Discussion Paper No. 10-001

What Lures Cross-Border Venture Capital Inflows?

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ZEW
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Non-technical summary

The change in the business model of venture capitalists from investing locally towards investing across borders started to intensify in the late 1990s. Compared to domestic investments, cross-border investments are likely to be associated with higher transaction and information costs. The reason for this is that venture capital is typically invested in opaque risky ventures where information asymmetries between the entrepreneurs and the venture capitalists are particularly pronounced and which therefore require intensive pre-investment screening, post-investment hands-on management support and control. Nevertheless, there are at least two potential benefits that might outweigh the higher costs of investing across borders. By crossing borders, venture capitalists are able to exploit return differences between their home country and the portfolio companies' countries. But even if return differences were absent, venture capitalists might invest abroad in order to diversify their portfolios geographically and to reduce their country-specific risks.

In this paper we study the economic determinants of cross-border and domestic venture capital investments. A better understanding of the determinants behind domestic and cross-border venture capital investments is interesting to academics as well as to policy makers since cross-border venture capital inflows may compensate for potential limits in the domestic venture capital supply. We use a European and North-American country dataset and start by simultaneously analyzing how economic determinants shape domestic venture capital investments (i.e., when the venture capitalist is located in the same country as the portfolio company) and gross cross-border venture capital inflows (i.e., when the venture capitalist is located outside the country under focus). We find that countries with higher patent counts have a higher number of domestic investments as well as gross cross-border inflows than countries with lower patent counts. Countries with higher expected economic growth have a higher number of gross cross-border inflows than countries with low growth prospects. In addition, countries with viable stock markets have more domestic investments and are more successful in attracting investments from foreign venture capitalists than countries with unviable stock markets.

We continue by investigating whether venture capital inflows compensate for potential limits in the domestic venture capital supply and analyze net cross-border venture capital inflows for country pairs. We define net cross-border inflows as the gross cross-border inflows attracted by the i-country portfolio companies from the k-country venture capitalists minus the gross cross-border outflows, which i-country venture capitalists invest into k-country portfolio companies. Our results indicate that countries with higher expected growth and lagged stock market returns receive larger net cross-border inflows. Moreover, a higher stock market capitalization and a more favorable environment for venture capital intermediation lead to lower net cross-border inflows. These finding may indicate that venture capitalists located in countries with viable stock markets can raise funds at more favorable conditions and venture capitalists located in countries with attractive tax and legal environments for venture capital intermediation have incentives to invest their funds in jurisdictions with less favorable tax and legal conditions. Thus, net cross-border inflows compensate limits in the local venture capital supply.

Das Wichtigste in Kürze

Ende der 1990er verstärkten Venture-Capital (VC) Investoren ihre ausländischen Investitionen. Im Vergleich zu den inländischen Investitionen dürften ausländische Investitionen mit höheren Transaktionskosten und Informationskosten verbunden sein, da die Informationsasymmetrien zwischen den Unternehmern und Investoren besonders stark ausgeprägt sind, und deshalb eine vor der stattfindenden Investition zeitaufwendige Auswahlphase, und nach erfolgter Investition eine zeitintensive Unterstützung und Überwachung des Managements durch den Investor erfordern. Es gibt jedoch mindestens zwei Vorteile, die diese mit ausländischen Investitionen verbundenen höheren Kosten kompensieren können. Beim Überschreiten von Ländergrenzen können VC-Investoren Renditedifferenziale zwischen ihrem Heimatland und dem Land des Portfoliounternehmens ausnutzen. Auch wenn solche Renditedifferenziale nicht existieren, können VC-Investoren einen Anreiz haben, im Ausland zu investieren, um so ihr Portfolio geographisch zu diversifizieren und dadurch ihr Länderrisiko zu reduzieren.

In diesem Forschungsaufsatz werden ökonomische Determinanten von ausländischen und inländischen VC-Investitionen untersucht. Ein besseres Verständnis der Determinanten von ausländischen und inländischen Investitionen ist dabei nicht nur für akademische Kreise, sondern auch für die wirtschaftspolitische Beratung interessant, da ausländische Investitionen potentielle Beschränkungen des inländischen VC-Angebotes aufweichen können. Die Analyse basiert auf einem Datensatz europäischer und nordamerikanischer Länder. Die Ergebnisse zeigen, dass mehr Patente in einem Land zu einer Steigerung der inländischen wie auch der ausländischen Investitionen führen. Ein höheres erwartetes Wachstum hilft ebenfalls, ausländische Investoren anzuziehen. Darüber hinaus haben Länder mit entwickelten Kapitalmärkten höhere inländische Investitionen und ziehen mehr ausländische Investoren an.

Um Einblicke darüber zu gewinnen, ob VC-Zuflüsse mögliche Beschränkungen des inländischen Angebots aufweichen, werden anschließend Netto-VC-Zuflüsse auf Länderpaarebene betrachtet. Netto-VC-Zuflüsse werden dabei definiert als die Investitionen, die Portfoliounternehmen im Land i von Investoren aus dem Land k erhalten, abzüglich der Investitionen, die Portfoliounternehmen im Land k von Investoren aus dem Land i erhalten. Unsere Ergebnisse induzieren, dass Länder mit höheren erwartetem Wachstum und höheren Renditen im Kapitalmarkt höhere Netto-VC-Zuflüsse erhalten. Länder mit einer höheren Marktkapitalisierung und einem guten rechtlichen und steuerlichen Umfeld für VC-Intermediation, hingegen, haben geringere Netto-VC-Zuflüsse, d.h. VC-Investoren aus diesen Ländern investieren mehr im Ausland, als ausländische VC-Investoren in diesen Ländern. Diese Ergebnisse deuten darauf hin, dass VC-Investoren in Ländern mit höherer Marktkapitalisierung das Kapital zu besseren Bedingungen aufnehmen können und dass ein attraktives rechtliches und steuerliches Umfeld VC-Investoren Anreize geben kann, im Ausland zu investieren. Unsere Ergebnisse unterstützen die These, dass Netto-VC-Zuflüsse aus dem Ausland Beschränkungen im inländischen VC-Angebot aufweichen können.

What lures cross-border venture capital inflows?

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Abstract

The change in the business model of venture capitalists from investing locally towards investing across borders started to intensify in the late 1990s. According to a dataset of European and North-American countries, we find that countries with higher expected growth and higher lagged stock market returns receive larger net cross-border venture capital inflows. Thus, portfolio companies located in high-growth and high-return countries receive more venture capital from foreign venture capitalists than these countries' venture capitalists invest in foreign portfolio companies. Also, countries with lower stock market capitalizations as well as those with poor tax and legal environments for venture capital intermediation exhibit larger net cross-border inflows. These findings offer important insights for policy makers since cross-border venture capital inflows partly compensate for potential limits in the domestic venture capital supply.

Keywords: Venture Capital, Internationalization, Net Cross-Border Inflows, Economic Determinants.

JEL Classification: F21, G24.

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1 Introduction

The change in the business model of venture capitalists from investing locally towards investing across borders started to intensify in the late 1990s (Aizenman and Kendall 2008). Compared to domestic investments, cross-border investments are likely to be associated with higher transaction and information costs (see, e.g., Wright et al. 2005, Cumming and Johan 2007a). The reason for this is that venture capital is typically invested in opaque risky ventures where information asymmetries between the entrepreneurs and the venture capitalists are particularly pronounced and which therefore require intensive pre-investment screening, post-investment hands-on management support and control (see, e.g., Amit et al. 1998). Nevertheless, there are at least two potential benefits that might outweigh the higher costs of investing across borders. By crossing borders, venture capitalists are able to exploit differences in risk-adjusted expected returns between their home country and the portfolio companies' countries, which may arise due to a better economic environment in foreign countries. But even if return differences were absent, venture capitalists might invest abroad in order to diversify their portfolios geographically and to reduce their country-specific risks.

In this paper we study the economic determinants of cross-border venture capital investments. To complete the picture, we complement the analysis of cross-border flows by investigating domestic venture capital investments. Given the role of venture capital finance for the countries' economic progress (see, e.g., a survey article by Strömberg 2009 summarizing its impact on economic growth, employment, innovative activity, company performance, etc.), it is vital to understand the geography of venture capital finance. A better understanding of the determinants behind domestic and cross-border venture capital investments is not only important to academics and practitioners but also to policy makers since, as we will show later, cross-border venture capital inflows may compensate for potential limits in the domestic venture capital supply. With the international dimension in venture capital finance, public policy becomes much more complex, as its actions do not only affect investments by domestic venture capitalists in domestic and foreign companies, but also foreign venture capitalists' participation in this particular country. Therefore, public policy that aims at fostering local venture capital industries has to take into account the internationalization in venture capital finance.

There is a long list of studies dealing with the determinants of domestic venture capital investments at the country level (see, e.g., Jeng and Wells 2000, Allen and Song 2005, Romain and van Pottelsberghe 2004, Da Rin et al. 2006, Armour and Cumming 2006). Some of these country analyses have been framed in a demand-supply framework, which we augment to a two-country case to study cross-border flows. In our two-country framework, cross-border venture capital flows are caused by expected return differences between the two countries. Expected return differences may result from economic determinants that shape either the venture capital demand or supply. Demand-specific determinants, such as the creativeness of entrepreneurs in the country, are supposed to give rise to a positive return differential on the side of the "creative" country, implying that venture capital finance flows from the "uncreative" country to the "creative" country. Supply-specific determinants, such as the tax and legal environment for venture capital intermediation, are conjectured to generate a positive return differential on the side of the "unfavorable-environment" country, implying that venture capital

finance flows from a country with a favorable environment to a country with an unfavorable environment.

We use a European and North-American country dataset and start by simultaneously analyzing how economic determinants shape *domestic venture capital investments* (i.e., when the venture capitalist is located in the same country as the portfolio company) and *gross cross-border venture capital inflows* (i.e., when the venture capitalist is located outside the country under focus). We continue by investigating whether venture capital inflows compensate for potential limits in the domestic venture capital supply and analyze *net cross-border venture capital inflows* for country pairs. We define net cross-border inflows as the gross cross-border inflows attracted by the i-country portfolio companies from the k-country venture capitalists minus the gross cross-border outflows, which i-country venture capitalists invest into k-country portfolio companies.

Our research adds to the findings of a rapidly growing number of studies dealing with the internationalization in venture capital finance. For instance, Aizenman and Kendall (2008) investigate how economic determinants, such as market capitalization, influence worldwide gross cross-border venture capital investments. Cumming and Johan (2007a, 2007b) analyze how venture capitalists raise funds from foreign investors. Kaplan et al. (2003) demonstrate that when investing abroad, deal contracts of venture capitalists located in civil law countries differ significantly from those of investors located in common law countries. Another strand of the literature analyzes motives behind cross-border venture capital investments (e.g., Mäkelä and Maula 2006, Bruner and Chaplinsky 2002, Ribeiro et al. 2006, Dixit and Jayaraman 2001, Wright et al. 2005, Manigart et al. 2006), particularly from the perspective of the company that receives venture capital funding.

The remainder of the paper is organized as follows. Section 2 employs a simple neoclassical supply-demand framework as a tool to predict the direction of net cross-border venture capital flows. Section 3 describes the dataset. Section 4 investigates the determinants of domestic investments, gross cross-border inflows at a country level and, finally, net cross-border inflows at a country-pair level. Section 5 summarizes our main findings and concludes.

2 Theoretical background and hypotheses

To yield hypotheses on the impact of economic determinants on cross-border inflows, we use a simple neoclassical supply-demand model of a closed economy that we augment to a two-country setting, which allows us to analyze cross-border flows. In the closed economy the venture capital demand results from companies' needs to finance investment projects with positive net present values. When the risk-adjusted expected return (hereafter referred to as expected return) required by the investors increases, companies demand a lower quantity of venture capital finance because fewer projects with positive net present values exist. Thus, the demand curve is downward sloping. The venture capital supply in the closed economy results from the willingness of limited partners, such as pension funds and insurance companies, to invest in this asset class, as well as from resources available in the country to set up and to manage venture capital funds (in particular human capital). At least two reasons exist why a higher quantity supplied has to go along with higher expected returns (i.e., the supply curve is upward sloping). First, if the capital gains of limited partners are subject to non-unique

tax rates, higher-taxed investors only provide capital for venture capital funds when they are compensated with a higher expected return (Gompers and Lerner 1998). Second, because fund managers need particular expertise to identify and structure promising deals, and because building up such expertise is costly and requires time, the availability of qualified managers increases only if the expected return rises. Panel a of Figure 1 visualizes the venture capital demand and supply in a closed economy.

Several economic determinants are likely to affect the position of the demand curve in the expected return-quantity diagram. A higher technological creativeness (Ueda and Hirukawa 2008) and a higher expected growth (Armour and Cumming 2006, Gompers and Lerner 1998, Cumming and MacIntosh 2006) will go along with more entrepreneurs who demand venture capital finance to start-up their companies and to finance their ideas. Moreover, a viable stock market will increase entrepreneurs' demand for venture capital because it gives them the opportunity to enter into an implicit contract over control with the venture capitalist. Whereas the entrepreneurs' control gets diluted after a trade sale, an initial public offering offers them the chance to at least partially reacquire control since the entrepreneurs can obtain leading management positions in the listed companies (Black and Gilson 1998, Bascha and Walz 2002). Further, capital gains tax rates will influence the decision to become an entrepreneur and thus the venture capital demand as Poterba (1989) shows within a theoretical model. Finally, the legal framework impacts the valuations and returns and is therefore supposed to shape the venture capital demand as well (Cumming and Walz 2009). For a country with a high and a low venture capital demand, respectively, Panel a of Figure 1 (left picture) depicts the expected return and the quantity of venture capital finance in equilibrium. Ceteris paribus, a higher demand implies a higher expected return for each quantity of venture capital finance.

[Insert Figure 1 about here]

Similarly, several economic determinants affect the position of the supply curve. The viability of the stock market is not only relevant for the demand, but also for the supply of venture capital because a viable stock market allows venture capitalists to build up a reputation by successfully exiting from their portfolio companies via an initial public offering. Venture capitalists may profit from this reputation by raising funds from limited partners at more favorable conditions (Gompers 1996). The position of the supply curve also depends on capital income taxes (see Keuschnigg and Nielsen 2002, 2004) and other elements of the fiscal environment relevant for venture capital intermediation, such as VAT on carried interest and management fees. High taxes on carried interest and management fees may destroy the managers' incentives to select, monitor and support the portfolio companies. Moreover, the legal environment determines the quality of support that the venture capitalists offer their portfolio companies (Bottazzi et al. 2005), the structure of contracts and deal characteristics (Lerner and Schoar 2004), and the efficiency of project screening and deal origination (Cumming et al. 2009). For a country with a high and a low venture capital supply, respectively, Panel a of Figure 1 (right picture) depicts the return and the quantity of venture capital finance in a state of equilibrium. Ceteris paribus, a higher supply implies a lower expected return for each quantity of venture capital finance.

To yield hypotheses on the determinants of cross-border flows we augment this simple demand-supply model of a closed economy to a two-country framework; the two countries are assumed to be identical apart from either the demand or the supply. To exemplify what may drive cross-border

investments, let country *i* have a higher venture capital demand than country *k.* This case will be further illustrated in Panel b of Figure 1. In the absence of cross-border venture capital flows, the expected return is higher in country *i* (left picture) than in *k* (right picture). The positive expected return difference between the countries *i* and *k,* caused by differences in economic determinants that shape the venture capital demand, incentivizes venture capitalists from country *k* to invest in country *i.* In the absence of distorting factors, such as transaction and information costs, the expected returns and quantities would be equalized in both countries in the new equilibrium. However, distorting factors cannot be neglected in the context of venture capital. To invest across borders, higher expected returns abroad have to outweigh the costs, which are likely to be higher for cross-border than for domestic investments (e.g., Wright et al. 2005, Cumming and Johan 2007a). As a result, the return difference may decrease if cross-border flows take place, but are unlikely to disappear completely.

Now, we turn to the venture capital supply and let country *i*, but not country *k,* have a favorable environment for the supply. This case is illustrated in Panel c of Figure 1. Without cross-border flows, the expected return is higher in country *k* (right picture) than in country *i* (left picture). The difference in the supply conditions generates an expected return difference that encourages cross-border flows from country *i* to *k.* Distorting factors may not only hinder an equalization of expected returns, but they may also affect the location decision of the venture capitalists (see Chen et al. 2009 on the latter). For example, differences in the tax and legal environment for venture capital intermediation, such as VAT on carried interest and management fees, may determine venture capitalists' decisions on where to locate as well as where to invest.

These considerations lead to the following hypotheses:

H 1: Economic determinants that increase the venture capital demand (the creativeness and expected growth)

- will increase domestic investments in country *i*.
- will increase cross-border inflows that country *i* attracts from any other country.

H 2: Economic determinants that increase the venture capital supply (tax and legal environment for venture capital intermediation)

- will increase domestic investments in country *i*.
- will decrease cross-border inflows that country *i* attracts from any other country.

H 3: Economic determinants that increase the venture capital demand as well as the supply (stock market viability and the legal framework)

- will increase domestic investments in country *i*.
- will increase or decrease cross-border inflows that country *i* attracts from any other country.[1]

[1] The demand and supply curves in country $y \in \{i,k\}$ are given by: $R_y = A_y - bQ_y^D$ and $R_y = C_y + dQ_y^S$ with d and $b>0$. Country *i* has a favorable, while *k* has a less favorable environment. A favorable environment leads to a higher demand and supply: $A_i = A_k + L^D$ and $C_i = C_k - L^S$, where L^D is the demand and L^S the supply curve shift.

The discussion above is based on the conjecture that venture capitalists exploit differences in expected returns when they invest abroad. However, venture capitalists may invest abroad to diversify their portfolios geographically and to reduce country-specific risks. Venture capitalists' diversification motives may result in cross-border flows even if differences in expected returns are absent and it may initiate venture capital flows in both directions, i.e., from country *i* to *k* and from country *k* to *i*, at the same time. Because of this diversification motive, *gross* cross-border inflows may not necessarily respond to expected return differences as formulated in our hypotheses. Therefore, we also analyze *net* cross-border inflows, which show whether a country "imports" or "exports" venture capital and which might therefore better reflect the exploitation of expected return differences. Our definition of net cross-border inflows differs from the one used in other studies on cross-border equity flows: Portes and Rey (2005), for example, focus on changes in portfolio positions, and calculate net cross-border flows as securities' purchases of *k*-country companies by *i*–country citizens minus securities' sales of *k*-country companies by *i*-country citizens.

3 The data

3.1 Data source for venture capital investments

Data on domestic and cross-border venture capital investments stem from Zephyr database, offered by the Bureau van Dijk Electronic Publishing. This information platform, initially aimed at M&A transactions, also conveys IPO and venture capital transaction data. For each transaction, besides the names of the target company and all investors, the Zephyr database contains a wide range of information on the participating parties, such as their countries of origin, parent companies, detailed business descriptions and industry affiliations.

In our dataset we include deals from the Zephyr database that fulfill the following conditions. (i) The deal has one of the following types of financing: venture capital, private equity, angel investment, corporate venturing, or seed financing. (ii) The portfolio company is a non-financial company located in Europe or North America. (iii) The investors acquire a minority stake in the portfolio company. (iv) At least one investor from Europe or North America provides venture capital. To distinguish venture capitalists from other investors, we analyzed investors' business descriptions and retained only those deals in which the business description of at least one investor included the terms "venture capital" or "private equity". In some cases, the identity of the investor in Zephyr is indicated on the level of the fund, in other cases on the level of the venture capital company. Also, in case of dependent private equity companies, sometimes the parent company, whereas in other cases the subsidiary is indicated as the investor in a particular deal. We created a consistent pattern by using the information on the

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For the equilibrium return without cross-border flows we obtain: $R_y^* = \frac{dA_y + bC_y}{d+b}$.

A positive expected return difference between countries *i* and *k* requires: $L^D > \frac{b}{d} L^S$.

Whenever *b*>*d*, a positive expected return difference between *i* and *k* implies that the demand shift is larger than the supply shift.

ultimate parent of the venture capitalist.[2] This procedure changed the relevant information on venture capitalists (country of origin) in 3 percent of the cases only.

Besides a simple deal count, we also employ the aggregated volume of domestic investments and cross-border inflows. For approximately 80 percent of the deals, Zephyr obtains information on the total deal volume, which is the total volume invested in the portfolio company plus the volume eventually paid to the exiting shareholders. We approximate missing deal volumes by predicted volumes from a linear regression model using the deal and the deal country characteristics as RHS variables. More specifically, we include dummy variables for the country and the year of the deal, the industry affiliation of the portfolio company as well as the number of venture capitalists that participated in the deal. Almost all variables have a significant impact on the deal volume. However, with an adjusted R^2 of about 30 percent, the explanatory power of the regression is moderate.

Researchers working in the field of venture capital and private equity have recently started to account for the Zephyr database (e.g., Goossens et al. 2008, Abdesselam et al. 2008, Prijcker et al. 2009). Nevertheless, it is useful to assess its completeness by comparing it with the data in other studies and other available databases. In the Zephyr database, we count a total of 38,125 domestic and cross-border venture capital deals worldwide in the period 2000-2008. The most recent paper by Lerner et al. (2009) is based on the Capital IQ database and includes 45,207 venture capital and growth capital deals worldwide from 1984 to September 2008. Unfortunately, the paper does not provide information on the number of deals within the period 2000-2008 so that this dataset is not directly comparable to Zephyr database. The most widely used database in venture capital research, Thomson VentureXpert database, covers 38,515 companies when searching for worldwide targets involved in venture related deals within the period 2000-2008. Thus, the Zephyr coverage seems to be slightly inferior to that of Thomson. However, the huge advantage of Zephyr is that it offers better information on deal volume than Thomson. For our purpose this information is necessary because we need to calculate the volume of domestic investments and cross-border inflows.

3.2 Dependent variables

To calculate the number and volume of domestic investment and cross-border inflows at the country level as well as at the country-pair level, we were obliged to set some assumptions since many venture capital deals are syndicated, i.e. several domestic and/or foreign venture capitalists participate in the same deal. When at least one venture capitalist is located outside the portfolio company country, we define the deal as being a cross-border deal. Regarding the number of investments, each deal counts only once when all venture capitalists that participate in a deal are located in one country.

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[2] However, a noteworthy characteristic of the dataset is that parent company information in Zephyr is updated regularly, so that – relying only on the information indicated in the field "parent company" – we have not been able to trace back changes in the organizational structure. What is a drawback of this feature? Let investor A take over a share in the target company Z on January 1st 2004. If another investor B took over investor A on January 1st 2003, we would attribute the above mentioned deal to B, because B became A's parent before the transaction had been conducted. However, if B took over A on January 1st 2005, the above deal is carried out by A, because at the date of the deal, A and B were independent. Using the parent information offered by Zephyr – we would falsely assign this deal to B because B is indicated as A's parent. To correct this "mistake" we have checked (within the Zephyr deal database) whether all our investors were acquired or merged during our observation period. All deals before a potential acquisition or merger date (in the latter example January 1st 2005) have been assigned to the original investor, all deals after this date to its parent company.

A deal counts more than once only if investors from different countries, e.g., the United Kingdom and France, invest in a portfolio company located outside their home countries, e.g. in Germany. For the investment volume, we divided the deal volume by the number of venture capitalists and assign the respective part-deal to the respective country and country pair. For example, when a German and a French venture capitalist jointly finance a deal in the United Kingdom, half the deal volume is assigned to Germany and the United Kingdom and the other half to France and the United Kingdom.

For each of the 17 sample countries, Panel a of Table 1 provides information on the number and volume of *domestic investments*, i.e. those investments where the venture capitalist is located in the same country as the portfolio company, *gross venture capital inflows* that aggregate the investments financed by foreign venture capitalists from other European and North-American countries in the respective country and, for the sake of completeness, *gross venture capital outflows* that sum up the investments from the venture capitalists located in the respective country in other European and North-American countries. The volume of gross venture capital inflows and outflows indicates the importance of exchanging investment opportunities among venture capitalists, which may partly result from diversification efforts. Several of the countries in our sample have higher outflows than inflows, implying that they export venture capital finance to other countries. For example, Germany, Switzerland, the United Kingdom and the United States originate much larger investment volumes in other countries than they attract from other countries. France and Italy, among others, have higher inflows than outflows and thus attract venture capital finance from foreign venture capitalists.

[Insert Table 1 about here]

Panel b of Table 1 depicts the volumes of *gross bilateral venture capital flows* between each pair of our sample countries in both directions separately, i.e., investments of French venture capitalists in Germany appear in one category, and those of German venture capitalists in France in another category. It reveals some interesting geographical patterns in cross-border investments. Some countries have investment links with many other countries, while others have only one or a few investment links (i.e. many zeros). For example, venture capitalists located in the United Kingdom and the United States originate venture capital deals in all countries under focus and portfolio companies located in these two countries receive venture capital financing from all other countries. Some regional clusters do, however, also exist: For instance, Austrian venture capitalists invest intensively in German portfolio companies, while Finish venture capitalists are intensively involved in Swedish portfolio companies.

Finally, Panel c of Table 1 depicts the volume of *net bilateral venture capital inflows* in our country-pair sample. We defined net bilateral inflows as the investments that portfolio companies located in country *i* receive from venture capitalists located in country *k* minus the investments that venture capitalists located in country *i* invest in portfolio companies located in country *k*. Net bilateral inflows are positive, when country *i* attracts more investments from *k* than it originates in country *k,* while they are negative when the country *i* originates more investments in *k* than it attracts from *k.* Panel c shows that some of the countries that attract more investments from abroad than the venture capitalists located in these countries invest abroad, such as France (as demonstrated in Panel a), do not have positive net bilateral inflows from all the other countries. For example, French portfolio companies receive 3,178 million Euros more from Belgian venture capitalists than French venture capitalists

invest in Belgian portfolio companies, while French portfolio companies receive 552 million Euros less from Italian venture capitalists than French venture capitalists invest in Italian portfolio companies.

For our empirical analyses of domestic investments and cross-border inflows, we take into account that the countries in our sample vary substantially in size. Therefore, we normalize the domestic investments and cross-border inflows by the GDP. This normalization eliminates a bias towards findings of positive relationships between investments and economic determinants purely based on the country size. Since the normalized domestic investments and cross-border inflows are positively skewed (for example, the skewness is 1.82 for the normalized domestic investment volume and 1.45 for the normalized cross-border inflows) we additionally use a log transformation (see, e.g., Dahl and Shrieves 1999). Panel a of Table 2 gives summary statistics and definitions of our dependent variables.

[Insert Table 2 about here]

3.3 Determinants

Our determinants capture several facets of the differences between countries that are likely to be correlated with the expected return differences and the costs for carrying out cross-border investments. We normalize all size-sensitive RHS variables with GDP. Panel b of Table 2 exhibits summary statistics, definitions and sources of our RHS variables. Correlations between RHS variables are depicted in Table 3: Panel a for the country-level dataset and Panel b for the country-pair dataset. In the country-pair dataset, all country-level RHS variables are employed in country-pair differences (defined as the value of a variable in country *i* minus the value of the variable in country *k*).

We employ three demand-related variables. To capture the technological creativeness in a country, we use patent counts. We suppose that a country with a high number of patents in the past has more entrepreneurs coming up with innovative ideas which lead to a higher demand for venture capital finance (cf. Ueda and Hirukawa 2008). Moreover, we proxy demand conditions in the countries by expected economic growth and lagged stock market returns. Both expected growth and stock market returns are likely to enforce the venture capital demand (cf. Gompers and Lerner 1998, Cumming and MacIntosh 2006, Armour and Cumming 2006) as many attractive investment opportunities arise in high-growth and high-return countries.

[Insert Table 3 about here]

The second set of variables which captures the viability of the stock market as well as the tax and legal environment is related to both the venture capital demand and supply. Corresponding to Portes and Rey (2005) among others, we employ the stock market capitalization to assess the viability of the stock markets. Following Armour and Cumming (2006), we use an indicator of the tax and legal environment pertinent to the venture capital demand and supply. This indicator comes from the Benchmarking Tax and Legal Environments Reports conducted by the European Private Equity and Venture Capital Association (EVCA) published in 2003, 2004, and 2006. The total score value (a higher value indicates a less favorable environment) from these reports combines information on (i) the quality of the tax and legal environment for fund managers and limited partners, such as pension funds and insurance companies, (ii) the environment for the portfolio companies, such as fiscal R&D

incentives for contracting researchers and technology transfer, (iii) and the environment for retaining talents in portfolio companies and management funds. This indicator combines many facets of the tax and legal environment into a single figure for each country and year, while other studies focus on particular fiscal variables, such as the capital gains taxation (e.g., Da Rin et al. 2006, Gompers and Lerner 1998) and/or various legal variables (Cumming and Walz 2009, Bottazzi et al. 2005, Lerner and Schoar 2004, Cumming et al. 2009). We do not use these general tax and legal indicators because they capture economy-wide characteristics, whereas our VC indicator is particularly designed to capture the tax and legal environment relevant for venture capital activity.

Besides this VC indicator that is related to both the venture capital demand and supply, we construct another indicator that combines the tax and legal factors from the Benchmarking Reports that can be attributed to the venture capital supply only. This VC-supply indicator combines the information on the "funds structure" and "retaining talent in fund management companies". More specifically, the indicator contains the following items: (i) Tax transparency for domestic investors: A fund structure is called tax transparent if the fund is not subject to taxation and taxation only applies at the limited partners' level after gains and revenues have been distributed. The availability of a transparent fund structure is likely to play a decisive role because a tax on funds' income diminishes the return to investors and lowers the quantity supplied. The item takes on a low value if the country has established a tax transparent investment vehicle's structure and a high value otherwise. (ii) The ability to avoid VAT on management fees: The management fee is an annual management charge received by the management company of the fund. The item takes on a low value if the management fee is not subject to VAT and a high value otherwise. (iii) The ability to avoid VAT on carried interest: Carried interest, which typically constitutes 20 percent of the funds' profits, is usually rendered payable when the limited partners have received repayment plus a minimum required rate of return (hurdle rate). The item takes on a low value if carried interest is exempted from VAT and a high value otherwise. (iv) Freedom from undue restrictions: The item takes on a low value if no restrictions severely affect venture capitalists' investment decisions, while it takes on a high value when regulations restrict investment decisions in a negative way. (v) Taxation of carried interest: The item has a low value if carried interest is taxed as capital gains, it has a medium value if carried interest is taxed as dividends, and it has a high value if carried interest is taxed as income. Our VC-supply indicator averages these five items; a higher value of our indicator indicates a less favorable tax and legal environment for venture capital intermediation.

Finally, we use three distinct measures to capture the cultural and geographical proximity between two countries formerly employed in the literature on international capital flows (e.g. Barron and Valev 2000, Portes et al. 2001, Portes and Rey 2005 for equity flows; Buch 2003 for banks' foreign asset holdings; Buch and DeLong 2004 for cross-border bank mergers). First, we create a dummy variable which is equal to one when the two countries have the same legal tradition. We distinguish between French, German, Scandinavian, and English law tradition. Second, we create a dummy variable equal to one when the same language is spoken in the two countries. This dummy variable is based on all official languages spoken in the two countries. Third, we use the log of the physical distance between the two countries.

3.4 Univariate tests

We begin our analysis by testing whether domestic investments and cross-border inflows vary systematically along with our economic determinants. For each economic determinant of interest, we divide the sample into those countries that have high values in the respective determinant (above the median value of the sample population) and those countries that have low values (below the median). We then test whether the average number and volume of domestic investments and cross-border inflows differ between these two subsamples. We normalize the investment number and volume by country GDP and use a log transformation.

Table 4 offers the results for domestic investments (Panel a) and gross cross-border inflows (Panel b) based on country data as well as for net cross-border inflows based on country-pair data (Panel c). The average investments vary systematically with expected growth, a variable that we believe to shape the demand. Countries with above-median values in expected growth have a higher number and volume of domestic investments, a higher number of gross cross-border inflows and a higher number and volume of net cross-border inflows than countries with below-median values. A positive value in net cross-border inflows indicates that the country attracts more investments from foreign venture capitalists than local venture capitalists originate abroad. Thus, countries with a strong venture capital demand, which we measure inter alia by expected growth, have more domestic investments and are more successful in attracting venture capitalists from other countries.

[Insert Table 4 about here]

The average investment volume also varies systematically with the stock market capitalization and with the legal and fiscal indicator. Countries with above-median values in capitalization have significantly more domestic investments, higher gross cross-border inflows and lower net cross-border inflows than countries with below-median values in capitalization. More specifically, countries with above-median values in capitalization have net venture capital outflows (indicated by the negative average value), while countries with below-median values in capitalization realize net venture capital inflows (indicated by the positive average value). The average investment volume does not differ between countries with below and above-median values in the VC indicator, but they do differ with the VC-supply indicator. Countries with above-median values in the VC-supply indicator, which indicates a poor tax and legal environment for venture capital intermediation, have higher net cross-border inflows than countries with below-median values in the VC-supply indicator. This finding suggests that venture capital finance flows from jurisdictions with favorable tax and legal environment for venture capital intermediation to countries with poor environments.

4 Econometric analyses

4.1 Domestic investments and gross cross-border inflows at the country level

Our econometric analyses start by investigating the determinants of venture capital investments at a country level. The determinants discussed in Section 2 should shape total venture capital investments which contain domestic investments and gross cross-border inflows in a given country. Thus, we have two dependent variables: domestic investments and gross cross-border inflows in country *i* and in

year *t*. We either use the investment number or volume that we normalize by country GDP and we use a log transformation. To minimize potential endogeneity of our RHS variables, we use their lagged values, except for expected growth. Additionally, we include country and year dummies. Since we have 17 countries in our sample, we include 16 country dummy variables; the reference country is the United States. We employ seemingly unrelated regression framework (Wooldridge 2002, Chapter 7).

Our estimation results, which we present in Table 5, suggest the following: In line with our first hypothesis, which deals with the impact of the demand-specific determinants, we find that countries with higher lagged patent counts have a significantly higher number of domestic investments than countries with lower patent counts. The economic effect of patent counts is, however, moderate in size: The transformed number of domestic investments, which is 4.2 on average (see Panel a of Table 2), increases by 0.36 when the patent counts increase by one-standard deviation. We also find that countries with higher patent counts have larger gross cross-border inflows. However, patent counts are only significant for the number but not for the volume of gross cross-border inflows. In addition, countries with higher expected growth have larger gross cross-border inflows.

[Insert Table 5 about here]

Corresponding to our third hypothesis, which deals with the demand and supply-specific determinants, we find that the market capitalization significantly increases the number and volume of domestic investments. It also positively affects the gross cross-border inflows. The transformed number of domestic investments rises by 0.52 when the market capitalization increases by one-standard deviation. The transformed gross cross-border inflows (number) increase by 0.23 when the capitalization increases by one-standard deviation. A more favorable tax and legal environment (captured either by the VC indicator or the VC-supply indicator) does not affect the number and volume of domestic investments and gross inflows significantly. The reason for this might be that these indicators have little variation over time and that the full set of country dummy variables picks up differences in the tax and legal environment. We therefore experiment with alternative specifications (results not depicted, but available upon request): when we exclude all country dummy variables, the VC indicator has the expected negative and significant effect on domestic investments, while its effect on gross cross-border inflows remains insignificant. The VC-supply indicator affects domestic investments and gross cross-border inflows significantly negatively. We yield similar results when we exclude all country dummy variables that have correlation coefficients above 0.4 (see Panel a of Table 3).

4.2 Net cross-border inflows by country pairs

Since net cross-border inflows do not only depend on the characteristics of the portfolio-company country but also on the characteristics of the country in which the venture capitalists are located, we analyze net cross-border inflows by country pairs. Our dependent variables are the number and volume of net cross-border inflows calculated as the investments that portfolio companies located in country *i* attract from venture capitalists located in country *k* minus the investments venture capitalists located in country *i* originate in country *k.* Our dataset consists of 17x16=272 country pairs and nine years (2000-2008); in total we have 2,448 country-pair-year observations. In our analysis of net cross-

border flows, however, we only use 136 country pairs and thus 1,224 country-pair-year observations, since net cross-border inflows are symmetrical (see Panel c of Table 1), i.e. the amount of positive net cross-border inflows from country *i* to *k* equals the amount of negative net cross-border inflows from country *k* to *i.*

In Table 6 we present estimation results from alternative model specifications with respect to the inclusion of RHS variables. In line with our first hypothesis, the number and volume of net cross-border inflows from country *i* to country *k* increase (more investments are attracted than are originated) when the difference in expected growth and stock market returns between country *i* and *k* widens. This effect may indicate that countries that are likely to come up with more investment opportunities (with higher expected growth and higher returns) attract more foreign venture capitalists on the one hand and on the other hand the venture capitalists located in these countries invest less often abroad. The number and volume of net cross-border inflows decrease when the difference in the stock market capitalization between countries *i* and *k* increases. This effect supports the view that viable stock markets are important for venture capitalists' fundraising. Being located in countries with viable stock markets facilitates the fund raising process for venture capitalists; the funds are then invested in promising portfolio companies located at home and abroad.

[Insert Table 6 about here]

The tax and legal environment also influences net cross-border inflows. The expected impact of the VC indicator on net cross-border flows is unclear (see hypothesis 3) since it combines the tax and legal environment relevant for the venture capital demand and supply. Our results suggest that the VC indicator (lower value is advantageous) has a negative impact on net cross-border inflows indicating that a poor environment prevents foreign venture capitalists from investing in a country. The VC-supply indicator (lower value is advantageous) is expected to have a positive effect on net cross-border inflows since it is relevant for the supply only. The difference in the VC-supply indicator between country *i* and *k* has the expected positive effect on the number and volume of net cross-border inflows. This positive coefficient suggests that countries with less favorable environments for venture capital intermediation receive more venture capital from abroad than the venture capitalists located in these countries invest abroad.

In Columns (4)-(5) and (9)-(10) of Table 6 we put particular emphasis on those country pairs for which no deal in either direction has occurred. By construction, the net cross-border inflows between countries *i* and *k* can either be positive, negative or zero. In our sample, 508 of the 1,224 country-pair-year observations are equal to zero because no cross-border investments in either direction have taken place. A two-step selection model (Heckman 1979) helps us to account for the possibility that the existence and the size of cross-border flows are driven by different processes. In the selection regression (results not depicted) we estimate the inverse Mills ratio, which we then include as an additional RHS variable in the outcome regression. Standard errors are bootstrapped with 150 replications to control for the fact that the inverse Mills ratio is a generated regressor. In the selection regression the dependent variable is equal to one when we observe cross-border flows between country *i* and *k* at least in one direction, and zero otherwise. As RHS variables we use the differences in the economic determinants between the two countries, country and year dummy variables and the cultural and geographical proximity between country *i* and *k.* As the results in Columns (4)-(5) and (9)-

(10) show, the coefficients of the inverse Mills ratio are insignificant at conventional significance levels in the outcome regression indicating that a selection bias does not seem to be relevant in this context.

In Columns (5) and (10) we additionally tackle another issue, namely the choice of country dummy variables. In Columns (1)-(4) and (6)-(9) we include country dummy variables which are equal to one when the country is either country *i* or country *k.* Since we have 17 countries, we include 16 country dummy variables, leaving one country (the United States) as the reference country. In Columns (5) and (10), we follow a different approach: we include dummy variables for both countries (*i* and *k*) separately, i.e. we generate 17 country *i* and 17 country *k* dummy variables. As an example, for net cross-border inflows between Austria (country *i*) and the United States (country *k*), the Austrian country *i* dummy variable is equal to one for Austria and equal to zero for the United States, while the US country *k* dummy variable is equal to one for the United States and equal to zero for Austria.[3] As the estimation results in Columns (5) and (10) show, including country *i* as well as country *k* dummy variables instead of simple country dummies does not substantially change our estimation results on how economic determinants affect net cross-border inflows.

4.3 Dynamics in net cross-border inflows by country pairs

Finally, we test dynamic responses in net cross-border inflows by country pairs. There are several reasons to expect such dynamic responses underlying net cross-border inflows: (i) Countries that have more promising investment opportunities than other countries and therefore attract more foreign venture capitalists in one year, are more likely to also offer more promising investment opportunities in the following year. (ii) It is unlikely that all promising investment opportunities in a country will vanish within a short time because transaction costs that arise when carrying out cross-border investments may hinder venture capitalists to fully equalize expected return differences between countries instantly. (iii) Herding behavior among venture capitalists might be another reason that motivates dynamic responses in net cross-border inflows. (iv) Venture capital funds are often specialized, i.e. they focus on investments in one country or one region. Since this specialization is a part of their fund strategy, which they have bindingly declared towards their limited partners, switching to other countries or regions is impossible or at least very costly from the fund's perspective. However, even funds that are not bindingly specialized may exhibit a certain persistence in their country portfolio structure by continuing to invest in those countries in which they have built up know-how and experience. Certainly, venture capitalists may gain experience in new regions and raise funds designed for investments in these regions; this, however, takes time. (v) Finally, some of the persistence may result from the fact that venture capitalists typically provide capital in stages and thus repeatedly invest in the same portfolio company and in the same country.

To test for dynamic responses, we extend the model used in the last subsection by including a lag of dependent variables and by modeling a fixed effect for each of the 136 country pairs. The fixed effects for country pairs resolve problems otherwise arising from unobserved time invariant heterogeneity in

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[3] However, given the construction of the net cross-border inflows, some country *i* and *k* dummy variables experience no or little variation over our sample. For example, the US country *i* dummy variable and the Austrian country *k* dummy variable are never equal to one. Therefore, we include only 13 country *i* and 13 country *k* dummy variables.

bilateral country relationships, which might influence net cross-border inflows, such as the protection of shareholders. We use the dynamic panel-data estimator (which is a generalized method of moments estimator) proposed by Blundell and Bond (1998) and a finite sample correction proposed by Windmeijer (2005). The estimation results will be consistent if we use appropriate instruments for the lagged dependent variable, and if there is no second-order or higher-order autocorrelation. Therefore, we test for overidentifying restrictions (Arellano and Bond 1991, Blundell and Bond 1998).

In Table 7 we present the estimation results for the number and volume of net cross-border inflows. The test results on overidentifying restrictions and autocorrelation fully verify our modeling approach. The lagged dependent variable has a positive coefficient, which is statistically significant for the number and volume of net cross-border inflows. Thus, higher net cross-border inflows in the previous year even lead to higher net cross-border inflows in the current year. The signs and significance levels of some economic determinants are even contained in this dynamic specification of the model, which includes a fixed effect for each country pair, similar to the results in the static specification presented in Table 6. The difference in the stock market capitalization has a significantly negative effect, while the difference in expected growth has a significantly positive effect on net cross-border inflows.

[Insert Table 7 about here]

4.4 Extensions and robustness

There is an on-going debate as to whether investments by governmental authorities influence the level of venture capital investments in a country. Investments by governments may positively affect the size of the venture capital industry in the case of positive externalities (see Gebhardt and Schmidt 2002, Lerner 2002), while they may have a negative impact in the case of adverse incentives on deal selection and monitoring (see Keuschnigg and Nielsen 2001, Murray and Marriot 1998). Several empirical studies investigate the relationship between venture capital investments and governmental activities. For instance, Leleux and Surlemont (2003) analyze whether funds offered by public authorities seed the venture capital industry or whether they crowd out private funds. Their results support neither the seeding nor the crowding-out hypothesis. Armour and Cumming (2006) do not find governmental venture capital investments to be significantly related to early- and expansion-stage investments. Da Rin et al. (2006) analyze whether public R&D expenditures influence the fraction of venture capital allocated to early-stage companies. They do not observe a significant link between public R&D expenditures and the ratio of early-stage investments.

We follow this literature and extend the models presented in Tables 5 – 7 by an additional regressor that captures how much venture capital government authorities provide. We use (i) the investments by the government relative to total investments in each country and (ii) new funds provided by the government for venture capital investments relative to total new funds raised in each country. We employ both variables since the correlation between investments and new funds by the government is only moderate (the correlation coefficient is 0.3). In these extended models, we find that governmental venture capital is not significantly related to domestic investments, which is in line with the findings by Armour and Cumming (2006). New funds provided by the government have a significant negative effect on gross cross-border inflows, but they do not affect net cross-border inflows. On the contrary,

investments by the government have no effect on gross cross-border inflows, but net cross-border inflows increase through governmental venture capital investments. Thus, our results on the role of governmental venture capital are not clear-cut. However, in these various extensions, the signs and significance levels of the other variables remain unchanged when we include governmental venture capital.

As a robustness test, we exclude the United States and United Kingdom from the sample because these economies are much more market-based than the rest of our sample in terms of market capitalization as well as turnover (e.g., Beck and Levine 2002) and because venture capital industries in these countries differ in their size and structure from the other countries. Moreover, the United Kingdom played a specific role in the venture capital and private equity internationalization process in the past. US investors, such as *Advent*, *General Atlantic,* and *Benchmark*, used the United Kingdom to systematically enter European industries in the boom phase at the end of the 1990s (Hardymon et al. 2003). Since syndicating with domestic investors started to play a key role, the expertise brought from the United States to the United Kingdom may have changed the business model of British venture capitalists. Our estimation results from Tables 5 – 7, however, do not depend on whether or not the United States and the United Kingdom are included in the analyses.

5 Summary and concluding remarks

We used a dataset of venture capital investments in European and North-American countries to investigate the economic determinants of net cross-border venture capital inflows for country pairs. Net cross-border inflows are positive when a country attracts more venture capital finance from another country than it invests there. Our results on net cross-border inflows can be summed up as follows: Countries with higher expected growth and lagged stock market returns receive larger net cross-border inflows. This result suggests that venture capital investments originate in countries with a low venture capital demand and target countries with a high demand. Moreover, countries with a higher stock market capitalization have lower net cross-border inflows than countries with a low stock market capitalization. This finding may indicate that venture capitalists located in countries with viable stock markets can raise funds at more favorable conditions than venture capitalists located in countries with poor stock markets. The tax and legal environments for venture capital intermediation also plays a decisive role: Countries with poor environments receive higher net cross-border inflows than countries with favorable environments. This last finding may suggest that venture capitalists located in countries with attractive tax and legal environments for venture capital intermediation have incentives to invest their funds in jurisdictions with less favorable tax and legal conditions, since they possess comparative advantages over local investors there. Last but not least, we also documented dynamic responses in net cross-border inflows: The past values of net cross-border inflows positively affect their current values. This positive effect may be due to transaction costs or informational asymmetries when venture capitalists exploit expected return differences between potential investment opportunities in different countries. However, it may also reflect herding behavior in cross-border venture capital investments or other typical features of venture capital finance, such as round financing or fund specialization.

For policy makers who aim at establishing viable venture capital industries our research analysis offers several important insights. (i) The internationalization in venture capital finance that started in the mid 1990s may help to improve the availability of venture capital in a country. (ii) Cross-border venture capital inflows partly compensate for unfavorable conditions that local venture capitalists face in countries with unviable stock markets or unfavorable tax and legal conditions for venture capital intermediation. (iii) The most relevant factors for high venture capital investment activity, both for domestic and for foreign venture capitalists, seem to be the innovativeness and the economic prosperity of a country. Thus, policy makers in countries where venture capital finance is less developed should aim at creating public policies that endorse innovative entrepreneurs and the country's economic prospects. Such policies may act as a boost for new domestic venture capitalists as well as help attract foreign investors.

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References

Abdesselam, R., Cieply, S., Le Nadant, A.-L., 2008. Are corporate governance systems typologies relevant? Evidence from European transfers of ownership rights. Corporate Ownership & Control 5(2), 87-99.

Aizenman, J., Kendall, J., 2008. The internationalization of venture capital and private equity. NBER Working Paper 14344.

Allen, F., Song, W., 2005. Venture capital and corporate governance. Wharton University Working Paper.

Amit, R., Brander, J., Zott, C., 1998. Why do venture capital firms exist? Theory and Canadian evidence. Journal of Business Venturing 13, 441-466.

Arellano, M., Bond, S., 1991. Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. Review of Economic Studies 58, 277-297.

Armour, J., Cumming, D., 2006. The legislative road to Silicon Valley. Oxford Economic Papers 58(4), 596-635.

Barron, J. M., Valev, N. T., 2000. International lending by U.S. banks. Journal of Money, Credit and Banking 32(3), 357–381.

Bascha, A., Walz, U., 2002. Convertible securities and optimal exit decisions in venture capital finance. Journal of Corporate Finance 7(3), 285–306.

Beck, T., Levine, R., 2002. Industry growth and capital allocation: Does having a market- or bank-based system matter? Journal of Financial Economics 64(2), 147-180.

Black, B. S., Gilson, R. J., 1998. Venture capital and the structure of capital markets: Banks versus stock markets. Journal of Financial Economics 47(3), 243–277.

Blundell, R. W., Bond, S. R., 1998. Initial conditions and moment restrictions in dynamic panel data models. Journal of Econometrics 87, 29-52.

Bottazzi, L., Da Rin, M., Hellmann, T., 2005. What role of legal systems in financial intermediation? Theory and evidence. RICAFE 022, London School of Economics and Political Science.

Bruner, R. F., Chaplinsky, S. J., 2002. Practices of active private equity firms in Latin America. Available at SSRN: http:,//ssrn.com/abstract=909702.

Buch, C. M., 2003. Information or regulation: What drives the international activities of commercial banks? Journal of Money, Credit and Banking 35(6), 851-869.

Buch, C. M., DeLong, G., 2004. Cross-border bank mergers: What lures the rare animal? Journal of Banking and Finance 28(9), 2077–2102.

Chen, H., Gompers, P., Kovner, A., Lerner, J., 2009. Buy local? The geography of successful and unsuccessful venture capital expansion. Harvard Business School Working Paper 09-143.

Cumming, D., MacIntosh, J.G., 2006. Crowding out private equity: Canadian evidence. Journal of Business Venturing 21, 569–609.

Cumming, D., Johan, S., 2007a. Regulatory harmonization and the development of private equity markets. Journal of Banking and Finance 31(10), 3218–3250.

Cumming, D., Johan, S., 2007b. Socially responsible institutional investment in private equity. Journal of Business Ethics 75(4), 395-416.

Cumming, D., Walz, U., 2009. Private equity returns and disclosure around the world. Journal of International Business Studies, forthcoming.

Cumming, D., Schmidt, D., Walz, U., 2009. Legality and venture governance around the world, Journal of Business Venturing, forthcoming.

Da Rin, M., Nicodano, G., Sembenelli, A., 2006. Public policy and the creation of active venture capital markets. Journal of Public Economics 90(8-9), 1699-1723.

Dahl, D., Shrieves, R.E., 1999. The extension of international credit by US banks: a disaggregated analysis, 1988-1994. Journal of International Money and Finance 18 (1999), 153-167.

Dixit, A., Jayaraman, N., 2001. Internationalization strategies of private equity firms. The Journal of Private Equity 5(1), 40–54.

EVCA (European Private Equity and Venture Capital Association), 2003. Benchmarking tax and legal environments report. Zaventem, Belgium.

EVCA (European Private Equity and Venture Capital Association), 2004. Benchmarking tax and legal environments report. Zaventem, Belgium.

EVCA (European Private Equity and Venture Capital Association), 2006. Benchmarking tax and legal environments report. Zaventem, Belgium.

Gebhardt, G., Schmidt, K. M., 2002. Der Markt für Venture Capital: Anreizprobleme, Governance Strukturen und staatliche Interventionen. Perspektiven der Wirtschaftspolitik 3(3), 235–255.

Gompers, P. A., 1996. Grandstanding in the venture capital industry. Journal of Financial Economics 42(19), 133–56.

Gompers, P. A., Lerner, J., 1998. What drives venture capital fundraising? Brooking Papers on Economic Activity – Microeconomics 1998, 149-192.

Goossens, L., Manigart, S., Meuleman, M., 2008. The change in ownership after a buyout: impact on performance. Journal of Private Equity. 12(1), 31-41.

Hardymon, F., Lerner, J., Leamon, A., 2003. Accel partners' European lunch', HBS Case 9-803-021, Harvard Business School, Boston, MA.

Heckman, J. J., 1979. Sample selection bias as a specification error. Econometrica 47(1), 153-161.

Jeng, L. A., Wells, P. C., 2000. The determinants of venture capital funding: evidence across countries. Journal of Corporate Finance 6(3), 241–289.

Kaplan, S., Martel, F., Strömberg, P., 2007. How do legal differences and experience affect financial contracts. Journal of Financial Intermediation, 16(3): 273-311.

Keuschnigg, C., Nielsen, S. B., 2001. Public policy for venture capital. International Tax and Public Finance 8(4), 557–572.

Keuschnigg, C., Nielsen, S. B., 2002. Tax policy, venture capital, and entrepreneurship. Journal of Public Economics 87, 175–203.

Keuschnigg, C., Nielsen, S. B., 2004. Start-ups, venture capitalists, and the capital gains tax. Journal of Public Economics 88, 1011–1042.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., Vishny, R.W., 1998. Law and finance. Journal of Political Economy 106(6), 1113–1155.

Leleux, B., Surlemont, B., 2003. Public versus private venture capital: Seeding or crowding out? A pan-European analysis. Journal of Business Venturing 18(1), 81–104.

Lerner, J., 2002. When bureaucrats meet entrepreneurs: The design of effective public venture capital programmes. Economic Journal 112(February), F73–F84.

Lerner, J., Schoar, A., 2004. Transaction structures in the developing world: Evidence from private equity. NBER Working Paper 10348.

Lerner, J., Sorensen, M., Strömberg, P., 2009. What drives private equity activity and success globally? In: World Economic Forum, Globalization of Alternative Investments Working Papers Volume 2. The Global Economic Impact of Private Equity Report 2009.

Mäkelä, M. M., Maula, M., 2006. Interorganizational commitment in syndicated cross-border venture capital investments. Entrepreneurship Theory and Practice 30(2), 273-298.

Manigart, S., Lockett, A., Meuleman, M., Wright, M., Bruining, H., Landström, H., Desbrières, P., Hommel, U., 2006. The syndication decision of venture capital investments. Entrepreneurship: Theory and Practice 30(2), 131–153.

Murray, G. C., Marriot, R., 1998. Why has the investment performance of technology-specialist, European venture capital funds been so poor? Research Policy 27(9), 947–976.

Poterba, J. M., 1989. Venture capital and capital gains taxation. Tax Policy and the Economy 3, 47-67.

Portes, R., Rey, H., 2005. The determinants of cross-border equity flows. Journal of International Economics 65(2), 269–296.

Portes, R., Rey, H., Oh, Y., 2001. Information and capital flows: The determinants of transactions in financial assets. European Economic Review 45(4-6), 783–796.

Prijcker, S. De, Manigart, S., Wright, M., De Maeseneire, W., 2009. The influence of international human capital and international network relationships on the cross-border investment behaviour of private equity firms. Ghent University Working Paper 2009/597.

Ribeiro, L. L., De Carvalho, A. G., Furtado, C. V., 2006. Private equity and venture capital in an emerging economy: Evidence from Brazil. Available at SSRN: http://ssrn.com/abstract=912523.

Romain, A., Pottelsberghe, B. van, 2004. The determinants of venture capital: Additional evidence. Discussion Paper Series 1: Studies of the Economic Research Centre 19, Deutsche Bundesbank.

Strömberg, P., 2009. The economic and social impact of private equity in Europe: summary of research findings. Available at SSRN: http://ssrn.com/abstract=1429322.

Ueda, M. Hirukawa, M., 2008. Venture capital and innovation: which is first? Available at SSRN: http://ssrn.com/abstract=1242698 .

White, H., 1980. A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity. Econometrica 48(4), 817–838.

Windmeijer, F., 2005. A Finite sample correction for the variance of linear efficient two-step GMM estimators. Journal of Econometrics 126(1), 25-51.

Wooldridge, J.M., 2002. Econometric analysis of cross section and panel data. MIT Press.

Wright, M., Pruthi, S., Lockett, A., 2005. International venture capital research: from cross country comparisons to crossing countries. International Journal of Management Reviews 7(3), 135-166.

Table 1
Venture capital investment data

Panel a – Domestic investments, inflows and outflows by countries

	AUS	BEL	CN	DEN	FIN	FRA	GER	IRE	IT	NET	NOR	POR	ES	SD	SW	UK	US
Domestic investments																	
Number	81	207	1,109	156	194	1,406	802	109	253	266	107	54	669	643	56	2,497	10,263
Volume (in billion Euros)	0.38	1.29	4.05	0.56	1.84	22.18	6.94	0.31	6.83	2.33	0.47	2.22	12.62	4.99	0.40	13.48	128.18
Gross cross-border inflows (from all sample countries)																	
Number	86	183	652	187	191	839	663	201	348	246	149	66	227	366	245	2,233	2,926
Volume (in billion Euros)	0.90	3.26	7.20	1.48	1.60	27.34	12.63	1.25	11.90	7.64	2.58	2.13	11.67	3.86	2.16	24.77	37.01
Gross cross-border outflows (from all sample countries)																	
Number	22	315	521	169	79	521	1,342	66	77	503	127	21	52	266	800	2,171	2,756
Volume (in billion Euros)	0.07	6.90	6.52	1.38	0.44	6.36	22.96	0.50	2.71	4.68	0.86	1.21	1.72	2.49	9.47	33.39	57.72

Panel b – Gross cross-border inflows by country pairs (in million Euros)

	Country in which the venture capitalist is located																	
Country of the company	AUS	BEL	CN	DEN	FIN	FRA	GER	IRE	IT	NET	NOR	POR	ES	SD	SW	UK	US	Total
Austria		3	0	3	0	4	453	3	8	20	0	0	0	0	86	145	176	901
Belgium	0		0	18	0	262	126	0	4	381	0	0	0	0	26	407	2,032	3,255
Canada	0	0		49	31	56	81	15	0	125	16	0	18	8	123	774	5,909	7,205
Denmark	0	9	0		91	70	89	0	0	59	53	0	0	158	105	487	363	1,483
Finland	0	122	4	37		20	361	0	4	21	3	0	0	166	30	251	579	15,96
France	6	3,439	102	40	0		2,893	52	40	495	7	4	1,105	75	361	6,122	12,603	27,344
Germany	42	91	1	85	3	253		0	773	669	14	2	23	48	995	2,843	6,785	12,626
Ireland	0	23	19	0	0	33	84		0	13	0	0	0	18	54	549	461	1,254
Italy	0	53	10	0	0	593	1,283	18		127	10	0	0	0	505	4,179	5,118	11,896
Netherlands	0	607	14	11	6	913	228	0	1,442		0	5	8	9	176	976	3,251	7,644
Norway	0	4	0	14	27	46	36	0	3	22		0	0	104	56	686	1,580	2,578
Portugal	0	0	0	0	0	15	616	0	0	225	0		320	0	339	379	239	2,133
Spain	0	1,439	0	0	0	900	2,872	0	17	141	0	1,166		24	135	1,858	3,123	11,675
Sweden	0	8	8	149	156	51	1,796	0	0	86	121	0	0		108	636	740	3,860
Switzerland	0	128	75	10	3	211	513	0	12	57	68	0	12	24		633	413	2,160
United Kingdom	22	310	868	246	25	844	5,800	358	147	577	182	4	93	127	816		14,351	24,769
United States	5	666	5,420	722	102	2,090	5,729	51	260	1,663	383	31	144	1,731	5,555	12,463		37,014
Total	75	6902	6,519	1,383	444	6,362	22,960	497	2,709	4,682	855	1,212	1,722	2,492	9,469	33,386	57,722	

Panel c – Net cross-border inflows by country pairs (in million Euros)

Country *i* receives net cross-border inflows (+) from, or originates net cross-border outflows (-) to, the following countries

	Country *i*	AUS	BEL	CN	DEN	FIN	FRA	GER	IRE	IT	NET	NOR	POR	ES	SD	SW	UK	US
Country *k* receives net cross-border inflows (-) from or originates net cross-border outflows (+) to the following countries	Austria		-3	0	-3	0	2	-411	-3	-8	-20	0	0	0	0	-86	-123	-171
	Belgium	3		0	-9	122	3178	-35	23	50	225	4	0	1,439	8	102	-97	-1,365
	Canada	0	0		-49	-27	45	-80	4	10	-111	-16	0	-18	0	-48	94	-489
	Denmark	3	9	49		-55	-30	-4	0	0	-48	-39	0	0	-9	-95	-241	359
	Finland	0	-122	27	55		-20	-358	0	-4	-15	24	0	0	-10	-26	-225	-477
	France	-2	-3,178	-45	30	20		-2,640	-19	552	418	39	11	-205	-24	-150	-5,278	-10,513
	Germany	411	35	80	4	358	2,640		84	510	-441	23	614	2,849	1,748	-481	2,957	-1,057
	Ireland	3	-23	-4	0	0	19	-84		18	-13	0	0	0	-18	-54	-191	-410
	Italy	8	-50	-10	0	4	-552	-510	-18		1,314	-7	0	17	0	-492	-4,032	-4,858
	Netherlands	20	-225	111	48	15	-418	441	13	-1,314		22	220	133	78	-119	-399	-1,588
	Norway	0	-4	16	39	-24	-39	-23	0	7	-22		0	0	17	12	-504	-1,197
	Portugal	0	0	0	0	0	-11	-614	0	0	-220	0		846	0	-339	-375	-208
	Spain	0	-1,439	18	0	0	205	-2,849	0	-17	-133	0	-846		-24	-124	-1,765	-2,979
	Sweden	0	-8	0	9	10	24	-1,748	18	0	-78	-17	0	24		-84	-509	991
	Switzerland	86	-102	48	95	26	150	481	54	492	119	-12	339	124	84		183	5,142
	United Kingdom	123	97	-94	241	225	5,278	-2,957	191	4,032	399	504	375	1,765	509	-183		-1,888
	United States	171	1,365	489	-359	477	10,513	1,057	410	4,858	1,588	1,197	208	2,979	-991	-5,142	1,888	

Note: The number and volume of venture capital investments in 17 countries is aggregated over the period 2000-2008. Panel a provides information on domestic investments (the venture capitalist is located in the same country as the portfolio company), gross cross-border inflows (only the portfolio company, but not the venture capitalist, is located in the country under focus) and gross cross-border outflows (only the venture capitalist, but not the company, is located in the country under focus) at the country level. Panel b depicts *gross cross-border inflows* for country pairs. Panel c depicts *net cross-border inflows* for country pairs defined as investments attracted by country *i* from venture capitalists located in country *k* minus investments attracted by *k* from *i*. All figures are based on the Zephyr database.

Table 2
Summary statistics

Variable	Mean	Standard deviation	Description
Panel A: Dependent variables			
Domestic investments (the venture capitalist is located in the same country as the portfolio company)			
Number	4.209	0.809	log(1+number of domestic investments normalized by GDP in trillion Euros)
Volume	6.077	1.090	log(1+volume of domestic investments normalized by GDP in million Euros)
Gross cross-border inflows (the portfolio company but not the venture capitalist is located in the country under focus)			
Number	4.123	0.767	log(1+number of foreign investments normalized by GDP in trillion Euros)
Volume	6.627	1.004	log(1+volume of foreign investments normalized by GDP in million Euros)
Net cross-border inflows (investments attracted by country *i* from venture capitalists located in country *k* minus investments attracted by *k* from *i*)			
Number	-0.105	0.853	log(1+number normalized by GDP in trillion Euros) from *i* to *k* minus log(1+number normalized by GDP in trillion Euros) from *k* to *i*.
Volume	-0.264	1.886	log(1+volume normalized by GDP in thousand Euros) from *i* to *k* minus log(1+volume normalized by GDP in thousand Euros) from *k* to *i*.
Panel B: RHS variables			
Economic environment			
Patents	3.639	2.454	Number of patents granted to residents relative to country's GDP in trillion Euros. Source: www.wipo.int/ipstats/fr/statistics/patents; www.worldbank.org
Expected growth	0.025	0.009	Expected growth of real GDP over next 3 to 5 years. Source: Thomson Financial Datastream
Returns	0.106	0.286	Annual stock market returns calculated from MSCI performance indexes in Euros. Source: Thomson Financial Datastream
Capitalization	0.986	0.609	Stock market capitalization relative to GDP. Source: www.worldbank.org
VC indicator	1.789	0.430	Total score of the EVCA Benchmarking Reports. The value of the indicator between 2000-02 (2003-05; 2006-08) comes from the EVCA Benchmarking Report 2003 (EVCA 2004; EVCA 2006). Lower value of indicator is better. Source: EVCA 2003, EVCA 2004, EVCA 2006
VC-supply indicator	1.438	0.468	Subscore from the EVCA Benchmarking Reports including tax transparency for domestic investors, ability to avoid VAT on management fees and carried interest, freedom from undue restrictions, taxation of carried interest. The value of the indicator between 2000-02 (2003-05; 2006-08) comes from the EVCA Benchmarking Report 2003 (EVCA 2004; EVCA 2006). Lower value of indicator is better. Source: EVCA 2003, EVCA 2004, EVCA 2006
Cultural and geographical proximity			
Same law	0.221		Dummy variable equal to one if the two countries have the same legal tradition based on French, German, English or Scandinavian law. Source: La Porta et al. (1998)
Same language	0.147		Dummy variable equal to one if the same language is spoken in the two countries. Source: www.cepii.fr
Log of distance	7.341	0.916	The logarithm of the distance between the two countries in kilometers. Source: www.cepii.fr

Note: Summary statistics for the dependent and RHS variables are based on annual data from 17 European and North-American countries. The mean of net cross-border inflows is based on 136 of the total 272 country pairs in our dataset since net cross-border inflows from country i to k equal the negative net cross-border inflows from country k to i. The mean net cross-border inflows based on all country pairs is, obviously, equal to zero.

Table 3
Correlation between variables

Panel a – Country-level data

		(1)	(2)	(3)	(4)	(5)	(6)
(1)	Patents in previous year	1					
(2)	Expected growth	0.14*	1				
(3)	Returns in previous year	0.07	0.33*	1			
(4)	Capitalization in previous year	0.11	0.03	0.14*	1		
(5)	VC indicator	0.13	-0.11	0.02	-0.25*	1	
(6)	VC-supply indicator	-0.07	-0.24*	-0.02	-0.41*	0.55*	1
	Country dummies						
	Austria	0.08	-0.08	0.05	-0.28*	0.26*	0.51*
	Belgium	-0.18*	-0.16*	-0.05	-0.01	0.02	0.07
	Canada	-0.22*	0.22*	0.07	0.08	-0.46*	-0.22*
	Denmark	-0.29*	-0.03	0.04	-0.14*	0.06	0.00
	Finland	0.35*	0.22*	0.10	0.21*	0.21*	-0.07
	France	0.22*	-0.08	-0.01	-0.03	-0.01	0.07
	Germany	0.22*	-0.16*	-0.01	-0.19*	0.30*	0.22*
	Ireland	-0.12	0.28*	-0.06	-0.14*	-0.19*	-0.22*
	Italy	0.02	-0.24*	-0.04	-0.19*	0.03	0.15*
	Netherlands	0.06	-0.10	-0.04	0.08	-0.04	-0.22*
	Norway	-0.16*	0.23*	0.01	-0.18*	0.16*	-0.22*
	Portugal	-0.31*	-0.16*	-0.04	-0.22*	0.09	0.29*
	Spain	-0.15*	0.13*	0.00	-0.04	0.05	0.37*
	Sweden	0.37*	0.05	0.05	0.08	0.17*	-0.22*
	Switzerland	-0.19*	-0.23*	-0.05	0.67*	0.07	-0.07
	United Kingdom	-0.18*	-0.00	-0.05	0.21*	-0.28*	-0.22*
	United States	0.47*	0.09	-0.07	0.18*	-0.46*	-0.22*

Panel b – Country-pair data

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1)	Δ Patents in previous year	1								
(2)	Δ Expected Growth	0.07*	1							
(3)	Δ Returns in previous year	0.05*	0.10*	1						
(4)	Δ Capitalization in previous year	0.08*	0.02	0.15*	1					
(5)	Δ VC indicator	0.11*	-0.23*	0.06*	-0.22*	1				
(6)	Δ VC-supply indicator	-0.07*	-0.35*	-0.03	-0.37*	0.51*	1			
(7)	Same law	0.02	0.04	0.03	-0.07*	0.12*	0.14*	1		
(8)	Same language	0.08*	-0.11*	-0.02	0.19*	0.09*	-0.02	0.38*	1	
(9)	Log of distance	0.25*	-0.07*	-0.07*	-0.16*	-0.01	0.14*	-0.26*	-0.15*	1
	Country dummies									
	Austria	-0.12*	0.10*	-0.05	0.18*	-0.22*	-0.47*	-0.08*	0.04	-0.03
	Belgium	0.12*	0.19*	0.10*	-0.01	0.02	-0.04	0.08*	0.24	-0.22*
	Canada	0.16*	-0.18*	-0.04	-0.17*	0.43*	0.21*	-0.03	0.23*	0.49*
	Denmark	0.20*	0.03	-0.01	-0.00	0.05*	0.05*	-0.03	-0.15*	-0.09*
	Finland	-0.16*	-0.14*	-0.07*	-0.22*	-0.04	0.10*	-0.03	-0.09*	0.07*
	France	-0.10*	0.02	0.01	-0.10*	0.06*	0.03	0.08*	0.04	-0.16*
	Germany	-0.10*	0.04	0.01	-0.05*	-0.04	-0.02	-0.08*	0.04	-0.20*
	Ireland	-0.03	-0.05*	0.02	-0.06*	0.06*	0.07*	-0.03	0.04	-0.03
	Italy	-0.05	-0.01	0.02	-0.05*	0.04	0.04	0.08*	-0.09*	0.04
	Netherlands	-0.04	-0.00	0.02	-0.04	0.03	0.02	0.08*	-0.09*	-0.21*
	Norway	-0.09*	0.07*	0.06*	-0.09*	0.08*	0.02	-0.03	-0.15*	-0.03
	Portugal	-0.13*	-0.08*	-0.01	-0.10*	0.05*	0.19*	0.08*	-0.15*	0.13*
	Spain	-0.06*	0.08*	0.02	-0.02	0.04	0.22*	0.08*	-0.15*	0.06*
	Sweden	0.24*	0.02	0.06*	0.06*	0.11*	-0.12*	-0.03	-0.09*	-0.01
	Switzerland	-0.16*	-0.21*	-0.04	0.52*	0.03	-0.02	-0.08*	0.23*	-0.12*
	United Kingdom	-0.14*	0.01	-0.04	0.09*	-0.27*	-0.14*	-0.03	0.04	-0.15*
	United States	0.48*	0.12*	-0.07*	0.06*	-0.45*	-0.14*	-0.03	0.04	0.48*

Note: Panel a is based on 17 countries whereas Panel b includes variables for country-pair data. All variables are defined in Table 2. Δ is the difference between country *i* and *k*. * denotes significance at the 10 percent level.

Table 4
Tests on equality of means

Panel a –Domestic investments

	Mean number			Mean volume		
X	Median > X	Median < X	mean test	Median > X	Median < X	mean test
Patents	4.24	4.18	0.47	6.27	5.89	2.14**
Expected Growth	4.52	3.91	5.03***	6.23	5.94	1.67*
Returns	4.20	4.22	-0.11	6.24	5.92	1.83*
Capitalization	4.53	3.89	5.36***	6.44	5.72	4.28***
VC indicator	4.13	4.28	-1.14	5.92	6.23	-1.77*
VC-supply indicator	3.83	4.40	-4.63	6.09	6.07	0.11

Panel b – Gross cross-border inflows in country i

	Mean number			Mean volume		
X	Median > X	Median < X	mean test	Median > X	Median < X	mean test
Patents	3.98	4.27	-2.35**	6.57	6.68	-0.71
Expected Growth	4.30	3.95	2.88***	6.70	6.56	0.85
Returns	4.21	4.03	1.46	6.79	6.47	1.95*
Capitalization	4.32	3.94	3.31***	6.82	6.44	2.41**
VC indicator	4.07	4.18	-0.85	6.53	6.72	-1.18
VC-supply indicator	3.56	4.40	-7.01***	6.45	7.71	-1.33

Panel c – Net cross-border inflows by country pairs

	Mean number			Mean volume		
X (*i* minus *k*)	Median > X	Median < X	mean test	Median > X	Median < X	mean test
Δ Patents	-0.09	-0.11	0.41	-0.36	-0.17	-1.71*
Δ Expected Growth	0.06	-0.28	7.02***	-0.01	-0.53	4.92***
Δ Returns	-0.07	-0.14	1.38	-0.18	-0.35	1.61*
Δ Capitalization	-0.28	0.07	-7.28***	-0.68	0.16	-7.98***
Δ VC indicator	-0.08	-0.14	1.25	-0.18	-0.34	1.49
Δ VC-supply indicator	-0.06	-0.16	2.06**	-0.08	-0.48	3.79***

Note: The results of mean tests are with unequal variances; the data in our sample are separated according to whether the economic determinant of a country is above or below the median value of the sample. All variables are defined in Table 2. Δ is the difference between country *i* and *k (i* minus *k).* ***, **, * denote significance at the 1, 5, and 10 percent level, respectively.

Table 5
Domestic investments and gross cross-border inflows

	Domestic investments in country *i*					
	Number			Volume		
Patents in the previous year	0.145**	0.127*	0.123*	-0.195*	-0.168	-0.148
	(0.064)	(0.066)	(0.068)	(0.109)	(0.113)	(0.115)
Expected growth	7.925	6.809	7.697	10.735	12.404	11.228
	(5.581)	(5.663)	(5.570)	(9.471)	(9.618)	(9.433)
Returns in the previous year	-0.282*	-0.26	-0.256	0.416	0.383	0.361
	(0.157)	(0.158)	(0.159)	(0.266)	(0.268)	(0.268)
Capitalization in the previous year	0.740***	0.758***	0.726***	0.784***	0.756**	0.814***
	(0.177)	(0.178)	(0.177)	(0.301)	(0.302)	(0.301)
VC indicator (lower is better)		0.196			-0.293	
		(0.188)			(0.319)	
VC-supply indicator (lower is better)			0.204			-0.441
			(0.212)			(0.360)
Country dummies	yes	yes	yes	yes	yes	yes
Year dummies	yes	yes	yes	yes	yes	yes
Observations	153	153	153	153	153	153
R^2	0.75	0.75	0.75	0.6	0.61	0.61
F test	19.21	18.62	18.59	9.76	9.46	9.52

	Gross cross-border inflows in country *i*					
	Number			Volume		
Patents in the previous year	0.141*	0.138*	0.150*	0.034	0.083	0.079
	(0.073)	(0.076)	(0.078)	(0.141)	(0.145)	(0.149)
Expected growth	10.865*	10.705	10.960*	7.004	10.014	7.471
	(6.383)	(6.499)	(6.386)	(12.233)	(12.390)	(12.212)
Returns in the previous year	0.11	0.113	0.1	0.2	0.141	0.148
	(0.179)	(0.181)	(0.182)	(0.344)	(0.345)	(0.348)
Capitalization in the previous year	0.364*	0.367*	0.370*	0.853**	0.804**	0.882**
	(0.203)	(0.204)	(0.203)	(0.389)	(0.389)	(0.389)
VC indicator (lower is better)		0.028			-0.528	
		(0.215)			(0.410)	
VC-supply indicator (lower is better)			-0.085			-0.417
			(0.244)			(0.466)
Country dummies	yes	yes	yes	yes	yes	yes
Year dummies	yes	yes	yes	yes	yes	yes
Observations	153	153	153	153	153	153
F test	11.21	10.77	10.78	1.84	1.85	1.81
R^2	0.64	0.64	0.64	0.22	0.23	0.23

Note: Estimation results are from seemingly unrelated regressions for annual domestic investments and gross cross-border inflows based on 17 countries and the period 2000-2008. The equation system looks like:

$$DD_{it} = \alpha_0 + \alpha_1 Patents_{it-1} + \alpha_2 Growth_{it} + \alpha_3 Returns_{it-1} + \alpha_4 Capitalization_{it-1} + \alpha_5 VC_{it-1} + \eta_{it}$$
$$CB_{it} = \beta_0 + \beta_1 Patents_{it-1} + \beta_2 Growth_{it} + \beta_3 Returns_{it-1} + \beta_4 Capitalization_{it-1} + \beta_5 VC_{it-1} + \varepsilon_{it},$$

where *DD* denotes the domestic investments (the venture capitalist and portfolio company are located in country *i*) and *CB* denotes gross cross-border inflows (the portfolio company but not the venture capitalist is located in country *i*) in year *t* normalized by GDP and logarithmized. All variables are defined in Table 2. Country and year dummy variables are included. Standard errors are given in parentheses. ***, **, * denote significance at the 1, 5, and 10 percent level, respectively.

Table 6
Net cross-border inflows for country pairs

	1	2	3	4	5	6	7	8	9	10
			Number					Volume		
Δ Patents in the previous year	0.009	0.021**	0.009	0.010	0.023	-0.032°	0.003	-0.029°	-0.028	-0.022
	(0.009)	(0.01)	(0.009)	(0.009)	(0.017)	(0.02)	(0.021)	(0.02)	(0.023)	(0.035)
Δ Expected growth	0.118***	0.108***	0.145***	0.142***	0.057**	0.189***	0.162***	0.257***	0.253***	0.147**
	(0.021)	(0.021)	(0.022)	(0.023)	(0.029)	(0.047)	(0.047)	(0.051)	(0.048)	(0.063)
Δ Returns in the previous year	0.300***	0.316***	0.298***	0.287***	0.247***	0.459***	0.501***	0.451***	0.439**	0.501***
	(0.088)	(0.089)	(0.087)	(0.096)	(0.095)	(0.176)	(0.178)	(0.173)	(0.182)	(0.185)
Δ Capitalization in the previous year	-0.364***	-0.394***	-0.328***	-0.319***	-0.276***	-0.602***	-0.684***	-0.510***	-0.500***	-0.581***
	(0.039)	(0.038)	(0.041)	(0.046)	(0.072)	(0.091)	(0.089)	(0.093)	(0.093)	(0.166)
Δ VC indicator (lower is better)		-0.208***					-0.572***			
		(0.055)					(0.121)			
Δ VC-supply indicator (lower is better)			0.182***	0.181***	0.135*			0.455***	0.454***	0.276°
			(0.052)	(0.053)	(0.077)			(0.119)	(0.124)	(0.177)
Inverse Mills ratio				0.052	0.006				0.061	-0.161°
				(0.053)	(0.049)				(0.108)	(0.107)
Country dummies	yes	yes	yes	yes		yes	yes	yes	yes	
i-country and *k*-country dummies					yes					yes
Year dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Observations	1,224	1,224	1,224	1,224	1,224	1,224	1,224	1,224	1,224	1,224
F test	9.81	10.46	10.07			8.24	8.73	8.43		
χ^2				314.34	457.03				328.57	522.10
Adjusted R^2	0.167	0.174	0.175	0.175	0.248	0.135	0.146	0.145	0.145	0.247

Note: OLS estimation results for annual net cross-border inflows between 136 country pairs for the period 2000-2008. The model is given as follows:

$$NCB_{ikt} = \delta_0 + \delta_1 \Delta Patents_{ikt-1} + \delta_2 \Delta Growth_{ikt} + \delta_3 \Delta Returns_{ikt-1} + \delta_4 \Delta Capitalization_{ikt-1} + \delta_5 \Delta VC_{ikt-1} + \eta_{ikt}$$

where *NCB* denotes net cross-border inflows defined as investments attracted by country *i* from *k* minus investments originated by *i* in *k* in year *t* normalized by GDP and logarithmized. Net cross-border inflows are positive when country *i* attracts more investments from *k* than it originates there. Δ is the difference between country *i* and *k* (*i* minus *k*). All variables are defined in Table 2. In Columns (1)-(4) and (6)-(9), 16 country dummy variables are included, while Columns (5) and (10) include 13 *i*- country and 13 *k*-country dummies. Year dummy variables are employed in all models. In Columns (4)-(5) and (9)-(10) the inverse Mills ratio from a first stage regression (whether or not any cross-border investments are observed in either direction) is included. This first stage model (results not depicted) includes the same RHS variables plus a dummy variable for the same law tradition and language, and the geographical distance between the two countries. White (1980)-heteroscedasticity-consistent standard errors are given in parentheses. In Columns (4)-(5) and (9)-(10) bootstrapped standard errors with 150 replications are presented. ***, **, *, ° denote significance at the 1, 5, 10, and 15 percent level, respectively.

Table 7
Dynamics in net cross-border inflows for country pairs

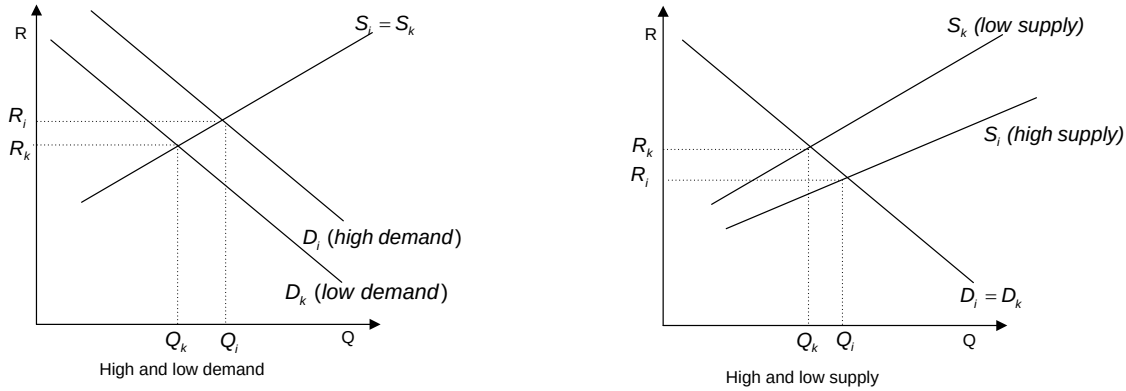
	1	2	3	4	5	6
		Number			Volume	
Lagged dependent variable	0.224***	0.230***	0.225***	0.117**	0.118**	0.119**
	(0.070)	(0.070)	(0.072)	(0.055)	(0.055)	(0.055)
Δ Patents in previous year	0.009	0.012	0.008	0.001	0.002	-0.004
	(0.009)	(0.009)	(0.009)	(0.024)	(0.024)	(0.024)
Δ Expected growth	0.107***	0.096***	0.118***	0.210***	0.203***	0.235***
	(0.029)	(0.029)	(0.031)	(0.064)	(0.065)	(0.072)
Δ Returns in previous year	0.049	0.080	0.024	-0.230	-0.209	-0.281
	(0.157)	(0.166)	(0.161)	(0.325)	(0.347)	(0.341)
Δ Capitalization in previous year	-0.226***	-0.244***	-0.202***	-0.638***	-0.646***	-0.587***
	(0.052)	(0.052)	(0.059)	(0.112)	(0.114)	(0.122)
Δ VC indicator (lower is better)		-0.107*			-0.058	
		(0.055)			(0.129)	
Δ VC-supply indicator (lower is better)			0.073			0.132
			(0.054)			(0.128)
Year dummies	yes	yes	yes	yes	yes	yes
Country-pair fixed effect	yes	yes	yes	yes	yes	yes
Observations	1,088	1,088	1,088	1,088	1,088	1,088
Number of country pairs	136	136	136	136	136	136
F test	9.85	9.66	11.53	6.93	6.48	7.57
Hansen test (p-value)	0.793	0.731	0.823	0.151	0.166	0.139
Number of instruments	29	30	30	29	30	30
AR 1 (p-value)	0	0	0	0	0	0
AR 2 (p-value)	0.467	0.453	0.472	0.277	0.277	0.272
AR 3 (p-value)	0.824	0.826	0.824	0.427	0.428	0.421

Note: Estimation results from Blundell/Bond(1998)-GMM estimations with absolute Windmeijer's (2005) corrected standard errors in parentheses are from the following model:

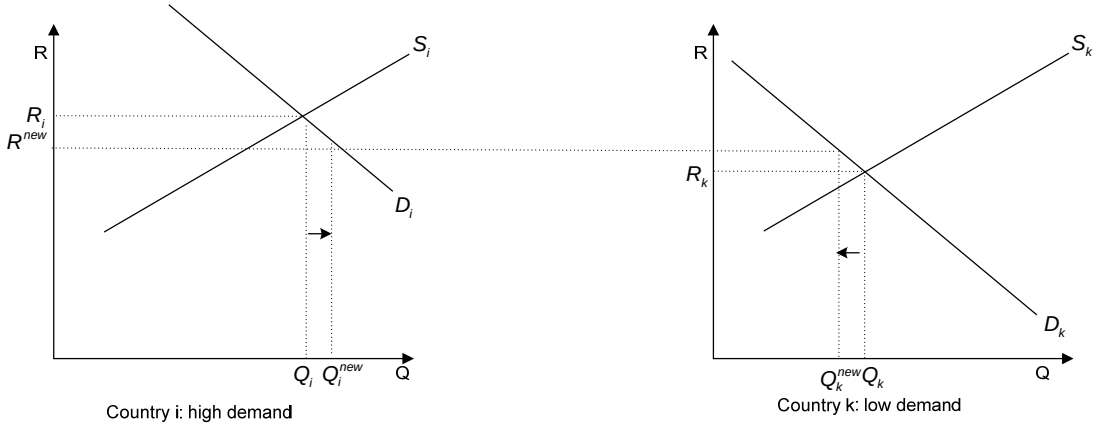
$$NCB_{ikt} = \gamma_0 + \gamma_1 NCB_{ikt-1} + \gamma_2 \Delta Patents_{ikt-1} + \gamma_3 \Delta Growth_{ikt} + \gamma_4 \Delta Returns_{ikt-1} + \gamma_5 \Delta Capitalization_{ikt-1} + \gamma_6 \Delta VC_{ikt-1} + u_{ikt},$$

where *NCB* denotes net cross-border inflows by country pairs defined as investments attracted by country *i* from country *k* minus investments originated by country *i* in country *k* in year *t* normalized by GDP and logarithmized. Δ is the difference between country *i* and *k.* Positive values of net cross-border inflows imply more investments being attracted to than originated from country *i* to country *k* (*i* minus *k*). All variables are defined in Table 2. The lagged dependent variable is instrumented using past values. Year dummy variables are employed in all models. ***, **, * denote significance at the 1, 5, and 10 percent level, respectively.

Panel a – Domestic investments (one-country setting)



Panel b – Cross-border investments and demand differences (two-country setting)



Panel c – Cross-border investments and supply differences (two-country setting)

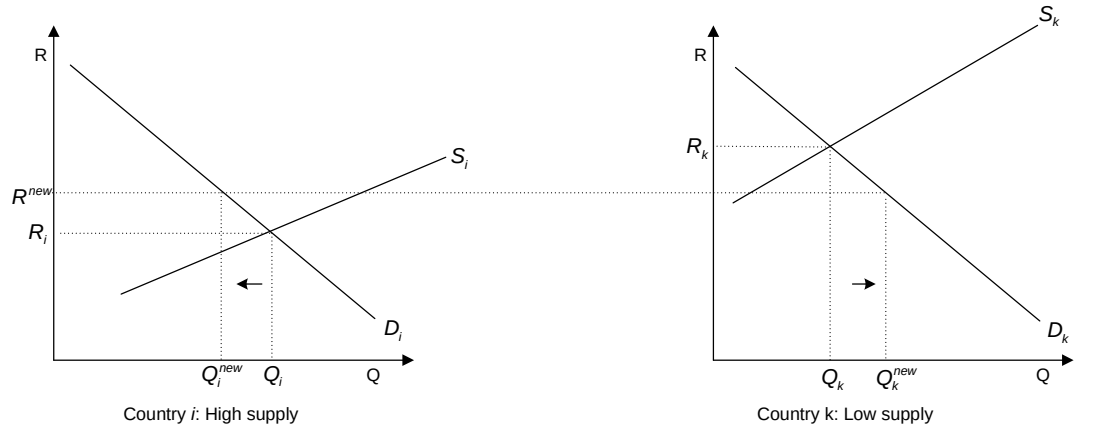


Fig. 1. Domestic and cross-border investments. Panel a shows how differences in the supply and demand conditions in a closed economy determine the quantity of venture capital finance, *Q*, and the risk-adjusted expected return, *R* in equilibrium. Panel b (Panel c) shows the impact of differences in the demand (supply) on cross-border investments in a two-country setting.