

A Short Course on
Estimation and Policy Analysis of Equilibrium Monetary
Models

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I will discuss the construction and use of dynamic stochastic general equilibrium (DSGE) models in the analysis of monetary policy. We will begin with the estimation of DSGE models, with a special focus on the role that estimated Vector Autoregressions (VAR) can play. We will then move on to discuss several monetary policy issues that have received much attention in recent years. The course is targeted to a range of people. The lectures are designed so that students who have little time outside of class for preparation and study will see the basic ideas. In addition, a set of homework assignments has been prepared for people who want to dig in much deeper. The assignments give students hands-on experience estimating VARs, as well as solving, simulating and analyzing DSGE models. It is not necessary to do the assignments to follow the lectures.

**Estimation of a Dynamic, Stochastic, General
Equilibrium Model**

Here, we discuss a strategy for using data to construct an econometrically sound general equilibrium model that can

be used to study alternative monetary policies. This strategy begins by estimating a Vector Autoregression, which is used to identify the dynamic effects of monetary policy and other shocks. A dynamic general equilibrium model is then formulated and estimated based on this reduced form. In the course of this discussion, we will discuss various nominal frictions that have appeared in the literature, including sticky prices, sticky wages and limited participation in financial markets. Because of the general equilibrium nature of the model, all aspects of the macro economy matter in determining the quality of model fit. This includes features of the economy that are not traditionally associated with the monetary transmission mechanism, such as the structure of labor markets and the nature of investment and consumption decisions, as well as the degree to which capital is specific to the firm in which it is located. As a result, our discussion will necessarily also involve these features of the economy.

[lecture notes](#), [readings](#)

Optimal Monetary and Fiscal Policy

We turn to the *analysis* of monetary models. We start with the most basic question: ‘what is the *optimal* monetary policy?’ To make the question interesting, we will formulate it in the context of an economy where the government must finance its expenditures with distortionary taxes. We address a debate between Milton Friedman and Edmund Phelps. The former argued that the

optimal monetary policy sets the nominal rate of interest to zero, to minimize the distortions associated with economizing on cash balances. The latter argued that this conclusion does not hold up when account is taken of the fact that the government must finance its expenditures with distorting taxes. In an environment like this, argued Phelps, it is desirable to spread taxes over many different things, including money. This involves some inflation and, hence, positive nominal interest rates. We will address the Friedman-Phelps debate using the tools of public finance, by studying Ramsey equilibria. We will do so in a model economy (the Lucas-Stokey cash-credit good model) that incorporates the features emphasized by both Friedman and Phelps in their debate. This model does not incorporate sticky prices. We will also review the implications for optimal monetary policy of sticky prices.

[lecture notes](#), [readings](#)

Policy in the Absence of Commitment

We explore the importance of institutions in determining whether the optimal monetary and fiscal policy will in fact be implemented. In particular, we examine the properties of equilibrium ('Markov Perfect Equilibrium') when a government cannot commit to its future policy. We ask whether the ups and downs observed in inflation in the past several decades could reflect a lack of commitment in monetary policy institutions. To do this, we will make use of micro-founded, general equilibrium versions of the models initially proposed in classic papers by Kydland-

Prescott and Barro-Gordon for this purpose. We will also investigate the interaction between lack of commitment and asymmetric information in monetary policy.

[lecture notes](#), [readings](#)

The Operating Characteristics of Simple Policy Rules

We will analyze the operating characteristics of alternative monetary policy rules, without modeling explicitly the optimization problem of the monetary authority. We will in particular emphasize the recent literature on Taylor rules. This is a monetary policy strategy under which the monetary authority raises the interest rate when expected inflation is high, and reduces it when it is low. We will discuss the reasons why people have proposed this rule, as well as some of the pathologies associated with it. For example, we will explore the argument that a Taylor rule which assigns insufficient weight to inflation laid the groundwork for the ‘Great Inflation’ of the 1970s. We will also explore the possibility that a Taylor rule which assigns too much weight to inflation may inadvertently contribute to a stock market boom-bust cycle such as the ones experienced in the US in the 1920s or the 1990s. We will explore the idea that a policy of monitoring the monetary aggregates may reduce the likelihood of pathologies associated with the Taylor rule. Finally, we will explore the idea that a commitment to low inflation could, in conjunction with the zero lower-bound on the nominal

interest rate, expose the economy to falling into a ‘liquidity trap’.

[lecture](#) notes on 1970s and Taylor rule pathologies; [lecture](#) notes on boom-bust cycle ([assignment #4](#)); lecture notes on liquidity trap to be added later. [Readings](#)

Monetary Policy and Financial Markets

Considerable attention has been given to the appropriate monetary policy in a ‘Sudden Stop’. These are financial crises experienced by several emerging market economies in which domestic output and employment collapse and the current account swings sharply from negative to positive. We will review one model of a ‘Sudden Stop’, according to which it is triggered by a tightening of collateral constraints on foreign borrowing. The economic collapse is brought on by the resulting inability to finance crucial foreign intermediate inputs. The monetary policy question is how best to set the domestic nominal interest rate under these circumstances. In practice, countries in a ‘Sudden Stop’ initially raise the domestic interest rate sharply, and then reduce it. We will explore what features of the environment make such a policy optimal. At a technical level, the analysis will expose the student to a standard small open economy model with a traded and non-traded goods sector. In addition, we will discuss how the presence of binding collateral constraints may profoundly affect the nature of the monetary transmission mechanism.

[lecture](#) notes, [reading](#).