EABCN Training School
Monetary-Fiscal Policy Interactions
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1 Course Introduction

The course aims to provide some of the background necessary to understand and conduct research at the frontier of monetary-fiscal policy interactions. The precise lectures covered appear below. The first part of this sketch describes other background material that is necessary to understand the lectures.

1.1 Current Issues

Current issues are typically couched in terms of dynamic stochastic general equilibrium models with nominal rigidities, often referred to as "New Keynesian" models. The workhorse model is a three-equation system that can easily be manipulated analytically and numerically.

To understand where that system of equations comes from one needs a background in general equilibrium monetary models. With the inclusion of capital accumulation and/or elastic labor supply, these models are simply monetary versions of the canonical real business cycle setup. In their basic form, these models deliver implications that are contrary to conventional wisdom and empirical evidence. For example, the basic models imply that a serially correlated expansion in the growth rate of the model supply *raises* the nominal interest rate and *reduces* output. Extensions of the models that retain the assumption that wages and prices are perfectly flexible and determined in competitive spot markets do not deliver quantitatively believable results.

Research over the past decade or so has focused on various schemes for bringing the predictions of general equilibrium monetary models in line with empirical evidence. The most popular scheme dispenses with the assumption of perfect competition in goods or labor markets and then assumes the presence of nominal rigidities. The simplest variant assumes monopolistically competitive goods markets, so that firms are price setters. But firms are not free to adjust their prices every period. When this market structure and pricing behavior are embedded in an otherwise standard monetary model with elastic labor supply, the result is a simple dynamic, stochastic model with three equations. The first—an "IS" type of relationship—comes from the household's consumption Euler equation and relates current output to expected output and the ex-ante real interest rate. The second—a Phillips curve, or "aggregate supply" equation—comes directly from pricing behavior and relates current inflation to expected inflation and some notion of current demand for goods. The model is typically closed by assuming that monetary policy controls the short-term nominal interest

rate and adjusts that rate in response to inflation and a measure of the state of the business cycle. This is the New Keynesian model.

New Keynesian models have become the workhorse for monetary policy analysis. They have formed the basis for studies of the operating characteristics of various policy rules, of descriptions of optimal monetary policy, of presentations conceptual frameworks for inflation targeting, and even of estimated econometric models. More complicated versions of these estimated dynamic stochastic general equilibrium models are now in use in many central banks around the world.

Much current research continues to have at its core some version of the basic New Keynesian model. Because that is a model designed to study *only* monetary policy, it cannot be applied to analyze future issues without significant alterations that give fiscal policy a non-trivial role.

1.2 Future Issues

Future issues—and here I am using my judgment to forecast what set of issues will be most pressing in the future—will center on interactions between monetary and fiscal policies. This forecast is based on the observation that in many countries fiscal forces are likely to become more pressing over the next few decades. A few examples include: world-wide demographic shifts that imply aging populations and the consequent rise in demands for government social programs; the growing consensus that low and stable inflation is a desirable goal of macroeconomic policies suggests there is substantial resistance to generating needed revenues through seigniorage; increased integration and sophistication of financial markets means the dynamic implications of changes in macro policies are likely to be understood and responded to quickly; organized resistance to raising taxes in many countries (especially true of the United States); monetary union(s) imply that each country has less flexibility in monetary policy than in the past. How does explicitly accounting for monetary and fiscal interactions change mainstream monetary analyses?

We are already seeing a number of central banks that have begun to worry about fiscal issues. The ECB, for example, has directed its staff to study monetary-fiscal interactions, including political economy aspects of the issue. The Reserve Bank of New Zealand has begun to ask questions about how fiscal disturbances affect the ability of a small open economy to target inflation. The Bank of Korea, like many central banks, issues nominal debt in order to generate exchange rate stabilization funds; as a consequence, the BoK has been asking what, if any, implications such debt issuances have for price level stabilization.

The first step in this analysis is to move away from the trivialization of fiscal policy that is common in models of monetary policy. Those models usually introduce monetary injections by means of "helicopter drops/sucks" whose fiscal conseqences are exactly offset with lump-sum taxes/transfers. Because there is no consequent change in the state of government indebtedness (as there would be from a conventional open-market operation), the usual policy scheme eliminates any dynamic links between current monetary policy and future monetary/fiscal policies. It should be understood that this scheme is *special* and the resulting predictions of the impacts of monetary policy are equally special. Other, equally or more plausible, schemes can produce very different monetary impacts.

That monetary and fiscal policies intrinsically interact has been recognized at least since

Friedman (1948) and Hansen (1958). Christ (1967, 1968) showed that the values of Keynesian "multipliers" in existing models can be quite different once one explicitly accounts for the existence of a government budget constraint. Thirty years ago Tobin (1980) pointed out the implicit fiscal assumptions underlying then-popular monetary analyses.

Modern work on monetary/fiscal policy interactions really begins with Sargent and Wallace (1981). That paper was the first to explore the potentially dramatic implications that can arise when fiscal behavior imposes restrictions on monetary policy. Their analysis emphasizes the intertemporal implications that have become the hallmark of modern macroeconomics. The "fiscal theory of the price level" can be construed as another application of the implications of fiscal restrictions on monetary policy, though the mechanism by which fiscal disturbances affect the economy is very different from Sargent and Wallace's mechanism. The course will explore these issues, including some exploration of how the nature of equilibrium is altered when monetary and fiscal policy regimes are subject to recurring change.

1.3   Technical Background

The lectures will presume familiarity with general equilibrium models of the real business cycle variety, and well as familiarity with techniques like dynamic programming, Kuhn-Tucker lagrangian methods, linearization of dynamic stochastic model, and methods for solving linear rational expectations models. Some excellent sources for information about these techniques are: Blanchard and Kahn (1980); Blanchard and Fischer (1989); Sargent (1987a,b); Stokey, Lucas, and Prescott (1989); Marimon and Scott (1999); Sims (2001). Economists whose backgrounds do not include all of these techniques can nonetheless follow the *economic* content of the mini-course.

2   Background Readings

There are now several good textbooks that deal with monetary economics. In increasing order of technical difficulty, four such books are: Walsh (2003), Galí (2008), Woodford (2003), and Ljungqvist and Sargent (2004). Some of the following readings will come from these texts. Walsh offers a broad overview of monetary theory and policy, but suffers from the fact that his general equilibrium monetary models are linearized before a rich set of analytical implications are extracted. Gali presents monetary policy analysis in a single class of models, the new Keynesian dynamic stochastic general equilibrium models. Woodford pushes analytical methods very far, but it is by no means a survey of the literature. Instead, it is narrowly focused on the models currently in use for policy analysis. Ljungqvist and Sargent is a broad overview of macroeconomic research. Their chapter on "Monetary Doctrines" is especially useful for our purposes.

What follows is just a smattering of the work that exists. These references can get you started and will point you toward further readings.

2.1 Classic Papers

These are papers that at some point every monetary economist should read. I include them largely for background, as I will not explicitly discuss them.

Friedman (1948, 1956, 1968b); Tobin (1961, 1969, 1980); Brunner and Meltzer (1971, 1972, 1993).

2.2 Empirical Surveys

These papers use identified vector autoregressions to obtain a set of empirical facts about monetary policy and about fiscal policy. Unfortunately, none of these considers monetary and fiscal policies jointly. No existing empirical work connects well with the theoretical literature on interactions. I will refer to, but not directly present, these papers.

Walsh (2003, chapter 1); Gordon and Leeper (1994); Leeper, Sims, and Zha (1996); Christiano, Eichenbaum, and Evans (1999); Leeper and Roush (2003); Blanchard and Perotti (2002); Perotti (2004); Mountford and Uhlig (2009); Giannitsarou and Scott (2006); Chung and Leeper (2007); Favero and Giavazzi (2007); Cwik and Wieland (2009); Coenen, Erceg, Freedman, Furceri, Kumhof, Lalonde, Laxton, Lindé, Mourougane, Muir, Mursula, de Resende, Roberts, Roeger, Snudden, Trabandt, and in't Veld (2010)

2.3 General Equilibrium Models of Money

There are a variety of methods that researchers use to put money into general equilibrium models with complete Arrow-Debreu contingent claims markets. What follows is a sampling of those methods.

2.3.1 Money-in-the-Utility Function

Walsh (2003, chapter 2); Sidrauski (1967); Brock (1974, 1975); Sargent (1987a, chapter 4).

2.3.2 Cash-in-Advance

Walsh (2003, chapter 3); Stockman (1981); Lucas and Stokey (1987); Sargent (1987a, chapter 5).

2.3.3 Transactions Costs and Shopping Time

Walsh (2003, chapter 3); Feenstra (1986); Sims (1989); McCallum and Goodfriend (1987).

2.3.4 Limited Participation and the Credit Channel of Monetary Policy

Walsh (2003, chapters 5.2 and 7); Friedman (1968a); Leeper and Gordon (1992); Fuerst (1992); Christiano (1991); Nason and Cogley (1994); Evans and Marshall (1998).

2.4 Interest Rate Rules for Monetary Policy

In the past decade it has become commonplace to model central banks as controlling a short-term nominal interest rate, rather than a money stock, as in past modeling. This change in modeling strategy has spawned some interesting issues.

Taylor (1993); Kerr and King (1996); King and Wolman (1996); Woodford (2003, Part I, Section 2, pp. 61-138); Alvarez, Lucas, and Weber (2001); Taylor (1999).

2.5 Monetary Models with Nominal Rigidities

2.5.1 Monopolistic Competition

Blanchard and Kiyotaki (1987).

There are now many excellent introductions to the canonical New Keynesian model. Many of these exist only as lecture notes available on the internet. With some careful searching using Google, under key words like "new keynesian," "general equilibrium models," "nominal rigidities," "sticky prices," among others, you can find some useful notes.

2.5.2 The Canonical New Keynesian Model

Walsh (2003, chapter 5); Calvo (1983); Yun (1996); Clarida, Galí, and Gertler (1999, 2000); Woodford (2003, Part I, Sections 3-4, pp. 139-319); Galí (2002); Chari, Kehoe, and McGrattan (2000); King (2000); Galí (2008)

2.5.3 Estimated New Keynesian Models

Ireland (2001); Lubik and Schorfheide (2004); Smets and Wouters (2003a,b, 2007); Christiano, Eichenbaum, and Evans (2005)

2.5.4 Optimal Monetary Policy in New Keynesian Models

Woodford (2003, Part II, Section 6, pp. 381-463); Clarida, Galí, and Gertler (1999); Erceg, Henderson, and Levin (2000); Galí (2008)

3 EABCN Training School Lectures

What follows is an outline of the material that I will cover during the EABCN Training School in September 2010. Lecture notes will be available to be downloaded. The following sketch lists the topics covered and the relevant reading material for the lectures.

Lecture 1. Simple Models of Policy Interactions: Some Monetary Doctrines

Ljungqvist and Sargent (2004, chapter 24), Sargent and Wallace (1981); Aiyagari and Gertler (1985); McCallum (1984)

Lecture 2. Fiscal Theory of the Price Level

Walsh (2003, chapter 4); Leeper (1991, 1993); Woodford (1995, 2001); Cochrane (1999, 2005, 2001); Sims (1994, 1997, 2004, 2008) Christiano and Fitzgerald (2000); Bassetto (2002); Kocherlakota and Phelan (1999); Buiter (2002)

Lecture 3. Policy Interactions with Tax Distortions

Gordon and Leeper (2006), Gordon and Leeper (2005); Leeper and Yun (2006), Leeper and Yang (2008); Traum and Yang (2009, 2010)

Lecture 4. Generalizing Policy Interactions

Canzoneri, Cumby, and Diba (2001); Davig and Leeper (2006, 2007, 2010a); Chung, Davig, and Leeper (2007); Farmer, Waggoner, and Zha (2010)

Lecture 5. The Lucas Critique

Lucas (1976), Sims (1982, 1987), Sargent (1984), Leeper and Zha (2003)

Lecture 6. Foresight: Theory and Econometrics

Quah (1990); Hansen and Sargent (1991); Lippi and Reichlin (1994); Yang (2005); Beaudry and Portier (2006); Jaimovich and Rebelo (2009); Leeper, Walker, and Yang (2008, 2009a); Mertens and Ravn (2009a,b,c); Ramey (2010); Leeper and Walker (2010); Romer and Romer (2010); Schmitt-Grohé and Uribe (2010)

Lecture 7. Efficacy of Fiscal Stimulus

Elmendorf and Mankiw (1999); Romer and Bernstein (2009); Gordon and Leeper (2005); Corsetti and Muller (2008); Corsetti, Meier, and Muller (2009); Christiano, Eichenbaum, and Rebelo (2009); Cochrane (2010); Leeper and Yang (2008); Leeper, Plante, and Traum (2010); Davig and Leeper (2010b); Leeper, Walker, and Yang (2009b); Uhlig (2010); Leeper (2010b)

Lecture 8. Fiscal Limits and Fiscal Stress

Bi (2009), Bi and Leeper (2010), Leeper (2010a), Davig, Leeper, and Walker (2010b,a), Daniel and Shiamptanis (2010)

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