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THE EUROPEAN VENTURE CAPITAL AND PRIVATE EQUITY COUNTRY ATTRACTIVENESS INDEX(ES)

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Abstract

We calculate composite indexes to compare the attractiveness of 25 European countries for institutional investments into the Venture Capital and Private Equity asset class. To achieve this we use 42 different criteria, and propose an aggregation structure that allows for benchmarking on more granulated levels. The United Kingdom leads our ranking, followed by Ireland, Denmark, Sweden, and Norway. While Germany is slightly above the average European attractiveness level, the scores are rather disappointing, for example, for France, Italy, Spain, and Greece. Our analyses reveal that while the United Kingdom is similar to the other European countries with respect to many criteria, there are two major differences which ultimately affect its attractiveness: its investor protection & corporate governance rules, and the size and liquidity of its capital market. The state of the capital market is likewise a proxy for the professionalism of the financial community, for deal flow and exit opportunities. We determine a reasonable correlation between our attractiveness index scores and actual Venture Capital and Private Equity fundraising activities and prove the robustness of our calculations. Our findings across all the European countries suggest that, while investor protection and capital markets are in fact very important determinants for attractiveness, there are numerous other criteria to consider.

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1. Introduction

Why is there such a strong market for Venture Capital (VC) and Private Equity (PE) in the United Kingdom or in the United States, why is there relatively little activity in Germany, for example, the largest European economy, and why is activity close to zero in Greece or in some of the new European Union accession countries? Spatial variations in VC/PE activity result from numerous factors. Partly, they can be explained by built-in bias mechanisms. The whole investment process from institutional investors (the Limited Partners or LPs) to the finally-backed corporations is geographically biased: the largest, most prominent and most active institutional investors in the VC/PE asset class are located in the United States. This certainly contributes to the dominant role of the United States Venture Capital and Private Equity market. However, not only in the US, the institutional investors allocate their capital via chains of agents and networks in certain regions, and among countries. Usually, there is a concentration in 'hotspots' or core economic centers. These hotspots evolve mainly for two reasons. First, there is a professional community to support transactions, and to establish the capital supply side. Second, there must be expectation for demand of the committed capital. The last elements along the chain of agents are the Venture Capital and Private Equity funds (the General Partners or GPs). They prefer spatial proximity in their investments to facilitate the transaction processes, monitoring and involvement. It is popular for GPs to focus on a particular region, or just on one single country when searching for corporations that deserve financial backing. Hence, the geographical source of VC/PE is generally not very distant from the demand. This built-in bias mechanism is intensified by the institutional investors' international allocation approaches. Diversification needs urge the LPs to commit capital to funds that cover a particular country, or region. Therefore, LPs make a geographical selection of promising spots. The selection depends on their expectation of the demand for VC/PE, and on their evaluation of the host country's professional community.

In this paper, we address the international VC/PE allocation issue and propose a composite measure to compare the attractiveness of 25 European countries (the EU-25 with Estonia, Latvia and Lithuania grouped as "The Baltic States", plus Switzerland and Norway). We review the literature and search for criteria that determine both supply and demand for VC and PE in a country. The higher the quality of the criteria, the more attractive a particular country is for institutional investors. We find 42 data series for our sample countries as proxies for these

criteria and aggregate them to the "Venture Capital and Private Equity Country Attractiveness Index". In this first step, we combine all the criteria into one index and receive an attractiveness ranking of the European countries. The index structure allows for benchmarking, and we comment our results for the first ranked, for the largest European and for the last ranked countries; namely United Kingdom, Germany, and Romania. Our analyses reveal that, while the European countries are similar with respect to many criteria, there are two major differences which ultimately affect a country's attractiveness: the protection of investors & corporate governance, and the size and liquidity of its capital market, which is likewise a proxy for the professionalism of the financial community, for deal flow and exit opportunities. In sensitivity analyses, we show that our index is robust with respect to different aggregation methods. In a second approach, we control for the fact that some of the criteria are more meaningful for either of the two market segments Venture Capital and Private Equity. Venture Capital is used to back young and start-up corporations in markets with high growth expectations. Private Equity finances changes of ownership in established businesses, often supported by debt finance. Hence, we calculate two more indexes, one of them focused on VC, and one on PE only. Finally, as a further robustness check, we analyze whether our initially chosen series of 42 data does not over-determine the index and present a calculation where we discard criteria. This tight index version consists of 17 determinants only, and aims to improve the results in a statistical sense. With the initially proposed index structure, its sensitivity analyses, and the three alternative index definitions, we show that there are five tier groups of attractiveness of European countries for VC and PE investments. The attractiveness ranking is robust to different aggregation methods, and to the deletion of individual data series. Some countries would change ranks within their tier group, especially when we focus on the individual VC and PE indexes; however, there is hardly any transition across the tier groups. We compare the indexes from the sensitivity analyses and the tight index version with the actual VC and PE fundraising activities in the particular countries and reveal reasonable correlations of both figures. We achieve the highest correlation for the initially proposed "base-case" index structure consisting of 42 data series. This signals that, while investor protection and corporate governance, and the capital markets are in fact very important determinants to assess the attractiveness of a country for VC and PE investors, there are many more criteria to consider. Neglecting some of them, leads to inferior tracking results.

Our paper makes the following contributions: First, we provide a comprehensive discussion of the important parameters that determine the international allocation process of institutional investors in the VC and PE asset class. Second, we propose a composite measure, data sources, and the methodology to quantify how individual economies attract these investors. Third, we apply the suggested method, perform sensitivity analyses and robustness checks and create a ranking for 25 European countries. Fourth, with these analyses, we are able to benchmark the individual countries with respect to detailed strengths and weaknesses, and explicitly do so for the United Kingdom, Germany and Romania. Fifth, we show that all of the included criteria are important, and neglecting some of them reduces the tracking power of the index. Sixth, while there are many similarities among the European countries, we claim that the size and liquidity of their capital markets, and hence the professional environment, deal flow, and exit opportunities finally distinguish their attractiveness.

The paper is structured as follows: After a brief introduction of our assumptions about supply and demand in the VC/PE market, we review the most important literature on the criteria for vivid VC and PE markets, and discuss the relevant parameters for our index. Next, we explain the data and the technical background for our calculations. We verify the appropriateness of the sub-indicators included, and discuss different aggregation methods. Then we present the

index's results, interpret them, perform the sensitivity analyses and robustness checks, and determine tier groups regarding the attractiveness of the various economies for VC/PE investors. Finally, we measure the tracking power of our index, summarize this paper, and conclude.

2. Equilibrium in the VC/PE Market

Gompers and Lerner (1998), Balboa and Martí (2003), and Jeng and Wells (2000) comprehensively discuss models and conditions for achieving equilibrium in a national VC/PE market. Institutional investors supplying VC/PE analyze several economic parameters and estimate the future demand for particular countries. Then, they choose among them for their international asset allocation. Statistics on supply and demand characteristics for VC/PE in Europe, such as EVCA (2007), show that there is usually no lack of supply of funds. On the contrary, the amount of funds raised in a particular year is generally higher than the amount invested in the same period, and the funds raised will be invested progressively in subsequent years. The suppliers of capital estimate the demand for VC/PE over a horizon of several years and make their allocations accordingly. Consequently, they judge the individual countries' attractiveness. This attractiveness is primarily determined by expectations about the ability of local VC/PE funds to perform a sufficient number of transactions with satisfactory risk and return ratios. Hence, the predominant issues regarding the attractiveness of a particular region for an institutional investor are the availability of adequate investment opportunities and the infrastructure to perform the transactions. The investment opportunities are directly related to local entrepreneurial activities and associated, among other factors, with innovations, restructurings, the pure size of the economy, growth expectations, and the entrepreneurial spirit of people. The quality of the infrastructure to handle deal flow and exit is related to the professionalism of the financial community. However, it is not clear to what extent these factors influence the attractiveness of individual economies for investors in VC/PE funds, and how much these factors depend on others respectively. Therefore, in the following section, we provide a comprehensive overview of the literature dealing with success factors for entrepreneurial activities, and the volume of VC/PE transactions.

3. Literature Review

The related literature discusses and analyses the determinants of Venture Capital and Private Equity activity in national economies or regions. However, only some of the papers explicitly distinguish between the Venture Capital and Private Equity market segments. One can intuit whether the reported finding is more relevant for backing corporations in early stages or later stages of their lifetime. Some criteria have a stronger impact on young and start-up corporations, some of them more closely affect established businesses, while others are valid for all corporations and, hence, both market segments. In our literature overview, we do not differentiate at the first stage between the two segments, but rather present all the relevant findings that should influence the institutional investors' allocation decisions. In a subsequent section of this paper, we separately focus on the more relevant topic for either the Venture Capital or the Private Equity segment, and briefly discuss the more important activity determinants in each market.

We group the literature overview into six sub-chapters that will also reflect the structure of our index, as we subsequently explain. Each heading represents one of six "key drivers" that we regard important, appropriate and quantifiable to determine the attractiveness of a country for institutional VC/PE investments. The sub-chapters define a set of criteria we need to proxy with our index.

3.1. Literature on the Importance of Economic Activity

Intuitively, the state of a particular country's economy should affect the VC/PE activity. Pure economic size will be an indicator for the body of corporations and deal flow opportunities in general. Economic growth should also lead to demand for finance. Gompers and Lerner (1998) focus on the VC segment and point out that there exist more attractive opportunities for entrepreneurs if the economy is growing quickly. Wilken (1979) argues that a situation of economic prosperity and development facilitates entrepreneurship as it provides a greater accumulation of capital for investments. The ease of start-ups is expected to be related to societal wealth, not only due to the availability of start-up financing, but also to higher income among potential customers in the domestic market. Romain and van Pottelsberghe de la Potterie (2004) find that VC/PE activity is cyclical and significantly related to GDP growth.

3.2. Literature on the Importance of the Capital Market

Black and Gilson (1998) focus on the differences between bank-centered and stock market-centered capital markets. They argue that a well-developed stock market that permits Venture Capitalists to exit through an IPO is crucial for the existence of a vibrant VC market. In general, bank-centered capital markets show less ability to produce an efficient VC infrastructure. They affirm that it is not merely the strong stock market missing in bank-centered capital markets; it is also the secondary institutions, including the bankers' conservative approach to lending and investing and the social and financial incentives that reward entrepreneurs less richly and penalize failure more severely, that compromise entrepreneurial activity. While their paper focuses on the early stage segment, the findings should be equally important for the later stage. Jeng and Wells (2000) stress that the main force behind the cyclical swings is IPO activity because it reflects the potential return to the VC/PE funds. Kaplan and Schoar (2005) confirm this. Analogue to Black and Gilson (1998), Gompers and Lerner (2000) point out that risk capital flourishes in countries with deep and liquid stock markets. Likewise, Schertler (2003) uses either the capitalization of stock markets or the number of listed companies as a measure for the liquidity of stock markets. He finds that the liquidity of stock markets has a significant positive impact on VC investments at early stages.

Despite the principal disadvantages of bank-centered capital markets, Green (1998) emphasizes that low availability of debt financing is an obstacle for start-ups in many countries. Entrepreneurs need to find backers - whether banks or VC/PE funds - who are willing to bear risk. Hellmann et al. (2004) argue that banks represent the dominant financial institutions in most of the countries. They examine the role of banks for the VC/PE industry and stress that banks act in this market segment mainly for strategic reasons. They try to build early relationships for future lending activities. Cetorelli and Gamera (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 younger companies.

Additionally, the VC/PE activity in a particular country relates to the state of the local VC/PE market's maturity level. Sapienza et al. (1996) mention that acceptance in a country's society

and the historical evolvement of its VC/PE market determines investor confidence. Balboa and Martí (2003) find that annual fundraising volume is strongly dependent on the previous year's market liquidity. Chemla (2005) argues that the management of VC/PE funds is costly. Particular regions become attractive to investors only when the expected number of transactions is large and their volumes and payoffs exceed a certain amount to cover the management fees. Hence, the entry of new investors is dependent upon the prevailing activity in that region.

3.3. Literature on the Importance of Taxes

We assume that two types of taxes affect VC and PE activity; those directly related to the asset class, such as taxes on dividends and capital gains, and those with an impact on corporations and entrepreneurship, such as corporate tax rates. Gompers and Lerner (1998) stress that the capital gains tax rate influences VC/PE activity. In fact, they confirm Poterba's finding (1989), who builds a decision-model to become entrepreneur. Bruce (2000 and 2002), and Cullen and Gordon (2002) prove that taxes matter for businesses entry and exit. Djankov et al. (2008) show that corporate tax rates strongly affect entrepreneurship. Bruce and Gurley (2005) explain that increases in income tax raise the probability of becoming an entrepreneur. Hence, the difference between personal income tax rates and corporate tax rates tends to be an incentive to create self-employment.

3.4. Literature on the Importance of Investor Protection and Corporate Governance

Legal structures and the protection of property rights also appear to influence the attractiveness of a VC/PE market. La Porta et al. (1997 and 1998) confirm that the legal environment strongly determines the size and extent of a country's capital market and local companies' ability to receive outside financing. They emphasize the difference between law on books and the quality of law enforcement in some countries. Roe (2006) comprehensively discusses and compares political determinants of corporate governance rules for the major economies and focuses on the importance of a strong minority 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. (2006a) find that the quality of a country's legal system is stronger connected to facilitating VC/PE backed exits than the size of a country's stock market. Cumming et al. (2006b) 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) discuss that fairness and property rights protection largely determine the growth and emergence of new enterprises. Cumming and Johan (2007) highlight that the perceived importance of regulatory harmonization increases institutional investors' allocations to the asset class. La Porta et al. (2002) find lower cost of capital for companies in countries with better investor protection. 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. Even so, Knack and Keefer (1995), Mauro (1995), and Svensson (1998) demonstrate that property rights significantly affect investments and economic growth.

3.5. Literature on the Importance of the Human and Social Environment

Black and Gilson (1998), Lee and Peterson (2000), and Baughn and Neupert (2003) argue that national cultures shape both individual orientation and environmental conditions, which lead to different levels of entrepreneurial activity in particular countries. Megginson (2004) argues that, in order to foster a growing risk capital industry, research culture plays an important role, especially in universities or national laboratories.

Rigid labor market policies negatively affect the evolvement of a VC/PE market. Lazear (1990), and Blanchard (1997) discuss how protection of workers can reduce employment and growth. Black and Gilson (1998) argue that labor market restrictions influence VC/PE activity; however, not to the same extent as the stock market.

Djankov et al. (2002) investigate the role of several societal burdens for start-ups in different countries. They conclude that the highest barriers and costs are associated with corruption, crime, a larger unofficial economy, and bureaucratic delay.

3.6. Literature on the Importance of Entrepreneurial Opportunities

Access to viable investments is probably one of the most important factors for the attractiveness of a regional VC/PE market. The number of potential investments relates to the research output in an economy. Gompers and Lerner (1998) show that both industrial and academic R&D expenditure significantly correlates with VC/PE activity. Kortum and Lerner (2000) highlight that the growth in VC/PE fundraising in the mid-90s may be due to a surge of patents in the late 1980s and 1990s. Schertler (2003) emphasizes that the number of employees in the field of R&D, and the number of patents, as an approximation of the human capital endowment, has a positive and highly significant influence on VC/PE activity. Furthermore, Romain and von Pottelsberghe de la Potterie (2004) find that the level of entrepreneurship interacts with the R&D capital stock, with technological opportunities, and the number of patents. Similarly to Djankov et al. (2002), Baughn and Neupert (2003) argue that bureaucracy in form of excessive rules and procedural requirements, multiple institutions from which approvals are needed, and numerous 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.

3.7. Summary of the Literature Review

The numerous contributions emphasize the difficulty of identifying the appropriate criteria for our index. There is neither consensus about the most important criterion nor any ranking. While some of the criteria are more comprehensively discussed, and certainly of very high relevance, it remains unclear how these criteria interact. For example, it is questionable whether the VC/PE activity in a country with a high corporate governance level is more affected by the liquidity of the national stock market or by the labor regulations. While an IPO exit is in principle possible at many stock exchanges in the world, labor market frictions can hardly be evaded.

For the index calculation, it would be ideal to include all the mentioned criteria. However, some of the cited papers focus on particular economies or regions, depending on the data available, and their analyzed datasets are not existing or hardly comparable to the datasets that exist for the European Union countries (and Norway and Switzerland). Hence, we try to find the best possible proxies for the determined drivers of VC/PE activity. Therefore, we summarize the

related literature, as already expressed by the sub-chapter's headings, and identify six main criteria that ultimately determine the attractiveness of an individual country for VC/PE investments: Economic Activity, Capital Markets, Taxation, Investor Protection & Corporate Governance, Human & Social Environment, and Entrepreneurial Opportunities. We regard these criteria as "key drivers", and base the index structure upon them. Since none of the key drivers is directly measurable, we regard them as constructs and search for data series that adequately express their character. For example, we search appropriate data to proxy Economic Activity. Altogether, we find 42 individual data series to describe the six key drivers. We define sub-constructs and group data series when they share a common character. We refer to the sub-constructs as lower index levels (level 2 and 3) and aggregate the data on the lower levels to concentrate information. The final step is to aggregate the information of the six key drivers to the overall index. An important issue is the determination of the weights of the individual data series and constructs when aggregating the index. We describe the structure of our constructs, the methodologies for determining the weights and for the index aggregation in the following chapter.

4. Data and Aggregation Methodology

4.1. Data Sample

The selection of our data series is driven by the previous literature findings. The task is to find adequate measures that share common characteristics with one of the six identified key drivers for the European Union countries plus Switzerland and Norway. Thus, we want to rely on commonly accepted data sets only and, below, we propose the 42 individual data series presented. However, the selection remains arguable: we might include additional data-series, or exchange some of them against different ones. The quality of some data might be poor due to heterogeneous data gathering methods in the individual countries. Additionally, we might include too many individual items for the calculation and, hence, over-determine the index. A fewer items might be more appropriate to predict a country's VC/PE attractiveness.

To control for this criticism, we perform the robustness checks where we alter the aggregation methodology and where we discard data series from the selection. These checks confirm the robustness of our calculations, and the data selection. They also emphasize that exchanges of particular data-series or discarding data does not meaningfully affect the overall results. We present the robustness checks in a subsequent chapter of this paper.

Table 1 shows the selected raw data series and their sources (respectively, alternative sources if data was not available for all countries) that we use for the calculation of our index. The outline in Table 1 also represents the structure of the index. The six first-order constructs - Economic Activity, Capital Market, Taxation, Investor Protection & Corporate Governance, Human & Social Environment, and Entrepreneurial Opportunities - correspond to the six key drivers we already defined. The criteria of all lower orders are grouped and aggregated to the next superior construct to finally proxy the six latent drivers. For example, 5.2 Labor Regulations, which is one construct to express 5. Human & Social Environment, depends on three sub-criteria; 5.2.1 Rigidity of Employment, 5.2.2 Hiring Cost, and 5.2.3 Firing Cost. Similarly, 5.2.1 Rigidity of Employment is itself constructed by three sub-criteria: 5.2.1.1 Difficulty of Hiring Index, 5.2.1.2 Rigidity of Hours Index, and 5.2.1.3 Difficulty of Firing Index.

Table 1

List of raw data and their sources

Key Drivers/Individual Data Series	Source
1. Economic Activity	
1.1. Gross Domestic Product	
1.1.1. Total GDP [€/capita]*	Global Market Inform. Database
1.1.2. Total GDP y-o-y Growth [%]**	Global Market Inform. Database
1.2. General Price Level [Index=1995]***	Global Market Inform. Database
1.3. Working Force (Unemployment Rate) [%]*	Global Market Inform. Database
1.4. Foreign Direct Investment, Net Inflows [% of GDP]***	Global Market Inform. Database
2. Capital Market	
2.1. IPO [IPO Volume in % of GDP]****	Thomson Financial Data
2.2. Stock Market	
2.2.1. Stock Market Capitalization [% of GDP]*	Worldbank Data
2.2.2. Stock Market Total Value Traded / GDP [% of GDP]*	Worldbank Data
2.3. M&A Market [sales % of GDP]*	Global Market Inform. Database
2.4. Debt & Credit Market	
2.4.1. Central Bank Discount Rate [%]*	IMF
2.4.2. Private Credit by Deposit Money Banks and Other Financial Institutions [% of GDP]*	Worldbank Data
2.4.3. Number of Banks [per Capita]	EBRD, EUROSTAT Database
2.5. VC/PE Activity [Funds Invested in % of GDP]****	Thomson Financial Data
3. Taxation	
3.1. Highest Marginal Corporate Tax Rate (%)	Worldbank Data
3.2. Difference Between Income and Corporate Tax Rate [%]	The Heritage Foundation
4. Investor Protection and Corporate Governance	
4.1. Extent of Disclosure Index	Worldbank Data
4.2. Extent of Director Liability Index	Worldbank Data
4.3. Ease of Shareholder Suits Index	Worldbank Data
5. Human & Social Environment	
5.1. Education	
5.1.1. Government Expenditure on Education [% of GDP]*	Global Market Inform. Database
5.1.2. Amount Employees as Researchers in the University Sector [per capita]	EUROSTAT
5.1.3. Amount University Students [per capita]*	Global Market Inform. Database
5.1.4. Amount University Establishments [per capita]	Global Market Inform. Database
5.2. Labor Regulations	
5.2.1. Rigidity of Employment	
5.2.1.1. Difficulty of Hiring Index	Worldbank Data
5.2.1.2. Rigidity of Hours Index	Worldbank Data
5.2.1.3. Difficulty of Firing Index	Worldbank Data
5.2.2. Hiring Cost [% of salary]	Worldbank Data
5.2.3. Firing Costs [weeks of wages]	Worldbank Data
5.3. Bribing & Corruption Index	Transparency
5.4. Crime	
5.4.1. Juvenile Offenders [per capita]*	Global Market Inform. Database
5.4.2. Offences [per 100,000 habitants]*	Global Market Inform. Database
6. Entrepreneurial Opportunities	
6.1. General Innovativeness Index	TrendChart.Cordis
6.2. R&D Expenditure	
6.2.1. Public R&D Expenditures [% of GDP]	EUROSTAT, OECD
6.2.2. Business R&D Expenditures [% of GDP]	EUROSTAT, OECD
6.3. Enterprise Restructuring	
6.3.1. Small-Scale Privatization Index	EBRD
6.3.2. Large-Scale Privatization Index	EBRD
6.3.3. Governance and Enterprise Restructuring Index	EBRD
6.4. Enterprise Stock Activity	
6.4.1. Number of Enterprises [per capita]	World Bank, EUROSTAT, OECD
6.4.2. Enterprise Foundation Rate [%]*	World Bank, EUROSTAT, OECD
6.5. Burden: Starting a Business	
6.5.1. Procedures [numbers]	Worldbank Data
6.5.2. Time [days]	Worldbank Data
6.5.3. Cost of Business Start-Up Procedures [% GNI per capita]	Worldbank Data
6.5.4. Min. Capital [% GNI per capita]	Worldbank Data

*	=	arithmetic average of annual data from 2000 to 2005,
**	=	geometric average of annual data from 2000 to 2005,
***	=	log of arithmetic average of annual data from 2000 to 2005,
****	=	arithmetic average of annual data since coverage in the database for CEE countries, arithmetic average of annual data from 2003 to 2005 for the other countries, otherwise: 2005 data record.

We use time series ranging from 2000 to 2005 and usually refer to the last data record. However, some of the data-points are averages over a certain time-period to smooth fluctuations. For example, GDP figures, VC and PE activity or M&A transaction volume among others are such averages considering the period from 2000 to 2005. For large fluctuations and large differences between the countries we also use logs of the averages (please refer to the legend of Table 1 for detailed information). In less than one percent of all cases, data was not available for a certain year. If data-points are missing, we apply the three methods suggested by Nardo et al. (2005a) in the following order: a) We try to find missing data in other databases or via the Internet, b) we interpolate between the adjacent data records, and c) we use the latest available data before 2005.

However, we do not always use raw data but sometimes refer to ready-made indexes like the "doing business indexes" from the World Bank.[1] For instance, our indicator for investor protection and corporate governance is a ready-made index. For detailed descriptions of the individual index items, we refer the reader to the Appendix to this paper and the original data sources, where comprehensive definitions and descriptions of the data series are provided. Also in the Appendix, we comment on our motivation for the choice of the data series in more detail. We discuss the problems that remain in the selection, and how we address these issues.

4.2. Base Case Index Calculation

In general, composite indicators are used to summarize a number of underlying individual indicators or variables. They are quantitative or qualitative measures derived from a series of observed facts that can reveal or proxy characteristics. The facts we observe for our index are heterogeneous and, to ensure that our cross-country aggregations are comparable, we need to deflate several variables by the sizes of the economies/countries and use either GDP or population as deflators. Further, due to the large number of index items (42) and data-points (105) per country (including the data records over a certain period to calculate the averages), we follow the method as already described above, and proposed by Nicoletti et al. (2000). We determine a structure of three sub-index levels and group the items that we expect to correlate with each other. The main advantage of this structure is that we can trace back indicator values to increasing levels of detail. This will help in interpreting the strengths and weaknesses of the individual countries and in drawing up the conclusions. Another advantage of the built sub-constructs is, in fact, that lower data series do not gain too much weight in the aggregation process. For example, the four data series to proxy the burden of starting a business are considered only once, when we determine entrepreneurial opportunities.

Using this composition technique for all the calculations in principle, we differentiate three methods to determine the weights for the overall index aggregation. The first method is the simplest, where we equally weigh the individual data series or constructs when we aggregate them on the superior index level. In the second approach, we refer to it as our base case, we perform factor analysis when it is suitable. The third method is a severe application of factor analysis, where we discard data series or constructs if discarding them leads to improved statistical results. Using this method in the robustness check to calculate the tight index version, we break with the above proposed data structure and strictly adhere to the mathematical result. For the two latter methods based on factor analyses, we have to prove that

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[1] See http://www.doingbusiness.org.

the raw data and the ready-made indexes are consistent for their aggregation. We perform reliability analyses, using Cronbach's Alpha, the Kaiser-Meyer-Olkin Measure of Sampling Adequacy, and Bartlett's Test of Sphericity to ascertain the consistency of the chosen data and the validity of the applied statistical method.

All the different weighting schemes are sensitive to the normalization and standardization of the underlying variables. Hence, we perform sensitivity analyses to show the impact of the different approaches on the results. All these procedures are described in the subsequent sections.

4.2.1. Analysis of Index Consistency

Cronbach's (1951) Alpha is a measure of internal consistency of items in a model or survey.[2] It assesses how well a set of items measures unidimensionality. Here, we use it to approve the consistency in our aggregation steps. Cronbach's Alpha is defined as:

$$\alpha = \frac{n\overline{R}}{1 + (n-1)\overline{\overline{R}}} \tag{1}$$

where n is the number of the components of a (sub-) construct and $\overline{R}$ is the mean correlation of the items (e.g. the mean of the non-diagonal terms of the correlation matrix). The coefficient increases with the number of sub-indicators and with the correlation of each tuple. Cronbach's Alpha is equal to zero if no correlation exists and the sub-indicators are independent. The coefficient is equal to one if sub-indicators are perfectly correlated. Hence, a high alpha indicates that the underlying items proxy well the desired characteristic. Nunnaly (1978) suggests a value of 0.7 as an acceptable threshold. The Cronbach Alpha will provide information if our selected data is adequate to express the six key drivers, and if it is appropriate to aggregate the six key drivers to the overall index. Additionally, we use Cronbach's Alpha for the determination of the optimal data set when we calculate the tight index as a robustness check.

The Kaiser-Meyer-Olkin Measure of Sampling Adequacy (MSA) is based on the partial correlations among the input variables. The measure should be above 0.5 for each individual variable and likewise for the overall test. In factor analyses, variables with MSA values below 0.5 should be omitted from the analysis one at a time. With Bartlett's Test of Sphericity, it can be shown that the correlation matrix is not an identity matrix. The test value should be below the 0.05 significance level.

Table 2 presents the consistency of the six key drivers measured by their Cronbach's Alphas, their MSA values and Bartlett's Test significance values. We do not consider Taxation and Investor protection in this calculation, because they consist of only two and three underlying data series respectively. Hence, we always aggregate these constructs using equal weights of the sub-indicators.

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[2] Cf. Raykov (1998), Cortina (1993), Feldt et al. (1987), Green et al. (1977), Hattie (1985), and Miller (1995).

Table 2

Consistency analysis of the underlying items on the level of the six key drivers

Key Driver	Cronbach's Alpha	MSA Value	Bartlett's Test
1. Economic Activity	0.553	0.549	0.001
2. Capital Market	0.729	0.603	0.000
3. Taxation	-	-	-
4. Investor Protection & Corporate Governance	-	-	-
5. Human & Social Environment	0.750	0.604	0.000
6. Entrepreneurial Opportunities	0.785	0.624	0.000

Cronbach's Alpha for economic activity is below the cut-off value of 0.7. This could lead us to exchange or to drop some items that proxy economic activity and we will address this issue in the robustness check with our tight index definition, where we show that improvements of unidimensionality achieved by discarding data series do not necessarily lead to a more accurate overall index. Regardless, the aggregation of the six key drivers to the overall VC/PE Attractiveness Index yields a Cronbach's Alpha of 0.769, and the MSA value is 0.629, while the Bartlett Test of Sphericity is significant at 0.000. Thus, we propose that our selection of index items altogether is adequate to calculate a country's attractiveness for VC/PE investors, and proceed using the index structure with 42 data series as described above.

4.2.2. Normalization and Standardization

All data-points need to be normalized for their index aggregation. There exist various techniques, each one with particular advantages and disadvantages as discussed by Freudenberg (2003), Jacobs et al. (2004), and Nardo et al. (2005a). We use two different methods – standardization, and rescaling - in our calculations, and analyze their sensitivity on the results.

Standardization (or z-scores) converts the underlying data to a common scale of the normal distribution with a mean of zero and a standard deviation of one. Hence, variables with extreme values have a greater effect on the indicator. The z-score is defined as:

$$z = \frac{x - \bar{x}}{s}$$

(2)

The rescaling method is used to normalize indicators to an identical range by linear transformation. This method is vulnerable for extreme values or outliers that can distort the transformation. However, rescaling can widen the range of indicators lying within small intervals more than using the z-scores transformation. The rescaling method is defined as:

$$y = \frac{x - \min(x)}{\max(x) - \min(x)}$$

(3)

Ebert and Welsch (2004) discuss that the selection of a suitable normalization method is not trivial and requires special attention. The method must consider the properties of the underlying data, as well as the objective of the summarized indicator. The z-scores and the rescaling approach are the most commonly used because they have desirable characteristics when it comes to aggregation.

Considering our data, where the values of the variables are rather close to each other for some criteria, the rescaling method seems most appropriate because it widens the countries' spread and, thus, allows easier interpretations. Accordingly, we use the rescaling method as our base case and convert all variables of the particular sub-indexes to a common scale from 1 to 100 points. Thereby, 100 represents the best score, while 1 is the worst. For every individual variable, we define whether high values positively or negatively influence the attractiveness for VC/PE investors, and hence, assign 100 points either to the lowest (e.g. in case of hiring costs) or to the highest score (e.g. in case of GDP/Capita). In our sensitivity analyses, we investigate the difference resulting from using z-scores for standardization. The next step deals with the weighting of the individual criteria and constructs, and their aggregation to the VC/PE Attractiveness Index.

4.2.3. Weighting of the Index Items

If there are no statistical or empirical grounds for choosing a different scheme, we could use equal weights to aggregate the index items. This implies an equal contribution of all sub-indicators to the VC/PE attractiveness, which is arguable. However, from the large body of literature it is difficult to draw conclusions about the importance, and hence the weight, of the individual criteria. Equal weighting, as discussed by Nardo et al. (2005a), can be the result of insufficient knowledge about causal relationships, ignorance about the correct model to apply or even stem from the lack of consensus on alternative solutions. There are a number of weighting techniques derived from statistical models. Manly (1994) discusses principal component analysis. Nardo et al. (2005a) propose factor analysis, and data development analysis. Kaufmann et al. (1999 and 2003) use an unobserved component model. Other, similar weighting techniques are derived from analytic hierarchy processes, as described in Forman (1983), or Saaty (1987), or from conjoint analysis, as in Green and Srinivasan (1978), Hair et al. (1998), and McDaniel and Gates (1998).

We use both; one approach with equal weights among all the sub-index items and one approach based on factor analysis. Using this latter technique, we differentiate between the index levels. The level 3 sub-indexes are always aggregated using equal weights, but for the level 2 sub-indexes, and for the key drivers, we follow Berlage and Terweduwe (1988). In this weighting method, each component is assigned a weight according to its contribution to the total variance in the data. This is an attractive feature, because it ensures that the resulting summary indicators account for a large part of the cross-country variance of the underlying items. That makes this method independent of prior views on their relative economic importance. This is at once an advantage and a disadvantage. The advantage is that "we let the data speak" and do not need to determine weights on our own which would be an arbitrary task. The disadvantage is that one might assume that some of the criteria play a dominant role. However, as highlighted in Nicoletti et al. (2000), the properties of factor analyses are particularly desirable for cross-country comparisons. In our sensitivity analyses, we investigate the impact of different criteria weights on the overall result.

A detailed discussion of factor analyses is carried out in, for instance, Hair et al. (1998). The general linear factor model for p observed variables and q factors or latent variables takes the form:

$$x_i = \alpha_{i1} F_1 + \alpha_{i2} F_2 + ... + \alpha_{iq} F_q + e_i \qquad (i = 1,...,p) \qquad (4)$$

where x_i represent standardized variables, and $\alpha_{i1},...,\alpha_{iq}$ are factor loadings related to the factors $F_i,...,F_q$, while e_i are residuals. We assume that the factors are uncorrelated with each other, and with the residuals. Further, they have zero means, and unit variance. Additionally, the residuals are uncorrelated with each other. They have zero means, but not necessarily equal variances.

Now, the most common method used to extract the first m components is principal component analysis. The decision of when to stop extracting factors depends on the point when only little "random" variability remains. Various stopping rules have been developed as described in Dunteman (1989): Kaiser's Criterion, Scree Plot, variance explained criteria, Joliffe Criterion, Comprehensibility, Bootstrapped Eigenvalues and Eigenvectors. Kaiser's Criterion is one of the most widely used stopping rules and recommends dropping all factors with an Eigenvalue below one. Due to Kaiser (1958), most of the total variance is determined by components beyond the Eigenvalue of one. However, regarding the Eigenvalues in our sample, there is another large decrease of explained variance below Kaiser's mark. As demonstrated in Table 3, we obtain three components that represent 83.8% of the total variance of the underlying data.

Table 3

Total variance explained by components

| Component | Initial Eigenvalues | | |
	Total	% of Variance	Cumulative %
1	2.747	45.776	45.776
2	1.306	21.766	67.541
3	0.976	16.268	83.810
4	0.446	7.431	91.241
5	0.300	5.005	96.246
6	0.225	3.754	100.000

The next step deals with the rotation of factors (see Table 4). According to Hair et al. (1998) the usual rotation method is the Varimax Rotation. Rotation minimizes and maximizes the factor loadings. Ideally, each indicator is loaded exclusively on one of the factors. Kline (1998) points out that the rotation changes the factor loadings and, hence, the factors' interpretation, but leaves the analytical solutions *ex-ante* and *ex-post* rotation unchanged.

Table 4

Rotated Component Matrix

| | Component | | |
	1	2	3
Economic Activity	0.849	0.077	0.249
Capital Market	0.700	-0.457	0.391
Taxation	0.018	0.924	0.154
Investor Protection & Corporate Governance	0.089	0.133	0.966
Human & Social environment	0.796	0.376	-0.088
Entrepreneurial opportunity	0.851	-0.211	0.004

Table 4 presents the component matrix after Varimax Rotation and allows an interesting interpretation: Economic Activity, Capital Market, Human & Social Environment and Entrepreneurial Opportunities have high loadings on the first factor. Hence, the first factor represents the general socio-economic conditions. Taxation and Investor Protection & Corporate Governance each have high loadings on one of the remaining two factors. Consequently, we can name the two other factors correspondingly. As a result, the index score of a country depends on these three main components: the socio-economic environment, the tax regime and the corporate governance & property rights protection.

The last step (see Table 5) of the weighting procedure deals with the construction of the weights from the matrix of factor loadings after rotation. The square of a factor loading represents the proportion of the variance of the indicator explained by the factors. Now, the three intermediate components are aggregated by weighting each composite using its proportion of explained variance in the dataset: 0.513 for the first (0.513 = 2.578/(2.578+1.272+1.179)), 0.253 for the second component and 0.235 for the third one. Finally, we can calculate the overall weights as a linear combination of the three components.

Table 5

Calculation of the weights

	Rotated component loadings			Component weights			Overall weights
	1	2	3	1	2	3	
Economic Activity	0.849	0.077	0.249	0.280	0.005	0.053	**0.157**
Capital Market	0.700	-0.457	0.391	0.190	0.164	0.130	**0.169**
Taxation	0.018	0.924	0.154	0.000	0.671	0.020	**0.174**
Investor Protection & Corporate Governance	0.089	0.133	0.966	0.003	0.014	0.791	**0.191**
Human & Social Environment	0.796	0.376	-0.088	0.246	0.111	0.007	**0.156**
Entrepreneurial Opportunity	0.851	-0.211	0.004	0.281	0.035	0.000	**0.153**
Explained Variance	2.578	1.272	1.179				
Explained Variance/Total Variance	0.513	0.253	0.234				

Table 5 presents the weights of the six key drivers. Investor Protection & Corporate Governance achieves the highest weight, followed by Taxation and the Capital Market. However, it becomes obvious that the difference between the weights of the six key drivers is not very large, probably leading to similar results if we applied equal weights to aggregate the sub-indexes. We address this issue in the scenario analyses.

Tables 3, 4, and 5 present the procedure to determine the weights of the already aggregated key drivers. To determine the key drivers we had to perform the analogue procedure one-step before, using the data and sub-constructs they consist of. We present the results of the factor analyses for the key drivers in the Appendix to this paper.

Nardo et al. (2005b) discuss the advantages and disadvantages of factor analysis. Factor analysis can summarize a set of sub-indicators while preserving the maximum possible proportion of the total variation in the original set. This is a very desirable feature for cross-country comparisons. Contrarily, the determined factor loadings might not represent the real influence of sub-indicators. However, the real influences are as yet unknown and our index will contribute to solving this problem. Furthermore, factor analysis is highly sensitive towards modification of the sample due to data revisions or updates of new countries. Factor analysis is

also very sensitive to the presence of outliers, which may introduce a spurious variability in the data, and to the sample size.

4.2.4. Aggregation

Various possible procedures exist for the index aggregation. Nardo et al. (2005a and 2005b) distinguish additive methods, geometric aggregation and non-compensatory multi-criteria analysis. We focus on linear and geometric aggregation because they are in common use.

Linear aggregation is an additive method and defined as:

$$\bar{x} = \sum_i w_i x_i, \quad where \ 0 \leq w_i \leq 1, \ and \ \sum_i w = 1$$

(5)

Geometric aggregation is defined as:

$$\bar{x} = \prod_i x_i^{w_i}, \quad where \ 0 \leq w_i \leq 1, \ and \ \sum_i w = 1$$

(6)

Ebert and Welsch (2004) recommend that the linear aggregation method is useful when all sub-indicators have the same measurement unit, and geometric aggregation is better suited if non-comparable and strictly positive sub-indicators are expressed in different ratio scales. Nardo et al. (2005a) highlight that linear aggregation assigns base indicators proportionally to the weights, while 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-indexes benefit from linear aggregation.

Linear aggregation is the more intuitive approach. However, the subsequently described sensitivity analyses reveal that the index calculation based on geometric aggregation yields the best tracking results if we compare the index scores with the actual fundraising activities of the particular countries. For this reason, we describe our base case findings using the geometric aggregation method in the following chapter.

5. Results

5.1. Base Case Findings

We calculate the base case of our VC/PE Attractiveness Index according to the procedures described using rescaling, factor analysis, and geometric aggregation. Figure 1 presents the index rankings for the 25 European Union countries (Estonia, Latvia, and Lithuania grouped into the Baltic States), plus Switzerland and Norway. We also calculate a GDP-weighted average score of the EU-25 members. This average score is rescaled to 100 points to simplify country comparisons. Hence, every country is directly comparable to the European Union average.

Figure 1

Country ranking according to our base case calculations: rescaling, factor analysis, and geometric aggregation
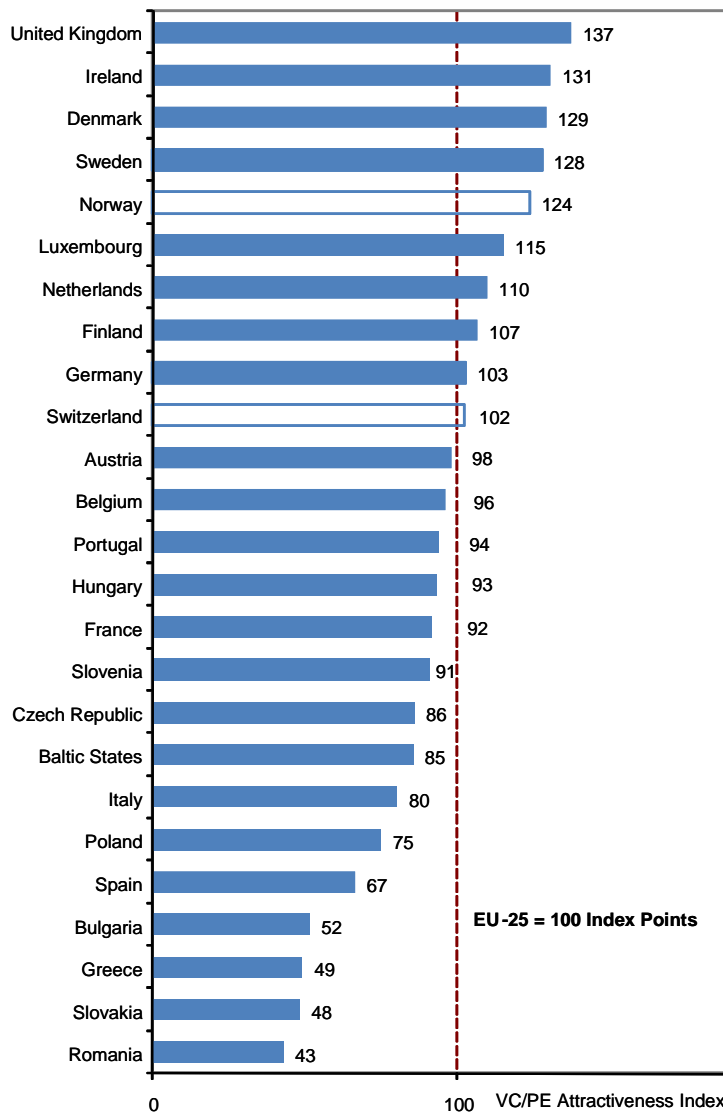
The top performers are the United Kingdom, Ireland, Denmark, Sweden and Norway. Germany, the largest European economy, ranks slightly above the average, while other large economies, such as France, Italy, and Spain have rather disappointing scores. Bulgaria, Greece, Slovakia, and Romania are the least attractive European countries for VC and PE investors. Bulgaria, Slovakia, and Romania are "new" European Union members that just recently joined in 2004. Caused by the ongoing transition process from former centrally-governed socialistic economies their low scores are understandable. However, for Greece the result is unfruitful. Due to lack of space, we cannot discuss the decisive factors that determine the scores for all the individual countries. However, we find a typical pattern in the scores and explain it with a focus on the first and last ranked countries, and on the largest European economy.

Figure 2 presents a spider chart with the scores of the six key drivers for the United Kingdom, Germany and Romania. Once again, the EU-25 average is rescaled to 100 so that the scores are directly comparable with the European Union average.

Figure 2

Comparison of Key Drivers of the United Kingdom, Germany and Romania
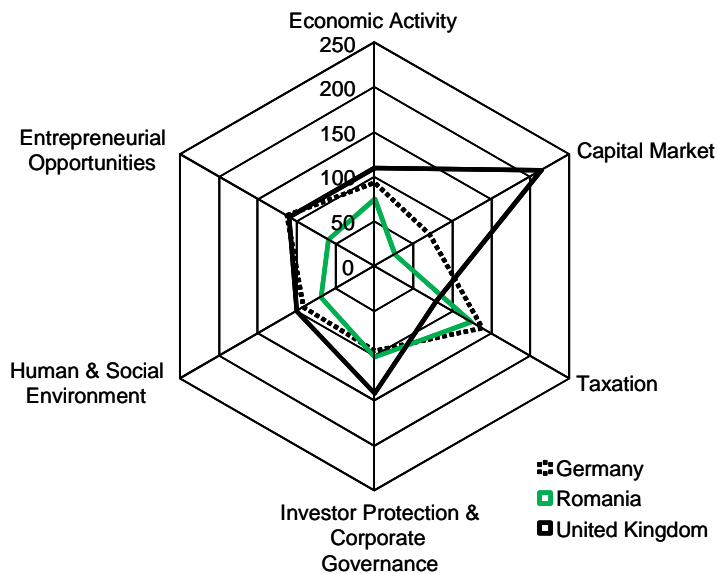

Figure 2 shows that, while Investor Protection & Corporate Governance is on an equal level for Romania and Germany, the United Kingdom is superior. There is only very little dispersion regarding Investor Protection & Corporate Governance among the Continental European Union members as they all have similar rules. However, the United Kingdom (and this is also valid for Ireland) impressively outperforms the EU-25 average. La Porta (1997 and 1998), Glaeser et al. (2001), and Djankov et al. (2003 and 2005) link this to the common law system. Roe (2006) emphasizes that and argues that the historically good corporate law protection of minority shareholders in the United Kingdom is a good example for the precondition for the development of a vibrant capital market. This becomes evident when we compare the scores for the Capital Market key driver of the three countries. While the size and liquidity of Germany's and Romania's capital markets are even below the EU-25 average, the United Kingdom demonstrates its major advantage. This is in line with the findings of Black and Gilson (1998) who discuss the implications of a stock market centered capital market for the VC/PE asset class. Similarly, Gompers and Lerner (2000) highlight the importance of the capital market. Good investor protection leads to a vibrant capital market, and this likewise establishes the required professional community to secure deal flow and exit opportunities for VC and PE funds. The capital market turns out to be the most distinguishing feature between the United Kingdom and the other European countries. The United Kingdom is on par or only slightly better than the EU-25 average with respect to Economic Activity, Entrepreneurial Opportunities, and Human and Social Environment. It has a small disadvantage regarding Taxation. However, this disadvantage is more than compensated by its Investor Protection & Corporate Governance and its Capital Market. Our proposed index structure allows disaggregation of the results on the lower index levels. Figure 3 presents the scores for the United Kingdom, Germany and Romania on the aggregation level below the key drivers.

Figure 3

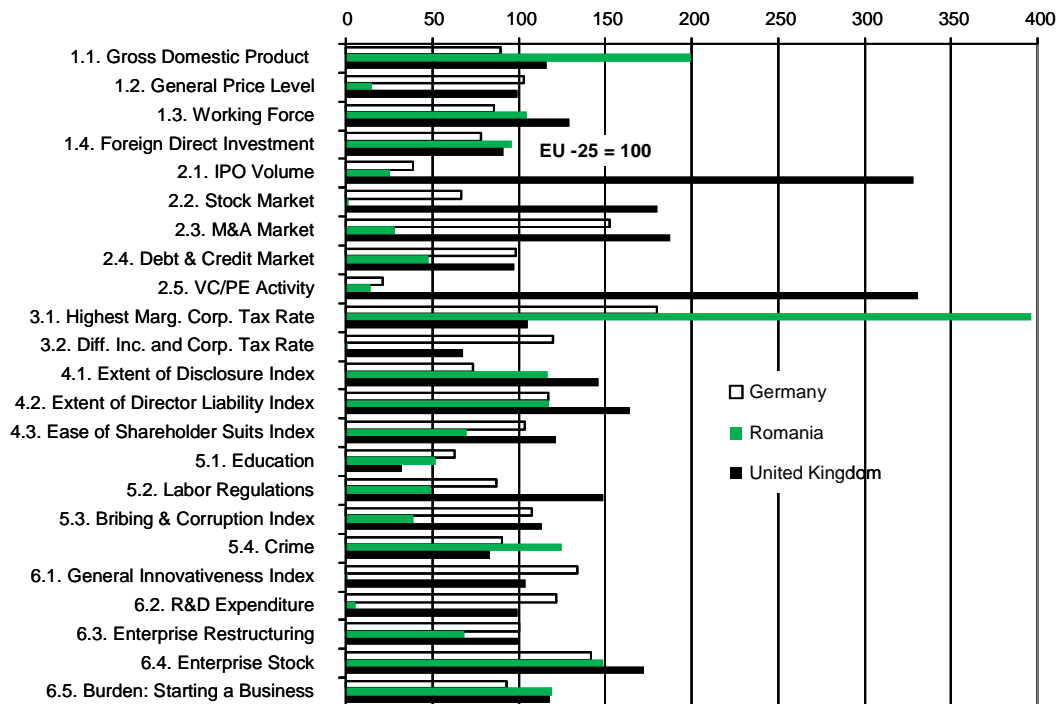Comparison of level 2 sub-indexes of the United Kingdom, Germany and Romania

Figure 3 underlines the strengths of the United Kingdom Capital Market and its Investor Protection & Corporate Governance. It also presents its disadvantage regarding Taxation. Germany has lessened the tax burden for its corporations in recent years and, in addition, is above average regarding the differential to the top income tax rate. Romania has a very low corporate tax rate, but the same low top income tax rate (hence an invisible score of 1 point). The United Kingdom is on a par with the average European corporate tax rate but only has a small differential to the income tax rate. For Romania, we should note that its top position regarding GDP is caused by the large growth rate in recent years and not by the GDP/capita figure. This information would become transparent if we presented the scores on the subsequent index-sublevels. Additionally, as can be seen in Figure 3, Romania's scores regarding innovations are disappointing.

5.2. Sensitivity Analyses

Our index is sensitive to the normalization, weighting, and aggregation techniques. For our base case calculation, we use rescaling, factor analysis, and geometric aggregation. Now, we address the sensitivity of the index scores regarding the applied normalization, weighting, and aggregation.

Since the alternative procedures are straightforward calculations using the same data and index structure, we do not present the individual calculation steps, but only the results in Table 6. The Table shows the countries' scores and ranks according to several combinations of the discussed calculation methods. The first two columns present our base case for comparison. Then we use equal weights for aggregating the constructs on the next upper levels, instead of weights determined by factor analysis. Next, we combine linear aggregation and factor analysis. The

third sensitivity analysis applies equal weights, and linear aggregation, while in the last one we use z-scores for normalization instead of our rescaling procedure. It is obvious that the countries' ranks change only slightly across the chosen methods.

Table 6
Sensitivity analyses

	Base Case: Rescaling, factor analysis, geometric aggregation		Rescaling, equal weights, geometric aggregation		Rescaling, factor analysis, linear aggregation		Rescaling, equal weights, linear aggregation		Z-scores, equal weights, linear aggregation	
	Score	Ranking	Score	Ranking	Score	Ranking	Score	Ranking	Score	Ranking
Austria	97.95	11	95.46	11	99.94	11	100.10	11	101.72	12
Baltic States	85.47	18	79.13	19	92.61	17	89.63	17	89.76	17
Belgium	95.99	12	91.78	12	102.01	10	100.01	12	102.09	10
Bulgaria	51.54	22	46.18	23	79.00	22	74.49	22	76.95	23
Czech Republic	85.87	17	81.68	17	85.01	19	82.39	19	81.39	19
Denmark	129.09	3	129.64	3	120.60	5	121.02	5	122.76	4
Finland	106.55	8	111.07	9	104.22	8	109.16	8	110.52	8
France	91.55	15	90.62	13	94.96	16	94.94	13	96.87	13
Germany	102.68	9	103.60	10	99.49	12	100.62	10	101.77	11
Greece	49.18	23	50.29	22	69.38	25	67.20	25	64.52	25
Hungary	93.26	14	88.85	14	95.87	14	93.29	15	94.10	15
Ireland	130.57	2	132.06	2	130.03	1	127.85	1	129.51	1
Italy	80.24	19	80.05	18	81.22	21	80.99	21	79.27	21
Luxembourg	115.17	6	111.10	8	127.21	2	124.30	3	123.82	3
Netherlands	109.87	7	112.09	7	102.34	9	105.00	9	108.72	9
Norway	123.79	5	121.85	5	110.63	6	110.36	7	112.13	7
Poland	75.03	20	63.90	21	89.23	18	83.00	18	86.54	18
Portugal	93.85	13	88.52	15	95.89	13	92.69	16	92.01	16
Romania	43.05	25	35.90	25	76.69	23	73.34	24	75.58	24
Slovakia	48.37	24	44.72	24	76.27	24	73.81	23	78.76	22
Slovenia	90.79	16	87.46	16	95.34	15	94.14	14	95.06	14
Spain	66.55	21	68.13	20	82.41	20	81.97	20	80.76	20
Sweden	127.70	4	128.85	4	122.26	4	124.96	2	125.13	2
Switzerland	102.30	10	112.65	6	109.83	7	117.90	6	116.20	6
United Kingdom	137.39	1	133.19	1	124.26	3	121.37	4	119.19	5

Table 6 documents that the discussed statistical issues, and the choice of the weighting technique and aggregation procedure do not harm our general ranking to a great extent. The results are driven by the socio-economic facts and not by the weighting scheme. However, the analyses also provoke the question about the most reliable index version. This question will be addresses after further robustness checks.

5.3. Robustness Checks: Separate VC and PE Indexes, and a Statistically Optimized Tight Index Calculation

As argued above, our proposed data selection is subject to criticism. First, all the criteria defined are not equally important for both market segments, Venture Capital and Private Equity. Second, it might anyway be suitable to minimize the input data and discard some of the selected criteria. We address these issues with three robustness checks: we redefine our index structure and the appropriate data series, and calculate two separate VC and PE indexes as well as a "tight index".

For the separate VC and PE indexes, we refer to the literature overview and analyze the importance of the individual criteria for either market segment. Some of the criteria affect both segments equally, others are relatively less important either for Venture Capital or for Private Equity. Hence, we discard these criteria from the data selection to calculate the specific index. To gain variation in these robustness checks, we apply this rule strictly, even if the differences in importance are minor.

We assume that the general Economic Activity and Investor Protection & Corporate Governance affect both segments equally. Therefore, we use the same data and aggregation structure as before for both indexes. For the Capital Market, we believe that the credit market conditions are less important for the VC segment and, therefore, we discard that construct. Unfortunately, the available data does not allow the separation of lagged Venture Capital and lagged Private Equity activities, since for many of our sample countries no such differentiation was made in the past. Hence, we retain our measure for lagged Venture Capital *and* Private Equity activity likewise for both indexes.

Regarding Taxation we refer to Bruce (2000 and 2002), Cullen and Gordon (2002), Bruce and Gurley (2005), and Djankov et al. (2008) who discuss the impact of corporate tax rates and the differential to the income tax rate on entrepreneurial activity and the entry of businesses. Since our key driver Taxation directly seizes their arguments, we discard the construct from the PE index. Additionally, we should note that there is another effect that we have ignored so far, which impacts contrarily and hence, suggests to discard Taxation from the PE index: Low tax rates decrease the value of tax shields in debt financed transactions, and hence their rationale.

With respect to the Human and Social Environment, the level of education, and crime should influence entrepreneurial culture more strongly. Contrarily, labor regulations, and hiring and firing difficulties hurt more-established corporations than start-ups, where the entrepreneurial spirit of the employees is mandatory anyway. Finally, R&D spending, and innovativeness should be less important for the later stage segment, while we assume that privatization activities generate deal flow for PE funds. Additionally, there should be a relationship of the deal flow in the PE market segment and the total number of corporations in an economy, but not with the number of new start-ups. Finally, the burden to start a business is not relevant for already existing corporations. Consequently, we discard these data series (respectively constructs) from either data sample for the sub-indexes.

In Table 7, we present the chosen data series for the separate VC and PE indexes. The calculations directly follow our base case procedure and are described in the Appendix.

While the selection of data series for our separate VC and PE indexes is economically motivated, we propose a pure technical approach for a "tight VC and PE index". Therefore, we apply a simple heuristic to improve the statistical quality of our data aggregation, and discard data series or constructs that share little common variance with the other data. We search the data series and constructs that maximize Cronbach's Alphas and MSA values. This leads to a redefinition of the key drivers and all the underlying items. We start on the level of the individual data series and analyze the impact of regrouping or discarding them. We strictly drop items with MSA values below 0.5 or with negative marginal contributions to the Cronbach's Alpha from our dataset. Since this heuristic is based on repeated trials, we only present the final index composition in the Appendix. In Table 7, we show the 17 remaining data series and the index structure together with the chosen data series and constructs for the separate VC and PE indexes.

Table 7

Composition of the robustness checks

Key Drivers/Individual Data Series	VC Index	PE Index	Tight Index
1. Economic Activity	X	X	X
1.1. Gross Domestic Product	X	X	
1.1.1. Total GDP [€/capita]	X	X	X
1.1.2. Total GDP y-o-y Growth [%]	X	X	
1.2. General Price Level [Index=1995]	X	X	X
1.3. Working Force (Unemployment Rate) [%]	X	X	X
1.4. Foreign Direct Investment, Net Inflows [% of GDP]	X	X	
2. Capital Market	X	X	X
2.1. IPO [IPO Volume in % of GDP]	X	X	
2.2. Stock Market	X	X	X
2.2.1. Stock Market Capitalization [% of GDP]	X	X	X
2.2.2. Stock Market Total Value Traded / GDP [% of GDP]	X	X	X
2.3. M&A Market [sales % of GDP]	X	X	
2.4. Debt & Credit Market		X	
2.4.1. Central Bank Discount Rate [%]		X	
2.4.2. Private Credit by Deposit Money Banks and Other Financial Institutions [% of GDP]		X	X
2.4.3. Number of Banks [per Capita]		X	
2.5. VC/PE Activity [Funds Invested in % of GDP]	X	X	
3. Taxation	X		
3.1. Highest Marginal Corporate Tax Rate (%)	X		
3.2. Difference Between Income and Corporate Tax Rate [%]	X		
4. Investor Protection and Corporate Governance	X	X	X
4.1. Extent of Disclosure Index	X	X	X
4.2. Extent of Director Liability Index	X	X	X
4.3. Ease of Shareholder Suits Index	X	X	X
5. Human & Social Environment	X	X	
5.1. Education	X		
5.1.1. Government Expenditure on Education [% of GDP]	X		
5.1.2. Amount Employees as Researchers in the University Sector [per capita]	X		
5.1.3. Amount University Students [per capita]	X		
5.1.4. Amount University Establishments [per capita]	X		
5.2. Labor Regulations		X	
5.2.1. Rigidity of Employment		X	
5.2.1.1. Difficulty of Hiring Index		X	
5.2.1.2. Rigidity of Hours Index		X	
5.2.1.3. Difficulty of Firing Index		X	
5.2.2. Hiring Cost [% of salary]		X	
5.2.3. Firing Costs [weeks of wages]		X	
5.3. Bribing & Corruption Index	X	X	
5.4. Crime	X		
5.4.1. Juvenile Offenders [per capita]	X		
5.4.2. Offences [per 100,000 habitants]	X		
6. Entrepreneurial Opportunities	X	X	X
6.1. General Innovativeness Index	X		X
6.2. R&D Expenditure	X		X
6.2.1. Public R&D Expenditures [% of GDP]	X		X
6.2.2. Business R&D Expenditures [% of GDP]	X		X
6.3. Enterprise Restructuring		X	
6.3.1. Small-Scale Privatization Index		X	
6.3.2. Large-Scale Privatization Index		X	
6.3.3. Governance and Enterprise Restructuring Index		X	
6.4. Enterprise Stock Activity	X	X	
6.4.1. Number of Enterprises [per capita]		X	
6.4.2. Enterprise Foundation Rate [%]	X		
6.5. Burden: Starting a Business	X		X
6.5.1. Procedures [numbers]	X		X
6.5.2. Time [days]	X		X
6.5.3. Cost of Business Start-Up Procedures [% GNI per capita]	X		X
6.5.4. Min. Capital [% GNI per capita]	X		X

Table 7 reveals that, compared to our base case and the separate VC and PE indexes, the tight index depends more strongly on the economic power of the countries, on the state of their debt and public equity markets, on investors' protection, on innovativeness, and on the burden for starting businesses.

Including our robustness checks and the sensitivity analyses, we have a lot of variation in our index definitions and aggregation methods. We compare the country scores with respect to the different versions and present the ranking results in Figure 4. As our base case calculation and the four sensitivity analyses are based on the same data and index structure, we mark the span of their ranks as a vertical line. Hence, this line shows the variability of a country's ranking across the different calculation methods. The small horizontal bar is the average of these five (not necessarily different) ranks. The order of the countries from left to right is according to these average positions and, therefore, not equal to the order as in Figure 1. For the three robustness checks, we break with the data structure and, hence, do not include the ranks of the robustness checks in the vertical bar as an indicator for deviation, but mark them separately. Additionally, it is of particular interest to demarcate the VC and PE indexes to address strengths and weaknesses of our sample countries with respect to both market segments separately. The triangle indicates the rank for the VC index, while the dot represents the PE rank. The cross designates the tight index rank.

Figure 4
Sensitivity analyses, robustness checks, and average rankings
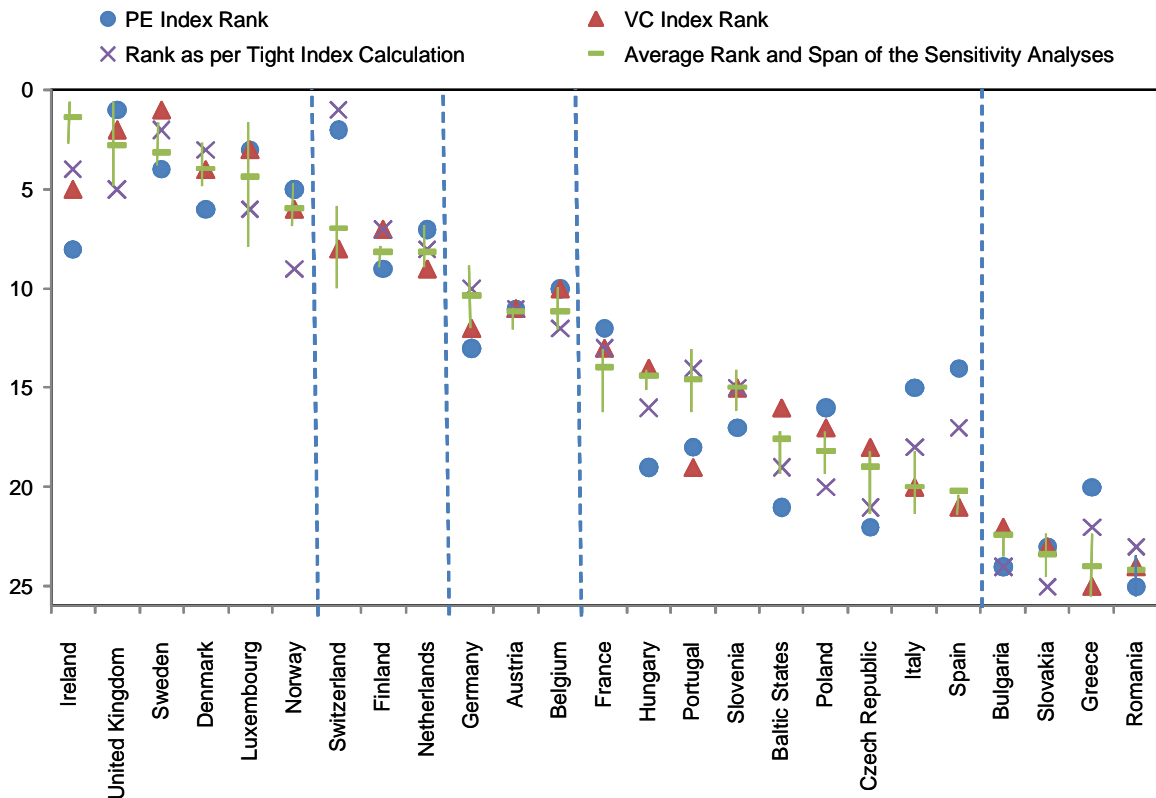
It is evident from the sensitivity analyses that the dispersion of ranks is not very large among the different calculation procedures. Additionally, the deviations of the separate VC and PE index ranks, as well as of the tight index are not very large for most of the countries, except for Ireland, Switzerland, Hungary, Portugal, Italy and Spain. The large deviation of their VC or PE

rank from the average rank (of the sensitivity analyses) is caused by changes in weight, respectively by the deletion of data series where the countries have competitive advantages/disadvantages. Spain and Italy advance many positions if we focus on the attractiveness of their PE markets only, which is mainly due to the deletion of Taxation in that index. Ireland and Hungary lose some ranking positions for the same reason. Switzerland benefits because some of its deficits regarding Human and Social Environment are discarded. However, if we focus on the VC index, their comparative positions remain. This confirms our base case calculation, which considers both segments, and uses more data series.

From Figure 4, we can also identify five tier groups of attractiveness as marked by the dashed lines. Within those tier groups, the ranks vary with respect to the different sensitivity analyses and index versions, but there is hardly any transition across the tier groups.

5.4. Explanatory Power of the Results

Intuitively, the VC/PE fundraising activity should indicate the attractiveness of a particular country to foreign investors. Hence, there should be a strong correlation between our VC/PE attractiveness scores and the actual fundraising activities in the various countries. We measure the expected VC/PE activity as ratios between raised funds and GDP. For a part of our sample, the recent European Union accession countries, the fund raising activity fluctuated very strongly in the past from zero to peak levels in some years. For this reason, we use averages over five years to smooth the fluctuations using data from the EVCA (2003, 2004, 2005, and 2006) yearbooks. We determine the Pearson Correlation of the VC and PE fundraising activity with the index-scores of our base case, all the sensitivity calculations, and the tight index version. Unfortunately, we cannot compare our two VC and PE indexes with the actual separate VC and PE fundraising activities. For the same accession countries, EVCA made no sufficient distinction of the two market segments in the past. Hence, there is no disaggregated data on the two distinct segments available and, therefore, no consistent analyses over all the countries possible. Table 8 summarizes the correlation analyses.

Table 8

Tracking power of the sensitivity analyses and the tight index

Index Calculation Method	Correlation with VC/PE activity, (two-tailed significance level)
Base Case: Rescaling, factor analysis, geometric aggregation	0.599, (0.002)
Rescaling, equal weights, geometric aggregation	0.580, (0.002)
Rescaling, factor analysis, linear aggregation	0.567, (0.003)
Rescaling, equal weights, linear aggregation	0.551, (0.004)
Z-scores, equal weights, linear aggregation	0.529, (0.007)
Tight Index: Rescaling, factor analysis, geometric aggregation	0.550, (0.004)

The correlation analyses reveal ($\rho = 0.599$) that our base case calculation method is the most adequate to measure the attractiveness of a country for Venture Capital and Private Equity investors. However, the proposed factor analyses are extensive. Evading the effort to perform these analyses and weighing all index items and constructs equally yields to a small decrease of the tracking power ($\rho = 0.580$). If we keep our base case, but aggregate all the constructs linearly (instead of geometrically), we further decrease the index's tracking power ($\rho = 0.567$). Avoiding factor analyses in that case continues deteriorating the result ($\rho = 0.551$). We receive the largest loss

in quality if we use z-scores to standardize the variables (ρ = 0.529) instead of rescaling them. Finally, discarding data series from our proposed selection, and optimizing the statistical quality of the data aggregation, as in our tight index version, indeed leads to a lean and consistent index, but also to less satisfying results (ρ = 0.550). This means that the advantage of handling less data and performing fewer calculations goes along with a loss of the explanatory power.

Figure 5

Tracking power of our base case index
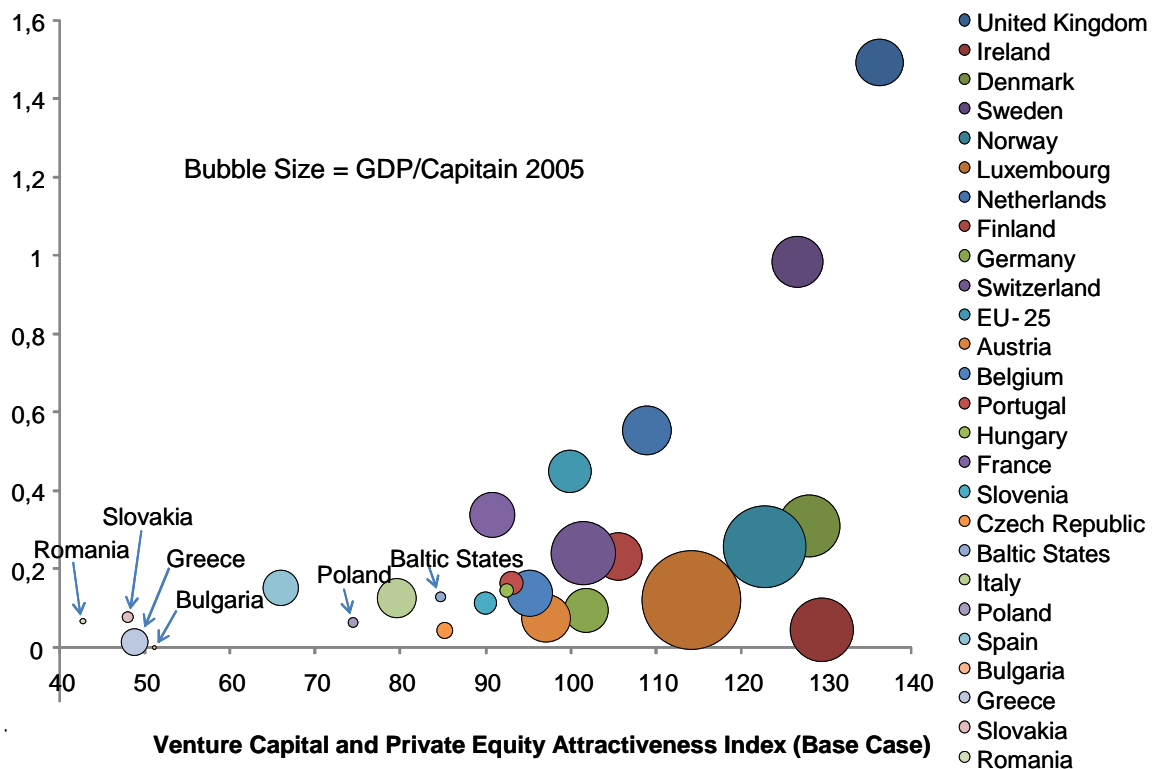
In Figure 5, we present the tracking power of our base case index. The ordinate captures the expected VC and PE activity in the particular countries, measured by the average of the ratios of funds being raised and GDP for the years 2001 to 2005. The data source is the EVCA (2003, 2004, 2005, and 2006) yearbooks. The abscissa reflects the countries' scores according to our base case Venture Capital and Private Equity Attractiveness Index. Additionally, we also consider the economic prosperity of the countries [GDP/capita] by the size of the bubbles to provide a benchmark for comparison.[3] Figure 5 expresses the dominating role of the United Kingdom regarding the VC/PE activity in Europe. We should note however, that the data on raised funds is collected according to the "office approach". That means that the headquarters of the fund raising GPs determine the country statistics. It is not clear, where the money will finally be invested. For example, a large portion of the capital allocated in the United Kingdom serves other European countries. On one hand, this represents investors' confidence in the quality of the United Kingdom finance professional community. On the other hand, this highlights that the raised funds are a biased indicator for expected VC/PE activity in particular country.

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[3] Note: Bulgaria's GDP/capita ratio is very small and its expected VC/PE activity is close to zero. Hence, Bulgaria's position is next to the abscissa and hardly visible.

6. Conclusions and Outlook

We present a composite index to measure the attractiveness of 25 European countries for Venture Capital and Private Equity investors. Therefore, we review the literature on VC/PE activity determinants and identify six key drivers that affect a country's attractiveness: Economic Activity, Capital Markets, Taxation, Investor Protection & Corporate Governance, Human & Social Environment, and Entrepreneurial Opportunities. We propose 42 data series to proxy these key drivers, and different methods for calculating the index, namely for normalization, weighting, and aggregation. We run a base case calculation and find the United Kingdom to be the most attractive European country for VC/PE investors, followed by Ireland, Denmark, Sweden, and Norway. The largest European economy, Germany, ranks slightly above the European Union average. Other large European economies, such as France, Italy and Spain show little attractiveness. The ranking concludes with Bulgaria, Greece, Slovakia, and Romania. The low attractiveness scores of Bulgaria, Slovakia, and Romania are understandable, as they are recent entrants into the European Union and still in transition from a former centrally planned economy. However, for Greece the result is rather disappointing.

In additional robustness checks, we distinguish the differences of the two market segments Venture Capital *and* Private Equity, and calculate two separate indexes. Further, we present a "tight index" where we discard data series with little or negative contribution to the series' unidimensionality. This reduces the number of necessary data series to 17, and likewise addresses a potential over-determination of our base case index. We find that the advantage of less effort in collecting data and running the calculations goes along with less explanatory power of the index. We measure the explanatory power of the different index-versions by the correlation of the country scores with their actual VC and PE fundraising activity and receive the highest correlation for our proposed base case index. The separate VC and PE indexes lead to similar country rankings as our base case. However, some countries slightly change their rank if we focus on their attractiveness for either Venture Capital *or* Private Equity investments. Over all of our index versions and robustness checks, we find five tier groups of attractiveness rankings for the European countries. This signals the robustness of our calculations: the results are economically driven by interaction of several criteria, and not by the statistical approach or by individual data series.

Lack of space prevents us from commenting on all the individual countries. However, we find a general pattern if we compare the characteristics. There is dispersion in all the six key drivers across Europe. Some countries attract investors with low corporate taxes. The Nordic countries are especially strong in Entrepreneurial Opportunities. There is some dispersion in Economic Activity, and in the Human & Social Environment. However, Investor Protection & Corporate Governance, and Capital Markets make the difference. The United Kingdom clearly dominates all the other countries regarding these criteria while their taxation score is below the European average, and while the other criteria are on a par. Glaeser et al. (2001), and Djankov et al. (2003 and 2005) discuss the impact of a common-law system and La Porta et al. (1997 and 1998) confirm that the legal environment strongly determines the size and liquidity of a country's capital market. Roe (2006) expands this line of research and comments on the historical development of corporate governance rules for major economies. He points to the importance of shareholder protection for the establishment of a vibrant capital market, and compliments the United Kingdom's example. Black and Gilson (1998) emphasize the role of the professional infrastructure that accompanies the stock market-centered capital markets. From their studies, we can conclude that good investor protection leads to a vivid capital market, and this likewise

evolves the required professional community to secure deal flow and exit opportunities for VC and PE funds. This ultimately determines a country's attractiveness for institutional investments in the VC/PE asset class.

However, Black and Gilson (1998) name it a "chicken and egg problem": a VC/PE market requires a stock market but a stock market requires entrepreneurs and exit transactions, which in turn, require a VC/PE market. Instead of creating multiple new institutions, they recommend piggybacking on the institutional setting of another country. If this is successful, it will bring a potential for the development of local institutions. For example, foreign VC/PE funds might find it profitable to hire and train locals to help them find investment opportunities. Once trained, some of them will found their own companies locally, and compete with their former employers.

While their arguments are very rich, the discussion reflects the capital supply side only. We should also take into account that, as revealed in our analyses, some European countries lack several important attractiveness criteria. Without sufficient entrepreneurial culture and entrepreneurial opportunities, with rigid labor markets, and bribery and corruption, there will be no demand for Venture Capital and Private Equity. If there is no demand, there is also no need to piggyback on another country's institutions.

The availability of the necessary data series limits the scope of our index. The full data set with the required quality is not available to any useful extent for other regions of the world (besides North America). However, the research project should be extended to cover the whole world. A fruitful approach is to search for new data series that cover all relevant countries and to calculate an index based on the proposed method for comparison between continents and, especially, for emerging markets. This should shed more light on the worldwide competition of economic regions.

Unfortunately, our economic approach cannot cover special situations or special opportunities for VC/PE investments in particular countries. This is notably the case for tax considerations. It is impossible to cover and compare individual countries' tax regimes on a general and transparent level, especially including taxes on dividends, and capital gains taxes, which are of particular importance for the asset class in question. Similarly, this is valid for different public subsidy policies to attract institutional capital. Moreover, our approach relies on last available and historic (averaged) data, and cannot consider the latest development of individual items. Nevertheless, we attempt to contribute to the transparency of the VC/PE asset allocation process, and to discover strengths and weaknesses of the European economies to spur their competitiveness, innovation, entrepreneurship, employment, and growth.

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Appendix A

Motivation for the Data Selection

The presented selection of raw data and ready-made indexes in Table 1 deserves several comments. Unfortunately, due to the poor supply for adequate data, we choose individual data series in reverse order of the criteria. In the first stage, the choice is driven by its availability for the sample countries, and in the second stage by its character. Data series like GDP/capita or average GDP growth are commonly available and need not be explained. However, a construct like Crime is less intuitive. We emphasize that the basic idea of the index is that the chosen data series do not directly express the attractiveness of an individual country for VC and PE investors, but all of the data related together contribute to that latent information. The rationale for the definition of a construct like Crime is the following: as also discussed by Djankov et al. (2002) the crime rate in a particular country affects its human and social environment, and an investor should prefer countries with lower crime rates. Hence, crime is a latent driver for institutional investors' activities. Unfortunately, an objective and reliable measure for crime does not exist on a pan-European scale. There only exist two data series on juvenile offenders and offences per capita for our sample countries. It sounds odd, to relate juvenile offences and institutional investments. However, this is exactly the justification of the proposed index structure: we assume that the number of juvenile offenders and offences per capita contribute to the perception of crime in a society. The perception of crime is one criterion to describe the human and social environment, which is in turn, finally one parameter that institutional investors consider for their international asset allocation. This way, the number of juvenile offenders becomes a latent driver of the country's attractiveness. With this presupposition, we describe in the following sections the choice of our data series for every key driver.

A.1. Data for the Economic Activity Construct

Our definition of the Economic Activity construct follows the findings of Gompers and Lerner (1998), Wilken (1979), and Romain and van Pottelsberghe de la Potterie (2004). They argue that the growth of national economies influences the foundation of new enterprises. Related to that, the pure size of an economy should also determine the VC/PE activity. First, one might expect a similar ratio of VC/PE activity to economy size for comparable countries. Hence, the ratio represents average VC/PE funding needs. Second, institutional investors might just not track countries of little economic size. Similar to these reasons, we add an indicator for inflation, for unemployment, and for foreign direct investments to the construct. With the indicator for inflation, we control for real growth. Unemployment represents another criterion for the prosperity of an economy. The net inflow of foreign direct investments mirrors the availability to attract international investments in general. We assume that this indicator first summarizes all the economic conditions to some extent and, second, strongly correlates with the attractiveness to receive VC/PE funding.

Regarding the correlation of the chosen indicators, we would expect that GDP/capital correlates negatively with economic growth, as small economies have more potential to achieve large growth rates. Contrarily, we assume that large growth is related positively to higher inflation and a higher current unemployment rate. These issues highlight the problem of selecting adequate criteria and finally determining their weight in the overall index. As we present in the analytical section of the paper, it is more promising for the determination of the index weights if we focus on positively correlated variables only. However, we argue by the provided economic reasoning that it is neither desirable nor adequate to include only positively correlated variables in this and the following constructs. Likewise, this is proven with our tight index calculation where we discard (among others) the negatively correlating determinant GDP growth. As a result, the tight index has inferior tracking power of the VC/PE fundraising activity.

A.2. Data for the Capital Market Construct

For the Capital Market Construct, we differentiate the deal flow and exit market conditions, the debt market, and a variable to measure the lagged VC/PE activity itself. The IPO activity proxies the exit conditions in a particular country. Even if there exist opportunities to go public abroad, we expect a strong relationship between a national IPO volume and the VC/PE attractiveness as likewise documented by Jeng and Wells (2000), and Kaplan and Schoar (2005). Referring to Black and Gilson (1998), Gompers and Lerner (2000), and Schertler (2003), the stock market capitalization and the trading volume capture the size and liquidity of the public equity markets. This construct indicates the probability of finding preferable exit conditions and additionally, measure the degree of the finance and capital market culture and the finance professional environment in a country. Similar, this is valid for the M&A market volume, that indicates both deal flow (for the PE segment) and exit conditions.

We measure the state of the debt market conditions by three criteria: the central bank discount rate, by private credit activity, and by the number of banks per capita. As pointed out by Green (1998) and Hellmann (2004), banks also play an important role for the VC segment. However, facing good debt financing opportunities is even more important for later stage transactions. For this construct, it would be desirable to use proxies that replicate better and more directly the debt financing conditions for VC/PE transactions. For example, it would be more promising to use the price for debt in Leveraged Buyout transactions directly, or to focus on the number of investment banks only. However, this data simply does not exist on the pan-European scale. Instead, we capture competition among banks by their number per capita, and by the private loan activity. We assume that if the competition among banks is high, it is easier to receive debt financing, also for Leveraged Buyouts and VC transactions. The central bank discount rate indicates the price of risk-free lending. We use it as an indicator for the cost of debt and, hence, the cost of capital for transaction financing. We emphasize that the rate is the same for all countries in the Euro-zone, but there is some variation among the countries outside the zone.

The last criterion that we use to build the capital market construct is the VC/PE activity itself. We refer to Sapienza et al. (1996), and Balboa and Martí (2003) and include a lagged variable for VC/PE investments over a three year average. It can be argued that including this parameter immediately increases the tracking power of the attractiveness index. However, we refer to the presented calculation procedures and claim that, finally, the weight of this criterion in the overall index is (depending on the aggregation method) 4% maximum. Hence, this does not substantially affect the results.

A.3. Data for the Taxation Construct

It would be desirable to include a country-indicator on the taxation of capital gains, as pointed out by Gompers and Lerner (1998) or directly on investors' tax burdens in general. Once more, as no such comprehensible indicators exist for the different tax regimes on the European scale, we refer to Bruce (2000 and 2002), Cullen and Gordon (2002), and Djankov et al. (2008), and indirectly measure the tax incentives for corporate investment activity and entrepreneurship. The higher the marginal tax rate, the lower the incentive. Additionally, we include the difference between personal and corporate taxes as suggested by Bruce and Gurley (2005) in the construct. The latter criterion is probably more important for the early stage market segment, as it measures a direct tendency towards starting a business. We interpret our construct in that way: more corporate investment activity and more entrepreneurial activity lead to better deal flow and exit conditions, and hence, to an increasing attractiveness. However, we should note, that there is also a reverse effect of the tax rate on debt financed transactions. The lower the corporate tax rate, the smaller the advantage from debt financing. Since we cannot control for this issue we discard the Taxation construct when we calculate the separate PE index.

A.4. Data for the Investor Protection & Corporate Governance Construct

To measure the level of investor protection and corporate governance we refer to three indicators provided by World Bank and directly make use of the results of Djankov et al. (2005). The construct measures the strength of minority shareholder protection against directors' misuse of corporate assets for personal gain. The indicators distinguish transparency of related-party transactions (this is the extent of disclosure index), liability for self-dealing (the extent of director liability index), and shareholders' ability to sue officers and directors for misconduct (the ease of shareholder suits index).

A.5. Data for the Human & Social Environment Construct

It is the most difficult task to measure the human and social environment, because it lacks quantitative indicators. The choice of the data series for this construct is more constrained by the availability of adequate information. Since it is impossible to capture the entrepreneurial spirit and entrepreneurial culture in particular economies by a comprehensible indicator as would be suggested by Lee and Peterson (2000), and Baughn and Neupert (2003), we focus on Megginson (2004) and include a measure of intellectual potential and output of talented people based on education. Hence, education is the first sub-construct to proxy the human and social environment. We are aware of the special difficulty of an international comparison of educational levels. However, it is intuitive that the potential output of talented entrepreneurs and managers relates to the expenditure on education, and the number of researchers and university students.

We also include a measure for labor market regulations in this construct. This sub-construct is based on the findings of Lazear (1990), Blanchard (1997), and Black and Gilson (1998). The available data sets describe the labor market rigidity and are provided by World Bank. Further, we include bribery and corruption and crime in this construct. Djankov et al. (2002) describe the negative consequences associated with corruption and the unofficial economy. Unfortunately, measures for the unofficial economy are by definition not available. The only remaining possibility is to proxy them by the numbers of (registered) offences and juvenile offenders.

A.6. Data for the Entrepreneurial Opportunities Construct

The construct for entrepreneurial opportunities considers both the Venture Capital and the Private Equity segment. We capture the opportunities for start-up creations, as well as the deal flow perspective from enterprise restructurings and from the pure quantity of corporations. However, in our robustness check we split this construct and analyze the consequences for the index rankings when we focus on only the Early Stage or the Later Stage segment. Following Kortum and Lerner (2000), and Schertler (2003), we focus on an index that measures the general innovativeness of countries; in this instance the number of patents produced. We also include public and corporate spending for R&D, as suggested by Gompers and Lerner (1998). More important for the Later Stage segment, we consider measures for expected restructuring and privatization activities provided by EBRD. Here, we assume that lower privatization and restructuring scores enable transaction opportunities for Later Stage funds. This is similarly valid for the inclusion of the enterprise stock and the enterprise foundation rate. The first criterion should correlate with the deal flow for the Later Stage, and the second one with the Early Stage market segment.

Finally, we refer to Djankov et al. (2002) and Baughn and Neupert (2003) and use data series from World Bank to capture administrative burdens for starting businesses. Once more, the potential deal flow, especially in the VC segment, should correlate with the difficulty of becoming an entrepreneur.

Appendix B

Factor Analyses for the Construction of the Key Drivers

Analysis for Economic Activity

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.549
Bartlett's Test of Sphericity	Approx. Chi-Square	22.200
	df	6
	Sig.	0.001

Total Variance Explained

Component	Initial Eigenvalues			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1.	1.892	47.289	47.289	1.715	42.887	42.887
2.	1.152	28.810	76.099	1.328	33.212	76.099
3.	0.697	17.414	93.513			
4.	0.259	6.487	100.000			

Rotated Component Matrix

	Component	
	1	2
1.1. Gross Domestic Product	0.881	0.216
1.2. General Price Level	-0.141	0.878
1.3. Working Force	0.556	0.693
1.4. Foreign Direct Investment, Net Inflows [% of GDP]	0.781	-0.175

Determination of Weights

Economic Activity	Component loadings		Component weights		Overall weights
	1	2	1	2	
1.1. Gross Domestic Product	0.881	0.216	0.453	0.035	0.270
1.2. General Price Level	-0.141	0.878	0.012	0.580	0.260
1.3. Working Force	0.556	0.693	0.180	0.362	0.259
1.4. Foreign Direct Investment, Net Inflows [% of GDP]	0.781	-0.175	0.355	0.023	0.210
Explained Variance	1.715	1.328	1	1	1
Explained/Total Variance	0.564	0.436	Sum		Sum

Analysis for Capital Market

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.603
Bartlett's Test of Sphericity	Approx. Chi-Square	51.054
	df	10
	Sig.	0.000

Total Variance Explained

Component	Initial Eigenvalues			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1.	2.606	52.117	52.117	2.011	40.226	40.226
2.	1.153	23.064	75.181	1.748	34.955	75.181
3.	0.740	14.805	89.986			
4.	0.357	7.150	97.136			
5.	0.143	2.864	100.000			

Rotated Component Matrix

	Component	
	1	2
2.1. IPO	0.948	-0.009
2.2. Stock Market	0.522	0.607
2.3. M&A Market	0.068	0.733
2.4. Debt & Credit Market	0.108	0.871
2.5. VC/PE Activity	0.908	0.289

Determination of Weights

Capital Market	Component loadings		Component weights		Overall weights
	1	2	1	2	
2.1. IPO	0.948	-0.009	0.447	0.000	0.239
2.2. Stock Market	0.522	0.607	0.135	0.211	0.170
2.3. M&A Market	0.068	0.733	0.002	0.308	0.144
2.4. Debt & Credit Market	0.108	0.871	0.006	0.434	0.205
2.5. VC/PE Activity	0.908	0.289	0.410	0.048	0.241
Explained Variance	2.011	1.748	1	1	1
Explained/Total Variance	0.535	0.465	Sum		Sum

Analysis for Human and Social Environment

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.604
Bartlett's Test of Sphericity	Approx. Chi-Square	24.907
	df	6
	Sig.	0.000

Total Variance Explained

Component	Initial Eigenvalues			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1.	2.045	51.131	51.131	2.045	51.128	51.128
2.	1.143	28.586	79.718	1.144	28.590	79.718
3.	0.525	13.118	92.835			
4.	0.287	7.165	100.000			

Rotated Component Matrix

	Component	
	1	2
5.1. Education	0.145	0.923
5.2. Labor Regulations	0.666	-0.517
5.3. Bribing & Corruption Index	0.893	0.117
5.4. Crime	-0.885	-0.107

Determination of Weights

Human and Social Environment	Component loadings		Component weights		Overall weights
	1	2	1	2	
5.1. Education	0.145	0.923	0.010	0.745	0.274
5.2. Labor Regulations	0.666	-0.517	0.217	0.233	0.223
5.3. Bribing & Corruption Index	0.893	0.117	0.390	0.012	0.255
5.4. Crime	-0.885	-0.107	0.383	0.010	0.249
Explained Variance	2.045	1.144	1	1	1
Explained/Total Variance	0.641	0.359	Sum		Sum

Analysis for Entrepreneurial Opportunities

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.624
Bartlett's Test of Sphericity	Approx. Chi-Square	80.855
	df	10
	Sig.	0.000

Total Variance Explained

Component	Initial Eigenvalues			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1.	2.988	59.754	59.754	2.421	48.412	48.412
2.	1.100	22.009	81.763	1.668	33.351	81.763
3.	0.486	9.727	91.490			
4.	0.372	7.431	98.921			
5.	0.054	1.079	100.000			

Rotated Component Matrix

	Component	
	1	2
6.1. General Innovativeness Index	0.854	0.447
6.2. R&D Expenditure	0.855	0.355
6.3. Enterprise Restructuring	0.875	-0.132
6.4. Enterprise Stock Activity	0.019	0.907
6.5. Burden: Starting a Business	0.441	0.709

Determination of Weights

Entrepreneurial Opportunities	Component loadings		Component weights		Overall weights
	1	2	1	2	
6.1. General Innovativeness Index	0.854	0.447	0.301	0.120	0.227
6.2. R&D Expenditure	0.855	0.355	0.302	0.076	0.210
6.3. Enterprise Restructuring	0.875	-0.132	0.316	0.010	0.191
6.4. Enterprise Stock Activity	0.019	0.907	0.000	0.493	0.201
6.5. Burden: Starting a Business	0.441	0.709	0.080	0.301	0.170
Explained Variance	2.421	1.668	1	1	1
Explained/Total Variance	0.592	0.408	Sum		Sum

Appendix C

Composition of the Tight Index

Economic Activity – Tight Index

For the Economic Activity construct, we adhere to GDP/Capita and our measures for inflation and unemployment only, and discard GDP-growth, and Foreign Direct Investments. This way, we receive a Cronbach's Alpha of 0.764, a MSA value of 0.576 and a Bartlett's Test significant at the 0.000 level. We highlight that discarding the two data series with little unidimensionality increases Cronbach's Alpha by 0.221 points, compared to our base case analysis. In the factor analysis, we extract one single factor that explains 68.2% of the construct variance.

Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1.	2.045	68.172	68.172
2.	0.699	23.301	91.474
3.	0.256	8.526	100.000

The factor loadings lead to the following weights for the construct aggregation:

	Component	
	1	Weight
1.1.1. Total GDP [€/capita]	0.917	0.411
1.2. General Price Level	0.711	0.247
1.3. Working Force	0.836	0.342

Capital Market – Tight Index

The capital market construct is statistically optimized using the measures for public market liquidity (Stock Market Capitalization/GDP, and Stock Market Total Value Traded/GDP), and private debt volume (Private Credit by Deposit Money Banks and Other Financial Institutions/GDP). The Cronbach Alpha yields the very high score of 0.880, the MSA value becomes 0.709 and Bartlett's test of Sphericity is significant at a 0.000 level.

We detect one single factor that explains 81.79% of the total-construct variance.

Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1.	2.454	81.793	81.793
2.	0.387	12.895	94.687
3.	0.159	5.313	100.000

The weights for the Capital Market construct calculate as follows:

	Component	
	1	Weight
2.2.1. Stock Market Capitalization	0,935	0,357
2.2.2. Stock Market Total Value Traded	0,921	0,346
2.4.2. Private Credit by Deposit Money Banks and Other Financial Institutions	0,854	0,297

Human & Social Environment – Tight Index

Since we respectively use two and three individual data series to proxy the key drivers Taxation and Investors Protection and Corporate Governance we keep them equally weighted as in our base case index. For Human & Social Environment we adhere to the data series that describe the labor market rigidity. This yields a Cronbach's Alpha of 0.735 and a MSA value of 0.738. Bartlett's Test for Sphericity is at the 0.000 level significant. We extract one factor that explains 57.15% of the construct variance.

Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1.	2.286	57.154	57.154
2.	0.733	18.319	75.473
3.	0.509	12.735	88.207
4.	0.472	11.793	100.000

For the aggregation of the Human and Social Environment construct, we calculate the following weights:

	Component	
	1	Weight
5.2.1.1. Difficulty of Hiring	0.760	0.253
5.2.1.2. Rigidity of Hours	0.787	0.271
5.2.1.3. Difficulty of Firing	0.742	0.240
5.2.3. Firing Costs	0.734	0.236

Entrepreneurial Opportunities – Tight Index

We reduce the Entrepreneurial Opportunities construct to three data series: the General Innovativeness Index, the measure for R&D expenditures and the measure for the burden of starting a business. The constructs Cronbach's Alpha is 0.853, the MSA value is 0.615 and Bartlett's Test of Sphericity becomes significant at 0.000. We extract one factor that explains 77.69% of the construct's variance.

Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1.	2.331	77.690	77.690
2.	0.599	19.958	97.648
3.	0.071	2.352	100.000

This yields the following weights:

	Component	
	1	Weight
6.1. General Innovativeness Index	0.953	0.390
6.2. R&D Expenditure	0.939	0.378
6.5. Burden: Starting a Business	0.736	0.232

Aggregation to the Overall Tight Index

In the final step, we aggregate the overall tight index from the six constructs using the same heuristic as described in the body of the paper to increase the statistical quality of the results. We receive a Cronbach's Alpha of 0.776 when we discard the Taxation and the Human and Social Environment construct from the selection of items. We should note that this is a very little increase of the overall Cronbach's Alpha of 0.007 points, only, compared to our base case. As a result, the tight index calculation is based on four key drivers only. The MSA value is 0.705, and hence, 0.076 points above the base case and Bartlett's Test of Sphericity is significant at 0.000. The factor analysis yields two factors that explain 86.62% of the total index variance.

Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1.	2.447	61.182	61.182
2.	1.018	25.440	86.622
3.	0.286	7.160	93.782
4.	0.249	6.218	100.000

The factor rotation provides a similar interesting interpretation as for our base case index. The optimally calculated constructs Economic Activity, the Capital Market, and the Entrepreneurial Opportunities have high loadings on the first factor, while Investor Protection & Corporate Governance has a high loading on the second factor. Hence, the tight index reveals the same character. It depends on the socio-economic environment and on the investor protection and corporate governance legal system.

	Component loadings		Component weights		Overall weights
Components	1	2	1	2	
1. Economic Activity - Tight	0.891	0.202	0.327	0.039	0.241
2. Capital Market - Tight	0.906	-0.098	0.339	0.009	0.240
4. Investor Protection & Corporate Governance	0.044	0.993	0.001	0.950	0.285
6. Entrepreneurial Opportunities - Tight	0.899	0.045	0.333	0.002	0.234

Appendix D

Calculation of the VC Index

In the VC Index, the key drivers Economic Activity, Taxation, and Investor Protection & Corporate Governance remain unchanged. Hence, we only describe the reweighting procedure for the remaining constructs and for the overall VC Index aggregation in the following:

Capital Market – VC Index

With the remaining data series for the Capital Market construct, we receive a MSA value of 0.591 and Bartlett's Test is significant at the 0.000 level. The factor analysis extracts one factor that contributes 60.33% of the construct variance.

Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1.	2.413	60.331	60.331
2.	0.865	21.632	81.963
3.	0.585	14.615	96.577
4.	0.137	3.423	100.000

The loadings of the criteria are as follows:

	Component	
	1	Weight
2.1. IPO	0.829	0.285
2.2. Stock Market	0.756	0.237
2.3. M&A Market	0.521	0.112
2.5. VC/PE Activity	0.940	0.366

Human & Social Environment – VC Index

For the Human & Social Environment construct in the VC Index, we receive a MSA value of 0.517. Bartlett's Test of Sphericity is significant at the 0.000 level.

The factor analysis extracts one factor that accounts for 59.13 % of the construct variance.

Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1.	1.774	59.129	59.129
2.	0.953	31.763	90.892
3.	0.273	9.108	100,000

The analysis yields the following weights:

	Component	
	1	Weight
5.1. Education	0.320	0.058
5.3. Bribing & Corruption Index	0.917	0.474
5.4. Crime	-0.912	0.468

Entrepreneurial Opportunities – VC Index

For the Entrepreneurial Opportunities construct, we calculate a MSA value of 0.659, and Bartlett's Test is significant on the 0.000 level. The factor analysis yields one factor that explains 65.51% of the construct variance.

Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1.	2.621	65.514	65.514
2.	0.870	21.738	87.252
3.	0.442	11.058	98.311
4.	0.068	1.689	100.000

The weights result as follows:

	Component	
	1	Weight
6.1. General Innovativeness Index	0.958	0.350
6.2. R&D Expenditure	0.934	0.333
6.4.2. Enterprise Foundation Rate	-0.634	0.153
6.5. Burden: Starting a Business	0.655	0.164

Aggregation to the VC Index

The aggregation of the redefined constructs to the VC Index yields a MSA value of 0.609 at a Bartlett's Test of Sphericity significance level of 0.000. The factor analysis extracts two factors that account for 66.42% of the variance in the data.

Component	Initial Eigenvalues			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1.	2.625	43.752	43.752	2.520	41.999	41.999
2.	1.360	22.667	66.418	1.465	24.419	66.418
3.	0.836	13.935	80.353			
4.	0.619	10.315	90.668			
5.	0.355	5.923	96.591			
6.	0.205	3.409	100.000			

Rotation leads to the following matrix of component loadings, and the corresponding weights of the individual key drivers:

	Component loadings		Component weights		Overall weights
Components	1	2	1	2	
1. Economic Activity – VC	0.826	0.126	0.271	0.011	0.175
2. Capital Market – VC	0.734	0.001	0.292	0.001	0.185
3. Taxation	-0.309	0.755	0.038	0.389	0.167
4. Investor Protection & Corporate Governance	0.202	0.715	0.016	0.349	0.139
5. Human & Social Environment – VC	0.465	0.605	0.086	0.249	0.146
6. Entrepreneurial Opportunities - VC	0.866	0.028	0.298	0.001	0.188

Appendix E

Calculation of the PE Index

For the PE index, we need to recalculate the Human & Social Environment construct, and the Entrepreneurial Opportunities construct. The other key drivers remain unchanged, and are not considered in the PE index. For the Human & Social Environment key driver, there remain only two constructs to consider: 5.2 Labor Regulations, and 5.3 Bribery & Corruption Index. Hence, we apply equal weights to aggregate Human & Social Environment in the PE index. Analogue, this is the case for the Entrepreneurial Opportunities construct, where we equally weight 6.3 Enterprise Restructuring and 6.4.1 Number of Enterprises.

Aggregation to the overall index yields a MSA value of 0.756 at the 0.000 significance level of Bartlett's test of Sphericity.

The factor analysis extracts one factor, which contributes to 53.9% of the variance in the data.

Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1.	2.695	53.900	53.900
2.	0.980	19.592	73.492
3.	0.708	14.151	87.643
4.	0.398	7.955	95.598
5.	0.220	4.402	100.000

This leads to the following weights for the individual key drivers:

	Component	
	1	Weight
1. Economic Activity	0.836	0.276
2. Capital Market	0.822	0.251
4. Investor Protection & Corporate governance	0.436	0.071
5. Human & Social Environment – PE	0.884	0.290
6. Entrepreneurial Opportunities - PE	-0.550	0.112

Appendix F

Raw Data Series and Ready-made Indexes – Explanations and Sources

#	Indicators	Numerator	Denominator	Explanation	Source
1.1.1.	Total GDP/capita in [€/capita]	Total GDP	capita	A region's gross domestic product, or GDP, is one of the several measures of the size of its economy. The GDP of a country is defined as the market value of all final goods and services produced within a country in a given period of time. It is also considered the sum of value added at every stage of production of all final goods and services produced within a country in a given period. The most common approach to measuring and understanding GDP is the expenditure method: GDP = consumption + investment + government spending + (exports – imports).	Global Market Information Database, Euromonitor International from International Monetary Fund (IMF), International Financial Statistics
1.1.2.	Total GDP y-o-y growth [%]	Total GDP		The growth rate of GDP in year t; equal to $(Y_t-Y_{t-1})/Y_{t-1}$.	Global Market Information Database, Euromonitor International from International Monetary Fund (IMF), International Financial Statistics
1.2.	General Price Level	Nominal GDP	Real GDP	The ratio of nominal GDP to real GDP; a measure of the overall price level. Gives the average price of the final goods produced in the economy.	Global Market Information Database, Euromonitor International from International Monetary Fund (IMF), International Financial Statistics
1.3.	Unemployment rate			The ratio of unemployment in a country.	Global Market Information Database, International Labour Organisation/Euromonitor International
1.4.	Foreign direct investment	FDI, net inflow	GDP	The purchase of existing companies or the development of new companies by foreign investors.	Global Market Information Database, UNCTAD
2.1.	IPO Volume	IPO Volume	GDP	IPO as exit condition for Private Equity Investments.	Thomson Statistics
2.2.1.	Stock market capitalization	Stock market capitalization	GDP	Is a measurement of corporate size that refers to the current stock price times the number of outstanding shares. This measure differs from equity value to the extent that a firm has outstanding stock options or other securities convertible to common shares. The size and growth of a company's market capitalization is often one of the critical measurements of a public company's success or failure. However, market capitalization may increase or decrease for reasons unrelated to performance such as acquisitions, divestitures and stock repurchases.	Worldbank Data
2.2.2.	Stock Market Total Value Traded	Stock Market Total Value Traded	GDP	Trading volume of the Stock Market per year.	Worldbank Data
2.3.	M&A: sales/GDP		GDP		Global Market Information Database, UNCTAD
2.4.1.	Central bank discount rate			Interest rate.	IMF, Global Financial Database
2.4.2.	Private Credit by Deposit Money Banks and Other Financial Institutions/GDP		GDP	Concentration of credits in the debt market.	Worldbank Data
2.4.3.	Number of Banks/Capita	Number of Banks	Capita	Concentration of banks leads to higher availability for credits.	EBRD, Transition report 2005
2.5.	VC/PE Funds/GPD [%]	Funds raised per year	GDP	Size of the Venture Capital market. The data is collected according to the office approach, which means according to the location of the GP's headquarter.	Thomson Financial Statistics
3.1.	Highest marginal tax rate, corporate rate [%]			Incentive for starting a business.	Worldbank Data
3.2.	Income - corporate tax rate [%]			Incentive for starting a business.	The Heritage Foundation, http://www.heritage.org/research/features/index/chapters/Chapter_5.cfm

#	Indicators	Numerator	Denominator	Explanation	Source
4.	Investor protection & Corporate Governance			Doing Business measures the strength of minority shareholder protections against directors' misuse of corporate assets for personal gain. The indicators distinguish 3 dimensions of investor protection: transparency of transactions (extent of disclosure index), liability for self-dealing (extent of director liability index) and shareholders' ability to sue officers and directors for misconduct (ease of shareholder suits index). The data come from a survey of corporate lawyers and is based on company laws, court rules of evidence and securities regulations. The strength of investor protection index is the average of the extent of disclosure index, the extent of director liability index and the ease of shareholder suits index. The index ranges from 0 to 10, with higher values indicating better investor protection.	World Bank, http://www.doingbusiness.org/ExploreTopics/ProtectingInvestors/; Source: Djankov et al. (2005).
4.1.	Extent of disclosure index			The extent of disclosure index has 5 components: (i) what corporate body can provide legally sufficient approval for the transaction; (ii) whether immediate disclosure of the transaction to the public, the shareholders or both is required; (iii) whether disclosure in the annual report is required; (iv) whether disclosure by the Buyer's controlling shareholder and a member of Buyer's board of directors to the board of directors is required; and (v) whether it is required that an external body, for example, an external auditor, review the transaction before it takes place.	World Bank, http://www.doingbusiness.org/ExploreTopics/ProtectingInvestors/; Source: Djankov et al. (2005).
4.2.	Extent of director liability index			The extent of director liability index measures (i) a shareholder plaintiff's ability to hold Buyer's controlling shareholder and a member of Buyer's board of directors liable for damage the Buyer-Seller transaction causes to the company; (ii) a shareholder plaintiff's ability to hold the approving body; (iii) whether a court can avoid the transaction upon a successful claim by a shareholder plaintiff; (iv) whether Buyer's controlling shareholder and a member of Buyer's board of directors pays damages caused to the company upon a successful claim by the shareholder plaintiff; (vi) whether fines and imprisonment can be applied against the Buyer's controlling shareholder and a member of Buyer's board of directors; and (vii) shareholder plaintiffs' ability to sue directly or derivatively for damage the transaction causes to the company.	World Bank, http://www.doingbusiness.org/ExploreTopics/ProtectingInvestors/; Source: Djankov et al. (2005).
4.3.	Ease of shareholder suits index			The extent of disclosure index has 5 components: (i) what corporate body can provide legally sufficient approval for the transaction; (ii) whether immediate disclosure of the transaction to the public, the shareholders or both is required; (iii) whether disclosure in the annual report is required; (iv) whether disclosure by Buyer's controlling shareholder and a member of Buyer's board of directors is required; and (v) whether it is required that an external body, for example, an external auditor, review the transaction before it takes place.	World Bank, http://www.doingbusiness.org/ExploreTopics/ProtectingInvestors/; Source: Djankov et al. (2005).
5.1.1.	Government expenditure on education/GDP, total [% of GDP]	Government expenditure on education	GDP	Approximation for educational level and hence human capital.	Global Market Information Database, Euromonitor International from International Monetary Fund (IMF), International Financial Statistics
5.1.2.	Amount university teachers/capita	Amount university teachers	capita	Approximation for educational level and hence human capital.	Global Market Information Database, Euromonitor International from International Monetary Fund (IMF), International Financial Statistics
5.1.3.	Amount university students/capita	Amount university students	capita	Approximation for educational level and hence human capital.	Global Market Information Database, Euromonitor International from International Monetary Fund (IMF), International Financial Statistics
5.1.4.	Amount university establishments per capita	Amount university establish-ments	capita	Approximation for educational level and hence human capital.	Global Market Information Database, Euromonitor International from International Monetary Fund (IMF), International Financial Statistics
5.2.1.	Rigidity of employment index			The rigidity of employment index is the average of three sub-indices: a difficulty of hiring index, a rigidity of hours index and a difficulty of firing index. All the sub-indices have several components. All take values between 0 and 100, with higher values indicating more rigid regulation.	World Bank, http://www.doingbusiness.org/ExploreTopics/HiringFiringWorkers/; Botero et al. (2004).
5.2.1.1.	Difficulty of hiring index			The difficulty of hiring index measures has 3 components: (i) whether term contracts can be used only for temporary tasks; (ii) the maximum cumulative duration of term contracts; and (iii) the ratio of the minimum wage for a trainee or first-time employee to the average value added per worker.	World Bank, http://www.doingbusiness.org/ExploreTopics/HiringFiringWorkers/; Botero et al. (2004).

#	Indicators	Numerator	Denominator	Explanation	Source
5.2.1.2.	Rigidity of hours index			The rigidity of hours index has 5 components: (i) whether night work is unrestricted; (ii) whether weekend work is unrestricted; (iii) whether the workweek can consist of 5.5 days; (iv) whether the workweek can extend to 50 hours or more (including overtime) for 2 months a year; and (v) whether paid annual vacation is 21 working days or fewer.	World Bank, http://www.doingbusiness.org/ExploreTopics/HiringFiringWorkers/; Botero et al. (2004).
5.2.1.3.	Difficulty of firing index			The difficulty of firing index has 8 components: (i) whether redundancy is disallowed as a basis for terminating workers; (ii) whether the employer needs to notify a third party (such as a government agency) to terminate 1 redundant worker; (iii) whether the employer needs to notify a third party to terminate a group of more than 20 redundant workers; (iv) whether the employer needs approval from a third party to terminate 1 redundant worker; (v) whether the employer needs approval from a third party to terminate a group of more than 20 redundant workers; (vi) whether the law requires the employer to consider reassignment or retraining options before redundancy termination; (vii) whether priority rules apply for redundancies; and (viii) whether priority rules apply for re-employment.	World Bank, http://www.doingbusiness.org/ExploreTopics/HiringFiringWorkers/; Botero et al. (2004).
5.2.2.	Hiring cost [% of salary]			The non-wage labor cost indicator measures all social security payments (including retirement fund; sickness, maternity and health insurance; workplace injury; family allowance; and other obligatory contributions) and payroll taxes associated with hiring an employee in fiscal year 2005. The cost is expressed as a percentage of the worker's salary.	World Bank, http://www.doingbusiness.org/ExploreTopics/HiringFiringWorkers/; Botero et al. (2004).
5.2.3.	Firing costs [weeks of wages]			The firing cost indicator measures the cost of advance notice requirements, severance payments and penalties due when terminating a redundant worker, expressed in weekly wages. One month is recorded as 4 and 1/3 weeks.	World Bank, http://www.doingbusiness.org/ExploreTopics/HiringFiringWorkers/; Botero et al. (2004).
5.3.	Corruption Perceptions Index			The Corruption Perceptions Index (CPI) is a composite index, using data compiled between 2003 and 2005. 16 surveys of businesspeople and assessments by country analysts from 10 independent institutions enter the CPI. All sources employ a homogeneous definition of "extent of corruption". The assessments are gathered from experienced respondents and enhance our understanding of real levels of corruption. Six dimensions of governance: (i) Voice and Accountability – measuring political, civil and human rights; (ii) Political Instability and Violence – measuring the likelihood of violent threats to, or changes in, government, including terrorism; (iii) Government Effectiveness – measuring the competence of bureaucracy and the quality of public service delivery; Regulatory Burden – measuring the incidence of market-unfriendly policies; (iv) Rule of Law – measuring the quality of contract enforcement, the police, and the courts, as well as the likelihood of crime and violence; (v) Control of Corruption – measuring the exercise of public power for private gain, including both petty and grand corruption and state capture. The index is coded on a ten point descending scale from 1 (most corrupt) to 10 (least corrupt).	Transparency, http://www.transparency.org/policy_research/surveys_indices/
5.4.1.	Juvenile offenders per capita	Juvenile offenders	Capital	Approximation of crime-rate.	Global Market Information Database, International Criminal Police Organisation/Euromonitor International
5.4.2.	Offences per 100,000 habitants	Offences	100,000 habitants	Approximation of crime-rate.	Global Market Information Database, International Criminal Police Organisation/Euromonitor International
6.1.	General Innovativeness			Innovation is one of the key-drivers of VC-activity. The index of the 2005 European Innovation Scoreboard deals with five categories that cover different key dimensions of innovation performance. Innovation drivers measure the structural conditions required for innovation potential, Knowledge creation measures the investments in R&D activities, Innovation & entrepreneurship measures the efforts towards innovation at the firm level, Application measures the performance expressed in terms of labor and business activities and their value added in innovative sectors, and Intellectual property measures the achieved results in terms of successful know-how.	InnovationScoreboard; http://trendchart.cordis.lu/

#	Indicators	Numerator	Denominator	Explanation	Source
6.2.1.	Public R&D expenditures [% of GDP]	Public R&D	GDP	Difference between GERD (Gross domestic expenditure on R&D) and BERD (Business enterprise expenditure on R&D). R&D expenditure represents one of the major drivers of economic growth in a knowledge-based economy. As such, trends in the R&D expenditure indicator provide key indications of the future competitiveness and wealth of the EU. Research and development spending is essential for making the transition to a knowledge-based economy as well as for improving production technologies and stimulating growth. Recognizing the benefits of R&D for growth and being aware of the rapidly widening gap between.	InnovationScoreboard; http://trendchart.cordis.lu/
6.2.2.	Business R&D expenditures [% of GDP]	Business R&D	GDP	All R&D expenditures in the business sector (BERD). The indicator captures the formal creation of new knowledge within companies. It is particularly important in the science-based sector (pharmaceuticals, chemicals and some areas of electronics) where most new knowledge is created in or near R&D laboratories.	InnovationScoreboard; http://trendchart.cordis.lu/
6.3.1.	Small-scale privatization index			1= Little progress. 2= Substantial share privatized. 3= Comprehensive program under implementation. 4= Complete privatization of small companies with tradable ownership rights. 4+= Standards and performance typical of advanced industrial economies: no state ownership of small enterprises, effective tradability land.	EBRD, Transition report 2005
6.3.2.	Large-scale privatization index			1= Little private ownership. 2= Comprehensive scheme almost ready for implementation, some sales completed. 3= More than 25% of large-scale enterprise assets in private hands or in the process of being privatized (with the process having reached a stage at which the state has effectively ceded its ownership rights), but possibly with major unresolved issues regarding corporate governance. 4= More than 50% of state-owned enterprise and farm assets in private ownership and significant progress with corporate governance of these enterprises. 4+= Standards and performance typical of advanced industrial economies: more than 75% of enterprise assets in private ownership with effective corporate governance.	EBRD, Transition report 2005
6.3.3.	Governance and enterprise restructuring index			1= Soft budget constraints (lax credit and subsidy policies weakening financial discipline at the enterprise level), few other reforms to promote corporate governance. 2= Moderately tight credit and subsidy policy, but weak enforcement of bankruptcy legislation, little action taken to strengthen competition and corporate governance. 3= Significant and sustained actions to harden budget constraints and to promote corporate governance effectively (for example, privatization combined with tight credit and subsidy policies and/or enforcement of bankruptcy legislation. 4= Substantial improvement in corporate governance and significant new investment at the enterprise level, including minority holdings by financial investors. 4+= Standards and performance typical of advanced industrial economies: effective corporate control exercised through domestic financial institutions and markets, fostering market-driven restructuring.	EBRD, Transition report 2005
6.4.1.	Enterprise stock per capita	Number of Enterprises	Capita	Volume of SME companies in the market.	Worldbank Data
6.4.2.	Enterprise foundation [% of Enterprises total stock]	Number of foundations	Number of Enterprises	SME company growth rate.	Worldbank Data

#	Indicators	Numerator	Denominator	Explanation	Source
6.5.1.	Procedures [numbers]			A procedure is defined as any interaction of the company founder with external parties (government agencies, lawyers, auditors, notaries). Interactions between company founders or company officers and employees are not counted as procedures. Procedures that must be completed in the same building but in different offices are counted as separate procedures. The founders are assumed to complete all procedures themselves, without middlemen, facilitators, accountants or lawyers, unless the use of such a third party is mandated by law. Both pre- and post-incorporation procedures that are officially required for an entrepreneur to formally operate a business are recorded. Procedures that are not required to start and formally operate a business are ignored. For example, obtaining exclusive rights over the company name is not counted in a country where businesses may use a number as identification. Procedures required for official correspondence or transactions with public agencies are included. For example, if a company seal or stamp is required on official documents, such as tax declarations, obtaining it is counted. Similarly, if a company must open a bank account before registering for sales tax or value added tax, this transaction is included as a procedure.	World Bank, http://www.doingbusiness.org/ExploreTopics/Starting Business/; Source: Djankov et al. (2002).
6.5.2.	Time [days]			Time is recorded in calendar days. The measure captures the median duration that incorporation lawyers indicate is necessary to complete a procedure. It is assumed that the minimum time required for each procedure is 1 day. Although procedures may take place simultaneously, they cannot start on the same day. A procedure is considered completed once the company has received the final document, such as the company registration certificate or tax number. If a procedure can be accelerated for an additional cost, the fastest procedure is chosen. It is assumed that the entrepreneur does not waste time and commits to completing each remaining procedure without delay. The time that the entrepreneur spends on gathering information is ignored. It is assumed that the entrepreneur is aware of all entry regulations and their sequence from the beginning but has had no prior contact with any of the officials.	World Bank, http://www.doingbusiness.org/ExploreTopics/Starting Business/; Source: Djankov et al. (2002).
6.5.3.	Cost of business start-up procedures [% GNI per capita]		GNI per capita	Cost is recorded as a percentage of the country's income per capita. Only official costs are recorded. The company law, the commercial code and specific regulations and fee schedules are used as sources for calculating costs. In the absence of fee schedules, a government officer's estimate is taken as an official source. In the absence of a government officer's estimate, estimates of incorporation lawyers are used. If several incorporation lawyers provide different estimates, the median reported value is applied. In all cases the cost excludes bribes.	World Bank, http://www.doingbusiness.org/ExploreTopics/Starting Business/; Source: Djankov et al. (2002).
6.5.4.	Min. capital [% of income per capita]		income per capita	The paid-in minimum capital requirement reflects the amount that the entrepreneur needs to deposit in a bank before registration starts and is recorded as a percentage of the country's income per capita. The amount is typically specified in the commercial code or the company law. Many countries have a minimum capital requirement but allow businesses to pay only a part of it before registration, with the rest to be paid after the first year of operation.	World Bank, http://www.doingbusiness.org/ExploreTopics/Starting Business/; Source: Djankov et al. (2002).