



РОССИЙСКАЯ ЭКОНОМИЧЕСКАЯ ШКОЛА

NEW ECONOMIC SCHOOL

Imperfect Information and Bounded Rationality with Applications to Macroeconomic Dynamics

Alexei Deviatov
The New Economic School

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Abstract

A few decades ago macroeconomics was a field of its own. Now there is an understanding that macroeconomics should have explicit micro foundations. This project aims to look into several traditional arenas of macroeconomics from the microeconomics standpoint. Specifically, we focus on the role of imperfect information and bounded rationality for the real business cycle, growth, and money.

1 Overview

For a long time macroeconomics had been a field quite of its own. The empirical failures of 1970s have caused a major shift towards understanding of the importance of things, which had long been within the realm of microeconomics — things such as information and expectations. Bringing in of the former has reinforced what we now call a neoclassical economics; bringing in of the latter has resulted in a celebrated rational expectations revolution.

By now there is a wide understanding of a sheer importance of having microeconomic foundations in macroeconomic models; indeed, the very boundary between the two fields is now blurred to the point where it is difficult to discern where one field ends and the other begins. Non-walrasian markets, imperfect information, adverse selection, moral hazard, and many other microeconomic developments are now standard ingredients of dynamic general equilibrium macroeconomic models. The hope is that such models will eventually help to reconcile the theory and the empirics of the world around us.

This project aims to contribute towards development of micro-based macro models. The scope is broad: the topics I offer cover some important aspects of the business cycle, long-run growth, and monetary economics. Here I only very briefly outline some of the topics; one can get a more detailed insight into the subject matter by looking at some of the papers on the reading list below.

1.1 Search, incomplete information, and price dynamics

Short-run fluctuations in economic activity generally referred to as the business cycle is one of the major headaches for economics profession. Whereas calibrated general equilibrium models fail in many dimensions, there is a long-standing debate between the two schools of thought — new classicals and new keynesians. The subject of the debate is the speed of adjustment towards equilibrium. Classicals argue that adjustment is fast, so that the economy is never too far from the equilibrium; keynesians think that the economy can be off its equilibrium path for considerable periods of time. By large, the debate boils down to how long following the initial shock relative prices can differ from market-clearing prices. Keynesians point to observed price stickiness and produce theories consistent with such observations; the

standard ingredients of new keynesian models are imperfect competition, costly price adjustment (or the “menu costs”), and real rigidities. Classicals emphasize importance of imperfect information, higher-order expectations, and limited ability of individuals to process available information.

Here we look at what imperfect information has to do with price stickiness; our goal is to build a model which would be capable of generating price setting behavior a lá Calvo (1983). The key friction we introduce is search: tastes and incomes are heterogenous, centralized markets are absent, so that sellers can learn local income distribution (which is relevant for optimal price setting) only through their trade experience. Because search brings in uncertainty regarding sales (sellers do not observe incomes of buyers they trade with and buyers remain anonymous), it may take a while before sellers decide they have enough evidence that a price increase will not scare away customers. In such a case even small menu costs can generate substantial price rigidity, so that firms will change prices occasionally and at random — a kind of price setting behavior postulated by Calvo.

1.2 Optimal patent protection and long-run growth

It has been long recognized that free dissemination of know-how may impede incentives to innovate. On the other hand, too much of patent protection may depress innovation when innovation is sequential and complimentary. In environments where the length and/or breadth of patent protection is difficult to manipulate, incomplete enforcement of patent rights may become socially optimal as a way to mitigate overprotection implied by full enforcement of patent law. The idea runs counter with conventional wisdom that full patent enforcement is a must, however, it appears to be quite natural in a schumpeterian world with strong “creative destruction” of patents and high enough product diversification.

1.3 Bounded rationality and monetary stability

Over the recent years there has been a considerable advance in studying monetary theory and policy in environments which feature nice micro foundations of money. It has been shown that such models have steady states with valuable fiat money, yet under rational expectations these monetary steady states fail to be expectationally stable. This, among other things,

implies that prolonged circulation of fiat money is difficult to explain if individuals are fully rational. One way to get around the problem is to study price dynamics under bounded rather than full rationality. This can be done by adopting the classifier system as a model of artificial intelligence and by using genetic algorithm as a learning device.

1.4 Sunspots, legal restrictions, and exchange-rate puzzles

Since the collapse of the Bretton Woods system in 1973 the real success in explaining exchange-rate behavior is a list of exchange-rate puzzles. Whereas different people have put various things on their lists, there seem to be four most important empirical facts: exchange rates are disconnected from fundamentals, exchange rates are much more volatile than fundamentals, there is little difference in behavior of nominal and real exchange rates, and there is no volatility conservation. The latter means that contrary to predictions of standard “monetary” models of exchange rates, volatility of fundamentals is virtually unchanged following an exchange rate regime shift.

Whereas there is no model which has a good grasp of all four puzzles, some of the models are consistent with some of the puzzles. The literature seems to evolve along the two dimensions: one end there are “sunspot” exchange-rate models where exchange-rate volatility is purely non-fundamental, while on the other end there are models where exchange-rate volatility is a reflection of volatility of fundamentals. The latter models introduce various imperfections into otherwise perfect markets in order to amplify the underlying volatility of fundamentals to what would seem consistent with the data. At this point, there are two models in that literature which seem to be consistent with the four puzzles: Devereux and Engel (2002) and Deviatov and Dodonov (2005). The former model assumes local currency pricing, heterogeneous product distributions, and noisy expectations; the latter assumes search, legal restrictions, and small markup shocks. Here we plan to build a sunspot model consistent with exchange-rate empirics; such model can be thought of as an extension of Manuelli and Peck (1990) with legal restrictions and non-tradable goods.

Notice that these are the topics that I find interesting by myself; the fact that I list them here does not mean that I am unwilling to advise students on topics of their choice. However, it should be understood that if someone

plans to come up with his/her own topic, that topic should line up with the main direction of this project, which is the effects of imperfect information and bounded rationality on dynamics in macro models. Other than that, there are no restrictions. Welcome to the journey!

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