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# Optimal monetary policy in a Phillips-curve world

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**Abstract**

In this paper, we study optimal monetary policy in a model that integrates the modern theory of unemployment with a liquidity model of monetary transmission. Two policy environments are considered: period-by-period optimization (time consistency) and full commitment (Ramsey allocation). When the economy is subject to productivity shocks, the optimal policy is pro-cyclical. We also characterize the long-term properties of monetary policy and show that with commitment the optimal inflation rate is inversely related to the bargaining power of workers. Both results find empirical support in the data.


*JEL classification:* E5; E6; J64

*Keywords:* Matching; Unemployment; Liquidity channel; Time-consistent policy

"*Despite its disrepute within important academic and policymaking circles, the Phillips Curve persists in US data. Simple econometric procedures detect it.*" Thomas Sargent, 1998

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## 0. Introduction

A robust empirical feature of post-war US data is the positive correlation between inflation and employment, which is commonly referred to as the Phillips-curve relation (see [28]). This empirical feature supports the view that inflationary monetary policies have expansionary effects on the real sector of the economy, at least in the short-run. The goal of this paper is to study the optimal monetary policy in a model in which there is a direct link between these policies and employment.

We study a general equilibrium model where the real side of the economy is characterized by a search and matching framework with equilibrium unemployment. In this framework, we introduce a monetary sector in which changes in the supply of money affects the nominal interest rate by changing the supply of loanable funds (liquidity effect). The change in the interest rate, in turn, affects the financing cost of firms and impacts on the real sector of the economy. In this way the model captures the ‘‘cost channel’’ of monetary transmission that Barth and Ramey [5] find significant for the propagation of monetary shocks. This channel is also consistent with recent empirical studies that find significant liquidity effects of monetary policy shocks.[1]

We consider two policy environments. In the first environment we assume that monetary policy interventions are decided on a period-by-period basis, and the monetary authority cannot credibly commit to long-run plans (time-consistent policy). In studying the time-consistent policy, we restrict the analysis to policies that are Markov-stationary, i.e., policy rules that only depend on the current (physical) states of the economy. In the second policy environment, we assume that the monetary authority is able to commit to long-term plans (Ramsey allocation).

There are two main findings. The first finding concerns the *cyclical* properties of the optimal policy while the second concerns the *long-term* properties. Regarding the cyclical properties, we show that in both policy environments the optimal policy is pro-cyclical when business cycle fluctuations are driven by technology shocks: it increases the stock of money when employment and output are high and reduces the stock of money when they are low. Further, the optimal growth rate of money is positively correlated with employment and output. Both features—the pro-cyclicality of the monetary aggregates and the money growth—characterize the post-war history of the US economy as documented in [11].

The second finding is that there are important differences between the long-term properties of the time-consistent policy and the long-term properties of the optimal policy with commitment. We show that when the worker's share of the matching surplus is small and the employer's share high, the time-consistent policy is less inflationary than the optimal policy with commitment. This result contrasts with earlier studies of optimal monetary policy, such as [4,21].

The intuition for these results is simple. Consider first the pro-cyclicality of the optimal policy. After a positive productivity shock, the demand for loanable funds increases due to the firms' desire to expand production. The increase in the demand

[1] See, for example [10,18,22].