

## Drivers of Private Equity Investment Activity

Are buyout and venture investors really so different?

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## Abstract

This paper investigates the drivers of private equity activity by undertaking a panel data study for 17 European countries. Activity is affected by both cyclical and structural factors. We control for the cyclical factors and examine structural drivers of investment in private equity. We examine whether these drivers are different for venture capital and buyout investors, and find that indeed there is a strong distinction between the factors influencing investment in these two groups of investors. Based on our results, we consider policy options for governments to attract more investment.



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## Executive Summary

This paper investigates the drivers of private equity activity by undertaking a panel data study for 17 European countries. Activity is affected by both cyclical and structural factors, but in our model we control for the cyclical factors in order to focus on structural drivers of investment in private equity, which can be affected by government policy.

We find that indeed there is a strong distinction between the factors influencing investment activity among venture and buyout investors. One common factor is the significance of a summary innovation indicator, showing that innovation is key to attracting both buyout and venture investors.

Market capitalisation, which is a proxy for depth and liquidity of financial markets, is found to be a statistically significant determinant of buyout investment activity but not venture investment. Possible interpretations of this result include the fact that market capitalisation is a proxy for availability of leverage, a key aspect of the buyout model. A second possible interpretation is that it provides an indicator of the ease of exit via IPO, something that is more significant for buyout investors than venture investors. We do not ignore the fact that there may be a causality issue here, i.e. that this phenomenon may be due to the fragmented nature of the European small cap markets, which discourages IPO, or encourages venture investors to exit via NASDAQ; the point is that it matters less to venture funds whether they are located in a country with a deep, liquid capital market, in fact their investment opportunities may be greater in countries where this is not the case, as there will be less alternative financing opportunities.

An employment protection indicator is found to be statistically significant for buyout investors, but not for venture investors, while the reverse is true for unemployment. The former result may reflect the significance of a flexible labour market for the 'creative destruction' that is an important part of the buyout model. The latter result, that unemployment is significantly negatively related to venture investment activity, can be taken as evidence that venture investment is provided more for opportunity-based, rather than necessity-based entrepreneurs.

In the buyout equation, two of the three indicators that look at the tax incentives for PE and VC are significant, while none are significant in the venture equation. These findings perhaps show the greater importance of returns to the buyout model. The fact that none of the indicators are significant for venture is open to interpretation, but one explanation could be that it reflects the relative importance of public investors in the venture capital market, investing under mandates that are not purely returns focused; such mandates mean that they will not be driven by fiscal incentives. Equally likely, it may reflect the opportunity-driven nature of venture capital investors, who are more likely to seek returns through investing in innovative high-growth companies, and less likely to rely on achieving their returns through financial engineering.

As regards policy implications, we start from the basis that, given the claimed economic benefits of private equity investment, governments should be interested in attracting more buyout and venture investment. Action can be taken on both the supply and demand side. On the supply side, investment is attracted to countries that have less employment protection, more developed capital markets, and tax incentives for attracting and retaining investor talent. On the demand side, there is clearly a case for governments to provide fiscal incentives for R&D activity, and implement measures to foster an innovative environment.

## 1. Introduction

Private equity has increased enormously in popularity as an alternative investment asset class over the past two decades. In addition to widespread claims about the returns outstripping the market, supporters of the industry claim that it provides extensive economic benefits too, thanks to a model that centres around aligning interest of owners and management.

Although there are some controversies surrounding the claimed financial and economic benefits, investors continue to put their money into the asset class. Given the opaque nature of the industry, it is difficult to establish the motivations behind investors' decisions to invest, and to know whether the objectives of investors in different segments of this rather heterogeneous asset class differ.

One important consideration is that private equity activity, venture or buyout, is, like any other source of finance, driven by both demand and supply side factors. It forms part of an ecosystem. Supply of private equity is driven by the willingness and ability of investors to provide funds to general partners (GPs), and in turn of GPs to provide funds to investee companies, and demand is based on the quantity and quality of investee companies in need of equity finance. However, we cannot generalise about private equity as a whole, as the extent to which these factors (or indeed whether these factors are relevant at all) will differ depending on whether we are considering early stage venture capital or buyout capital, for example. Thus it is important to treat them separately.

While studies have been undertaken to examine the drivers of investment in venture and in buyout, there have until now been no studies that have used the same methodology to look at both classes of private equity together in order to seek to understand the different motivations of each type of investors. Furthermore, most studies have neglected to differentiate between cyclical and structural factors, thereby failing to isolate those factors that can be directly influenced by policy.

This study seeks to address the above lacuna by using a dynamic panel data methodology that permits the creation of a robust model of the European private equity market, in order to see what factors are relevant in driving investment decisions in the buyout and venture capital segments<sup>1</sup>. It complements a previous paper in the EIF Working Paper Series<sup>2</sup>, which analysed indicators that contributed to private equity and venture capital activities in EU countries.

The paper continues as follows. In the next section, we look at the size and nature of the private equity market in Europe, and also look at the question of financial and economic returns of the asset class. In section 3 we briefly review the existing literature on drivers of investment. Based on this literature review, in section 4 we discuss potential drivers of investment activity, and set out the indicators we intend to use in our model. Section 5 sets out the econometric methodology to be used, section 6 sets out the results of our analysis, and section 7 concludes by providing some policy implications.

## 2. Private Equity in Europe

Private equity is a heterogeneous activity; there is a large distinction between venture capital activity and buyout activity. The former tends to be provided to young and start up companies with high growth potential; the latter generally involves investment to finance ownership changes: companies are purchased, restructured and improved to add value, and

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<sup>1</sup> It is important to note at this stage that due to data limitations the study does not include investment decisions made by funds of funds.

<sup>2</sup> Conforti, A. 'Private Equity and Venture Capital Indicators', EIF Working Paper 4/2010.

subsequently sold. The idea is to remove the principal – agent problem which arises due to the difference between ownership and control of public companies: by introducing a more direct link between owner and manager, interests are better aligned. Not being listed removes the pressure faced by publicly quoted companies to sacrifice longer term value-adding goals in favour of short term performance.

Over the past decade, the European private equity industry has seen average annual fundraising of over EUR 50bn. Fundraising has been highly cyclical, ranging from EUR 112bn raised in 2006, to 16bn raised in 2009. Over the same period, annual investment has averaged just over EUR 40bn, peaking at EUR 73bn in 2007 and falling to only EUR 23bn in 2009 (EVCA 2010). On average over the past 10 years, private equity investment in the EU27 has been equivalent to around 0.37% of annual GDP. 80% of investment in 2007 was undertaken by the buyout sector; this had fallen to 50% in 2009 in part due to problems faced by this sector in obtaining leverage for their deals. Seed, start-up and later stage venture (which we refer to more generally as venture in this paper) correspond to less than 20% of overall investment.

There are a number of claimed benefits of private equity, both from a financial point of view – the returns to investors – and from an economic point of view. The relative importance of these benefits differs according to whether we are considering buyout or venture activity. It is beyond the scope of this paper to go into too much depth about the controversies surrounding the claims made by supporters of private equity and those made by its detractors; we merely present a brief outline here.

On the financial side, there are various claims made by private equity regarding its outperformance compared to the wider market. However it should be noted that returns are extremely heterogeneous, differing widely between buyout and venture capital returns; between strong performers (the top quartile) and weaker performers; across countries; over time; and depending on whether we are looking at fees on a gross basis or net of fees. Morris (2010) notes that there are issues relating to the standard metrics used to measure performance, and it is difficult to get a clear picture from the main academic studies in this area, which find widely differing results even when using the same datasets (Phalippou and Gottschalg, 2009, Kaplan and Schoar, 2005, Ljungqvist and Richardson, 2003).

The economic benefits of private equity include claims that private equity backed companies have superior sales, exports, investment than their peers, and indeed create more employment (BVCA, 2008, Achleitner and Klockner, 2005). Surveys find that the contribution (both financial and non-financial) of VC and buyout investment has been critical to the existence or survival of companies (EVCA 2001, 2002). These claims, generally made by industry associations, are corroborated in the academic literature (Belke et al., 2003 and Fehn and Fuchs, 2003). However, what has tended to be ignored until relatively recently, is the origin of the returns, in particular the returns achieved by buyout investment, which some claim come principally from leverage, or financial engineering (Morris 2010). As such the declared economic benefits of private equity are less clear, in particular since excessive use of leverage could be damaging to an economy, as recent events in global financial markets have demonstrated.

### 3. An Overview of the Literature

A number of studies have been undertaken in this area. Some of these studies look at both the supply and demand side from a GP and investee company perspective in order to determine drivers of activity, some focus on the supply side, to understand in particular what makes LPs provide funds.

Meyer (2006a) undertakes a panel study using data from 20 European countries for the period 1994-2004 to look at the impact of private equity investment on GDP growth, using control variables of GDP per capita, national stock market indices and the unemployment rate to account for differences in initial country conditions (fixed effects). He finds that certain segments of private equity (notably buyouts and venture capital) correlate with economic growth; an increase in buyouts equivalent to 0.1% of GDP is associated with an increase in real economic growth of 0.2% and a similar increase in early stage investments is associated with a 0.8 percentage point increase in economic growth. The author tested for reverse causality to see whether economic growth has a significant effect on venture capital investment, but noted that this was not the case. In a follow-up paper (Meyer 2006b) the author uses the same dataset to identify the main determinants of VC investments. As regards cyclical drivers, he finds a positive and robust correlation between VC investments and the development of major stock market indices, and a negative correlation with unemployment rates. On the fundamental side, he finds a positive correlation with national expenditures on research and development, although this is unique to the venture stage; finally he finds a positive and robust correlation between the ratio of current IPOs to VC investments made four years previously, lending support to the pro-cyclical nature of VC investments.

Schertler (2003) uses dynamic panel estimations to identify the driving forces of venture capital activity in 14 European countries over the period 1988 to 2000. To take account of fixed effects, the author scales investments by GDP. He uses a broad and a narrow definition of venture capital, the latter containing only investments in enterprises' early stages of development, while the former also contains investments in enterprises' expansion stages. He finds that interpretable results are only obtained using the narrow definition of venture capital, which he attributes to the fact that the broader definition of venture capital is affected by determinants not included in his analysis. Regarding the narrow definition, he finds that the level of investments depends positively on the capitalisation of stock markets, the number of employees in research and development as a proportion of the labour force, and the degree of rigidities in labour markets. The last of these results, which is somewhat unexpected, he puts down to differences in the labour-capital ratio of high technology enterprises: enterprises operating in economies with rigid labour markets demand more capital per employee than their counterparts operating in flexible labour markets.

Clarysse et al (2009) use a panel technique to identify supply and demand drivers of VC activity for the UK (1985-2006), Israel (1999-2007) and the US (1980-2007). They found that the amounts of early stage and total VC invested in the three countries are determined by three main factors, namely total entrepreneurial activity (as measured by the Global Entrepreneurship Monitor), stock market capitalisation, and R&D expenditure.

Looking purely at the supply side, and focusing on the supply of funds from LPs to GPs, Groh and Liechtenstein (2009) undertake a study to see the attractiveness of Central and Eastern Europe for risk capital investors. They conduct a survey among LPs, asking them about the importance of several emerging markets allocation criteria, which yields a tailored ranking of an emerging countries' attractiveness for VC and PE investors. This ranking is then transferred into a weighting scheme for the criteria and the attractiveness of 27 sample countries is assessed using 42 different socio-economic data series. The authors use this to focus on the particular strengths and weaknesses of the CEE region compared to the EU 15 average. Based on this analysis, Groh and Liechtenstein identify six tier groups of attractiveness, namely tax regime, protection of investors and corporate governance, human and social environment, entrepreneurial culture and opportunities, prosperity of economy, and size and liquidity of national capital markets.

In a further study, Groh and Liechtenstein (2010) create composite indices to compare the attractiveness of 27 European countries for institutional investments into the Venture Capital and Private Equity asset class, based on the same 42 parameters used in their 2009 paper.



Interestingly, they find that while the UK 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 and corporate governance rules, and the size and liquidity of its capital market, the latter they regard being a proxy for the professionalism of the financial community, for deal flow and exit opportunities.

## 4. Potential Drivers of Investment Activity

From the literature on this subject, we can identify a number of potential drivers of private equity investment activity. These can be broadly classified into cyclical and structural factors; within the latter we have categorised five main pillars of drivers, namely those related to the entrepreneurial environment, the institutional environment, taxation regimes, the labour market and the capital market. In this section, we explain the rationale for inclusion of each of these pillars as a driver, discuss potential indicators, and give details of the indicators that we intend to use in our analysis.

### 4.1 Cyclical factors

As discussed above, and as one would expect, the state of a country's economy is likely to affect PE investment activity. However, the way in which the cycle affects investment activity is not of particular importance to us, because, as discussed, for the purposes of this study we are not particularly interested in the impact of the economic cycle on investment activity. It will affect all countries in a similar manner. Rather we are interested in structural factors, which can be impacted by policy. That is not to say that we can ignore cyclical factors – rather we seek to neutralize them by including them as control variables in our panel regression, in order that our analysis of structural variables is not biased by changes in investment driven by the economic cycle. This is particularly significant given the period under consideration, which includes the severe economic slowdown of 2007-8 caused by the economic crisis.

In terms of empirical evidence of the impact of cyclical factors on investment activity, Romain and van Pottelsberghe de la Potterie (2004) find evidence for the cyclical nature of private equity investment activity, and its close correlation to GDP growth. This stands to reason; a fast-growing economy is likely to provide more opportunities for entrepreneurs, as noted by Gompers and Lerner (1998). However, Meyer (2006a) notes that there is no simple correlation with any individual sub-category of private equity investments, because there are many factors that influence economic growth that are unrelated to venture capital or buyouts – exactly the counterfactual of the issue we are trying to address by including cyclical indicators as control variables. Stock market performance is an indicator of the economic cycle, as a strong equity market indicates a healthy economy. Meyer (2006a) finds a positive and robust correlation between VC investments and performance of the leading national stock market indices. Unemployment tends to be inversely related to the economic cycle, and Meyer (2008) finds unemployment to be negatively correlated with VC investment, which he attributes to the cyclical nature of VC investing.

For our study, we use three indicators as proxies for economic activity. First, GDP, which is an indicator of the size of the market. Second, GDP per capita, which is a commonly used variable to take account of the level of development of an economy. Finally we use the rate of inflation, as a general indicator of macroeconomic stability. All these indicators are taken from the World Development Indicators produced by the World Bank.

## 4.2 Structural factors

### Entrepreneurial environment

Most basic of all, without a demand side there can be no supply side. No entrepreneurs means no demand for venture capital. There are different forms of entrepreneurship, and one can differentiate high growth from general forms of entrepreneurship, with high growth-oriented, early stage entrepreneurial activity driving VC demand. Below we make the distinction between necessity-driven and opportunity-driven entrepreneurship<sup>3</sup>, noting that the latter is more likely to give rise to VC demand. By contrast, the entrepreneurial environment is not such a significant factor for the buyout side of private equity which is less innovation driven.

Innovation potential depends on having an active R&D culture, and this will be influenced by government support to R&D, across the range from supporting university research, through technology transfer and on to realisation. Of course all this has to be underpinned by strong human capital, which depends on quality of education. Some argue that an entrepreneurial environment can only be developed to a certain degree, and that culture plays an important part (Lee and Peterson, 2000). For example, Clarysse et al. (2009) note that the development of the Israeli venture capital industry was in no small part due to the immigration of Russian engineers.

A further element that is important in promoting an entrepreneurial environment is cultural attitudes towards bankruptcy: the Global Entrepreneurship Monitor indicates that while in the UK 38% of potential entrepreneurs are afraid to start a business because they fear it will fail, the corresponding figure for the US is only 28%, with a significant explanation being that bankruptcy laws are more entrepreneur friendly in the US (Lee et al. 2008)<sup>4</sup>.

There is significant empirical evidence to support the above hypotheses. Romain and van Pottelsberghe de la Potterie (2004) find a relationship between entrepreneurship, technological opportunities and the number of patents, and the R&D capital stock. Gompers and Lerner (1998) find that industrial and academic R&D expenditure is correlated with venture activity. Similarly, Meyer (2006b) finds a robust and positive relationship between expenditures on R&D and VC investment, but finds no similar relationship to the buyout side of private equity. Meyer takes this as evidence that VC backed start-ups and young firms operate closer to the technology frontier than other private equity financed firms. Schertler (2007) finds a strong positive correlation between number of patents, number of scientists engaged in research, R&D expenditure, and venture capital activity. Clarysse et al. (2009) find similar results using the Global Entrepreneurship Monitor's measure of Total Entrepreneurial Activity.

Measuring entrepreneurialism is clearly a subjective issue, with many potential indicators. One commonly-used indicator for the quality of the entrepreneurial environment is government expenditures on R&D as a share of GDP. Of course government expenditure is only a proxy: it depends on how well this expenditure is allocated, which in turn depends on the education levels of the population. Thus we could have followed the approach of many other researchers and used a measure such as number of science and engineering graduates or similar; alternatively we could have taken a more direct route and used the number of patent applications in a country. Instead, and to take account of the problem of determination if too many regressors are used in the model, we make use of the 'Summary Innovation Index' produced by the Enterprise and Industry Directorate of the European Commission, under the

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<sup>3</sup> Note that opportunity driven entrepreneurship could be considered as innovative entrepreneurship. In addition, while replicative entrepreneurship (which is driven mainly by general growth in the population and the economy) differs from necessity-based entrepreneurship, the implications for the demand for VC are likely to be similar.

<sup>4</sup> In Europe a "stigma of failure" exists. The European Commission addresses this issue in its Small Business Act for Europe (Brussels, COM(2008)394 final 25.6.2008)

Competitiveness and Innovation Framework, a single measure which covers a number of elements related to innovation. It is a composite of 29 indicators in three main categories, enablers, the main drivers of innovation external to a firm; firm activities, namely innovation efforts firms undertake recognising the fundamental importance of firms' activities in the innovation process; and outputs, which captures the outputs of firm activities as innovators and its economic effects. A full list of the indicators and categories is contained in "The European Innovation Scoreboard (EIS) 2009".

## Institutional environment

As discussed above, an entrepreneurial culture is important for generating demand for venture capital, however in itself it is not sufficient. Entrepreneurs must be able to benefit from the fruits of their labours. Likewise, in order to generate a supply side, from the perspective of both buyout and venture, it is important for GPs to know that if they invest in a portfolio company, their investment will be protected, and for LPs to know that the funds they provide to GPs are safeguarded against misuse. These require the existence of adequate legal and regulatory structures and the protection of property rights, as noted by Desai et al. (2006). What is key is that the institutional environment be appropriate: sufficient to protect, but not so much as to act as an administrative deterrent to new venture creations (Lee and Peterson (2000)).

Another important consideration is the existence of an institutional environment that allows PE investors to implement their model. Schertler (2003) notes that from a supply side perspective, the supply of 'active involvement' by experienced venture capitalists is only positive if regulations and contract law do not prevent venture capitalists from having exclusive control rights, such as board and voting rights, in the enterprises they have chosen to finance. The same holds for buyout investors.

An important area concerns regulations about pension funds, which are large potential providers of funds to the private equity industry. For example, changes made to the "prudent man" rule in the US in 1979 allowed pension funds to invest up to 15% of their funds in riskier assets. This resulted in pension funds becoming the largest source of venture capital funding in the US (Gill et al., 2002). Naturally supply of VC by GPs is heavily dependent on availability of funds from LPs, and increasingly pension funds have become important potential providers of funds to the VC industry.

Finally, the scope to provide employee incentivisation schemes such as share ownership schemes will affect the success of innovative companies, and hence the demand for venture capital (Clarysse et al., 2009): stock options enable technology-intensive and highly risky start ups to attract, compensate, incentivise, monitor and retain quality employees.

As regards empirical studies, Mauro (1995) finds a significant relationship between property rights and investments and economic growth. The importance of the enforcement of these structures is highlighted by La Porta et al (1997,8), who confirm the influence of the legal environment for the ability of firms to receive financing, in particular non-domestic financing. Cumming et al. (2006) find that cross-country differences in the legal environment have an impact on the governance of investments in the private equity industry. As one might imagine, companies in countries with stronger institutions face a lower cost of capital (La Porta et al., 2002, Lerner and Schoar, 2005).

There are many individual aspects of institutional environment that it would be useful to capture in our model. However, capturing and quantifying cross-country differences in the institutional environment is extremely difficult. Hence we base our indicators on a measure created by EVCA, which undertakes a semi-annual study benchmarking European tax and legal environments. We interpolate for the missing years. EVCA use 30 variables considered to be important for the functioning of the private equity and venture capital ecosystem. These variables are grouped into seven criteria, which in turn are grouped into three main areas of concern. For the purposes of a measure of the institutional environment, we focus on the area of concern related to the legal environment for LPs and fund management companies. This measure covers pension funds, insurance companies, and fund structures. The details of the indicators included in the EVCA variable are included in annex 2.

## Taxation regimes

The tax regime is an important consideration for both funds and potential investee companies. The tax regime affects the risk-return relationship of private equity investments relative to other investments by affecting the return without affecting the risk. Thus it can favour particular forms of investment, influencing the supply of capital from investors to private equity funds. Gompers and Lerner (1998) note that low capital gains tax makes people more inclined to start their own company or undertake a spin out from an existing company, thereby affecting demand for PE; also the relative rates of income, capital gains and corporation tax are an important influence in the decision to become an entrepreneur (Bruce and Gurley, 2005). Poterba (1989) notes that the tax system determines the revenue and profit of entrepreneurship. Thus one might expect that the higher the capital gains tax rate, the lower entrepreneurial activity would be in an economy, and therefore the lower the demand for venture capital. From a GPs perspective, much of their return arises from the capital gains made on exiting an investment, so the treatment of this gain clearly has an important impact on the supply of VC and buyout funds.

From an empirical perspective, in an extensive study Djankov et al. (2008) find that corporate tax rates have significant negative correlation with entrepreneurial activity, aggregate investment and FDI.

Assessing the relative attractiveness of tax regimes across countries is not an easy task. So we use the EVCA indicator, discussed above, which covers important aspects concerning the tax environment. We create three indicators based on sub-categories of their indicator. The first is a measure of the attractiveness of the fiscal regime of a country for investee companies. This evaluates fiscal incentives for R&D expenditure, technology transfer, cooperation between firms and research institutes, the creation of innovative firms and contracting researchers. The second is an indicator of general tax incentives for private equity and venture capital funds, and covers any form of fiscal incentive to encourage investments in the PE and VC market. The third is an indicator of the attractiveness of the fiscal regime in terms of retaining talent in investee companies and fund management companies. This includes income and capital gains tax for private individuals, tax incentives for individual investors, and taxation treatment of stock options.

## Labour market

The rigidity of the labour market, or the degree of employment protection, has important implications for both the supply and demand side of equity finance. On the demand side, particularly for venture investments, labour market rigidities, or high degrees of employment protection which make hiring and firing difficult, can discourage entrepreneurship and with it

the demand for venture capital funding. The opportunity cost of becoming an entrepreneur is higher in the context of rigid labour markets, as the latter are associated with safer wage incomes thanks to increased job security. Thus, in theory, the incentives for opportunity-driven entrepreneurial activity are lower in economies with rigid labour markets. However, as noted by Schertler (2003) it is more difficult to enter the labour market when the labour market is rigid, so there is a higher incentive for those who are unemployed to start their own enterprises, becoming necessity-driven (as distinct from opportunity-driven) entrepreneurs. The opposing forces suggest that the overall effect of rigid labour markets on venture capital demand is not clear, but it is likely that, as suggested by Meyer (2008), those who are entrepreneurs by necessity rather than choice (such as the unemployed) are less prone to use VC. Hence on balance we would expect labour market rigidity, or high employment protection to be associated with lower venture activity. Interestingly, as noted above, Schertler (2003) found a positive relation between venture activity and labour market restrictions, which he interpreted to suggest that enterprises operating in economies with rigid labour markets demand more capital per employee than their counterparts operating in flexible labour markets.

Of course, supply of venture capitalists, which in turn impacts the supply of venture capital in a particular country, also depends on the labour market. Schertler (2003) notes that labour market rigidities affect the decision of individuals to become venture capitalists in the same way that they affect the decisions of individuals to become entrepreneurs. Thus, labour market rigidities may increase the opportunity cost and thus lower the incentives of individuals to become venture capitalists, reducing VC activity.

As regards buyout, studies (e.g. Blanchard 1997) show that protection of workers can result in reduced employment and growth. In the case of buyouts the rigidity of the labour market is relevant, but for different reasons: an important aspect of the private equity business model, in particular buyout investment, is restructuring in order to create efficiencies: although evidence as to whether buyouts result in net job creation or destruction is mixed, the concept of creative destruction tends to result in reductions in employment in the short term, but job creation in the longer term. Clearly, for this business model to be effective, the labour market needs a degree of flexibility, so the rigidity of the labour market may impact buyout investment activity.

Based on the above considerations, we use the OECD's summary indicator of employment protection as a measure of labour market rigidity. This is a summary indicator of 14 indicators related to the difficulty of hiring and firing both permanent and temporary employees, including notification procedures, severance pay requirements, trial periods etc. The indicators are listed in annex 2.

## Capital market

Companies and indeed entrepreneurs have a choice when it comes to finance: debt or equity, with the former from the banking sector or capital markets, depending on accessibility. The presence of a deep, liquid capital market is important for a number of reasons.

First, a deep, liquid capital market provides an important exit route for private equity, allowing investors to recoup their funds in the future. A lack of an appropriate exit is one of the main factors discouraging private equity investment (NVCA, 2010). Bringing a company to IPO is a valuable signal of the quality of a GP, and is recognised during subsequent fundraisings.

Furthermore, IPOs tend to be the most profitable exit routes, but generally occur several years after investments. However, according to Levis (2008) for the period 1998-2006 IPOs account for only around 2.7% of the number, and 8.5% of the value of divestments in the UK, with trade sales (20.6% by number, 23.5% by value) being far more common.

Second, liquid stock markets are also important in ensuring the supply of investment capital. There is a transaction cost that arises due to information asymmetries between a GP and a potential investee company or entrepreneur, and also between an LP and a GP. IPOs help reduce this information asymmetry, and hence the transaction cost, as they signal the experience of the GP to the investee company/entrepreneur. Also, successful IPOs encourage capital providers to provide more capital and at more favourable conditions (Schertler, 2003).

Third, the depth and liquidity of capital markets is an important proxy for financial depth, and hence the availability of leverage, something that is key to the buyout model.

Finally, the existence of a liquid stock market can help promote venture capitalism, and thus the supply of venture capital, as it allows necessary skills to be developed (Schertler, 2003). Liquid stock markets increase the number of individuals who have basic technological experience required to be venture capitalists. Entrepreneurs who sell their enterprises on stockmarkets are natural candidates for becoming venture capitalists who offer management support in addition to financial means. The same applies to buyout fund managers.

These arguments are supported in the empirical literature. Gompers and Lerner (2000) and Black and Gilson (1999) both note that private equity is more prevalent in countries with deep and liquid stock markets. Schertler (2003) finds that the liquidity of stock markets has a significant positive impact on early stage VC investments. Meyer (2006b, 2008) finds a positive and robust correlation between the ratio of current IPOs to VC investments four years previously and current VC investments. He notes that most start-ups need at least a few years of business development before they can be sold publicly. However, Meyer also notes that this finding lends support to the pro-cyclical nature of VC investments because successful exits of past VC investments may not necessarily imply that current investments will be successfully exited in the future. Clarysse et al (2009) find that market capitalisation of listed companies, in other words stock market depth, is a driver of venture capital investment.

Based on the above, for our study we use the most simple, and commonly used indicator for the depth and liquidity of the capital market, namely market capitalisation as a share of GDP. As noted by Groh and Lichtenstein (2009), this indicator also serves as a proxy for financial depth, for the professionalism of the financial community, for deal flow and exit opportunities.

### 4.3 The dependent variable

Investment activity data comes from EVCA/PEREP analytics. We use investment activity data measured in Euro on an industry basis, in other words allocated according to the country in which the GP is located, rather than according to where the final investee company is located. We use the overall investment activity figure, the total venture figure (which includes seed, start up and later stage venture) and the buyout figure. Thus the total investment activity figure that we use does not equal the sum of the total venture and buyout investment figures, as we do not include other categories, namely growth capital, rescue/turnaround capital and replacement capital. Note that this data includes primary investments only: it does not include investment by funds of funds.

## 4.4 Data scope

Data for the above variables have been collected for 17 EU countries, namely Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Netherlands, Poland, Portugal, Spain, Sweden and the United Kingdom. The initial sample covering the EU 27 had to be reduced due to data availability issues. The sample covers a 6 year period, from 2003 to 2008. Again, the length of the sample had to be reduced due to data availability. Whilst in time series analysis a sample period of only 6 years would restrict the number of independent variables that could be included in the regression, in this case the problem is mitigated due to the use of panel data.

## 5 Econometric Methodology

A brief methodological outline is appropriate at this stage. We propose the use of panel data analysis. Use of a more simplistic econometric methodology (such as cross sectional or time series analysis) would mean the possibility of encountering problems of spurious correlation: clearly a number of factors are likely to drive activity, and looking at them individually fails to take account of how they interact with each other. Panel data allows us to use both spatial and temporal aspects of data to study the determinants of activity.

Our model uses an equation along the following lines:

$$Y_{it} = \lambda X_{it} + e_{it}$$

$$e_{it} = \eta_i + \gamma_{it} + u_{it}$$

Where  $Y$  is the dependent variable, the behaviour of which we are trying to model, in this case total private equity investment activity, venture capital investment activity or buyout investment activity.  $X$  is a vector of the potential explanatory variables, namely the entrepreneurial environment, the institutional environment, tax regimes, the labour market and the capital market, and control variables. The vector  $X$  also includes the lagged dependent variable. The error term,  $e$ , comprises not only observation-specific errors,  $u$ , but also unobservable country specific attributes that give rise to differences unrelated to investment activity in the countries being considered (known as cross sectional fixed effects), denoted  $\eta$ , and time-specific fixed effects, denoted  $\gamma$ . The temporal element is indicated by  $t$ , and the spatial element indicated by  $i$ , which in this case represents countries.

There are some technical problems that need to be addressed when estimating the above equation. Some of the explanatory variables are likely to be endogenous, in other words, causality may run in both directions. For example, venture investment activity is likely to be greater in a country with an attractive entrepreneurial environment, while at the same time the entrepreneurial environment may be enhanced by the presence of an active venture capital market. In such a circumstance, an ordinary least squares regression (OLS) of the above model would be biased because the error term,  $e$ , would be correlated with elements of the vector of regressors,  $X$ . Furthermore, there are likely to be a number of time-independent country characteristics (known as fixed effects: for example GDP per capita as a measure of initial development) which may be correlated with the regressors. These are captured in the error term above. A further issue is that we are likely to want to include lagged dependent variable as a regressor, which will give rise to autocorrelation. Finally, the dataset covers only a short period (6 years), but has a relatively larger cross-country element, covering 17 countries.

To address these problems we use a Generalised Method of Moments (GMM) estimator. We use the version proposed by Arellano and Bond (1991). This involves adding lagged levels of the potentially endogenous regressors of interest. This makes the endogenous variables predetermined and so not correlated with the error term. To address the fixed effects problem the difference GMM estimator uses first differences to transform the equation; by transforming the regressors by first-differencing, the fixed country-specific effect is removed as it is time-invariant. The issue of autocorrelation of the lagged dependent variable is resolved by instrumenting it with its past levels. The issue of short time series relative to the cross section is addressed because the Arellano and Bond methodology is designed for small time period, large cross-country samples.

In such a model there is a question of robustness. One issue concerning the use of instruments is the question of their validity, more specifically the issue of overidentifying restrictions. We address this by using the Sargan test to check the validity of the instruments. Under the null hypothesis that the over identifying restrictions are valid, the Sargan statistic is distributed as Chi squared, with the number of degrees of freedom equal to the instrument rank less the number of estimated coefficients.

As a further robustness check, the second order correlation of the error term in the first differenced equation is assessed using Arellano-Bond statistics for autocorrelation, which is asymptotically distributed  $N(0,1)$ .

## 6. Results

The results of the panel regression are summarised in the table below:

	Total Investment Activity	Buyout Investment Activity	Venture Investment Activity
<b>Market Capitalisation</b>	0.720*** [0.129]	0.949*** [0.291]	0.059 [0.188]
<b>Unemployment</b>	-0.149*** [0.049]	-0.073 [0.086]	-0.091** [0.042]
<b>Employment Protection</b>	-0.756 [0.580]	-2.376** [1.197]	-2.255 [1.494]
<b>R&amp;D Expenditure</b>	1.605 [4.959]	-7.628 [7.935]	-1.593 [4.001]
<b>Summary Innovation Index</b>	11.954** [6.095]	65.467*** [13.005]	-15.359** [7.328]
<b>Tax and Legal Environment</b>	-1.353* [0.759]	0.472 [1.491]	-0.728 [0.832]
<b>Fiscal R&amp;D Incentives</b>	0.109 [1.160]	-1.684** [0.855]	0.368 [0.707]
<b>Attracting and Retaining Talent</b>	0.914 [0.769]	1.626* [0.879]	-0.171 [0.543]
<b>Tax Incentives for PE and VC</b>	-0.26 [1.522]	1.241 [2.372]	0.545 [0.896]
<b>Sargan test (p value)</b>	0.186	0.232	0.425

Regressions use the system-GMM estimator. Standard errors are reported in brackets under the coefficients. \*\*\*, \*\*, and \* indicate significance at the 1%, 5% and 10% levels respectively.

The Sargan test indicates that the instruments are valid, and no autocorrelation is detected in the first differenced equation, suggesting that the model is correctly specified.

A summary of the model results is presented above. Instruments are used in the regressions – first, as control variables, we use  $\log^5$  of GDP,  $\log$  of GDP per capita and inflation. These account for our fixed effects, namely the differences between the economies that are not related to the issue we are investigating. Other instruments are used as follows: variables that are suspected to be endogenous, namely research and development expenditure, summary innovation index, the tax and legal environment, fiscal R&D incentives, attracting and retaining

<sup>5</sup> Logs are used to account for the fact that these variables may not change in a linear fashion



talent, and tax incentives for PE and VC are instrumented with GMM style instruments, i.e. lagged values of the variables in levels. Strictly exogenous variables, i.e. market capitalisation, unemployment, and employment protection are used as their own instruments.

We find the following results. In the initial regression, where total investment activity is used as the dependent variable, we find that determinants are market capitalisation and unemployment, both of which are significant at the 1% level; the summary innovation index, which is significant at the 5% level; and the tax and legal environment which is significant at the 10% level<sup>6</sup>. These results are mostly in line with expectations, based on the analysis in section 4 and the findings of other researchers: a higher market capitalisation to GDP indicates a deeper and more liquid stock market which is attractive for investors, as it provides an exit route, reduces information asymmetries, and creates an enabling environment. Higher unemployment is associated with lower total investment activity; this is to be expected and in line with the findings of Meyer (2006b) outlined above, and demonstrates the cyclical nature of investment activity. However, we do not find employment protection to be a determinant, indicating that at the total investment activity level, the issue of labour market rigidity may be dominated by other considerations. The summary innovation index is significant at the 5% level, indicating the importance of an innovative environment to investors. Finally, the tax and legal environment is significant in instilling confidence that investors will see the benefits of their labours.

Whilst the overall picture is interesting, there are some surprises, namely the fact that employment protection, government expenditure on R&D, and the three indicators that look at tax incentives to PE and VC are not significant. However, to a certain degree, this arises because we are looking at combined buyout and VC investment; the basis for this paper is that there are differences between the two areas, so we now look at the findings at the disaggregated level.

Regarding buyouts, the initial striking difference is that employment protection is seen as significant at the 5% level, while unemployment ceases to be significant. Perhaps this is not surprising. We noted earlier that an important aspect of the buyout model is the ability to restructure in order to create efficiencies: a flexible labour market is important to the concept of creative destruction. Another key element of the buyout model is the availability of leverage, thus it is of no surprise that the market capitalisation indicator is significant at the 1% level in the buyout model: as discussed above, market capitalisation is an important proxy for financial depth, which in turn can serve as a proxy for availability of leverage. Of course, exit via IPO is another important aspect of buyout, for which a liquid stock market is critical. Another key difference is that the tax and legal environment (which admittedly was only significant at the 10% level) is no longer significant, but instead two of the three indicators that look at the tax incentives for PE and VC are significant. The indicator of fiscal R&D incentives is significant at the 5% level, and the indicator that looks at incentives for attracting and retaining talent is significant at the 10% level. These perhaps show the importance of returns in the buyout model: and some might argue that it provides corroboration of recent findings that show that buyout fund returns are built on leverage (Morris 2010).

Finally, looking at the venture model, it is interesting to note that market capitalisation is no longer significant. This is highly relevant, and reflects the fact that IPO is a much less commonly-used exit route for venture capital. Furthermore, it reflects the oft-cited issue with the European venture market, namely fragmentation, and the lack of a pan-European small cap market. It is notable that many European VC exits tend to go through NASDAQ.

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<sup>6</sup> Significant at the 1%, 5% and 10% levels means that if the same population is sampled on numerous occasions, the results would support the hypothesis in 99%, 95% and 90% of cases respectively, and as such we can reject the hypothesis that the outcome arises due to chance.

Thus it matters little to venture funds whether they are located in a country with a deep, liquid capital market, in fact their investment opportunities may be greater in countries where this is not the case, as there will be less alternative financing opportunities. That unemployment is significant for venture, whereas employment protection is not, indicates that venture investment is provided more for opportunity based, rather than necessity based entrepreneurs; otherwise we would expect a positive relationship between unemployment and investment activity. Finally, we note that not only is the legal and taxation environment not significant, but neither are any of the three indicators looking at tax incentives. This is open to interpretation, and may to a certain degree reflect the relative importance of public investors in the venture capital market, compared to buyout, who invest under mandates that have developmental objectives, and are not purely returns based: on the one hand, such mandates mean that they will not be driven by fiscal incentives. Equally likely, it reflects the opportunity-driven nature of venture capital investors, who are more likely to seek returns through investing in innovative high-growth companies, and less likely to rely on achieving their returns through financial engineering.

## 7. Conclusions

By examining venture capital and buyout activity using the same model and data sources, we have been able to undertake a balanced analysis of what drives investment activity in these two segments of the private equity market. In the context of previous studies in this area, and conceptual understanding of the markets, the results are not unexpected. However, they help highlight some interesting distinctions between the two segments, and the motivations of investors. In response to the initial question, we would argue that venture and buyout investors really are quite different. This may well be because of the significant involvement in venture capital investment of government investors with motivations that lean towards generating the economic benefits, rather than the financial benefits that it is claimed that the asset class can provide. Of course this raises the question of whether this behaviour is a significant contributor to the poorer performance of venture capital in recent years in Europe; this is an important area for future research.

The results have important policy implications. Given the economic benefits for an economy of private equity investment that were discussed in section 2, clearly governments should be interested in attracting more buyout and venture investment (albeit with the caveat made earlier that studies such as Morris (2010) have demonstrated the reliance of buyout returns on use of leverage, which brings additional risks). The above results have demonstrated that overall, on the supply side, investment is attracted to countries that have less employment protection, more developed capital markets, and tax incentives for attracting and retaining investor talent. On the demand side, there is clearly a case for governments to provide fiscal incentives for R&D activity, and implement measures to foster an innovative environment. One policy action which can only be surmised from the results is the importance of creating a single European small-cap stock market, to increase liquidity and provide a suitable exit route: the indicator of market capitalisation was not a significant determinant of venture investment activity, however this is likely to be because at present venture investors either do not use IPO as a means of exit, or if they do, they look to the US to do so.

## Annex

### Annex 1: Components of the EVCA 'Tax and Legal Environment for Limited Partners and Fund Management Companies' indicator.

1. Pension funds
  - a. Type of public mandatory pillar one pension system
  - b. Availability of incentives for complementary Pillar Two (occupational) pension systems
  - c. Quantitative or qualitative restrictions impeding or limiting the investments by pension funds in private equity and venture capital
  - d. Geographical restrictions for pension funds to invest in private equity and venture capital in other European countries
2. Insurance Companies
  - a. Possibility to invest in private equity and venture capital
  - b. Quantitative or qualitative restrictions impeding or limiting the investments by insurance companies in private equity and venture capital
  - c. Geographical restrictions for insurance companies to invest in private equity and venture capital in other European countries
3. Fund Structures
  - a. A dedicated or suitable domestic fund structure or investment vehicle for private equity and venture capital investments
  - b. Tax transparency for domestic limited partners
  - c. Tax transparency for non-domestic limited partners
  - d. Ability for non-domestic limited partners to avoid having a permanent establishment in the country
  - e. Fund management companies liable for VAT on management fees, and ability to recuperate it
  - f. Freedom from undue restrictions on investments

## Annex 2: The OECD Employment Protection index

This comprises the following indicator relating to both temporary and permanent contracts. Countries are scored relative to each other on a scale of 0 (least restrictions) to 6 (most restrictions):

- Notification procedures
- Delay involved before notice can start
- Length of notice period at 9 months of tenure
- Length of notice period at 4 years of tenure
- Length of notice period at 20 years of tenure
- Severance pay at 9 months of tenure
- Severance pay at 4 years of tenure
- Severance pay at 20 years of tenure
- Definition of justified or unfair dismissal
- Length of trial period
- Compensation following unfair dismissal
- Possibility of reinstatement following unfair dismissal
- Valid cases for use of fixed term contracts
- Maximum number of successive fixed term contracts
- Maximum cumulated duration of successive fixed term contracts
- Types of work for which temporary work agency employment is legal
- Restrictions on number of renewals of temporary work agency contracts
- Maximum cumulated duration of successive temporary work agency contracts

## Annex 3: List of Acronyms

- **BVCA:** British Venture Capital Association
- **CEE:** Central and Eastern Europe
- **EC:** European Commission
- **EIB:** European Investment Bank
- **EIS:** European Innovation Scoreboard
- **EU:** European Union
- **EVCA:** European Venture Capital Association
- **GDP:** Gross Domestic Product
- **GMM:** Generalised Method of Moments
- **GP:** General Partner
- **IPO:** Initial Public Offering
- **IRR:** Internal Rate of Return
- **LP:** Limited Partner
- **NVCA:** National Venture Capital Association
- **OECD:** Organisation for Economic Co-Operation and Development
- **OLS:** Ordinary Least Squares
- **PE:** Private Equity
- **R&D:** Research and development
- **VC:** Venture Capital
- **VCs:** Venture Capitalists

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