Journal of Economic Dynamics & Control 75 (2017) 28–51

Contents lists available at ScienceDirect

Journal of Economic Dynamics & Control

journal homepage: www.elsevier.com/locate/jedc

Labor market dynamics with endogenous labor force participation and on-the-job search

Didem Tüzemen

Research Department, Federal Reserve Bank of Kansas City, 1 Memorial Drive, Kansas City, MO 64198, United States

ARTICLE INFO

Article history:
Received 17 December 2014
Received in revised form
13 November 2016
Accepted 20 November 2016
Available online 25 November 2016

JEL Classification:
E24
E32
J63
J64

Keywords:
Search and matching
Endogenous participation
On-the-job search
Job-to-job flows
Business cycle

ABSTRACT

Studies that incorporate endogenous labor force participation and search and matching frictions in a real business cycle model report that the model generates counterfactual dynamics: (1) Labor force participation is very volatile and strongly procyclical; (2) Unemployment is weakly procyclical or acyclical; (3) Unemployment and vacancies are positively correlated. To improve the model's performance, I enrich the model with on-the-job search as a mechanism to dampen the movements of participation and keep vacancy creation high for longer periods. The proposed model successfully generates weakly procyclical participation, strongly countercyclical unemployment, and the Beveridge Curve. The model also succeeds in matching the statistics for labor force participation and job-to-job flows.

1. Introduction

A major shortcoming of most existing real business cycle models with labor market search and matching frictions is that all agents in the economy are assumed to be part of the labor force.[1] Researchers who extend this structure by incorporating an out-of-the-labor-force state through allowing for a work vs. leisure decision report that this model with three labor market states ("three-state model") generates counterfactual labor market dynamics: labor force participation is strongly procyclical, while unemployment is weakly procyclical, or acyclical (Tripier, 2004; Veracierto, 2008). Moreover, the model fails to generate the strong negative correlation between unemployment and vacancies, also known as the Beveridge Curve.

The main reasons why the three-state model fails to match the data are labor force participation follows output too closely and vacancy creation is not persistent. In response to a favorable technology shock, labor force participation increases a lot, since it is a bad time to be out of the labor force, whether engaging in home production or enjoying leisure. In turn, labor force participation is strongly procyclical. Since forming matches takes time, not all agents searching for jobs get

E-mail address: didem.tuzemen@kc.frb.org

[1] Starting with Merz (1995), Andolfatto (1996), and Den Haan et al. (2000), incorporating labor market search and matching frictions as in Mortensen and Pissarides (1994), and Pissarides (2000) into the basic real business cycle model has become a common exercise. In these studies agents are either employed or unemployed.

http://dx.doi.org/10.1016/j.jedc.2016.11.004
0165-1889/

placed at jobs initially. Unemployment increases sharply in response to the shock, and falls sharply in a few quarters, following an acyclical (or a weakly procyclical) pattern. Vacancy creation also rises sharply with the positive technology shock, but falls sharply in a few quarters. Since both vacancies and unemployment follow a similar pattern, the model cannot generate the downward-sloping Beveridge Curve. To bring the three-state model closer to the data there needs to be a mechanism that dampens the movements along the participation margin and promotes high vacancy creation for longer periods.

I propose on-the-job search as a solution, based on the empirical evidence that job-to-job flows are a crucial part of U.S. labor market dynamics. These flows are as large as flows between employment and nonparticipation, and they are almost twice as large as flows between employment and unemployment.[2] The intuition for why on-the-job search affects the performance of the three-state model is as follows. In the simpler model without on-the-job search adjustments to aggregate economic conditions mainly take place at the participation margin. However, with job-to-job flows there is a second margin along which the household's labor market adjustments can take place. In addition to the unemployed, the employed workers can also search for better-paying jobs. Therefore, the overall utility of the household can be increased without a large increase in participation. Moreover, job-to-job transitions dampen movements of wages, and promote persistent and high vacancy creation by firms. These factors help the proposed model generate labor market dynamics that are significantly different from those presented in the previous studies. More specifically, the model successfully generates weakly procyclical participation, strongly countercyclical unemployment, and the Beveridge Curve relationship. It also produces business cycle statistics for labor force participation and job-to-job flows that are in line with their empirical counterparts.

This paper is related to two strands of literature. First, it contributes to the efforts of modeling labor force participation. Andolfatto and Gomme (1996), Alvarez and Veracierto (2000), Garibaldi and Wasmer (2005), Veracierto (2008), Kim (2008), Pries and Rogerson (2009) and Krusell et al. (2011) consider three-state labor market structures, but do not analyze business cycle dynamics. Tripier (2004) and Veracierto (2008) show that when an out-of-the-labor-force state is added to the basic two-state model, the model generates counterfactual business cycle dynamics. Ebell (2011) relies solely on an alternative parametrization to improve the performance of the three-state model. More recently, Shimer (2013) proposes that rigid wages may help in resolving the shortcomings of the three-state model.

Second, this paper is related to studies that integrate on-the-job search in models to explain cyclical fluctuations of labor market variables. Nagypal (2004) and Taşçı (2007) address the Shimer (2005) puzzle of low volatility of unemployment and vacancies by using on-the-job search. While Krause and Lubik (2006) show that on-the-job-search accelerates the reallocation of workers across jobs, Krause and Lubik (2010) use the same structure to focus on the role of on-the-job search in increasing the volatilities of vacancies and unemployment, and enhancing the overall amplification and propagation properties of the basic two-state model. VanZandweghe (2010) introduces on-the-job search as in Krause and Lubik (2006) to a sticky price model with search frictions. He finds that on-the-job search provides a strong propagation of monetary shocks that increase output persistence, and help the model generate plausible labor market fluctuations.

This paper's main contributions are modeling all aggregate flows in the U.S. labor market, significantly improving the performance of the basic three-state model in matching the statistics related to participation, unemployment, and vacancies, and explaining the role of capital and investment in the puzzle related to the Beveridge curve. First, this is the first paper to integrate endogenous participation and job-to-job flows to provide a complete picture of aggregate flows in the labor market, and to study the interaction between participation and on-the-job search. Second, this is the first paper to have significant improvements in all of the aforementioned statistics related to participation, unemployment, and vacancies. Ebell (2011) tackles the same problem as I do by proposing three alternative calibration techniques: calibrating the elasticity of labor supply to match the relative volatility of labor force participation, using the small surplus calibration strategy used in Hagedorn and Manovskii (2008), and correcting for a possible time aggregation problem by calibrating to weekly frequency. Compared to the results presented in this paper, Ebell (2011) predicts a less negative correlation between unemployment and vacancies, and does not report detailed statistics on labor force participation. I follow Krause and Lubik (2006, 2010) in building a two-sector economy where workers are allowed to flow between jobs. However, different from these papers, I endogenize the labor market participation decision by allowing for flows into and out of the labor force. Lastly, I include capital and investment decisions in my model since the puzzle related to the Beveridge Curve arises in the three-state model when there is capital and investment.[3]

The organization of this paper is as follows. Section 2 provides evidence on worker flows using micro-level data. Section 3 presents the theoretical model. Section 4 displays the calibration strategy. Section 5 discusses the main results. Section 6 presents the robustness checks and Section 7 concludes.

[2] Empirical facts regarding job-to-job flows are presented in detail in the next section.

[3] Without capital, the three-state model generates a negative correlation between unemployment and vacancies, therefore there is no puzzle about the Beveridge Curve. This is further explained in the Appendix.