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**A Reply to Douglas Cumming's  
"Review Essay: Public Policy and the Creation of Active Venture  
Capital Markets"**

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In Da Rin, Nicodano, and Sembenelli (2006) we evaluate the effectiveness of different public policies for venture capital using an econometric approach that allows to overcome several well-known flaws of purely cross-country studies. Our results cast serious doubts on the widespread illusion that channelling more funds would create more active capital markets, while they support the use of capital gains taxation and the creation of a stock exchange for exiting investments. In his book on public policy for venture capital, Josh Lerner (2009) refers to our article's results as a key piece of empirical evidence on the ineffectiveness of increasing the supply of funds for creating more active venture capital markets (pages 123-124).

Cumming (2010) reviews our article and Lerner's book. He disputes our results, and also the interpretation that both Lerner and ourselves give of them. In this short note we explain why we believe this criticism to be misplaced. We develop our argument in two steps. First, we summarize our article's approach and results. Second, we consider Cumming's criticisms and show why they are based on a misunderstanding of our methodology.

In our article, we provide an innovative approach to the evaluation of public policy for venture capital. Our goal is to provide a more rigorous assessment of public policy than one can get from comparing the experience of different countries with a cross-sectional study.

A first departure from previous studies is that we do not look at the sheer size of the venture capital market, but at two ratios. The high-tech ratio measures the share of venture funds invested in high-tech companies. The early-stage ratio measures the share of venture funds invested in early-stage (i.e., seed and start-up) companies. We look at ratios for both substantial and methodological reasons. Substantially, the ratios reveal to which extent an increase in market size translates into relatively more early-stage and high-tech investments. This is important because it is in this segments of the venture capital market

that more dynamic companies are more likely to be found. The ratios capture the notion that size alone is not a satisfactory measure of the contribution of the venture capital market to economic growth.

Methodologically, the ratios allow us to overcome one flaw of cross-sectional studies. Following, for instance, an unobserved demand shock, policy variables are likely to react, but at the same time the same shock is likely to affect also investment decision. Therefore the observed changes in investment levels cannot be ascribed to changes in policy, since both are affected by the underlying shock. Using ratios reduces these concerns, as long as both numerator and denominator are similarly affected by the shock (see pages 1702 and 1703 of the article).

We also depart from previous studies by avoiding a cross-sectional approach. Cross-sectional studies exploit differences in the explanatory (policy) variables across countries to infer the effects of policy changes on the size or composition of the venture capital market. A fundamental flaw of such studies is the likely existence of unobservable permanent factors that influence both policy and outcome variables. In the context of venture capital, think, for example, of a country's cultural propensity towards entrepreneurship (or innovation). This is likely to affect both the amount invested and some of the policy variables, like the availability of a stock exchange (or public R&D). The existence of such factors has long been recognized as an impediment to any meaningful causal interpretation of the correlations found in purely cross-sectional studies (see page 1702 of the article).

To overcome these limitations, we employ a different approach, that exploits variation of policy variables *within countries over time*, rather than across them. It is crucial to understand this methodological point to appreciate our contribution. The question we address is not 'what explains the different levels of high-tech and early stage ratios we observe across countries?' but rather 'what can governments do to modify the high-tech and early-stage ratios?' In other words, we do not explain cross-country variation in the values of the ratios, but instead how policy can modify ratios within a country.

Limitations of cross-country analysis of public policy in contexts like the one we are studying are well known in the literature. Therefore, Cumming's assertion that "perhaps the endogeneity concern is overrated," which is supported by any rigorous empirical evidence, is not a scholarly one (Cumming (2010), page 5, working paper version).

Based on theoretical arguments, we compare the effect of several policies on the composition of venture capital markets. We consider the supply of funds, the taxation of capital gains and of corporate income, the tax incentive to become an entrepreneur (relative to an employee), the availability of a stock exchange for exiting the investment, labor regulations, and public R&D. We base our analysis on the experience of 14 Western European countries over the 1988-2001 period.

What do we find? Our main result is that changes in the supply of funds do not affect the high-tech and early-stage ratios. This means that increasing the supply of funds does not shift the *proportion* of funds invested in high-tech or early stage companies. By contrast, changes in the capital gains taxation, the availability of a stock exchange where investments can be exited, and a reduction of labour regulations have a (statistically and economically) relevant effect on both the high-tech and the early-stage ratio.

Let's now consider Cumming's criticisms, and why they are misplaced. First, he claims

that the high-tech and early-stage ratios are flawed because they would reflect an implausible ranking of national venture capital markets. This is precisely what we do not do and do not want to do, for the reasons highlighted above. A careful reader may criticize us by showing that our ratios increase (or decrease) for a country whose growth rates in the numerators have been negative (positive) over time. But this is not Cumming's claim.

Importantly, the cross-sectional rankings provided by Cumming are not based on the sample and on the data that we use in our analysis. He provides some data from the OECD and a table from a working paper version of our article. The OECD data include central European transition countries, whose venture capital markets were quite underdeveloped in the period 1988-2001 period. We would never have used such data. Our analysis is instead based on data from the European Venture Capital Association. Unlike OECD data, these data are collected across a more homogeneous set of countries with a well specified, uniform methodology, consistent over time.

Incidentally, the rankings that emerge from Exhibit 1 in Cumming (2010) are in fact plausible. For both ratios, Northern European countries tend overall to show higher values than Southern European countries, as one would expect from the different structures of these economies. While the UK shows relatively low ratios, this is not surprising either. The UK is by far the largest European venture capital market, accounting for over a third of the total venture investments. The UK is also Europe's most mature market in terms of variety and specialization of venture investors, who cater to a wider spectrum of funding needs, both across the technological and the stage ranges. It is therefore not surprising that it reaches out to a higher proportion of late stage and low-tech companies. In our article we also check that our results are not driven by any single country, including the UK (p. 1718). We do so by estimating all our regressions omitting one country at a time. Once again all our results are confirmed. Also notice that different countries are likely to differ in the value of ratios most appropriate for their economy. Therefore, comparing ratios across countries, while deceptively appealing from a descriptive perspective, is hardly meaningful.

Cumming also claims that we interpret our own data incorrectly (Cumming (2010), page 6, working paper version). In this, we are in good company, as the same interpretation is shared by Josh Lerner, certainly not a superficial scholar. This misunderstanding largely stems from Cumming focussing on Tables 8 and 9 in our article, which present regressions based on levels (i.e., absolute amounts of early-stage and high-tech investments). By looking at these tables, he concludes that neither Josh Lerner nor ourselves have understood our own article. As we explain on page 1718 of the article, these two tables were reported purely to provide a comparison with previous studies, and should not be taken at face value. Indeed, these two tables have to be taken with extreme caution since within-group estimation requires (for consistency) past, present, and future shocks to the level of investment to be orthogonal to all the covariates, including fund availability. This assumption, as explained above, is unlikely to be satisfied in our case. Furthermore, even considering the tables at face value, they imply that a one euro increase in the availability of funds translates in less than 10 cents (three cents) of high-tech (early stage) investment. Not a big achievement, indeed (see p. 1719 of the article). Cumming only looks at the statistical significance of the coefficients, and fails to consider their, very modest, economic significance. His conclusion that these tables "support the view that government policy towards

venture capital in Europe has been successful' has therefore no ground.

Our conclusion is that Cumming (2010) criticizes our work incorrectly. First, and foremost, he does not recognize the need for a methodology suitable for overcoming the endogeneity issues that plague cross-sectional analyses of public policy. Such concern has become central in public economics, and the analysis of public policy for venture capital should be no exception. Second, and consequently, he misunderstands what we do in the article, describing our analysis as if it were cross-sectional. This leads him to think that we are comparing high-tech and early-stage ratios across countries, while we use within-country variation to understand how different policies can affect ratios and direct them to the level suitable for their own country. We hope this note has clarified the content of our article to readers interested in how public policy can contribute to create active capital market, and therefore favour entrepreneurship and economic growth.

## References

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