The Effects of Government-Sponsored Venture Capital: International Evidence

James A. Brander

Sauder School of Business, University of British Columbia

Qianqian Du

Shanghai Advanced Institute of Finance (SAIF), Shanghai Jiao Tong University

Thomas Hellmann

Sauder School of Business, University of British Columbia

August 2013

Abstract:

This paper examines the investments and performance of enterprises that are funded by government-sponsored venture capitalists (GVCs) and/or private venture capitalists (PVCs). Using a large international data set, we find that enterprises funded by a mixture of GVCs and PVCs obtain more investment than enterprises funded purely by PVCs, which in turn obtain more investment than those funded purely by GVCs. There is a positive association between mixed GVC/PVC funding and successful exits, as measured by IPOs and acquisitions. The main channel for the exit effects appears to be through the total amount of investment. We also find that markets with more GVC funding have more total funding and, strikingly, even have more PVC funding, even after correcting for possible endogeneity. The evidence suggests that GVC funding can have effects on both the intensive margin (more funding per enterprise) and the extensive margin (more enterprises funded). The strength of these effects differs across countries. The performance of GVCs also depends on whether they are fully owned by government or supported by governments in other ways.

JEL Classification Codes: G24, G28

Keywords: venture capital, government support, investment, exit, crowding out

1. INTRODUCTION

Governments around the world have taken a strong interest in venture capital. This interest stems in part from the important role venture capitalists have played in the early development of some of the world's most influential enterprises. [1] More broadly, venture capital provides significant support in many countries for rapidly growing entrepreneurial enterprises that are important sources of innovation, employment, and productivity growth. Furthermore, there is a sizable body of research in economics emphasizing potential market failures associated with the innovation process and with the provision of entrepreneurial finance – market failures that might create a reasonable economic rationale for government intervention in venture capital markets.

It is therefore not surprising that many governments have sponsored the provision of venture capital finance to entrepreneurial ventures. The overall public sector commitment to venture capital in the world as a whole is substantial, including forgone taxes, outright subsidies, preferential regulation, and public provision of investment capital. In our data, venture capital firms owned or supported by governments invested over $4 billion per year in privately held enterprises around the globe. Over a quarter of all enterprises financed by venture capital received some government-sponsored venture capital funding. However, there is also considerable resistance, or at least scepticism, regarding the role of government in venture capital finance. Critics doubt whether governments can do anything to improve upon private sector venture capital activity and many fear that government activity in venture capital markets might be associated with a variety of problems arising from political pressures, rent-seeking, and general bureaucratic inefficiency.

Our main objective in this paper is to assess the record of government support for venture capital. This is an important objective for several reasons, including the simple fact that a lot of money is allocated by governments to such activities. We acknowledge that assessing the record is challenging, in part because much of the information that would be helpful is confidential and therefore not readily available, and in part because the economic processes at work are complex – making it hard to clearly identify causal mechanisms. However, we feel that the time is appropriate to make a "best effort" attempt to evaluate the fairly extensive evidence now available at an international level.

We undertake the assessment in two steps, looking first at investment and then at performance. The first major question we consider is the important issue of "crowding out". Does the activity of government venture capitalists (GVCs) tend to displace or crowd out private venture capitalists (PVCs), or is GVC financing mainly additional financing? We refer to the possibility that GVC activity expands total financing rather than simply crowding out PVC finance as the *additionality hypothesis*.

There are two possible levels at which crowding out might occur—the *enterprise level* and the *market level*. An analysis at the enterprise-level provides insights about the *intensive* margin, i.e., whether GVC financing is associated with more or less funding per enterprise. 'Crowding out' means that enterprises that receive

[1] Our working characterization of venture capitalists is that they are financial intermediaries that seek out and invest in high-potential entrepreneurial ventures, predominantly in high- technology sectors, and that often provide managerial assistance to enterprises that they invest in. See Sahlman (1990) for a more detailed discussion. Iconic companies financed by venture capital include, among others, Apple, Facebook, FedEx, and Google.

GVC finance receive correspondingly less PVC finance. By contrast, additionality means that they receive more VC finance in total.

We also consider the effects of GVC funding at the market level, which allows us to consider effects at the extensive margin. Additionality might arise either from more funding per enterprise (the *intensive* margin) or from more enterprises receiving funding (the *extensive* margin). We define a market as the enterprises in a particular industry in a particular country that received their first venture capital funding in a particular year. We ask whether GVC investments in a given market tend to increase the total amount of funding obtained by enterprises in that market.

It seems likely that enterprise-level additionality would lead to market-level additionality. Suppose, for example, that a group of enterprises in a specific market receive GVC funding and, as result, obtain more funding overall. Then, other things equal, the market as a whole would obtain more funding purely on the basis of this intensive margin additionality. However, enterprise-level additionality and market-level additionality do not necessarily coincide because of the extensive margin. It is possible, for example, that even if GVC funding in a given enterprise displaces PVC funding in that enterprise, the displaced PVC funding might be invested in other enterprises in that market, including enterprises that would not otherwise get venture capital funding – expanding the extensive margin. Such a mechanism is, after all, one of the rationales for GVC finance. This pattern would imply market-level additionality even in the absence of enterprise-level additionality.[2] Both enterprise-level additionality and market-level additionality are of interest and we investigate both in this paper.

The second major question we consider is how the presence of GVC finance relates to the chances of success for the enterprises receiving such finance. Our primary performance measure is whether an enterprise has a successful exit event. We assess the relationship between GVC investment and the likelihood that an enterprise generates a successful exit. We refer to the possibility that GVC activity is positively associated with this likelihood as the *exit hypothesis*.

As with additionality, it is possible to assess the exit hypothesis at either the enterprise level or the market level. Our primary interest here is at the enterprise level, where we ask how the presence of GVC relates to an enterprise's chance of a successful exit, and through what channel such an effect would likely come through.

One important contribution of this paper is that we use a very broad database, seeking to assess the role of government support for venture capital on a global basis – with significant amounts of data from many countries. We combine data from Thomson One (previously called VentureXpert) and the Asian Venture Capital Journal to assemble a sample of 20,446 enterprises (based in 25 countries) that received venture capital funding in the 2000–2008 period, and we track whether successful entry occurred through early 2012. Approximately half of these enterprises were based in the United States but the dataset also contains substantial representation from various European and East Asian economies, along with Australia, Brazil,

[2] Alternatively, it is also possible to have additionality at the enterprise level but not at the market level. Additional GVC funding in a set of enterprises might raise total funding for those enterprises, but make investment in other enterprises (potential competitors to the GVC-funded enterprises) less attractive to PVCs, causing those PVCs to invest less in other enterprises. Thus market-level funding could stay the same or even fall, despite apparent additionality at the enterprise level.

Canada, India and Israel. The enterprises cover a wide range of industries but have strong representation in technology-intensive sectors.

We believe that there are important benefits to analyzing the role of government across a large number of countries. Each individual country is likely to have some unique circumstances that may affect the government's approach to supporting venture capital. While these country-specific constraints may all be interesting by themselves, they also imply that any country-specific study is limited in terms of the generalizability of results. We therefore see value in cross-country studies that identify the robust aspects of government interventions that do not depend on country-specific circumstances. Put differently, our approach allows us to identify some common themes that apply broadly across countries regarding the experience of governments in supporting venture capital investments.

Our central finding suggests an apparent complementarity between GVC finance and PVC finance. When GVC finance and PVC finance are both present (*mixed funding*), total investment is higher and exit outcomes are better than with PVC finance alone or with GVC finance alone. To the best of our knowledge, this complementarity has not been addressed by previous research and seems to us to be a potentially important result.

More specifically, using the individual enterprise as the primary unit of analysis we find support for the additionality hypothesis if mixed funding is present: If GVC investment and PVC investment are both present in an enterprise, that enterprise tends to obtain more total venture capital (VC) funding than if the enterprise receives all of its venture capital from PVCs, or if it receives all of its funding from GVCs. The full ordering is that mixed funding has the highest investment level, followed by pure PVC funding, and then by pure GVC funding. Moreover, even if we focus only on the amount of investment enterprises receive from PVCs, we find that mixed GVC-PVC enterprises receive more PVC funding than enterprises financed solely by PVCs. We also find evidence of additionality at the market level: Markets that receive more GVC funding also receive more funding overall and, strikingly, receive more PVC finance.

We acknowledge that drawing causal inferences regarding additionality is not easy. At the enterprise level there may be unobservable characteristics related to enterprise quality that explain why some enterprises attract GVC funding. Similarly at the market level there may be unobservable market characteristics that attract more or less GVC funding. However, while there is no perfect fix for the possible endogeneity that may arise from such omitted variable problems, we do seek to correct for such effects to the extent possible. We believe that we have made significant progress. One approach is to use appropriate control variables to minimize the role of omitted variables. We also use instrumental variables to attempt to correct for any remaining endogeneity, and we take account of the sequencing of investment events. After doing what can be done with available data to correct for the various concerns that arise, the evidence in favor of additionality seems at least suggestive, albeit not definitive, both at the enterprise level and the market level.

We also find some support for the exit hypothesis using both enterprise-level data and market-level data. When GVC and PVC finance are present in the same enterprise (mixed funding), that enterprise is more likely to have a successful exit than when only PVC finance or only GVC finance is present. As with the additionality hypothesis, mixed funding does best, followed by pure PVC funding and then by pure GVC funding.

Importantly, our analysis suggests a very simple channel by which GVC funding affects performance. The positive effect of mixed GVC and PVC investment on exit performance appears to be due primarily to investment additionality. Specifically, once we control for the amount of investment, mixed funding no longer has a statistically significant effect on exit performance.

As with the additionality results, the exit results must be interpreted with care regarding possible causality. The observed correlation between mixed GVC-PVC financing and performance at the enterprise level might be due to treatment effects – an effect of mixed funding on performance. However, it might also be due to selection effects, making the GVC or mixed GVC-PVC indicator endogenous. We consider two distinct selection effects. One type of selection effect – which we call "bandwagon selection" – concerns the possibility that more successful enterprises raise more money, eventually also attracting some GVC funding from GVCs who wish to "jump on the bandwagon" associated with a successful enterprise.[3] Thus GVC presence would be an endogenous variable determined in part by the dependent variable – success. Under this hypothesis GVCs would invest mostly in later rounds when enterprises are further along the path of success. Our empirical analysis does not support the bandwagon hypothesis and in our main analysis we focus on funding obtained in the first round of financing so as to exclude by construction any potential bandwagon effects.

Unobservable selection effects concern the possibility that GVCs select enterprises based on information that is not observable to the econometrician (to us). This information might allow GVCs to differentially select better enterprises. In other words, presented with a set of companies receiving PVC finance, GVCs might be able to select those that are particularly likely to do well. If so, then mixed funding would be associated with better performance than pure PVC funding, even if the GVC funding was doing nothing to contribute to that performance – was having no treatment effect. This is a classic endogeneity problem of the reverse causality type. We use an instrumental variable approach based on local market conditions, similar to Berger et al. (2005) to distinguish between such selection effects and treatment effects. It is reasonable to argue that the local availability of GVC funding is exogenous from the enterprise's perspective, but is likely to affect the probability of obtaining GVC funding. Our results reinforce the inference that GVC has a positive effect on performance through investment additionality.

We also contribute to the literature on cross-country differences in venture capital characteristics. Hege, Palomino and Schwienbacher (2009) document important differences between the performance of venture capital in the United States and Europe. We find some intriguing differences concerning the relative performance of enterprises purely funded by GVCs compared to those funded purely by PVCs. While pure GVC enterprises have significantly fewer successful exits in the US, they actually have more in Europe. We also find that the relative performance of pure GVC investments is better in civil law countries than in common law countries, and it is better in countries with relatively less developed venture capital markets.

We also disaggregate GVCs into two different types: government-owned venture capitalist (GOVCs) and government-supported venture capitalist (GSVC). The latter are venture capital firms that are typically

[3] Such bandwagon effects are similar to "window-dressing", which refers to the practice adopted by some mutual fund managers or other portfolio managers of purchasing high flying stocks or other assets at the end of a reporting period, in effect paying high prices in order to be able to list assets that have performed well in the portfolio of the fund.

privately owned, but that obtain significant financing, tax credits or other subsidies from government. In our data 86% of all GVC backed enterprises received their funding from GSVCs. Interestingly, both the additionality and the performance effects of mixed GVC and PVC funding are significantly lower for GOVCS than for GSVCs.

Section 2 outlines the theoretical foundations for our analysis and explains how our contribution relates to the prior literature. Section 3 is devoted to a description of the data. Section 4 contains the main empirical analysis, examining the additionality and exit hypotheses at the enterprise level and the market level. Section 5 contains concluding remarks.

2. CONCEPTUAL FRAMEWORK AND LITERATURE REVIEW

Many economists believe that the innovation process is prone to significant market failure. One market failure is the public good nature of innovation, which generates problems of free-riding and insufficient incentives for innovation. A related market failure is that R&D carried out by one firm generates knowledge that is useful in other areas. Such positive externalities will be underprovided in the absence of policy intervention. Another important type of market failure in innovation is due to informational asymmetries, implying potential adverse selection, and possibly moral hazard problems. All three of these market failures lead to a potential undersupply of innovation, providing a rationale for government intervention in the innovation process. Creation of intellectual property rights is unlikely to be sufficient to offset externality-based and informational market failures, and is far from ideal even for correcting the public good problem.[4]

A complementary policy instrument for mitigating market failures in innovation is government support for venture capital finance. If there is insufficient innovation, then the amount of innovation can perhaps be moved toward a more efficient level by providing additional innovation funding. If innovative entrepreneurial firms are capital-constrained, as seems likely, then relaxing these constraints might increase innovation. The hope is that providing additional resources to the venture capital firms that invest in innovating enterprises is one way of relaxing that constraint.

But why channel government support through venture capital firms rather than in alternative ways, such as providing tax credits or direct subsidies for R&D expenditures? One reason is that venture capitalists have a comparative advantage in dealing with informational asymmetries in innovation finance. Arguably, venture capitalists exist as specialized financial intermediaries precisely because they specialize in reducing informational asymmetries (as described, for example, in Amit, Brander and Zott (1998)). Venture capitalists often have highly relevant technical background experience and devote significant effort to obtaining information about particular enterprises and technologies and devote significant resources to monitoring the enterprises in which they invest.[5] Venture capitalists are unlikely to eliminate informational asymmetries, but their investments may help to reduce market failures.

[4] There is a significant literature questioning whether current patent policy might hinder rather than promote innovation as patents held by one firm may act as a roadblock for related innovation by other firms. See, for example, Boldrin and Levine (2008), Jaffe and Lerner (2004), and Marengo et al. (2012).

[5] See Hellmann and Puri (2002), Kaplan and Strömberg (2004), Hsu (2006) and Chemmanur, Krishnan and Nandy (2008).

Thus the conceptual framework supporting GVC activity relies on three steps: (1) the existence of significant market failure in the innovation process leading to insufficient innovation, (2) the presumption that innovators are capital constrained and would innovate more if more financing were available, and (3) the expectation that providing support to venture capitalists is an effective method of increasing innovation financing. In this paper we investigate the third step: We ask whether GVC activity increases the amount of venture capital available to recipient enterprises or whether such funding simply displaces private venture capital (the additionality hypothesis). We also address the effectiveness of such investments by investigating the success of GVC-supported enterprises (the exit hypothesis).

Government support for venture capital is related to R&D subsidies, although it is not the same thing. First, R&D subsidies are not usually channeled through venture capital funds. In addition, funds provided by GVCs to innovative enterprises are not confined to R&D, but may be spent on marketing, production, human resource development and other functions. The effect of R&D subsidies has been subject to significant study. For example, Zhao and Ziedonis (2012) find that R&D awards by the Michigan state government to technology companies in Michigan had significant positive outcomes for recipient companies. Similarly, Lerner (1999) and Audretsch, Link and Scott (2002) find positive results from R&D awards made under the U.S. Small Business Innovation Research (SBIR) program. Related studies indicating a positive effect of R&D subsidies include Almus and Czarnitski (2003) and Busom (2000). However, Da Rin Nicodano and Sembenelli (2006) find no effect of government R&D support on the innovation measures they consider. A review by Klette, Møen and Griliches (2000) finds that the research up to 2000 was inconclusive regarding the effect of government R&D subsidies on market failure in the innovation process.

Our interest in the systematic evaluation of government venture capital programs follows the seminal work of Lerner (2009). In this book, Lerner provides a general description and critique of government efforts to promote venture capital finance. He also provides valuable suggestions for improvement and calls for more systematic data evaluation of these programs. This paper seeks to provide a significant step in that direction by examining the broad international evidence. While there may be considerable variation in the details of how different countries implement their government venture capital programs, our approach allows us to identify some of the more robust patterns that apply across countries more broadly.

Two important prior papers on additionality and crowding out are Leleux and Surlemont (2003), who examine European data and finds evidence in support of additionality, and Cumming and MacIntosh (2006), who examine Canadian data and find evidence of significant crowding out. However, later work on Canadian data by Brander, Egan and Hellmann (2010), find results that closely match the international evidence reported in this paper, with very little apparent crowding out.[6]

A broader review of venture capital finance, including a discussion of public policy toward venture capital, is provided in Da Rin, Hellmann and Puri (2013). The effect of tax policies on venture capital has been

[6] Looking at the different but related context of SBIR research grants, Wallsten (2000) finds evidence that suggests substantial crowding out effects, whereas Lerner (2002) finds evidence that suggests complementarities between SBIR grants and venture capital funding. Link and Scott (2010) also provide more recent evidence.

examined theoretically by Keuschnigg and Nielsen (2003, 2004). See also Kanniainen and Keuschnigg (2004) for a range of views on public policy toward venture capital.

3. DATA DESCRIPTION

Our primary unit of observation is the enterprise that receives venture capital. We also undertake significant analysis of market level effects, for which the unit of observation is a local market – defined as the set of enterprises in a particular industry in a particular country that received their initial VC funding in a particular year.

For the enterprises, the universe of potential observations consists of all enterprises that have received venture capital funding. We have two sources of venture capital data. The larger source, which has been widely used by researchers, is the Thomson One (T1) database of venture capital investments (formerly known as VentureXpert) provided by Thomson Reuters. From this database, we use all recorded enterprises that received their first venture capital funding between 2000 and 2008, and we track successful exits up through the end of 2012. The sample period was chosen to account for the fact that T1 has only limited international coverage prior to 2000. After 2000, T1 has good coverage for the US and significant coverage for Canada and Europe, along with some but limited coverage for Asia.

We were able to augment the T1 data with data from Asian Venture Capital Journal (AVCJ), which has good coverage for Asia. The VC deals identified from T1 and AVCJ were made in 56 countries but with a highly skewed distribution across countries. Over 96% of VC investments occurred in the top 25 countries. We restrict attention in this paper to these 25 countries as some of our analysis and interpretation requires each country to have a reasonable number of investments each year. However, the main results are not affected if the small number of observations in the other countries are included. The dataset we use contains 20,446 enterprises, of which 1,992 are a net addition due to the AVCJ database. There are 5,095 distinct venture capitalists that make first round investments in our data, of which 406 are GVCs and the rest are PVCs.

It is sometimes difficult to distinguish between true investments in venture capital and investments in other types of private equity, such as investments in large, well-established privately held enterprises. In order to do so, as a first step, we use the categorization provided by T1 and AVCJ. We also did extensive additional checking of the data. We eliminate enterprises with more than US$500 million in sales or that receive more than US$500 million of investments (as venture capital investments are typically much less), and eliminate enterprises with more than 500 employees. Our results are robust to variations in these admittedly arbitrary cut-off points.

The variables we use are defined in the Appendix. Our main dependent variable for the analysis of successful exits is EXIT, which is an indicator variable that takes the value 1 if the enterprise went public (had an IPO) or was acquired. We refer to IPOs and third party acquisitions as "successful exits" or just as "exits" for brevity. T1 tends to underreport these exit events, so we also matched the VC-backed enterprises with the Global New Issuance and Mergers and Acquisitions databases in Thomson Reuters. Because we intend exit as a measure of success, we set exit equal to zero in the rare cases in which we observe an exit value that is below the total amount of investments. We track exits through the end of 2012. Enterprises that

were first financed in 2008 (the last year of financing in our data) are less likely to have an exit than enterprises with earlier financing given the typical time between funding and exit. However, even the latest investments (2008) have four additional years to generate an exit. Our econometric analysis includes year fixed effects that correct for the enterprises' different time horizons.

Ideally we would like to measure the success of venture capital investments with returns data. Short of that, it is sometimes possible to use exit values or exit multiples as a measure of success (as in Brander, Egan and Hellmann 2010). This dataset, however, does not offer any such opportunities, as it contains no returns data and contains exit values for only about 5% of all exits. We note, however, that using IPOs and third party acquisitions as a measure of success is standard in the venture capital literature (as in Brander, Amit and Antweiler 2002). Importantly, Phalippou and Gottschalg (2009) demonstrate a high positive correlation between exit and returns to venture capitalists, suggesting that such exits are a reasonable measure of success. Other types of exit – "unsuccessful" exits such as write-offs and management buyouts – have much lower (and usually negative) returns. Finally, it is likely that other aspects of the performance of enterprises such as employment or innovation are also correlated with successful exit performance.

Our main independent variables relate to the presence of government-sponsored venture capitalists (GVCs). In identifying which venture capitalists are government sponsored there is an issue of definition – what should count as a GVC? We focus on two main channels of activity that serve to identify GVCs. One channel is the direct provision of venture capital through government-owned venture capitalist. The other channel includes other major forms of government support, such as government investments in independently managed venture capital funds that also rely on private investors, and tax concessions and subsidies to venture capitalists. Since Thomson Reuters severely under-reports government presence and lacks information on investors and limited partners of venture capital funds, we rely on Capital IQ to identify the investors and limited partners of funds. We also undertook extensive analysis of the individual websites of venture capital firms to identify indicators of government support.

We first identify all investors and limited partners and then check whether they are owned by government entities. A VC firm is then defined as a GVC if it is fully owned by a government entity or if it has any limited partners or investors wholly owned by a government entity. We exclude three types of government entity from this definition: (i) purely profit-maximizing entities such as government pension funds and sovereign wealth funds, (ii) international government institutions such as the European Development Bank, and (iii) 'remote' or 'indirect' government ownership – where a VC limited partner or other investor is only partially owned by a government entity. Therefore the GVCs in our sample fall into two main categories – venture capital funds owned outright by government entities (GOVCs) and privately owned venture funds in which a limited partner or other significant investor is a government entity (GSVCs). In addition to these data sources on venture capital, for some purposes we augment the data using information from the World Bank on patent applications, GDP, and the ease of starting a new business.

Our dataset includes enterprises from all major regions in the global economy. Table 1 shows the number of enterprises supported by venture capital on a country-specific basis for all 25 countries in our data. It indicates that the US accounts for approximately half of all VC backed enterprises. There is a large variation in the frequency of GVC activity by country. In South Korea and Canada, over 50% of the identified

enterprises had GVC support. France and Germany also had relatively high levels of GVC involvement. The United States had a more moderate (but still significant) level of GVC support of about 17%.

TABLE 1 HERE

Table 2 provides the main descriptive statistics for the variables used in our analysis. Panels A and B show the variables used for analysis at the enterprise level. The information is provided for the entire sample, and for the pure PVC, mixed PVC and GVC, and pure GVC sub-categories.

TABLE 2 HERE

The top row in Panel A, referring to the "EXIT" variable, gives a strong hint of the main results. Recalling that the EXIT variable takes on the value 1 if the enterprise has a successful exit and 0 otherwise, we see that in the entire sample, approximately 19% of enterprises had a successful exit. Decomposing this we find that 20% of pure PVC-funded enterprises had a successful exit, while 24% of enterprises with mixed GVC and PVC funding had a successful exit and only 15% of enterprises with pure GVC funding had a successful exit.

If we look at the row titled *Total Investment* we can get a sense of the results of the additionality analysis. The amount of VC investment received over all rounds by different categories of enterprises. Enterprises receiving mixed PVC and GVC funding received significantly more investment ($28.7 million on average) than enterprises receiving PVC support only ($25 million). Enterprises receiving only GVC funding received far less ($7.3 million).

The entries in bold in Panel A indicate statistically significant differences (based on t-tests) between enterprises with different funding mixes. Our primary analysis, described in the next section, is based on regression analysis, but these simple t-tests indicate that mixed funding is associated with consistently better outcomes than either pure PVC support or pure GVC support. On the other hand, enterprises with pure GVC support have the worst performance.

Panel B of Table 2 shows the time series pattern of investments and the distribution across industries. As we can see, the year 2000 had a large number of venture capital investments, capturing the end of the ICT boom before the downturn of 2001. Panel B also shows the distribution of investments across industries. Most are in industries normally categorized as "high tech" but about 25% are in other areas. However, many of those, such as alternative energy, also rely significantly on advanced technology.

Panel C of Table 2 shows the main variables used for market level analysis. The market level data is obtained by aggregating enterprise level data to the market level. We have data from 25 countries, 9 years, and 6 industries. Therefore the number of local markets is (25)(9)(6) = 1350. However some of these markets have no investments as a relatively small country might have no investments in a particular industry in a particular year. There are 1,030 distinct markets with VC investments. The average number of enterprises per market is about 16 and the average market has about $122 million in PVC investment and $13 million in GVC investment. However, this data is highly skewed as the U.S. markets tend to be very large compared with markets in the smaller countries. In our regression analysis we take logarithms of the number of enterprises and total investment which dramatically reduces the skewness.

Table 3 provides correlation matrices for the main variables of interest. Correlations that are statistically significant (different from 0) at the 5% level of significance are shown in bold, which includes most of the correlations.

TABLE 3 HERE

As with the t-test results illustrated in Table 2, the correlations also foreshadow our main results. For example, the EXIT variable is positively correlated with mixed funding and negatively correlated with pure GVC funding, which is consistent with the exit hypothesis for mixed funding. Similarly, total investment is positively correlated with mixed funding, which is consistent with the additionality hypothesis for mixed funding, and is negatively correlated with pure GVC funding. Regression analysis, presented in the next section, allows us to control for other influences on enterprise performance and to address whether these relationships are mere (albeit interesting) correlations arising from selection effects or whether they are treatment effects that might be given a causal interpretation

4. REGRESSION ANALYSIS

4.1 Enterprise-level Analysis of the Additionality Hypothesis

To assess the additionality hypothesis – whether GVC investment crowds out PVC investment at the enterprise level – we treat the total amount of first-round investment received by an enterprise as the dependent variable. Each enterprise is one observation. We ask how investment is related to GVC financing.[7] For this we distinguish between enterprises that have three different financing mixes: those that receive all of their VC funding from PVCs (the default category), those that receive all of their VC funding from GVCs (in which case GVC-Pure equals 1) and those that receive funding from both PVCs and GVCs (in which case GVC-Mix equals 1). We classify enterprises into these three categories solely on the basis of first round investments. This allows for a cleaner interpretation, eliminating potential problems associated with bandwagon selection effects, as previously discussed.

We use a complete set of country fixed effects to control for the many institutional differences across countries. Importantly, these fixed effects control for country-to-country variations in data collection methods. We account for time horizon effects by using calendar year fixed effects identifying the year in which the enterprise received its first VC investment. These fixed effects reflect the possibility that investments made in certain years tend to generate better results than those made in other years because of exogenous macroeconomic effects such as the business cycle. Finally, we also include a set of fixed effects for each industry.

Panel A of Table 4 shows the results. The main message from the first two columns is that enterprises with mixed (GVC and PVC) funding receive more financing than enterprises supported only by PVCs – the base case. However, enterprises with pure GVC funding receive much less total investment than those with pure

[7] Our econometric specification has the form $I = f(GVC, X, \varepsilon)$ where I stands for investment amounts (using natural logarithms) received by the enterprise, GVC represents a vector of measures concerning the presence of GVC funding in the first round, X is a vector of control variables, and ε is the random error.

PVC funding. These results are statistically highly significant, and the economic effects appear to be substantial.

TABLE 4 HERE

The coefficients and standard errors for GVC-Mix and GVC-Pure allow us to test the hypothesis that each of these coefficients is different from zero – from the base case – which is pure PVC finance. The table also reports, in the last row, the results of testing whether the GVC-Mix and GVC-Pure coefficients are significantly different from each other. This difference is large and highly significant as enterprises with mixed funding attract far more investment than enterprises with pure GVC funding only.

The third column treats later round investment (investment after the first round) as the dependent variable. As many enterprises never have a second round of investment this variable is truncated from below with many enterprises at the no investment boundary. Accordingly we use a Tobit specification.[8] This specification provides essentially the same findings as for first round investment and total investment. Mixed funding in the first round is associated with more funding in later rounds than pure PVC funding. On the other hand, pure GVC funding in the first round is associated with significantly less expected funding in later rounds. In unreported regressions we also decomposed the Tobit regression into its two components, the probability of obtaining later round funding, and the amount of funding conditional on obtaining later round funding. Using Probit and OLS regressions respectively, we find the same coefficient pattern. Specifically GVC-Mix is positive and significant at the 1% level in both regressions, while GVC-Pure is negative and significant at the 1% level in both regressions.

The first three columns examine the intensive margin of GVC financing by considering three alternative measures of the total investment in a given enterprise. The final two columns of Table 4A further decompose this intensive margin by looking at the number of investors in the deal, and the average size of investment per investor. The fourth column shows that syndicate size – the number of VC firms investing in the enterprise – tends to be greater in the presence of mixed funding than under pure PVC finance, but is lower for pure GVC finance. The fifth column re-estimates the model from the first column, now also controlling for the number of investors. The negative coefficient suggests that the average investment per investor is lower for GVC-backed enterprises (both GVC-Mix and GVC-Pure). This suggests that, even though individual investors invest less on average in the presence of GVC investors, the increase in the number of investors more than compensates for this, resulting in an overall higher level of investment in GVC-Mix deals.

[8] Many enterprises do not receive later round funding so later round investment is truncated from below at zero. However, the actual dependent variable is the log of investment. As the log of zero is not defined some slight change in specification is required. The two standard approaches are to use the log of one plus the investment level or to truncate the dependent variable at the log of the minimum observed positive investment level. Results from these two approaches are virtually identical. The results shown are for the former case.

We ask whether the GVC-investors are merely crowding out PVC investors. Panel B of Table 4 therefore re-examines the evidence from Panel A by focusing on the same dependent variables, but only measuring the investment of PVC, as opposed to total investment, which is the sum of PVC and GVC investment.[9]

Panel B of Table 4 reports some striking results. The first column shows that the presence of GVCs (in the first round) has no significant effect on the amount of PVC funding received in the first round. This suggests that the presence of GVC financing is not associated with a decline in PVC financing. Furthermore, the results from columns (2) and (3) suggest that the presence of GVC funding in the first round has a strong positive effect on later round PVC funding (column 3), so that total PVC investment (the sum of first round and later round investment) is higher when GVC activity is present (column 2). [10] Columns (4) and (5) again provide the decomposition of the effects found in column (1). Column (4) shows that the presence of first round GVC activity is associated with more PVC investors (larger PVC syndicate size), while column (5) suggests that the average investment of individual PVCs is lower, leading to the positive but insignificant net effect found in column (1).

Overall we interpret the results in Table 4 as being supportive of the additionality hypothesis. Specifically, enterprises that receive both PVC funding *and* GVC funding end up with significantly more funding in total than other enterprises. This finding is consistent with the hypothesis that GVC funding adds to the total funding pool rather than just displacing private investment. More importantly, we find that enterprises with mixed GVC and PVC funding do not experience lower funding from PVCs. This result suggests that, rather than crowding out PVC funding, GVC funding may well act as a catalyst that actually attracts more PVC funding to an enterprise. Furthermore, the timing of such effects, with later round but not first round PVC funding increasing in mixed first round finance, suggests that this effect is not due to the possibility that better enterprises simply get more funding of both types (i.e. is not due to endogenous selection effects).

We also find that enterprises with pure GVC funding receive much less investment than other enterprises (with fewer investors, and also less investment per investor). One possible interpretation is that these are enterprises that might never have received PVC funding in any case. In that case it seems likely that this type of GVC funding is also additional to what would be present without GVC activity, i.e., it reflects an effect on the extensive margin. Further evidence in section 4.3 supports this interpretation.

4.2 Endogeneity

Although Tables 5 and 6 seem to provide evidence of additionality it is important to acknowledge the possible role of endogeneity of the regressors. Specifically, it is possible that, among the enterprises obtaining PVC funding, GVCs are able to self-select into better enterprises – enterprises that will ultimately attract more PVC investment irrespective of whether GVCs are present or not. If so, then the GVC-mix variable would be endogenous in the sense that it would be correlated with the error term in the regression.

[9] Enterprises purely financed by GVCs receive no PVC funding by definition, so we exclude them from the sample when assessing the effect of GVC activity on PVC funding. Adding the pure GVC firms back into the sample and including a GVC-pure fixed effect generates very similar results.

[10] Decomposing the Tobit regression in Column (3) we find that GVC-Mix has a positive and significant effect on the probability of a later round, but an insignificant effect on the investment amount conditional on having a later round.

A positive error term would give rise to more PVC investment and a greater likelihood of GVC involvement, inducing a correlation between investment and mixed funding

First we would like to point out that it is far from obvious that such endogeneity would be important in this case. It requires that GVCs have an ability to self-select into promising ventures even when PVCs invest in less attractive enterprises. Also, the strong negative effect of pure GVC funding that comes through in Table 4 seems to argue against such self-selection. In order for endogeneity to explain this pattern, GVCs would have to be particularly good at selecting among enterprises that attract PVC investment but much worse in selecting among enterprises that do not receive PVC investment.

Nevertheless, it is important to investigate possible endogeneity. We have already taken the precaution of defining GVC variables using only first stage investment, so our analysis is not subject to the bandwagon form of endogeneity, in which GVCs simply join in promising enterprises (paying appropriately high prices for equity) shortly before an exit event. In addition it is possible to use instrumental variables to identify an exogenous component in the GVC variables.

We need instruments that identify exogenous variations in the type of funding, i.e., the instruments need to be related to the type of funding received by the enterprise. We use an instrumentation strategy based on local market conditions. This approach is based on work in industrial organization starting with Berry, Levinsohn and Pakes (1995), was first applied in corporate finance by Berger et al. (2005), and has been used in a number of subsequent papers. In this case, we use shocks to the local availability of GVC funding in a given market as an instrument for whether a particular company is more or less likely to obtain GVC financing.[11] The key intuition is that the availability of GVC funding is likely to affect whether a specific enterprise receives funding or not.

In order to be useful as an instrument, the exclusion restriction requires that the availability of GVC funding has no direct effect on the specific investment, after controlling for country, industry and year conditions. As is often the case with exclusion restrictions, we recognize that it may be possible to come up with some rationale as to why the instrument could still be directly affecting the outcome variable. Our main defence is that while the effect of local availability on the right hand side variable has a clear economic prediction (more GVC availability leads to more GVC deals), there is no natural theoretical prediction that would link shocks in the availability of GVC to the investment needs of enterprises.

Moreover, we would argue that because all enterprises *within* a market are treated to the same shock, the strength of our instrument is that it addresses any unobserved within-market selection effect, such as the possibility that GVCs (or mixed GVC-PVC syndicates) are merely cherry-picking better deals. However, we acknowledge that we cannot fully exclude the possibility of unobserved heterogeneity *across* markets, and therefore note the desirability of further research based on quasi-natural experiments that would allow for even cleaner identification.

[11] As previously described, we define a local market as a particular country-industry-year combination. For example, the biotech enterprise in France that received their first investment in 2000 would be one local market. There are 25 countries, 9 years, and 6 industries, yielding 1350 local markets in total.

Table 5 reports the results of applying our instrumental variable method on the regressions of Table 4. We regress variables the key dependent variables GVC-Mix, GVC-Pure (and in column (5) Number of Investors) on their market averages.[12] The (unreported) first stage regressions show that these market averages are all highly significant at the 1% for predicting the key dependent variables, and easily pass the F-test for joint significance. Table 5 then reports the results for the second stage regressions. We find that all coefficients retain their sign, and that almost all coefficients that are significant in Table 4 remain significant in Table 5 (although some at slightly lower levels of significance). Overall these results suggest that unobservable selection does not seem to be the main drivers of the observed patterns in the data.

TABLE 5 HERE

4.3 Market Level Analysis of Additionality

The primary objective of most GVC programs is to increase entrepreneurial funding of innovation on both the intensive margin (more funding per enterprise) and on the extensive margin (more enterprises receiving funding). The enterprise-level analysis addresses the intensive margin. We now want to investigate whether GVC activity affects the extensive margin. Although we might expect that market level and enterprise level additionality are closely related it is possible, as described in the introduction, to have one without the other. To assess market level additionality we ask the question of whether, other things equal, markets with more GVC funding tend to have more total VC funding and more PVC funding.

We use a panel data approach that builds on the prior work of Leleux and Surlemont (2003). Their approach is based on a country panel, so their identification requires no unobserved time-varying heterogeneity at the country level. We adopt a more fine-grained approach of looking at what we call a market panel. Our approach allows us to provide an identification strategy where our variation does not come merely from a country's year-to-year variation in the amount of GVC financing, but instead from the variation of GVC financing that different industries within a country experience over time.

Specifically, the cross-sectional dimension of our panel is country-industry pairs. As we have 25 countries and 6 industries there are 150 cross-sectional units. The time series dimension is defined by year of first investment and is 9 years long (2000 to 2008). All of our regressions use market fixed effects. Moreover, we also include country-year fixed effects that should eliminate concerns about unobserved time-varying heterogeneity at the country level. Therefore our identification comes from variation over time within markets.

TABLE 6 HERE

Table 6 reports the results from our panel estimation. Consider first Panel A. The first column considers at the market level the effect of aggregate GVC investment on aggregate investment (consisting of both GVC and PVC investment). We find a positive and highly significant correlation between aggregate GVC investment and aggregate investment. Because we incorporate market fixed effects these results are not just

[12] Instead of using market averages as instruments, it also possible to use one dummy variable per market as an instrument (see Ackerberg and Botticini (2002) and Bottazzi, Da Rin and Hellmann (2008)). This approach yields results that are very similar to those reported here.

a matter of larger markets attracting more GVC investment and more PVC investment. The second and third column decomposes this effect into two components. Column (2) also finds a positive and highly significant correlation between aggregate GVC investment and the number of enterprises funded. Column (3) finds a positive and marginally significant relationship with the average investment received by enterprises.[13] In addition column (4) examines the effect on the average number of investors in a deal, finding a positive and highly significant correlation. This result mirrors at the market level the findings from column (4) in Tables 4 and 5, which found that at the enterprise level GVC funding is associated with larger syndicates.

The dependent variables in Panel A pertain to the entire market, which includes the GVC investment itself. Panel B therefore reruns the regressions from Panel A, using only the investments of PVC investors. Column (A) finds that markets with more GVC investment also have more PVC investment. This is a striking result, suggesting clear additionality at the market level. Column (B) further shows that this result is driven the extensive margin, finding a positive relationship between GVC investment and the number of PVC-backed enterprises.

Column (3) finds a negative but insignificant relationship with the average investment size, and column (4) finds a negative but insignificant coefficient for the average number of PVC investors. One may wonder if the negative coefficients may indicate some crowding out at the intensive margin, although neither coefficient is significant. Moreover, recall that in Table 4 we mostly found positive effects for the intensive margin. However, Table 4 also shows that pure GVC investments are associated with smaller investment amounts and fewer investors. The results from column (3) and (4) of Panel B of Table 6 include these effects, since they measure the average PVC investment and number of PVC investors across all investments, including pure GVC deals. Therefore, Panel C re-estimates the models of column (3) and (4) (from both Panel A and B), aggregating over PVC-backed companies only. That is, Panel C focuses on the universe of PVC deals and excludes all pure GVC deals, both for the dependent and independent variables. The results show a positive relationship that is statistically significant for three of the four specifications. The results from Panel C help to reconcile the findings between the enterprise and market-level analysis. Overall the results suggest clear additionality at both the extensive and the intensive margin.

Just as the enterprise level results might be influenced by endogeneity, the same is possible for market level analysis. Specifically, it is possible that an unobserved positive shock in the dependent variable might also cause an increase in the explanatory variable, inducing a correlation between market level PVC and GVC investment. The powerful fixed effects we use should control for many unobserved effects of this type, although some endogeneity might remain. An additional correction is to use Arellano-Bond dynamic panel regressions. This is an instrumental variable method for panel data in which lagged variables are used as instruments. We believe that the use of lagged dependent variables is a reasonable approach to correct for some endogeneity. However, we also acknowledge the standard limitations of this approach, and believe that future research based on a quasi-natural experiment could shed further light on the causal links.

The results are shown in Table 7. The dynamic panel regressions tell a similar story to our earlier regressions. As shown in Panel A, the exogenous component of GVC market investment appears to have a

[13] The number of observations is lower because the average investment cannot be defined for those country-industry-year combinations where no investment took place.

positive effect on overall market investment, on the number of enterprises, and on the number of investors per enterprise. The effects on PVC investment in Panels B and C are also very similar to those of Table 6. Overall we conclude that the evidence at the market level does not support the crowding out hypothesis, but instead favors the additionality hypothesis.

TABLE 7 HERE

4.4 The Exit Hypothesis

To examine the exit hypothesis we wish to assess whether government-sponsored venture capitalists (GVCs) are associated with better or worse enterprise exit performance than private venture capitalists (PVCs). As already described, the primary measure of performance is whether or not the enterprise experiences a successful exit event – either an IPO or a third party acquisition. As with the additionality analysis, we can study exit at the enterprise level or at the market level.[14]

Our dependent variable is the indicator variable EXIT, which takes the value 1 if the enterprise went public or was acquired. For the analysis of the exit hypothesis shown in Table 8 we use linear probability models. This has several advantages. It produces coefficients that are readily interpretable, and it allows us to directly compare the coefficients of the models without and with instrumental variables. The results remain very similar when using Probit or Logit models.[15]

TABLE 8 HERE

The main message from Table 8 is that mixed funding is associated with a higher probability of successful exit, as shown in result column (1). However, it is important to assess whether this better exit performance is the result of the higher investment levels associated with mixed funding, or whether it is due to other aspects GVC activity. For example, it is possible GVCs might have government contacts or particular areas of expertise that are complementary to the benefits provided by PVCs.

This question can be addressed by including total investment as an explanatory variable, as in the second result column in Table 8. The GVC-Mix variable then reflects only a partial effect of GVC activity – that part not associated with increased investment. In the resulting regressions the GVC-Mix indicator, reflecting this residual effect of GVC, loses its statistical significance. Its coefficient, while positive, is only about the half the size of the full GVC-Mix effect. The third result column uses the number of investors rather than the amount of investment as a control, with a similar result. The number of investors is highly significant and its inclusion eliminates the significance of the GVC-mix variable. Interestingly, when both the number of investors and the amount of investment are included as controls, both remain statistically significant.

[14] At the enterprise level our regressions take the form $P = f(GVC, X, \varepsilon)$, where P is the probability of exit, GVC is a set of measures indicating the source of the funding mix (GVC, PVC, or both), X is a vector of control variables and ε a random error.

[15] There are several standard estimation approaches for such a specification, such as Probit, Logit or linear probability models (LPM). The relative advantages of these approaches are discussed in many econometrics textbooks, such as Wooldridge (2008), and depend on the specific context in question. See Angrist and Pischke (2009) for a particularly helpful discussion that is highly relevant to our context.

The GVC-pure variable has a negative effect in the base regression (column 1): enterprises with pure GVC funding do not do as well as other enterprises. However, this negative effect disappears once we control for the amount of investment, as shown in column 2.

The last row of Table 8 shows the difference between the GVC-Mix and GVC-Pure coefficients. This difference is strongly significant before including total investment as a control and but loses its significance after including investment amounts or syndicate size as an explanatory variable. Thus the effect of GVC participation of either mixed or pure varieties seems to operate primarily through the amount of investment and number of VC investors.

We should again consider possible endogeneity issues. For example, it is possible that better quality enterprises – those more likely to have successful exits – are more likely to attract both GVCs and PVCs, while lower quality enterprises are more likely to attract only PVCs or only GVCs. If so, we would observe a positive relationship between mixed funding and successful exits, even if mixed funding did not have a positive treatment effect on exit performance. It is does not seem all that plausible that GVCs are particularly good at choosing enterprises when they syndicate with PVCs but particularly bad at making such selections when they do not. However, it is possible to use instrumental variables of the type used in the analysis of the additionality hypothesis here.

TABLE 9 HERE

Table 9 shows the results of IV estimation, using a linear probability IV framework.[16] Our instruments are statistically highly significant, and easily pass the F-test for joint significance. Overall the main result of Table 9 is that correcting for endogeneity does not change the basic message – that mixed funding is associated with relatively strong exit performance that is apparently due largely to the additionality effect (more funding) associated with mixed funding.

However, the results from Table 9 do suggest that unobservable selection effects may explain some of the lower exit performance of enterprises funded only by GVC. Indeed, comparing column (1) shows that the GVC-Pure coefficient switches from negative and significant in Table 8 to positive but insignificant in Table 9. In column (4), which also controls the investment effect as well as the number of investors, the GVC-Pure coefficient goes from being small and insignificant (β=0.002, P=0.713) in Table 8 to much larger and almost statistically significant (β=0.072, P=0.101). This says that the performance of enterprises funded only by GVC funding looks worse if we don't account for unobservable selection effect. This finding is consistent with the notion that pure GVC investments pertain to companies that have lower chances of success (and that are therefore not always able to attract PVC funding). Once we account for this selection effect, we find that GVC funding has a positive effect on exit performance.

We also investigate market-level exit effects. We ask whether markets that receive more GVC funding have better exit rates. In unreported regressions we find no significant effects of GVC funding. This result is not entirely surprising, as it seems likely that more GVC funding in mixed enterprises would be associated with a higher probability of a successful exit, but markets with higher GVC levels would also tend to have more

[16] The nonlinear IV Probit never converges in Stata, which is not surprising given the large number of fixed effects among the explanatory variables.

pure GVC-funded enterprises, which are less likely to have a successful exit. The combined effect could go in either direction and, in our data, turns out to be not significantly different from zero.

4.5. Cross Country Comparisons

One advantage of our data set is that it provides the opportunity to make cross-country comparisons. While such comparisons are not the primary focus of our analysis, here we report the most interesting findings. One natural use of the international dimension of our data is to compare different world regions. Our data comprises the 25 countries that account for the vast majority of the world's venture capital activity. By far the largest contributor to VC activity is the US. The other two main geographic clusters are Europe and East Asia. For simplicity we lump all other countries into a "Rest of Word" category.[17] Using specifications parallel to those in Tables 4 (additionality) and 8 (exit), Panel A of Table 10 shows how the GVC coefficients differ across our four regions.

The first two columns indicate that the relationship between GVC and investment amounts is fairly similar across all regions. This suggests that our main results concerning the additionality hypothesis applies broadly to all regions of the world. The last two columns find that the relationship between mixed GVC funding and exit is fairly similar across regions. However, we find some intriguing differences concerning the performance of purely GVC backed enterprises. In the US we find a negative and significant coefficient, even in the last column which controls for investment and the number of investors. By contrast we find a positive coefficient for Europe (which is significant at the 10% level in the last column). The difference between the US and European coefficient is highly significant. The Rest of the World behaves similarly to the US, whereas the coefficients for East Asia are insignificant. This suggests that the performance of pure GVC investments differs significantly across regions, with a much better relative performance in Europe than elsewhere.[18]

TABLE 10 HERE

A prior literature suggests that legal systems, and specifically whether the foundation of commercial law is based on common law or a civil code, can explain many cross-country differences in financial systems.[19] Using the classification provided by La Porta et al. (2000) we classify each country in the sample as either a common law country or a civil law country.[20] Interestingly we find that GVC financing is much abundant in civil law countries: 37.30% of all enterprises in civil law countries obtain some form of GVC funding, compared to 15.77% in common law countries.

[17] Specifically we categorize our 25 countries countries as follows: US is a category of its own, Europe consists of Belgium, Denmark, Finland, France, Germany, Ireland, Italy, Netherlands, Spain, Sweden and the United Kingdom. East Asia includes China, Hong Kong, Japan, Malaysia, Singapore and South Korea. The Rest of World category contains Australia, Brazil, Canada, India, Israel and New Zealand.

[18] Approximately half our sample companies are US based, so one may ask whether the main effects of the analysis are primarily due to US or non-US companies. In unreported regressions we reran our regressions dividing the sample only into US versus non-US enterprises. We find a very similar pattern to Panel A of Table 10. Specifically there are no significant differences for mixed GVC deals, but the performance of pure GVC deals in the US is significantly worse than outside the US.

[19] See, for example, La Porta et al. (2000), Lerner and Schoar (2005), Kaplan, Martell and Strömberg (2007), and Hege, Palomino and Schwienbacher (2009).

[20] The common law countries in our data are, in alphabetical order, Australia, Canada, Hong Kong, India, Ireland, Israel, Malaysia, New Zealand, Singapore, U.K., and U.S. The civil law countries are Belgium, Brazil, China, Denmark, Finland, France, Germany, Italy, Japan, Netherlands, South Korea, Spain, Sweden, and Switzerland.

For the analysis we interact the common law indicator variable with the GVC variables to distinguish between the effect of GVC-Mix and GVC-Pure funding in common vs. civil law countries. We consider both additionality and exit, as shown in Panel B of Table 10. The distinction between common law and civil law countries does not affect our basic findings that mixed funding increases total funding and pure GVC funding reduces total funding. However, we do see some interesting differences between common law and civil law regimes. Mixed funding has a stronger positive effect on both investment and exit in civil law regimes than in common law regimes. Correspondingly, pure GVC funding has a less negative effect in civil law regimes. Thus, GVC activity is not only more widespread, it also exhibits relative better performance in civil law countries.

The role of GVC may naturally depend on the degree to which venture capital is already developed within a country. In particular, one may conjecture that GVC plays a more important role in earlier stages of market development, but plays a more marginal role in more developed venture markets. To examine this we use a simple measure of venture capital development, specifically looking at the total amount of venture capital raised by enterprises in a country, as a fraction of GDP (expressed in US$M). Panel A of Table 11 shows the interaction of our measure of venture capital development with our usual GVC effects. The interaction with the GVC-Mix coefficient is insignificant, but the coefficient on GVC-Pure is negative and significant in all four columns. This suggests that enterprises purely funded by GVCs receive relatively less funding, and perform relatively worse in more developed venture capital markets. This result is not only consistent with the results from Panels A and B, it also confirms the notion that government support of the venture capital industry plays different roles at different stages of market development.

TABLE 11 HERE

One may also wonder if the effect of GVC financing depends on other country developmental characteristics, such as how "innovative" or "entrepreneurial" or a country is. Any such comparison inherently faces difficulties of measurement and interpretation, but there are some useful indicators. In order to examine a country's level of innovativeness, we consider a simple measure of patenting provided by the World Bank – the number of patent applications, which we normalize across countries by dividing by GDP. Again we calculate the interaction of this variable with the GVC-Mix and GVC-Pure variables. Panel B of Table 11 shows that all the interaction effects have positive coefficients, and 6 out of 8 are statistically significant. This suggests that GVC has a more positive effect in more innovative countries, both in terms of additionality and exits.

Given possible weaknesses in our innovation measure we do not want to overstate the importance of this result, but it provides at least some suggestive evidence that the role of GVC varies with the degree of innovativeness. Specifically, countries with a lot of patent applications have a lot of potential commercialization opportunities than might go unrealized due to market failure in innovation finance. These are precisely the countries in which we might expect GVC support to have a significant impact. The results from Panel D support this notion.[21]

[21] In unreported regressions we also consider cross- country variation in entrepreneurship. Following Klapper, Laeven, and Rajan (2006) we use the World Bank's index about the ease of starting a business to examine country-level differences in barriers to entrepreneurship. We add two interaction terms that multiply the GVC-Mix and GVC-Pure coefficients by the enterprise's country

4.6. Government-owned versus government-supported VCs

There is significant heterogeneity within the GVC category. One important distinction is between GVCs that are *owned* by government and those that are merely *supported* by government. Government-owned venture capitalists (GOVCs) are typically associated with development banks, such as South Korea's Korea Development Bank (KDB), or Canada's Business Development Bank (BDC). They may also be directly affiliated with government departments, such as the 'In-Q-Tel' fund that is owned by the US Central Intelligence Agency. Government-supported venture capitalists (GSVCs) get financial support from government programs, such as the US SBIC program, the New Zealand Venture Investment Fund, or Canada's Labour Sponsored Venture Capital Corporations.[22] GOVCs obtain all of their funding from government, whereas GSVC obtain some of their funding from government and the remainder from private sources. We define an enterprise as GOVC-funded if at least one of its investors is a GOVC.

In Table 12 we report how the effects of GVCs break down between these two subcategories. We focus on the main model specifications from Table 4 (additionality) and Table 8 (exit).

TABLE 12 HERE

Pure GVC funding has a more negative effect on total investment for GOVCs than for GSVCs. While both the GOVC-Pure and GSVC-Pure coefficients are negative and significant in column 1, the GOVC-Pure coefficient is more than twice as large, and the difference of coefficients is significant at the 5% level. This suggests that enterprises backed by GOVCs receive significantly less funding. Furthermore, mixed funding has a more positive effect when the GVC component is due to GSVCs than when it is due to GOVCs. An even more extreme version of this pattern can be found in column 2, which shows that GSVCs have a positive effect on the amount of PVC funding, while GOVCs have a significant negative effect.

Columns 3 and 4 indicate that mixed funding has a significant positive effect on exit when the GSVCs are present but the coefficient turns negative (although insignificant) when GOVCs are present. Pure GVCs of both types have a negative effect, and the coefficients are larger for GOVCs, but the difference between the coefficients is not statistically significant. Column 4 shows that even after controlling for the amount of investment, mixed funding due to GSVCs continues to have a modest positive effect on successful exit.

Some might consider GOVCs as the purest form of government support for venture capital. If so, the basic message of the paper does not change. Mixed GOVC-PVC funding still generates more investment than pure PVC financing, while pure GOVC funding generates less. The main difference is that mixed GOVC-PVC funding does not generate better exit performance. GOVC might represent the purest form of government involvement, but it represents only a small part of government involvement in the venture capital market. GSVCs account for the vast majority of all GVC deals. And while they have some private

ranking in the Ease of Starting index (using the 2012 ranking). We find that our main effects for GVC-Mix and GVC-Pure remain unaffected, and that the interaction term is insignificant.

[22] The term "labour-sponsored" refers to the fact that in order to qualify for a government tax credit, these venture capital funds must be "sponsored" by a labour organization such as a labour union. In practice this has very little effect on the funds, as the labour "sponsorship" typically amounts to little more than a token involvement by organized labour. However, the government tax credit and the associated rules have a major impact on the operation of these funds.

sector involvement, their government support is vital to their existence, as can be readily seen from the experience of SBICs in the US or labour-sponsored funds in Canada.

Another possible variation for defining pure GVC investments is to drop those GVCs that *always* syndicate with PVCs. (Some GVCs are required by regulation to syndicate with PVCs.) The argument for using such a definition is that the GVCs that always syndicate with PVCs are different from GVCs that seek to support enterprises that would not be supported by PVCs, and that the latter represent a purer form of GVCs. Of the 406 GVCs in the data set, this filter drops 109. The remaining pool of 297 GVCs provided funding on a GVC-pure basis at least once. We re-ran the main regressions under this alternative definition and found very similar results to those obtained with the broader definition of GVCs.

4.7. Robustness

Our analysis focuses on one particular characteristic of VCs – whether they have strictly private funding or whether they have significant government support. It might also be reasonable to consider other investor characteristics. In unreported regressions we considered several investor controls, including the number of prior investments and the percentage of successful investments – those that led to IPOs or acquisitions. We find that the inclusion of these additional investor controls does not materially affect our main results.

Instead of using such investor controls, an alternative and arguably more powerful approach is to consider investor fixed effects that fully absorb any unobservable time-invariant investor characteristics. However, a conceptual challenge is that our unit of observation, the individual enterprise, does not lend itself to the inclusion of investor fixed effects, given than many enterprises have multiple investors. We therefore examine enterprise-investor pairs as an alternative unit of analysis.[23] The results obtained are broadly similar to the enterprise-level analysis shown in the previous sections.

Our exit analysis includes some companies that had only a few years to exit. In our main specification the calendar fixed effects correct for the mechanical fact that older firms have more time to exit. As robustness checks we also verified that our results continue to hold if we remove enterprises that received their first investment after 2006 from the analysis. We also tried dropping enterprises that received initial funding in the "bubble" year of 2000. Once again the results obtained were very similar to the results already reported.[24] Another robustness check expands the number of industry controls from 6 to 18 (based on the Thomson One classification) without materially affecting the results.

We focus on identifying financing type (GVC, PVC, or mixed) based on the first round of investment. This approach has the advantage that it should eliminate "bandwagon" effects in which GVCs or PVCs join successful enterprises late just to get an association with a successful enterprise. However, the disadvantage of this approach is that we end up not using later round data on investor identity. However, as a robustness check we have done the analysis using all investments (not just first round investments) as the basis for classifying enterprises as GVC-Pure, PVC-Pure, or GVC-Mix. This exercise of course increases the share of mixed enterprises. However, it does not significantly affect the main results.

[23] This is a common unit of observation in the venture capital literature, sometimes referred to as 'deal level' analysis. See Hellmann, Lindsey and Puri (2008).

[24] These findings are not very surprising given that we already use year fixed effects to control for year-to-year differences.

Our analysis of the exit hypothesis focuses on IPOs and acquisitions as our measure of success, which is a standard measure of success in the venture capital literature. An alternative approach is to look only at IPOs. In unreported regressions we found that the relationship between our GVC variables and IPOs is typically statically insignificant. We attribute this to the low incidence of IPOs in our data. Indeed, while 19% experience a successful exit, only 4% experience a successful IPO. This is consistent with the observations by Kaplan and Lerner (2010) who note that the first decade of the 21st century was marked by a relatively low incidence of IPOs relative to acquisitions.

Our instrumental variable specifications require the use of a linear probability model as convergence cannot be achieved with the nonlinear instrumental variable Probit specification, which is not surprising given the large number of fixed effects.[25] For purposes of comparison we also used a linear probability model for all the regressions without instrumental variables. However, we also checked the effects of using Probit and Logit models in the non-instrumented regressions and found a very similar pattern of results to those obtained with the linear probability model.

5. CONCLUDING REMARKS

This paper seeks to contribute to the assessment of government-sponsored venture capital (GVC) finance. We focus on two related hypotheses: the additionality hypothesis and the exit hypothesis. The additionality hypothesis addresses the important question of "crowding out": Does GVC finance crowd out (replace) private venture capital (PVC) finance or does it provide additional finance? The *exit hypothesis* concerns the impact of GVCs on the exit performance of the enterprises in which they invest. More specifically, we compare how enterprises that receive PVC finance only, GVC finance only, or mixed PVC and GVC finance perform relative to each other.

We find significant evidence of additionality – evidence that GVC activity increases the total amount of venture capital funding available. This evidence emerges from analysis at both the enterprise level and the market level. At the enterprise level we find that enterprises that receive mixed funding – funding from both PVCs and GVCs – tend to receive more funding in total than do enterprises financed purely by PVCs. Furthermore, enterprises with mixed funding tend to have more VC investors and, strikingly, obtain more PVC funding than other enterprises. This basic pattern is robust to a wide range of alternative specifications, including the use of instrumental variables to control for possible endogeneity.

This evidence is consistent with a straightforward mechanism. It appears that when GVCs syndicate with PVCs – when they co-invest in the same enterprise—they act primarily to increase the amount of financing received by the enterprise and do not significantly displace PVC financing for that enterprise. In short, it appears that GVC activity of this type expands available finance along the *intensive* margin – providing more funding for a given enterprise.

[25] One disadvantage of the linear probability model is that it can produce predicted values that may fall outside of the [0,1] range even though actual probabilities cannot fall outside this range. We find predicted values that lie outside this range for 432 out of 20,446 enterprises (i.e., 2.11%). As a robustness check we dropped those enterprises from the estimation and found this had no discernible effect on the results.

This mechanism raises the question of why some enterprises are able to obtain mixed funding – funding from both GVCs and PVCs – and some are not. One possibility is that both GVCs and PVCs are trying to invest in the highest quality enterprises they can and that an enterprise that passes the screen imposed by more VCs is likely to be a more promising enterprise. One fact that is consistent with this interpretation is that enterprises that receive mixed funding tend to have more investors. The fact that enterprises with mixed funding also tend to have more PVC funding than other enterprises is also consistent with this interpretation. Thus an enterprise with more VC investors – GVC and PVC – tends to be more successful. Under this interpretation, GVC participation would be endogenous – determined by enterprise quality.[26] Finding a positive relationship between enterprise success and GVC participation for this reason would still be of interest, but it would not be a treatment effect associated with GVC participation.

However, if it is hard to distinguish good enterprises from bad enterprises then, in more formal terms, the equilibrium outcome could be a pooling equilibrium – in which both types of enterprise are funded but are capital constrained – with the result that good enterprises get less than the optimal amount of funding that would maximize the chance of a successful exit. In such a world an increase in funding provided by GVCs, even if applied randomly to good and bad enterprises would have the effect of increasing funding of some good enterprises toward the efficient level and increasing the likelihood of a successful exit. In such a world the effect of GVC would be correctly viewed as a treatment effect, where the channel of the effect is the funding amount.[27]

In practice it seems likely that GVCs, when they syndicate with PVCs, probably do exercise some positive selection --- selecting the best enterprises they can and, in addition, that GVC finance also contains a random component reflecting the difficulty of distinguishing between high and low quality enterprises. Therefore, a positive coefficient on GVC-mix finance would contain both a selection effect and a treatment effect. Our instrumental variable approach attempts to isolate the treatment effect by correcting for the selection effect. We therefore view our results as indicating that syndication between GVCs and PVCs does have a treatment effect, even though selection effects are likely also present.

The enterprises that receive pure GVC funding (i.e. that receive only GVC funding) seem to be a very different category than those that receive mixed funding. In particular, they get significantly less total funding than other enterprises. This might mean that pure GVC funding tends to reduce VC funding for a given enterprise if GVC funding displaces PVC funding. However, it is more likely that enterprises that receive pure PVC funding represent additionality on the *extensive* margin. In other words, it seems likely that many enterprises that receive pure GVC funding would not otherwise receive VC funding at all. This is, after all, a stated purpose of many GVC programs – to expand funding to enterprises that would not be supported by the private sector alone. It is still true that our empirical analysis is conditional on an enterprise

[26] Note that this interpretation does not imply that GVCs are better informed than PVCs. It is based on the idea that different VCs might have different information or different expertise and that an enterprise that passes the test for financing with more VCs is likely to be a better enterprise. This idea has been previously investigated by Lerner (1994) and Brander, Amit and Antweiler (2002).

[27] This interpretation was helpfully provided by a referee, who also pointed out that such a policy (increasing GVC finance to both good and bad companies) could have positive or negative effects overall, depending on whether the beneficial effects of extra funding for good companies would outweigh costs associated with "wasting" funding on bad enterprises.

receiving some funding, as unfunded enterprises are not in our data. However, we believe that our results are consistent with the possibility that GVC funding does increase the number of funded enterprises.

To investigate effects at the extensive margin we also perform an analysis at the market level. There we find further support for the notion that GVC funding provides additional funding, rather than crowding out private investments. Specifically, the market level analysis indicates that a market (defined as a particular industry in a particular year in a particular country) that has more GVC funding tends to have significantly more total funding and even more PVC funding. Moreover, we find that the number of enterprises (total and PVC-backed) also increases with GVC funding.

A potential concern for the market level analysis is again endogeneity: better markets might simply attract more PVC investment *and* more GVC investment. Our analysis already controls for market fixed effects and country-year fixed effects. We also consider an instrumental variables approach based on standard time series methods of using lagged dependent variables as instruments and find that this does not have much effect on our main results.

In addition to assessing additionality we also consider the effect of GVC finance on the incidence of successful exits. We find that enterprises with mixed funding are significantly more likely to have successful exits than are enterprises that receive pure PVC funding. However, enterprises that receive pure GVC funding are less likely to have successful exits. For enterprises receiving mixed funding it seems that the better exit performance is due largely to simply receiving more investment – as would be consistent with a model in which enterprises are capital constrained. When the exit regressions include total VC investment as an explanatory variable, the effects of mixed funding and pure GVC funding lose their statistical significance. At the market level, we do not find significant effects of GVC activity on the rate of successful exits.

We also take advantage of the international character of our data to assess regional and country-level differences. We compare common law countries with civil law countries and find that GVC activity (mixed or pure) is much more prevalent in civil law countries than in common law countries, and, most importantly, performs relatively better too. Moreover, we consider how GVC activity behaves differently in different regions of the world. The most interesting finding is that while there is a negative relationship between pure GVC funding and exit performance, especially in the US, we actually find a positive relationship in Europe.

We acknowledge that this paper is only an early step in a full evaluation of the value and performance of government activity in the venture capital process and that there are other important topics that could be investigated. We believe that the analysis in this paper provides a useful step forward in addressing a topic of considerable importance, and that the topic deserves additional research attention.

References:

Ackerberg, D. and Botticini, M. (2002). Endogenous matching and the empirical determinants of contract form. *Journal of Political Economy* 110, 564–591.

Almus M, Czarnitzki D. (2003). The effects of public R&D subsidies on firms' innovation activities. *Journal of Business and Economic Statistics*, 21(2): 226-236.

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

Angrist, J. and Pischke, S. (2009). *Mostly Harmless Econometrics: An Empiricist's Companion. Princeton,* New Jersey: Princeton University Press.

Audretsch DB., Link AN, & Scott JT. (2002). Public/private technology partnerships: evaluating SBIR-supported research. *Research Policy*, 31(1): 145-158.

Berger, A., Miller, N., Petersen, M., Rajan, R. and Stein, J. (2005). Does function follow organizational form? Evidence from the lending practices of large and small banks. *Journal of Financial Economics* 76, 237-269.

Berry, Steven, James Levinsohn and Ariel Pakes (1995). "Automobile Prices in Market Equilibrium", *Econometrica,* 63(4) (Jul., 1995): 841-890.

Boldrin, M., and D. Levine. (2008). *Against intellectual monopoly*. Cambridge: Cambridge University Press.

Bottazzi, L., Da Rin, M. and Hellmann, T. (2008). Who are the active investors? Evidence from venture capital. *Journal of Financial Economics* 89, 488-512.

Brander, J., Amit, R. and Antweiler, W. (2002). Venture capital syndication: Improved venture selection versus the value-added hypothesis. *Journal of Economics and Management Strategy* 11, 423-452.

Brander, J., Du, Q. and Hellmann, T. (2010). Governments as venture capitalists: Striking the right balance, in Globalization of Alternative Investments, Working Papers Volume 3: The Global Economic Impact of Private Equity Report 2010, *World Economic Forum*, 25-52.

Brander, J. Egan, E. and Hellmann, T. (2010). Government sponsored versus private venture capital: Canadian evidence. in *International Differences in Entrepreneurship*, edited by J Lerner and A. Schoar, National Bureau of Economic Research, 275-320, University of Chicago Press, Chicago, IL, US.

Busom I. (2000). An empirical evaluation of the effects of R&D subsidies. *Economics of Innovation and New Technology*, 9(2): 111-148.

Chemmanur, T., K. Krishnan, and D. Nandy. (2011). "How does venture capital financing improve efficiency in private firms? A look beneath the surface." *Review of financial studies* 24.12: 4037-4090.

Cumming, D. and MacIntosh, J. (2006). Crowding out private equity: Canadian evidence. *Journal of Business Venturing* 21, 569-609.

Da Rin, M., Nicodano, G. and Sembenelli, A. (2006). Public policy and the creation of active venture capital markets. *Journal of Public Economics* 90, 1699-723.

Da Rin, Marco, Thomas Hellmann, and Manju Puri (2013). "A Survey of Venture Capital Research", *Handbook of the Economics of Finance*, Elsevier. See dx.doi.org/1 0.1016/B978-0-44-453594-8.00008-2

Hege, U., F. Palomino and A. Schwienbacher (2009) "Venture Capital Performance: The Disparity Between Europe and the United States" *Revue de l'association française de finance*, vol. 30, n° 1

Hellmann, T. and Puri, M. (2002). Venture capital and the professionalization of start-up firms: Empirical evidence. *Journal of Finance* 57, 169-197.

Hellmann, T., Lindsey, L. and Puri, M. (2008). Building relationships early: Banks in venture capital. *Review of Financial Studies* 21, 513-41.

Hsu, D. (2006). Venture capitalists and cooperative start-up commercialization strategy. *Management Science* 52, 204-19.

Jaffe, A. and J. Lerner. (2004). *Innovation and its discontents: how our broken patent system is endangering innovation and progress, and what to do about it*. Princeton University Press, 2004.

Kanniainen, V. and Keuschnigg, C. (2004) ed. *Venture Capital, Entrepreneurship, and Public Policy*. MIT Press, Cambridge Mass.

Kaplan, S. and Lerner, J. (2010). It ain't broke: the past, present, and future of venture capital. *Journal of Applied Corporate Finance* 22, 36-47.

Kaplan, S. and Strömberg, P. (2004). Characteristics, contracts, and actions: Evidence from venture capitalist analyses. *Journal of Finance* 59, 2177-210.

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

Keuschnigg, C. and Nielsen, S. (2003). Tax policy, venture capital, and entrepreneurship. *Journal of Public Economics* 87, 175-203.

Keuschnigg C. and Nielsen, S. (2004). Start-ups, venture capitalists, and the capital gains tax. *Journal of Public Economics* 88, 1011-42.

Klette TJ, Møen J, Griliches Z. (2000). Do subsidies to commercial R&D reduce market failures? Microeconometric evaluation studies. *Research Policy*, 29(4-5): 471-495.

Klapper, L., L. Laeven and R. Rajan (2006), Entry Regulation as a Barrier to Entrepreneurship, *Journal of Financial Economics* 82 (3). 591-629.

La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shliefer, and Robert Vishney (2000). Investor Protection and Corporate Governance, *Journal of Financial Economics* 58: 3-27

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

Lerner, J. (1994). The Syndication of Venture Capital Investments. *Financial Management* 23, 16–27.

Lerner, J. (1999). The government as a venture capitalist: The long-run impact of the SBIR program. *Journal of Business* 72, 285-318.

Lerner, J. (2002). When bureaucrats meet entrepreneurs: The design of effective 'public venture capital' programmes. *The Economic Journal* 112, 73-84.

Lerner, J. (2009). *Boulevard of Broken Dreams: Why Public Efforts to Boost Entrepreneurship and Venture Capital Have Failed – and What to Do About It*. Princeton, New Jersey: Princeton University Press.

Lerner, J., Schoar, A. (2005). "Does legal enforcement affect financial transactions? The contractual channel in private equity". *Quarterly Journal of Economics* 120, 223-246.

Link A, and Scott .J.T (2010). Government as entrepreneur: Evaluating the commercialization success of SBIR projects. *Research Policy*, 39(5): 589-601.

Marengo, L., C. Pasquali , M. Valente & G. Dosi (2012), Appropriability, patents, and rates of innovation in complex products industries, *Economics of Innovation and New Technology*, 21:8, 753-773

Phalippou, L. and Gottschalg, O. (2009). The performance of private equity funds, *Review of Financial Studies* 22, 1747-1776

Sahlman, W. (1990). The structure and governance of the venture capital organizations. *Journal of Financial Economics* 27, 473-521.

Wallsten SJ. (2000). The effects of government-industry R&D programs on private R&D: The case of the small business innovation research program. *The RAND Journal of Economics*, 31(1): 82-100.

Wooldridge, J. (2008). Introductory Econometrics: A Modern Approach, 4th ed. Mason, Ohio: South Western, a division of Thomson Learning.

Zhao, Bo and Rosemarie Ziedonis. 2012. State Governments as Financiers of Technology Startups: Implications for Firm Performance, *Discussion Paper, Stephen Ross School of Business, University of Michigan*.

Table 1: Venture Capital Activities by Country

This table presents VC activities in 25 countries between 2000 and 2008. All variables are defined in the Appendix. The unit of observation is the individual enterprise. The "Number of Enterprises" column reports the number of enterprises that were financed by VCs. The "Enterprises with GVC finance First Round" column reports the percentage of enterprises financed by at least one GVC in the first financing round. The "Enterprises with GVC finance All Rounds" column reports the percentage of enterprises financed by at least one GVC in all financing rounds. The "Enterprises with an exit" column reports the percentage of enterprises that generate successful exits.

Country	Number of Enterprises	Enterprises with GVC finance First Round	Enterprises with GVC finance All Rounds	Enterprises with an exit
United States	10269	13%	17%	20%
United Kingdom	1394	21%	24%	18%
South Korea	1365	60%	62%	16%
China	1226	22%	23%	22%
India	833	18%	19%	21%
Japan	735	33%	36%	19%
France	674	41%	45%	18%
Australia	636	18%	20%	21%
Germany	456	41%	44%	15%
Canada	396	49%	55%	31%
Israel	332	9%	13%	19%
Sweden	266	16%	20%	18%
Spain	231	30%	32%	10%
Finland	181	44%	45%	11%
Brazil	166	52%	53%	13%
Denmark	153	47%	54%	13%
Singapore	149	23%	23%	20%
Belgium	141	28%	35%	13%
Ireland	137	36%	47%	19%
Netherlands	133	11%	14%	12%
Italy	129	14%	16%	11%
Hong Kong	124	7%	8%	21%
New Zealand	117	51%	56%	14%
Switzerland	104	12%	16%	22%
Malaysia	99	5%	6%	60%
Full Sample	20446	22%	26%	19%

Table 2: Descriptive Statistics

The unit of observation in Panels A and B is the individual enterprise that received venture capital. Panel C describes the sample in which the unit of observation is a local market – all enterprises in a given industry in a given country that received their first VC funding in a given year. Panel A reports means and standard deviations of variables. In panel A numbers are bold if the mean of GVC-Mix or GVC-pure is significantly different from the mean of PVC-Pure at the 5% significance level based on a t-test assuming unpaired data with unequal variances. All variables are defined in Appendix 1. Note that in Table 2 all investments are reported in millions of 2008 US$. For all subsequent tables, investment variables are transformed using the natural logarithm of one plus the investment amount, denoted in 2008 US$.

Panel A: Key Variables Defined at the Enterprise Level

	Entire Sample		PVC-Pure		GVC-Mix		GVC-Pure	
Variable	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
EXIT	0.19	0.39	**0.20**	0.40	**0.24**	0.42	**0.15**	0.35
GVC	0.22	0.41	0.00	0.00	1.00	0.00	1.00	0.00
GVC-Mix	0.07	0.26	0.00	0.00	1.00	0.00	0.00	0.00
GVC-Pure	0.15	0.35	0.00	0.00	0.00	0.00	1.00	0.00
GOVC	0.03	0.18	**0.00**	0.00	**0.13**	0.34	**0.17**	0.37
GSVC	0.19	0.39	**0.00**	0.00	**0.87**	0.34	**0.83**	0.37
Total Investment	22.72	46.94	**25.03**	49.49	**28.70**	49.10	**7.33**	22.26
First Round Investment	8.88	16.18	**9.66**	17.14	**11.35**	14.15	**3.45**	9.33
Number of Investors	1.53	0.98	**1.49**	0.91	**2.92**	1.25	**1.07**	0.27
Total PVC Investment	20.93	45.30	**24.63**	48.69	**19.73**	39.98	**1.76**	11.82
First Round PVC Investment	8.05	15.77	**9.66**	17.14	**7.02**	10.55	**0.00**	0.00
Number of PVC Investors	1.29	1.02	**1.49**	0.91	**1.76**	1.17	**0.00**	0.00

Table 2: Descriptive Statistics (cont.)

Panel B: Further Variables Defined at the Enterprise Level

Variable	Entire Sample	PVC-Pure	GVC-Mix	PVC-Pure
Year of First Round = 2000	27.61%	28.50%	26.46%	23.45%
Year of First Round = 2001	12.08%	11.96%	12.31%	12.61%
Year of First Round = 2002	6.77%	6.63%	8.91%	6.47%
Year of First Round = 2003	6.35%	6.00%	7.47%	7.65%
Year of First Round = 2004	7.21%	7.11%	8.91%	6.88%
Year of First Round = 2005	8.55%	8.43%	7.47%	9.76%
Year of First Round = 2006	10.31%	10.34%	10.09%	10.23%
Year of First Round = 2007	11.16%	11.29%	9.23%	11.44%
Year of First Round = 2008	9.96%	9.74%	9.17%	11.51%
Biotechnology	6.11%	5.62%	9.95%	6.78%
Communications and Media	13.57%	13.83%	15.06%	11.37%
Computer Related	39.17%	40.76%	36.28%	32.17%
Medical/Health/Life Science	8.51%	8.41%	10.87%	7.85%
Semiconductors/Other Electronics	7.50%	6.80%	11.07%	9.46%
Non-High-Tech	25.13%	24.58%	16.76%	32.37%

Panel C: Key Variables Defined at the Market Level

Variable	Obs	Mean	Std. Dev.	Min	Max
Aggregate Investment	1350	134.45	691.36	0.00	19010.71
Number of Enterprises	1350	16.15	61.43	0	1624
Average Investment	1093	15.30	1.18	9.77	18.43
Average Number of Investors	1093	1.50	0.72	1	7
Aggregate GVC Investment	1350	12.51	46.51	0.00	1020.27
Aggregate PVC Investment	1350	121.94	650.64	0.00	17990.46
Number of PVC Enterprises	1350	13.94	57.30	0	1541
Average PVC Investment	1030	15.12	1.26	9.77	18.43
Average Number of PVC Investors	1030	1.21	0.68	0.06	7

Table 3: Correlation Matrices

This table describes the piecewise correlations among key variables. Panel A describes the individual enterprise sample, Panel B describes the market level sample. All variables are defined in Appendix 1. We indicate in bold all coefficients that are significantly different from zero at the 5% significance level.

Panel A: Variables Defined at the Enterprise Level

		1	2	3	4	5	6	7	8
1	EXIT	1.00							
2	GVC-Indicator	**-0.02**	1.00						
3	GVC-Mixed	**0.03**	**0.53**	1.00					
4	GVC-Pure	**-0.05**	**0.78**	**-0.12**	1.00				
5	Total Investment	**0.14**	**-0.17**	**0.10**	**-0.27**	1.00			
6	First Round Investment	**0.13**	**-0.16**	**0.11**	**-0.28**	**0.91**	1.00		
7	Later Round Investment	**0.09**	**-0.13**	**0.03**	**-0.20**	**0.96**	**0.70**	1.00	
8	Number of Investors	**0.08**	**0.09**	**0.40**	**-0.20**	**0.35**	**0.37**	**0.23**	1.00

Panel B: Variables Defined at the Market Level

		1	2	3	4	5	6	7	8	9
1	Aggregate Investment	1.00								
2	Number of Enterprises	**0.74**	1.00							
3	Average Investment	**0.74**	**0.21**	1.00						
4	Average Number of Investors	**0.16**	-0.04	**0.32**	1.00					
5	Aggregate GVC Investment	**0.61**	**0.68**	**0.11**	**0.15**	1.00				
6	Aggregate PVC Investment	**0.91**	**0.73**	**0.54**	**0.19**	**0.48**	1.00			
7	Number of PVC Enterprises	**0.70**	**0.97**	**0.29**	0.03	**0.57**	**0.75**	1.00		
8	Average PVC Investment	**0.66**	**0.15**	**0.94**	**0.26**	-0.03	**0.74**	**0.25**	1.00	
9	Average Number of PVC Investors	**0.13**	**-0.08**	**0.33**	**0.87**	**-0.14**	**0.20**	0.04	**0.42**	1.00

Table 4: Effects of GVC Activity on Enterprise-level Investment

In Panel A the regressions are based on a sample of 20,446 enterprises. In Panel A the regressions are based on a sample of 17,465 enterprises that received at least some funding from PVCs. Columns (1), (2), and (5) use OLS regressions. Column (3) uses a TOBIT specification where the dependent variable is left-censored and column (4) uses a Negative Binomial model where the dependent variable is a count variable. We report the R-squared for OLS regressions and the pseudo R-squared for TOBIT regressions. Robust and clustered standard errors at the enterprise's country level are reported in parentheses, and ***, **, and * denote significance at the 1%, 5%, and 10% levels (two-sided), respectively. The final row in Panel A shows the difference between the GVC-Mix and the GVC-Pure coefficient.

Panel A: Effects of GVC on Total Investment

Dependent Variables:	(1) First Round Investment	(2) Total Investment	(3) Later Round Investment	(4) Number of Investors	(5) First Round Investment
	OLS	OLS	TOBIT	Neg. Bin.	OLS
GVC-Mix	0.606***	0.631***	3.030***	0.667***	-0.144***
	(0.032)	(0.041)	(0.466)	(0.044)	(0.028)
GVC-Pure	-0.778***	-0.798***	-2.642***	-0.260***	-0.613***
	(0.147)	(0.163)	(0.413)	(0.064)	(0.108)
No. of VC Investors					0.527***
					(0.021)
Year, Country, Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	20,446	20,446	20,446	20,446	20,446
R-squared	0.195	0.235	0.055	NA	0.274
GVC-Mix- GVC-Pure	1.38***	1.43***	5.67***	0.927***	0.468***

Panel B: Effects of GVC on PVC Investment

Dependent Variables:	(1) First Round PVC Investment	(2) Total PVC Investment	(3) Later Round PVC Investment	(4) Number of PVC Investors	(5) First Round PVC Investment
	OLS	OLS	TOBIT	Neg. Bin.	OLS
GVC-Mix	0.014	0.084**	1.447***	0.171***	-0.749***
	(0.033)	(0.036)	(0.474)	(0.037)	(0.035)
Number of Investors					0.532***
					(0.018)
Year, Country, Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	17,465	17,465	17,465	17,465	17,465
R-squared	0.130	0.182	0.051	NA	0.228

Table 5: IV Regressions for GVC Funding and Amount of Investment

The regressions are based on a sample of 20,446 enterprises. All regressions are Instrumental Variable regressions. In the first stage regressions, GVC-Mix, GVC-Pure, and Number of Investors are regressed against instruments which are dummy variables for local markets. Only second-stage regression results are reported. Robust and clustered standard errors at the enterprise's country level are reported in parentheses, where ***, **, and * denote significance at the 1%, 5%, and 10% levels (two-sided), respectively.

Panel A: Effects of GVC on Total Investment

Dependent Variables:	(1) First Round Investment	(2) Total Investment	(3) Later Round Investment	(4) Number of Investors	(5) First Round Investment
GVC-Mix	0.901***	1.039***	1.781**	1.664***	-0.425
	(0.305)	(0.331)	(0.781)	(0.178)	(0.300)
GVC-Pure	-0.960**	-1.031**	-1.425*	-0.340***	-0.689*
	(0.373)	(0.419)	(0.758)	(0.104)	(0.335)
Number of Investors					0.797***
					(0.092)
Year, Country, Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	20,446	20,446	20,446	20,446	20,446
R-squared	0.190	0.230	0.196	0.227	0.251
GVC-Mix-GVC-Pure	1.86***	2.07***	3.22***	2.00***	0.264

Panel B: Effects of GVC on PVC Investment

Dependent Variables:	(1) First Round PVC Investment	(2) Total PVC Investment	(3) Later Stage PVC Investment	(4) Number of PVC Investors	(5) First Round PVC Investment
GVC-Mix	0.438	0.617**	1.347*	0.462**	-0.913***
	(0.261)	(0.272)	(0.697)	(0.172)	(0.248)
Number of Investors					0.827***
					(0.084)
Year, Country, Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	17,465	17,465	17,465	17,465	17,465
R-squared	0.124	0.176	0.187	0.071	0.196

Table 6: Market Level Investment

All panel regressions use fixed effects panel regression models where the panel identifier is each country-industry pair and time series are organized by first year of financing. We include fixed effects at the country-industry level, as well as at the country-year level. Columns (1) and (2) of Panel A and B are based on the entire panel. Columns (3) and (4) of Panel A are based on the sample of markets where at least one investment was made. Columns (3) and (4) of Panel B, as well as Panel C, are based on the sample of panel observations where at least one GVC investment was made. Robust and clustered standard errors at the enterprise's country level are reported in parentheses, where ***, **, and * denote significance at the 1%, 5%, and 10% levels (two-sided), respectively.

Panel A: Combined Investment

Dependent Variables:	(1) Aggregate Investment	(2) Number of Enterprises	(3) Average Investment	(4) Average Number of Investors
Aggregate GVC Investment	0.364***	0.046***	0.015*	0.025***
	(0.052)	(0.003)	(0.008)	(0.006)
Fixed Effects	YES	YES	YES	YES
Observations	1,350	1,350	1,093	1,093
R-squared	0.369	0.618	0.345	0.283

Panel B: PVC Investment

Dependent Variables:	(1) Aggregate PVC Investment	(2) Number of PVC Enterprises	(3) Average PVC Investment	(4) Average Number of PVC Investors
Aggregate GVC Investment	0.218***	0.027***	-0.010	-0.004
	(0.043)	(0.003)	(0.007)	(0.006)
Fixed Effects	YES	YES	YES	YES
Observations	1,350	1,350	1,030	1,030
R-squared	0.277	0.541	0.373	0.302

Panel C: PVC-backed Enterprises

Dependent Variables:	(1) Average Investment	(2) Average Number of Investors	(3) Average PVC Investment	(4) Average Number of PVC Investors
Aggregate GVC Investment in PVC-backed enterprises	0.029***	0.041***	0.012	0.016**
	(0.010)	(0.008)	(0.009)	(0.006)
Fixed Effects	YES	YES	YES	YES
Observations	1030	1030	1030	1030
R-squared	0.387	0.405	0.374	0.322

Table 7: Dynamic Panel Regressions for Market Level Investment

All regressions use the Arellano-Bond dynamic panel regression model where the panel identifier is each country-industry pair and time series are organized by first year of financing. We include fixed effects at the country-industry level, as well as at the country-year level. Columns (1) and (2) of Panel A and B are based on the entire panel. Columns (3) and (4) of Panel A are based on the sample of panel observations where at least one investment was made. Columns (3) and (4) of Panel B, as well as Panel C, are based on the sample of panel observations where at least one GVC investment was made. Aggregate GVC Investment and lagged dependent variables are instrumented by their respective lags. Robust standard errors are reported in parentheses, where ***, **, and * denote significance at the 1%, 5%, and 10% levels (two-sided), respectively.

Panel A: Combined Investment

	(1)	(2)	(3)	(4)
Dependent Variables:	Aggregate Investment	Number of Enterprises	Average Investment	Average Number of Investors
Aggregate GVC Investment	0.359***	0.042***	0.007	0.016***
	(0.036)	(0.003)	(0.009)	(0.006)
Lagged Dependent Variable	-0.063	0.095***	-0.406***	-0.395***
	(0.039)	(0.034)	(0.052)	(0.049)
Fixed Effects	YES	YES	YES	YES
Observations	1,200	1,200	840	840

Panel B: PVC Investment

Dependent Variables:	(1) Aggregate PVC Investment	(2) Number of PVC Enterprises	(3) Average PVC Investment	(4) Average Number of PVC Investors
Aggregate GVC Investment	0.206***	0.022***	-0.003	-0.007
	(0.036)	(0.003)	(0.010)	(0.006)
Lagged Dependent Variable	-0.050	0.106***	-0.482***	-0.432***
	(0.040)	(0.034)	(0.060)	(0.044)
Fixed Effects	YES	YES	YES	YES
Observations	1,200	1,200	773	773

Panel C: PVC-backed Enterprises

Dependent Variables:	(1) Average Investment	(2) Average Number of Investors	(3) Average PVC Investment	(4) Average Number of PVC Investors
Aggregate GVC Investment in PVC-backed enterprises	0.026**	0.032***	0.013	0.013**
	(0.012)	(0.007)	(0.012)	(0.006)
Lagged Dependent Variable	-0.485***	-0.412***	-0.499***	-0.453***
	(0.055)	(0.056)	(0.056)	(0.043)
Fixed Effects	YES	YES	YES	YES
Observations	773	773	773	773

Table 8: Exit Performance at the Enterprise Level

The regressions are based on a sample of 20,446 enterprises and use a linear probability specification. The dependent variable is EXIT, an indicator that takes on value 1 if the enterprise went public or was acquired by a third party. All regressions use a Linear Probability Model (LPM). Robust and clustered standard errors at the enterprise's country level are reported in parentheses, where ***, **, and * denote significance at the 1%, 5%, and 10% levels (two-sided), respectively. The final row shows the difference between the GVC-Mix and GVC-Pure coefficients.

Dependent Variable: EXIT	(1)	(2)	(3)	(4)
GVC-Mix	0.040**	0.022	0.006	0.010
	(0.015)	(0.013)	(0.012)	(0.012)
GVC-Pure	-0.023***	0.0005	-0.016**	0.002
	(0.007)	(0.005)	(0.007)	(0.005)
Investment		0.031***		0.029***
		(0.003)		(0.003)
Number of Investors			0.024***	0.009***
			(0.004)	(0.003)
Year, Country, Industry Fixed Effects	Yes	Yes	Yes	Yes
Observations	20,446	20,446	20,446	20,446
R-squared	0.039	0.052	0.042	0.052
GVC-Mix - GVC-Pure	0.06***	0.02	0.02	0.01

Table 9: Exit Performance at the Enterprise Level Using Instrumental Variables

The regressions are based on a sample of 20,446 enterprises. The dependent variable in Column (1) is EXIT, an indicator variable showing whether the enterprise went public or was acquired by a third party. All regressions are Instrumental Variable regressions. In the first stage regressions, GVC-Mix, GVC-Pure, Investment, and Number of Investors are regressed against instruments which are dummies of all local markets. Only second-stage regression results are reported. Robust and clustered standard errors at the enterprise's country level are reported in parentheses, where ***, **, and * denote significance at the 1%, 5%, and 10% levels (two-sided), respectively.

Dependent Variable: EXIT	(1)	(2)	(3)	(4)
GVC-Mix	0.131**	0.075	0.048	0.074
	(0.058)	(0.050)	(0.055)	(0.056)
GVC-Pure	0.012	0.071*	0.029	0.071
	(0.047)	(0.041)	(0.048)	(0.042)
Investment		0.062***		0.062***
		(0.012)		(0.012)
Number of Investors			0.050***	0.001
			(0.013)	(0.014)
Year, Country, Industry Fixed Effects	Yes	Yes	Yes	Yes
Observations	20,446	20,446	20,446	20,446
R-squared	0.035	0.036	0.036	0.036
GVC-Mix - GVC-Pure	0.12***	0.00	0.02	0.00

Table 10: Cross Country Differences

Panel A: Country Regions

The regressions are based on a sample of 20,446 enterprises. The specification is analogous to that of Panel A, except for the interaction terms. Europe comprises Belgium, Denmark, Finland, France, Germany, Ireland, Italy, Netherlands, Spain, Sweden and the United Kingdom. East Asia comprises of China, Hong Kong, Japan, Malaysia, Singapore and South Korea. Rest of World comprises of Australia, Brazil, Canada, India, Israel and New Zealand.

Dependent Variable:	First Round Investment	First Round PVC Investment	EXIT	EXIT
GVC-Mix x US	0.613***	0.013	0.025***	-0.005
	(0.024)	(0.021)	(0.003)	(0.003)
GVC-Pure x US	-1.188***		-0.050***	-0.011***
	(0.019)		(0.003)	(0.003)
GVC-Mix x Europe	0.701***	0.064	0.036*	0.004
	(0.100)	(0.094)	(0.020)	(0.021)
GVC-Pure x Europe	-0.753***		0.011	0.034*
	(0.146)		(0.021)	(0.017)
GVC-Mix x East Asia	0.679***	0.104	0.101**	0.066
	(0.102)	(0.116)	(0.044)	(0.045)
GVC-Pure x East Asia	-0.475**		-0.007	0.009
	(0.207)		(0.013)	(0.007)
GVC-Mix x Rest of World	0.359*	-0.254	0.021	-0.001
	(0.195)	(0.183)	(0.031)	(0.037)
GVC-Pure x Rest of World	-0.576***		-0.049***	-0.031*
	(0.198)		(0.014)	(0.015)
First Round Investment				0.029***
				(0.003)
Number of Investors				0.008***
				(0.003)
Year, Country, Industry Fixed Effects	Yes	Yes	Yes	Yes
Observations	20,446	20,446	20,446	20,446
R-squared	0.198	0.130	0.040	0.053

Table 10: Cross Country Differences (continued)

Panel B: Legal Regimes

The regressions are based on a sample of 20,446 enterprises. The dependent variables are First Round Investment, First Round PVC Investment and EXIT, an indicator that takes on value 1 if the enterprise went public or was acquired by a third party. All regressions use OLS. Common Law and Civil Law are indicator variables that show whether the enterprise operates in a common law or civil law commercial regime. Robust and clustered standard errors at the enterprise's country level are reported in parentheses, where ***, **, and * denote significance at the 1%, 5%, and 10% levels (two-sided), respectively. The last two rows show the differences between the "GVC-Mix x Common Law" and "GVC-Mix x Civil Law" coefficients, and between the "GVC-Pure x Common Law" and "GVC-Pure x Civil Law" coefficients.

Dependent Variable:	First Round Investment	First Round PVC Investment	EXIT	EXIT
GVC-Mix x Common Law	0.557***	-0.037	0.026***	-0.002
	(0.040)	(0.043)	(0.006)	(0.007)
GVC-Mix x Civil Law	0.719***	0.075	0.071**	0.036
	(0.086)	(0.098)	(0.032)	(0.033)
GVC-Pure x Common Law	-0.963***	-15.182***	-0.047***	-0.016**
	(0.133)	(0.143)	(0.006)	(0.007)
GVC-Pure x Civil Law	-0.561***	-14.308***	0.006	0.024**
	(0.156)	(0.295)	(0.011)	(0.010)
First Round Investment				0.029***
				(0.003)
Number of Investors				0.009***
				(0.003)
Year, Country, Industry Fixed Effects	Yes	Yes	Yes	Yes
Observations	20,446	20,446	20,446	20,446
R-squared	0.196	0.940	0.040	0.052
GVC-Mix-Com. – GVC-Mix-Civ.	-0.16*	-0.11	-0.05	-0.04
GVC-Pure-Com. – GVC-Pure-Civ.	-0.40*	-0.87**	-0.05***	-0.04***

Table 11: Stage of Development

Panel A: Venture Capital Development

The regressions are based on a sample of 20,446 enterprises. The dependent variables are First Round Investment, First Round PVC Investment and EXIT, an indicator that takes on value 1 if the enterprise went public or was acquired by a third party. All regressions use OLS. VC-Development is measured by the total amount of VC investments received by enterprises in a country, divided by the country's GDP. Robust and clustered standard errors at the enterprise's country level are reported in parentheses, where ***, **, and * denote significance at the 1%, 5%, and 10% levels (two-sided), respectively.

Dependent Variable:	First Round Investment	First Round PVC Investment	EXIT	EXIT
GVC-Mix	0.618***	-0.007	0.039	0.008
	(0.076)	(0.092)	(0.024)	(0.026)
GVC-Pure	-0.599***	-14.33***	-0.001	0.018
	(0.159)	(0.232)	(0.016)	(0.013)
GVC-Mix x VC-Development	-2.383	3.027	0.913	1.222
	(23.74)	(27.33)	(9.351)	(9.220)
GVC-Pure x VC-Development	-95.97**	-241.5***	-12.39**	-8.985*
	(44.57)	(73.80)	(5.458)	(4.597)
VC-Development	44.36	52.25	-0.625	-2.119
	(74.58)	(59.08)	(12.82)	(11.17)
First Round Investment				0.029***
				(0.003)
Number of Investors				0.009***
				(0.003)
Year, Country, Industry Fixed Effects	Yes	Yes	Yes	Yes
Observations	20,446	20,446	20,446	20,446
R-squared	0.196	0.940	0.039	0.052

Table 11: Cross Country Differences (continued)

Panel B: Innovativeness

The regressions are based on a sample of 20,446 enterprises. The dependent variables are First Round Investment, First Round PVC Investment and EXIT, an indicator that takes on value 1 if the enterprise went public or was acquired by a third party. All regressions use OLS. Innovativeness is measured by the total number of patent applications, divided by the country's GDP. Robust and clustered standard errors at the enterprise's country level are reported in parentheses, where ***, **, and * denote significance at the 1%, 5%, and 10% levels (two-sided), respectively.

Dependent Variable:	First Round Investment	First Round PVC Investment	EXIT	EXIT
GVC-Mix	0.588***	-0.020	0.013	-0.016
	(0.041)	(0.043)	(0.010)	(0.010)
GVC-Pure	-0.923***	-15.15***	-0.030***	-0.000
	(0.154)	(0.194)	(0.010)	(0.008)
GVC-Mix x Innovativeness	1.350**	0.934	1.098***	1.033***
	(0.594)	(1.258)	(0.316)	(0.337)
GVC-Pure x Innovativeness	4.781***	10.44***	0.268**	0.113
	(1.455)	(1.691)	(0.105)	(0.080)
Innovativeness	22.17	11.32	0.541	-0.083
	(18.13)	(13.91)	(3.215)	(2.743)
First Round Investment				0.029***
				(0.003)
Number of Investors				0.009***
				(0.003)
Year, Country, Industry Fixed Effects	Yes	Yes	Yes	Yes
Observations	20,446	20,446	20,446	20,446
R-squared	0.199	0.940	0.039	0.052

Table 12: Government Owned vs. Government Supported GVCs

The regressions are based on a sample of 20,446 enterprises. The dependent variables of Columns (1) and (2) are the log of total financing received by the enterprise and the log of total PVC financing received by the enterprise. Columns (3) and (4) have EXIT as the dependent variable. All regressions use OLS. GOVC-Mix and GSVC-Mix are interactions between type of GVC, GOVC or GSVC, and GVC-Mix. GOVC-Pure and GSVC-Pure are interactions between type of GVC, GOVC or GSVC, and GVC-pure. Robust and clustered standard errors at the enterprise's country level are reported in parentheses, where ***, **, and * denote significance at the 1%, 5%, and 10% levels (two-sided), respectively. The final two rows show the differences between GOVC and GSVC coefficients.

Dependent Variables:	First Round Investment	First Round PVC Investment	EXIT	EXIT
GOVC-Mix	0.334*	-0.298*	-0.006	-0.029
	(0.169)	(0.146)	(0.022)	(0.021)
GSVC-Mix	0.649***	0.058*	0.047***	0.016
	(0.031)	(0.032)	(0.015)	(0.013)
GOVC-Pure	-1.509***		-0.037	0.009
	(0.406)		(0.026)	(0.024)
GSVC-Pure	-0.624***		-0.021**	0.000
	(0.107)		(0.008)	(0.007)
First Round Investment				0.029***
				(0.003)
Number of Investors				0.009***
				(0.003)
Year, Country, Industry Fixed Effects	YES	YES	YES	YES
Observations	20,446	17,465	20,446	20,446
R-squared	0.201	0.130	0.039	0.052
GOVC-GSVC (Mix)	-0.315*	-0.356**	-0.053***	-0.045**
GOVC-GSVC (Pure)	-0.885**		-0.016	0.009

Appendix 1: List of Variables

Variables Defined at the Enterprise Level

Variable Name	Definition
GVC-Mix	Indicator variable equal to 1 if an enterprise received some but not all of its first round investment from a GVC investor.
GVC-Pure	Indicator variable equal to 1 if an enterprise received all of its first round investment from a GVC investor.
GOVC-Mix	Indicator variable equal to 1 if an enterprise received some but not all of its first round investment from a GVC investor, and some or all GVC investors were fully government owned.
GOVC-Pure	Indicator variable equal to 1 if an enterprise received all of its first round investment from a GVC investor, and some or all GVC investors were fully government owned.
GSVC-Mix	Indicator variable equal to 1 if an enterprise received some but not all of its first round investment from a GVC investor, and none of the GVC investors were fully government owned.
GOVC-Mix	Indicator variable equal to 1 if an enterprise received all of its first round investment from a GVC investor, and none of the GVC investors were fully government owned.
Total Investment*	The natural logarithm of one plus the amount of investment raised by the enterprise across all financing rounds denoted in 2008 US$.
First Round Investment*	The natural logarithm of one plus the amount of investment raised by the enterprise in the first financing round denoted in 2008 US$.
Number of Investors	Number of VC investors that invested in the enterprise in first round of financing.
Total PVC Investment*	The natural logarithm of one plus the amount of investment raised by the enterprise from PVCs, across all financing rounds denoted in 2008 US$.
First Round PVC Investment*	The natural logarithm of one plus the amount of investment raised by the enterprise from PVCs, in the first financing round denoted in 2008 US$.
Number of PVC Investors	Number of PVC investors that invested in the enterprise in first round of financing.
EXIT	Indicator variable equal to 1 if the enterprise provides a successful exit for its investors through an IPO or acquisition. Exit is set to 0 if the exit value is known to lie below the total amount of investments received by the enterprise.

Appendix 1: List of Variables (cont.)

Variables Defined at the Market Level

Variable Name	Definition
Definition of Market	Each market consists of a unique combination of country, industry and year.
Number of Enterprises	The natural logarithm of one plus the number of enterprises raising their first round of financing in a given market.
Average Investment*	The natural logarithm of one plus the average amount raised in their first round of financing by enterprises in a given market.
Average Number of Investors	Average number of investors in first financing round by enterprises in a given market.
Aggregate GVC (PVC) Investment*	The natural logarithm of one plus the sum of the amounts raised from (PVC) GVC investors in their first round of financing by all enterprises in a given market.
Number of PVC Enterprises	The natural logarithm of one plus the number of enterprises raising their first round of financing from PVC investors in a given market.
Average PVC Investment*	The natural logarithm of one plus the average amount raised from PVC investors in their first round of financing by PVC-backed enterprises in a given market.
Average Number of PVC Investors	Average number of PVC investors in first financing round by PVC-backed enterprises in a given market.

* Note that in Table 2 all investments are reported in millions of 2008 US$. In all other tables, investment variables are transformed using one plus the natural logarithm of the investment amount, denoted in 2008 US$.