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Risk aversion and business cycles: An empirical analysis

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ABSTRACT

Unlike investors, who tend to maintain highly-diversified portfolios, private entrepreneurs usually lack access to complete risk-pooling for idiosyncratic risks, thus more directly internalize the cost of volatility. Risk aversion, however, modifies the optimal contract between entrepreneurs and lenders by incorporating the risk premium that entrepreneurs demand for the uninsurable risk: the private equity premium. Consequently, real shocks tend to be amplified as changes in entrepreneurs' net worth affect the private equity premium and so the rental rate of capital, investment and output. This theoretical framework suggests that economies where the private entrepreneurial sector is a relatively larger, and therefore more vulnerable to uninsurable risk, all else equal, should present higher volatility. I test this prediction by (1) conducting a simple reduced-form analysis that shows that output volatility is negatively associated with the relative importance of the corporate vs. the privately-held sector; and (2) estimating the model's structural parameters. Intuitively, countries where private entrepreneurs are predominant and so risk aversion is likely to impose stronger impacts, positive risk aversion coefficients should be found. Results suggest that risk aversion is empirically more relevant for economies like Argentina, Brazil, Chile, Korea, Mexico and Thailand than for Canada, France, Germany, the U.K. and the U.S.

1. Introduction

Differences in business cycle fluctuations in emerging markets relative to developed economies have been extensively studied by economists. Prasad, Agenor, and McDermott (1999), among many others, provide empirical evidence supporting much higher average output volatility in emerging economies than in industrialized economies.[1] In the theoretical arena, numerous models rely on financial imperfections as a primary stylized fact to motivate this discussion, where low levels of development in financial markets observed in emerging markets are often cited. For instance, Calvo and Reinhart (2000) and Chang and Velasco (2000) focus on the role of "dollarized liabilities." Namely, due to currency mismatching, real exchange rate depreciations may negatively impact firms' and banks' balance sheets by asymmetrically increasing the value of outstanding debt relative to revenues.

Another stylized fact commonly analyzed is the presence of a more important privately-held sector relative to corporations in emerging markets. Market capitalization as a fraction of GDP, for instance, is about 100 percent or more in high-income countries, while 35 percent or less in low and middle-income countries (The World Bank, 2010). The fact that privately-owned firms tend to rely more on debt rather than equity to finance their investments may play an additional role in creating frictions in emerging economies. Bernanke, Gertler, and Gilchrist (1999, chap. 21), for example, study the impact of information asymmetries in the borrower–lender relationship. The authors show that the agency problems that arise from the positive probability of costly default imply that lenders optimally charge entrepreneurs an external finance premium. This premium is endogenous to firms' balance sheet in that a higher reliance on external funds raises the aforementioned agency costs. As business cycles affect entrepreneurs' net worth, the resulting external finance premium is counter-cyclical and may become a mechanism that magnifies the impact of real shocks over time.

Pardo (2010) examines additional stylized facts about emerging markets, including that private entrepreneurial activity in particular is also often very volatile. An illustrative example is the Chilean case. While it has boasted one of the most robust financial systems in its region, its economy still reacted strongly to the effects of the Asian crisis of the 1990s. A reason often cited for this response was that the entrepreneurial sector moved quickly from an early-to-mid 1990s boom euphoria to a deep depression in the following years. Evidence like this may make it worthwhile to further examine facts and assumptions about the private entrepreneurial sector.

In general, the simplifying assumption of risk neutrality on agents makes sense in some cases. Gale and Hellwig (1985), for instance, point out that "risk neutrality is not an unreasonable

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[1] See also Backus and Kehoe (1992).

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assumption to make in the case of investors since it can be justified as a consequence of risk-pooling." That is, by investing large amounts of funds and thus taking advantage of economies of scale, lenders tend to successfully maintain highly diversified portfolios that allow them to significantly reduce the exposure to risk. However, the authors also emphasize the fact that the risk-neutrality assumption "makes less sense in the case of entrepreneurs." As shown by Moskowitz and Vissing-Jørgensen (2002), the high concentration of ownership of privately-held companies and their importance in their owners' portfolios, leave private entrepreneurs highly vulnerable to project-specific, uninsurable risks. That is, the lack of access to complete risk-pooling for their idiosyncratic risks leaves private entrepreneurs with no other option but to internalize the cost of volatility. Therefore, assuming risk neutrality (that is, assuming that risk can be ignored) seems to be a stronger assumption in this case.

Pardo (2010) builds on Bernanke et al. (1999, chap. 21) to show that introducing risk aversion among private entrepreneurs modifies the optimal relationship with lenders mainly by incorporating a positive risk premium that entrepreneurs demand due to the stochastic nature of the uninsurable part of their investment returns. Specifically, for risk-neutral entrepreneurs, the marginal cost of investing one extra unit of capital is given by the sum of the standard unit opportunity cost of investing their internal net worth and the unit cost of debt repayment. Risk-averse entrepreneurs, however, face a third cost associated with the fall in utility from facing uncertain non-diversifiable returns, which I refer to in this paper as "the private equity premium."[2] This cost borne by private entrepreneurs is captured by the covariance between the stochastic capital returns and the entrepreneur's marginal utility of consumption, which is negative for any strictly concave utility function. Consequently, all else equal, a risk-averse entrepreneur requires a higher expected return to capital, as given by the rental rate to capital, than a risk-neutral entrepreneur does. Equivalently, for a given rental rate of capital, a risk-averse entrepreneur is willing to supply less capital to final goods firms than a risk-neutral entrepreneur.

The private equity premium may lead to further magnifying the aggregate effects of real shocks. The mechanism works as follows: a real shock that decreases entrepreneurial profits and net worth, reduces entrepreneurs' minimum guaranteed level of consumption (the insurable part of the entrepreneur's returns). Consequently, their effective risk aversion and so the private equity premium rise. In response to the increased internal and external costs, entrepreneurs increase the rental rate of capital to final goods firms, producing a contraction in the supply of capital and thus additional impact of shocks on investment and production.

Finally, Pardo (2012) extends the previous model into a small open economy framework. In this context, following Chang and Velasco (2000), shocks not only affect entrepreneurs' net worth directly, but also indirectly through the increase in the value of debt following the corresponding real exchange rate adjustment. As wealth falls, the aforementioned private equity premium rises, therefore generating the known amplifying impacts of shocks over time. Consequently, a direct implication of this model is that economies where the private entrepreneurial sector is a relatively important actor in the financial market (for instance, where family-owned businesses are predominant), and therefore the economy as a whole is more vulnerable to uninsurable risk, all else equal, should present higher output volatility than economies where the corporate sector, whose ownership structure is highly diversified at all levels, is more important.

Considerable debate has taken place among economists about the role of entrepreneurial activity in affecting economic growth. Arguments about the impact of entrepreneurship on important factors affecting long-run growth often discuss innovation, productivity and knowledge spillovers (van Stel, Carree, & Thurik, 2005). Much less attention has been given to the relationship between entrepreneurship and output growth volatility. Apart from Pardo (2012), another exception is Rampini (2004), who provides a theoretical framework in which entrepreneurial activity is procyclical and produces amplification and propagation of shocks. In the empirical arena, however, to the best of my knowledge there have been no studies examining the relationship between the ownership structure of the real sector and output volatility.

Entrepreneurial activity is a plausible index of the economic importance of entrepreneurship. The Global Entrepreneurship Monitor (GEM) builds the total entrepreneurial activity rate (TEA), which measures the "relative amount of nascent entrepreneurs and business owners of young firms for a range of countries" (van Stel et al., 2005). Fig. 1 illustrates the simple direct (unconditional) correlation between total entrepreneurial activity, as measured by the TEA index, and output volatility, as measured by the standard deviation of the per capita real GDP growth, for 46 countries. At least as preliminary evidence, there seems to be a positive correlation between those two variables.[3]

The objective of this paper is to empirically test whether the volatility-inducing frictions that risk aversion introduces are more likely to be present the greater the relative size of the private entrepreneurial sector is. I test this prediction through two alternative approaches. First, I examine the statistical significance of the correlation between GDP growth volatility and the ownership structure of the productive sector through a simple reduced-form analysis. In particular, using international data, I find that output volatility is negatively associated with the relative importance of the corporate sector in the financial market, all else equal. The investment-to-capital ratio (as a measure of financial leverage), indices of financial structure and development plus other measures of cross-country sources of uncertainty are used as control variables.

The reduced-form approach's main limitation in this case is that a resulting statistical relationship between output volatility and ownership structure may not provide empirical significance of the magnitude of the impact imposed by private entrepreneurs in promoting sharper business cycle volatility. Consequently, I also conduct a structural analysis through which instead of using a measure of ownership of the real sector as a proxy for the relevance of entrepreneurial risk aversion, I estimate the model's risk-aversion coefficient (γ) that is consistent with an economy's observed fluctuation of output. That is, I estimate the structural parameters of the dynamic model that I introduce in Section 2 using observed data for the model's main variables; namely output, investment and consumption. Intuitively, if an economy is mostly composed of corporations (such as the U.S.) and so the importance of frictions imposed by risk-averse entrepreneurs is relatively small, we should

[2] The private equity premium defined in this paper is conceptually similar to Mehra and Prescott (1985)'s equity premium in that they both reflect the gap between investment returns and risk-free assets and that its theoretical value depends critically on individuals' risk aversion. Mehra and Prescott's equity premium and the private equity premium explored here differ in that investment returns are measured in terms of returns to public equity (stock in publicly-traded companies) and private equity (stock in nonpublicly-traded companies), respectively.

[3] The limitation of this index is that it is measured in absolute terms and not relative to the importance of the corporate sector. That is, a country with a higher entrepreneurial activity index does not necessarily have lower participation corporate sector participation in the productive sector. In Section 3.1, I use a different variable that overcomes this limitation.