfolio reflects the performance of the public markets: if the markets rise, the LP will be able to meet all capital calls and generate additional returns, as illustrated in Exhibit 7.

This additional return, however, can be earned only by taking on default risk: if the public markets performed negatively, the LP may find itself with no cash left before it receives the final call from its GPs. If so, and unless it can obtain the missing cash from elsewhere, the LP would be defaulting on at least a portion of its private equity fund commitments.

Investing into risk-free[14] (or at least low-risk) and readily saleable securities such as U.S. Treasuries, as opposed to public equity securities, may be one approach, albeit one with a potentially high opportunity cost. In this case the return generated on the Drawdown Reserve is likely to be very low, especially in low interest rate environments. So whilst the LP may have significantly reduced the risk of default, it may also have suffered a corresponding reduction in expected returns from its overall investment portfolio. As a result, it would have suffered a higher opportunity cost from committing to private equity: the incremental expected return potentially foregone by choosing not to invest the Drawdown Reserve into a higher returning asset class[15] (public equities as opposed to U.S. Treasuries) should be taken into account when assessing the returns generated by the

private equity portfolio itself. We do not believe the latter should be viewed in isolation.

In general, a LP's cash management policy – how it chooses to invest its Drawdown Reserve – should be tailored to the composition of a LP's private equity portfolio as well as its risk tolerance. As we have seen, the former will influence the expected drawdown profile the LP will face; depending on how smooth the drawdown profile is expected to be, and over what time period, the LP may have greater or lesser confidence in accepting market risk via the Drawdown Reserve. Its risk tolerance will similarly influence this decision. And, given how costly it may be for a LP to default on its unfunded obligations, a LP may only wish to assume a high level of risk via the Drawdown Reserve when it has access to, and is ready to access, alternative sources of liquidity.

However, taking into account the differences in potential drawdown profiles generated by different private equity programs, is there any data that can help private equity investors decide how much risk to assume? In trying to answer the question, "what cash management policy should I pursue, given the make-up of my private equity program?" can any potentially useful pointers be found?

3. Cash Mangement in Practice

In this Section, we explore the risk-return profiles of a number of cash management strategies for three types of private equity portfolios:

A. Single-fund, single-vintage portfolios;

B. Multi-fund, single-vintage portfolios; and

C. Multi-fund, multi-vintage portfolios.

We have chosen these examples in order to illustrate a range of possible results based on different portfolio construction strategies that private equity LPs may pursue, from the most simple (a single commitment to a single fund) to the more complex (multiple funds across multiple vintages) that also have the benefit of more closely resembling how sophisticated investors are likely to build out their private equity portfolio over time.

In the analysis that follows, for each of our three scenarios we have examined the impact on the LP of investing its Drawdown Reserve – the cash it has set aside to meet future calls from GPs – into a mix of 3-month U.S. Treasuries and the S&P 500[16]. We have considered an exposure to the latter of anywhere between 0% and 100%. For the sake of consistency with Section 2, we will refer to the amount invested in the S&P 500 as the "Market Portfolio". All the details behind the dataset and methodology underlying the results are explained in detail in the "Appendix" section at the end of the paper.

Our objective is to try to address this question: "Given my risk tolerance, what proportion of my Drawdown Reserve can I invest into the Market Portfolio in the expectation of generating a market return, whilst committing to private equity?". The higher the percentage of the Drawdown Reserve that can be invested in the S&P 500, the less potential equity upside a LP need sacrifice. Moreover, if a LP can generate a return via its Drawdown Reserve, it will be adding to the return already being generated from its private equity portfolio. Indeed, the two could be considered in aggregate in order to calculate the total return generated by the LP.

A. Single-Fund, Single-Vintage Portfolio

We will begin by considering a simple portfolio composed of one fund; the results are summarized in Figure 8. The blue bars represent the return that would have been earned, on average[17], by implementing cash management strategies with increasing exposure to the Market Portfolio. As the exposure to the S&P 500 increases from 0% to 100%, the average returns on the Drawdown Reserve increase significantly: with 100% exposure to the Market Portfolio, LPs could have earned, on average, almost 25% of committed capital on top of the returns generated by the private equity assets themselves[18]. This additional return, relative to the size of the LP's capital commitment to private equity, is derived from always investing 100% of the cash set aside for future unfunded obligations into the Market Portfolio, and only selling to the extent necessary when the GP issues capital calls. In this way, the LP never holds U.S. Treasuries within its Drawdown Reserve. The approach assumes the LP has a high risk tolerance

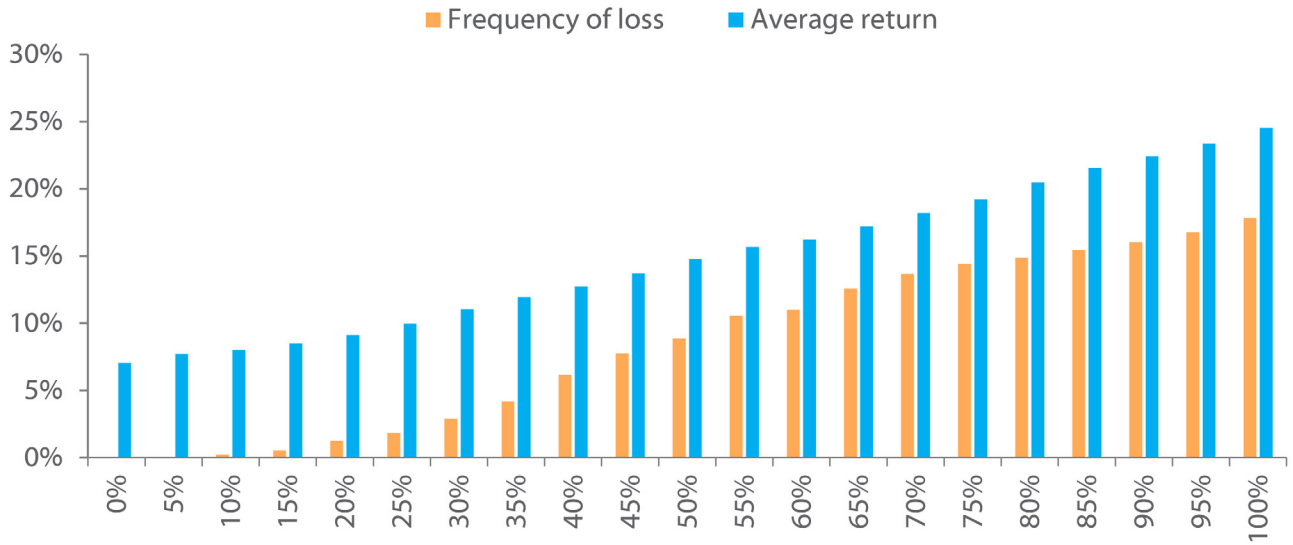

Exhibit 8: Single-Fund, Single-Vintage Portfolio
Source: Pantheon

and/or access to alternative liquid resources.

The potential to supplement a private equity return with this type of return from the Market Portfolio seems attractive. However, to what extent can LPs achieve this additional return in practice? Given the potential financial consequences to the LP of defaulting on a call, what is the risk associated with this type of cash management strategy, and should the LP pursue a more conservative approach?

The level of risk is represented by the orange bars, which measure how often the strategies generated a loss, necessitating the LP to access alternative cash resources to meet capital calls. Our analysis shows a risk of loss of approximately 18% should the LP continually invest 100% of the Drawdown Reserve in the Market Portfolio, throughout the life of its single fund portfolio. This implies a one-in-seven chance that over the life of its commitment to private equity, the LP would have been unable to fund all the capital calls it received. To put this another way, on average one in seven LPs pursuing this strategy would have defaulted on their private equity investment at some point, unless they had had access to alternative cash resources.

As can be seen from Exhibit 8, the pattern in the frequency of loss mirrors that of average returns, suggesting that the risk of default goes hand-in-hand with potential upside. The data in Figure 8 therefore provides an indication (based on our historical dataset) of the trade-off available to a LP in designing its cash management strategy based on a single-fund, single-vintage private equity investment.

Some readers with existing private equity programs may have been surprised to find that even with 100% allocation of the Drawdown Reserve to the Market Portfolio, the risk of loss (default) from our dataset was only approximately 18%. But is this risk "high" or "low"? Should it give investors comfort, or should it make them less willing to pursue the approach laid out above of investing the entirety of the Drawdown Reserve into the Market Portfolio? Every investor will have their own response to this question, and rightly so. The results do not by themselves suggest any particular cash management strategy. This will depend on each LP's individual circumstances: for example, how much risk it is comfortable taking, and whether it can access cash from other sources if its Drawdown Reserve proved insufficient. But we believe it provides a very useful framework to help LPs come to a more well-informed decision.

B. Multi-Fund, Single-Vintage Portfolio

The above analysis was based on a LP making a single commitment to a single fund. How do the results change if a LP commits to more than one fund? Exhibit 9 shows the results for a multi-fund, but still single-vintage, portfolio. We have assumed the LP makes a commitment to three funds in our hypothetical portfolio, all in the same year. Interestingly, the risk-return profile is similar to the one shown in Figure 8: fund diversification appears to have little impact on the risk/return profile of any given cash management strategy.

For example, based on 100% exposure to the Market Portfolio, and using our historical dataset, LPs could have earned, on average, almost 28% of committed capital on top of the returns generated by the private equity assets themselves. This compares to almost 25% in the single-fund, single-vintage scenario. The risk of loss (defaulting on a call, at some point, somewhere in this three-fund portfolio) stands at approximately 17%, marginally below the single-fund case but again in similar territory.

C. Multi-Fund, Multi-Vintage Portfolio

Exhibit 10 considers the case of a portfolio that is also diversified across vintages. We believe this is the most interesting, and most relevant, of the three scenarios. It is also the one that in our opinion will most closely resemble how the majority of LPs actually build out their private equity programs. As such, readers might find this scenario the most useful one to consider.

Our hypothetical portfolio assumes that a LP commits to nine funds per year, across ten different vintages[19]. The results are striking: again based on our historical dataset, not only does the probability of loss become zero for market exposures up to 75%,

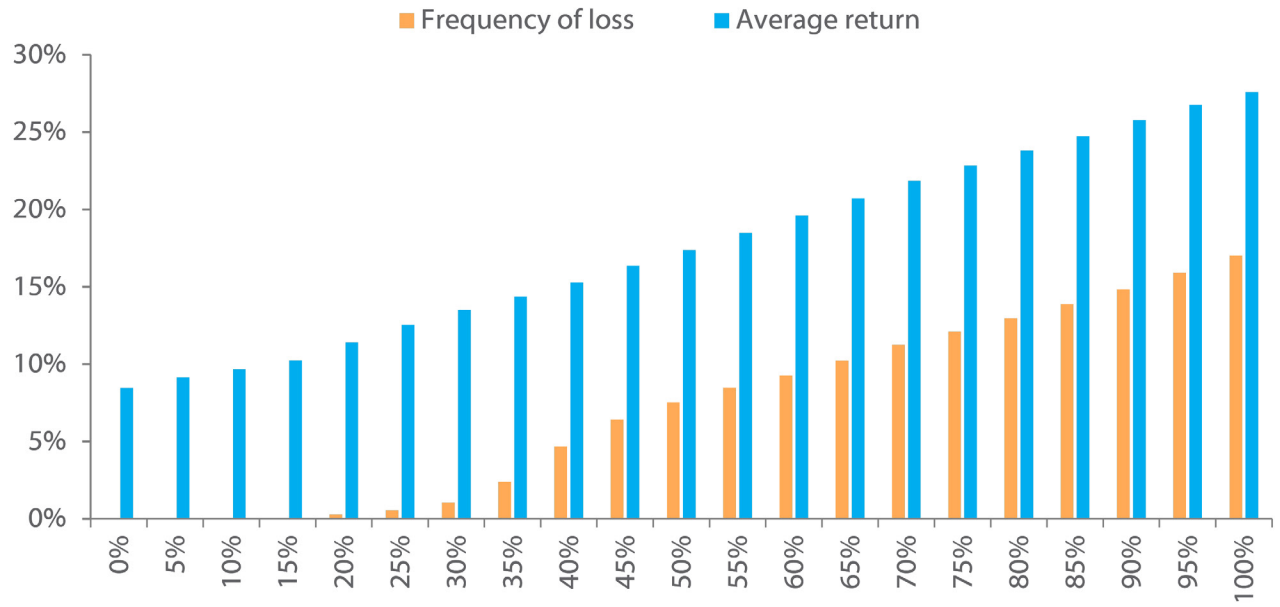

Exhibit 9: Multi-Fund, Single-Vintage Portfolio
Source: Pantheon

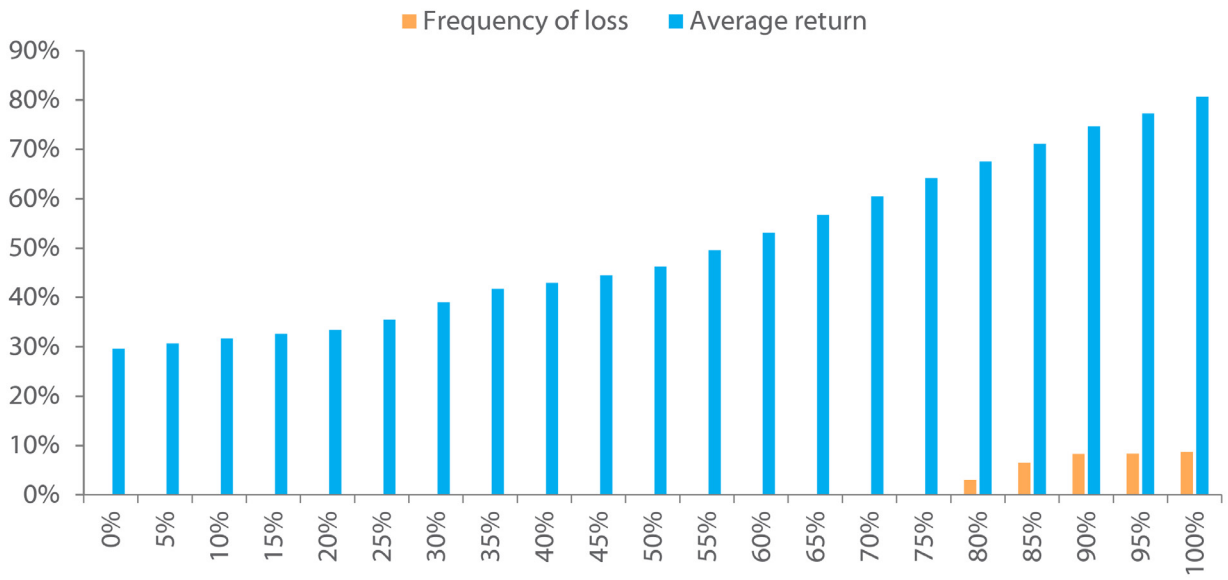

Exhibit 10: Multi-Fund, Mingle-Vintage Portfolio
Source: Pantheon

but the average return is also substantially higher than for the portfolios with higher fund and vintage concentration compared to the scenarios in Exhibit 8 and 9.

Our analysis finds that, based on 100% exposure to the Market Portfolio and using our historical dataset, LPs could have earned, on average, over 80% of committed capital on top of the returns generated by the private equity assets themselves. To a certain extent this is intuitive, but for a different reason: the Drawdown Reserve would have been invested into the Market Portfolio over a longer period of time compared to Scenarios A and B above. But what we regard as a much more important result is the change to the risk of loss/default. The risk of loss associated with this cash management strategy would have been below 10%: on average less than one in ten LPs pursuing this strategy would have defaulted on at least a portion of their private equity portfolio, assuming they had no access to alternative cash resources. This compares to somewhere between 17% and 18% for scenarios A and B above.

The conclusion that a reader might derive from these results is that, with a private equity portfolio that is diversified across funds and vintages, a LP may be able to invest the vast majority of its Drawdown Reserve into what can be perceived as "risky" assets (i.e. the Market Portfolio), and only assume minimal default risk as a consequence. Moreover, vintage – rather than fund – diversification seems to be key in helping to reduce default risk. We expect that many readers will find these results surprising, and hope that they will prove useful. After all, the approach to cash management may have a very significant impact on the overall private equity experience: if properly managed it seems to have the potential to generate significant incremental performance. The exposure of the Drawdown Reserve should be tailored to the specific composition of the private equity portfolio and the risk tolerance of the LP, as noted earlier. However, our analysis suggests that one part of the so-called "lock-up" cost of investing in private equity is over-stated: when a carefully designed cash management strategy is employed, LPs can achieve a low opportunity cost, minimizing the risk of default from their contractual obligations whilst generating the potential for additional returns[20]. Indeed, a well-constructed cash management strategy may be able to supplement the return LPs can obtain from a private equity program, and thereby enhance the performance of their investment portfolio overall.

Key Findings

- The liquidity mechanics of private equity funds represent both a challenge and an opportunity for private equity investors
- Failing to meet GP drawdown requests can have severe financial implications for a LP; on the other hand, a well-structured cash management strategy has the potential to add to an investor's return on its private equity portfolio
- We believe that an effective cash management strategy must reflect the structure of a private equity program (fund and vintage diversification) and be consistent with the risk tolerance of a private equity investor
- Vintage diversification appears to be the key consideration to take into account in determining how unfunded commitments should be managed
- Our empirical historical analysis suggests that investors in sufficiently diversified private equity portfolios could have invested up to 75% of unfunded commitments in public markets with low risk of defaulting on their commitments
- Based on our study, this appears to provide strong evidence in support of the argument that there is little "lock-up" or opportunity cost from the management of unfunded commitments in private equity

Endnotes

1. For example, the manager of a fund will commonly commence investing before the fundraising phase has been fully completed.
2. The cash received by LPs may be net of any profit share or performance fee the GP charges, typically referred to as "Carried Interest" or "Carry".

3. Note that most GPs will provide somewhere between five and 10 days' notice to LPs prior to the due date of a capital call.

4. There are a few limited exceptions to this statement. For example, if a LP has excused itself from participating in certain transactions (e.g. investments a GP wishes to make in a specific sector) by prior agreement with the GP, then the LP would not be expected to meet drawdown requests associated with those investments. However, these situations are generally limited in nature and agreed upon by LPs and GPs on an individual basis prior to the LP committing capital to the fund.

5. Another important consideration omitted here is the liquidity generated by private equity assets in the form of distributions. Recycling of distributions is beyond the scope of this study, but will be addressed in a future white paper. In addition, some LPs utilize leverage facilities to help manage the process of funding capital calls. These leverage facilities are typically fully backed by uncalled commitments.

6. Ibid.

7. The vintage of a private equity fund typically refers to the year in which the fund made its first investment. In some cases, it refers to the year when the fund secured its first capital commitment from a LP during the fundraising phase.

8. Note that throughout this paper we assume that a LP is making commitments to new funds being raised by GPs. These types of commitments are typically referred to as "primary" fund commitments, and they constitute the majority of the commitments that most private equity LPs make.

9. The example is illustrative. The actual drawdown profile experienced by a LP may differ from that shown in the graphic. A full description of the data is contained in the "Appendix" section towards the end of this document.

10. For example, some GPs try to ensure that LPs will only receive drawdown requests on a very regular basis, e.g. once per quarter. In doing so, they aim to simplify the cash management process for their LPs. However, achieving this added simplicity may come at the expense of the GP drawing more or less cash from its LPs than is strictly necessary, or using working capital facilities (provided by banks) to bridge any gaps.

11. The example is illustrative. The actual drawdown profile experienced by a LP may differ from that shown in the graphic.

12. The example is illustrative. The actual drawdown profile experienced by a LP may differ from that shown in the graphic.

13. This assumes that the LP reserves cash in an amount equal to the sum total of its unfunded obligations.

14. The Drawdown Reserve could of course simply consist of cash.

15. This reflects the commonly accepted tenet in finance that assets with higher risk should compensate investors for this through a higher expected return.

16. As set out under "Appendix" at the end of the paper, we have selected the S&P 500 in order to be consistent with our private equity dataset which consists exclusively of U.S. buyout funds. We have focused on U.S. buyout funds as this is the subset of the wider private equity universe that provides the richest source of historical private equity data, and remains the largest geographic market for private equity today.

17. See "Appendix" for details.

18. Additional returns are expressed on a cumulative basis (not annualized).

19. This equates to 27 fund commitments over any given three year period, consistent with the conclusions we drew in a prior InFocus publication regarding our views on the optimal level of diversification for a well-diversified buyout-focused portfolio. See Pantheon's Infocus "Diversification Study: Less is More", October 2013.

20. The management of uncalled capital is not the only lock-up cost for private equity investors: also relevant is the fact that LPs give up the right to decide when to invest and liquidate their private equity portfolio.

21. Focusing on funds and investment strategies denominated in the same currency allows us to avoid having to consider additional implications that might arise from currency risk. The study could be extended to other private equity investment strategies (e.g. Venture), fund currencies, and/or securities.

22. We exclude vintages before 1993 because there is not a sufficient number of observations to form multi-asset portfolios.

23. Recallable distributions technically qualify as an increase in commitments: unfunded commitments should be re-defined accordingly when recallable distributions take place. This approach is however unfeasible in practice, because Preqin does not pinpoint the timing and extent of recallable distributions. In the context of this study, ignoring calls issued after the fund is 100% funded is equivalent to assuming that LPs hold recallable distributions in cash to match subsequent calls: since cash produces no yield, the profit/loss we calculate ignores potential gains from management of recallable distributions and may therefore be deemed to be conservative.

24. The initial value of the Drawdown Reserve is assumed to be equal to 100% of commitments.

Appendix

The study focuses on U.S. buyout funds and cash management strategies in U.S. public equity markets and Treasury securities[21]. The data come from three sources: fund-level cash flows from Preqin, 3-month yields on U.S. Treasuries from the Federal Reserve Board H.15 file, and the S&P500 total return index from Bloomberg. All data are at quarterly frequency. The private equity funds sample consists of all U.S. Buyout funds with vintage years between 1993 and 2013 available in Preqin's 2014 Q1 update[22]. Capital calls are standardized by fund size. If funds feature cumulative calls exceeding 100% of fund size because of recycling of distributions, we consider the fund to be fully funded when cumulative calls reach 100% of fund size and ignore subsequent calls[23]. The three-month Treasury constant maturity yield from the H.15 file is assumed to be the risk free rate at quarterly frequency.

The profit/loss on a cash management strategy is determined as follows. When a portfolio issues the first call, a fraction w of the Drawdown Reserve is invested in public markets, while the residual 1-w is kept in 3-month Treasury securities[24]. In every subsequent quarter that the portfolio issues a new call, the call amount is deducted from the Drawdown Reserve, and the Drawdown Reserve is rebalanced to ensure that w and 1-w are still invested in the public markets and Treasury securities, respectively. If the Drawdown Reserve becomes negative, the exposure is set to a default w=0 for all subsequent periods until the last call is issued. When the portfolio issues the last call, the profit/loss is calculated simply as the final value of the Drawdown Reserve; if the fund has not called 100% of the commitments by the end of the sample, the profit/loss is calculated as the final value of the Drawdown Reserve minus unfunded commitments. We consider public markets exposures ranging from 0% to 100% at 5% increments.

This paper quantifies the funding risk that a LP would have so far experienced by adopting different cash management strategies with simulated (hypothetical) private equity portfolios over the 1993 to 2013 vintage period. We consider a variety of private equity roadmaps that differ in the extent of their vintage (from one to nine vintages) and fund (from one to nine funds per vintage) concentration. Given a private equity

roadmap, we first simulate 1,000 equally-weighted portfolios for each portfolio vintage and then calculate the profit/loss that would have accrued to a LP who had implemented the cash management strategy described above; the profit/loss is then aggregated by strategy across portfolio vintages. We analyze two key summary statistics that capture, respectively, downside frequency and expected return from the investment strategies, namely the proportion of simulations with negative profit/loss and median profit/loss.

Glossary

Call: request made by a GP to its LPs to pay in the capital committed to a fund

Closing: process whereby new investors are admitted as LPs of a fund

Commitment: pledge made by a LP to pay in capital to a fund as and when requested by the GP

Drawdown: see Call

Fund: pool of capital raised from LPs and managed by a GP to make private equity investments

Funding risk: risk that a LP may not have sufficient liquid funds to meet capital calls

GP (General Partner): manager of a private equity fund

Drawdown Reserve: pool of assets that a LP may wish to seed and manage in order to fulfill future capital calls

LP (Limited Partner): investor in a private equity fund

Unfunded commitments: portion of LP commitments that have not been called yet and therefore may be called in the future

Vintage: year in which a private equity fund makes its first investment, or secures its first "Closing"

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Chris Meads, Head of Investment (joined 2001, 19 years of private equity experience)

Chris is a member of Pantheon's Partnership Board and Chief Investment Officer. Chris also leads Pantheon's Asian investment activity, chairs the Asia Regional Investment Committee and is a member of the International Investment Committee. Chris joined Pantheon from HSBC Hong Kong, where he was involved both in strategic acquisitions and the design and implementation of internal operating procedures. He was previously a senior investment analyst for Brierley Investments Ltd in both Hong Kong and New Zealand, and before that worked in a deal advisory capacity for CS First Boston (NZ) and as an economist for the National Bank of New Zealand and the Reserve Bank of New Zealand. Chris received a BCom in Economics from Auckland University New Zealand, and a BCA Hons in Economics from Victoria University of Wellington, New Zealand. Chris is based in Hong Kong.

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Andrea Carnelli, Vice President (joined 2014, 3 years of private equity experience)

Andrea joined the Quantitative Research Team in London as a Vice President and focuses on the empirical analysis of private equity markets. Before joining Pantheon, Andrea obtained a PhD in Financial Economics at Imperial College London, where he worked on asset pricing models and monetary policy while assisting in teaching postgraduate courses in Finance and Financial Econometrics. Andrea holds a "Visiting Researcher" position at the Finance Department of Imperial College Business School. He also holds a BSc in Economics from Bocconi University and MSc in Financial Engineering from Imperial College. Andrea is fluent in Italian and English.