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Public economics *gone wild*: Lessons from venture capital[☆]

Douglas Cumming

York University – Schulich School of Business, 4700 Keele Street, Toronto, Ontario M3J 1P3, Canada

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ABSTRACT

A recent article in the Journal of Public Economics has asserted, among other things, that government venture capital funds in Europe have crowded out private venture capital. I explain that the findings in that paper are based on empirical measures that are completely flawed. Moreover, I show with data spanning 13 countries and the years 1989–2011 that government venture capital funds in Europe have not crowded out private venture capital investment. Finally, I draw implications for studying venture capital and public policy for other countries such as India and China.

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1. Introduction

Venture capital (VC) has faced rough times since the collapse of the Internet bubble in April 2000. Pitchbook, for instance, reports that VC investment returns in the past decade have been on average negative in the US.¹ The financial crisis that started in August 2007 has made matters even worse, leaving many venture capitalists (VCs) in difficult times for fundraising, and entrepreneurs in difficult times for raising capital. At the same time, however, it is widely known that VC is the 'money of invention' and significantly helps high-tech start-ups grow and innovate (Gompers & Lerner, 1999; Groh & von Liechtenstein, 2011; Groh, von Liechtenstein, & Lieser, 2010; Keuschnigg, 2004; Klonowski, 2012; Li, Tan, Wilson, & Wu, 2013; Nahata, 2008; Nahata, Hazaruka, & Tandon, in press; Xue & Klein, 2010). Therefore, an empirical assessment of the impact of public policy on VC markets seems more important now than it ever has been in the past.

Recent work on the topic of public policy towards VC is in a complete state of confusion and has given rise to incorrect policy prescriptions. Much of this confusion originates from work published in the Journal of

Public Economics (Da Rin et al., 2006). Da Rin et al. find evidence of government funds crowding out private investment in Europe, and this apparent finding has been referenced as an authoritative source by Lerner (2009). The policy lesson from Lerner (2009) and Da Rin et al. (2006) is that there has been too much government investment in Europe.

Unfortunately, this policy conclusion of too much government investment in Europe is completely unsupported by the data, since the empirical methods used by Da Rin et al. are completely incorrect. Put succinctly, Da Rin et al. run regressions that explain ratios of early to late stage VC and high-tech to non-high-tech VC.² As I have commented elsewhere (Cumming, 2011a, 2011b), these ratios give rise to completely bizarre country rankings where the best countries include countries such as Ireland, Austria and Portugal, while the worst country in Europe is the United Kingdom (and based on OECD data presented in Cumming, 2011a, the UK likewise has the worst venture capital market in the world by the same measure). I explain in this paper that country rankings are completely reversed by benchmarking early stage VC by GDP or population. Moreover, I explain in this paper that regression results are completely reversed as well. I provide summary statistics and regression analyses herein to illustrate these facts with data spanning 1989–2011.

Section 2 of this paper provides a discussion of the literature and institutional context in which to understand venture capital and public policy in different countries around the world. Section 3 introduces an updated dataset that enables a clear look at the different ways to benchmark VC across countries. As well, section 3 provides some parsimonious

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E-mail address: dcumming@schulich.yorku.ca.

URL: <http://ssrn.com/author=75390>.

¹ <http://www.pitchbook.com>

² In this paper, for succinctness, I focus on early stage/late stage investment. Inferences based on high-tech/non-high-tech investment are not materially different.

Table 1
Variable definitions and summary statistics.
This table defines the variables, lists data sources, and provides summary statistics for all of the variables used in the regressions presented in Table 2. Additional details on calculations are provided in Appendix 2.

| Variable | Definition and source | Mean | Median | Std. dev. | Min. | Max. |
|---------------------------------------|---|----------|----------|-----------|-----------|----------|
| Early stage VC ratio in amounts | Amounts of early stage VC/total PE. "PE" includes early stage VC. Source: European Venture Capital Association (EVCA). | 0.539 | 0.556 | 0.313 | 0.016 | 2.108 |
| Early stage VC ratio in numbers | Numbers of early stage VC investment/total numbers of PE investment. Source: European Venture Capital Association (EVCA). | 0.793 | 0.824 | 0.163 | 0.040 | 1.421 |
| Early stage VC/GDP in amounts | Amounts of private early stage VC (in 1000 s)/GDP. Source: European Venture Capital Association (EVCA). | 5.05E-07 | 2.90E-07 | 6.48E-07 | -8.21E-08 | 4.47E-06 |
| Early stage VC/GDP in numbers | Numbers of private early stage VC investment/GDP. Source: European Venture Capital Association (EVCA). | 4.95E-10 | 3.42E-10 | 4.94E-10 | -1.25E-10 | 2.71E-09 |
| Early stage VC/population in amounts | Amounts of private early stage VC (in 1000 s)/population. Source: European Venture Capital Association (EVCA). | 0.016 | 0.010 | 0.020 | -0.003 | 0.156 |
| Early stage VC/population in numbers | Numbers of private sector early stage VC investment/population. Source: European Venture Capital Association (EVCA). | 1.51E-05 | 1.05E-05 | 1.43E-05 | -8.64E-06 | 7.06E-05 |
| Public sector VC numbers/GDP | Amounts of public sector VC (in 1000 s)/GDP. Source: European Venture Capital Association (EVCA). | 7.15E-08 | 1.55E-08 | 1.48E-07 | 0 | 1.30E-06 |
| Public sector VC numbers/population | Numbers of of public sector VC investment/population. Source: European Venture Capital Association (EVCA). | 3.65E-06 | 1.21E-06 | 6.34E-06 | 0 | 5.68E-05 |
| MSCI Return | Country-specific MSCI stock index return. Source: http://www.msci.com/ | 0.082 | 0.091 | 0.290 | -0.727 | 1.507 |
| Income, profits and capital gains tax | Taxes on income, profits, and capital gains are levied on the actual or presumptive net income of individuals, on the profits of corporations and enterprises, and on capital gains, whether realized or not, on land, securities, and other assets. Intragovernmental payments are eliminated in consolidation. Source: World Bank | 45.435 | 46.182 | 9.755 | 14.108 | 68.701 |
| Market capitalization/GDP | Stock market capitalization as a percentage of GDP. Source: World Bank | 59.772 | 50.443 | 41.348 | 4.471 | 268.110 |
| Market capitalization/population | Stock market capitalization per population. Source: World Bank | 1790854 | 1347314 | 1483031 | 71559.67 | 6980283 |

regressions that highlight how policy lessons are completely changed by the use of improper dependent variables. Section 4 considers implications for studying other venture capital markets such as India and China. Section 5 thereafter summarizes the policy lessons the extent to which the public has been misinformed about the effect of public policy towards VC.

2. Prior literature: venture capital and public policy around the world

Public policy towards venture capital can come in a variety of forms (for theoretical work on topic, see Keuschnigg & Nielsen, 2001, 2003a, 2003b, 2004a, 2004b, 2004c). The coarsest categorization includes legislative options versus direct government expenditure programs (see Cumming & Johan, 2013, chapter 9). Legislative options pertinent to venture capital include but are not limited to securities laws, contract laws, bankruptcy laws, taxation, labor laws, and intellectual property laws. Direct government expenditure programs, by contrast, involve a governmental body directly allocating funds for investment, which can include investment through a government supported venture capital like schemes (such as the Business Development Bank of Canada and the Saskatchewan Government Growth Fund Management Corporation) or fund-of-funds (such as the Australian Innovation Investment Fund). In some cases policy options are mixed, such as the creation of venture capital funds that are publicly subsidized by taxation schemes (such as the venture capital trust (VCT) in the UK, and the labor sponsored venture capital corporation (LSVCC) in Canada).

Prior research is consistent with the view that legislative instruments can have a pronounced impact on venture capital markets. For example, fewer restrictions on trade positively impact cross-border venture capital flows in China (Wang & Wang, 2012). Markets with fewer labor restrictions positively impact venture capital markets in Europe (Bozkaya & Kerr, in press) and the U.S. (Cumming & Li, in press). Bankruptcy laws that are more entrepreneur-friendly positively enhance entrepreneurship, new firm formation, and venture capital markets in Europe (Armour & Cumming, 2006). Markets with low capital gains taxes positively impact venture capital markets in the United

States (Gompers & Lerner, 1999), Europe (Armour & Cumming, 2006), and the rest of the world (Jeng & Wells, 2000). Regulations that enhance or permit pension fund participation as limited partners in venture capital funds likewise stimulate venture capital markets in the U.S. (Poterba, 1989) and Europe (Cumming & Johan, 2007). Overall, there is little debate about the important role of legislative improvements in fostering more efficient venture capital markets.

The role of direct government expenditure programs, by contrast, has engendered substantial debate. On one hand, we may expect direct government expenditure programs to enhance venture capital markets. The reasons in support of this "crowding in" or value-adding prediction include the following (for an extended discussion, see, e.g., Cumming & Johan, 2013, Chapter 9). First, government programs fill a "capital gap" insofar as there is a market failure for entrepreneurial finance. Capital gaps arise because there are not enough investors with sufficient funds that are willing to meet the demands of entrepreneurs due to issues of illiquidity (private investments are not as liquid as investments in publicly traded companies), excess risk (small private companies have a much higher failure rate than large public companies), information asymmetries (there is little or no track record with start-ups, and no prospectus requirement, and as such it is harder for investors to assess entrepreneurial quality), and agency problems (entrepreneurs may deviate from their stated business plan and take other actions that are detrimental to their investors). Second, government programs fulfill a certification role to other private investors in the marketplace, whereby getting a government award provides a quality signal that encourages private investors to subsequently invest in the market.

On the other hand, there are reasons to support the contrasting "crowding out" hypothesis (Cumming & MacIntosh, 2006; Leleux & Surlmont, 2003). That is, governmental investment may displace private investment for the following reasons. If government investors compete with private investors for the same investment, then government investors bid up deal prices and lower returns. Government investors can typically outbid private venture capital investors, particularly as government investors do not have institutional investors to which they are accountable to for generating high returns. The presence of government investors thereby discourages the presence of private

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