The Venture Capital and Private Equity Country Attractiveness Index 2018

Ninth Edition

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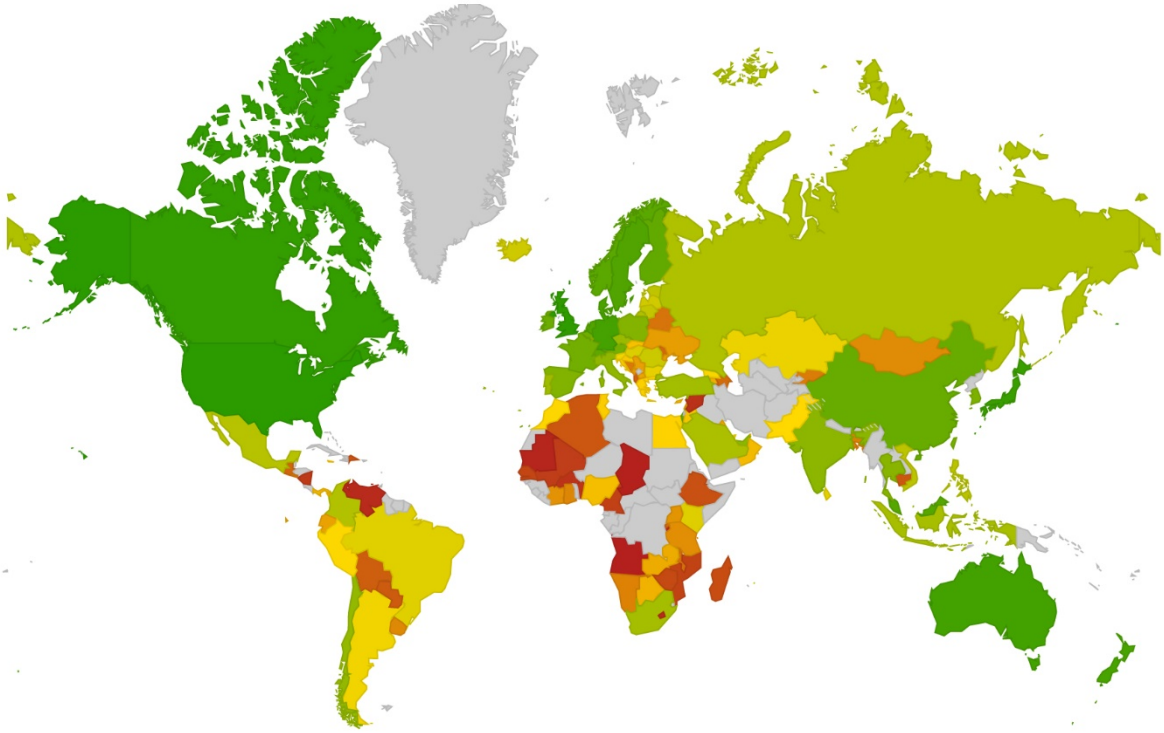

Foreword from the Research Team

We are pleased to present the ninth edition of our Venture Capital and Private Equity Country Attractiveness Index. The index measures the attractiveness of countries for investors in the venture capital (VC) and private equity (PE) asset classes. It provides the most up-to-date aggregated information on the quality of the investment environment and an assessment of the ease of transaction-making in 125 countries.

Although we are aware that the stage of development in many of the covered emerging markets is not yet sufficiently mature to support VC or PE transactions, we expect improvements in the future. We have therefore started tracking these emerging economies and our index illustrates the progress of their investment conditions.

As we did in recent years, we prove that our index corresponds with the actual VC and PE investment activity in our sample of countries. This demonstrates the quality of our composite measure and its value to investors. The high explanatory power of our index for the real VC and PE activity results from exclusively focusing on those factors which really shape the attractiveness of particular VC and PE markets, and weighting them reasonably.

In future editions, selected data series may be substituted by newer or more appropriate ones. Additional data could be added, while other series with poor explanatory power can be deleted. As a result, our composite measure remains a dynamic research product that always takes into account the most relevant and recent data. We believe this index is unique in providing such a broad scope of information on the VC and PE capital market segment. We hope that investors appreciate the information generated to aid their decision-making; while politicians may utilise the index to benchmark their countries and to make improvements to attract international risk capital.

We are very grateful for the support by our Research Assistants Arnau Gil and Florian Linz. They provided substantial effort to update the data and to compile the new index.

Website

Please visit our website http://blog.iese.edu/vcpeindex/ where you can download the pdf of this annual, and find additional information, links to literature, multimedia presentations, and analytical tools for country benchmarking purposes.

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About the Editors

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Alexander Groh is Professor of Finance and Director of the Entrepreneurial Finance Research Centre at EMLYON Business School, France. He has held visiting positions at The University of New South Wales, Sydney, Australia, IESE Business School, Barcelona, Spain, and INSEAD, Fontainebleau, France. His research focuses on VC and PE, and includes performance measurement and socio-economic determinants for the development of vibrant VC and PE markets. His papers have been published in the European Economic Review, the Journal of Banking and Finance, the Journal of Corporate Finance, the Journal of International Money and Finance, the European Financial Management Journal, the Journal of Alternative Investments, the Journal of Real Estate Finance and Economics, the Emerging Markets Review, and in Venture Capital, among others. He was involved in executive education courses for Invest Europe (formerly EVCA), and has worked for Quadriga Capital, a Frankfurt based Private Equity fund, since 1996.

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Heinrich Liechtenstein is Professor of Financial Management at IESE Business School, Barcelona – University of Navarra, Spain. His areas of interest are entrepreneurial finance, Venture Capital and Private Equity, wealth management and families' strategies. He is active in the supervisory and advisory boards of several family holdings and foundations, as well as a private equity firm.

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How to Measure a Country's Attractiveness for Investors in VC and PE Assets

Without being familiar with the socio-economic environment in various host countries, an investor cannot make rational international VC and PE allocation decisions. Investors overcome potential knowledge deficits and gather data to analyse the determinants they deem important before allocating to a particular country. However, this country due diligence is time-consuming and costly. Additionally, the pace of economic development of many emerging countries makes the selection of those that meanwhile support VC and PE activity more and more cumbersome. Our index guides institutional investors to solve the problem of where to allocate their capital. We aggregate and provide the requisite information for international VC and PE allocation decisions. Of course, this information cannot act as a substitute for investors' own efforts to build up country knowledge and experience. It can only facilitate this process and support the initial due diligence stage.

We propose a composite measure that benchmarks the attractiveness of 125 countries to receive institutional VC and PE allocations. Our intention is to serve the investment community, preparing and analysing a large quantity of socio-economic data. However, it is not only the financial community that can benefit from our research, politicians may also conclude that vibrant risk capital markets increase innovation, entrepreneurial activity, economic growth, employment, competitiveness and wealth and hence they may be interested in increasing the supply of risk capital in their countries.

There is a major shift of focus from "traditional" and mature VC and PE markets towards emerging regions. Emerging countries attract investors by high economic growth opportunities. Nevertheless, as we subsequently discuss, growth opportunities are not the only factor that renders countries attractive for VC and PE investments, and it is these broader conditions that motivate our index. The existence of a prospering VC and PE market infrastructure and investment environment requires many socio-economic and institutional prerequisites. We presume that several emerging countries are not yet sufficiently mature in terms of their socio-economic development to support the VC and PE business model. Too early entrance in those countries does not appear to be a beneficial strategy. However, our index tracks the countries' socio-economic and institutional development and reveals improvements. This allows investors to better observe foreign markets and to recognise good timing for allocations.

What are Institutional Investors' International VC and PE Allocation Criteria?

Our index addresses the first level of investors' concerns from a top-down perspective and evaluates countries with respect to socio-economic criteria for international VC and PE allocation. These criteria assess, in the first instance, the determination of local demand for VC and PE and second, the expectation of an efficient deal-making environment which allows matching with the supplied capital. Further levels of the allocation process include the selection of particular fund management teams. Thereby, the investors evaluate the general partners' competencies, their track records and other parameters in their fund due diligence before committing to a general partner.[1] However, these criteria cannot be considered in our index because they depend on individual cases, personal judgment and mostly undisclosed data.

Institutional investors communicated to us that levels of valuation are also important for their decisions. Unfortunately, we cannot compare valuation levels across countries for two major

[1] For more details please refer to Groh, Alexander and Liechtenstein, Heinrich (2011): The First Step of the Capital Flow from Institutions to Entrepreneurs: The Criteria for Sorting Venture Capital Funds, European Journal of Financial Management, Vol. 17, Issue 3, 2011, pp. 532-559. Related working papers are available on http://blog.iese.edu/vcpeindex/.

reasons. First, there is too little information provided on transaction multiples. Second, multiples reflect the relationship between the expected growth in certain industries (and countries) and the opportunity cost of capital. It is impossible to estimate these parameters and to find a common benchmark for all of our sample countries. Instead, we need to take a practical approach and assess the expected deal opportunities arising from the socio-economic environment in a country without addressing valuation levels. Investors will need to enrich our assessment with their own knowledge and expectations about deal values.

Our index summarises factors that shape national VC and PE markets into one single composite measure. The determinants of vibrant VC and PE markets have been extensively studied in academic literature. We reviewed this literature and collect data for our index spanning several years to verify these studies and actually contribute to a better understanding of the drivers of international VC and PE activity. With every subsequent index edition, we become more confident in our ability to assess the right criteria for VC and PE investors. These criteria are derived from the research on the topic that we group into six sub-headings. These sub-headings illustrate the structure of our index as each presents one of six "key drivers" of country attractiveness for investors in VC and PE assets:

1. Economic Activity,
2. Depth of Capital Market,
3. Taxation,
4. Investor Protection and Corporate Governance,
5. Human and Social Environment, and
6. Entrepreneurial Culture and Deal Opportunities.

These key drivers define a subset of criteria we need to assess for our sample countries in order to aggregate our index.[2]

Importance of Economic Activity

Evidently, the state of a country's economy affects its VC/PE attractiveness. An economy's size and employment levels are proxies for prosperity, the number and diversity of corporations and general entrepreneurial activity, and therefore also for expected VC and PE deal flow. Economic growth expectations require investments and provide the rationale to enter many emerging countries. Gompers and Lerner (1998) argue that more attractive VC and PE investment opportunities exist if an economy is growing quickly. Romain and van Pottelsberghe de la Potterie (2004) find that VC/PE activity is cyclical and significantly related to GDP growth. Wilken (1979) highlights the fact that economic prosperity and development facilitate entrepreneurship, as they provide a greater accumulation of capital for risky investments. The number of new ventures that qualify for VC backing is related to societal wealth, not solely because of generally better access to financing, but also because of higher income among potential customers in the domestic market. Economic size and growth are certainly very important criteria to assess expected deal opportunities and VC/PE country attractiveness. However, economic growth itself is also a result of many other criteria which we discuss within the subsequent key drivers.

Importance of Depth of Capital Market

Black and Gilson (1998) discuss major differences between bank-centred and stock market-centred capital markets. They argue that well-developed stock markets, which allow general partners to exit via IPOs, are crucial for the establishment of vibrant VC/PE markets. In general, bank-centred capital markets are less able to produce an efficient infrastructure of institutions that support VC/PE deal-making. They affirm that it is not only the strong stock market that is missing in bank-centred capital markets; it is also the secondary institutions in place, including bankers' conservative approach to lending and investing, and the social and financial incentives that reward entrepreneurs less richly (and penalise

[2] For a comprehensive review please refer to Groh, Alexander, Liechtenstein, Heinrich and Lieser, Karsten (2010): The European Venture Capital and Private Equity Country Attractiveness Indices, Journal of Corporate Finance, Volume 16, Issue 2, April 2010, pp. 205 – 224.

failure more severely), that compromise entrepreneurial activity. Jeng and Wells (2000) stress that IPO activity is the main force behind cyclical VC and PE swings because it directly reflects the returns to investors. Kaplan and Schoar (2005) confirm this. Similar to Black and Gilson (1998), Gompers and Lerner (2000) point out that risk capital flourishes in countries with deep and liquid stock markets. Similarly, Schertler (2003) uses the capitalisation of stock markets or the number of listed companies as measures for stock market liquidity and finds that they significantly impact VC and PE investments.

As well as the disadvantages of bank-centred capital markets, Greene (1998) emphasizes that low availability of debt financing is an obstacle for economic development, especially for start-up activity in many countries. Corporations and entrepreneurs need to find backers — whether banks or VC/PE funds — who are willing to bear risk. Cetorelli and Gambera (2001) provide evidence that bank concentration promotes the growth of those industrial sectors that have a higher need for external finance by facilitating credit access to companies.

To summarise, the state of a country's capital market evidently affects its VC and PE activity. There is a direct link between the quoted capital market, banking activity and the unquoted segment. Banks are required for transaction financing and credit facilities. The size of the IPO market indicates the potential for the preferred exit channel and IPOs likewise spur entrepreneurial spirit because they reward entrepreneurs. This may be considered as analogous to the size of the M&A market, which also incentivises entrepreneurial managers and presents the second preferred VC/PE divestment channel, as well as deal sourcing opportunities. Therefore, the liquidities of the M&A, banking, and public capital markets provide good proxies for the VC and PE segment because they assess the quality of the VC and PE deal-making infrastructure. In countries with a strong public capital market, M&A, and banking activity, we also find the professional institutions, such as investment banks, accountants, lawyers, M&A boutiques or consultants, which are essential for successful VC and PE deal-making.

Importance of Taxation

Bruce (2000 and 2002), and Cullen and Gordon (2002) reveal that tax regimes matter for business entry and exit. Djankov et al. (2008) show that direct and indirect taxes affect entrepreneurial activity. Poterba (1989) builds a decision model showing the advantages of becoming an entrepreneur, driven by taxation incentives. Bruce and Gurley (2005) explain that increases in personal income tax can raise the probability of becoming an entrepreneur: large differences between personal income tax rates and corporate tax rates provide an incentive for start-up activity.

While it is much discussed in economic literature and reasonable to predict that taxation of income drives corporate activity and new venture creation, it is more difficult to detect a direct link with VC and PE investments. There are countries with relatively high corporate income tax rates but also very large VC and PE investments at the same time. On the other hand, there are many (especially emerging) countries with low corporate tax rates where no remarkable VC and PE investments are reported. In general, developed countries have higher tax brackets, but also more VC and PE investments. This signals that the levels of taxes themselves do not strongly affect VC and PE activity. It also points to the characteristic reliance of the VC and PE asset classes on tax transparent fund and transaction structures that neutralise the differentials across tax regimes. Therefore, we focus on the incentives for new venture creation provided by the spread between personal and corporate income tax rates as suggested by Bruce and Gurley (2005) and reward tax regimes with low administrative burdens and requirements in our index. However, since these tax aspects are more important for start-up activity, and hence for the VC segment, we assign a low weight to this key driver and do not use it to assess attractiveness in the PE-only index as subsequently discussed.

Importance of Investor Protection and Corporate Governance

Legal structures and the protection of property rights strongly influence the attractiveness of VC and PE markets. La Porta et al. (1997 and 1998) confirm that the legal environment determines the size and extent of a country's capital market and local companies' ability to receive outside financing. They emphasize the differences between statutory law and the quality of law enforcement. Roe (2006) discusses and compares the political determinants of corporate governance legislation for the major economies and focuses on the importance of strong shareholder protection to develop a vibrant capital market. Glaeser et al. (2001) and Djankov et al. (2003 and 2005) suggest that parties in common-law countries have greater ease in enforcing their rights from commercial contracts.

Cumming et al. (2006) find that the quality of a country's legal system is even more closely related to facilitating VC/PE backed exits than the size of a country's stock market. Cumming et al. (2009) extend this finding and show that cross-country differences in legality, including legal origin and accounting standards, have a significant impact on the governance of investments in the VC/PE industry. Desai et al. (2006) show, that fairness and property rights protection largely affect growth and the emergence of new enterprises. Cumming and Johan (2007) highlight the perceived importance of regulatory harmonisation with respect to investors' commitments to the asset class. La Porta et al. (2002) find a lower cost of capital for companies in countries with better investor protection, and Lerner and Schoar (2005) confirm these findings. Johnson et al. (1999) show that weak property rights limit the reinvestment of profits in start-up companies. Finally, and more broadly, Knack and Keefer (1995), Mauro (1995), and Svensson (1998) demonstrate that property rights significantly impact investments and economic growth.

The numerous studies cited above illustrate the importance of the quality of a country's legal system for its capital market, be it in terms of the quoted or unquoted segment. Nevertheless, what is important for financial claims is equally valid for any claim in the corporate world. Doing business becomes costly without proper legal protection and enforcement possibilities. VC and PE are strongly exposed to this circumstance because they are based on long-term relationships with institutional investors, where the investment source and host countries can be distant and different. Investors rely on their agents, and the general partners themselves rely on the management teams they back. If investors are not confident that their claims are well protected in a particular country, they refuse to allocate capital.

Importance of Human and Social Environment

Black and Gilson (1998), Lee and Peterson (2000), and Baughn and Neupert (2003) argue that cultures shape both individual orientation and environmental conditions, which may lead to different levels of entrepreneurial activity. Megginson (2004) argues that, in order to foster a growing risk capital industry, education with respect to schools, universities and research institutions plays an important role.

Rigid labour market policies negatively affect the evolution of a VC/PE market. Lazear (1990) and Blanchard (1997) discuss how protection of workers can reduce employment and growth. It is especially important for start-up and medium-size corporations to respond quickly to changing market conditions. Black and Gilson (1998) argue that labour market restrictions influence VC/PE activity, though not to the same extent as the stock market.

Djankov et al. (2002) investigate the role of several societal burdens for start-ups. They conclude that the highest barriers and costs are associated with corruption, crime, a larger unofficial economy and bureaucratic delay. This argument is of particular importance in some emerging countries with high perceived levels of corruption.

Importance of Entrepreneurial Culture and Deal Opportunities

The expectation regarding access to viable investments is probably the most important factor for international risk capital allocation decisions. Particularly for the early stage segment, we expect the number and volume of investments to be related to the innovation capacity and research output in an

economy. Gompers and Lerner (1998) show that both industrial and academic research and development (R&D) expenditure significantly correlates with VC activity. Kortum and Lerner (2000) highlight that the growth in VC fundraising in the mid-1990s may have been due to a surge of patents in the late 1980s and 1990s. Schertler (2003) emphasizes that the number of both R&D employees and patents, as an approximation of the human capital endowment, has a positive and highly significant influence on VC activity. Furthermore, Romain and von Pottelsberghe de la Potterie (2004) find that start-up activity interacts with the R&D capital stock, technological opportunities and the number of patents. However, innovations and R&D are not only important for early stage VC investments. Without modernisation and sufficient R&D, it will be impossible for established businesses to maintain brand names and strong market positions, factors which attract later stage PE investors.

Despite the innovative output of a society, Djankov et al. (2002), and Baughn and Neupert (2003) argue that bureaucracy in the form of excessive rules and procedural requirements, multiple institutions from which approvals are needed and cumbersome documentation requirements, may severely constrain entrepreneurial activity. Lee and Peterson (2000) stress that the time and money required to meet such administrative burdens may discourage new venture creations.

Summary on the Determinants of Vibrant VC and PE Markets

The research papers emphasise the difficulty of identifying the most appropriate parameters for our index. There is no consensus about a ranking of the criteria. While some parameters are more comprehensively discussed, and certainly of high relevance, it remains unclear how they interact with others. For example, it is arguable whether the VC/PE activity in a country with a high quality of investor protection is affected more by the liquidity of its stock market or by its labour regulations.

While an IPO exit is, in principle, possible at any stock exchange in the world, the labour market frictions in a particular country can hardly be evaded. On the other hand, many of the criteria are highly correlated with each other. Black and Gilson (1998) call it a “chicken and egg” problem: it is impossible to detect which factor causes the other. One line of argument is that modern, open and educated societies develop a legislation that protects investors’ claims, which favours the output of innovation and the development of a capital market. This leads to economic growth and to demand for VC and PE. However, the causality might be the reverse: economic growth spurs innovation and the development of modern educated societies. There is a third suggestion: only competitive legal environments allow the development of the societal requirements that support innovations, economic growth, the capital market, and VC and PE activity. Finally, there is a fourth alternative, which may also be relevant: low taxes attract investors who provide financing for growth which in turn leads to modern and educated societies.

All lines of argument are reasonable and validated by the economic development of selected countries in different historic periods. Nevertheless, it seems to be the combination of all these factors which need to be improved in parallel to increase VC and PE attractiveness of countries and regions. For this reason, we do not rely on a selection of only a small number of parameters. For a country to receive a high index rank, it needs to achieve a high score on all of the individual criteria. Therefore, we propose a structure of the discussed determinants to achieve a comprehensive result and to facilitate interpretation. Firstly, we differentiate the six key drivers: economic activity, depth of the capital market, taxation, investor protection and corporate governance, human and social environment, and entrepreneurial culture and deal opportunities. We then confirm their choice via a survey of institutional investors, reported in Groh and Liechtenstein (2009) and (2011), and base our index structure upon them. Unfortunately, none of these six key drivers is directly measurable, so we seek data series that adequately express their character. Hence, we try to find best proxies for the aforementioned drivers of VC/PE attractiveness. One constraint is that these proxies must be available for a large number of countries.

Building the 2018 Index

Assessing Six Latent Key Drivers

The most important principle of our index is to assess the six latent drivers of VC/PE attractiveness:

1. Economic Activity,
2. Depth of Capital Market,
3. Taxation,
4. Investor Protection and Corporate Governance,
5. Human and Social Environment, and
6. Entrepreneurial Culture and Deal Opportunities.

Latent drivers are criteria that are not directly observable, but driven by others which can be measured. For example, we assume in a first step that the VC/PE attractiveness of a country is determined by six key drivers. Nevertheless, as pointed out, the key drivers themselves are not measurable but need to be estimated. For example, ideally the quality of the deal-making environment in a country would be expressed by the number of investment banks, M&A boutiques, law firms, accountants and consultants. Unfortunately, while it might be possible to obtain these data for a selected number of developed countries, such data does not exist on a global scale. Our only alternative is to gather more general information, for example on the level of debt provided by the banking sector, or estimates about the perceived sophistication of the financial system. We submit that these criteria affect the latent key driver, the depth of the capital market. Even if they are not perfect proxies, we maintain that in countries where these criteria are better developed, the capital market will be deeper and more deal-supporting institutions will exist to facilitate VC and PE activity. Hence, we assess the latent key driver with observable data. This principle is maintained at all individual levels for the index construction. An unobservable criterion is assessed with several proxy parameters. In principle, we measure the attractiveness of a country by the six key drivers but use many more proxies for their assessment. We always use several proxies so as not to be reliant on single individual data series which might be biased by different gathering procedures across the countries or by insufficient reporting.

How We Disaggregate the Six Key Drivers

In accordance with the principle of assessing latent key drivers with observable data, we disaggregate each key driver into sub-categories. These sub-categories are either individual data series or, again, latent drivers dependent on determinants that we name “level-2 constructs.” For example, as documented in Exhibit 1, we split the key driver “2. Depth of the capital market” into seven sub-categories:

2. Depth of Capital Market

2.1 Size of the Stock Market,

2.2 Stock Market Liquidity (Trading Volume),

2.3 IPOs and Public Issuing Activity,

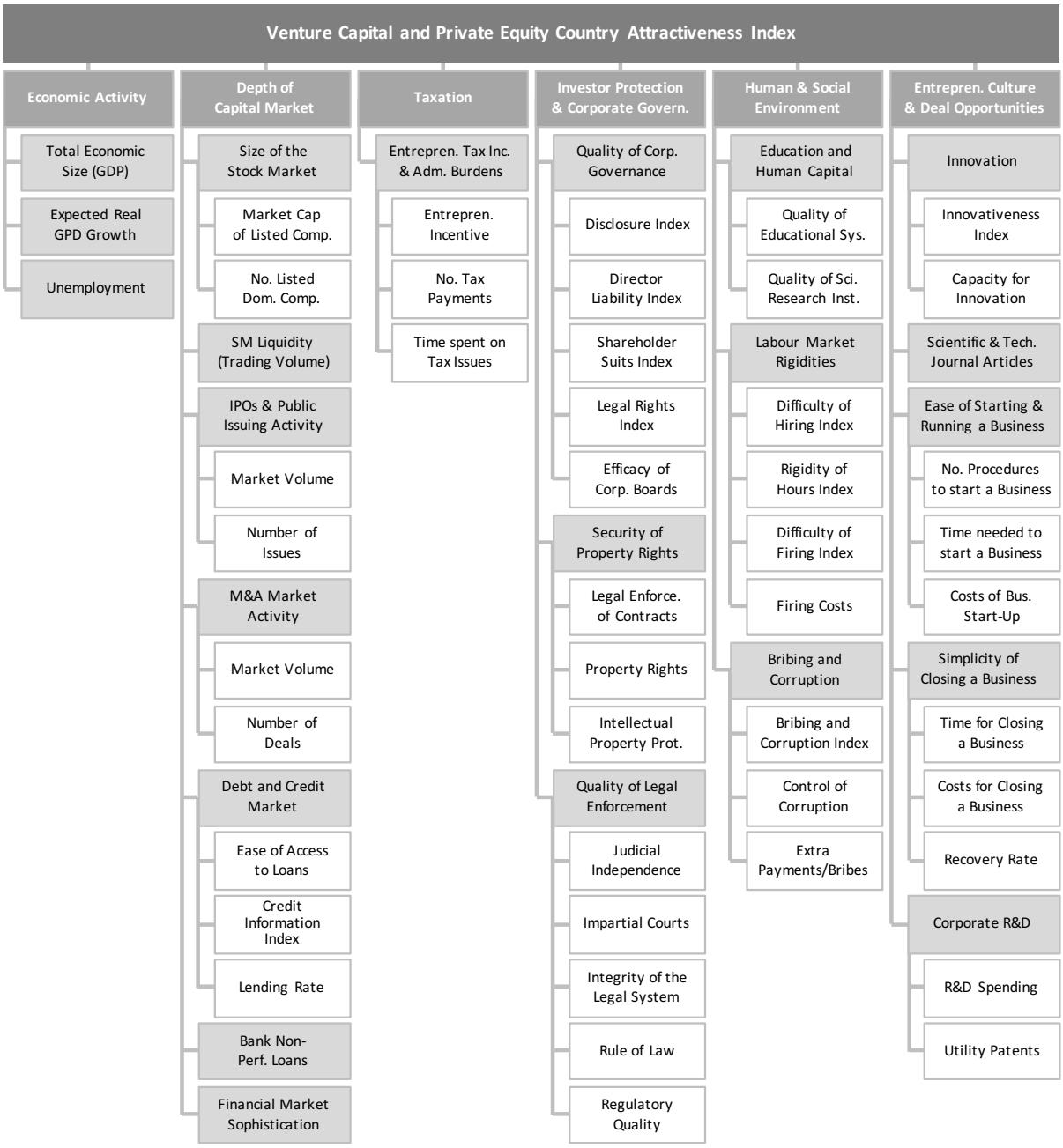
2.4 M&A Market Activity,

2.5 Debt and Credit Market,

2.6 Bank Non-Performing Loans to Total Gross Loans, and

2.7 Financial Market Sophistication.

Exhibit 1: The VC and PE Country Attractiveness Index – Construction Scheme



Data series 2.2 and 2.6 are provided by the World Bank and data series 2.7 results from a survey initiated by the World Economic Forum (WEF). However, the other indicators are constructs themselves. For instance, we assess "2.3 IPOs & Public Issuing Activity" by volume and by number of issues. This approach has two major advantages. First, individual data series do not gain too much weight when they are grouped, and this limits the impact of outliers. Second, the overall results can be traced to more granulated levels which provide complete transparency and better interpretation.

The Weighting Scheme

We spent a great deal of effort refining the statistical analyses and optimising the structure for our first two index editions.[3] We keep this optimised structure and apply equal weights for all data series when we aggregate them to the level-2 constructs and equal weights for the level-2 constructs to aggregate them on the next higher level of the six key drivers. Finally, the individual weights for the six key drivers depend on the number of their level-2 constructs. For example, "1. Economic Activity" consists of three level-2 constructs, "2. Depth of Capital Market" of seven, while "3. Taxation" consists of only one. Overall, we use 22 level-2 constructs for our index, and hence, "1. Economic Activity" receives a weight of 3/22, which is 0.136, while the weight of "2. Depth of Capital Market" is 7/22, which is 0.318, and for "3. Taxation" it is 1/22 =0.046, respectively.

The advantage of this weighting scheme is that the key drivers which include more level-2 constructs, and hence data series, gain more weight. First, this represents their actual importance for VC and PE attractiveness as revealed by our own analyses and second, we diminish the effect of potential outliers in our data. This final index structure results from substantial prior optimisation effort. We find that any statistically "more sophisticated" technique does not improve the index quality. The weighting scheme assigns appropriate emphasis according to the explanatory power of the individual key drivers. We will return to this topic in a later section of this annual.

Separate VC and PE Indices

To account for differences with respect to the two market segments, VC vs. PE, we propose three related indices. The first one combines both segments (VC/PE). The second focuses on early stage VC only and the third index on later stage PE. The combined index includes all data series proposed in Appendix 1, while we discard the data series that are less important for either of the two market segments when calculating the individual VC and PE indices.

For the VC index, we consider the level-2 construct "2.5 Debt & Credit Market" to be of minor importance and hence, discard it. We also delete "2.6 Bank Non-Performing Loans to Total Gross Loans" and "2.7 Financial Market Sophistication" from the VC index.

For the PE index, we discard key driver "3. Taxation," because the criteria considered are barely relevant for later-stage PE. Similarly, we drop "5.1 Education & Human Capital" from the human and social environment key driver and keep only "6.5 Corporate R&D" to assess the deal opportunities related to proprietary research output of corporations.

The weights for the individual index items in the separate VC and PE indices are determined in the same way, and this leads to changes of some of the key driver weights. The results are highlighted on the individual country pages subsequent in this annual.

Appendix 1 shows the data series, the level-2 constructs and the weights for the combined VC/PE, and the separate VC-only and PE-only indices. The weights are presented with respect to the next aggregation level. Hence, "1.1 Size of the Economy", "1.2 Expected Real GDP Growth" and "1.3 Unemployment" receive each a weight of 33.3% when determining the Economic Activity key driver. The key driver itself has an importance of 13.6% for the aggregation of the overall VC/PE

[3] Details about the applied statistical procedures to determine weights for the data series are provided in our paper Groh, Alexander, Liechtenstein, Heinrich and Lieser, Karsten (2010): The European Venture Capital and Private Equity Country Attractiveness Indices, Journal of Corporate Finance, Volume 16, Issue 2, April 2010, pp. 205 – 224. Related working papers are available at http://ssrn.com/author=330804.

index. We provide more information about the aggregation technique in the appendix.

Changes with Respect to the Prior Index Version

The index structure remained unchanged.

Country Coverage

We aim to cover as many countries as possible, and the inclusion of a particular country is dependent only on data availability. Since our first index edition, the availability and quality of data has continuously improved so that we can now include 125 countries

Region*	Countries
Africa (31)	Algeria, Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Chad, Côte d'Ivoire, Egypt, Ethiopia, Ghana, Kenya, Lesotho, Madagascar, Malawi, Mali, Mauritania, Mauritius, Morocco, Mozambique, Namibia, Nigeria, Rwanda, Senegal, South Africa, Tanzania, Tunisia, Uganda, Zambia, Zimbabwe
Asia (22)	Armenia, Azerbaijan, Bangladesh, Cambodia, China, Hong Kong, India, Indonesia, Japan, Kazakhstan, Korea South, Kyrgyzstan, Malaysia, Mongolia, Pakistan, Philippines, Russia, Singapore, Sri Lanka, Taiwan, Thailand, Vietnam
Australasia (2)	Australia, New Zealand
Eastern Europe (21)	Albania, Belarus, Bosnia-Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Georgia, Hungary, Latvia, Lithuania, Macedonia, Moldova, Montenegro, Poland, Romania, Slovakia, Slovenia, Turkey, Ukraine, Serbia
Latin America (17)	Argentina, Bolivia, Brazil, Chile, Colombia, Dominican Republic, Ecuador, El Salvador Guatemala, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay, Venezuela
Middle East (10)	Bahrain, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syria, United Arab Emirates
North America (2)	United States, Canada
Western Europe (20)	Austria, Belgium, Cyprus, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom

* Number of countries covered in parentheses.

The 2018 VC and PE Country Attractiveness Ranking

We gathered the individual data series in Appendix 1 for all our sample countries from 2000 onwards to most recent data retrieved including the expected economic growth rates for 2018. We calculate the 2018 outlook and find that the US remains the most attractive country for VC and PE allocations, retaining its ranking from all previous index editions. We rescaled the US score to 100.[4] Its two followers, the United Kingdom and Canada, achieved rescaled scores of 94.4% and 92.6% respectively. Hence, both countries lost compared to the US and to the previous ranking. This results from a widening gap of the expected economic growth rates between the US and the UK and some deterioration of corporate governance indicators of Canada. A majority of economists expect financial market activity in the UK and trading between the UK and Continental Europe to be negatively impacted by the referendum to exit the European Union. The Brexit decision is not yet reflected in the current socio-economic figures (with the exception of a moderately lower economic outlook) but gives rise to a detailed analysis in a subsequent section of this annual how Brexit might affect the UK's attractiveness for institutional VC and PE investors.

Table 1 presents the ranking of The VC and PE Country Attractiveness Index 2018. The table is open to debate. Some readers might argue that particular countries are ranked too high, others too low. However, we note that the index ranking is the result of commonly available, transparent, aggregated socio-economic data, which describes relevant characteristics for investors in VC and PE assets. The results can be traced to the level of the individual data series, and hence, can be reconciled. We are aware that there are several countries, e.g. among the BRICS or other emerging markets which currently receive strong investor attention and record levels of VC and PE activity. One could criticize our index ranking which hardly reflects this trend. It is certain that the capital absorption capacity in many emerging markets allows quick transaction making and large volumes. We could be attempted to increase the weight of GDP growth or of the economic activity key driver to reflect investors' appreciation of these fast-growing markets. However, we note that our weights are an optimized result of comprehensive cross sectional and longitudinal analyses (as we show subsequently). Increasing the weight of GDP growth, for example, can produce awkward rankings which do not correspond with the fact that many of the "traditional" markets still provide the best deal making, value adding, and exit opportunities for VC and PE investors. It is not evident from today's perspective that the shift of investors' attention towards emerging countries will result in increased levels of successful transactions on the long run, and hence, satisfying returns to investors in the future. Our index assesses a "probability for success" from the institutional and socio-economic perspective. This probability increases with better developed key driving forces as we defined them above, and vice versa.

Please note that the underlying data is the most recent information available. Hence, we show the current attractiveness ranking including the economic outlook for 2018 and invite investors and advisers to enrich the information with their own knowledge, experience and expectations when drawing their conclusions on allocation.

[4] We explain the rescaling procedure in the appendix.

Table 1: The Venture Capital and Private Equity Country Attractiveness Ranking 2018

Country	Rank	Score
United States	1	100,0
United King dom	2	94,4
Canada	3	92,6
Hong Kong	4	91,2
Japan	5	91,2
Singapore	6	90,7
Australia	7	90,2
Germany	8	87,7
New Zealand	9	87,2
Denmark	10	84,3
Sweden	11	83,3
Netherlands	12	83,3
Malaysia	13	83,1
Norway	14	83,0
Switzerland	15	82,2
Finland	16	82,2
Israel	17	81,8
China	18	80,7
Ireland	19	79,7
Belgium	20	79,6
France	21	79,0
Austria	22	76,9
Taiwan	23	76,9
Korea, South	24	76,2
Spain	25	73,4
Poland	26	72,4
Thailand	27	72,2
India	28	72,2
United Arab Emirates	29	69,1
Italy	30	68,9
Chile	31	68,1
Luxembourg	32	67,1
Czech Republic	33	65,7
Portugal	34	65,6
Turkey	35	65,2
South Africa	36	64,8
Indonesia	37	64,3
Saudi Arabia	38	64,3
Russian Federation	39	63,5
Colombia	40	63,3
Mexico	41	62,8
Philippines	42	61,3
Vietnam	43	60,7
Estonia	44	60,2
Lithuania	45	59,5
Malta	46	59,4
Romania	47	59,0
Iceland	48	58,6
Latvia	49	58,2
Bahrain	50	57,9
Mauritius	51	57,8
Hungary	52	57,7
Kenya	53	57,6
Brazil	54	57,4
Sri Lanka	55	57,3
Bulgaria	56	57,1
Kazakhstan	57	56,3
Argentina	58	56,2
Slovenia	59	54,7
Qatar	60	54,5
Georgia	61	53,7
Peru	62	53,2
Pakistan	63	53,2
Morocco	64	52,9
Egypt	65	52,7
Greece	66	51,9
Tunisia	67	51,8
Croatia	68	51,8
Jamaica	69	51,5
Jordan	70	50,8
Slovakia	71	50,5
Nigeria	72	50,1
Oman	73	49,6
Panama	74	49,0
Cyprus	75	48,5
Botswana	76	48,4
Armenia	77	48,1
Zambia	78	45,4
Kuwait	79	45,3
Macedonia	80	45,3
Ecuador	81	45,2
Serbia	82	44,9
Ukraine	83	44,3
Lebanon	84	43,9
Montenegro	85	42,5
Uganda	86	42,0
Ivory Coast	87	42,0
Tanzania	88	41,8
Mongolia	89	41,8
Uruguay	90	41,7
Ghana	91	40,4
Namibia	92	37,5
Bangladesh	93	37,4
Kyrgyzstan	94	36,8
Bosnia-Herzegovina	95	34,8
El Salvador	96	34,6
Belarus	97	33,9
Malawi	98	32,1
Rwanda	99	29,9
Azerbaijan	100	29,7
Moldova	101	29,4
Guatemala	102	28,3
Albania	103	27,9
Bolivia	104	27,8
Paraguay	105	27,5
Cambodia	106	27,5
Algeria	107	27,2
Dominican Republic	108	26,6
Ethiopia	109	23,5
Madagascar	110	23,4
Zimbabwe	111	23,1
Senegal	112	22,6
Mozambique	113	22,2
Cameroon	114	22,1
Mali	115	20,5
Nicaragua	116	20,4
Benin	117	18,5
Burkina Faso	118	17,5
Syria	119	15,3
Lesotho	120	15,3
Venezuela	121	13,5
Burundi	122	13,5
Mauritania	123	12,6
Chad	124	11,5
Angola	125	11,4

The Regional VC and PE Attractiveness Landscape

Our methodology allows calculating regional key driver scores as presented in Table 2. Note that these regional scores are not computed as "simple averages". They result from weighting the individual data series of the countries corresponding to a particular region either by GDP or population, whatever is more appropriate. We realize that the higher ranked core markets (North America, Australasia and Western Europe) have consistently better developed key drivers with the exception of economic activity. The table also reveals particular weaknesses of emerging (Asia, Middle East and Eastern Europe) and frontier markets (Latin America and Africa) with respect to their capital market depth, investors' protection, their human and social environment, and related to that, innovation driven entrepreneurial and deal opportunities. We stress again that "Taxation" does not measure the levels of marginal corporate or capital gains tax rates. The key driver rather assesses incentives for entrepreneurship resulting from the differential of the personal and corporate income tax rates and the administrative burdens when determining and paying taxes.

Table 2: Regional VC and PE Attractiveness Landscape

Region	VC/PE Index	Economic Activity	Depth of Capital Market	Taxation	Investor Protection and Corporate Governance	Human and Social Environment	Entrepreneurial Culture and Deal Opportunities
1. North America	96,8	95,4	96,5	103,2	99,0	99,6	94,1
2. Australasia	89,2	84,8	82,8	107,8	104,6	98,5	83,9
3. West. Europe	78,7	78,5	70,6	112,7	85,3	83,0	78,9
4. Asia	69,1	88,8	65,1	95,9	69,6	61,0	64,9
5. Middle East	60,5	71,1	54,6	93,2	64,1	65,3	53,8
6. Eastern Europe	57,5	73,8	45,7	100,1	63,2	58,6	57,2
7. Latin America	51,5	72,0	45,9	88,6	53,0	46,5	46,2
8. Africa	43,0	62,9	31,2	82,8	54,8	46,1	39,0

Historic comparison and allocation recommendations

In order to demonstrate shifts in the VC and PE country attractiveness, we perform comparison of the 2014 and 2018 rankings. Exhibit 2 shows the current country ranks (ordinate) and the historic rank changes (abscissa - positive to the right and negative to the left) between the two indices. It provides interesting insights and reveals strong increases of VC and PE attractiveness for certain countries, and the impact of financial and economic crises on others. However, instead of discussing individual countries here in length, we would like to refer the interested reader to our website where this exhibit is directly linked with the detailed country profiles and additional analytic tools.

It should be stressed that according to the methodology of the index calculation, every country's score is calculated relative to all other sample countries. This means that those countries which gained or lost ranking positions did not necessarily improve or worsen their investment conditions in absolute terms. They may simply have outperformed or been outperformed by others in the international competition to attract capital resources.

Exhibit 2: Current Ranks and Rank Changes between Index Version 2014 and 2018

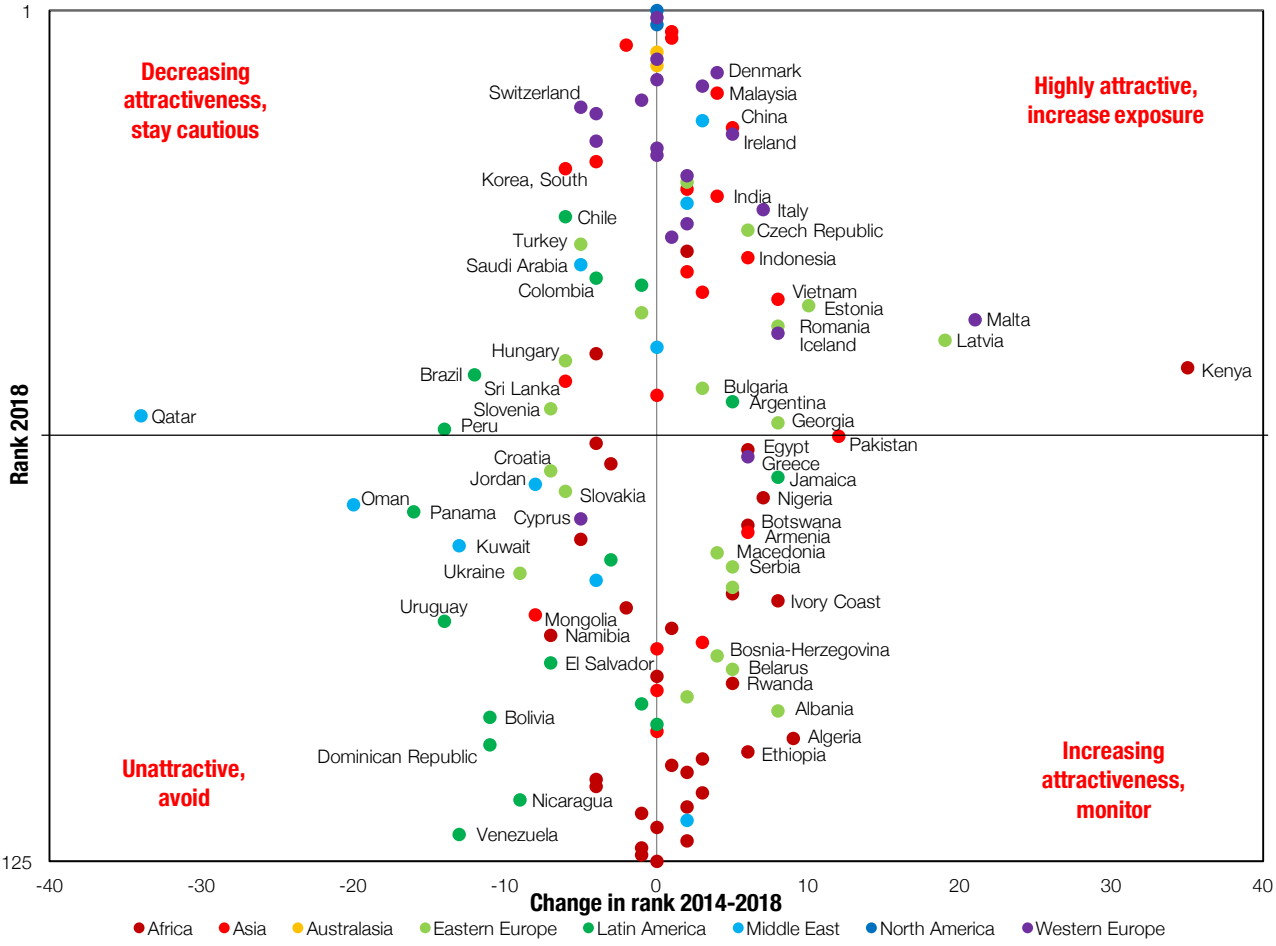


Exhibit 2 allows valuable insights interpreting the four quadrants of the graph. Obviously, all countries on the left-hand side of the exhibit should be carefully observed by investors, in particular the lower their current rank. It seems reasonable to recommend to investors avoidance of the countries in the lower left quadrant. Contrarily, we see the promising development of the countries to the right-hand side of the ordinate. The countries in the right upper quadrant can be considered highly attractive investment hosts. The lower right corner groups the countries with increasing but yet moderate levels of attractiveness. The further down we get in the graph the lower the maturity of these countries to support VC and PE transactions. However, investors should stay alert not to miss the right time to enter.

For more information and comparisons, we refer to the individual country profiles on our website http://blog.iese.edu/vcpeindex/ where additional graphs, analyses, and benchmarking tools are available.

VC and PE Attractiveness of the UK after Brexit

Brexit will affect the attractiveness of the UK for institutional investors in VC and PE assets. In addition to the direct regulatory burden and the resulting cost to receiving access to the EU single market as an alternative fund manager, Brexit is expected to have severe consequences on the UK's economic growth, her trading with the EU and on the dominance of London as financial hub for Europe. Newspaper headlines about important financial market players shifting staff or opening new offices in Amsterdam, Frankfurt or Paris proliferate. Real estate and prices for services adapt progressively to the new clientele in the host cities. Hence, Brexit has already begun and has its consequences. The shift of qualified staff and branches improves the deal making capacity and the quality of supporting institutions in the latter cities. This will increase their attractiveness in the global competition.

A large number of economists have estimated the effect of Brexit on the UK's economic growth and employment. Nearly all of them conclude that there will be a long-term loss of GDP compared with the status quo projections of remaining fully in the EU and its single market. The range of estimates is large. However, the impact may even be as high as a loss of almost ten percentage points of GDP until 2030 in estimates of the Centre of Economic Performance at the London School of Economics or the UK Treasury.

It is a simple economic mechanism that a loss of GDP comes along with a reduction in employment. Hence, Brexit may affect UK employment levels twice: first, via the general reduction in economic growth and eventually second directly, via an expected lower trade volume with the EU. Demand from other EU countries constitutes around 12% of the overall demand for UK goods and services and approximately 3 million jobs. However, these jobs will not necessarily be lost. They depend on the general openness of the UK and her trading activity with the EU after Brexit and with other countries.

Summarizing, the emphasized negative effects on the UK's financial market, the additional regulatory burden to do VC/PE business with continental Europe, and the loss of economic welfare and employment will decrease the attractiveness of the UK for institutional VC and PE investors. Current data (with the exception of a slightly lower economic outlook) do not yet fully reflect the negative scenario of Brexit for the UK VC/PE industry. However, we can implement a Brexit scenario in our data series and detect its consequence for London as a hub (not only) in the European VC and PE landscape. We believe that the socio-economic indicators will adapt in the next three to four years and then reveal the new ranking of the UK, respectively. We base our Brexit scenario on the following three stylized assumptions:

- The UK's GDP growth rate in the subsequent years is 1% below what it would be without Brexit
- All indicators measuring the UK's depth of the capital market receive a haircut of 20%.
- The UK's unemployment increases by 2% compared to what it would be without Brexit.

All else being equal, this leads to the following ranking:

Table 3: The VC and PE Country Attractiveness Ranking after Brexit

Country	Rank	Score
United States	1	100,0
Canada	2	92,6
Hong Kong	3	91,2
Japan	4	91,2
Singapore	5	90,7
United Kingdom	**6**	**90,6**
Australia	7	90,2
Germany	8	87,7
New Zealand	9	87,2
Denmark	10	84,3

Table 3 presents the ranking under the Brexit scenario. The UK drops by four ranks in the VC and PE country attractiveness ranking. However, it is important to note that our scenario analysis does not include any spill over effects of Brexit. For example, if significant financial market players shift staff from London to other cities the deal making environments improve in the host cities and thus, increase their VC and PE attractiveness. We also acknowledge that Brexit probably affects many other drivers of VC and PE country attractiveness but we focus on the most obvious ones. It is even possible that some drivers will turn in a positive direction. For example, the British government could try to improve investment conditions to compensate a loss of the market share of its financial sector. Potential direct levers are taxation and regulation. However, such a move is hard to predict and it would create a notable political challenge because it seems difficult to communicate it to those who were in favour of Brexit.

To conclude, the UK has consistently ranked second in all previous versions of our VC and PE country attractiveness index. Unfortunately, a future loss of several ranking positions of the UK appears inevitable given the Brexit decision. It is in the strong interest of the UK's VC and PE industry to pursue Brexit as smooth as possible.

The BRICS, Turkey, Mexico, Indonesia, the Philippines, and Nigeria

The BRICS (Brazil, Russia, India, China, and including South Africa) have received substantial attention and VC and PE flows in recent years. China is among the top active countries world-wide, India and Brazil do not rank far behind. China and India improved in their rankings by five, respectively four positions in the 2014-2018 comparison (Exhibit 2), while South Africa and Russia gained two ranks. South Africa was already high ranked, due to its ties with the UK and the establishment of a similar legal and capital market oriented culture. However, Brazil has lost 12 ranks over the same period and this is mainly related to a strong drop in economic activity and a deterioration of several indicators for its human and social environment.

Apparently, investors meanwhile look beyond the BRICS and search for new emerging and frontier markets for their allocations. Similar to the experiences with the BRICS, the race winning countries will probably be those with large populations and strong economic catch-up potential, notably Mexico, Indonesia, the Philippines, Nigeria and Turkey. The size of a population combined with expected economic growth is a simple indicator for deal opportunities. Nevertheless, we recall that this combination is necessary for emerging countries but not sufficient to guarantee appropriate VC/PE investment conditions. All of our defined key drivers should be taken into account. Combining all the drivers, we realize that Nigeria gained seven, Indonesia six, the Philippines three, while Mexico lost one and Turkey even five ranking positions in the 2014-2018 comparison (Exhibit 2). We compare the current VC and PE attractiveness drivers of the BRICS, Turkey, Mexico, the Philippines, Indonesia, and Nigeria in Table 4 and Exhibits 3 and 4.

Table 4: The Six Key Drivers for the BRICS, Turkey, Mexico, the Philippines, Indonesia, and Nigeria

Country	VC/PE Index	Economic Activity	Depth of Capital Market	Taxation	Investor Protection and Corporate Governance	Human and Social Environment	Entrepreneurial Culture and Deal Opportunities
18. China	80.7	113,5	89,4	111,3	58,3	55,2	81,4
28. India	72.2	105,1	78,1	101,3	67,7	46,6	65,1
35. Turkey	65.2	94,3	72,2	107,4	59,1	43,3	55,6
36. South Africa	64.8	48,5	78,8	110,9	71,1	40,1	66,3
37. Indonesia	64.3	95,7	73,1	79,2	46,8	41,0	64,4
39. Russia	63.5	88,1	65,1	97,9	57,2	35,2	69,9
41. Mexico	62.8	90,2	68,8	104,4	60,0	29,9	64,4
42. Philippines	61.3	91,8	70,5	95,7	47,3	48,5	48,7
54. Brazil	57.4	79,2	74,9	21,4	53,5	35,8	54,9
72. Nigeria	50.1	72,6	56,1	53,9	52,2	33,1	42,1

Exhibit 3: Level-2 Constructs for the BRICS

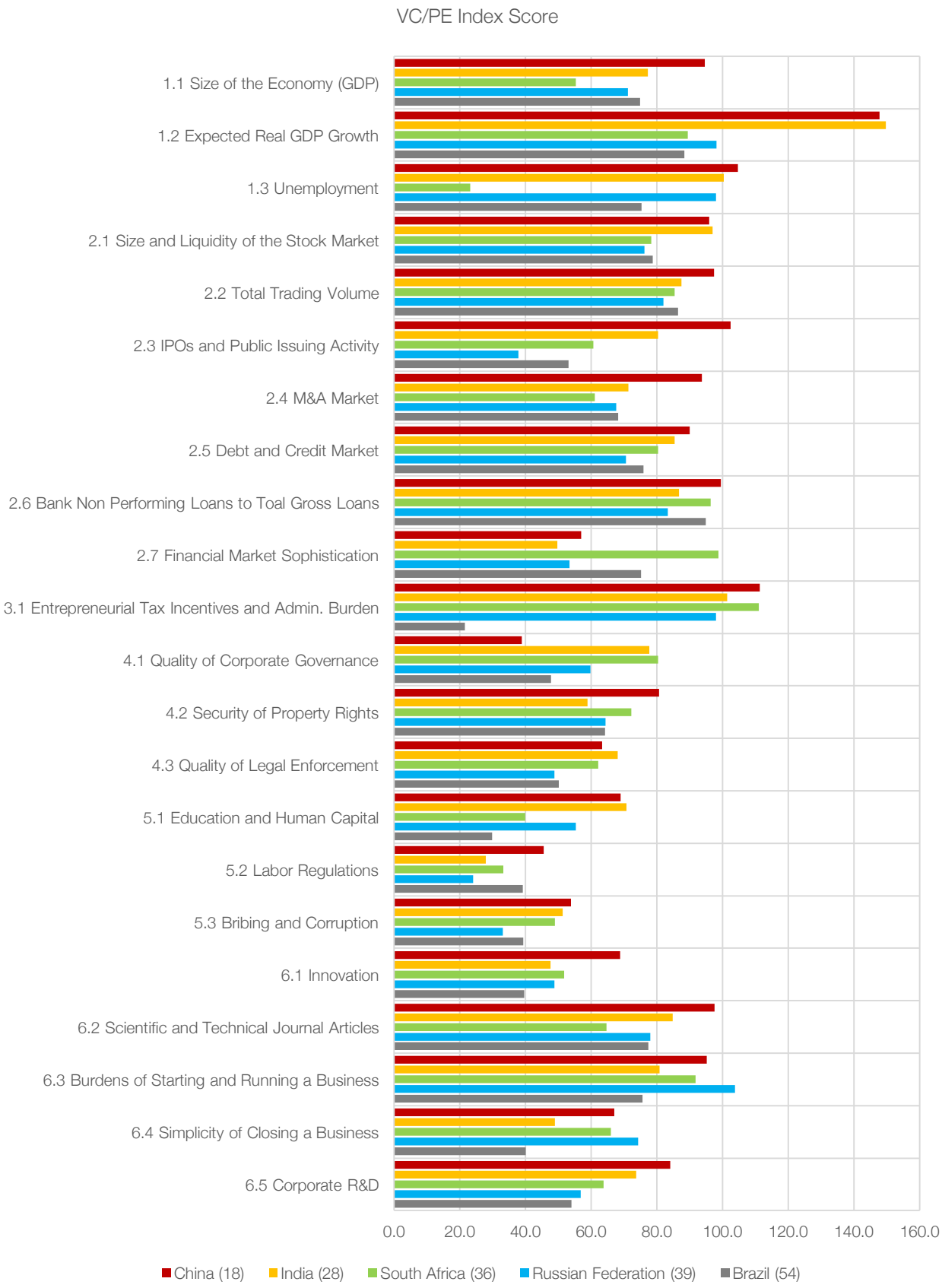
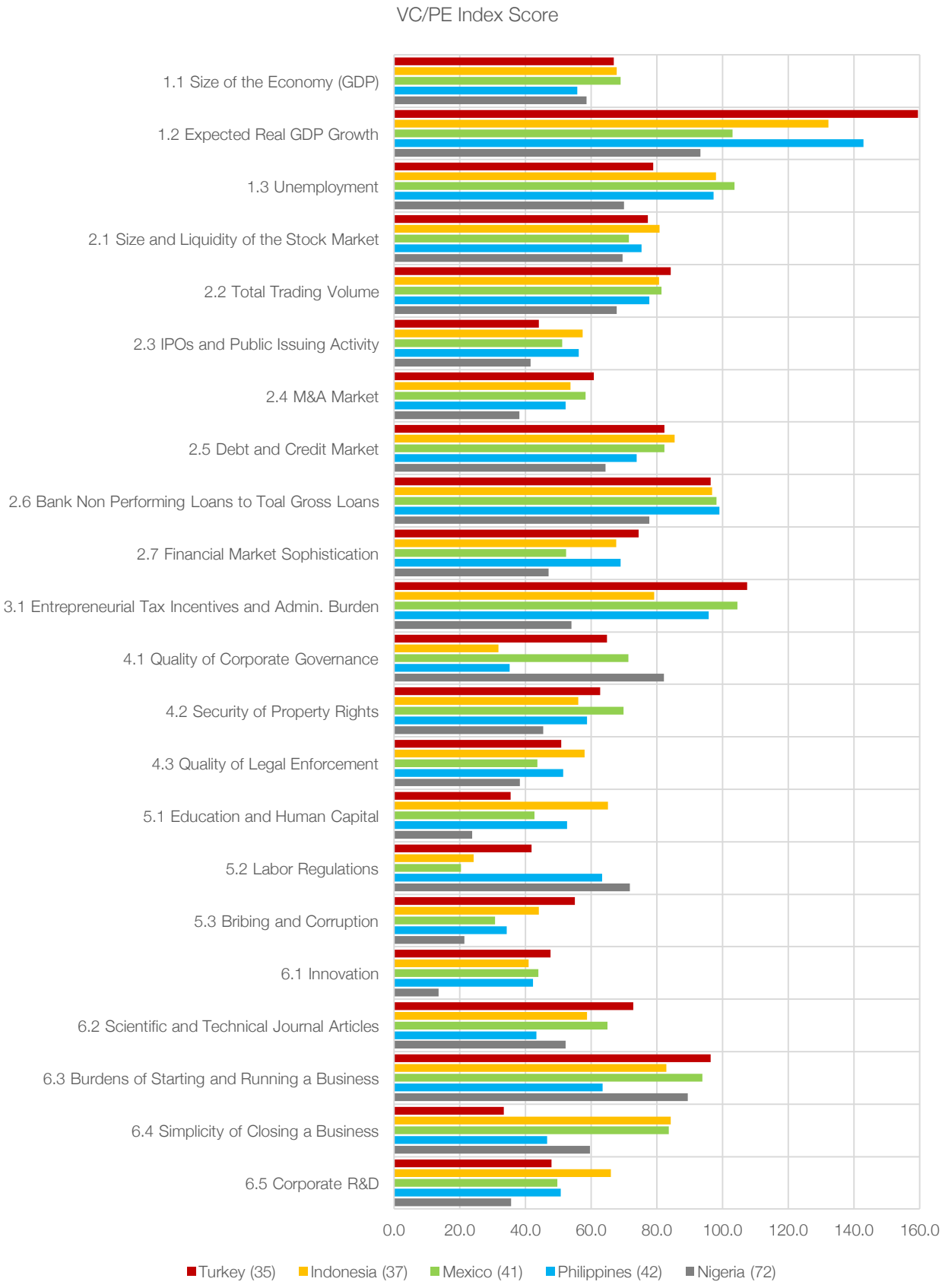


Exhibit 4: Level-2 Constructs for Turkey, Mexico, Indonesia, the Philippines, and Nigeria



Investors seek to capitalise on the combination between expected growth and the large populations. The graphs reveal that not only the economic soundness of the presented emerging countries is excellent. China, India, South Africa, Turkey, Indonesia and Brazil have also developed a financial market infrastructure, which ranks ahead of many of the developed countries. However, the exhibit also reveals the disequilibrium among the key driving forces of VC and PE attractiveness. Emerging VC and PE markets are characterised by peaks towards their economic activity. Despite meanwhile deep capital markets, the other important key drivers “Investor protection and corporate governance” “Human & social environment”, and “Entrepreneurial culture & deal opportunities” are poorly developed for most of them. This effect can be reconciled by considering the level-2 constructs.

Exhibits 3 and 4 present the scores of the level-2 constructs for the BRICS, Turkey, Mexico, the Philippines, Indonesia, and Nigeria. They reveal the expectations of growth and the deep capital markets. However, they also point to general concerns about emerging market VC and PE in general. Corporate governance indicators (with the exception of South Africa) and investor protection still remain obstacles. Further, perceived bribery and corruption levels are high, while innovations and corporate R&D remain relatively low. We know from the BRICS and other emerging countries that growth and development are mainly concentrated in particular hubs or certain regions, but are not widespread. We also know that the benefit of wealth creation is often allocated among small elite groups and not larger parts of the population. This presents not only socio-economic and political challenges in those countries, but also affects their VC and PE attractiveness. If the countries cannot transfer the wealth effects of growth to a broader part of their population, this is unlikely to improve the other key driving forces for VC and PE attractiveness, and if the pace of economic growth slows down, the countries will be less attractive for VC/PE investors.

In summary, the BRICS and the other emerging markets provide many investment opportunities and have strong financing requirements for their expected economic growth. However, it is more challenging in several emerging countries to get access to high-quality deals because of the relative immaturity of the institutional deal-supporting environment. Where corruption is present, it might be the case that the most promising transactions are negotiated among small groups of local elites while lemons are broadly auctioned. Hence, deal flow could be cumbersome and costly. Furthermore, if the protection of investors is insufficient, and if bribery and corruption are high, then the net returns to investors can suffer. Limited partners should carefully consider the advantages and disadvantages of the emerging opportunities as the exceptional growth comes at a certain cost.

Tracking Power of our Index

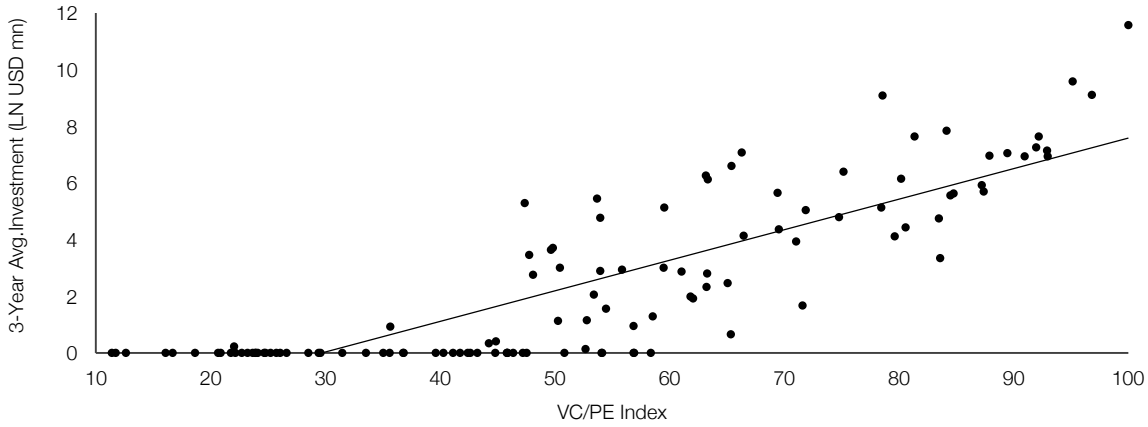
Our index ranks the attractiveness of countries to receive VC/PE allocations from institutional investors based on many socio-economic data series. The composite measure can deviate from the actual risk capital market activity and these deviations might point to an inaccuracy of our measure. With respect to their allocations, investors are often influenced by herding behaviour and follow trends to certain countries and regions, especially driven by growth expectations. However, the countries might not have sufficiently developed "VC/PE infrastructure" to absorb the committed capital, leading to over-funding. The VC/PE infrastructure is exactly what we aim to assess with our index: can we expect sufficient VC and PE deal opportunities resulting from the entrepreneurial culture in a country, from its economic soundness, or from innovations? Are potential transactions efficiently supported by the financial community? Are the public equity and M&A markets liquid enough to facilitate divestments? Are investors' concerns legally taken care of? We do not claim that our index provides the correct answer to these questions, however we submit that it is comparatively helpful in this respect. Therefore, we expect deviations between our attractiveness measure and actual VC and PE activity in the particular countries to be at a minimum level.

To analyse the tracking power of our index, we compare the index scores with the actual VC and PE activity in the various countries using the data from Thomson One. Our activity measure is the logarithm of an average of all VC and PE investments made by the general partners in a certain country over the last three years. We use the logarithm to account for the large activity divergence (e.g. activity in the US vs. several emerging countries), and we use an average over three years to smooth fluctuations. For some emerging countries in particular, annual activity strongly fluctuates from peak levels to zero in subsequent years. We chose the criterion "location of the general partners" — and not of the investments — for the following reason: some financial centres serve as hubs and channel VC and PE abroad. Investors allocate their capital to these hubs because they can rely on the efficiency of the financial community there. This is exactly what we try to measure with our index. In fact, we focus on the demand for VC and PE in a particular economy, and similarly on the state of the professional financial community that supports the supply side and directs the funds to the investee corporations. In addition, we use investments — and not raised funds — because our index measures the "absorption capacity" (either caused by direct local demand or by channelling funds abroad) of the particular economies. Raised funds might deviate from this absorption capacity due to the herding behaviour of investors, caused by over-optimism or negligence.

The statistical measure for such a comparison is the Pearson correlation coefficient. It lies between 0 and 1, where 0 signals "no" and 1 "perfect correlation." The coefficient for our index is 0.73, signalling that the index excellently tracks world-wide activity. We illustrate this high correlation in Exhibit 5.

Exhibit 5 shows the tracking power of our index. We plot the countries' investment activity on their index scores and identify a strong link. The exhibit further illustrates that we only observe VC and PE activity at index levels above approximately 45 points. For countries with scores below this level, no activity is (publicly) reported. Hence, 45 points can be considered a threshold for the emergence of VC and PE activity.

Exhibit 5: Tracking Power of our Index



Our Index and Historic VC and PE Returns

Concurrent to the finding that our index performs well when tracking VC and PE activity, it is of particular interest to analyse whether it also corresponds with the average performance achieved in the particular countries. Unfortunately, performance figures are still one of the best kept secrets in the VC and PE industry. The principle of non-disclosure of information on returns is equally valid in developed and in emerging markets. In addition, the emerging VC and PE markets are young with generally low activity (despite some exceptions), and hence there are very few transactions from which achieved returns can be calculated. Therefore, an assessment of VC and PE performance is even more challenging for the developing countries than for the developed. Commercial data suppliers provide only very limited performance figures. The only way to obtain reliable performance data on a sufficient number of transactions for empirical analyses is via an extensive effort to collect private placement memoranda (PPMs). A private placement memorandum is a document edited by a general partner that raises a VC/PE fund and solicits capital commitments from institutional investors. It is a marketing document used for fundraising purposes. General partners provide information about their track records and the performance of individual transactions in PPMs. The figures are audited and investors trust them. However, only successful general partners raise a subsequent fund and edit a PPM. Therefore, their use is criticised by academic researchers, as average performance figures from PPMs are upward biased. Nevertheless, there is no reason to believe that this upward bias is different among particular countries. This means that benchmarking countries is feasible: because the countries are compared on a consistent relative basis, absolute terms are not important.

Using PPMs, Lopez-de-Silanes, Phalippou and Gottschalg (2010) put together the most comprehensive database on VC and PE returns at the investment level, containing the performance and characteristics of 7,453 investments, of which 1,694 were in emerging countries. The first transaction considered was closed in 1971 and the last prior to 2006. We are grateful to Ludovic Phalippou for providing us with aggregated country returns from this database. These returns are compiled as the mean average of gross internal rates of return of all transactions in a particular country. We are aware that this is a rough estimate, disregarding different fund vintage years, industries, deal structures and development cycles of the particular VC/PE markets. Unfortunately, controlling for these effects is impossible with the data available. In addition, an IRR is a capital- and time-weighted return measure that requires a reinvestment assumption and that has aggregation issues as described in Phalippou (2008). However, the IRR pitfalls are the same for all transactions and for all of our countries. Therefore, they do not affect our cross-sectional country benchmarking approach.

With these aggregate performance measures, we can not only analyse the extent to which our index tracks VC and PE market activity, but also the average country returns. We note that the Lopez-de-Silanes, Phalippou and Gottschalg (2010) data include transactions in four emerging markets with index scores below the previously discussed cut-off rate of 45 points. However, these transactions took place several years ago and are not reported in the Thomson One database. We can match the index scores of 48 countries (of which 24 are emerging countries) with their aggregate performance data. There are at least 10 observed IRRs for each country. We find that the correlation between the index scores and a country's average gross internal rate of return is 0.62. This high correlation is presented in Exhibit 6, which plots the average of the country returns on their index scores.

Exhibit 6: Historic Performance and our Index

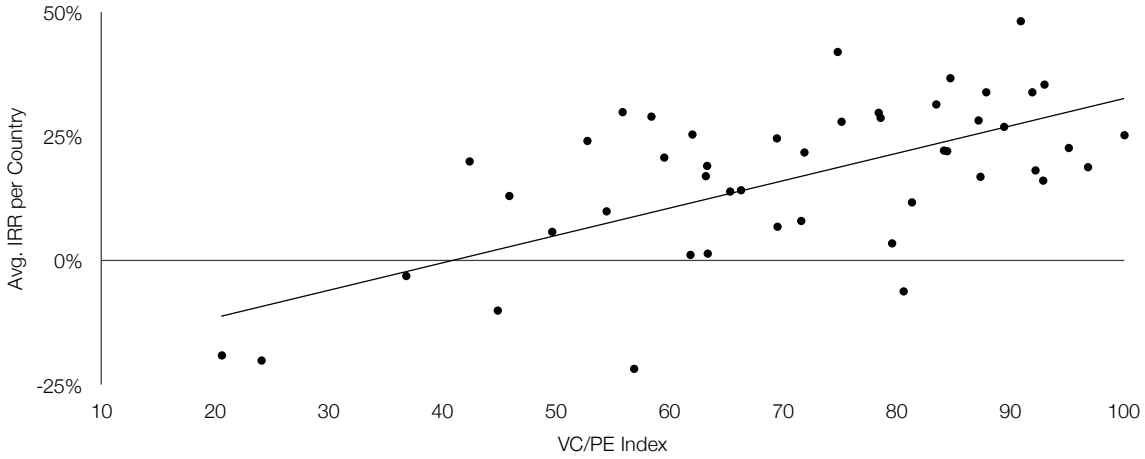


Exhibit 6 shows that our index is not only a valid proxy for VC and PE activity; it is also a good indicator for aggregate historic country returns. It is evident that the averages of historic gross internal rates of return were larger in countries that rank higher in our index than in low-ranked countries. The regression line has a slope of 0.55 %, signalling that a one point increase in the index score comes with a 0.55% rise of average historic IRRs. Nevertheless, there are "outliers," meaning low ranked countries with high returns and vice versa. Additionally, there is a strong dispersion of returns within each particular country, driven by very successful transactions and complete write-offs in any of them. We highlight that the internal rates of return collected by Lopez-de-Silanes, Phalippou and Gottschalg (2010) are calculated gross of any fees. We can assume that fees are higher for investors in immature markets with less competition among general partners. Therefore, we expect the less competitive emerging countries to be more costly for investors. This effect supports our result and would be expected to increase the correlation if we considered net returns to investors.

Nevertheless, analyses with return data have to be treated with caution as historic returns are not necessarily good proxies for future returns. Additionally, for 11 emerging countries the number of recorded deals is between 10 and 20 only. Therefore, their IRR averages can be affected to a greater extent by outliers.

Summary and Outlook

We provide a composite measure that determines the attractiveness of 125 countries to receive capital allocations from investors in the VC and PE asset class. The composite measure is based on six main criteria: economic activity, depth of the capital markets, taxation, investor protection and corporate governance, the human and social environment, and entrepreneurial culture and deal opportunities. The definition of these criteria is based on an extensive review of academic literature, on a survey of institutional investors we conducted prior to our study, and on our own econometric analyses. The six criteria are not directly observable. Therefore, we use proxy variables to assess them for each country. As a result, we obtain a country ranking and provide detailed analyses on the strengths and weaknesses of the particular nations and information on the historic development of the criteria. Our index performs well in terms of explaining the differences of observed VC and PE activity, and excellently tracks historic country performance. However, it does not qualify as a crystal ball for investment advisers. We highlight our intention to enrich the discussion regarding national VC and PE markets and to propose a valuable informational tool, rather than an arbitrage instrument.

We find a general pattern if we compare country characteristics. There is considerable dispersion with respect to the six key drivers. Some countries attract investors with tax incentives. Many countries show strong entrepreneurial culture and deal opportunities. There is great dispersion in economic activity, especially with respect to emerging markets and in the human and social environment. However, the two key criteria, depth of capital markets, and investor protection and corporate governance make the difference across the large sample. Common law countries dominate the others regarding these criteria. We observe that strong investor protection and corporate governance rules favour deep and liquid capital markets. These elicit the required professional community to secure deal flow and exit opportunities for VC and PE funds which affects a country's attractiveness for institutional investments in the VC and PE asset class.

However, this discussion reflects the capital supply side only. We should also take into account that, as revealed by our analyses, many countries lack several important characteristics. Without a sufficient entrepreneurial culture, and with rigid labour markets, bribery and corruption, there will be firstly less demand for VC and PE, and secondly returns to investors will diminish.

Emerging VC and PE provide interesting opportunities to investors. However, it is the discussed lack of balance of the key driving forces that renders emerging VC/PE allocation decisions challenging. Exceptional growth opportunities come at the cost of disadvantageous conditions with respect to investors' protection, usually less liquid exit markets, lower innovation capacity and higher perceived bribery and corruption.

We invite you to examine and thoroughly analyse our results. If you are an investor, please enrich the information provided with your own expertise and knowledge about the key driving forces and market conditions in the individual countries to make your allocation decisions. If you are a politician, please use our analyses as a demonstration of how investors can evaluate and benchmark countries. If you are a researcher, and this is equally valid for the whole constituency, please do not hesitate to criticise our approach and findings. We will continue to update our index annually and very much appreciate any critique and comment.

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Appendix 1: Structure of the VC/PE Index, Separate VC and PE Indices, and Weighting Schemes

ID	Construct	Dimension	VC/PE Index Weight	VC-only Index Weight	PE-only Index Weight
0	**VCPE Index 2016**		100.0%	100.0%	100.0%
1	**Economic Activity**		13.6%	15.8%	18.8%
1.1	**Size of the Economy (GDP)** Source: Euromonitor International, National statistics/Eurostat/OECD/UN/International Monetary Fund (IMF), International Financial Statistics (IFS)	LN US$ mn	33.3%	33.3%	33.3%
1.2	**Expected Real GDP Growth** Source: Euromonitor International, National statistics/Eurostat/OECD/UN/International Monetary Fund (IMF), World Economic Outlook (WEO)	%	33.3%	33.3%	33.3%
1.3	**Unemployment** Source: Euromonitor International, International Labour Organisation (ILO)/Eurostat/national statistics/OECD	%	33.3%	33.3%	33.3%
2	**Depth of Capital Market**		31.8%	21.1%	43.8%
2.1	**Size of the Stock Market**		14.3%	25.0%	14.3%
2.1.1	**Market Capitalization of Listed Companies** Source: World Bank, World Development Indicators; World Federation of Exchanges database	% of GDP	50.0%	50.0%	50.0%
2.1.2	**Number of Listed Domestic Companies** Source: World Bank, World Development Indicators; World Federation of Exchanges database	LN number	50.0%	50.0%	50.0%
2.2	**Stock Market Liquidity (Trading Volume)** Source: World Bank, World Development Indicators; World Federation of Exchanges database	% of GDP	14.3%	25.0%	14.3%
2.3	**IPOs & Public Issuing Activity**		14.3%	25.0%	14.3%
2.3.1	**Market Volume** Source: Thomson One Banker, SDC Platinum Global New Issues	LN US$ mn	50.0%	50.0%	50.0%
2.3.2	**Number of Issues** Source: Thomson One Banker, SDC Platinum Global New Issues	LN number	50.0%	50.0%	50.0%

2.4	**M&A Market Activity**		14.3%	25.0%	14.3%
2.4.1	**Market Volume** Source: Thomson One Banker, SDC Platinum Mergers & Acquisitions	LN US$ mn	50.0%	50.0%	50.0%
2.4.2	**Number of Deals** Source: Thomson One Banker, SDC Platinum Mergers & Acquisitions	LN number	50.0%	50.0%	50.0%
2.5	**Debt & Credit Market**		14.3%		14.3%
2.5.1	**Ease of Access to Loans** Source: World Economic Forum, Global Competitiveness Report; World Economic Forum, Executive Opinion Survey	% of GDP	33.3%		33.3%
2.5.2	**Credit Information Index** Source: World Bank, Doing Business		33.3%		33.3%
2.5.3	**Lending Rate** Source: Euromonitor International from International Monetary Fund (IMF), International Financial Statistics and national statistics/OECD	%	33.3%		33.3%
2.6	**Bank Non-Performing Loans to Total Gross Loans** Source: World Bank, World Development Indicators; International Monetary Fund, Global Financial Stability Report	%	14.3%		14.3%
2.7	**Financial Market Sophistication** Source: World Economic Forum, Global Competitiveness Report; World Economic Forum, Executive Opinion Survey		14.3%		14.3%
3	**Taxation**		4.5%	5.3%	
3.1	**Entrepreneurial Tax Incentives & Administrative Burdens**		100.0%	100.0%	
3.1.1	**Entrepreneurship Incentive** Source: KPMG, Corporate Tax and Personal Income Tax Tables	%	33.3%	33.3%	
3.1.2	**Number of Tax Payments** Source: World Bank, Doing Business		33.3%	33.3%	
3.1.3	**Time spent on Tax Issues** Source: World Bank, Doing Business	Hours per year	33.3%	33.3%	
4	**Investor Protection & Corporate Governance**		13.6%	15.8%	18.8%
4.1	**Quality of Corporate Governance**		33.3%	33.3%	33.3%

4.1.1	**Disclosure Index** Source: World Bank, Doing Business	20.0%	20.0%	20.0%
4.1.2	**Director Liability Index** Source: World Bank, Doing Business	20.0%	20.0%	20.0%
4.1.3	**Shareholder Suits Index** Source: World Bank, Doing Business	20.0%	20.0%	20.0%
4.1.4	**Legal Rights Index** Source: World Bank, Doing Business	20.0%	20.0%	20.0%
4.1.5	**Efficacy of Corporate Boards** Source: World Economic Forum, Global Competitiveness Report; World Economic Forum, Executive Opinion Survey	20.0%	20.0%	20.0%
4.2	**Security of Property Rights**	33.3%	33.3%	33.3%
4.2.1	**Legal Enforcement of Contracts** Source: Fraser Institute, Economic Freedom of the World; World Bank, Doing Business	33.3%	33.3%	33.3%
4.2.2	**Property Rights** Source: World Economic Forum, Global Competitiveness Report; World Economic Forum, Executive Opinion Survey	33.3%	33.3%	33.3%
4.2.3	**Intellectual Property Protection** Source: World Economic Forum, Global Competitiveness Report; World Economic Forum, Executive Opinion Survey	33.3%	33.3%	33.3%
4.3	**Quality of Legal Enforcement**	33.3%	33.3%	33.3%
4.3.1	**Judicial Independence** Source: World Economic Forum, Global Competitiveness Report; World Economic Forum, Executive Opinion Survey	20.0%	20.0%	20.0%
4.3.2	**Impartial Courts** Source: World Economic Forum, Global Competitiveness Report; World Economic Forum, Executive Opinion Survey	20.0%	20.0%	20.0%
4.3.3	**Integrity of the Legal System** Source: Fraser Institute, Economic Freedom of the World; PRS Group, International Country Risk Guide	20.0%	20.0%	20.0%
4.3.4	**Rule of Law** Source: World Bank, Worldwide Governance Indicator	20.0%	20.0%	20.0%
4.3.5	**Regulatory Quality** Source: World Bank, Worldwide Governance Indicator	20.0%	20.0%	20.0%
5	**Human & Social Environment**	13.6%	15.8%	12.5%

5.1	**Education & Human Capital**		33.3%	33.3%	0.0%
5.1.1	**Quality of the Educational System** Source: World Economic Forum, Global Competitiveness Report; World Economic Forum, Executive Opinion Survey		50.0%	50.0%	0.0%
5.1.2	**Quality of Scientific Research Institutions** Source: World Economic Forum, Global Competitiveness Report; World Economic Forum, Executive Opinion Survey		50.0%	50.0%	0.0%
5.2	**Labour Market Rigidities**		33.3%	33.3%	50.0%
5.2.1	**Difficulty of Hiring Index** Source: World Bank, Doing Business, Labor Market Regulation		25.0%	25.0%	25.0%
5.2.2	**Rigidity of Hours Index** Source: World Bank, Doing Business, Labor Market Regulation		25.0%	25.0%	25.0%
5.2.3	**Difficulty of Firing Index** Source: World Bank, Doing Business, Labor Market Regulation		25.0%	25.0%	25.0%
5.2.4	**Firing Costs** Source: World Bank, Doing Business, Labor Market Regulation	Weeks of wages	25.0%	25.0%	25.0%
5.3	**Bribing and Corruption**		33.3%	33.3%	50.0%
5.3.1	**Corruption Perception Index** Source: Transparency International		33.3%	33.3%	33.3%
5.3.2	**Control of Corruption** Source: World Bank, Worldwide Governance Indicator		33.3%	33.3%	33.3%
5.3.3	**Extra Payments/Bribes** Source: World Economic Forum, Global Competitiveness Report; World Economic Forum, Executive Opinion Survey		33.3%	33.3%	33.3%
6	**Entrepreneurial Culture & Deal Opportunities**		22.7%	26.3%	6.3%
6.1	In**novation**		20.0%	20.0%	
6.1.1	**Global Innovation Index** Source: INSEAD, WIPO, Johnson Cornell University		50.0%	50.0%	
6.1.2	**Capacity for Innovation** Source: World Economic Forum, Global Competitiveness Report; World Economic Forum, Executive Opinion Survey		50.0%	50.0%	

6.2	**Scientific and Technical Journal Articles** Source: Elsevier, Scopus	LN number	20.0%	20.0%	
6.3	**Ease of Starting & Running a Business**		20.0%	20.0%	
6.3.1	**Number of Procedures to Start of Business** Source: World Bank, Doing Business		33.3%	33.3%	
6.3.2	**Time Needed to Start a Business** Source: World Bank, Doing Business	Days	33.3%	33.3%	
6.3.3	**Costs of Business Start-Up Procedures** Source: World Bank, Doing Business	% of income per capita	33.3%	33.3%	
6.4	**Simplicity of Closing a Business**		20.0%	20.0%	
6.4.1	**Time for Closing a Business** Source: World Bank, Doing Business	Years	33.3%	33.3%	
6.4.2	**Costs for Closing a Business** Source: World Bank, Doing Business	% of estate	33.3%	33.3%	
6.4.3	**Recovery Rate** Source: World Bank, Doing Business	Cents on US$	33.3%	33.3%	
6.5	**Corporate R&D**		20.0%	20.0%	100.0%
6.5.1	**Company Spending on R&D** Source: World Economic Forum, Global Competitiveness Report; World Economic Forum, Executive Opinion Survey		50.0%	50.0%	50.0%
6.5.2	**Utility Patents** Source: Euromonitor International, Trade sources/national statistics	LN Number	50.0%	50.0%	50.0%

Appendix 2: Computation of the Index

The VC/PE attractiveness of each country is computed by calculating a weighted average of country performance scores in the six key drivers. The scores within each key driver are derived from the level-2 constructs, respectively derived from several raw data series.

Normalisation

In order to make the cross-sectional data series comparable, the raw data has to be converted into a common range. The rescaling method is used to normalise indicators to such a range by linear transformation. Thereby, 100 represents the best score, while 1 represents the worst.

For every individual variable, we define whether high values influence the attractiveness for investors positively or negatively, and hence, assign 100 points either to the highest score (e.g. in the case of GDP) or to the lowest (e.g. in the case of high hiring costs).

The points are calculated according to the following formula:

$$y_{q,i} = 99\times \left[\frac{x_{q,i} - \min(x_q)}{\max(x_q) - \min(x_q)} \right] + 1$$

$y_{q,i}$ = normalised value of category q and country i

$x_{q,i}$ = raw data value of category q and country i

$\min(x_q)$ = minimum raw data value of category q within the sample

$\max(x_q)$ = maximum raw data value of category q within the sample

Example:

Raw data value [any unit]	1 (lowest value in sample)	12 (random value in sample)	20 (highest value in sample)
Normalised value [1-100]	99x[(1-1)/(20-1)]+1=1	99x[(12-1)/(20-1)]+1=58	99x[(20-1)/(20-1)]+1=100

Aggregation

For the index score calculation, we use geometric aggregation because it is better suited than arithmetic aggregation. Geometric aggregation rewards those countries or those sub-indicators with higher scores. Overall, a shortcoming in the value of one variable or sub-index can be compensated by a surplus in another. Compensability is constant in linear aggregation, while it is smaller in geometric aggregation for the sub-indicators with low values. Therefore, countries with low scores in some sub-indices would benefit from linear aggregation.

For this reason, we use geometric aggregation as follows:

$$\text{Index Value}_i = \prod_{q=1}^{Q} y_{q,i}^{w_q}$$

Index Value_i = index value of country i

$y_{q,i}$ = normalised value of category q and country i

w_q = weight of category q

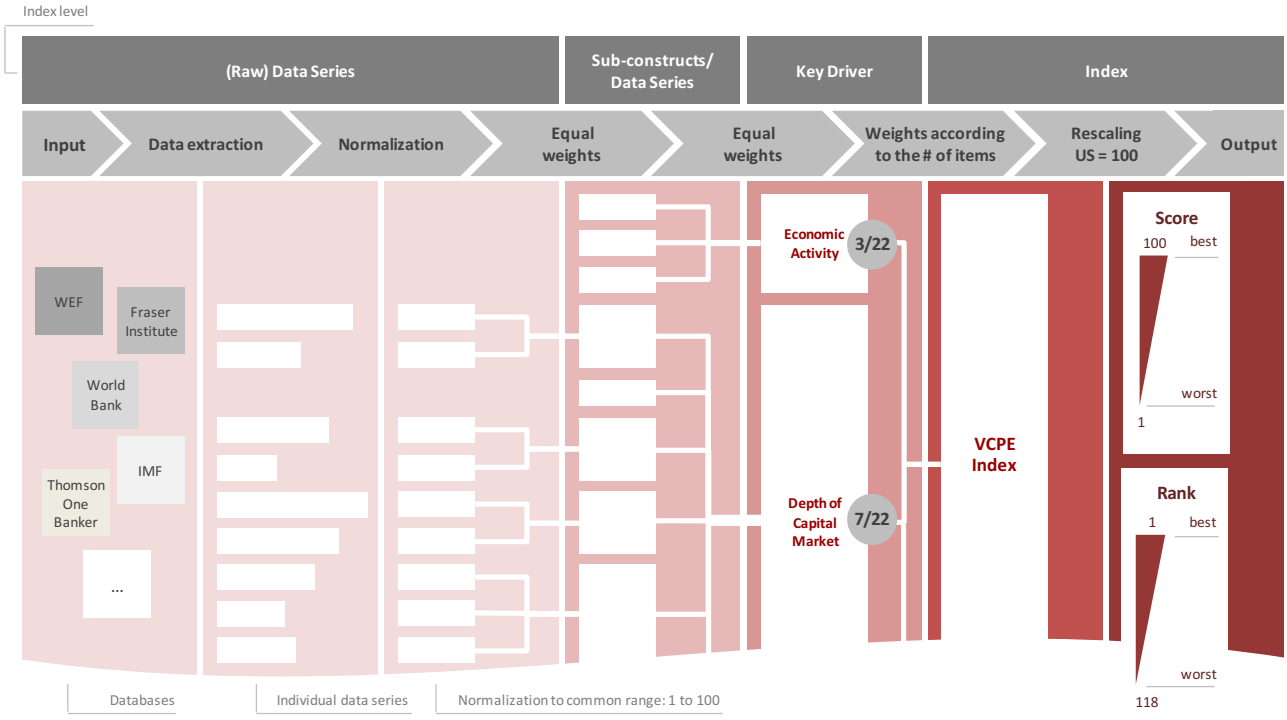
Example:

Category	Economic Activity	Depth of Capital Market	Investor Protection and Corporate Governance
Weight	0.50	0.25	0.25
Normalised value of country i ($y_{q,i}$)	30.0	40.0	50.0
Index value for the country	$(30^{0.5})$ x $(40^{0.25})$ x $(50^{0.25})$ = 36.6		

Weighting

After calculating the performance scores for each data series on the lowest level, the scores are aggregated using the aforementioned aggregation method. On the lowest level, items are aggregated with equal weights, i.e. the weights are derived from the number of components that are aggregated. Exhibit 7 shows the aggregation path from the normalised (raw) data series to the final VC/PE Country Attractiveness Index score.

Exhibit 7: Computation of the Index



Appendix 3: Statistical Validation of the Index

Correlation is a measure for the strength and directionality of a linear relation between two variables. The Pearson-Correlation-Coefficient ρ_(X,Y) lies between 0 to ±1. Zero indicates a non-linear or missing relation between two data sets and ±1 indicates perfect linearity. A positive (negative) correlation indicates a positive (negative) relation.

$$\rho_{X,Y} = \frac{cov(X,Y)}{\sigma_X \sigma_Y} = \frac{E((X-\mu_X)(Y-\mu_Y)}{\sigma_X \sigma_Y}$$

To test the quality of our index, we calculate the correlation between the index scores with the control variable. The results of these analyses are displayed in the following table. The correlation coefficients are very high for all cases considered. These high values prove the accuracy of the index scores and its ability to measure a countries' attractiveness for investors in VC and PE funds. It should be noted, however, that the accuracy and the volumes of reported VC investments is lower than for PE. Therefore, the correlations for the combined VC/PE and for the PE Index are somewhat higher than for VC.

	VC/PE investments LN (average 2013–2015)	**VC investments LN (average 2013–2015)**	**PE investments LN (average 2013–2015)**
VC/PE Index 2016	0.63	-	-
VC Index 2016	-	0.62	-
PE Index 2016	-	-	0.61

This report presents the results of a comprehensive research project on how to measure the attractiveness of a country for VC and PE investors. Designed to be an index produced annually, it is a dynamic product. An online version that uses the most recent data and allows for country comparisons can be found at:

http://blog.iese.edu/vcpeindex/.