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# Price setting, price dispersion, and the value of money: or, the law of two prices<sup>☆</sup>

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## Abstract

We study models combining search, money, price posting, and preference shocks. We show how these features interact to influence the price level and price dispersion. First, price-posting equilibria exist with valued fiat currency. Second, although both are possible, price dispersion is more common than a single price. Third, we prove that generically there cannot be more than two prices. We provide intuition for this *law of two prices*, show it also holds in some nonmonetary search models, and discuss variations of the assumptions under which it may not hold.

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## 1. Introduction

We analyze search-based models of monetary exchange along the lines of Shi (1995) or Trejos and Wright (1995), but in contrast to the majority of papers in this literature,

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we assume sellers post prices *ex ante* rather than having traders bargain after they meet. Price posting is a common assumption in nonmonetary models, and it seems natural to explore its implications in monetary theory. However, in the standard Shi–Trejos–Wright model, equilibria with valued fiat currency do not even exist with price posting. To see why, recall Diamond’s (1970) result from nonmonetary models: there is a unique price-posting equilibrium, it has a single price, and this price gives all the gains from trade to sellers. In a monetary model, since buyers get no gains from trade, the value of fiat currency falls to zero—i.e., the monetary equilibrium unravels and the unique equilibrium is the nonmonetary equilibrium.

Hence, one needs to change the basic Shi–Trejos–Wright model in some way to even discuss price posting. It is known from the literature on price dispersion in nonmonetary models that assuming some type of heterogeneity may overturn Diamond’s results. For example, in the context of the labor market, Albrecht and Axell (1984) show that if workers differ in their intrinsic values of leisure there can exist equilibrium where different firms post different wages (see also Diamond, 1987). As we will show, this idea does *not* work in a monetary economy: if some agents enjoy permanently higher utility from consumption, monetary equilibria still unravel and fiat currency still cannot be valued. Hence, we add match-specific shocks; i.e., we assume that the utility of a buyer differs randomly across meetings.

We show that with match-specific shocks there *can* exist price-posting equilibria with valued fiat currency. Given that we can have monetary equilibrium, our main goal is to study the nature of the equilibrium price distribution. We first show that equilibria with nondegenerate distributions exist, and indeed are more common than equilibria with a single price in the following sense: at least in some cases one can show that single price equilibria exist for a strict subset of the parameters for which there exist equilibria with price dispersion. Finally, and perhaps most surprisingly, we prove that generically there are *at most two* prices posted in equilibrium. This is our law of two prices.

In terms of the related literature in monetary economics, there do exist a few papers with price posting, including Green and Zhou (1998), Zhou (1999), Jafarey and Masters (2003), Faig (2002) and Camera and Winkler (2002), all of which adopt some deviation from the basic Shi–Trejos–Wright framework (e.g., in Green and Zhou match-specific heterogeneity results because different agents hold different amounts of money). We discuss some of this work in more detail later, but it is worth emphasizing that our focus is very different: those papers confine attention to single-price equilibria, either by making assumptions to rule out equilibria with price dispersion or simply by not looking for such equilibria; our interest is precisely on the nature of equilibrium price dispersion.<sup>1</sup>

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<sup>1</sup>A recent paper that does study price dispersion in a monetary search model is Head and Kumar (forthcoming), although they take a different approach: instead of match-specific preferences shocks they assume some buyers may get to see more than one price at a time, as in Burdett and Judd (1983). It is also true that some bargaining models, like Camera and Corbae (1999) or Molico (2001), have price dispersion because agents negotiate conditional on the circumstances of their meetings, including their cash holdings. The goal here is to study distributions in *posted* prices, following the tradition in nonmonetary search theory.

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