

# GLOBAL PRIVATE EQUITY PERFORMANCE SERIES

An international comparison of major markets

2019

# FOREWORD



Welcome to the latest report from eFront Insight's Global Private Equity Performance Series. This paper is an ambitious and far-reaching analysis of the risk, return, maturity and liquidity characteristics of the main national and regional markets that constitute the global private equity industry. To our knowledge, no other publicly available analysis is comparable to it in either scale or depth.

Despite this depth, the following analysis will inevitably prompt more questions than answers. The imperfect nature of private markets, with its information asymmetries, means that unambiguous answers, perfect solutions and mathematical certainty rarely feature.

Instead, at eFront we believe in providing investors with the data, tools and insight, so that they can exercise their skill to the greatest possible effect. Whether you are an experienced veteran or just starting out on your alternatives journey, I hope you find the following inspiring in your search for the market that suits your risk-return profile.

Best wishes,

A handwritten signature in blue ink, appearing to read 'Tarek Chouman'.

Tarek Chouman  
eFront CEO

# CONTENT

INTRODUCTION .....	3
1. MAIN FINDINGS .....	4
1.1 VENTURE CAPITAL .....	5
1.2 LEVERAGED BUYOUT .....	7
2. PERFORMANCE ANALYSIS OF THE PE MARKETS .....	9
2.1 ALL PRIVATE EQUITY FUNDS .....	10
2.2 VENTURE CAPITAL FUNDS .....	13
2.3 LEVERAGED BUYOUT FUNDS .....	16
3. METHODOLOGY .....	20

The aim of this report is to provide readers with elements of analysis and understanding of the private finance universe, based only on data collected by eFront Insight. It does not intend to draw any definitive conclusion, nor judge the performance of fund managers. By providing a guided reasoning, this report hopes to contribute to the overall progress of understanding of the asset class in an annual format, with all the limits that this entails.

# INTRODUCTION

In most of modern finance, things tend to matter only if they can be measured precisely and frequently. By contrast, in alternative investment, that which matters most – performance – is remarkably difficult to pin down. Knowing what the precise performance is, of any fund, region or market, at any moment in time, is a complicated process, layered with judgement and requiring context. Perhaps this is why so much attention is paid to activity, sentiment and anecdote. But it is possible to understand more, if you have access to the right data and the patience to interpret it. One intriguing headline from our data could be: 'China overtakes the US as the top performing VC market.' However, much of that value is unrealized.

The Chinese market's immaturity means that much of this value is effectively unproven. Another soundbite might be: 'Holding periods plummet in wake of global financial crisis'. A closer look reveals this faster time-to-liquidity is almost entirely driven by emerging markets and venture capital. And 'Nordic private equity provides strongest returns' is great news for the region, although investors will also want to know that its cash-on-cash performance is skewed by some very strong outliers. For this reason, the following analysis attempts to be as objective as possible, while pointing out, where possible, when the face-value of the data may not be the whole story.

## KEY POINTS



### GEOGRAPHICAL DEFINITION

In this report, the method for geographical allocation of funds is based on the location of the investee company, rather than that of the private equity investor. This choice was made to allow for an explicit comparison of different geographical strategies in private equity investment decision-making. For a fund to be classified as invested in a particular region, at least 70% of the fund's assets has to be invested into that region. If not, the fund would be classified as investing in a region with a broader geographical span<sup>1</sup>.



### REPORTING CURRENCY

For each geographical group of funds, the returns are calculated in terms of the local currency in which the cash distributions and residual valuations were reported in order to neutralize foreign exchange effects.



### MEASURING RETURN

This study will use the time-sensitive internal rate of return, and the multiple of invested capital. Pooled average return indicators will be used to assess the performance of a given set of funds.



### MEASURING RISK

This study defines risk as the difference in performance between the best and worst performing funds in any given region. It uses two measures: one of 'extreme' selection risk, which refers to the difference between the average performance of top and bottom 5% performers and 'most frequent selection risk', for the difference in either IRR or TVPI between the top and bottom quartile funds.

<sup>1</sup>A fund that has at least 70% of portfolio value invested in French companies is considered to have "France" as a geographical strategy. If it has 40% of portfolio invested in French companies, 35% in UK companies and the rest in other regions, it is considered to have "Western Europe" as a strategy.





Benelux, China, the Nordics and the UK continue to be the private equity markets with the most attractive risk-return profiles in 2018. However, over the past year France and Spain's LBO markets saw significant improvements in performance as they converged with their mature Western European peers. This helped bump up risk-return trendlines and average global performance for LBOs.

French LBO and VC funds as a whole improved their TVPI over the past year from 1.45x to 1.53x, while experiencing only a negligible increase in both measures of selection risk. With a maturity level below the UK or Nordics, there is still room for further improvement compared with Western European peers. For LBO funds, TVPI rose from 1.51x to 1.61x at the end of 2018.

Since the global financial crisis, average time-to-liquidity – a measure of how long before investors see capital returned, for example from exits – has fallen by almost a third. In the seven vintage years following the 2008 crisis, time-to-liquidity fell most notably in China, Italy, Eastern Europe and Russian markets. By contrast, DACH markets benefited the least from this trend towards a more rapid return of capital.

This discrepancy in time-to-liquidity is even more pronounced in venture capital. The average reduction in time necessary to generate liquidity is 44%. By contrast to its LBO performance, DACH VCs succeeded in reducing this figure drastically, from more than eight years to less than three years.

In venture capital, Western Europe as a whole experienced an improvement in performance over the last year (from 1.34x to 1.47x), mostly due to a boost in Nordic, French, Italian and Spanish market performance. Italy's venture capital market has consolidated its position as a global outperformer, further increasing its IRR to 11.41% while reducing selection-risk spreads.

However, US venture capital remains globally preeminent, with an IRR of 14.36%. Meanwhile, Chinese VCs made up some lost ground over the past year, exhibiting relatively higher increases in performance than their top performing peers, which resulted in a significant reduction in the 'most frequent' selection risk in this market.

# | 1. MAIN FINDINGS



# 1.1 VENTURE CAPITAL

## BENELUX

The Benelux VC market continues to exhibit modest performance (0.33% of IRR and 1.05x of TVPI), but still showed some improvement relative to the historical returns from year ago. This low performance is mostly owed to the 2000-01 crash, as limiting the subset of funds to those of vintage years of 2002 and younger results in IRR of 6.94% and TVPI of 1.19x. Benelux funds have distributed only slightly above the half of returns so far and there is still value to be unlocked.

## CHINA

The Chinese market experienced an inflow of new funds which pulled the maturity level from 40.6% to 38.2%. This led to a moderate reduction in performance from 11.53% to 11.08% over the past year. However, TVPI remained at the same level of 1.72x. At the same time, the 'extreme' selection risk increased slightly, while the 'most frequent' selection risk was further reduced. In spite of these developments, the Chinese market continues to offer the most attractive risk-return profile, measured by both IRR and TVPI, with the caveat that it is the market with one of the longest time necessary to generate liquidity.

## DACH

The DACH VC market still lingers around low levels of performance (0.71% of IRR and 1.04x of TVPI), but the level of 'extreme' selection risk reduced over 2018, which brought this market closer to the risk-return trend line. DACH VC funds experienced the sharpest reduction in time-to-liquidity, when comparing pre-crisis with vintage years following the financial crisis in 2008. The first group of funds (2002-08) required more than 8 years to generate liquidity, while post-crisis funds now require less than 3 years.

## EASTERN EUROPE & RUSSIA

VC markets of Eastern Europe and Russia are underperforming relative to most of their Western and Southern European counterparts. Combined, they are the least mature of all the markets, with only 22.1% of returns being returned to investors. However, the region achieved a remarkable advancement in performance during 2018, in spite of slow progression in maturity. IRR went from 0.19% to 1.98% and TVPI from 1.01x to 1.10x. In absolute terms, this is still a particularly weak performance, but this increase was accompanied by a tremendous drop in both measures of risk. With 'extreme' selection risk declining from 37.84% to 22.94%, EE&R markets found itself on the trend line, which was not the case a year ago.

## FRANCE

The French market is still lingering around risk-return trendlines, but the global VC market experienced a push in average performance over 2018, as well as a significant increase in the slope of the risk-return trend lines. The development in the French market contributed to these changes, as both its measures of performance increased (TVPI from 1.19x to 1.24x and IRR from 3.19% to 3.79%), while the selection risks declined over that period.

## ITALY

The Italian VC market continued with stellar performance over 2018 to reach IRR of 11.41% (the second best after US market). It is still at the higher end of the risk levels, but it managed to reduce both spreads. 'Extreme' selection risk fell from 100.5% to 92.09% and the 'most frequent' selection risk was reduced to 20.6% from the last year level of 23.44%. Italian funds distributed additional 6% of realized returns back to investors, reaching a maturity level of 82%. Focusing on the universe of active funds, Italian funds yield the highest IRR of 14.29% and require the shortest time-to-liquidity of 3.7 years, which make this market very promising.

## ISRAEL

Israel's VC performance increased from 2.33% to 2.96% in IRR, and from 1.17x to 1.23x in TVPI. The 'most frequent' selection risk hasn't changed significantly in terms of IRR, but as the Italian funds exhibited sharp reduction in this measure of risk, Israel is now the market with the widest spread between the top and bottom quartile funds' performance. The average of the top 5% performing funds' TVPI moved from 2.95x to 3.39x which resulted in the above-mentioned performance boost, but also in the expansion of 'extreme' selection risk.

## NORDICS

The Nordic market has underperformed in the past by generating negative returns. However, active funds are ahead of all their geographic counterparts by being the only market that yields TVPI more than 2x. The poor performance delivered in the past is mostly owed to the underperformance of the Finnish VC market.

## SPAIN

With an inflow of new funds into Spanish VC market over 2018, there were significant shifts in its risk-return profile. It achieved performance increases in both IRR (from 2.67% to 3.5%) and TVPI (from 1.16x to 1.24x). In spite of expansion of both the 'extreme' and the 'most frequent' selection risk last year, Spain maintained its position on the lowest end of the 'most frequent' selection risk measured in terms of IRR.

## UNITED STATES

Generating 14.4% of historical IRR, the US market maintains its title of best-performing VC market globally. Removing the golden era of VC in the US and focusing only on the active funds gives an average performance of 7.89%, almost touching the typical hurdle rate for carried interest. For a given level of maturity (75.8%), the US market exhibits an exceptionally high level of 'most frequent' selection risk (1.18x). By further inspection, this is an anomaly that belongs to the past, as this spread is below 0.8x for the pool of active funds. On the other hand, comparing the group of funds for vintage years 2002-08 with 2009-15 finds that US funds have gone from being one of the fastest to return capital, to one of the slowest (3.86 years).

## UNITED KINGDOM

Looking at the risk-return profile of UK venture capital market shows that it can be found exactly on the global market trendline. Both manager selection risk and associated return have median values and the market shows outstanding consistency. It distributed an additional 4% of total value created in portfolio companies over the past year and the performance figures remained the same (4.96% of IRR and 1.38x of TVPI) as they were at the end of 2017. Looking at the two groups of post 2000-01 crash vintage years shows continuous growth of UK VC performance. VC funds of vintage years 2002-08 yielded a money multiple of 1.53x and it took them 6.6 years on average to generate liquidity. Younger funds (vintage years 2009-15) require 3.4 years on average to return 1.67x of TVPI.



## 1.2 LEVERAGED BUYOUT

### BENELUX

Benelux countries remain at the top of the LBO game, generating an IRR of 17%, the highest of all geographies. Furthermore, it is no longer the market with the highest 'most frequent' selection risk. Due to low performing funds in Benelux catching up slowly with top quartile performers over the last year, the performance spread reduced significantly. The extreme (most frequent) selection risk went down from 55.75% (23.57%) at the beginning of 2018 to the level of 48.44% (18.26%) at the end of last year.

### DACH

The DACH market's performance is consistent with last year, at 6.1% IRR and 1.3x TVPI. 'Extreme' selection risk measured in terms of IRR fell significantly, bringing this market closer to the trend line. However, the remarkable realization of the returns over 2018 did not significantly increase the poor performance of this market. However, the future of the DACH market is promising, as the funds of vintage years 2009-15 generate an IRR of 1.61 and still have more than half of the value to distribute to investors.

### CHINA

The Chinese market matured significantly during 2018, having distributed 58% of the value generated in buyout deals, relative to 52% of total returns a year ago. In addition, it maintained its attractiveness by achieving an IRR of 10.43% and preserving low levels of selection risk. A money multiple of 1.64x is a solid performance, particularly considering its 'most frequent' selection risk of just 0.53x.

### EASTERN EUROPE & RUSSIA

The LBO markets of Eastern European countries and Russia improved IRR performance from 6.63% to 7.25% over 2018. At the same time, the most frequent selection risk fell significantly, from 15.42% to 13.44%, which resulted in a remarkable increase of the returns yielded per unit of risk taken by the investors in this market. In terms of money multiple, the performance increase is more moderate, from 1.34x to 1.39x, but it is also followed by a slight increase in the selection risk. The market is still quite immature (56%), but it showed one of the sharpest drops in the number of years required to generate liquidity, going from vintage years 2002-08 to 2009-15.

## FRANCE

France is the market which exhibited one of the largest performance improvements over the past year. In terms of IRR, this market delivered 11.48% (relative to 10.24% generated by the end of 2017). 'Extreme' selection risk reduced significantly, mostly owing to the average performance of the bottom 5% funds improving by more than 3% in IRR. TVPI also moved in the right direction, from 1.51 at the end of 2017 to 1.61x. Since French LBO funds have realized only 70% of the created value, this may have further to run.

## ITALY

Italian LBO funds offer one of the least favorable risk-return profiles. Both measures of performance slightly deteriorated (IRR is 3.18% and TVPI is 1.15x), while the selection risk expanded moderately. On the brighter side, the Italian LBO landscape shows improvement as younger funds (vintage years 2009-15) generate 13.06% of IRR and 1.37x of TVPI. Their performance increased by 0.12x during 2018.

## ISRAEL

The Israeli LBO market improved its performance both in terms of IRR (from 4.43% to 4.97%) and TVPI (from 1.22x to 1.26x), but 'extreme' selection risk, measured in IRRs, expanded dramatically, due to a simultaneous increase in performance of top performers and low performing funds generating even worse performance. On the other hand, by looking at the 'most frequent' selection risk, the Israeli market is right on the trendline, suggesting that the extreme risk-return profile is a result of a few poorly-performing outliers.

## LATIN AMERICA

Latin American markets delivered the lowest IRR of 1.11%, but also generated the lowest 'extreme' selection risk of 26.4%. Local funds use little to no financial leverage, which limits the risks and also the potential returns. Given the limited number of active funds and the lowest maturity (54%) among all the markets in focus and the specific conditions of investments, it is difficult to compare Latin American LBO funds with the peer group.

## NORDIC COUNTRIES

'Extreme' selection risk increased in the Nordics, rising from 61% to 67.5%, while the IRR stayed level at around 16.35%. The spread in IRRs (15.87%) between the top and bottom quartiles, is beneath the levels found in some low performing regions such as DACH or Italy. This makes the Nordics the most attractive market with respect to risk-adjusted returns that required historically only 4.2 years to generate liquidity. The TVPI spread between the top and bottom quartile funds narrowed down from 1.13x to 0.95x. The Finnish market delivers the largest absolute TVPI performance globally, by generating returns of 1.98x and remains at the outermost high-end of 'extreme' selection risk.

## UNITED KINGDOM

UK upgraded its exceedingly attractive LBO risk-return profile even further. The performance figures remained at the similar level (IRR is 15.87% and TVPI is 1.64x), but the 'extreme' selection risk dropped further over 2018. It fell from 42.07% to 34.86%, thus putting the UK well above the trend line. By looking at the more recent vintages 2009-2015, UK funds are the most mature among their peers, as they have already distributed more than 60% of the total value generated in their portfolios by achieving the second best performance of 19.11% of IRR and 1.66x of TVPI.

## SPAIN

Despite having one of the longest time-to-liquidity (5.1 years), the Spanish market experienced one of the most exceptional improvements in performance and came closer to its Western European peers. IRRs evolved from 7.23% to 8.48% and TVPI from 1.4x to 1.51x over 2018. Over the same period, it distributed almost 10% of the total value to investors and underwent the significant reduction in both measures of risk. The Spanish market traditionally offers very low 'extreme' selection risk (1.09x), but its 'most frequent' selection risk dropped to 0.58x (from 0.78x), which placed this market above the trendline.

## UNITED STATES

Being the largest and the most mature LBO market in the world, the US preserves its very attractive risk-adjusted profile. The historical IRR remains at 12.2%, while selection risk increased only marginally over 2018. The US delivered the TVPI of 1.51x historically, on the risk-return trendline.





## **2. PERFORMANCE ANALYSIS OF THE PE MARKETS**

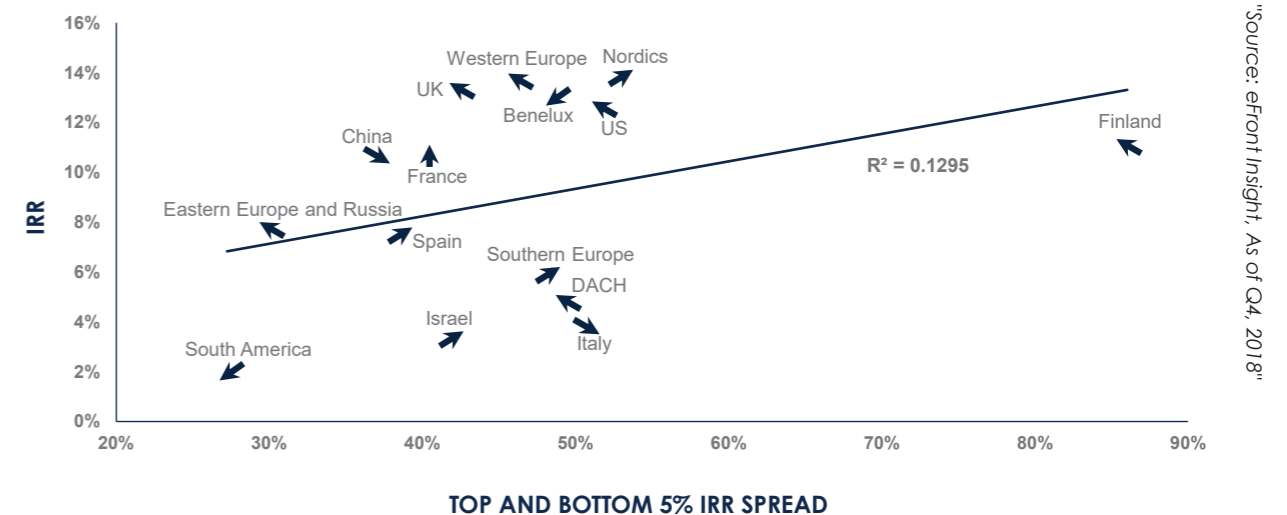


## 2.1 ALL PRIVATE EQUITY FUNDS

### Analysis using IRRs

A global overview of private equity markets shows that the 10% watershed IRR is becoming less relevant than was the case last year (Figures 1 and 2). The first group, which outperforms this theoretical benchmark and includes developed countries such as US, UK, Benelux and Nordic countries, as well as the Chinese private equity market, should soon be accompanied by France and Spain, which are catching up and improving notably. However, Eastern and other Southern European countries, DACH and Israeli markets still fall below this figure.

Figure 1 – Risk (5%) and return (IRR) analysis of private equity funds by geographical area

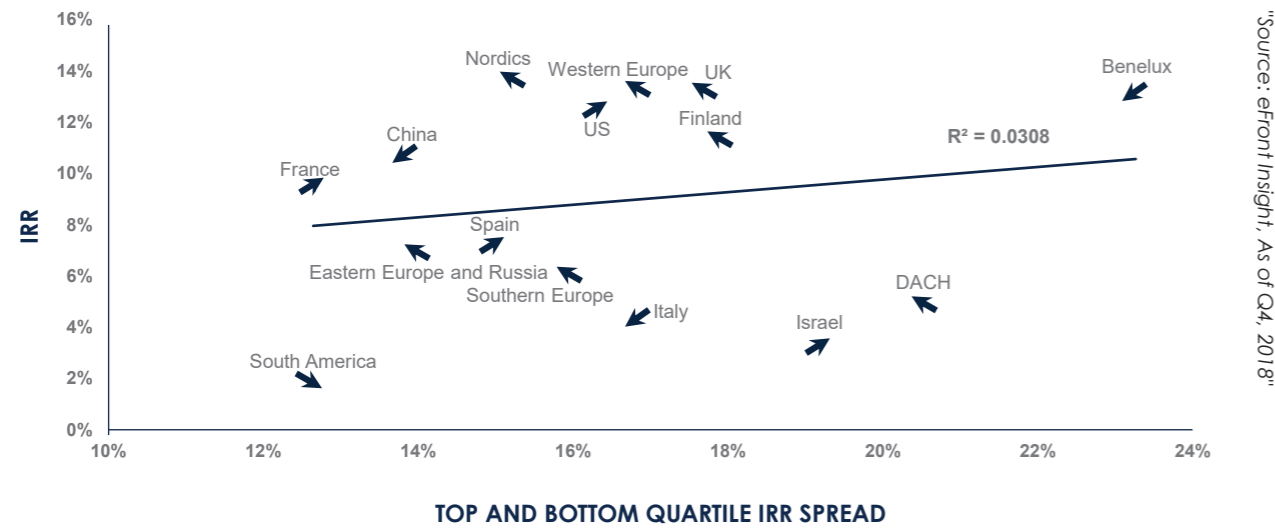


The previous divergence in historical performance between the two groups had its source in different levels of maturity of private equity funds in each market. With the exception of China, the first group of countries distributed 81% of the total value created, while the second group returned only 69% of the total value to its investors.

Nordic countries lead in terms of overall private equity performance, generating a combined IRR of 13.83%. They are followed by the UK (13.36%) and the Benelux (13.23%). Finland leads in terms of the 'extreme' selection risk, but exhibits closer to the average 'most frequent' selection risk. Conversely, Benelux and DACH groups of countries exhibit roughly the median levels of 'extreme' selection risk, while their 'most frequent' selection risk are the highest globally.



Figure 2 – Risk (25%) and return (IRR) analysis of private equity funds by geographical area



In comparison with last year (the direction of arrows points to the change in risk and return over 2018), in addition to the significant improvement in performance of French and Spanish markets, the Israeli market also experienced a shift upward, both in terms of IRR (from 2.88% to 3.48%) and TVPI (from 1.18x to 1.24x).

Over the past year, Benelux countries experienced a significant reduction in 'extreme' selection risk, falling from 55% at the end of 2017 to 49% at the end of 2018, due to the average of lowest 5% performing funds improving their IRR by more than 5%. At the same time, 'extreme' selection risk in the Chinese market increased both in terms of IRR and TVPI spread. In both cases the average of the top 5% performing funds increased over 2018.

### Analysis using money multiples

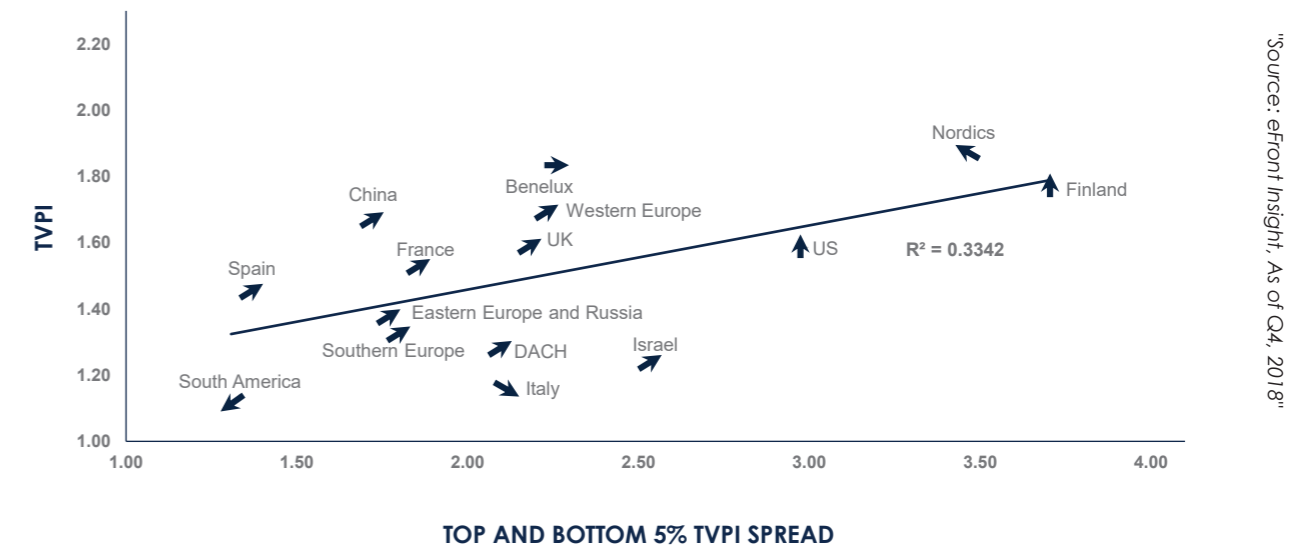
As IRR is time-weighted, its use is complemented by total value paid in (TVPI) as a performance measure.

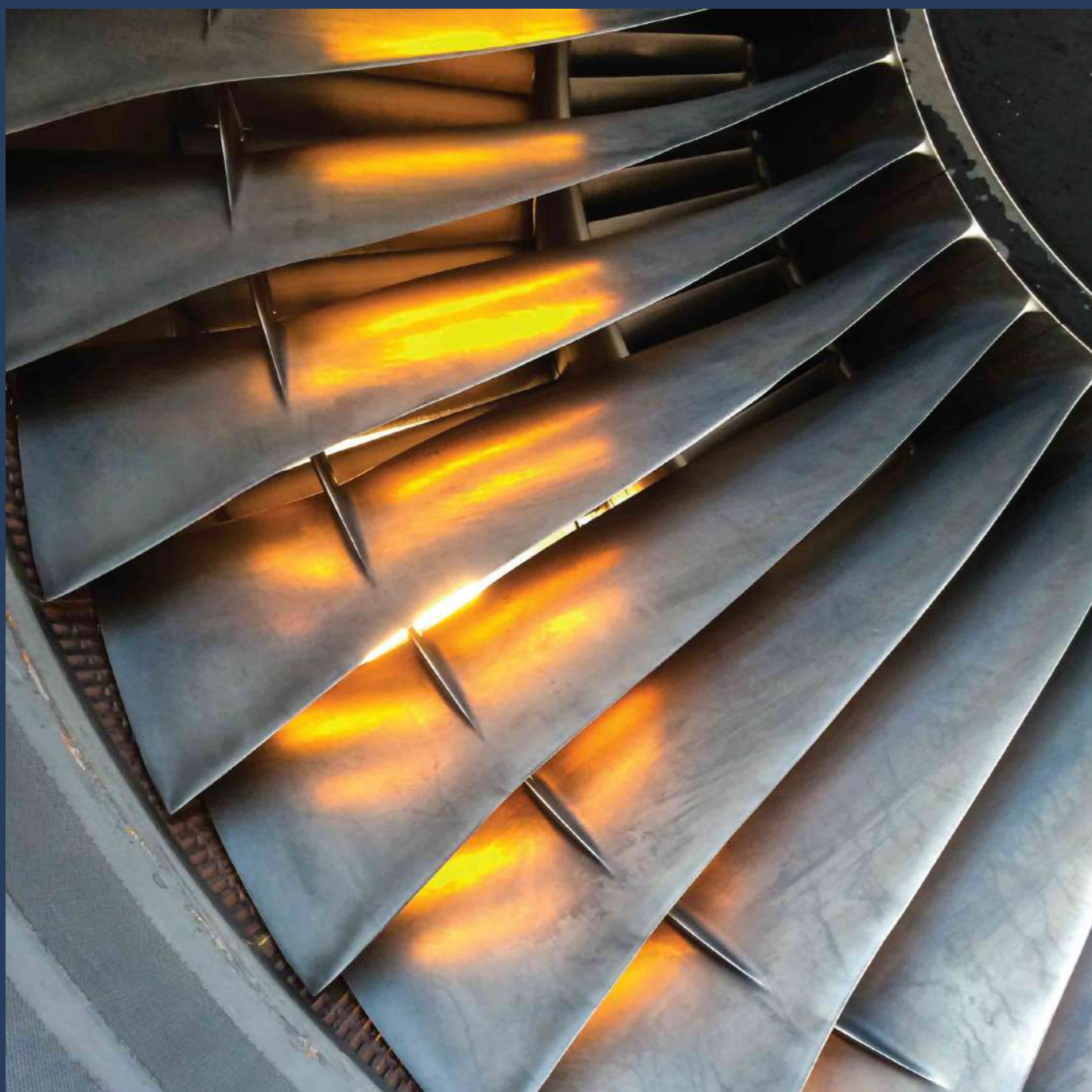
Figures 3 and 4 reveal that Nordic countries generate the highest money multiple of 1.86x, but at the cost of an extraordinary high level of 'extreme' selection risk (3.45x), and this despite a fall in 'extreme' selection risk compared with last year's figure of 3.53x.

Focusing on the median levels of both 'extreme' and 'most frequent' selection risks, the analysis shows that Benelux and the UK offer attractive risk-adjusted returns. China is well above the trend line, but funds investing in this market have only distributed 47% of the total value, thus limiting the spread in performance as measures of risk.



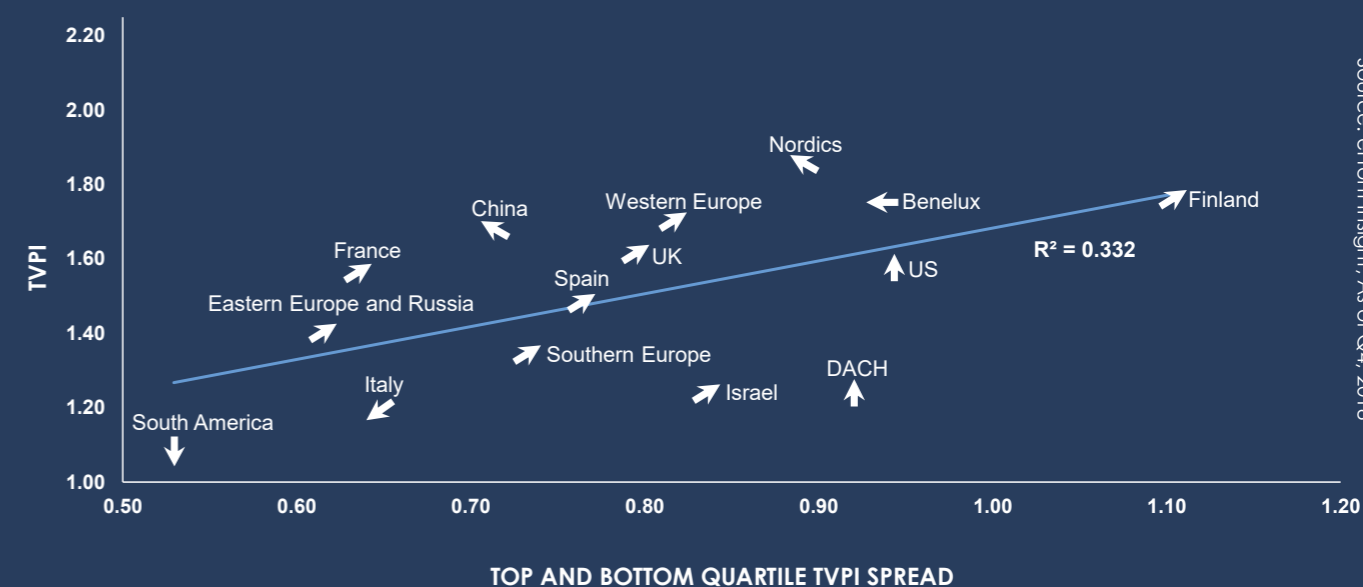
Figure 3 – Risk (5%) and return (TVPI) analysis of private equity funds by geographical area





French private equity funds improved their TVPI over the past year from 1.45x to 1.53x, while experiencing only a negligible increase in both measures of selection risk. With a maturity level below the UK or Nordics, there is still room for further improvement compared to its Western European peers. Similarly, Spain has also improved its TVPI from 1.37x to 1.47x, but it has also experienced an evident rise in the 'most frequent' selection risk, by moving from 0.63x to 0.77 over the last year.

Figure 4 – Risk (25%) and return (TVPI) analysis of private equity funds by geographical area



Source: eFront Insight, As of Q4, 2018

The performance of UK funds remains broadly flat, but their 'extreme' selection risk rose from 2x to 2.18x over the past year, due to the top 5% performing funds exhibiting an increase in TVPI of more than 0.2x. This affected its risk-adjusted perspective of performance, but the UK remains one of the strongest private equity markets globally.



## 2.2 VENTURE CAPITAL FUNDS

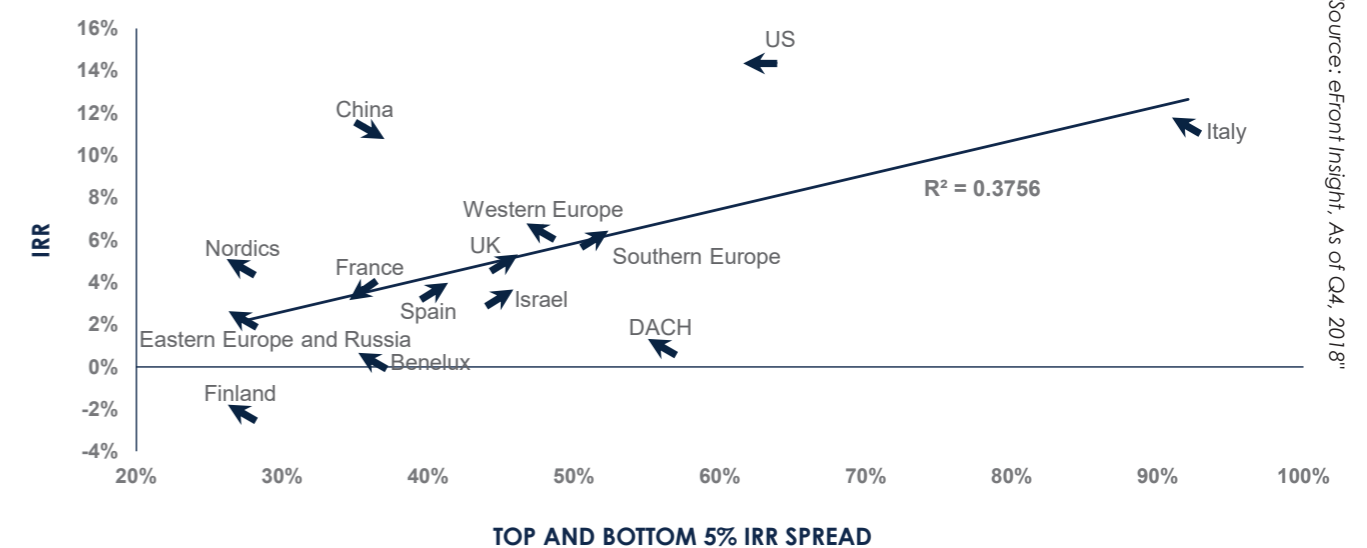
### Analysis using IRRs

Italian funds remain at the extreme end of the risk-return spectrum, but the levels of both extreme and 'most frequent' selection risk have dropped for this market, while at the same time the IRR has gone from 10.11% to 11.41% (Figures 5 and 6).

The US market remains the leader in venture capital, with an IRR of 14.36%. There was a slight contraction in Chinese VC market performance, caused by the emergence of new funds, that pushed this market to third place. Chinese low performers caught up gradually over the past year, by exhibiting a relatively higher increase in performance than their top performing peers.

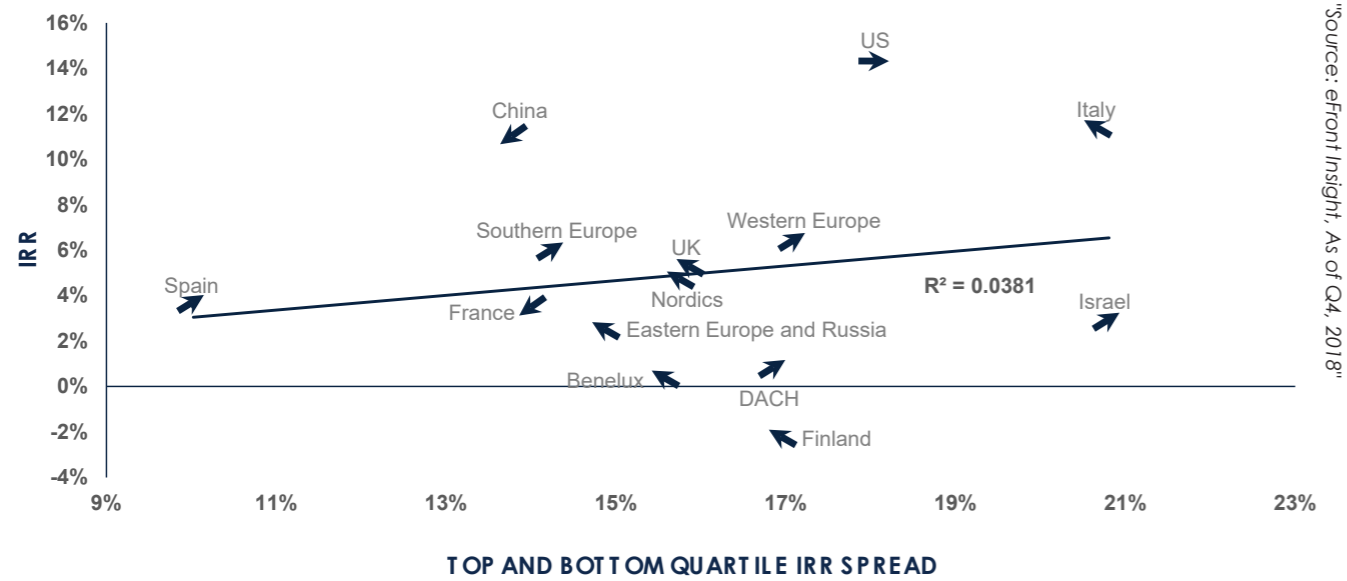
In general, the top performers can be found among the markets that were active during the exceptional years of high yields during the venture capital boom in 1990s and among those that were not active at the beginning of the millennium, thus avoiding the crash of 2000-2001.

Figure 5 - Risk (25%) and return (IRR) analysis of LBO funds by geographical area



Source: eFront Insight, As of Q4, 2018

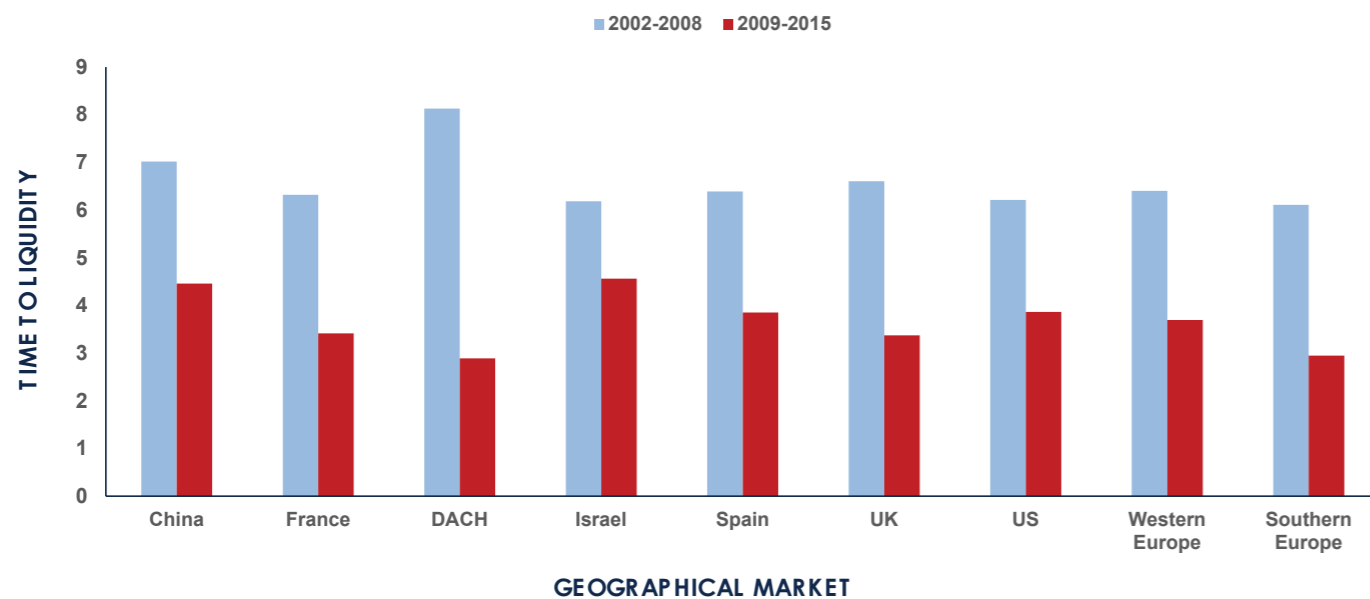
Figure 6 - Risk (25%) and return (IRR) analysis of VC funds by geographical area



Similar to the LBO market, the drop in time-to-liquidity has reduced significantly for funds that had their first capital call after the great financial crisis (Figure 7). The reduction is the most striking for the DACH market, as it fell from more than eight to less than three years. Chinese and Israeli VC funds are still experiencing relatively long periods before reaching liquidity.

Overall, VC funds are characterized by a longer duration of investments relative to their LBO counterparts, as start-up investments require longer to mature.

Figure 7 - Time-to-liquidity of VC funds by geographical area



## Analysis using money multiples

The US remains a high performer, in large part due to the venture capital boom in the decade of 1990s (Figures 8 and 9). However, China takes over the top performing position by delivering TVPI of 1.72x. Overall, Western Europe experienced the improvement in performance over the last year (from 1.34x to 1.47x), mostly due to a boost in Nordic, French, Italian and Spanish market performance.

Israel remains at the higher end of the risk spectrum, both in terms of the extreme and the 'most frequent' selection risk, while the performance figures move upwards from the past year performance level (from 1.17x to 1.23x).

Figure 8 - Risk (5%) and return (TVPI) analysis of VC funds by geographical area

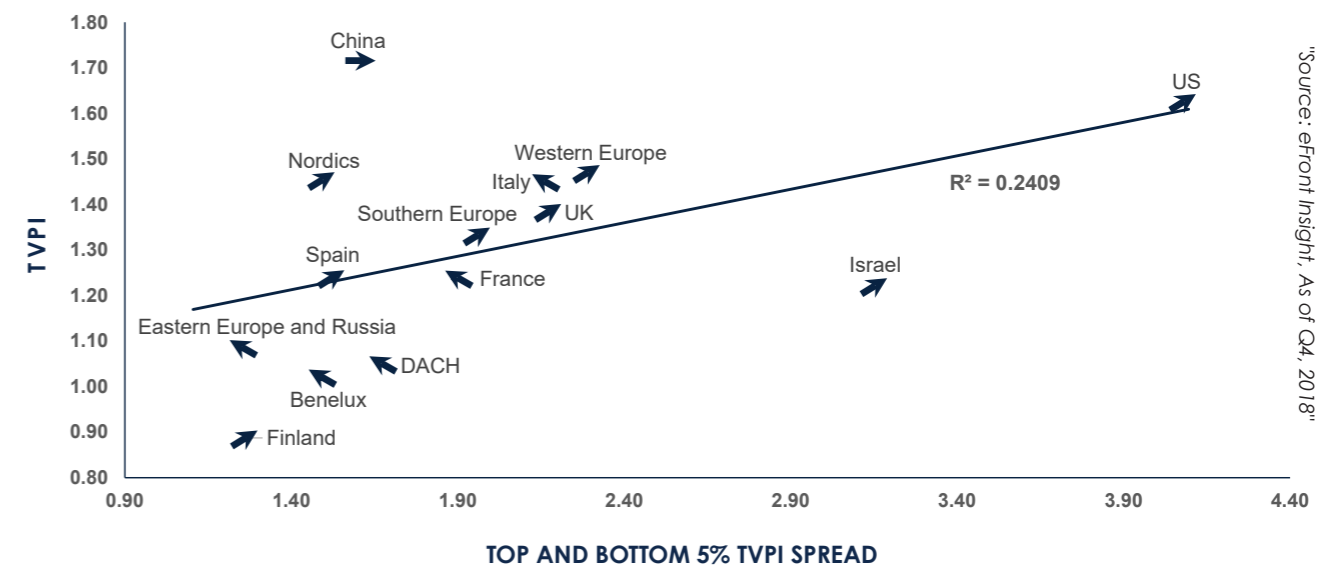
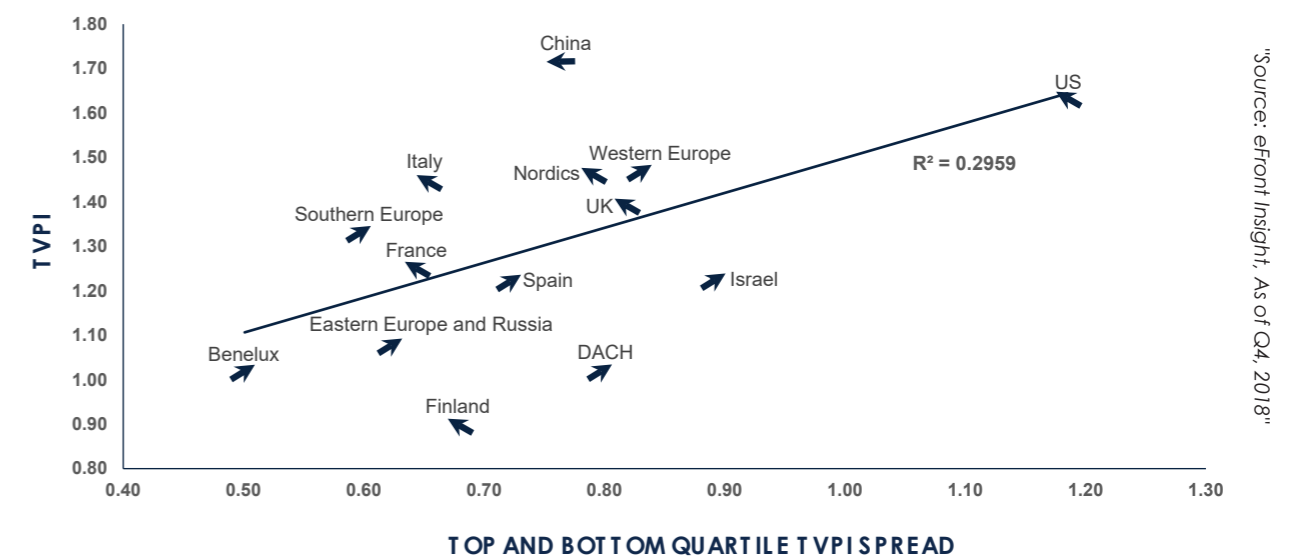
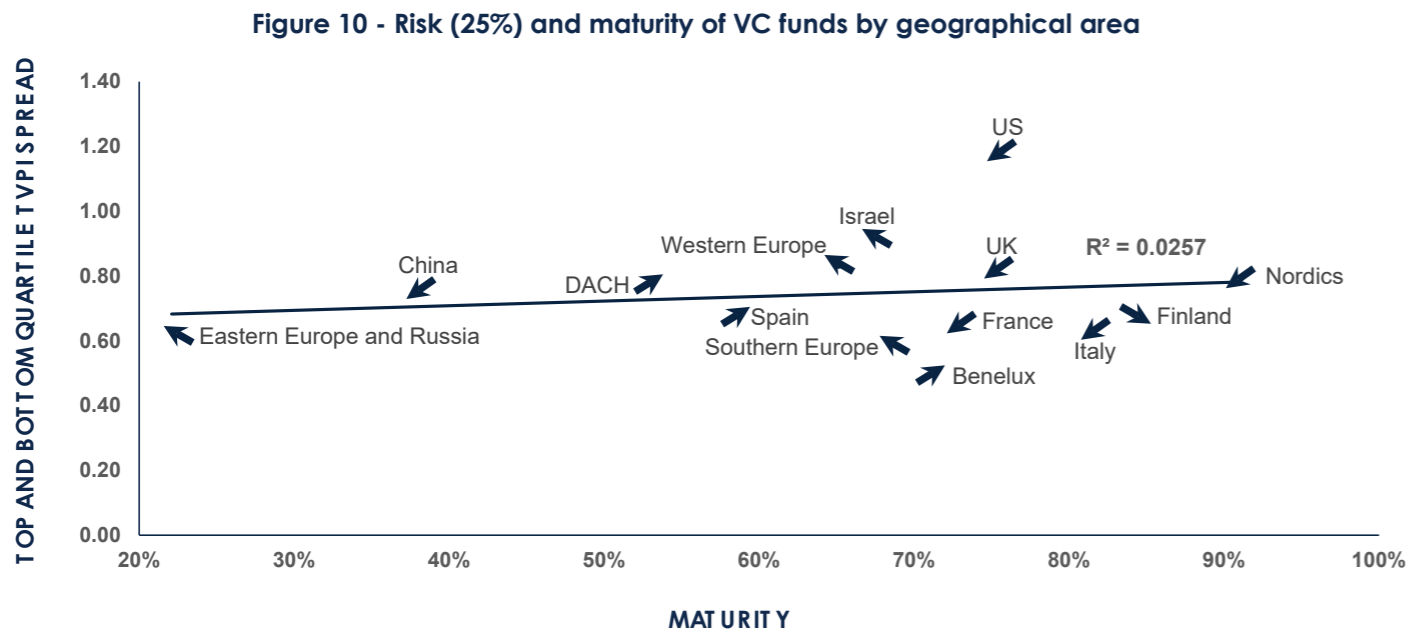


Figure 9 - Risk (25%) and return (TVPI) analysis of VC funds by geographical area

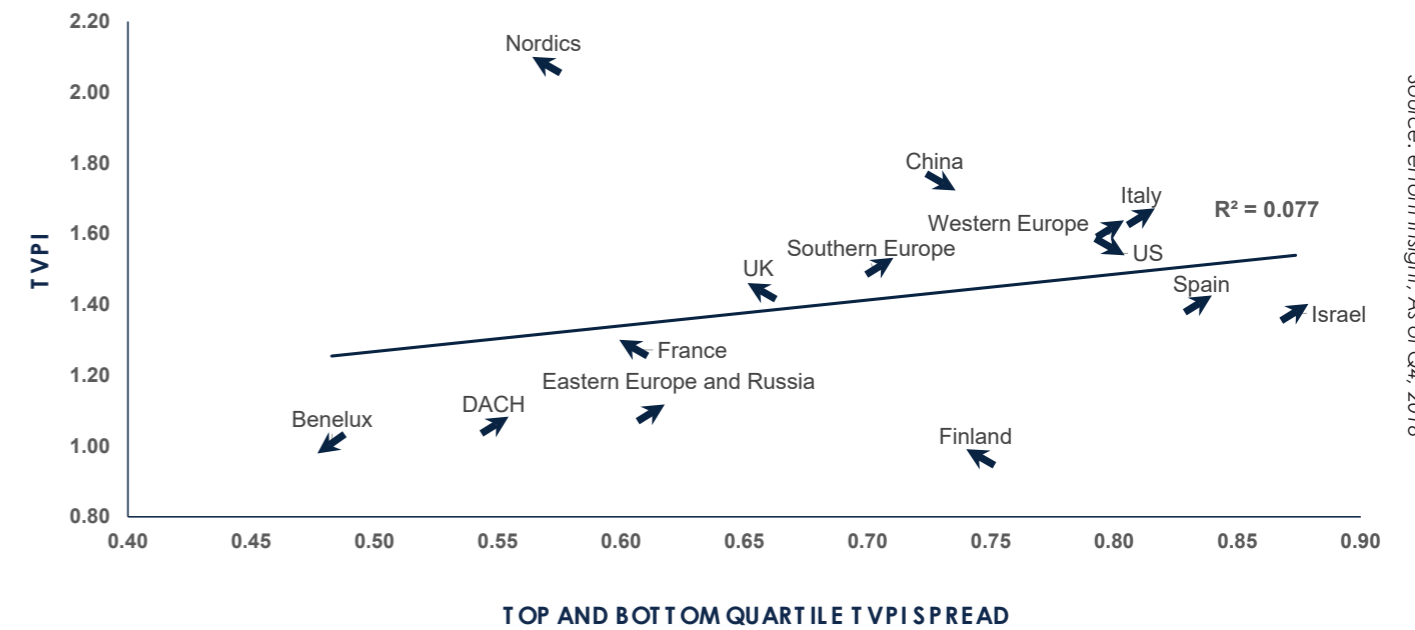




China is recognized as a top performer globally, defined in terms of TVPI. However, Figure 10 shows that China is one of the least mature markets and has yet to realize the value created. Figure 10 shows that the US market has a high level of the 'most frequent' selection risk for a given level of maturity, but looking closer at Figures 11 and 12 reveals that these high spreads belong to the past and that the active US funds have similar level of selection risk as the Western European peers.

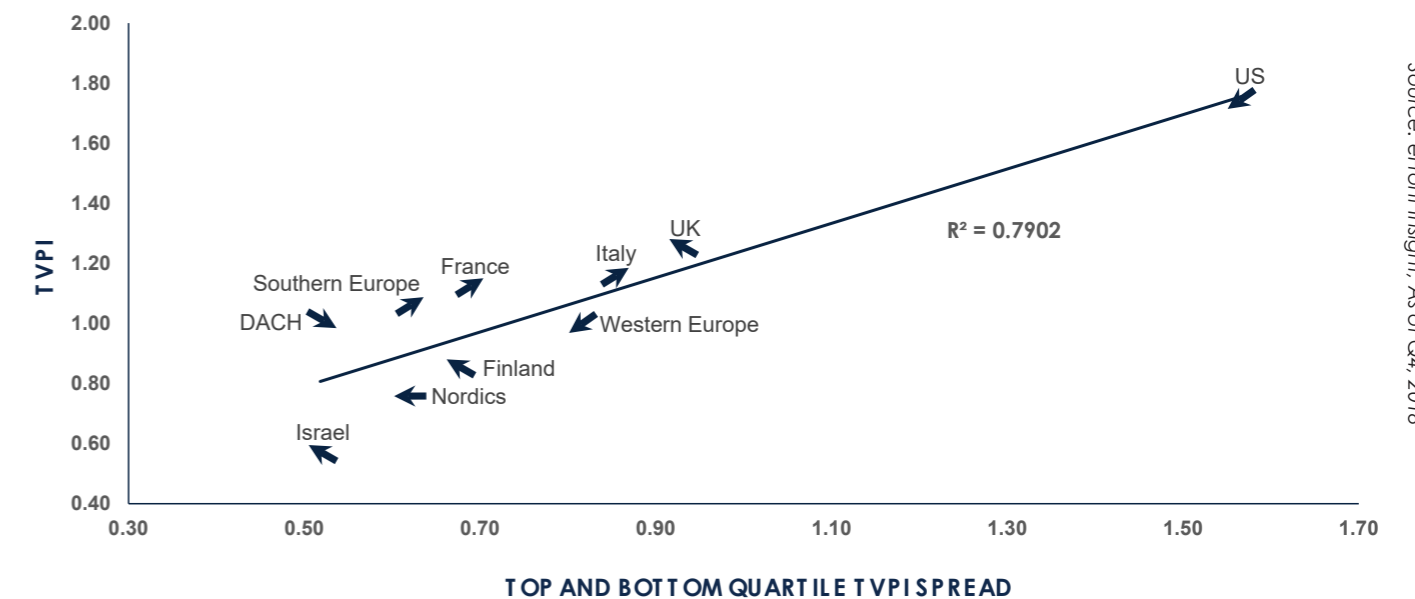


**Figure 11 - Risk (25%) and return (TVPI) analysis of active VC funds by geographical area**



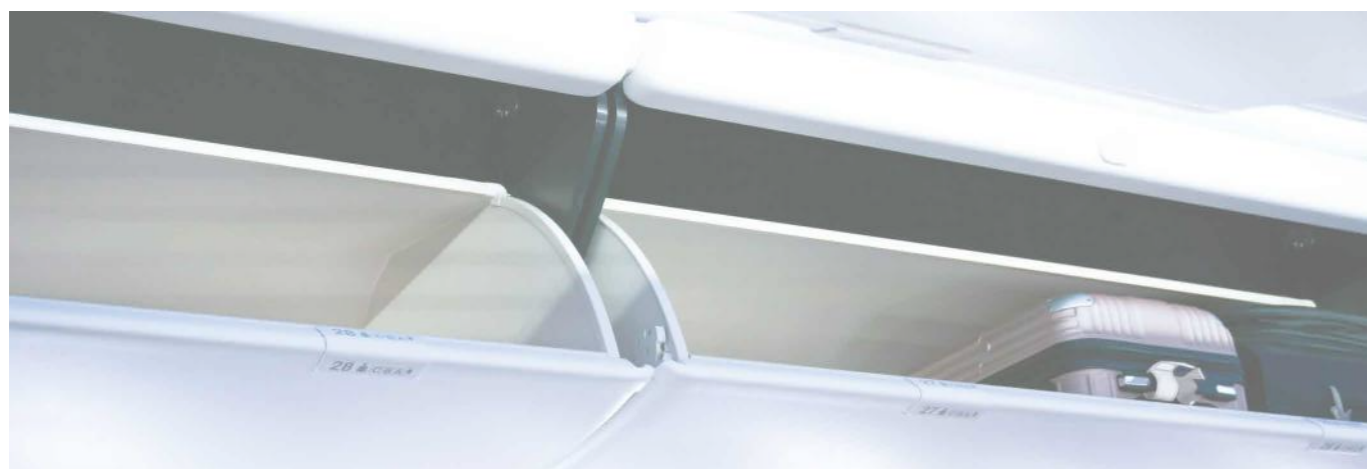
A comparison of the performance of fully realized VC funds with last year shows little movement (Fig. 12). It is mostly the British pool of liquidated funds that experienced the addition of new funds which resulted in the boost of past performance of this market segment.

**Figure 12 - Risk (25%) and return (TVPI) analysis of fully realized VC funds by geographical area**



## Active vs. Liquidated

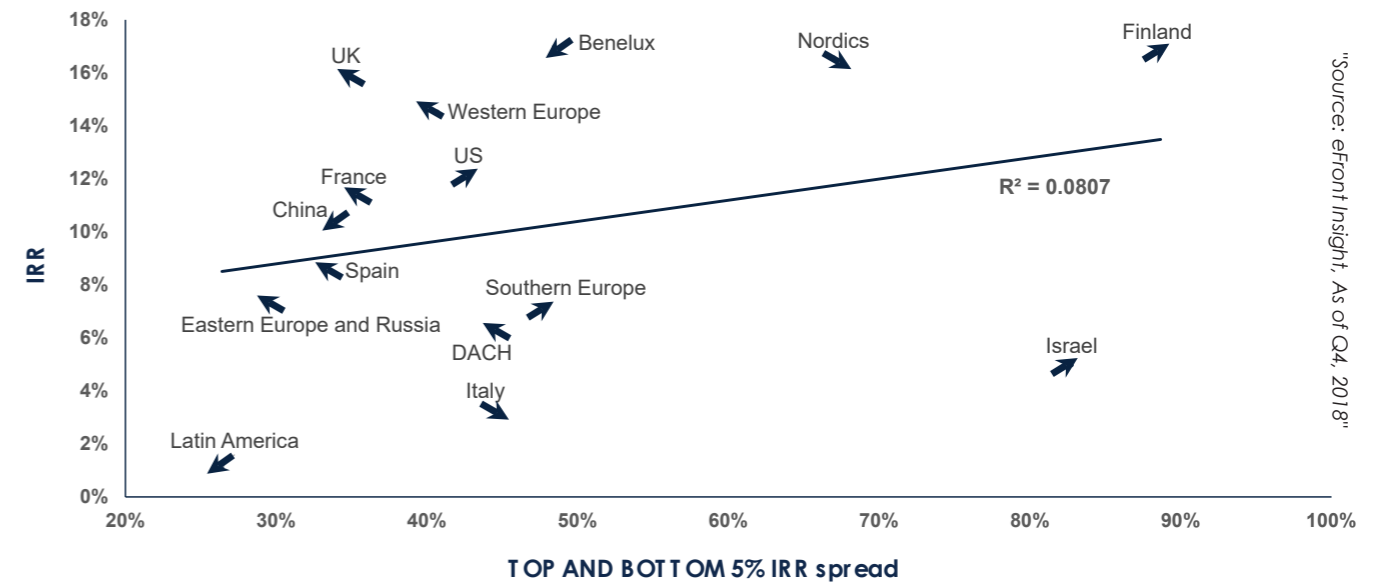
The most impressive performance development occurred in the active segment of the Nordic VC market (Fig. 11). TVPI jumped from 1.68x at the end of 2017 to 2.08x at the end of 2018. In terms of capital distribution, the maturity level of these funds moved from 49% to 88% during the course of one year, implying that active Nordic VC funds had an extraordinarily vibrant exit year.



## 2.3 LEVERAGED BUYOUT FUNDS

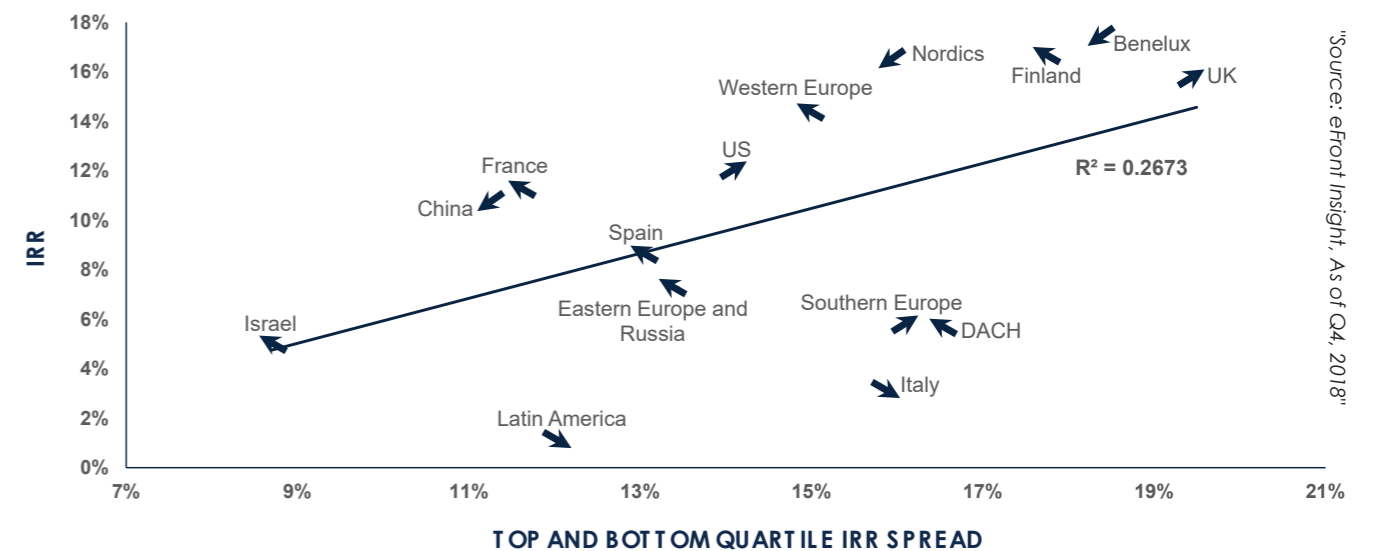
The Benelux is still the leading market with an IRR of 16.99% (slight downward correction in comparison with the last-year's 17.27%), but it is no longer the market with the highest 'most frequent' selection risk (Fig. 13). The region's weaker funds gradually improved to narrow the spread with top quartile performers over the last year.

Figure 13 - Risk (5%) and return (IRR) analysis of LBO funds by geographical area



The French market evolved significantly during 2018 with the IRR increasing from 10.24% to 11.48%. At the same time, the UK market experienced only modest growth. Spain improved its attractiveness on both ends. Its IRR increased from 7.23% to 8.48%, while both measures of selection risk fell. As a result, overall Western Europe moved further up, away from the trend line. China also experienced the boost in performance, while the US buyout market fortified its long-term performance at 12.2% of IRR.

Figure 14 - Risk (25%) and return (IRR) analysis of LBO funds by geographical area





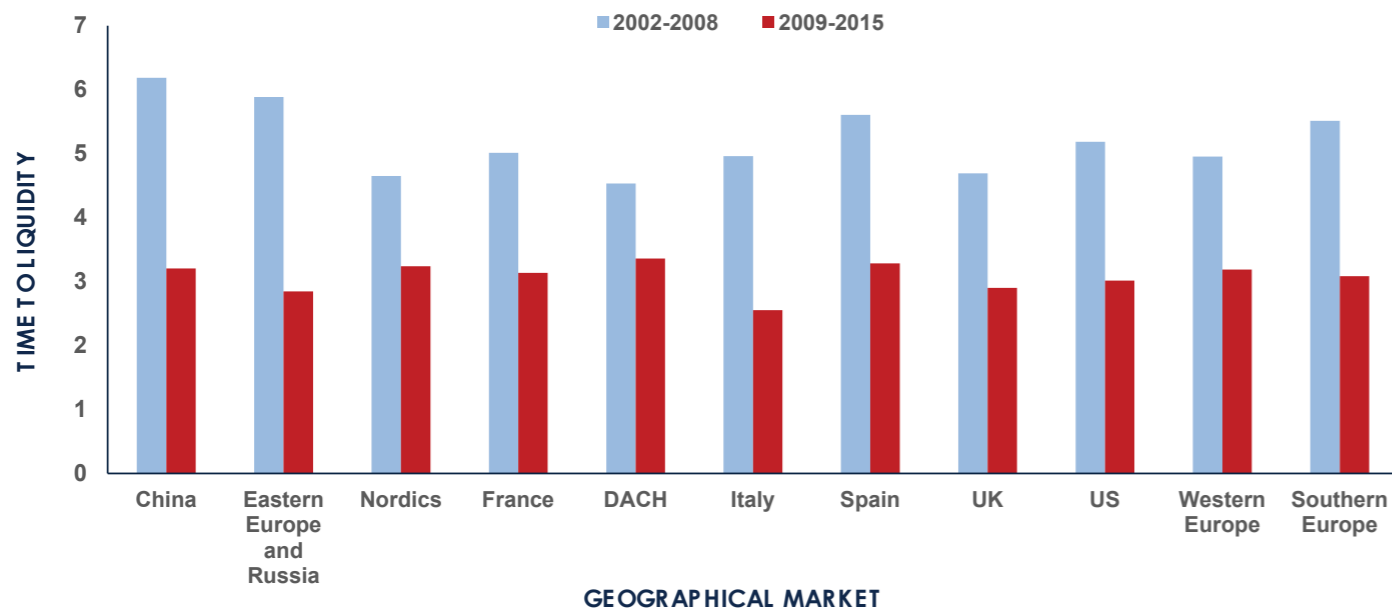
'Extreme' selection risk increased in the Nordic market, rising from 61% to 67.5%, while the IRR stayed more or less at the same level as last year (16.35%). The Israeli LBO market experienced an extraordinarily large expansion in spread between the average performance of the top and bottom 5% of funds (from 64.55% to 82.76%) due to simultaneous increase in performance of top performers and low performing funds generating even worse performance. The most remarkable reduction in 'extreme' selection risk is evidenced in the French market (from 39.9% to 35.17%), while the Eastern Europe and Russian markets achieved the most significant drop in the 'most frequent' selection risk (from 15.42% to 13.44%).

Given the time-weighted nature of IRRs, it is important to consider the speed at which different geographies return capital.

Using the global financial crisis as an inflection point, there was a persistent rise in both IRR and money multiples between 2002 and 2008. A sharp drop in valuations in 2008 was immediately followed by another period of steady growth which is still continuing.

There is a sharp difference in the number of years required to generate liquidity across all geographic markets between these two periods. Before the global financial crisis, the duration of private equity investment was 5.4 years, while it has now dropped to only 3.1 years. There are at least two possible explanations. First, some investments made by funds from the second group are probably very recent as the cut-off date is close to the investment date. Second, LBO funds of vintage years before 2008 have probably delayed the exits, waiting for the markets and liquidity to recover.

Figure 15 - Time-to-liquidity of LBO funds by geographical area



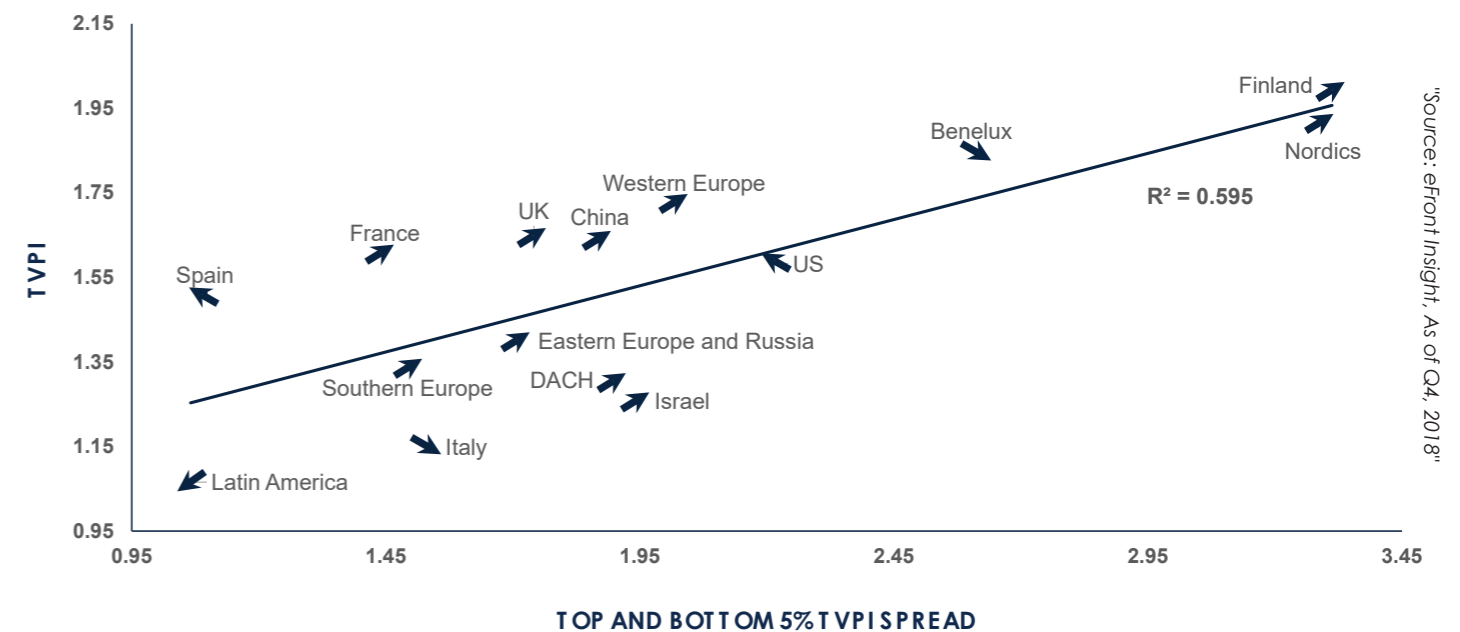
Source: eFront Insight, As of Q4, 2018

## Analysis using money multiples

The positive relationship between the funds' performance measured as a total value paid in (TVPI) and selection risk measures continues to be very strong (Figures 16 and 17).

Figure 16 shows that Finnish market achieves the best absolute performance, yielding almost \$2 for each one invested (1.98x), while Nordic funds provide the best risk-adjusted return within the 'most frequent' selection risk framework (Figure 17). In terms of the 'extreme' selection risk, France and Spain, that both have distributed around three quarters of the total generated value so far, provide the investors with most favorable risk-adjusted returns. The Chinese buyout market, while very young, continues to offer attractive risk-adjusted returns, both in terms of extreme and the 'most frequent' selection risk.

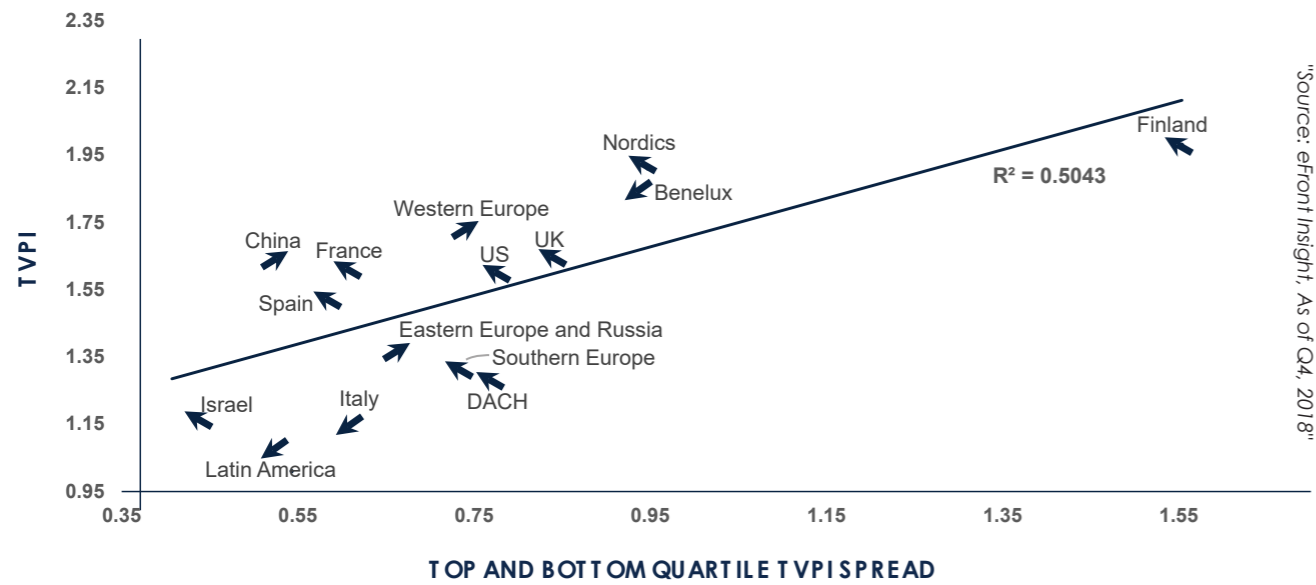
Figure 16 – Risk (5%) and return (TVPI) analysis of LBO funds by geographical area



Source: eFront Insight, As of Q4, 2018

Figure 17 also shows that all the regions except for the Finnish market, deliver a 'most frequent' selection risk below 1x. Last year, the Nordic and Benelux markets were above that threshold, but Nordic top quartile funds now generates somewhat lower performance, while the bottom quartile fund in Benelux is now better performing than was the case at the end of 2017.

**Figure 17 - Risk (25%) and return (TVPI) analysis of LBO funds by geographical area**

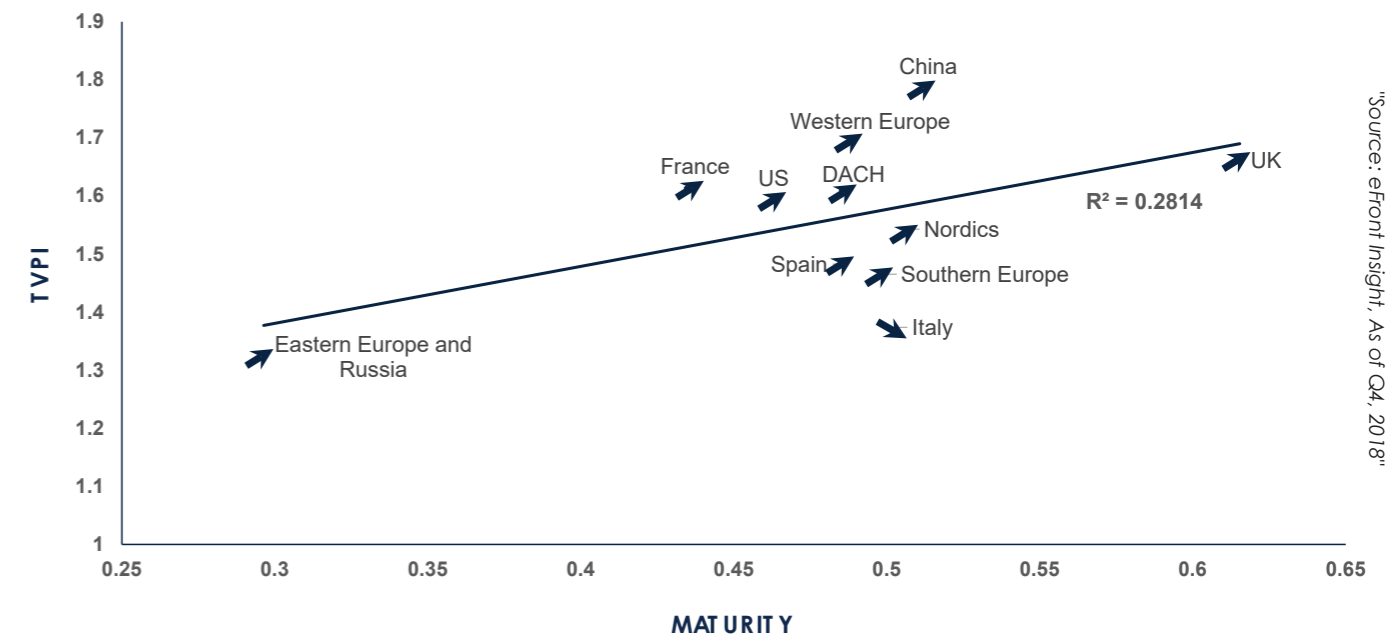


"Source: eFront Insight, As of Q4, 2018"

There is a strongly positive linear relationship between a market's performance and its maturity (the relationship would be even stronger if not for Chinese and Italian outliers.) In addition, with the exception of the UK, the majority of European funds of post-2008 vintage years have distributed half, or less, of the value created and are yet to deliver their full potential.



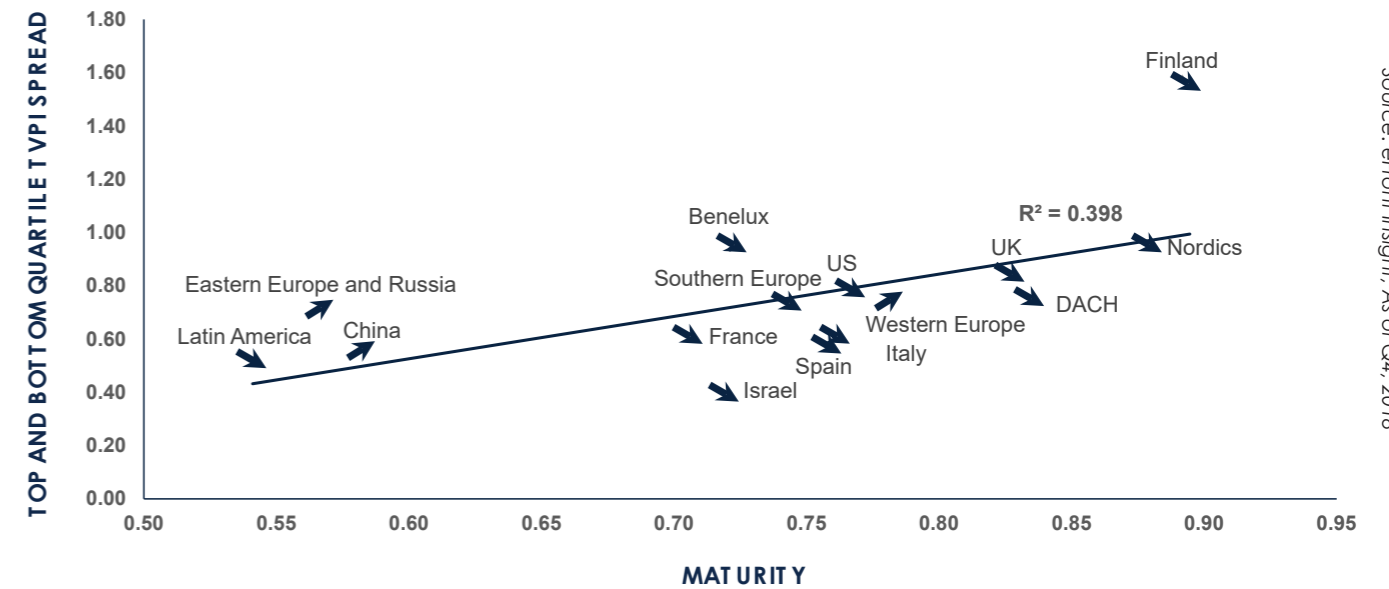
**Figure 18 - Performance and maturity of LBO funds by geographical area (vintage years 2009-2015)**



"Source: eFront Insight, As of Q4, 2018"

A very strong positive relationship is also present between the 'most frequent' selection risk and maturity of funds used to build this historical measure. This indicates that as distributions come forward, the top quartile funds improve their TVPI faster than the bottom quartile funds. Finland is a very distant outlier, with a spread significantly higher than the rest of its peers at the similar level of maturity.

**Figure 19 - Risk (25%) and maturity of LBO funds by geographical area**



"Source: eFront Insight, As of Q4, 2018"

Another interesting piece of evidence is that large markets and groups of countries are found closer to the trend line, implying that only relatively small markets can be found among the outliers.

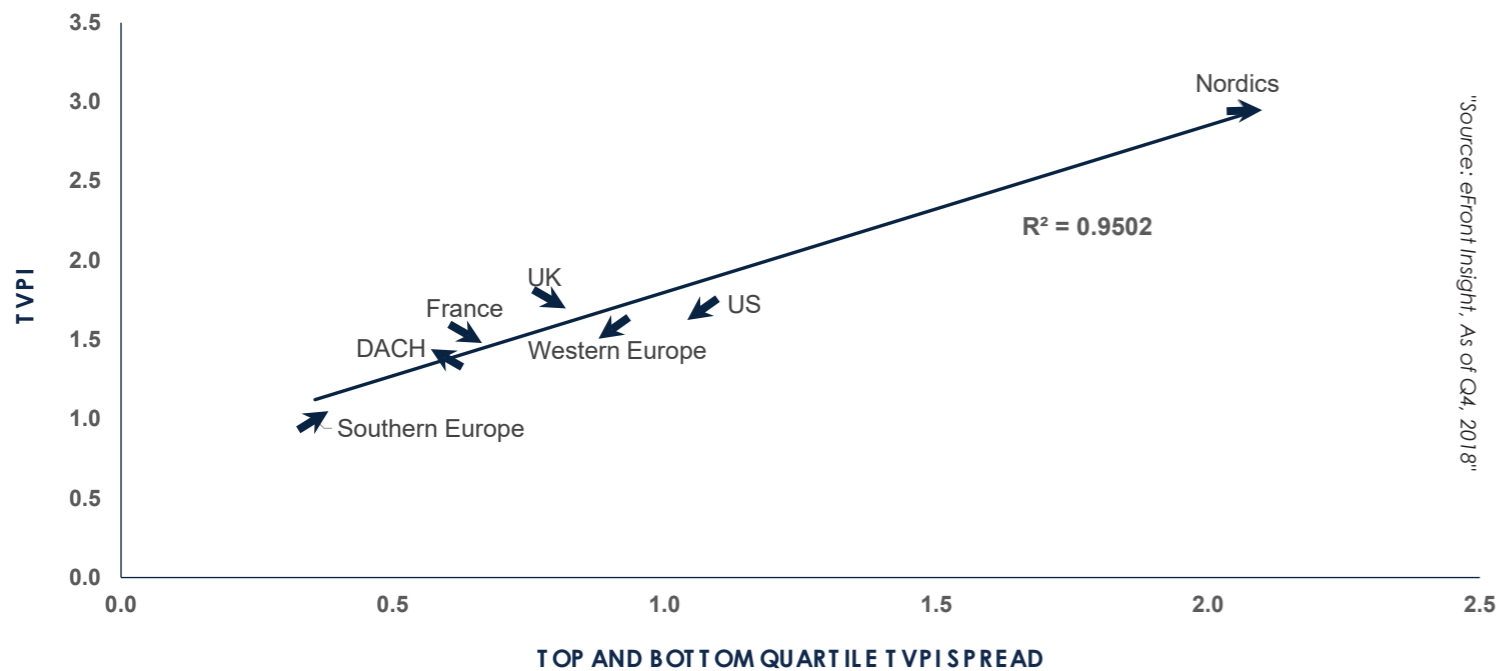


## Active vs. Liquidated

A comparison of the risk-return relationship between active and liquidated funds reveals that liquidated funds have a lower dispersion of individual market performance around the regression line.

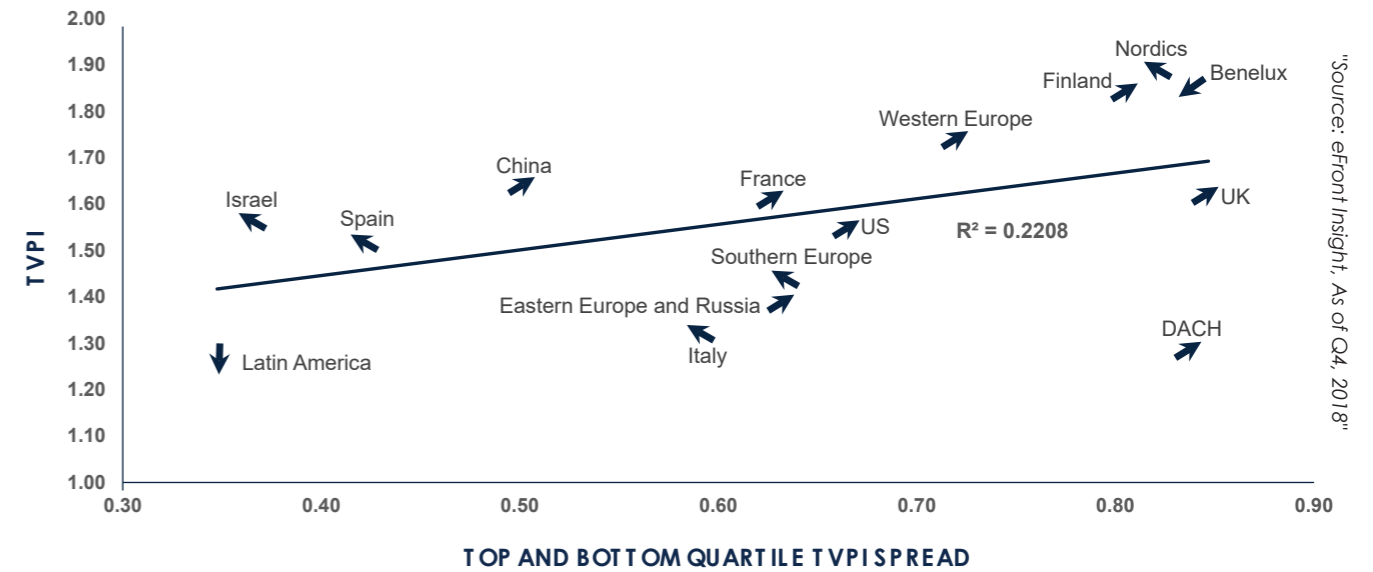
The positive relationship between the 'most frequent' selection risk and performance of fully realized LBO funds is particularly strong, with R-squared of 0.95. Nordic funds confirm their position at the extreme end of the risk-return spectrum, while the major markets can be found on the trend line.

**Figure 20 - Risk (25%) and return (TVPI) of fully realized LBO funds by geographical area**



With regards to active funds, Figure 21 shows that Benelux, Nordic and Chinese funds still offer the most favourable risk-adjusted returns, but also that the active Israeli funds deliver TVPI above 1.55x, while keeping the 'most frequent' selection risk at only 0.37x.

**Figure 21 - Risk (25%) and return (TVPI) of active LBO funds by geographical area**



Southern European, Eastern European and Israeli funds make up the least mature markets in total universe of funds and as such are candidates for significant shifts in performance over a given period of time. During 2018, all listed geographies experienced an increase in the performance of their active funds. Namely, Italian TVPI moved up by 0.12x, Spanish by 0.09x and Israeli by 0.06x.







# | 3. METHODOLOGY



**Fig. 1** is based on Internal rate of return (IRR) as a measure of return performance and the difference between the average IRR of the top 5% performers and the average IRR of the bottom 5% performers as a measure of fund selection risk. For each geographical group of funds of all the vintages available, the average IRR is calculated. This pool of funds includes both active and liquidated funds. In terms of the investment strategy, both LBO and VC funds are represented in the figure. The purpose is to exhibit the risk-return profile of private equity investments in each geographical region. The direction of the arrows points to the change in the risk and return that occurred over 2018. For example, if the size is pointed toward southwest, that indicates that both risk and return in a given region have reduced over the past year. The size of arrows is not indicative of magnitude of the change.

**Fig. 2** is based on Internal rate of return (IRR) as a measure of return performance and the difference between the IRR of the top quartile performer and the IRR of the bottom quartile performer as a measure of fund selection risk. For each geographical group of funds of all the vintages available, the average IRR is calculated. This pool of funds includes both active and liquidated funds. In terms of the investment strategy, both LBO and VC funds are represented in the figure. The purpose is to exhibit the risk-return profile of private equity investments in each geographical region. The direction of the arrows points to the change in the risk and return that occurred over 2018. For example, if the size is pointed toward southwest, that indicates that both risk and return in a given region have reduced over the past year. The size of arrows is not indicative of magnitude of the change.

**Fig. 3** is based on a multiple of invested capital (total value to paid-in, TVPI), defined as the sum of capital distributed and the residual net asset values, in relation to the total amount of capital paid in to the fund up to date. TVPI is used as a measure of the performance of the funds, whereas the difference between the average TVPI of the top 5% performers and the average TVPI of the bottom 5% performers is used as a measure of fund selection risk. For each geographical group of funds of all the vintages available, the average TVPI is calculated. This pool of funds includes both active and liquidated funds. In terms of the investment strategy, both LBO and VC funds are represented in the figure. The purpose is to exhibit the risk-return profile of private equity investments in each geographical region. The direction of the arrows points to the change in the risk and return that occurred over 2018. For example, if the size is pointed toward southwest, that indicates that both risk and return in a given region have reduced over the past year. The size of arrows is not indicative of magnitude of the change.

**Fig. 4** is based on a multiple of invested capital (total value to paid-in, TVPI), defined as the sum of capital distributed and the residual net asset values, in relation to the total amount of capital paid in to the fund up to date. TVPI is used as a measure of the performance of the funds, whereas the difference between the TVPI of the top quartile performer and the TVPI of the bottom quartile performer is used as a measure of fund selection risk. For each geographical group of funds of all the vintages available, the average TVPI is calculated. This pool of funds includes both active and liquidated funds. In terms of the investment strategy, both LBO and VC funds are represented in the figure. The purpose is to exhibit the risk-return profile of private equity investments in each geographical region. The direction of the arrows points to the change in the risk and return that occurred over 2018. For example, if the size is pointed toward southwest, that indicates that both risk and return in a given region have reduced over the past year. The size of arrows is not indicative of magnitude of the change.

**Fig. 5** is based on Internal rate of return (IRR) as a measure of return performance and the difference between the average IRR of the top 5% performers and the average IRR of the bottom 5% performers as a measure of fund selection risk. For each geographical group of funds of all the vintages available, the average IRR is calculated. This pool of funds includes both active and liquidated funds. In terms of the investment strategy, only VC funds are represented in the figure. The purpose is to exhibit the risk-return profile of venture capital strategy investments in each geographical region. The direction of the arrows points to the change in the risk and return that occurred over 2018. For example, if the size is pointed toward southwest, that indicates that both risk and return in a given region have reduced over the past year. The size of arrows is not indicative of magnitude of the change.

**Fig. 6** is based on Internal rate of return (IRR) as a measure of return performance and the difference between the IRR of the top quartile performer and the IRR of the bottom quartile performer as a measure of fund selection risk. For each geographical group of funds of all the vintages available, the average IRR is calculated. This pool of funds includes both active and liquidated funds. In terms of the investment strategy, only VC funds are represented in the figure. The purpose is to exhibit the risk-return profile of venture capital strategy investments in each geographical region. The direction of the arrows points to the change in the risk and return that occurred over 2018. For example, if the size is pointed toward southwest, that indicates that both risk and return in a given region have reduced over the past year. The size of arrows is not indicative of magnitude of the change.

**Fig. 7** is based on the calculated Time-to-liquidity (measured as a function of TVPI and IRR, to extract the time necessary to achieve the second from the first). The purpose is for each geographical group of funds, to identify the time necessary to generate liquidity, whether through exits, dividend recaps, but also write offs and compare it with other geographical groups. Two subsamples of funds are included in the analysis. The first subsample includes the funds of the vintage years (2002-2008) and the second one the funds of the vintage years (2009-2015). In terms of the strategy, only VC funds are represented in the figure.

**Fig. 8** is based on a multiple of invested capital (total value to paid-in, TVPI), defined as the sum of capital distributed and the residual net asset values, in relation to the total amount of capital paid in to the fund up to date. TVPI is used as a measure of the performance of the funds, whereas the difference between the average TVPI of the top 5% performers and the average TVPI of the bottom 5% performers is used as a measure of fund selection risk. For each geographical group of funds of all the vintages available, the average TVPI is calculated. This pool of funds includes both active and liquidated funds. In terms of the investment strategy, only VC funds are represented in the figure. The purpose is to exhibit the risk-return profile of venture capital strategy investments in each geographical region. The direction of the arrows points to the change in the risk and return that occurred over 2018. For example, if the size is pointed toward southwest, that indicates that both risk and return in a given region have reduced over the past year. The size of arrows is not indicative of magnitude of the change.



**Fig. 9** is based on a multiple of invested capital (total value to paid-in, TVPI), defined as the sum of capital distributed and the residual net asset values, in relation to the total amount of capital paid-in to the fund up to date. TVPI is used as a measure of the performance of the funds, whereas the difference between the TVPI of the top quartile performer and the TVPI of the bottom quartile performer is used as a measure of fund selection risk. For each geographical group of funds of all the vintages available, the average TVPI is calculated. This pool of funds includes both active and liquidated funds. In terms of the investment strategy, only VC funds are represented in the figure. The purpose is to exhibit the risk-return profile of venture capital strategy investments in each geographical region. The direction of the arrows points to the change in the risk and return that occurred over 2018. For example, if the size is pointed toward southwest, that indicates that both risk and return in a given region have reduced over the past year. The size of arrows is not indicative of magnitude of the change.

**Fig. 10** is based on the difference between the TVPI of the top quartile performer and the TVPI of the bottom quartile performer, which is used as a measure of fund selection risk, and the Maturity of a fund, which is calculated as a ratio of the capital distributed (distributed to paid-in, DPI) and TVPI. This pool of funds includes both active and liquidated funds. All available vintages are included in the analysis. In terms of the investment strategy, only VC funds are represented in the figure. The purpose is to represent the relation between the maturity of funds in each geographical group and the level of selection risk involved with investing in those funds. The direction of the arrows points to the change in the risk and return that occurred over 2018. For example, if the size is pointed toward southwest, that indicates that both risk and return in a given region have reduced over the past year. The size of arrows is not indicative of magnitude of the change.

**Fig. 11** is based on a multiple of invested capital (total value to paid-in, TVPI), defined as the sum of capital distributed and the residual net asset values, in relation to the total amount of capital paid-in to the fund up to date. TVPI is used as a measure of the performance of the funds, whereas the difference between the TVPI of the top quartile performer and the TVPI of the bottom quartile performer is used as a measure of fund selection risk. This pool of funds is restricted to those that are still active. All available vintages of active funds are included in the analysis. In terms of the investment strategy, only VC funds are represented in the figure. The purpose is to exhibit the risk-return profile of unrealized venture capital funds in each geographical region. The direction of the arrows points to the change in the risk and return that occurred over 2018. For example, if the size is pointed toward southwest, that indicates that both risk and return in a given region have reduced over the past year. The size of arrows is not indicative of magnitude of the change.

**Fig. 12** is based on a multiple of invested capital (total value to paid-in, TVPI), defined as the sum of capital distributed and the residual net asset values, in relation to the total amount of capital paid-in to the fund up to date. TVPI is used as a measure of the performance of the funds, whereas the difference between the TVPI of the top quartile performer and the TVPI of the bottom quartile performer is used as a measure of fund selection risk. This pool of funds is restricted to those that are fully realized. All available vintages of liquidated funds are included in the analysis. In terms of the investment strategy, only VC funds are represented in the figure. The purpose is to exhibit the risk-return profile of fully realized venture capital funds in each geographical region. The direction of the arrows points to the change in the risk and return that occurred over 2018. For example, if the size is pointed toward southwest, that indicates that both risk and return in a given region have reduced over the past year. The size of arrows is not indicative of magnitude of the change.

**Fig. 13** is based on Internal rate of return (IRR) as a measure of return performance and the difference between the average IRR of the top 5% performers and the average IRR of the bottom 5% performers as a measure of fund selection risk. For each geographical group of funds of all the vintages available, the average IRR is calculated. This pool of funds includes both active and liquidated funds. In terms of the investment strategy, only LBO funds are represented in the figure. The purpose is to exhibit the risk-return profile of buyout strategy investments in each geographical region. The direction of the arrows points to the change in the risk and return that occurred over 2018. For example, if the size is pointed toward southwest, that indicates that both risk and return in a given region have reduced over the past year. The size of arrows is not indicative of magnitude of the change.

**Fig. 14** is based on Internal rate of return (IRR) as a measure of return performance and the difference between the IRR of the top quartile performer and the IRR of the bottom quartile performer as a measure of fund selection risk. For each geographical group of funds of all the vintages available, the average IRR is calculated. This pool of funds includes both active and liquidated funds. In terms of the investment strategy, only LBO funds are represented in the figure. The purpose is to exhibit the risk-return profile of buyout strategy investments in each geographical region. The direction of the arrows points to the change in the risk and return that occurred over 2018. For example, if the size is pointed toward southwest, that indicates that both risk and return in a given region have reduced over the past year. The size of arrows is not indicative of magnitude of the change.

**Fig. 15** is based on the calculated Time-to-liquidity (measured as a function of TVPI and IRR, to extract the time necessary to achieve the second from the first). The purpose is for each geographical group of funds, to identify the time necessary to generate liquidity, whether through exits, dividend recaps, but also write offs and compare it with other geographical groups. Two subsamples of funds are included in the analysis. The first subsample includes the funds of the vintage years (2002-2008) and the second one the funds of the vintage years (2009-2015). In terms of the strategy, only LBO funds are represented in the figure.

**Fig. 16** is based on a multiple of invested capital (total value to paid-in, TVPI), defined as the sum of capital distributed and the residual net asset values, in relation to the total amount of capital paid in to the fund up to date. TVPI is used as a measure of the performance of the funds, whereas the difference between the average TVPI of the top 5% performers and the average TVPI of the bottom 5% performers is used as a measure of fund selection risk. For each geographical group of funds of all the vintages available, the average TVPI is calculated. This pool of funds includes both active and liquidated funds. In terms of the investment strategy, only LBO funds are represented in the figure. The purpose is to exhibit the risk-return profile of buyout strategy investments in each geographical region. The direction of the arrows points to the change in the risk and return that occurred over 2018. For example, if the size is pointed toward southwest, that indicates that both risk and return in a given region have reduced over the past year. The size of arrows is not indicative of magnitude of the change.

**Fig. 17** is based on a multiple of invested capital (total value to paid-in, TVPI), defined as the sum of capital distributed and the residual net asset values, in relation to the total amount of capital paid-in to the fund up to date. TVPI is used as a measure of the performance of the funds, whereas the difference between the TVPI of the top quartile performer and the TVPI of the bottom quartile performer is used as a measure of fund selection risk. For each geographical group of funds of all the vintages available, the average TVPI is calculated. This pool of funds includes both active and liquidated funds. In terms of the investment strategy, only LBO funds are represented in the figure. The purpose is to exhibit the risk-return profile of buyout strategy investments in each geographical region. The direction of the arrows points to the change in the risk and return that occurred over 2018. For example, if the size is pointed toward southwest, that indicates that both risk and return in a given region have reduced over the past year. The size of arrows is not indicative of magnitude of the change.



**Fig. 18** is based on a multiple of invested capital (total value to paid-in, TVPI), defined as the sum of capital distributed and the residual net asset values, in relation to the total amount of capital paid-in to the fund up to date and Maturity, which is calculated as a ratio of the capital distributed (distributed to paid-in, DPI) and TVPI. The fund's maturity reflects the portion of the total value generated for the investor that has already been distributed in a form of cash. The pool of funds is restricted to those of the vintage years (2009-2015). In terms of the strategy, only LBO funds are represented in the figure. The purpose is to exhibit the relation between the maturity of the group of funds and their performance. The direction of the arrows points to the change in the risk and return that occurred over 2018. For example, if the size is pointed toward southwest, that indicates that both risk and return in a given region have reduced over the past year. The size of arrows is not indicative of magnitude of the change.

**Fig. 19** is based on the difference between the TVPI of the top quartile performer and the TVPI of the bottom quartile performer, which is used as a measure of fund selection risk, and the Maturity of a fund, which is calculated as a ratio of the capital distributed (distributed to paid-in, DPI) and TVPI. This pool of funds includes both active and liquidated funds. All available vintages are included in the analysis. In terms of the investment strategy, only LBO funds are represented in the figure. The purpose is to represent the relation between the maturity of funds in each geographical group and the level of selection risk involved with investing in those funds. The direction of the arrows points to the change in the risk and return that occurred over 2018. For example, if the size is pointed toward southwest, that indicates that both risk and return in a given region have reduced over the past year. The size of arrows is not indicative of magnitude of the change.

**Fig. 20** is based on a multiple of invested capital (total value to paid-in, TVPI), defined as the sum of capital distributed and the residual net asset values, in relation to the total amount of capital paid-in to the fund up to date. TVPI is used as a measure of the performance of the funds, whereas the difference between the TVPI of the top quartile performer and the TVPI of the bottom quartile performer is used as a measure of fund selection risk. This pool of funds is restricted to those that are fully realized. All available vintages of liquidated funds are included in the analysis. In terms of the investment strategy, only LBO funds are represented in the figure. The purpose is to exhibit the risk-return profile of fully realized buyout funds in each geographical region. The direction of the arrows points to the change in the risk and return that occurred over 2018. For example, if the size is pointed toward southwest, that indicates that both risk and return in a given region have reduced over the past year. The size of arrows is not indicative of magnitude of the change.

**Fig. 21** is based on a multiple of invested capital (total value to paid-in, TVPI), defined as the sum of capital distributed and the residual net asset values, in relation to the total amount of capital paid-in to the fund up to date. TVPI is used as a measure of the performance of the funds, whereas the difference between the TVPI of the top quartile performer and the TVPI of the bottom quartile performer is used as a measure of fund selection risk. This pool of funds is restricted to those that are still active. All available vintages of active funds are included in the analysis. In terms of the investment strategy, only LBO funds are represented in the figure. The purpose is to exhibit the risk-return profile of unrealized buyout funds in each geographical region. The direction of the arrows points to the change in the risk and return that occurred over 2018. For example, if the size is pointed toward southwest, that indicates that both risk and return in a given region have reduced over the past year. The size of arrows is not indicative of magnitude of the change.

# About eFront

---

eFront is the leading pioneer of alternative investment technology, focused on enabling alternative investment professionals to achieve superior performance. With more than 850 Limited Partner, General Partner, and Asset Servicer clients in 48 countries, eFront services clients worldwide across all major alternative asset classes. The eFront solution suite is truly unique in that it completely covers the needs of all alternative investment professionals end-to-end, from fundraising and portfolio construction to investment management and reporting.

For more information, please visit [www.efront.com](http://www.efront.com)

## Learn More

---

[request@efront.com](mailto:request@efront.com)

## Our Offices

---

Abu Dhabi • Beijing • Belgrade • Boston • Cape Town • Cologne • Dubai  
Hong Kong • Jersey • London • Luxembourg • Montreal • Mumbai • New York  
Paris (HQ) • San Francisco • Seoul • Singapore • Tokyo