



Sentiments, financial markets, and macroeconomic fluctuations[☆]

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ABSTRACT

This paper studies how financial information frictions can generate sentiment-driven fluctuations in asset prices and self-fulfilling business cycles. In our model economy, exuberant financial market sentiments of high output and high demand for capital increase the price of capital, which signals strong fundamentals of the economy to the real side and consequently leads to an actual boom in real output and employment. The model further derives implications for asymmetric nonlinear asset prices and for economic contagion and co-movement across countries. In the extension to the dynamic overlapping generations (OLG) setting, our model demonstrates that sentiment shocks can generate persistent output, employment, and business cycle fluctuations, and it offers some new implications for asset prices over business cycles.

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1. Introduction

The financial sector plays a central role in the modern economy, as is evident from the wide and deep macroeconomic impact of the recent global financial crisis in 2007–2009. There are at least two channels through which the

financial sector can influence the aggregate real economy (see, e.g., [Levine, 2005](#)): (1) the financing of capital; (2) the production of information about investment opportunities. An exploding financial accelerator literature has shown, both theoretically and empirically, that the financial sector can influence business cycles through the *financing* channel.¹ In this paper, we explore the feedback effect from the financial market to the real economy due to the *informational* role of financial prices. Unlike the conventional view that prices can help to efficiently allocate economic resources in a free market by signaling relevant information to economic actors ([Grossman and Stiglitz, 1980](#); [Hayek, 1945](#)), we argue that the informational role of financial

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¹ See, e.g., the seminal work of [Bernanke and Gertler \(1989\)](#) and [Kiyotaki and Moore \(1997\)](#) and a recent excellent survey by [Brunnermeier, Eisenbach, and Sannikov \(2013\)](#).

markets in allocating resources can be impaired by investors' sentiments or sunspots. The sentiment-driven asset prices in turn can influence real activities and shape macroeconomic fluctuations.

We are motivated by a large empirical finance literature documenting that investor sentiment in financial markets can affect asset prices (see, e.g., the surveys by Hirshleifer, 2001 and Baker and Wurgler, 2007). The aggregate- (macro-) level asset prices are in particular sensitive to investor sentiment, which in turn impacts corporate financing and investment (Lamont and Stein, 2006). The recent empirical work of Angeletos, Collard, and Dellas (2014) also finds that business cycle fluctuations can be attributed to sentiments. Levchenko and Pandalai-Nayar (2015) identify the sentiment shock as being more important than other factors in explaining business cycle co-movement between the US and Canada.

We formalize our idea in a simple baseline three-period rational expectations model consisting of a continuum of investors and workers. The investors live from period 0 to period 1. They are the initial capital owners. The workers live from period 1 to period 2. The only fundamental uncertainty in the economy is the aggregate total factor productivity (TFP) shock in the last period (period 2). We assume, in the baseline case, that only the investors have information about the TFP shock. The TFP shock in period 2 directly affects the workers' return on capital holdings in period 2 (which are their labor income savings from period 1) and, hence, their incentive to supply labor in period 1. As capital and labor are complements in production, the workers' labor supply in period 1 in turn affects the investors' return on capital held from period 0 to period 1. In such an economic environment, the investors in period 0 need to forecast the level of aggregate economic activity, that is, employment and output in period 1. On the other side, forming expectations about the behavior of the investors, the workers can obtain information from the price of capital in period 0 about the return on their capital savings for period 2. This two-way interaction between the financial market and the real economy is at the heart of our mechanism of sentiments.

Suppose that somehow exuberant sentiments lead the investors to believe there will be a boom in output in period 1. Then they conjecture that the demand for capital and, therefore, return on capital will be high. Competition in the financial market pushes up the capital price in period 0. However, the workers cannot tell whether the high capital price is due to the investors' sentiments or their signal of a high TFP in period 2. After solving a signal extraction problem, they will attribute the high price partially to a high TFP in period 2. Their actual labor supply will indeed increase, resulting in an actual boom in output in period 1. So the investors' initial belief will be confirmed. We show that there exist sentiment-driven equilibria, in which the capital price reflects both sentiment and TFP shocks. Under these rational expectations equilibria, Bayesian optimal signal extraction results in an actual labor supply of workers that is always equal to investors' conjectured labor supply.

The sentiment-driven fluctuation studied in our baseline model links the Keynesian notions of “beauty contests”

and “animal spirits”. What matters to an individual investor is not his own assessment of the fundamentals, but his conjecture about the actions of other investors, as in a standard beauty contest game. Under the feedback effect, the asset price can influence real decisions and generate complementarities between the actions of investors. Thus, the sentiment shocks in financial markets endogenously drive the fundamentals and generate aggregate output fluctuations.

In our framework of the macroeconomy with feedback effects, we also derive implications for asymmetric nonlinear asset prices and for economic contagion and co-movement across countries. First, we show that our sentiment-driven equilibria can be nonlinear: When the fundamental value is high, the asset price reflects only fundamentals; when the fundamental value is low, the asset price is driven by both fundamentals and sentiments. Essentially, if investors perceive that the real side of the economy is affected by sentiments only for low fundamentals, their beliefs can become self-fulfilling under the two-way feedback. In such nonlinear equilibria, the price informativeness is asymmetric in fundamentals and the asset price exhibits a large discontinuity such that asset price collapses occur sometimes with a small change in economic fundamentals. This can help explain some asset price puzzles, as, for example, documented by Cutler, Poterba, and Summers (1989). Second, empirical evidence suggests that asset price contagion cannot be explained by fundamentals.² A prominent feature of the recent Great Recession is that it was global, even affecting many emerging countries with heavy capital controls. Perri and Quadrini (2013) find that all major industrialized countries experienced extraordinarily large and unprecedentedly synchronized contractions in output and asset prices. Our model is able to characterize such synchronization. Due to the informational feedback between the financial market and the real economy, investors' perception of synchronization across countries can lead to actual synchronization.

Finally, we extend our baseline model to a dynamic setting of an overlapping generations (OLG) model. In the dynamic setting, the current savings of workers become the capital stock in the subsequent period. The capital stock, therefore, is dynamically linked across periods through savings. In the sentiment-driven equilibria, capital accumulation, as well as output and employment, is driven not only by the private future productivity signals received by investors, but also by their sentiments. Hence, i.i.d. sentiment shocks can generate persistent fluctuations in output and unemployment. As persistence is a defining feature of all business cycles, this extension illustrates that sentiments also hold the promise of explaining the persistence in real data. While building a full dynamic stochastic general equilibrium (DSGE) model and confronting it with data is beyond the scope of this paper, the mechanisms developed herein can lay the ground for such work.

² See, e.g., the findings of Karolyi and Stulz (1996) and King and Wadhwani (1990).

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