



Growth and crisis, unavoidable connection?



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ABSTRACT

Periods of economic boom with rapid credit and GDP growth can be followed by sudden busts. In the presence of financial market imperfections, a simple modification of a neoclassical growth model can fully account for this behavior. I study a growth model for a small open economy where decreasing marginal returns to capital appear after the country has reached a threshold level of development, which is uncertain. Limited enforceability of contracts allows borrowers to default on their debt. Lenders optimally choose to suddenly restrict the supply of credit when the threshold is reached and decreasing marginal returns appear. Borrowers default, and a boom–bust cycle is generated.

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1. Introduction

In the standard neoclassical growth model, economic development is a smooth process where, in the presence of decreasing marginal returns, capital and GDP progressively converge to a steady state (Solow, 1954). However, in reality, growth does not evolve so smoothly but rather follows discontinuous paths, often punctuated by boom–bust cycles.

An important body of literature has addressed the presence of booms and busts by studying them in isolation from the endogenous process of long-run growth. In particular, this literature explains “sudden stops” and debt crises as a consequence of the interaction between credit markets imperfections and *exogenous and contemporaneous productivity shocks*, which are either cyclical (Arellano, 2008; Mendoza, 2008) or trend-like (Aguar and Gopinath, 2007).

In this paper I show how, at a theoretical level, boom–bust patterns can also be obtained by the interaction of credit market imperfections with the *neoclassical process of long-run growth*. In this sense, the paper builds a theory where some types of boom–bust patterns are explained as a natural consequence of the process of long-run growth. To show this point, I add two elements to the standard growth model. The first is some uncertainty surrounding the decreasing path

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for the marginal returns to the reproducible factor, i.e. capital (decreasing marginal returns are the key feature of the neoclassical model of long-run growth). The second is a financial imperfection which allows borrowers to default on their debt obligations. The financial imperfection gives rise to endogenous borrowing constraints, which represent the highest amount of debt that, at any given state, borrowers can commit to repay. With these two elements added to the neoclassical growth model, and appropriate assumptions on the structure of uncertainty, I show that there is a “turning point” along the long-run growth process where news about the decreasing path for marginal returns to capital triggers an endogenous and sharp tightening of the borrowing constraint. Consequently, at the turning point the economy moves from a credit and growth boom to a permanent credit and growth bust, and the sudden contraction in the supply of credit forces borrowers to default.

More precisely, the “turning point” is a random moment where agents learn that marginal returns to capital will start falling a bit more quickly than they had previously expected. To fix the ideas, the paper considers the simple example where the economy initially grows under constant marginal returns to capital. Let us define “turning point” the random moment when marginal returns eventually begin to follow a strictly decreasing path. Clearly, the arrival of the turning point is similar to a negative technological shock, bringing bad news about the production technology of the economy. An important, and somewhat surprising, result of the paper is that the boom–bust equilibrium pattern described above occurs at the turning point independently of the “size” of these bad news.

In our example, negative news can be said to be arbitrarily “small” when marginal returns to capital start falling at just an arbitrarily small pace. This means that it would take an arbitrarily long time before marginal returns were indeed significantly lower than their (constant) level before the turning point. Therefore, because of discounting, the negative news about a distant future is arbitrarily “small” from today’s perspective. In other words, contrary to the models with productivity shocks (Arellano, 2008; Mendoza, 2008; Aguiar and Gopinath, 2007), the particular type of “small” technological shock brought about by the turning point may not even generate any reduction in the present value of the representative household’s lifetime utility. As such, one could conjecture that these “small” news should be almost un consequential for the present behavior of agents, and hence for the aggregate economy. The core result of the paper is to show that this conclusion is not warranted, and that arbitrarily “small” negative news about the decreasing path of marginal returns are sufficient to cause booms and busts in credit and GDP growth. The linchpin for this result is what I call the *self-reinforcing property of growth and borrowing constraints*: high growth endogenously relaxes borrowing constraints and increases leverage, which in turn fosters higher growth and even larger borrowing constraints and leverage. Because of the self-reinforcing property, endogenous borrowing constraints turn out to be extremely sensitive to news about growth prospects which, within the neoclassical growth framework, are linked to the path of marginal returns to capital. This sensitivity implies that even arbitrary “small” bad news can be greatly amplified by the self-reinforcing property, leading to boom–bust cycles in credit and GDP growth.

The results of the paper bear some wider implications for the theory of endogenous borrowing constraints. In essence, the model provides an analytically simple proof that, in the presence of endogenous borrowing constraints, credit busts (preceded by booms) can be generated even without resorting to large or permanent productivity shocks that suddenly alter the present value of the representative borrower’s utility. In fact, thanks to the self-reinforcing property, the paper shows that credit busts are just caused by the arrival of news that the economy has to undertake an endogenous de-leveraging process. And even more importantly, the speed of this de-leveraging, which in the model depends endogenously on the speed of reduction in marginal turns to capital, is irrelevant in determining whether an endogenous boom–bust cycle occurs. How general are these results? One important goal of the paper is to emphasize that these results appear to be quite general, in the sense that they hinge only on one main property that the economy has to display at the macroeconomic level, i.e. that in equilibrium marginal returns have to be stochastically decreasing in the sense explained above (at the micro-level, the important assumption is that borrowers can renege on their debt obligations). From this point of view, the particular micro-economic mechanism at the source of the decreasing path for marginal returns is un consequential for the occurrence of a boom–bust equilibrium. To stress this point, and also to initially focus our attention only on the core mechanics, I present at first a basic economy where the micro-foundation for decreasing marginal returns is left unspecified, and is simply hard-wired into the model. Once the main results have been established, I then move to show how different micro-economic foundations make the results of the basic economy applicable to a variety of situations, from the accumulation of large stocks of foreign reserves in emerging economies, to the government’s use of export revenues in oil exporting countries, to the case of regional debt crises in countries with imperfect fiscal arrangements between the central government and regional borrowers. This brief overview of possible explicit micro-foundations for the model of booms and busts leads us to two interesting conclusions. The first is that the basic model has indeed the potential of being employed to study a variety of interesting real-world situations. Extending to those cases the results in this paper can be ground for future research. The second is that, under this framework with endogenous borrowing constraints, the imposition of exogenous prudential limits on leverage, aimed at avoiding the occurrence of boom–bust equilibria, tends to be (constrained) Pareto inefficient.

The basic model considers the case of a small open economy. In the context of the paper this choice is attractive for two reasons. The first is modeling convenience. In closed economies meaningful borrowing and lending relations, essential to my model, can be obtained only by departing from the representative agent framework. In an open economy, instead, we can keep the convenient representative agent assumption for domestic households, and let the interaction between representative domestic and foreign agents to be the source of equilibrium borrowing and lending. The second reason is that

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