



Comment on ‘Taxes and Venture Capital Support’

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The strength of economic theory is that it can look at the hypothetical rather than merely ex-post rationalize observed behavior. In particular, it can ask the ‘what if’ question of how changes in model parameters might affect efficiency and social welfare. Based on the answer, it can then suggest welfare-improving policy measures in situations in which privately optimal outcomes are socially inefficient.

While economic theory in the 1960s and 70s was frequently driven by the question of whether, and how, socially optimal outcomes can be implemented in private transactions, such normative focus is often missing in recent work. Corporate finance theory (my own work included), in particular, appears to be more concerned with the rationalization of stylized facts rather than asking how welfare can be improved through appropriate government intervention or changes in the law. This is surprising, if not paradoxical, given that the ability to derive policy implications constitutes one of the main advantages of theoretical over (non-structural) empirical research.

A good example, at least in my view, is the recent surge in theoretical work on venture capital. Inspired by the seminal empirical contributions of Gompers and Lerner (1999), Kaplan and Strömberg (2003), and others, theoretical research has largely confined itself to “explaining” empirically documented facts. Perhaps the best example is venture capital contracting, where the typical objective of a theory model is to explain why and under what conditions securities and contractual features observed in practice are optimal. While this is an important, and undoubtedly interesting question, it is unfortunate that research has systematically stopped short of asking how any remaining inefficiencies – i.e., inefficiencies which continue to exist *after* the second-best optimal contract is put in place – can be potentially overcome through government policy or changes in the law. This is precisely what Keuschnigg and Nielsen do in this and related papers.

As an illustration of how government (precisely: tax) policy can improve welfare in venture capital contracting, consider the standard double-sided moral hazard problem underlying most venture capital contracting models.¹ While arguably spe-

¹ Empirical support for the notion that the entrepreneur-VC relationship is characterized by double-sided moral hazard is provided by, e.g., Hellmann and Puri (2001) and Kaplan and Strömberg (2002).

cial, I use the production technology assumed by the authors. Accordingly, the entrepreneur's effort is $e \in \{0, 1\}$ with effort cost $l(e) \in \{0, \beta\}$ while the VC's effort $a \geq 0$ is continuous with linear effort cost $l(a) = a$. Efforts are chosen simultaneously. The firm can take two values: V with probability P and zero with probability $1 - P$, where P is given by $P = ep(a)$, where $p(a) = a^{1-\theta}/(1-\theta)$ and $\theta \in (0, 1)$. Hence efforts are complements: if the entrepreneur chooses $e = 0$ it makes no sense for the VC to exert any effort at all. Likewise, if the VC's effort is too low, it makes no sense for the entrepreneur to choose $e = 1$.

Consider the simplest case of full loss offset ($\xi = 1$ in the paper). The VC chooses $a \geq 0$ to maximize

$$(1 - \tau^F)ep(a)(1 - s)V - a,$$

while the entrepreneur chooses $e \in \{0, 1\}$ to maximize

$$(1 - \tau^E)ep(a)sV - e\beta.$$

There are two potential sources of distortion affecting the entrepreneur's and VC's effort choices: (i) the usual problem in double-sided moral hazard models that agents do not receive the full output but only a fraction s and $1 - s$, respectively, and (ii) the VC's and entrepreneur's capital gains tax τ^F and τ^E , respectively.

Assuming β is sufficiently small, the first-best levels of effort are given by $e_{FB} = 1$ and $p'(a_{FB})V = 1$, respectively. While the second-best contract s^* will implement the efficient entrepreneurial effort $e_{FB} = 1$, the fact that $s^* > 0$ (to induce the entrepreneur to choose $e = 1$) immediately implies that $a^* < a_{FB}$, i.e., the VC's effort will be inefficiently low. (This assumes a nonnegative tax $\tau^F \geq 0$.)

Evidently, the second-best contract s^* will give the entrepreneur just enough output share to make him choose $e = 1$, i.e., it must hold that $(1 - \tau^E)p(a)s^*V = \beta$. This in turn maximizes the VC's output share, and thus his incentives to expend effort. (The VC can always transfer rents to the entrepreneur ex ante via the upfront payment B .)

While private contracting between the VC and entrepreneur does not lead to the socially efficient outcome, the government can implement the first best through an appropriate tax policy. Given the second-best optimal contract s^* , the first best can be implemented via a revenue subsidy $\tau^F < 0$ (i.e., a negative capital gains tax) satisfying

$$(1 - \tau^F)(1 - s^*) = 1$$

or

$$\tau^F = \frac{-s^*}{1 - s^*} < 0.$$

(Note that τ^F is on both sides of the equation since s^* depends on τ^F .)

If budget-balancing is a concern, the VC can repay the government *ex ante* via an upfront transfer. Since the transfer is made before efforts are chosen, it has no incentive effects. In the paper, this upfront transfer takes the form of a negative investment subsidy $z < 0$, i.e., a tax on the VC's start-up investment.

In his seminal 1982 paper, Holmström has shown that the double-sided moral hazard problem can be solved by bringing in a third party who adds funds *ex post* (and possibly receives funds *ex ante* to break even). This makes all agents residual claimants, and the resulting effort choices are first-best efficient. This is precisely the role which government plays in this paper. Given that venture capital contracting is widely thought of as a double-sided moral hazard problem, and that Holmström's ingenious mechanism is well known (at least in academic circles), it is indeed puzzling – as the authors rightly point out – that real-world VC contracts do not try to emulate this sort of mechanism. One might argue that this is because there are no private institutions who would naturally qualify as budget breakers. (Is this really true? Why can't banks provide these services?) But this only takes the question to another level, namely, why haven't such institutions emerged in the past?

If it was only for showing that the government acts as a Holmström-type budget breaker, the paper would be interesting but not necessarily novel. But the paper goes well beyond this by embedding the above model in a general equilibrium framework. The paper is well written; so there is no need to repeat all the arguments. Let me therefore confine myself to one specific example, namely, that of a uniform capital gains tax $\tau^E = \tau^F = \tau > 0$. It is immediately clear from the above discussion that such a tax dulls both the entrepreneur's and VC's incentives. Since in the nontax equilibrium the entrepreneur's incentive constraint binds, the introduction of a tax implies that he must receive a higher output share s^* , or else his effort drops from $e^* = 1$ to zero. There are also feedback effects. Since efforts are complements, the tax-induced reduction in VC effort additionally dulls the entrepreneur's incentives. Again, s^* must increase. The end result is unambiguous: entrepreneurial effort remains at $e^* = 1$ while VC effort decreases, which is a consequence of both the increase in s^* and τ^F .

In the general equilibrium model, the firm value V is not fixed but depends on the price realized in the goods market. For simplicity, this price is equal to V . The increase in τ^F and the associated increase in s^* both reduce VC profits, with the consequence that VCs will fund fewer startups. (The indirect effect via a^* drops out due to the envelope theorem). This supply contraction, in turn, raises the goods price V , which restores the zero-profit constraint of VCs. While, *ceteris paribus*, the increase in V would ordinarily lead to higher VC effort, the increase in both s^* and τ^F outweighs this effect. In equilibrium, VC effort unambiguously drops.

The supply contraction and the associated increase in V implies a leftward move along the (product) demand curve, with a smaller entrepreneurial sector being the consequence. But there is a countervailing effect: to satisfy any *given* level of demand, the entrepreneurial sector must increase to offset the increase in the failure

rate $(1 - P)$ caused by the reduction in VC effort. The total effect depends on the price elasticity of demand. Except for very low demand elasticities, the first effect dominates the second, which implies the entrepreneurial sector shrinks.

Finally, the collected tax is distributed to households, where it raises disposable income. On the other hand, consumer surplus drops as a result of the increase in the goods price V . The second effect dominates the first, and the ultimate consequence of a uniform capital gains tax is a first-order loss in welfare. Intuitively, this is what we would expect given that taxation reduces the VC's already inefficiently low effort level.

Coming back to my initial remarks about policy implications, I think this paper generates many interesting insights. At the same time, I wish the authors had focused a bit more on *optimal* government policies. After all, in the end we want to know what the government should do. The reason why this problem is somewhat underrepresented in the paper is that the optimal government policy is trivial: Proposition 1 shows that the first best can be easily attained through a revenue subsidy in conjunction with an upfront investment tax. To justify their subsequent analyses of specific (but socially suboptimal) tax and subsidy policies (Sections 3-4), the authors must *assume* that the first-best (i.e., budget-breaking) mechanism is not feasible.²

An alternative approach would be to employ a setting in which the first best cannot be trivially attained. As the authors themselves point out, if the entrepreneur's effort was continuous instead of binary, the budget-breaking mechanism would fail to implement the first best since the entrepreneur has no wealth to make the necessary upfront payment. The obvious question is then: what government policy takes us as close as possible to the social optimum? Another direction which the authors could have taken is to introduce frictions into the market model, e.g., as in Michelacci and Suarez (2002) or Inderst and Müller (2002). These papers show that the combination of entrepreneur-VC matching with delay or search costs can generate inefficiencies in venture capital markets which might warrant government intervention. In Inderst and Müller, for instance, the first-best is generically unattainable due to the joint presence of search frictions and double-sided moral hazard (Section 5.5). Finding the optimal government policy is consequently nontrivial.

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² One obvious reason why budget-breaking mechanisms might fail is collusion between the budget breaker and one of the agents.

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