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Entry costs and labor market dynamics ☆

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ABSTRACT

We study the cyclical dynamics of the value of a vacant position in labor markets characterized by search and matching frictions. We present a model of aggregate fluctuations in which firms face sunk costs to enter the production process. Our specification of sunk costs gives rise to a countercyclical value of a vacancy. We find that this overlooked object has important quantitative implications for the study of labor markets and business cycles. It affects the cyclical dynamics of the surplus division between workers and firms, and provides a better characterization of the movements in income shares over recessions and expansions. Understanding movements in the value of a vacant position helps to link the dynamics of income shares with recent volatility puzzles found in models of search and matching in labor markets.

1. Introduction

This paper studies the interaction between entry costs and the uncertainty a firm faces, upon entry, about matching with appropriate workers. The goal is to investigate the role of that interaction in explaining observed cyclical dynamics in the labor market. To that end we have developed an equilibrium environment in which a firm's production decision is the outcome of a multi-period process. In the initial period, firms enter the market by paying a sunk cost. Paying this cost gives the firm the option to undertake investments in recruiting activities. These investments increase the probability of matching with a worker. Loosely speaking, this multi-period process resembles a time-to-build technology: a sequence of investments in entry costs and recruiting activities yields profits several periods hence. We find that, as with earlier models of fluctuations, these investment delays help to generate cyclical patterns in the time series that are consistent with empirical counterparts. The interaction between entry costs and a frictional labor market generates fluctuations in factor prices, factor income shares, and labor market variables, with properties similar to those observed in U.S. data.

Prior to any decision regarding production or hiring, potential entrants research product demand, shop for low financing costs, or engage in costly negotiations with market regulators. Once these costs are expended, firms are uncertain about their ability to find appropriate workers. Production takes place only when firms are successfully matched to workers.

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Elsewhere,[2] work has shown that entry costs propagate shocks in otherwise standard equilibrium models of fluctuations, but literature has assumed frictionless markets for capital and labor. We construct an environment in which firms produce commodities employing workers and capital and enjoy monopoly power when selling their output. Monopoly power results from each firm producing a differentiated variety of a consumption good. As firms enter and exit the market, the total number of varieties available varies over time. We assume that firms are required to pay an entry cost by renting capital and producing a certain amount of goods. After paying the entry cost, firms search for workers in a frictional labor market. In that market, firms post vacancies or ads in order to attract workers. The novel aspect of our setup is that it gives rise to an endogenously time-varying value of a vacant position. To see why, note that in typical models with frictional labor markets, the value of a vacancy is zero due to the free entry assumption. In the environment that we construct, a vacancy has positive value because firms need to incur entry costs before they are allowed to post a vacancy and hire workers. The equilibrium value of a vacancy is such that firms are indifferent between paying the sunk cost, allowing them to post a vacancy and staying out of the market. This equilibrium value is also time-varying. The reason is that entrants rent factors of production to pay for the sunk cost, and the efficiency of these factors is affected by the same shocks that generate aggregate fluctuations. As the prices and quantities of these factors vary with aggregate conditions, so do the expenditures that entrants undertake. In equilibrium, these expenditures must equal the value of a vacancy.

Sunk costs result in amplification and propagation effects: they slow the adjustment of vacancy postings and job creation as entrants react sluggishly to a shock. The efficiency of factors of production rises in booms, accelerating the entry of firms and making the posting of vacancies and as a result employment is more responsive to positive aggregate shocks. In other words, total vacancy creation results from both the hires of existing firms and the hires of new entrants. Moreover, assuming some degree of monopolistic competition increases the amplification and propagation of shocks relative to a perfectly competitive economy. The degree of market power matters because the prospect of higher profits increases the ability of firms to face the cost of entry.

An important element in search and matching models is the surplus division between workers and firms. In the data, we proxy this division using labor's share in total output. We use the cyclical dynamics of that variable as an additional dimension with which we judge our model. In models where entry of firms is free, the adjustment of labor market variables is too abrupt. This rapid adjustment makes the reaction of wages and profits too strong, forcing the correlations of labor's share to be close to minus one. In the models we present below, the moderate adjustment brought about by sunk costs of entry tame that correlation, generating more realistic dynamics.

We find that the amplification and propagation effects are largest (and the model's implications are closest to the data) when the value of a vacancy is countercyclical. Parameterizations that result in a procyclical value of a vacancy behave much like an environment where firms face no entry costs. This result does not imply that the mechanism that amplifies shocks in our environment is isomorphic to having a countercyclical vacancy posting cost in a model with free entry. The analogy made earlier between sunk entry costs and a time-to-build technology should make that point clear. Vacancy posting costs that exogenously drop in booms will amplify shocks, but the persistence and propagation effects that are prominent here are absent.

This paper's focus is not to explain the behavior of a different set of variables than that of the previous literature. Rather, we continue with a well-established tradition of using equilibrium business cycle models to explain quantitatively the statistical properties observed in aggregate time series. The first examples in that literature have focused on series such as consumption, investment, and output. More recently, labor markets have taken a prominent role with the advent of equilibrium search and matching models. Although the interest here has been mostly on the dynamics of wages, unemployment, and vacancies, studies in this area have not disregarded the behavior of series that were the focus of earlier literature. This paper contributes to that body of equilibrium business cycle studies. The framework that we construct improves existing models by matching the behavior of factor prices and factor shares. But the mechanism also amplifies productivity shocks at the firm level into cyclical movements in labor market variables, bridging the gap between model and data. The level of amplification our mechanism achieves is in line with that of Hagedorn and Manovskii (2008). Their calibration, while successful in matching the volatility of labor market variables, is somewhat controversial as it implies a small difference between the values of employment and unemployment for the average worker. We view our mechanism as providing an alternative which does not rely on a large workers' threat point and which still describes the data remarkably better than standard parameterizations (e.g. Shimer, 2005). The success in matching labor market dynamics does not come at the expense of failing to match business cycle dynamics of consumption or output. With its better fit of the data, our study highlights the importance of fluctuations in the value of a vacancy and, as a result, it also highlights a shortcoming of the extant literature. The existing body of work in search and matching models emphasizes fluctuations in the value of a filled job, eliminating the possibility of any kind of dynamics in the value of a vacancy by the free entry assumption. Studies in this area include Andolfatto (1996), Merz (1995), Shimer (2005), and many others.[3] The dynamics in the value of a vacancy are center to our analysis, in particular how those dynamics interplay with those of other variables in the labor market. Regarding the emphasis on the value of a vacancy, a possible exception in the literature is Fujita and Ramey (2007). These authors posit exogenously acost for firms to enter the labor market that is increasing in the level of aggregate

[2] See Bilbiie et al. (2012).

[3] Some other examples are Hagedorn and Manovskii (2008), Hall (2005), and references in Rogerson et al. (2005).