

# Understanding the Fiscal Theory of the Price Level

by Lawrence J. Christiano and Terry J. Fitzgerald

Lawrence J. Christiano is a professor of economics at Northwestern University and a visiting scholar at the Federal Reserve Bank of Cleveland; Terry J. Fitzgerald is an economist at the Bank. The authors benefited from discussions with Stefania Albanesi, Marco Bassetto, Charles Carlstrom, Martin Eichenbaum, and Timothy Fuerst. They thank John Cochrane, Christopher Sims, and Michael Woodford for their tireless efforts to educate them on the fiscal theory.

## I. Introduction to the Fiscal Theory of the Price Level

Price stability is an important goal of public policy. To reach this goal, two key questions must be addressed:

- How can price stability be achieved?
- And,
- How much price stability is desirable?

Standard monetarist doctrine offers a simple answer to the first question: Make sure the central bank has an unwavering commitment to price stability. Recently, though, some economists have begun to rethink the foundations of this doctrine, giving rise to an alternative view in which a tough, independent central bank is not sufficient to guarantee price stability. In this view, price stability requires not only an appropriate monetary policy, but also an appropriate *fiscal* policy.<sup>1</sup> Because fiscal policy receives so much attention in this new view of price-level determination, Michael Woodford has called it the *fiscal theory of the price level*.<sup>2</sup> Throughout this review, we refer to it as the *FTPL*.

Monetarist doctrine also recognizes that both fiscal and monetary policy must be

selected appropriately if price stability is to be achieved. However, this doctrine holds that if the central bank is tough, the fiscal authority will be *compelled* to adopt an appropriate fiscal policy.<sup>3</sup> The FTPL denies this. It says that unless steps are taken to ensure appropriate fiscal policies, the goal of price stability may remain elusive no matter how tough and independent the central bank is.

The FTPL has significant implications for the way central banks conduct business. The conventional view prescribes that central bankers should stay away from fiscal authorities to reduce the likelihood of being pressured into

■ 1 Cochrane (2000) goes so far as to say that monetary policy may be *irrelevant* to price determination. In his view, government-provided transactions assets are a vanishing component of all financial assets traded.

■ 2 Benhabib, Schmitt-Grohe, and Uribe (2000), Cochrane (1998a, 2000), Dupor (2000), Leeper (1991), Sims (1994, 1999), and Woodford (1994, 1995, 1996, 1998a,b,c, 1999) all advocate the FTPL, while Buiter (1999), Carlstrom and Fuerst (2000), Kocharlakota and Phelan (1999), and McCallum (1998) provide critical reviews.

■ 3 This classic statement is from Sargent and Wallace (1981); see especially the last paragraph of their paper.

making poor monetary policy decisions. The FTPL implies that central bankers with a mandate to foster price stability must do more than simply make sure their own house is in order; they also must convince the fiscal authority to adopt an appropriate fiscal policy.

The FTPL literature also draws attention to the second question—how much price stability is desirable?—which is both important and difficult. Sims (1999) and Woodford (1998a) point out that allowing the price level to fluctuate with unexpected shocks to the government budget constraint produces public finance benefits.<sup>4</sup> For example, a bad fiscal shock such as a war or natural disaster drives up the price level; this is equivalent to taxing the holders of the government's nominal liabilities. This promotes efficiency to the extent that it allows the authorities to keep labor tax rates smooth. In practice, this benefit is likely to be mitigated by whatever distortionary costs may be associated with price instability.<sup>5</sup> Cochrane (1998b) is mindful of these costs when, in his analysis, he simply takes for granted that complete price stability is a fundamental social objective.<sup>6</sup> Sims (1999) claims that public finance benefits overwhelm the distortionary costs associated with volatile prices, and so he conjectures that complete price stability is non-optimal. A convincing answer to the second question awaits a quantitative study that carefully balances benefits and costs.

This paper explains the FTPL and elaborates on its implications for the two questions posed above, as well as for other issues. In the remainder of this introduction, we provide an overview of our analysis. We first discuss the crucial assumption that differentiates the FTPL from the conventional view. Next, we summarize some of the key issues that any assessment of the FTPL must confront, then briefly describe other issues addressed in the FTPL literature. Finally, we emphasize the connection between the FTPL and the traditional Ramsey literature on optimal monetary and fiscal policy.

### What Distinguishes the FTPL?

The difference between the conventional view and the FTPL does not lie in any error of logic.<sup>7</sup> Instead, the two differ in their views of the government's intertemporal budget equation. That equation says the value of government debt is equal to the present discounted value of future government tax revenues net of expen-

ditures (that is, surpluses), where both debt and surpluses are denominated in units of goods. This equation is expressed as

$$(1.1) \quad \frac{B}{P} = \text{present value of future surpluses,}$$

where  $B$  is the outstanding nominal debt of the government and  $P$  is the price level. The conventional view holds that this equation is a constraint on the government's tax and expenditure policy;<sup>8</sup> that is, policy must be set so the right side equals the left, whatever the value of  $P$ . According to this view, when equation (1.1) is disturbed, the government must alter its expenditures or its taxes to restore equality. FTPL advocates, however, argue there is no inherent requirement that governments treat this equation as a constraint on policy. In their view, the intertemporal budget equation is instead an equilibrium condition: When something threatens to disturb the equation, the market-clearing mechanism moves the price level,  $P$ , to restore equality.

Michael Woodford has called this assumption—that government policy is not calibrated to satisfy the intertemporal budget equation for all values of  $P$ —the *non-Ricardian assumption*. Another way of stating this assumption is that if the real value of government debt were to grow explosively, no adjustments to fiscal and monetary policy would be made to keep it in line.<sup>9</sup>

■ 4 For previous discussions, see Chari, Christiano, and Kehoe (1991), Judd (1989), and Lucas and Stokey (1983).

■ 5 See Woodford (1998a, pp. 59–60) for an elaboration of this point.

■ 6 Cochrane (1998b) emphasizes the need for some type of government security whose payoff fluctuates with shocks to the government budget constraint but does not generate the sort of distortionary costs associated with a fluctuating price level.

■ 7 Some authors are concerned with the possibility the FTPL may be logically incoherent (see Buiter [1999]). We address these concerns, in part, by presenting a class of economic environments in which the FTPL is logically coherent.

■ 8 Our notion of taxes includes seignorage revenues and taxes on the return to government debt, that is, default.

■ 9 Technically, we are exploiting the equivalence between the intertemporal budget equation and a certain transversality condition. We discuss this equivalence later in the text and in the appendix.

The FTPL does not anticipate exploding debt. Rather, as long as there is absolutely no doubt about the government's commitment to *not* adjusting fiscal policy in the face of exploding debt, then prices will respond in such a way that the debt will not explode in the first place.

## Assessing the FTPL

To evaluate the FTPL, it is useful to focus on the following positive and normative issues. Is the non-Ricardian assumption empirically plausible?<sup>10</sup> Does the FTPL offer a compelling explanation for episodes of high inflation? And finally, does the FTPL provide useful input into the design of socially efficient policies?

Clearly, the non-Ricardian assumption is not a good characterization of policy in *all* times and places. Often governments do seem ready to adjust fiscal policy when the debt gets too large. For instance, when the U.S. government debt began to increase in the 1980s and 1990s, there was considerable pressure for some combination of a tax increase and expenditure decrease to bring the debt back in line.<sup>11</sup> Likewise, according to the Maastricht Treaty, members of the European Union formally record their intention to adjust fiscal policy in the event their debts grow too large. Another example is provided by the International Monetary Fund. That organization uses an array of sanctions and rewards to encourage member countries to keep their debts in line by suitably adjusting fiscal policy.

For the FTPL to be an interesting positive theory, it need not hold in all situations. As Woodford (1998b) emphasizes, it may provide a useful characterization of actual policies in some contexts, even if it does not in others. For example, the government budget constraint was essentially absent from standard macroeconomic models of the 1960s and 1970s, and it played little role in Keynesian policy analysis (Sargent [1987, p. 112]). As a result, it is perhaps reasonable to suppose the non-Ricardian assumption held for that period.<sup>12</sup> Loyo (1999) argues that Brazilian policy in the late 1970s and early 1980s was non-Ricardian and that the FTPL provides a compelling explanation for Brazil's high inflation during that time.<sup>13</sup>

Even if, in practice, policy has never been non-Ricardian, the FTPL might still hold interest as a normative theory, for two reasons. First, optimal policies might themselves be non-Ricardian.<sup>14</sup> Second, the FTPL could serve as useful input into policy design, even if non-Ricardian policies are, in practice, *bad*. To see why they might be bad, consider legislators living in a non-Ricardian regime. Understanding that tax cuts or increases in government spending do not necessarily have to be paid for with higher taxes later, they might be tempted to embrace policies that imply too much spending and too much debt. Restricting fiscal policy

by limiting government debt may be an effective way to deal with this problem.<sup>15</sup> By establishing the logical possibility of non-Ricardian policy, the FTPL implies that such policies could occur, in the absence of specific measures to rule them out. As a result, the FTPL can be used to articulate a rationale for the type of debt limitations imposed by the IMF and by the Maastricht Treaty.

## Other Issues Addressed by the FTPL

Although we stress the implications of the FTPL for the two questions posed above, they are not the exclusive or even primary focus of the literature. The FTPL has plenty to offer, even for those with no interest in our two questions. FTPL advocates emphasize the value of their framework for understanding price-level determination when traditional quantity-theoretic reasoning breaks down or does not apply. This

■ **10** The empirical plausibility of the non-Ricardian assumption poses a special challenge, because it cannot be assessed based on time series alone. For further discussion, see "Is the Non-Ricardian Assumption Empirically Plausible?" on page 8 of the present article.

■ **11** Woodford (1998b) acknowledges that the political reaction to growing debt in the 1980s and 1990s (as well as other considerations) indicates U.S. policy during the past two decades is probably not well-characterized as non-Ricardian (see also our section "The FTPL and the Control of Average Inflation" on page 18). He argues that earlier episodes in U.S. postwar history—for example, the 1965–79 period—might be better characterized in this way.

■ **12** See Woodford (1998b) for an elaboration of the argument that U.S. policy may have been non-Ricardian in the 1960s and 1970s.

■ **13** One wonders whether it makes sense to assume that a theory like the FTPL, which focuses on the long-run properties of fiscal policy, holds for some periods and not others.

■ **14** See Sims (1999) and Woodford (1998a).

■ **15** Chari and Kehoe (1999) describe a model in which countries form a monetary union, and, absent debt constraints, the result is excessive debt. Woodford (1996) argues that a union without debt constraints is likely to end up with excessive price volatility. His reasoning uses the kind of logic surveyed in this paper. He notes that if policy is non-Ricardian, then fiscal shocks must show up as shocks to the price level, regardless of monetary policy. (We call this "Woodford's really unpleasant arithmetic" in "The FTPL with Stochastic Fiscal Policy" on page 15.) He argues that price-level instability arising from this source is likely to be excessive in a monetary union that adopts a non-Ricardian policy. It is precisely because he believes non-Ricardian policy is a realistic possibility—a possibility which, in this case, he thinks is bad—that he approves of the explicit debt restrictions incorporated into the Maastricht Treaty. For another similar discussion of the potential dangers of non-Ricardian policy, see Woodford (1998a, p. 60).

could happen, for example, if the monetary authority adopted a policy of pegging the rate of interest, so that the money supply would respond passively to demand. This case deserves emphasis because interest rate targets are thought to play an important role in monetary policy in practice (see Taylor [1993]).<sup>16</sup> Another scenario of interest occurs when private transactions involve no use of government-provided money. This review presents examples to illustrate the interest rate pegging and cashless economy scenarios.

### Frank Ramsey and the FTPL

Our cashless economy example highlights the parallels between the FTPL and the traditional literature on optimal monetary and fiscal policy inspired by Frank Ramsey (1927) and reintroduced into macroeconomics by Lucas and Stokey (1983).<sup>17</sup> In the Ramsey literature, government “policy” is a sequence of actions (tax rates, expenditures, etc.) indexed by the date and (in models with uncertainty) by the realized value of shocks. Because these policies are not functions of past prices, prices exist such that the debt explodes and households refuse to buy it. Such possibilities are of no concern in the Ramsey literature because the government is viewed as having selected its policy before prices are determined, and it is taken for granted that only equilibrium prices occur.<sup>18</sup> In equilibrium, demand equals supply in all markets, including those for government debt.<sup>19</sup> We think of non-Ricardian policies as corresponding to the type contemplated in the Ramsey literature.

In the Ramsey literature, there is a concern that policies may not be time consistent, in the sense that they are not consistent with the government’s incentives to implement them in real time. We believe these concerns may also apply to the FTPL. Consider again the situation in which the price level rises when there is a bad shock to the government budget constraint. In this situation, private agents may suspect the government will resort to high prices as an easy way to renege on debt. In this case, the policy backfires, with agents refusing to accumulate government debt in the first place. To avoid this outcome, it is necessary to convince potential holders of government debt that they will receive subsidies when good things happen to the government constraint.<sup>20</sup> However, there may be times and places in which the

institutional and other social structures needed to achieve the required degree of credibility do not exist.

The remainder of this review is organized as follows: Part II makes most of our points in a one-period environment. By adopting such a simple setup we are able to get to the basic ideas without technical complications. At the same time, some issues simply cannot be discussed in a one-period environment; we defer these to part III. Part IV presents a simple model for thinking about the desirability of price fluctuations under the FTPL in an environment with no government-provided money. Part V provides concluding remarks.

■ **16** For a recent analysis of the case in which the interest rate is not pegged but is allowed to move around with variations in the state of the economy, see Benhabib, Schmitt-Grohe, and Uribe (2000).

■ **17** Sims (1999) and Woodford (1998a) emphasize these parallels.

■ **18** Implicitly, we are taking a particular stand on what constitutes government policy in a Ramsey–optimal policy setting. Strictly speaking, Ramsey theory tells us only what government actions are taken in the best equilibrium. There may well be many government policy rules that result in the same Ramsey equilibrium, where a policy rule specifies government actions as a function of the realization of exogenous and endogenous variables. Different policy rules imply different policy actions out of equilibrium. Woodford (1998a, 1999) clarifies the distinction between the government’s policy rule and the Ramsey-equilibrium outcomes. He computes Ramsey-equilibrium outcomes and then searches for Taylor-like interest rate rules which support those outcomes as an equilibrium. In this paper, we take the position that the government’s policy actions in a Ramsey equilibrium are the government’s policy rule.

■ **19** In Ramsey theory and in the FTPL, market prices exist where government policy commits to infeasible actions. For example, there may be prices where the government commits to paying for goods with money financed from new debt issues, which no one buys. By focusing on equilibrium prices only, standard practice ignores these possibilities. Bassetto (2000) argues this is a mistake and proposes alternative equilibrium concepts to deal with the problem.

■ **20** See Chari, Christiano, and Kehoe (1991) for a detailed analysis.