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Growth and welfare effects of business cycles in economies with idiosyncratic human capital risk

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Abstract

This paper uses a tractable macroeconomic model with idiosyncratic human capital risk and incomplete markets to analyze the growth and welfare effects of business cycles. The analysis is based on the assumption that the elimination of business cycles eliminates the variation in idiosyncratic risk. The paper shows that a reduction in the variation in idiosyncratic risk decreases the ratio of physical to human capital and increases the total investment return and welfare. If the degree of risk aversion is less than or equal to one, then economic growth is enhanced. This paper also provides a quantitative assessment of the macroeconomic effects of business cycles based on a calibrated version of the model. Even for relatively small degrees of risk aversion (around one) the model implies that the elimination of business cycles has substantial effects on investment in physical and human capital, economic growth, and welfare.

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1. Introduction

In a highly influential contribution, Lucas (1987) argues that the welfare costs of business cycles are likely to be very small, and that therefore the potential benefits from counter-cyclical stabilization policy are negligible. His argument is based on a calibrated representative-agent model with no production, that is, Lucas (1987) assumes that there is no uninsurable idiosyncratic risk and that economic growth and business cycles are

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unrelated. This paper asks to what extent the introduction of market incompleteness and production changes Lucas' conclusions regarding the welfare cost of business cycles.

The current analysis is based on an incomplete-markets version of the class of endogenous growth models analyzed by, among others, Jones and Manuelli (1990) and Rebelo (1991).¹ More specifically, households are *ex ante* identical and have CRRA preferences, production displays constant returns to scale with respect to physical and human capital, and all markets are competitive. There are aggregate productivity shocks that affect the return to physical and human capital investment (stock returns and wages), and there are idiosyncratic human capital shocks that only affect human capital returns.² Conditional on the history of aggregate states, these idiosyncratic shocks are independently distributed over time and identically distributed across households. Finally, the financial market structure is incomplete in the sense that there are no assets with payoffs that depend on idiosyncratic shocks. However, households have the opportunity to trade stocks (accumulate physical capital) and any asset (bond) in zero net supply with payoffs that depend on the aggregate shock variable.

The incomplete-markets model analyzed in this paper is highly tractable in the sense that there is always one equilibrium allocation that is identical to the equilibrium allocation of an economy in which households consume and produce in autarky facing both aggregate and idiosyncratic risk. In other words, a recursive equilibrium of the incomplete-markets economy can be found by solving a one-agent decision problem, but this one-agent decision problem is not the one-agent decision problem associated with the complete-markets economy (idiosyncratic risk matters). Exploiting the tractability of the model, this paper first conducts a qualitative analysis of the growth and welfare effects of business cycles. The analysis assumes that the amount of idiosyncratic risk varies over the business cycle, and that the elimination of business cycles removes these variations in idiosyncratic risk leaving the average amount of idiosyncratic risk unchanged. The economic motivation for this assumption derives from recent empirical work (Storesletten et al., 2001a, and Meghir and Pistaferri, 2001) that has documented strong cyclical variations in uninsured idiosyncratic labor income risk, and the notion that counter-cyclical stabilization policy might eliminate these variations in idiosyncratic risk without changing the average amount of idiosyncratic risk (Atkeson and Phelan, 1994; Imrohoroglu, 1989, Krusell and Smith, 1999 and 2002, and Storesletten et al., 2001b).

The qualitative analysis shows that business cycles have the following general effects on growth and welfare. First, a reduction in the variation in idiosyncratic human capital risk makes human capital investment less risky, and therefore induces households to invest more in high-return human capital. Thus, economic growth always increases if total investment

¹ See also Alvarez and Stokey (1998) and Caballe and Santos (1993). Lucas (1988) analyzes a human capital model with externalities. Krebs (2003) uses a version of the current model with logarithmic utility function and no aggregate risk to study the growth and welfare effects of uninsurable idiosyncratic human capital risk.

² A negative human capital shock (depreciation shocks) might occur when firm- or sector-specific skills are either destroyed or made obsolete in the event of a job loss. Jovanovic (1979) and Ljungqvist and Sargent (1998) analyze search models with specific human capital, but they assume risk-neutral workers and do not model the accumulation of physical capital. Empirically, the permanent wage loss of displaced workers is substantial (Jacobson et al., 1993; Neal, 1995, and Topel, 1991) suggesting that job displacement is associated with large losses of firm or sector-specific human capital.

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