Money and price posting under private information

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Abstract

We study price posting with undirected search in a search-theoretic monetary model with divisible money and divisible goods. Ex ante homogeneous buyers experience match-specific preference shocks in bilateral trades. The shocks follow a continuous uniform distribution, and the realizations of the shocks are private information. We show that there exists a unique monetary equilibrium for generic values of the inflation rate. In equilibrium, each seller posts a continuous pricing schedule that exhibits quantity discounts. Buyers may spend nothing, a fraction or all of their money holdings, depending on their preference-shock realizations. Inflation reduces the extent of non-linear pricing. The model captures the hot-potato effect of inflation along both the extensive margin, as an increase in the trading probability, and the intensive margin, as higher fractions of money being spent.
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1. Introduction

In this paper, we develop a monetary search model with private information and use the model to study how inflation affects the seller's pricing decision and the buyer's spending pattern. The model has three main features: buyers are randomly matched with sellers; buyers experience

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match-specific preference shocks and have private information about the realizations of the shocks; and the terms of trade are determined by sellers making take-it-or-leave-it offers. This trading protocol is termed *price posting with undirected search* in the monetary search literature. "Undirected" captures the feature that buyers cannot choose which sellers to go to (this is in contrast with competitive or directed search, where sellers post and commit to prices, and buyers observe the prices and direct their search toward sellers who offer the highest expected trading surplus). During a match, the seller makes a take-it-or-leave-it offer through monopolistic pricing and offers a menu of price-quantity pairs from which the buyer can choose. The model has a unique monetary equilibrium in which sellers post a non-linear pricing schedule that exhibits quantity discounts, and buyers spend a fraction of or their entire money holdings contingent on the realizations of their preference shocks. There are two major implications about the effects of inflation on trading behaviors: first, inflation reduces the extent of non-linear pricing; and second, inflation induces buyers to speed up spending, so the model is able to capture the hot-potato effect of inflation.

One of our main contributions is to complement the existing search-theoretic monetary literature on price posting with undirected search. Under this trading protocol, monetary equilibria do not exist with public information. When the nominal interest rate is positive, buyers incur a costly ex ante investment when they decide to carry money. The existence of monetary equilibria hinges critically on the condition that buyers extract some trading surpluses during the monetary exchange to cover the investment cost. With public information, sellers would propose terms of trade to extract the entire trading surplus. Monetary equilibria would unravel as a result. In the literature, private information about match-specific preference shocks has been introduced to restore monetary equilibria in this class of models. The presence of private information forces sellers to share some trading surpluses with buyers that could cover the cost of holding money.

Three other papers study price posting with undirected search in monetary economies. Jafarey and Masters [9] and Curtis and Wright [3] use the indivisible-money framework of Trejos and Wright [23]. Curtis and Wright [3] study the case where there are multiple ($\geqslant 2$) discrete realizations of the preference shock. Jafarey and Masters [9] assume that the preference shock follows a uniform distribution. More recently, Ennis [4] extends price posting with undirected search to a divisible-money framework, as in Lagos and Wright [13], with the preference shock following a two-point distribution. In all three papers, each seller a single price (if money is indivisible) or a single price-quantity pair (if money is divisible). At the aggregate level, at most two prices are observed in equilibrium, a result labelled as the "law of two prices" by Curtis and Wright [3]. As for buyers, they make binary choices, spending either nothing or their entire money holdings. Our study complements the existing literature by considering a model with divisible money and a continuous uniform distribution of the preference shock. The new environment leads to a different trading pattern. Instead of offering a single price, sellers post a continuum of price-quantity pairs that exhibits quantity discounts. For buyers, the dichotomous decision to spend nothing or all is replaced by a continuous choice, with the fraction of spending ranging from 0 to 100%.

The other main contribution of our paper is to provide a useful framework to study private information in monetary economies. As described in the previous paragraph, introducing a continuous distribution of the preference shock to a model with divisible money generates more variation in the trading pattern. This feature enables us to analyze how private information shapes the trading pattern, and how inflation affects the trading behavior in the presence of private information. In this paper we are particularly interested in two aspects of the trading behavior: the seller's pricing choice and the buyer's spending decision.