

Financial fragility and economic fluctuations

Serena Sordi^{a,b,*}, Alessandro Vercelli^{a,b}

^a *Dipartimento di Politica Economica, Finanza e Sviluppo, Università di Siena,
Piazza San Francesco 7, 53100 Siena, Italy*

^b *Centro per lo Studio dei Sistemi Complessi, Università di Siena, via Tommaso Pendola 37, 53100 Siena, Italy*

Received 24 October 2003; accepted 21 July 2004

Available online 14 July 2006

Abstract

This paper proposes a simple prototype model that describes the complex dynamics of a sophisticated monetary economy. The interaction between the current and intertemporal financial constraints on economic units brings about irregular fluctuations at both micro and macro levels. We use qualitative dynamic analysis and numerical simulations to investigate the interaction between financial fragility, modeled in terms of structural instability, and dynamically unstable financial fluctuations. The model, suggested recently by one of the authors, is here reformulated in more operational terms and extended in a number of new directions. © 2006 Elsevier B.V. All rights reserved.

JEL classification: B41; E12; E32; E52

Keywords: Complex dynamics; Structural instability; Financial fragility; Economic fluctuations; Numerical simulations

1. Introduction

In this paper, a monetary economy is defined as “one in which changing views about the future are capable of influencing the quantity of employment” (Keynes, 1936, p. xxii). In an economy of this kind, the interaction between current and intertemporal financial constraints generates cyclical fluctuations characterized by dynamic instability. This has been pointed out by a prestigious and diversified tradition of thought including, among others, Wicksell (1898), Fisher (1933) and Minsky (1982).

What, in our opinion, has not been thoroughly analyzed is the role of structural instability in this process. In this paper we intend to contribute to this analysis by interpreting the financial

* Corresponding author. Tel.: +39 0577232644; fax: +39 0577232661.
E-mail addresses: sordi@unisi.it (S. Sordi), vercelli@unisi.it (A. Vercelli).

fragility of economic units not as an index of dynamic instability, as is usually done in the above-mentioned literature, but as an index of structural instability. In fact, the higher the degree of financial fragility, the smaller the size of the shock that is sufficient to bring about a structural change in the behavior of the unit.¹

For well-known reasons (analyzed, for example, by Minsky, 1982), the fragility of financial units fluctuates pro-cyclically with financial fluctuations, increasing the danger of a severe financial crisis progressively in the boom phase. This raises an awkward dilemma for policy: when and how is it necessary to thwart the boom in order to avoid over-investment and an ensuing financial crisis? In order to answer this question it is crucial to understand the nature of the feedback between dynamic and structural financial instability. Therefore, in what follows we present a model that tries to capture, in the simplest possible way, the nexus between the financial fragility of economic units, conceived in terms of structural instability, and dynamically unstable financial fluctuations.

The approach adopted here is based on that suggested recently by one of the authors (Vercelli, 2000). The original model was based on heuristic arguments relying on mental experiments and phase diagrams in order to keep its intuitive intelligibility in economic terms and to clarify the underlying methodological issues. The models elaborated in this paper are analyzed by means of standard mathematical techniques and numerical simulations. The argument starts from a restatement of the original model that allows a derivation of results from rigorous dynamic theory and (local) stability analysis. This is a necessary step for introducing a series of modifications and extensions of the basic model in order to make it more pregnant and operational. In particular, we introduce a new version of the model that allows an extension of the analysis to a representative financial unit. This justifies the application of the same dynamic approach to the macroeconomic aggregates of the entire economy and the ensuing derivation of what is here called the financial multiplier. This allows an explicit discussion of the implications of financial fluctuations for the real economy and a more articulated discussion of a few policy implications of the approach here developed. We believe that in this version the approach may better reveal its constructive potential and act as a starting point for more complex and detailed analyses. We have retained, as far as possible, the simplicity of the original model, aiming to capture what we believe to be the essential mechanism of financial fluctuations and crisis: the interaction between current and intertemporal financial conditions. If this building block, as here restated and developed, can withstand critical scrutiny, further important features of financial fluctuations and crises may be added in the future.

The structure of the paper is as follows. In Section 2, Vercelli's original heuristic model of the dynamic behavior of a financial unit is restated and analyzed in formal terms. In Section 3, a variant of the model is suggested in order to analyze the behavior of a representative unit. In Section 4, on the basis of the model worked out in the preceding section, the dynamics of the financial aggregates of the entire economy are analyzed. In Section 5, the main implications of the financial fluctuations for the real economy are examined in some detail. In Section 6, a few tentative policy implications of the aggregate financial and real models of cyclical fluctuations and their interrelation are briefly discussed. In Section 7, some concluding remarks on the potential and the limits of our approach are briefly sketched.

¹ We assume that an economy is structurally unstable whenever, in consequence of a small shock ε , the qualitative properties of its dynamic behavior change. The distinction between structural ε -instability in the strict mathematical sense when the shock is infinitesimal and instability when the shock is small but finite was introduced in Vercelli (1991, 2001). In the latter case ε measures the minimum size of a shock that brings about a qualitative change in the dynamic behavior of the system. The concept of structural instability here utilized is that of ε -instability.

متن کامل مقاله

دریافت فوری ←

ISIArticles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات