Long waves and short cycles in a model of endogenous financial fragility

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Abstract

This paper presents a stock-flow consistent macroeconomic model in which financial fragility in firm and household sectors evolves endogenously through the interaction between real and financial sectors. Changes in firms' and households' financial practices produce long waves. The Hopf bifurcation theorem is applied to clarify the conditions for the existence of limit cycles, and simulations illustrate stable limit cycles. The long waves are characterized by periodic economic crises following long expansions. Short cycles, generated by the interaction between effective demand and labor market dynamics, fluctuate around the long waves.

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1. Introduction

A financial crisis hit the U.S and world economy in 2008. Giant financial institutions have collapsed. Stock markets have tumbled, and exchange rates are in turmoil. Governments and central banks around the world have responded by implementing bailout plans for troubled financial institutions and cutting interest rates to contain the financial panic, and expansionary fiscal packages are being pushed through to prop up aggregate demand. Hyman Minsky's Financial Instability Hypothesis offers an interesting perspective on these developments, which came after a long period of financial deregulation, rapid securitization and the development of a range of new financial instruments and markets.1

According to Minsky's financial instability hypothesis, a capitalist economy cannot lead to a sustained full employment equilibrium and serious business cycles are unavoidable due to the unstable nature of capitalist finance (Minsky, 1986, p. 173). An initially robust financial system is endogenously turned into a fragile system as a prolonged period of good years induces firms and bankers to take riskier financial practices. During expansions, an investment boom generates a profit boom but this induces investors and banks to adopt more speculative financial arrangements. This is typically reflected in rising debt finance, which eventually turns out to be unsustainable because the rising debt changes cash flow relations and leads to various types of financial distress. Minsky suggests that this kind of endogenous change in financial fragility can generate debt-driven long expansions followed by deep depressions (Minsky, 1964, 1995). In Minsky's theory of long waves,

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1 Wray (2008), Cynamon and Fazzari (2008), Crotty (2009), among others, provide perspectives on how shaky are the foundations of these ‘sophisticated’ developments in financial markets.
short cycles fluctuate around the long waves produced by endogenous changes in financial structure. Thus, the distinction between short cycles and long waves is an important characteristic of Minsky’s cycle theory.


This paper presents a stock-flow consistent model where firms’ and households’ financial practices evolve endogenously through the interaction between real and financial sectors. The interaction between changes in firms’ and households’ financial practices produces long waves. The resulting long waves are characterized by periodic economic crises following long expansions. Short cycles, generated by the interaction between effective demand and labor market dynamics, fluctuate around the long waves.

Compared to the previous literature, this paper has three distinct features: first, the model in this paper is stock-flow consistent. Financial stocks are explicitly introduced and their implications for income and financial flows are carefully modeled. In particular, unlike the previous studies listed above, capital gains from holding stocks are not assumed away and enter the definition of the rate of return on equity. The rate of return on equity defined in this way provides a basis of households’ portfolio decision. Firms’ and households’ financial decisions jointly determine stock prices and the rate of return on equity in equilibrium. Thus, stock markets receive a careful treatment in this model and play a central role in producing cycles.

Second, this paper pays attention to both firms’ and households’ financial decisions. Minsky’s own account of financial instability tends to privilege the firm sector as a source of fragility. Most previous studies follow this tradition and tend to neglect the role of households’ financial decisions in creating instability and cycles. Some of the previous studies, including Taylor and O’Connell (1985), Delli Gatti et al. (1994), and Flaschel et al. (1998, Ch. 12), do not suffer from this kind of limitation but analyze households’ portfolio decision as well. However, their neglect of the role of capital gains in households’ portfolio decision makes it difficult to analyze the implication of households’ financial decisions and stock market behavior for instability and cycles. In contrast to these models, the model in this paper analyzes both households’ and firms’ financial decisions. Capital gains and stock markets are considered explicitly in a stock-flow consistent framework. The interactions between households and firms turn out to be critical to the behavior of the system. The model consists of two subsystems: firms’ debt dynamics and households’ portfolio dynamics. One interesting result of our analysis is that two stable subsystems can be combined to produce instability and cycles in the whole system (see Section 3). Thus, the resulting instability and cycles are genuinely attributed to the interaction between sectors rather than characteristics of one particular sector.

Lastly, existing Minskian models do not distinguish long waves from short cycles and the periodicity of cycles in those models is ambiguous. Our model is explicit in this matter. It produces two distinct cycles: long waves and short cycles. Long waves are produced by the interaction between firms’ and households’ financial decisions, while short cycles are generated by the interaction between effective demand and labor market dynamics. The key idea underlying Minsky’s financial instability hypothesis is that firms’, bankers’, and households’ financial practices change endogenously. In the real world characterized by complexity and uncertainty, agents’ financial practices are largely affected by norms and conventions, which include borrowing and lending standards as well as portfolio investors’ attitude to risks and uncertainty. Changes in these norms and conventions take time and tend to exhibit inertia. On this basis, it is surely more plausible to think that the drama of the financial instability hypothesis is more likely to play itself out over the course of a long wave rather than a single business cycle.

To the best of our knowledge, our model is the first to integrate an analysis of Minskian long waves with that of short cycles. The analysis of the implications of financial behavior for instability and cycles in this paper complements a previous study on financialization and finance-led growth in Skott and Ryoo (2008) where the emphasis is on the effects of changes in financial behavior on long-run steady growth path with little attention to questions of stability and fluctuations.
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