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Monetary policy with heterogeneous households and imperfect risk-sharing ☆

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ABSTRACT

This paper considers a sticky-price model with heterogeneous households and financial frictions. Financial frictions lead to imperfect risk-sharing among households with idiosyncratic labor incomes. I study implications of imperfect risk-sharing for optimal monetary policy by documenting its impacts on the monetary transmission mechanism, the inflation–output tradeoff faced by the central bank, the policy objective function, and the resulting targeting rule. The main finding is that while the central bank continues to have the conventional dual mandate — the output gap and inflation stabilization — it should place a greater weight on the later as the degree of financial frictions increases because price stability provides the additional benefit of reducing undesired consumption dispersion.

1. Introduction

In reality, workers have heterogeneous labor skills. Consider two types of workers — dentists and carpenters for example. Each type produces a differentiated product and service, which generally results in different labor incomes. In addition, it is not easy for each type to learn a new skill and migrate to another specialty, especially in the short-run. Moreover, various financial frictions may prevent them from sharing their income risks perfectly.

In this environment with labor skill/income heterogeneity, this paper studies the implications of imperfect risk-sharing for optimal monetary policy. To the best of my knowledge, most of the literature on optimal monetary policy in standard sticky-price frameworks (also known as New Keynesian (NK) models) either assumes frictionless complete asset markets, or equivalently relies on a 'fictitious' representative household that consists of all types of workers. The assumption makes consumption distribution efficient and degenerate at all times, thereby precluding consideration of the policy implications of risk-sharing. This property is in contrast to most empirical analyses that have found risk-sharing is imperfect and thus consumption distribution across households is in general inefficient.[2]

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[2] For example, see Attanasio and Davis (1996) and Hayashi et al. (1996). Also see the comments of Nelson (1994) on Mace (1991)'s result.

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To consider a range of risk-sharing conditions, this paper introduces frictions in transferring resources between heterogeneous households, which I refer to as "*financial frictions*", into an otherwise perfect risk-sharing economy and documents how this affects equilibrium consumption allocation, the monetary transmission mechanism, and the central bank policy objectives. I then examine if monetary policies well-designed under the conventional assumption of perfect risk-sharing (or a representative household) work in a more general environment. I summarize the main results in the subsequent paragraphs.

First, this paper demonstrates that the familiar policy prescription, often referred to as "flexible inflation targeting", that attempts to stabilize two aggregate indices, inflation and the output gap, continues to characterize optimal monetary policy.[3] The central bank does not need to pay attention to any other aggregate or disaggregate variables or construct an index to address the inefficiency caused by financial frictions. However, eliminating financial frictions (or assuming perfect risk-sharing) is *not* a good simplification for evaluating monetary policies. This paper argues that in the presence of financial frictions, stabilizing inflation provides the additional benefit of reducing undesired consumption dispersion. Therefore the central bank should adopt "stronger" inflation targeting. In sum, while the central bank should continue to target inflation and the output gap, it should place a larger relative weight on inflation stabilization.

However, in an environment with financial frictions, the 'cost' of stabilizing inflation increases as well as the benefit. Imperfect risk-sharing amplifies price stickiness endogenously, reducing the slope of the NK Phillips curve for a given degree of nominal rigidities (Lee, 2012). As a result, under financial frictions the central bank faces a less favorable inflation–output gap tradeoff than in an environment without these frictions. In adjusting the inflation rate, the central bank would have to tolerate a larger deviation of output from its efficient level. In other words, the 'cost' of inflation stabilization is higher. Thus "stronger" inflation targeting under financial frictions does not necessarily result in inflation actually being more stable than it would be in an environment without financial frictions.

More generally, financial frictions generate macroeconomic as well as microeconomic inefficiencies. On the one hand, in a model with staggered price setting, unstable inflation leads to undesired dispersion of prices/productions across industries. This leads to variation in labor incomes across households, and when risk-sharing is imperfect, inefficient dispersion in household consumption: deviation of the cross-sectional distribution of household consumption from the first-best distribution. On the other hand, financial frictions flatten Phillips curve and hence aggravate inefficiency in macroeconomic dynamics. Stabilizing inflation more would reduce the microeconomic inefficiency in the allocation of household consumption, but the cost of moving inflation closer to the optimal target rate, which is zero in our stylized framework, is greater macroeconomic inefficiency: a larger deviation of output from its efficient level.

Therefore the central bank must consider the magnitude of the extra benefit and cost of stabilizing inflation, marginally generated by financial frictions, in the design of optimal monetary policy. Policymakers should stabilize inflation more aggressively only when the extra benefit exceeds the extra cost, or equivalently when the microeconomic effect of financial frictions (consumption dispersion) dominates the macroeconomic effect (output deviation) in affecting household welfare.

The paper shows that the microeconomic inefficiency dominates the macroeconomic inefficiency when the degree of financial frictions is sufficiently large (yet in a reasonable range), and argues that this is precisely the situation when financial frictions have potentially significant implications for monetary policy. The finding suggests that the central bank should monitor financial market conditions and shift a weight from the output gap stabilization to inflation stabilization when financial markets do not function well for agents' risk-sharing.

The paper proceeds as follows. After discussing the related literatures, I present the model in Section 2. Section 3 then discusses the impacts of financial frictions on the model structural equations. Section 4 shows the impact of financial frictions on the loss function of the central bank that maximizes household welfare and presents the main results on optimal monetary policy. Section 5 summarizes the results and concludes.

Related literature I employ a simple variant of a textbook NK model — detailed in Woodford (2003) — as a laboratory for three main reasons. First, NK models have recently become the workhorse for monetary policy analysis, and often serve as the basis for large-scale models used at central banks.[4] Second, the basic model is simple enough to show the main results analytically. In this regard, I deliberately avoid using more elaborate sticky-price models.[5] Third, Woodford's basic NK model features segmented labor markets across industries, which naturally generates labor income heterogeneity across households who work in different industries. This "industry-specific" labor market specification is widely used in NK literature because not only it is arguably more realistic (at least in the short-run as argued in Woodford (2003) and also at the beginning of this paper) relative to the opposite extreme specification (i.e. common economy-wide factor markets), but also it enhances strategic complementarity in price settings, which improves models' consistency with micro evidence on the frequency of price changes.[6]

[3] Inflation and output gap are the only variables that enter the central bank's loss function. The term "flexible" inflation targeting was first introduced in Svensson (1999). According to Svensson (2009), most inflation-targeting central banks (if not all) currently conduct flexible inflation targeting rather than "strict" inflation targeting that puts zero weight on output gap stabilization.

[4] The standard NK models are presented in many textbooks such as Woodford (2003), Walsh (2003), and Gali (2008). Benigno (2004), Clarida et al. (1999, 2002), Erceg et al. (2000), Benigno and Woodford (2008) and others document various issues in monetary policy in NK frameworks.

[5] See Christiano et al. (2005) and Smets and Wouters (2003, 2007) for leading examples of medium-scale sticky-price DSGE models.

[6] The implications of industry (or firm) specific factor markets on NK Phillips curve have been examined in many papers including Sveen and Weinke (2007), Schmitt-Grohe and Uribe (2006), Altig et al. (2011), Woodford (2003, 2005), and Lee (2010).