Behavioral economics and macroeconomic models

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ABSTRACT

Over the past 20 years, macroeconomists have incorporated more and more results from behavioral economics into their models. We argue that doing so has helped fixed deficiencies with standard approaches to modeling the economy—for example, the counterfactual absence of inertia in the standard New Keynesian model of economic fluctuations. We survey efforts to use behavioral economics to improve some of the underpinnings of the New Keynesian model—specifically, consumption, the formation of expectations and determination of wages and employment that underlie aggregate supply, and the possibility of multiple equilibria and asset price bubbles. We also discuss more broadly the advantages and disadvantages of using behavioral economics features in macroeconomic models.

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1. Introduction

Over the past 20 years, researchers have incorporated an increasing number of results from behavioral economics into macroeconomic models. There are two main reasons for this change. First, it has become clear to macroeconomists that models based on assumptions of optimizing behavior in many cases have difficulty accounting for key real-world observations. Hence researchers have used behavioral economics assumptions with the aim of making their model predictions better fit the data. Early attempts to do this were criticized as being *ad hoc*. The force of this criticism has been reduced by the second reason for incorporating behavioral economics results into macroeconomics: cognitive psychologists and experimental economists have documented a number of systematic deviations between the decisions of human beings and those of the "economic man."

The economics profession has widely, though by no means universally, acknowledged the empirical support for puzzles that can be explained by behavioral features. Moreover, behavioral features have been introduced in many parts of macroeconomics. Where have these development led us? Which assumptions should one now make when analyzing macroeconomic questions? The aim of this paper is to provide a selective survey of the implications of insights from behavioral economics for macroeconomic models.

We argue that the insights from behavioral economics have led to important progress in our understanding of macroeconomic phenomena by allowing us to explain more aspects of real world behavior than we could with the more restrictive theoretical framework that most economists have been using. Some behavioral assumptions that have already been implemented in macroeconomic models, such as fairness considerations, seem especially promising to us. In other cases, we sus-

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pect that behavioral assumptions are needed for explaining macroeconomic puzzles—such as the inertial response of the economy to shocks—but are uncertain which assumptions are the best one. There are still other results from cognitive psychology whose macroeconomic implications have not been explored.

Incorporating behavioral assumptions into macroeconomic models is not without its problems. Even if there is considerable microeconomic evidence from cognitive psychology or experimental economics for certain behavioral features, it is often difficult to know which features are most relevant for macroeconomic models. For example, while there is strong evidence for inertia in macroeconomic consumption behavior, it is less clear whether this inertia should be viewed as the outcome of habit formation, rule-of-thumb consumption, or other alternatives. Another open issue is whether macroeconomic models should incorporate behavioral features or other deviations from the standard economic model, like financial frictions, limited information or agency problems. Thus, there is a need for more research to guide the choice of model specification.

Given the widespread impact of behavioral economics on macroeconomics, it has been necessary to narrow the discussion somewhat. We focus on economic fluctuations, unemployment and saving, as these are all core macro areas which have incorporated results from behavioral economics heavily.[1] As an organizing principle, we use modifications to the New Keynesian model. Although that model is very widely used to analyze economic fluctuations and to evaluate the effectiveness of different approaches to monetary policy, it has some notable empirical deficiencies. Efforts to remedy those problems have been focused on different approaches to modeling consumption, expectations formation, and nominal wage and price setting. We will discuss those areas, and also use the discussion of consumption to study longer-run consumption and savings topics and the discussion of wage and price setting to study longer-run labor market issues. We will neglect issues related to finance, growth and happiness, although we will include a brief discussion of multiple equilibria, the effects of news, and asset market bubbles, because of their close association with economic fluctuations. Within each topic, we will discuss key innovations based on behavioral assumptions, as well as non-behavioral alternatives. Regrettably, space constraints will imply that the presentation will have to be selective also within the topics that are covered.

The rest of the paper is organized as follows. Section 2 provides a brief summary of the New Keynesian model and notes some of its key empirical failings. Section 3 discusses attempts to improve the model of consumption which underlies the New Keynesian model, and also discusses other attempts to better model longer-run consumption and savings decisions. Section 4 discusses efforts to improve models of aggregate supply, either by reconsidering how expectations are formed or by incorporating behavioral features of wage and employment determination. Section 5 discusses multiple equilibria, news, and asset market bubbles. Section 6 provides some broader critiques of behavioral economics. Section 7 concludes.

2. The New Keynesian model and its problems

The New Keynesian model is frequently used for analysis of economic fluctuations and macroeconomic policy. It shares many features with the older IS/LM-AD/AS framework still frequently employed in undergraduate textbooks, but has the advantage of being derived from an optimizing framework—which also facilitates comparisons with other dynamic stochastic general equilibrium (DSGE) models. Its simplest version has three equations.[2]

1. The *New Keynesian IS Curve*, which relates the output gap—the difference between the current and the natural rate of output —to the expected real interest rate and the expected future output gap. It is derived from the consumption Euler equation, usually with the additional simplifying assumptions that investment and government purchases are exogenous.
2. A *Monetary Policy Reaction Function*, which relates the current nominal interest rate to inflation and the output gap. Often Taylor's (1993) rule is used. When combined with the New Keynesian IS curve, it forms an aggregate demand curve relating the output gap and inflation.
3. The *New Keynesian AS Curve*, which relates current inflation to expected future inflation and the output gap. It can be derived in several ways, but the most common are to use the contracting models of Taylor (1980) or Calvo (1983), in which nominal wage or price schedules, respectively, are set several periods in advance.

These may be represented as:

$$\tilde{y}_t = E_t\tilde{y}_{t+1} - \alpha(i_t - E_t\pi_{t+1} - r_t^*) + \varepsilon_t^{IS} \tag{1}$$

$$i_t = r_t^* + E_t\pi_{t+1} + \theta_\pi(\pi_t) + \theta_y(\tilde{y}_t) + \varepsilon_t^{MP} \tag{2}$$

$$\pi_t = \beta E_t\pi_{t+1} + \gamma(\tilde{y}_t) + \varepsilon_t^{AS} \tag{3}$$

where $\tilde{y}_t$, the output gap, is the difference between current output y_t and the natural rate of output y_t^*; E_t is the conditional expectations operator as of time t, i_t is the nominal interest rate; π_t is inflation; r_t^* is the equilibrium real interest rate (labeled the "Wicksellian" real interest rate by Woodford, 2000); and $\varepsilon_t^{IS}, \varepsilon_t^{MP}$, and ε_t^{AS} are exogenous disturbances to the IS curve,

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[1] This distinguishes this paper from several excellent recent related surveys, like Duffy (2012) on experimental macroeconomics, Chakravarty et al. (2011) on experimental economics more generally, and Hommes (2011) on the formation of expectations.
[2] See Clarida et al. (1999), Romer (2011), Walsh (2010), and Woodford (2003a) for more discussion and derivations.