IFN Working Paper No. 1104, 2016

Stock Option Taxation and Venture Capital Activity: A Cross-Country Study

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November 9, 2017

Abstract: The VC sector is interesting both in its own right and as a proxy for entrepreneurial finance in a broader sense. We highlight the tax treatment of stock options as an important factor for variations in the size of the VC sector. VC often relies on complex mechanisms and option-based contracts to mitigate incentive problems. Granting stock options to founders and key employees also allows credit-constrained start-ups to attract and retain top talent. This type of compensation cannot be unambiguously classified as either capital or labor income. Some tax systems treat stock options in VC-funded firms as employee compensation, which is subject to payroll taxes with high progressive rates, whereas others treat them as capital gains with low flat tax rates. The effective rate depends on tax practices and is not readily indicated by statutory taxes.

The tax consultancy firm PwC calculated the effective tax rate for a standardized entrepreneurial case in 22 countries, which is supplemented with our own calculations for 16 additional countries. In this sample of 38 countries, we find a negative cross-country relationship between the effective tax rate on employee stock options and the rate of VC activity. This negative effect is stronger for countries with high R&D investments and weaker in countries with low R&D spending.

Keywords: Business taxation; Corporate governance; Entrepreneurship; Innovation; Institutions; Tax policy; Venture capital.

JEL *Codes*: L26 Entrepreneurship; H25 Business Taxes and Subsidies; H3 Fiscal Policies and Behavior of Economic Agents; K34 Tax law.

[‡] This paper builds on work that originally included Ola Bengtsson as a co-author. Ola unexpectedly and tragically passed away in January 2014, at the age of 38, during treatment for leukemia. His friendship, kindness and talent are deeply missed. We are grateful to Fredrik Andersson, Steven Kaplan and David Schizer for their useful comments and suggestions. Financial support from Karl-Adam Bonniers Stiftelse, the Marianne and Marcus Wallenberg Foundation, and the Jan Wallander and Tom Hedelius Foundation is gratefully acknowledged.

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1. Introduction

The first independent venture capital (VC) firms were born in the United States in 1946 to finance emerging technology firms (Gompers and Lerner 2001; Hsu and Kenney 2005). The concept was copied and further developed by other firms so that by the 1970s, VC constituted an entire industry in the United States. This financial innovation has since grown rapidly in scale and spread across the globe, effectively transforming the realm of entrepreneurship. Currently, there is VC activity in all industrialized and most developing countries; however, substantial cross-country differences in its magnitude continue to exist. VC is contractually complex, and an influential area of research has shown how it can be explained by economic theory. The growth of VC, in part, represents the development of contractual mechanisms to mitigate transaction costs in an environment with many incentive problems and information asymmetries pertaining to transactions with multiple agents.

A large body of literature has investigated the various causes of these cross-country variations (e.g., Gompers and Lerner 1998; Leleux and Surlemont 2003; Cumming, Schmidt and Walz 2010; Cherif and Gazdar 2011; Félix, Pires and Gulamhussen 2013; Li and Zahra 2012; Nahata, Hazarika and Tandon 2014). VC is a sophisticated activity that tends to flourish only under certain economic conditions and requires well-functioning financial development, investor protection, and contract enforcement.

Like virtually all economic activities, the extent of VC investment is affected by taxes. Several papers have shown that broad tax rates influence VC investments, both over time and across countries (e.g., Poterba 1989; Jeng and Wells 2000; Da Rin, Nicodano and Sembenelli 2006; Groh and Wallmeroth 2016). This paper discusses a more specific effect of taxes and its interaction with VC contracting, namely, the *de facto* tax treatment of stock options. The tax rate that effectively determines the relative return on VC activity is rarely the formal statutory capital tax rate—a noisy measure that tends to be far different from the one actually paid by entrepreneurs and investors. VC involves both financial capital in the form of funds and human capital in the form of founders and skilled personnel. This activity does not fit the stylized separation between capital and labor—it involves both in an inseparable bundle.

The tax rates and practices play a significant role vis-à-vis the return on investment. In many countries, there are considerable differences in how different types of income are taxed. In addition to large differences in tax rates across countries, there is also an often-neglected difference regarding how different types of income are taxed. Moreover, to be accurate, an

evaluation of the tax treatment and its effects requires the simultaneous consideration of both personal and corporate taxes.

One form of compensation that is often used in VC deals is employee stock options. In this paper, "employee" refers both to founders and key personnel, disregarding the semantic question regarding whether founders may be referred to as employees. An employee stock option grants the right to buy stock at a set price in the future, often subject to conditions such as continued employment and performance milestones. For incentive reasons, this form of compensation is believed to be particularly suited for VC deals.[1] However, it is not conceptually obvious how options-based compensation should be taxed and whether the returns on stock options should be viewed as returns on either capital or labor. Unsurprisingly, there are therefore large cross-country differences in the tax treatment of stock options—both because tax rates differ and because tax authorities treat this form of compensation differently. Some tax systems allow firms to treat stock options granted to employees as a tax-deductible business cost, some tax employee stock options when they are granted, whereas others defer taxation until the time when the option is exercised or when the underlying stock is eventually sold for a profit.

Differences in tax rates and tax practices are sufficiently large to potentially account for cross-country variations in VC activity. This paper analyzes the relationship between VC investments, as a share of GDP, and option taxes. This outcome variable is interesting for two reasons: First, VC activity is an important sector that public policy tries to stimulate, and it is believed to be an important driver of entrepreneurial activity.[2] Second, VC activity has the advantage of being readily standardized across countries and over time. Employee stock options not only affect VC-financed firms but also are likely to affect other start-ups that use state-contingent contracts. To a lesser extent, tax-favored employee stock options stimulate returns on all types of start-up activity for which it is important to attract talent in the form of founders and key personnel. If option tax rates can be convincingly shown to correlate with VC, the argument can be plausibly made that such a relation is also applicable to other similar forms of finance. The argument about favorable tax treatment is not limited to stock options but applies to a broader range of state-contingent contracts. Therefore, we use VC both as an

[1] Employee stock options are also granted in traditional firms and have a multitude of functions (Oyer and Schaefer 2011).

[2] VC is far from the only source of entrepreneurial finance. Start-ups and expansion are also financed in a multitude of other ways, including the founder's own funds, debt, angel investments, and new types of financing, such as crowdfunding (Robb and Robinson 2014; Harrison 2017; Estrin et al. 2017). Entrepreneurs often raise funds from several different sources and different types of finance can complement each other.

outcome variable, which is interesting in itself, and as a proxy for entrepreneurial finance in a broader sense. This paper focuses on stock options and VC activity, neither because stock options are the only form of contingency-based compensation, nor that VC is the only form of entrepreneurial finance where taxes are likely to matter, but because they can be defined and measured in a reasonably systematic manner across countries.

We study the relationship between taxes on employee stock options and VC activity in 38 countries. Since the effective tax rate of stock option contracts is a matter of tax practice, the tax burden is not immediately apparent through comparisons of statutory tax rates. Furthermore, when there is flexibility in designing compensation contracts, entrepreneurs and investors are likely to optimize and choose the structure with the lowest tax rate in each country. We therefore estimate the effective tax rate based on a standardized case of a successful entrepreneurial start-up using stock option contracts. The results from using these tax rates are compared to results based on tax rates customarily used in the literature, namely, the integrated statutory capital income tax rate, which is defined as a combination of the corporate capital income tax rate and the capital gains tax rate. Our study covers 38 developed countries and finds a negative cross-country correlation between the effective tax rate on employee stock options and the rate of VC activity. No such effect is found for the integrated statutory capital income tax rate.

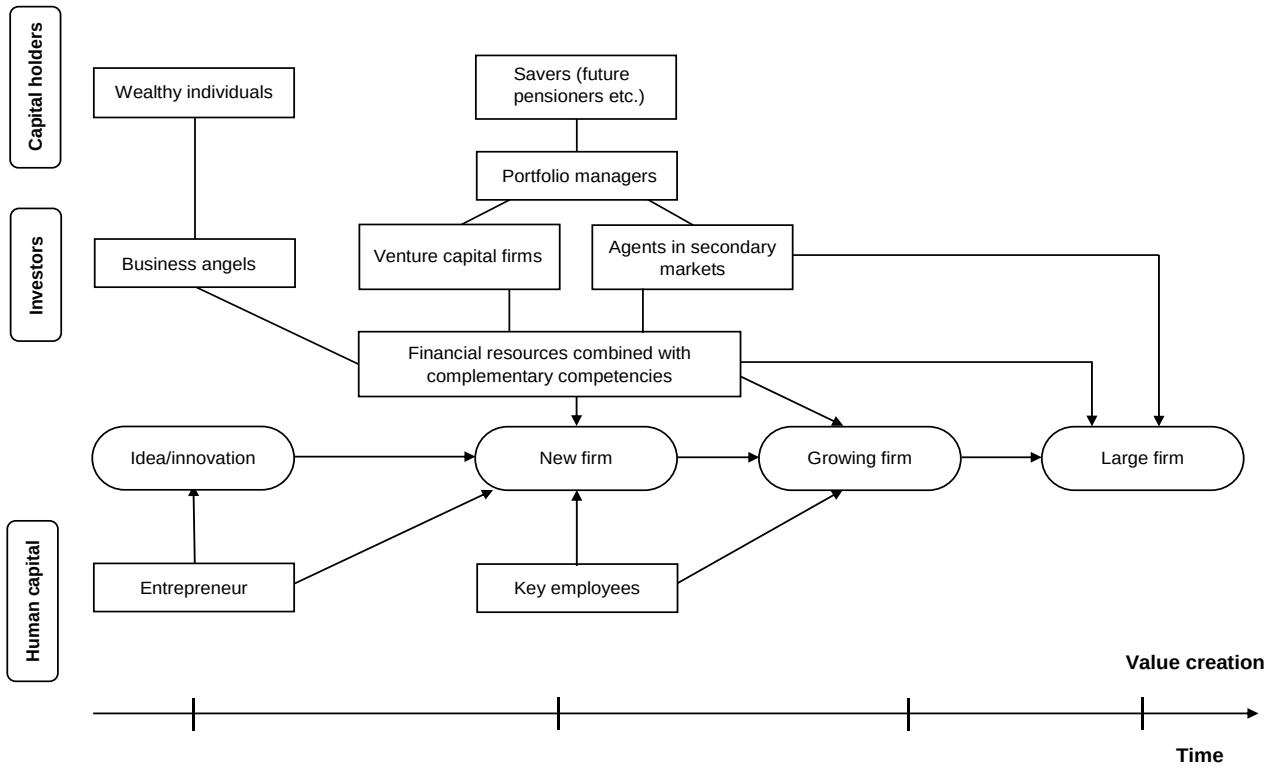
The remainder of this paper is structured as follows. Section 2 discusses innovative entrepreneurship, its need for external equity financing, and the incentive problems and information asymmetries arising in a context of transactions with multiple agents financing high-growth, high-risk firms. Section 3 briefly outlines the evolution of the use of stock options. Section 4 explains why and how the efficiency of stock options is greatly affected by how they are taxed. Section 5 presents the effective tax rate of 38 countries for a stylized VC-funded entrepreneurial firm that uses employee stock options to compensate founders, hired CEOs, and other key personnel. Section 6 presents the regression results. Finally, section 7 summarizes and concludes.

2. Innovative entrepreneurship, external equity financing and compensation contracts

Achieving success in innovative entrepreneurship is lucrative but also difficult and rare.[3] Contrary to the perception of solitary actors starting firms on their own, successful entrepreneurial firms tend to be collaborative efforts with other key actors, notably, active venture capitalists (business angels and/or VC firms), investors, key employees and customers. Innovative firms must overcome technological complexities, uncertainty, high initial investment costs and fierce competition from incumbent firms. Therefore, entrepreneurial firms tend to require resources from a support structure of financial and human capital, which can be seen as a contractual nexus (Coase 1937; Jensen and Meckling 1976).

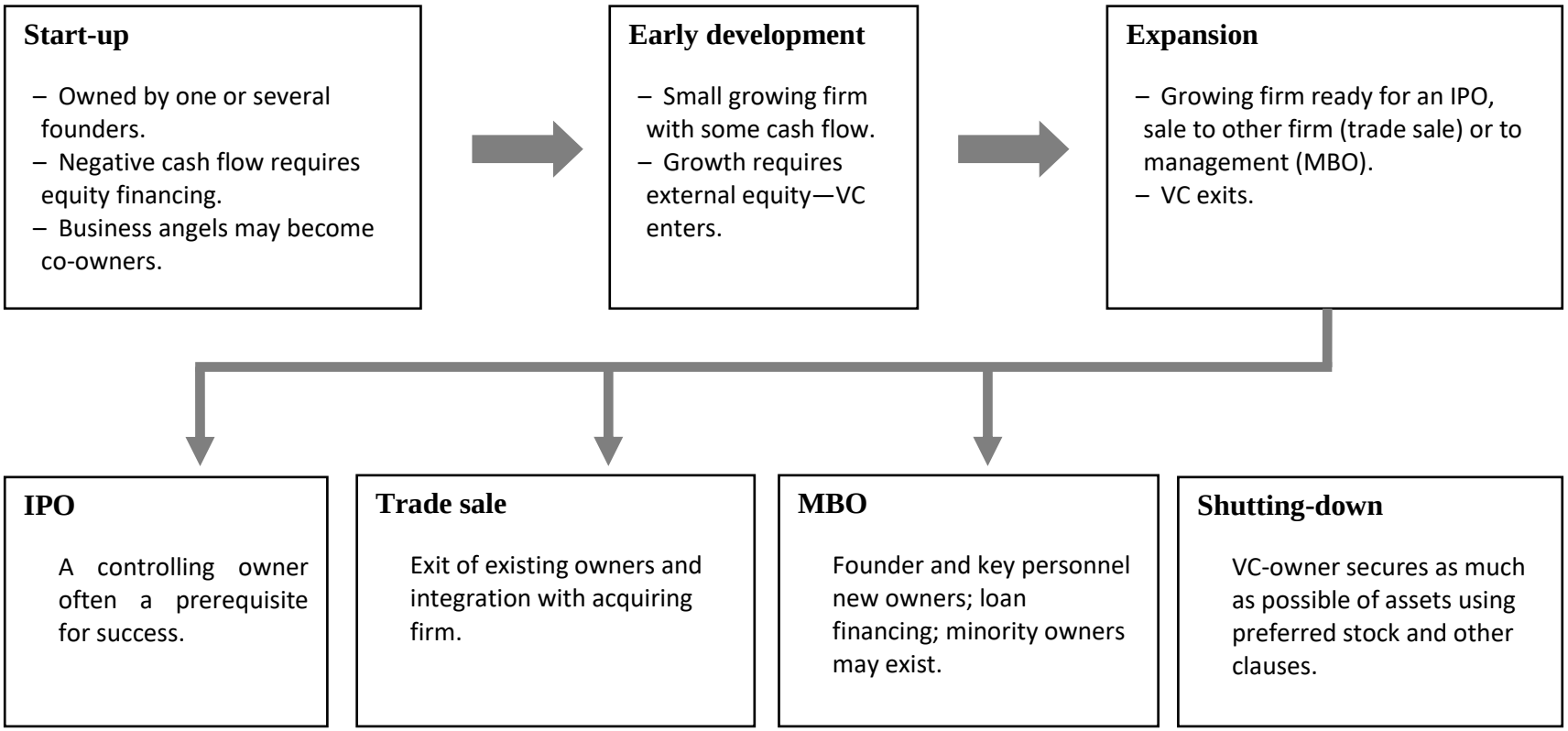
Figure 1 illustrates the complexity of the many relations of the agents in this support structure and their respective resource contributions to transform an innovation or a new venture idea into a growing and eventually large firm, while *Figure 2* more concretely describes the phases in the evolution of an entrepreneurial start-up (see, e.g., Fenn, Liang and Prowse 1995; Gompers and Lerner 2001).

Figure 1 Actors in the value creation from original idea to large-scale production.



[3] Hall and Woodward (2010) report that 75 percent of the VC-funded entrepreneurial ventures produced no profit for the founder and only ten percent led to sizable profits.

Figure 2 Central phases in the evolution of a firm.



Source: Henrekson and Sanandaji (2016).

Venture capitalists offer funds but also contribute key competencies such as business networks, management expertise, and market knowledge. Capital holders (private individuals and/or portfolio managers) provide the funds managed by venture capitalists as well as larger injections for later stage expansion and IPOs for firms that achieve substantial growth. Start-ups with potentially valuable ideas increase their chances of success by the early recruitment of highly skilled staff in R&D, management and sales.

An investment is relation-specific such that the value of equity would drop significantly if the founders were replaced or decided to leave (Caballero 2007). In addition, the founders and key personnel must make relation-specific human capital investments. The high degree of uncertainty and asset specificity make it both necessary and costly to formulate explicit contracts that give parties the right incentives in all contingencies.

In each phase, there are typical problems that must be addressed. A start-up does not have historical data to provide a basis for calculating the expected risk–return relationship. While mature firms can bear the cash flow risk at a relatively low cost by virtue of dispersed ownership and a lower variance in their cash flow, an entrepreneurial firm typically lacks the necessary capital to fully compensate its employees solely using cash payments.

Contracts must be designed to address adverse selection, moral hazard and high monitoring costs in an environment with high levels of uncertainty and ambiguity regarding future outcomes (Repullo and Suarez 2004). State-contingent contracts for various circumstances have evolved to mitigate agency problems and align the interests of the various agents in *Figure 1*. Kaplan and Strömberg (2003) show that contracts separately allocate control rights, such as cash flow rights, board rights, voting rights, and liquidation rights. VC contracts use tools such as contingencies, covenants, milestones, and restricted property, rules such as vesting, to deal with diverse agency problems (Bengtsson 2011).

A compensation contract must meet several requirements. First, it must ensure that the founder or employee receives sufficient compensation to make employment in the entrepreneurial firm attractive. Potential employees must be compensated for the unusually high risk of failure among entrepreneurial firms. Second, the contract must induce effort. Third, the compensation contract must allocate risk optimally across employees and between employees and investors.

A typical investor in an entrepreneurial firm is not willing to bear all such risks and uncertainties unless he or she receives adequate compensation. In practice, high-risk

compensation to the investor means that the founder must sell the firm to the investor at a cheap price, which lowers and may even eliminate the incentive to start the firm in the first place (Norbäck, Persson and Tåg 2013). Therefore, external investors are dependent on the knowledge and sustained effort of founders and other key employees to develop the start-up and increase the likelihood of success to a level that makes the investment worthwhile. This dependency necessitates offering remuneration schemes that closely mimic direct ownership. Stock options represent an efficient means in this respect.

Stock options are the equivalent of promises of future ownership stakes in the firm, which will be realized if the firm develops according to plan and manages to achieve the prescribed objectives for value creation. The granting of stock options can be substituted for high wages to moderate costs at the beginning of the lifecycle (Gompers and Lerner 2001; Bengtsson and Hand 2013). Stock options can thus be used to encourage and reward individuals who provide key competencies to a firm. When this becomes possible, capital holders and the investors who act on their behalf (see *Figure 1*) are more inclined to provide equity to the start-up sector.

At first, external equity may be provided by close family and friends, as well as business angels. In the latter case, moral hazard is reduced by screening and closely monitoring the firm's progress. However, a progressively larger share of savings is channeled into pension funds. This trend began more than half a century ago in the United States, and it has now become a defining feature of financial saving in virtually all developed countries.[4] At least a portion of these assets need to be channeled into entrepreneurial firms rather than being invested only in real estate, public firms and high-rated bonds. Since large financial institutions can rarely invest directly in small and new firms, someone must assume a bridging and intermediating role. This need led to the development of the professional VC sector.

3. The evolution of the use of stock options

The VC sector rapidly expanded in the United States during the 1970s and 1980s. Stock options quickly became an essential ingredient in the contractual toolbox of VC firms. Bengtsson and Hand (2011; 2013) find that three quarters of U.S. VC-backed firms grant stock options to their employees and that equity is a common form of compensation for the CEOs of entrepreneurial firms. CEOs hold an average of 9 percent of equity, mostly in the

[4] More than 40 years ago, Drucker (1976) argued that the growth of pension funds would have far-reaching consequences for the governance of U.S. corporations. See Ebbinghaus (2011) regarding the trend away from pay-as-you-go systems toward the privatization of pension systems in Europe.

form of unexercised stock options. Founder employees receive larger equity compensation but receive less cash pay than employees who are hired later, which indicates that employee stock options are often used by entrepreneurial firms in the start-up phase. Hand (2008) reports that 89 percent of the employees of VC-backed firms hold stock options.

Another striking commonality of American VC investments is that venture capitalists make their investments through convertible preferred stock. Gilson and Schizer (2003) and Kaplan and Strömberg (2003) find that over 90 percent of American VC contracts used convertible preferred equity in most financing rounds as the only source of finance, which results in more favorable tax treatment for the stock option gains of employees and secures priority in case of poor employee performance (Gilson and Schizer 2003).

The United States has the world's oldest and largest VC sector, which accounts for roughly half of the world's VC investments (Lerner and Tåg 2013); however, the VC sector has failed to grow commensurately in other countries—notably in Europe, despite its skilled workforce and high level of technology. Moreover, stock options are far less common in the European VC sector (Hege, Palomino and Schwienbacher 2003).

The influential study by Kaplan, Martel and Strömberg (2007) investigated the extent to which the structure of VC contracts outside the United States resembles U.S. ones by comparing the structure of VC contracts across 24 countries between 1992–2001. One of the factors studied is taxes, which are estimated for 19 countries depending on the specific rules rather than the common method of using the statutory capital income tax rate. They find only weak and often non-significant effects of option taxes—although unlike our study the outcome variable is the structural mix of VC contracts rather than the amount of VC activity. Investigating the type of contracts used in VC investments that take place answer a different question than our study, since investments that are not made due to high taxes are not observed. The effect of low option taxes through attracting more human capital to the VC sector is also not captured by studies of the contractual mix of deals.

Kaplan, Martel and Strömberg (2007) conclude that VC-financed ventures using U.S. style contracts are associated with a higher probability of survival, but that the low adaption is not mainly driven by policy differences but rather by the lack of experience. The paper argues that the older U.S. VC sector has learned the advantages of state-contingent contracts after experiencing economic downturns, and that VCs in other countries gradually evolve towards American-style contracts through a similar learning process.

There is no lack of studies trying to explain cross-country variations in VC activity, but the literature is fragmented, both in terms of methodology and focus (Terjesen, Hessels and Li 2016). A large number of explanatory variables that can be reasonably theoretically supported by different strands of economic research have been related to VC activity. These include institutional variables, such as property protection and legal origin; macroeconomic variables, such as GDP and interest rates; public policy variables, such as tax rates and regulatory burden; technological variables, such as R&D investment and the number of highly cited scientists; financial variables, such as equity market depth; and cultural variables, such as interpersonal trust.

For practical reasons (multicollinearity and few observations), papers tend to include only a few of these variables. The results are sensitive to the combination of the control variables used, and small countries with one or two large VC deals per year present an empirical problem. In addition, most countries lack comprehensive data for privately held firms (Cumming and Johan 2017). As a result, no consistent pattern emerges from the many cross-country studies to explain differences in VC activity. A more parsimonious and also more promising strategy to identify potential explanatory variables is identifying the crucial factors that enabled the rapid expansion of the U.S. VC sector in the early 1980s.

As we have seen, a thriving VC industry requires sophisticated mechanisms to provide high-powered incentives for both the key actors and final capital holders. The development of mechanisms for this purpose became possible in the U.S. after two key changes were made in the tax system: The capital gains tax was reduced to 20 percent in 1981, and in approximately 1980, legislation pertaining to stock options allowed tax liability to be deferred until the stocks were sold rather than when the options were exercised. In addition, legislation passed in 1978 allowed pension funds to invest in high-risk securities that were issued by small or new companies and VC funds, which greatly increased the potential supply of capital to the sector (Misher 1984; Fenn, Liang and Prowse 1995; Henrekson and Rosenberg 2001).

Within two years, the enormous financial resources channeled to pension funds became available for the start-up sector and the taxation of stock options and similar instruments that can be used to incentivize key actors became more advantageous. In the next section, we examine how and why the taxation of stock options affects their usefulness.

4. The taxation of stock options

The efficiency of stock options greatly depends on how they are taxed. Generally, stock options may be taxed on three occasions: (i) when they are received, (ii) when they are converted into shares or redeemed as shares, and (iii) when the underlying asset (i.e., the share) is sold.

If profits from stock options are taxed fully or partially as labor income, most of the incentive effect is lost—particularly when the marginal tax rate on labor income is high and when the firm (and/or the employee) is obliged to pay social security contributions on the profit.

An important advantage of stock options is that they allow for additional layers of state-contingent contracting or vesting. Time vesting prescribes that an individual loses all or part of the granted options if he or she leaves the firm. Performance-based vesting prescribes that the granted options are nullified if the firm does not meet one or several performance milestones, which has the benefit of linking an individual's compensation to both the attainment of a milestone and its value implications.

Clearly, any form of taxation of stock options that is due before the acquired shares are actually sold greatly reduces the attractiveness of this instrument for employees. The situation is reversed if the employee is able to defer all taxation until the underlying shares are sold. If obtaining or exercising stock options has no tax consequences and if the employee faces a low capital gains tax, then stock options can be used to create strong incentives for entrepreneurial effort. The key employees who drive the innovation and entrepreneurship processes in the firm can then receive a substantial part of the capital value created, even though they have not financially invested in the firm.

If the founder stays with the firm after the entry of external equity investors, it is normal to want to retain control over the firm until it goes public or is sold to another firm. If the tax code makes using stock options as an instrument impracticable, then external owners cannot simultaneously take control of the firm and retain the founder and other key employees when doing so is beneficial.

According to Gompers and Lerner (1998), lower capital gains taxes are likely to both increase commitments to VC funds and increase demand for funding from the founders or early employees of start-ups. Since VC is a cooperative activity that includes many parties, low taxes for investors benefit entrepreneurs by increasing the supply of capital, while low taxes on entrepreneurs' incomes benefit VCs by increasing the supply of potential new investments.

At the national level, VC activity is influenced by both the favorable tax treatment of employee stock options and carried interest securities used by the VC funds.[5]

In short, deferred taxation of capital gains on equity investments and stock options is beneficial and makes it possible for entrepreneurial firms to lower the transaction costs of the remaining support structure. Thus, the entrepreneurial support structure is less likely to succeed if taxes increase the cost of contracting with venture capitalists and key personnel (Keuschnigg and Nielsen 2004a, 2004b).

Based on the analysis thus far, we infer that favorable stock option taxation is a necessary, albeit insufficient, condition for the development of a large VC sector. Consequently, we hypothesize that differences in stock option taxation can effectively explain the observed cross-country variations in VC activity.

5. The effective tax rate on stock options in various countries

The statutory tax rate rarely reflects the true rate, since the actual effective rate depends on complex rules. Nor is there a single tax rate; the tax rate can differ substantially between different cases in the same country. To obtain a reasonably consistent and standardized estimate across countries, we constructed a stylized start-up scenario and commissioned the accounting firm PricewaterhouseCoopers (PwC) to compile the tax rate for employee stock options for a sample of countries for the year 2012. We relied on their tax experts in each country to estimate the effective stock option tax rate. It is essential to determine not only tax rates but also whether tax authorities treat employee stock options as investment or employment income. To approximate actual optimizing profit-maximizing behavior, we asked PwC to calculate the best-case tax rate when investors have discretion to lower tax rates by adjusting the structure of the investment within the limits determined by national law. Due to the high cost of calculating the effective tax rate for each individual country, we restricted the original sample to 22 countries. This original sample was used in Henrekson and Sanandaji (2017).

Here, we expand the sample with an additional 16 countries, thereby including the entire OECD as well as four non-OECD countries from the original sample—namely, China, Taiwan, Hong Kong, and Singapore. The tax rates of the expanded sample of 16 countries are

[5] A separate though related issue is the tax treatment of carried interest—a profit-sharing method used to compensate private equity managers and partners. The United States and some other countries treat carried interest as investment income and tax the returns at rates lower than employment income (Lee and McFarlane 2016).

not calculated by PwC but instead estimated by the authors. We relied on the OECD (2005), which estimates effective option tax rates for various scenarios in 2002; we updated the tax rules and tax rates to 2012 levels using the OECD tax database (OECD 2017) and public data from accounting firms. For Chile, Taiwan, Estonia, and Iceland, we relied on information obtained from Ernst & Young (2013). Calculating effective tax rates is complicated and sensitive to assumptions. In certain cases, the laws in some countries during certain periods (such as Chile in 2012) are ambiguous to the extent that even accounting firms cannot guarantee the correct tax rate, which depends on the judgement of the tax authorities. While we have attempted to be consistent and replicate the method set forth by PwC, the estimates of tax rates in the expanded sample are less reliable.

The effective tax rate is calculated for the following scenario: A firm is started in a home or in an incubator by a founder with negligible initial capital needs. After one year, additional expansion requires an equity infusion that the founder is unable to provide. A VC firm buys the entire firm, simultaneously giving the founder the option to buy back 25 percent of the firm after seven years. The options are priced as the nominal stock value of the firm that applies at year one, which is negligible. After three years, a CEO is hired. He or she is given the option to purchase 10 percent of the firm. At this time, the firm is valued at $5 million. After eight years, the firm is purchased for $20 million in a trade sale. Immediately before the sale, the stock options are exercised and the founder and CEO jointly possess 35 percent or $7 million worth of stock, which they sell to the purchasing firm.

The scenario is designed to calculate stock option taxes consistently and transparently. We make simplified assumptions, such as the VC firm buying the entire firm, to make it easier for the tax experts at PwC to disregard unimportant details in tax and accounting laws for the purpose of calculating tax rates. The goal is to use a stylized example based on assumptions that both capture the key differences in cross-country tax rates and considers the key incentive mechanisms affected by stock option contracts.

For some countries, alternative tax rates apply to this scenario, given that certain additional requirements were fulfilled. When these taxes are applicable, we rely on the best-case tax rate, which real-life firms are likely to take advantage of. *Table 1* reports the calculated tax rates as well as the integrated capital tax rate and two measures of the size of the VC sector. The tax rate is reported as a share of total compensation, and payroll taxes are assumed to fall on the recipient of the option.

In some countries, employee stock options are viewed as a form of labor income and are subject to high marginal income taxes as well as payroll taxes. However, other countries view them as a form of equity gain and levy only a low, flat capital gains tax. Labor income is often taxed at a progressive rate, which is highly disadvantageous for capital gains in entrepreneurial firms. Unlike ordinary income, the return on this income is skewed so that most firms do not make any profits, while most of the returns are generated by a small number of firms that generate very high returns for founders and key employees. Losses on failed ventures are seldom deductible, while the small number of successes face the highest marginal income tax rates as well as payroll taxes.

The tax rates on the options range from 72 percent in Italy—assuming that, if the gains are taxed as labor income, they are taxed at the highest marginal income rate and subject to payroll taxes—to 7 percent in Ireland, paid as investment income. The U.S. rate was only 15 percent in 2012, reflecting the long-term capital gains tax rate.[6]

We rely on VC investments from the *Thomson One Corporate Finance and Private Equity Database* (Thomson Reuters n.d.) for the sample of 38 countries.

[6] This rate has increased to 23.8 percent, as the long-term capital gains tax was increased to 20 percent and a net investment income tax on high income earners was introduced.

Table 1 Effective tax rates on stock options and the size of the VC sector in 38 countries.

Country	Option tax, %	Source	Integrated capital tax, %*	VC/GDP 2012, ‰	VC/GDP 2010–14, ‰
Australia	24.8	PwC	45.8	0.11	0.20
Austria	57.8	Own calc.	43.8	0.09	0.13
Belgium	60.0	Own calc.	34.0	0.31	0.30
Canada	31.9	PwC	42.8	1.12	0.95
Chile	53.5	Own calc.	33.6	0.03	0.03
China	45.0	PwC	25.0	0.49	0.98
Czech Republic	39.3	Own calc.	19.0	0.03	0.05
Denmark	55.3	PwC	56.5	0.78	0.54
Estonia	37.2	Own calc.	37.6	0.00	0.23
Finland	51.3	PwC	48.7	0.49	0.67
France	29.9	PwC	55.7	0.39	0.47
Germany	47.5	PwC	49.8	0.25	0.26
Greece	44.7	Own calc.	20.0	0.00	0.02
Hong Kong	15.0	PwC	16.5	0.10	0.46
Hungary	35.7	Own calc.	32.0	0.01	0.03
Iceland	40.1	Own calc.	36.0	0.00	0.05
Ireland	7.4	PwC	38.8	0.63	1.25
Israel	25.0	PwC	43.8	1.87	2.45
Italy	72.2	PwC	45.1	0.09	0.12
Japan	50.5	PwC	44.2	0.03	0.10
Korea	61.5	PwC	24.2	0.27	0.33
Luxembourg	47.7	Own calc.	28.8	0.18	0.45
Mexico	29.9	Own calc.	30.0	0.01	0.05
Netherlands	25.0	PwC	25.0	0.30	0.52
New Zealand	51.8	Own calc.	28.0	0.48	0.33
Norway	50.8	PwC	48.2	0.21	0.30
Poland	34.4	Own calc.	34.4	0.06	0.04
Portugal	56.5	PwC	43.8	0.51	0.25
Singapore	20.0	PwC	17.0	0.30	0.90
Slovak Republic	34.4	Own calc.	34.4	0.00	0.00
Slovenia	59.1	Own calc.	20.0	0.00	0.00
Spain	52.0	PwC	48.9	0.12	0.33
Sweden	54.3	PwC	48.4	0.55	0.99
Switzerland	51.5	PwC	21.2	0.31	0.48
Taiwan	40.0	Own calc.	17.0	0.02	0.10
Turkey	37.2	Own calc.	20.0	0.08	0.04
United Kingdom	28.0	PwC	45.3	0.80	0.90
United States	15.0	PwC	50.7	1.96	2.31

* Combination of statutory corporate tax rate and top long-term capital gains tax rate in 2012.

Sources: PricewaterhouseCoopers (PwC), Thomson Reuters (n.d.), OECD (2005), and Ernst and Young (2013).

6. Regression results

Table 2 presents the definitions and sources of the variables used, and *Table 3* presents the correlation matrix of these variables. *Table 4* presents our main regression estimates. While the option tax rate and the integrated capital tax rate are calculated for 2012, the outcome and control variables are the average values from 2010 to 2014. Such averaging addresses the problem that VC investments fluctuate substantially in small countries; certain countries, such as Estonia, Iceland, and Luxemburg, have high VC activity over the long run but can have zero or low levels in a single year or become outliers due to one or two very large deals. The explanatory power increases substantially when averaging over a five-year period, and the results are not sensitive to the exact years chosen. The controls are averaged from 2010 to 2014 to correspond to the study period for VC activity. In the Appendix, we report the results for VC investment and the control variables only for 2012. The option tax rate has a negative and statistically significant association when using only data for 2012, but the results are less robust compared to when the variables are averaged.

Table 2 Variable definitions.

Variable	Definition	Source
VC/GDP	Venture capital investment as a share of GDP in 2012 or 2010–2014	Thomson Reuters (n.d.)
Option tax	Harmonized effective tax rate on stock option gains in 2012	PwC and own calculations (see text for details)
GDP/cap	GDP per capita in 2012	IMF, http://www.imf.org/external/data.htm
Tertiary educ.	Share of population aged 25 and above with tertiary or college education in 2012	World Bank, http://www.doingbusiness.org/data
R&D/GDP	R&D expenditure as a share of GDP for 2012 or 2010–2014	World Bank, http://www.doingbusiness.org/data
Regul. burden	A cardinal estimate of regulations on start-ups (average 2008–2014); scale 0–100, where a higher score means less regulation	World Bank, http://www.doingbusiness.org/data
Market cap/GDP	Market capitalization of all listed firms as a share of GDP for 2012 or 2010–2014	World Bank, http://www.doingbusiness.org/data
Integrated capital tax	Combination of statutory corporate tax rate and top long-term capital gains tax rate in 2012	Carroll et al. (2012)

Note: The World Bank data was collected within the *Doing Business* project, which published its first report in 2004; see World Bank (2017). When missing, data for Taiwan were complemented using *Taiwan Statistical Data Book*. In some cases, such as Iceland, when World Bank data on tertiary education were missing, data were taken from *OECD Yearbooks*.

Table 3 Correlation matrix of variables used.

	VC/GDP	Option tax	GDP/cap	Tertiary educ.	R&D/GDP	Regul. burden	Market cap/GDP
Option tax	−0.459						
GDP/cap	0.275	−0.358					
Tertiary educ.	0.512	−0.262	0.182				
R&D/GDP	0.427	0.177	−0.011	0.546			
Regul. burden	0.304	−0.242	0.213	0.598	0.356		
Market cap/GDP	0.110	−0.349	−0.016	0.021	−0.122	0.386	
Integrated capital tax	0.290	0.105	0.101	0.219	0.286	0.222	−0.299

Table 4 Cross-country regressions of VC activity as a share of GDP

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Option tax	−0.174**	−0.157*	−0.179**		−0.179**	−0.175**	0.234***
	(0.066)	(0.079)	(0.070)		(0.080)	(0.079)	(0.074)
GDP/cap		0.005	0.004	0.011**	0.004	0.005	0.010
		(0.004)	(0.004)	(0.002)	(0.004)	(0.004)	(0.004)
Tertiary educ.			7.736	19.757*	7.730	11.783	−0.513
			(9.181)	(11.339)	(9.344)	(9.171)	(9.649)
R&D/GDP			2.587**	1.444	2.587**	2.674**	11.535***
			(1.095)	(1.029)	(1.107)	(1.148)	(2.592)
Market cap/GDP					−0.008	0.175	0.645**
					(0.219)	(0.328)	(0.260)
Regul. burden						−0.095	0.007
						(0.143)	(0.098)
Interaction Option tax and R&D/GDP							−0.196***
							(0.048)
Constant	11.854**	10.781**	4.489	−4.390	4.516	9.969	−12.957*
	(3.336)	(4.18)	(3.053)	(2.990)	(3.647)	(9.564)	(7.501)
Observations	38	38	38	38	38	38	38
R-squared	0.211	0.225	0.496	0.337	0.496	0.504	0.667

Note: Robust standard errors in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1.

Stock option tax rates are for the year 2012, whereas all other variables are the average of 2010 to 2014. Since VC activity is a small share of GDP, it is expressed as dollars in VC investments per $10.000 units of GDP. Each unit thus represents 0.01% of GDP. In median countries in our sample that VC investments were around 0.02% of GDP, ranging up to around 0.2% in the United States and Israel. Taxes are measured in percentage, so an increase from 20 percent to 21 percent represents a one unit increase in the tax rate. In all specifications, a 10 percentage point decrease in tax rates is associated with an increase of VC-activity of roughly 0.015% of GDP.

Note that the coefficient for the option tax in specification (7) must be interpreted together with the interaction variable and R&D. Taxes have a stronger association with VC activity in countries with higher R&D investments. An increase in the option tax rate of 10 percentage points at the sample mean rate of R&D of about 2 percent of GDP is associated with a decrease in VC activity of 0.02% of GDP, less so in countries with less R&D activity and more so in countries with higher R&D activity.

In specifications 2–6 we add several covariates and standard controls, such as gross domestic product per capita, the share of population with tertiary education, and R&D activity as a share of GDP. Market capitalization of all listed firms as a share of GDP is added to control for financial depth. The index of regulation from the *Doing Business* series is a cardinal estimate of regulations on start-ups. The World Bank's "distance to frontier" index benchmarks the regulatory environment in each country and estimates the distance to the best performing country, which allows the regulatory burden to be quantified.[7]

[7] Black and Gilson (1998) and Bernoth and Colavecchio (2014) find more VC activity in countries with larger public stock markets, and Cherif and Gazdar (2011) find a positive relationship between R&D spending and the size of the VC sector.

R&D spending has a strong positive correlation with VC activity. Interestingly, specification (7) shows a strong interaction effect between R&D spending and the option tax rate, indicating that the effect of the option tax is greater in countries with more R&D spending.

Including an interaction variable, as in specification (7), changes the interpretation of taxes and R&D spending, and the coefficient for the option tax must be interpreted with the interaction variable. The coefficient should be interpreted as +0.234 only if R&D investments are zero, and otherwise, it depends on the level of R&D spending as a share of GDP. The sign of the interaction term suggests that option taxes have a stronger negative association with VC activity in countries with higher R&D investments. R&D spending as a share of GDP varies between 0.4 percent in Chile to 4 percent in Israel, with a sample mean of approximately 2 percent. An increase in the option tax rate of 10 percentage points at the sample mean rate of research and development is associated with a decrease in VC activity of 0.02% of GDP. In countries, such as the United States, where R&D spending is higher, for example, 2.7 percent of GDP, a 10-percentage point increase in option taxes is associated with a 0.03 percentage point decline in VC investments as a share of GDP.

If this association is interpreted causally, it would indicate that favorable tax rates are less important in less innovative economies, whereas VC activity is stimulated when taxes are low and there is a demand for capital from high-tech start-ups. Intuitively, in countries with very little R&D spending, lowering option taxes may not impact VC activity, since there are few investment opportunities, whereas VC activity may be more sensitive to taxes in countries where many innovations could potentially be developed.

There is no statistically significant interaction effect between the VC market and the size of the stock market (not shown). Stock market capitalization as a share of GDP is positively correlated but statistically significant in only some specifications. Note that this variable is sensitive to outliers, notably, small countries experiencing depressed equity markets following the 2008 financial crisis.

Many studies rely on the integrated capital tax—a combination of the statutory corporate tax rate and the top long-term capital gains tax rate adjusted for possible deductions—to empirically estimate the effect of the capital tax burden. This estimation is *a priori* reasonable, and it may indeed be a reasonable proxy when used in a panel setting over time within the same country. *Table 5* shows the same regressions of VC activity, except the integrated capital tax rate is substituted for the option tax rate. Strikingly, the integrated

capital tax rate is positively associated with VC activity; the coefficient is weakly statistically significant. Therefore, a higher tax appears to stimulate VC activity. Since we consider the effective option tax to be closer to the actual tax rate that firms are subject to, this result should caution scholars against naïvely using the integrated capital tax rate in cross-sectional comparisons.

Table 5 Cross-country regressions of VC activity as a share of GDP and the integrated capital tax rate

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Integrated capital tax	0.137*	0.125*	0.064		0.092	0.120	−0.173
	(0.072)	(0.073)	(0.062)		(0.0645)	(0.072)	(0.145)
GDP/cap		0.012***	0.010***	0.011**	0.010***	0.012***	0.0124***
		(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)
Tertiary educ.			19.233	19.757*	17.475	24.987*	27.575**
			(11.426)	(11.339)	(11.370)	(12.633)	(13.097)
R&D/GDP			1.241	1.444	1.380	1.533	−3.012
			(1.072)	(1.029)	(1.072)	(1.083)	(2.316)
Market cap/GDP					0.636***	1.046**	0.773**
					(0.178)	(0.421)	(0.325)
Regul. burden						−0.195	−0.190
						(0.186)	(0.168)
Interaction Integrated capital tax and R&D/GDP							0.127*
							(0.072)
Constant	−0.242	−0.517	−6.114	−4.390	−7.482*	3.345	12.580
	(2.183)	(2.166)	(4.018)	(2.990)	(4.209)	(10.639)	(12.520)
Observations	38	38	38	38	38	38	38
R-squared	0.084	0.145	0.355	0.337	0.388	0.421	0.466

Note: Robust standard errors in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1.

Stock option tax rates and all other variables are for the year 2012. Since VC activity is a small share of GDP, it is expressed as dollars in VC investments per $10.000 units of GDP. Each unit thus represents 0.01% of GDP. In median countries in our sample VC investments were around 0.02% of GDP, ranging up to around 0.2% in the United States and Israel.

Taxes are measured in percentage, so that an increase from 20 percent to 21 percent represents a one unit increase in the tax rate. In all specifications, a 10 percentage point increase in tax rates is associated with an increase of VC-activity of roughly 0.01% of GDP. Taxes have a stronger association with VC activity in countries with higher R&D investments An increase in the option tax rate of 10 percentage points at the sample mean rate of R&D of about 2 percent of GDP is associated with a decrease in VC activity of 0.01% of GDP, less so in countries with less R&D activity and more so in countries with higher R&D activity.

The regulatory burden on start-ups is not statistically significant for any of the specifications. One explanation may be that the regulatory environment is fairly good for all advanced economies with high GDP per capita and does not vary much across countries. The regulation index positively correlates with VC activity when GDP is not controlled for but is not statistically significant when controlling for GDP and other variables. Another possible

explanation is that the World Bank index is designed to measure start-up procedures for small firms and may not capture factors important for VC activity.

7. Discussion and conclusions

We study the relationship between taxes on employee stock options and VC activity in 38 developed countries. We estimate the effective tax rate based on a standardized case of a typical entrepreneurial start-up using stock option contracts. We find a strongly negative cross-country relationship between the effective tax rate on employee stock options and the rate of VC activity, both directly and when controlling for several complementary explanations. The option tax has a stronger negative effect on VC activity when R&D investments are high.

The importance of VC-financed firms is demonstrated by their disproportionate share of firms with successful exits. The most common form of a successful exit is through an IPO or a trade sale, as illustrated in *Figure 2*. For VC-backed firms, acquisitions are twice as or three times more common than IPOs, but since IPOs, on average, are larger, they constitute a greater portion of the aggregate return for entrepreneurs than acquisitions (Hall and Woodward 2010). For both measures, VC-funded firms are overrepresented; they represent the majority of firms that go public and a sizable share of acquisitions, although estimates are more uncertain regarding the latter (Kaplan and Lerner 2010; Masulis and Nahata 2011; Brander and Egan 2012). This overrepresentation is revealing, since VC firms represent a small percentage of all U.S. firms. Between 1981 and 2005, a mere 0.1 percent of firms received early-stage VC financing, of which 40 percent failed, 34 percent were acquired, and 16 percent went public. Among non-VC-financed firms, approximately 80 percent failed, only 1 percent were acquired, and 0.02 percent went public (Puri and Zarutskie 2012).

To thrive, the VC industry requires sophisticated mechanisms that provide high-powered incentives for key actors and the final capital holders. In ideal circumstances, stock options provide incentives that closely mimic direct ownership, but their productivity greatly depends on the tax code. If gains on stock options are taxed as wage income, some of the incentive effect is lost—particularly if the gains are subject to (uncapped) social security contributions and the marginal tax rate on wage income is high. This situation changes dramatically if an employee with stock options can defer the tax liability until the stocks are sold. The effectiveness of these stock options is further reinforced if the employee suffers no tax

consequences from the granting or exercise of the option, and if the employee is taxed at a low capital gains rate when the acquired stock is sold.

Observations from the history of the U.S. VC sector indicate that stock options are widely used when they are advantageous from a tax perspective. The contractual design of financial instruments constitutes a good fit with the issues facing the VC-funded entrepreneurial sector. Therefore, the effective tax treatment of option contracts may be a major determinant for the size of the VC-funded entrepreneurial sector.

Decreased taxation of gains on employee stock options in the start-up sector is likely to be necessary in many countries, both to lure talented people away from traditional careers in incumbent firms and to channel institutional capital into the entrepreneurial sector, which should be mediated by a professional VC sector. A policy designed to apply only to start-ups receiving VC funding—a small but strategic sector of the economy—would narrowly target the entrepreneurial sector rather than entail broad tax cuts. This type of policy would lower the effective taxation of start-ups that are screened by venture capitalists willing to invest their own funds, without requiring the government to determine which firms are entrepreneurial. In this manner, innovative start-ups could be favored without the need for broad capital gains tax cuts.

It is difficult to *ex ante* identify innovative start-ups from non-entrepreneurial self-employment, and identifying the firms to target represents one of the greatest challenges in entrepreneurship and small business policy. Innovative start-ups that can be defined as Schumpeterian entrepreneurs are but a tiny percentage of new firms (Hurst and Pugsley 2011; Shane 2008; Henrekson and Sanandaji 2014). VC-funded firms that apply for funding and are screened represent a large segment of high-potential firms—this self-selection separates VC-funded firms from the majority of less viable firms for tax policy purposes. This occurrence does not imply that all entrepreneurial start-ups apply for VC funding but rather that the segment disproportionately consists of high-potential start-ups. Since many of the low-taxed stock option contracts used by venture capitalists can also be used by business angels and other similar funders, a favorable taxation of stock options is likely to stimulate entrepreneurial finance more broadly.

A tax break that targets human capital in this segment would promote innovative entrepreneurship without the high fiscal cost of broad capital gains tax cuts. Moreover, broad-

based capital gains tax cuts do not shift capital from passive investments to private equity, unlike tax breaks on stock options and other instruments used by the VC sector.

Studies on taxes and entrepreneurship tend to focus on capital allocation, while ignoring the effect of taxes on the occupational choices of entrepreneurs (Kanniainen and Panteghini 2013; Henrekson and Sanandaji 2016). The entrepreneurial start-up sector competes for talent with other sectors of the economy, such as large incumbent firms, academia, and the government, and lower stock option taxation would lure talent into the sector at a low fiscal cost.

As a long-term solution, the best way to ensure the financing of entrepreneurial firms is likely to be the pursuit of policies that encourage private wealth accumulation in forms that do not preclude the assets from being used as equity in entrepreneurial ventures. However, currently, there is a strong tendency to introduce or increase the use of funded pension systems in both the private and public sectors, and there is little reason to believe that this trend will be reversed. Therefore, it is essential to avoid regulations that preclude assets in pension funds from being channeled to the start-up sector.

The empirical limitations in our paper should be stated. Due to the complexity of actually measuring the effective option tax rate, we limit the study to 38 countries and one year, whereas it would be preferable to study the effect of taxation over a longer period. Variations in the tax rate across countries could be driven by unobserved factors or reverse causality. It is possible that countries that have a wide range of policies favorable to entrepreneurship and VC activity also have a low option tax rate, which would lead to an overestimation of the option tax effect. Another possibility is that in countries where the VC industry has grown large for other reasons, there has been more successful lobbying for lower taxes on VC activity. We attempt to control for other potentially important factors and cite supporting evidence, such as case studies and studies on the link between taxes and VC activity over time. In addition to option taxes, we include several standard control variables and apply an alternative tax measure. Most importantly, although the empirical results *per se* are largely suggestive given our data limitations, they are consistent with the presented theoretical arguments. The combination of these two types of evidence gives credence to our conclusion that the effective taxation of stock options is an important determinant of the extent of VC activity.

Future research on this issue should be based on more extensive data on option tax rates over time, including data on the taxes imposed on partners in VC firms and on the ultimate capital

holders. In addition, future studies should include data on regulations governing investments by pension funds and other financial institutions. Future empirical studies on cross-country determinants of VC and entrepreneurial finance are likely to benefit from larger samples of countries and longer data series, which are becoming available as time proceeds and the VC industry expands globally.

Studies on taxes and entrepreneurial activity often focus on broad aggregates and the top or average tax rates, disregarding that the specific rules that affect the activity in question may be of first-order importance. A closely related topic for future research is the tax treatment of the carried interest of managers and partners of VC and private equity firms—a complex topic for which there are considerable cross-country variations in rules and practices (Lee and McFarlane 2016). Whereas employee stock option taxation increases the demand for VC funding among entrepreneurs, the tax treatment of carried interest on VC fund managers is likely to affect the supply of VC.

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Appendix

Table A1 Cross-country regressions of VC activity as a share of GDP 2012

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Option tax	−0.102*	−0.103*	−0.099*		−0.110*	−0.110*	0.201**
	(0.060)	(0.060)	(0.056)		(0.062)	(0.063)	(0.075)
GDP/cap		0.038	−0.007	−0.023	−0.002	−0.029	−0.005
		(0.023)	(0.029)	(0.032)	(0.030)	(0.003)	(0.027)
Tertiary educ.			12.279	22.014**	11.295	11.112	1.348
			(9.975)	(10.781)	(10.257)	(11.953)	(13.07)
R&D/GDP			1.589*	0.892	1.587*	1.582	8.561***
			(0.867)	(0.743)	(0.878)	(0.959)	(2.590)
Market cap/GDP					−0.236	−0.245	0.076
					(0.180)	(0.293)	(0.251)
Regul. burden						0.005	0.104
						(0.123)	(0.096)
Interaction Option tax and R&D/GDP							−0.154***
							(0.048)
Constant	7.63**	6.147**	4.489	−3.686	1.943	1.653	−16.981**
	(3.041)	(3.02)	(3.053)	(2.151)	(2.829)	(7.663)	(7.391)
Observations	38	38	38	38	38	38	38
R-squared	0.108	0.147	0.367	0.292	0.373	0.373	0.533

Note: Robust standard errors in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1.

Stock option tax rates and all other variables are for the year 2012. Since VC activity is a small share of GDP, it is expressed as dollars in VC investments per $10.000 units of GDP. Each unit thus represents 0.01% of GDP. In median countries in our sample VC investments were around 0.02% of GDP, ranging up to around 0.2% in the United States and Israel.

Taxes are measured in percentage, so that an increase from 20 percent to 21 percent represents a one unit increase in the tax rate. In all specifications, a 10 percentage point increase in tax rates is associated with an increase of VC-activity of roughly 0.01% of GDP. Taxes have a stronger association with VC activity in countries with higher R&D investments. An increase in the option tax rate of 10 percentage points at the sample mean rate of R&D of about 2 percent of GDP is associated with a decrease in VC activity of 0.01% of GDP, less so in countries with less R&D activity and more so in countries with higher R&D activity.

Table A2 Cross-country regressions of VC activity as a share of GDP 2012 and statutory integrated capital gains and corporate tax rate

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Integrated capital tax	0.156***	0.147**	0.127*		0.146**	0.158**	−0.059
	(0.055)	(0.056)	(0.049)		(0.055)	(0.062)	(0.119)
GDP/cap		0.016	−0.039	−0.023	−0.045	−0.044	−0.043
		(0.0212)	(0.030)	(0.032)	(0.031)	(0.029)	(0.027)
Tertiary educ.			22.731**	22.014**	22.614**	25.525**	27.158**
			(10.260)	(10.781)	(10.279)	(12.065)	(11.756)
R&D/GDP			0.529	0.892	0.610	0.662	−2.653
			(0.716)	(0.743)	(0.729)	(0.755)	(1.768)
Market cap/GDP					0.387**	0.553	0.338
					(0.168)	(0.364)	(0.287)
Regul. burden						−0.076	−0.071
						(0.127)	(0.110)
Interaction Integrated capital tax and R&D/GDP							0.093***
							(0.055)
Constant	−2.150	−2.451	−7.038**	−3.686	−7.946**	−3.766	2.953**
	(1.474)	(1.563)	(2.946)	(2.151)	(3.220)	(7.026)	(7.993)
Observations	38	38	38	38	38	38	38
R-squared	0.166	0.172	0.387	0.292	0.405	0.413	0.451

Note: Robust standard errors in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1.

Stock option tax rates and all other variables are for the year 2012. Since VC activity is a small share of GDP, it is expressed as dollars in VC investments per $10.000 units of GDP. Each unit thus represents 0.01% of GDP. In median countries in our sample VC investments were around 0.02% of GDP, ranging up to around 0.2% in the United States and Israel.

Taxes are measured in percentage, so that an increase from 20 percent to 21 percent represents a one unit increase in the tax rate. In all specifications, a 10 percentage point increase in tax rates is associated with an increase of VC-activity of roughly 0.01% of GDP. Taxes have a stronger association with VC activity in countries with higher Research and Development investments. An increase in the option tax rate of 10 percentage points at the sample mean rate of R&D of about 2 percent of GDP is associated with a decrease in VC activity of 0.01% of GDP, less so in countries with less R&D activity and more so in countries with higher R&D activity.

About the authors

Magnus Henrekson is president of the Research Institute of Industrial Economics (IFN). Until 2009, he was Jacob Wallenberg professor at the Department of Economics at the Stockholm School of Economics. In 1990, he earned his doctorate (writing on the topic of public sector growth) at the University of Gothenburg. During the 1990s, his research mainly focused on empirical explanations of economic growth. He has written several papers on why Sweden's growth lagged behind comparable countries until the 1990s. In recent years, his research has focused primarily on entrepreneurship economics with a particular emphasis on the institutional determinants of the business climate.

In 2011–2014, he was a commissioned expert on the Swedish Government Committee on Business Taxation, and in 2015, he became a commissioned expert on the Government Committee on Entrepreneurship. He has also written a number of books, studies, and articles within the framework of Swedish policy discussions. He has experience in international banking, and has served as an advisor in both the public and private sectors. He has been a board member of two public companies.

Tino Sanandaji is an economics major from the Stockholm of Economics. He earned his doctorate in public policy at the University of Chicago in 2011. He was a researcher at IFN between 2007 and 2014 and is currently a research fellow at the Center for Policy Studies in London and a researcher at the Institute for Economic and Business History Research at the Stockholm School of Economics. His research interests are concentrated mainly in the areas of entrepreneurship and taxation. He has studied the differences between entrepreneurs and small firm owners, with attention to the effect of taxation and regulations.

Magnus Henrekson and Tino Sanandaji are the joint authors of two books in Swedish on the effects of taxation on entrepreneurship and business activity. They jointly authored two expert reports for the Swedish Government Committee on Business Taxation, which were published as part of its final report in the summer of 2014. Their report on the role of stock options provided the intellectual basis for the reform of Swedish stock-option taxation effective from January 1, 2018.