Accounting for Mismatch Unemployment*

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Abstract

We estimate unemployment due to mismatch in the US labor market, study its evolution over time and explore what frictions caused the mismatch. Our results speak to the policy debate about the recent increase in unemployment and we contribute to economic theory by providing a detailed empirical analysis of mismatch as a possible micro-foundation for search frictions. We find that mismatch unemployment as cyclical as the overall unemployment rate and no more persistent, casting doubt on the claim that unemployment in the Great Recession was due to structural factors. The most important source of mismatch are wage setting frictions. Worker and job mobility costs, which may also generate mismatch in theory, are not important empirically.

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1 Introduction

Unemployment has been at persistently very high levels in the United States since the start of the Great Recession in December 2007. One explanation that has been suggested is a mismatch in the skills or geographic location of the available jobs and workers (Kocherlakota (2010)). A rise in mismatch seems to be supported by a decline in aggregate matching efficiency (Elsby, Hobijn, and Sahin (2010), Barnichon and Figura (2012)) and geographic mobility (Frey (2009), Katz (2010)). There is, however, little empirical work on mismatch using disaggregated data.

In this paper, we estimate mismatch unemployment on the US labor market, study its evolution over time and explore what frictions caused the mismatch. This exercise is interesting because of its implications for both economic policy and economic theory. In the context of the policy debate, it has been argued that mismatch unemployment is 'structural', in the sense that it is more persistent than the business cycle and not responsive to stablization policy.[1] We find no evidence for this claim. Mismatch increased not only in the Great Recession but also in previous recessions. Over the entire sample period, mismatch unemployment is as cyclical as as the overall unemployment rate and no more persistent.[2]

Our contribution to economic theory is to provide a detailed empirical analysis of mismatch as a possible micro-foundation for unemployment. In most modern macroeconomic models of the labor market there is unemployment because of search frictions. But the micro-foundations for search frictions and the aggregate matching function are not very well developed. If unemployment is truly due to a time cost of search, it seems there should be a secular downward trend in the unemployment rate as computers and the internet improve the search technology available to firms and workers. Instead, we should think of search frictions as "a modeling device that captures the implications of

[1] The most prominent proponent of this view was the president of the Federal Reserve Bank of Minneapolis, Narayana Kocherlakota (2010), who argued in a speech that "it is hard to see how the Fed can do much to cure this problem. Monetary stimulus has provided conditions so that manufacturing plants want to hire new workers. But the Fed does not have a means to transform construction workers into manufacturing workers." Kocherlakota also argued that given the nature of mismatch unemployment, we should expect the high unemployment rate to be persistent: "Given the structural problems in the labor market, I do not expect unemployment to decline rapidly." Shortly after the 2001 recession, Groshen and Potter (2003) made a similar argument that misallocation of workers over industries might explain the so called jobless recoveries.

[2] To many, this conclusion may not come as a surprise. From December 2007 to December 2009, 2.3 million manufacturing workers lost their jobs and from December 2009 to December 2011 no more than 300 thousands jobs were created in this sector (BLS Current Employment Statistics). It seems, therefore, that there is no need for the Fed to turn construction workers into manufacturing workers. Given the lack of this type of direct evidence, Kocherlakota's view has been heavily criticized (Krugman (2010), DeLong (2010)). In his Nobel lecture, Peter Diamond (2011) draws attention to the fact that this is not the first time that a recession is mistake for a structural change: "There is no surprise that we are hearing claims of higher structural unemployment - such statements appear when unemployment is high. A similar debate unfolded as I was a new student of economics. (...) Indeed, there is a long history of claims that the latest technological or structural developments make for a new long-term high level of unemployment, but these have repeatedly been proven wrong." (page 1065).

the costly trading process without the need to make the heterogeneity and the other features that give rise to it explicit" (Pissarides (2000, p.4)). Mismatch generates heterogeneity and therefore gives rise to unemployment. The results in this paper shed light on the question what are the frictions that give rise to mismatch.[3]

We use an accounting framework that puts just enough structure on the data to allow us to quantify the sources of mismatch unemployment. In this framework, the labor market consists of multiple submarkets or segments. Conditions in each segment are characterized by four variables: the job finding rate, which measures how hard it is for workers to find a job; the job filling or worker finding rate, which measures how hard it is for firms to find a worker; workers' surplus from having a job over being unemployed; and firms' surplus of having a filled position over a vacancy. Within segments, frictions prevent the instantaneous matching of unemployed workers to vacant jobs, resulting in search unemployment in the tradition of Diamond (1982), Mortensen (1982) and Pissarides (1985). Across segments, adjustment costs lead to dispersion in labor market conditions, generating mismatch unemployment. There are four sources of mismatch unemployment: worker mobility costs, job mobility costs, wage setting frictions and heterogeneity in matching efficiency. Figure 1 visualizes the framework.

In order to estimate mismatch unemployment and its sources, we need data on job and worker finding rates and worker and job surplus by labor market segments, which we operationalize as states or industries. We construct these variables over the 1979-2009 period using data on worker flows and wages from the Current Population Survey (CPS) and data on profits from the National Income and Product Accounts (NIPA). Since in our accounting framework all workers and all jobs are assumed to be identical, we verify that our results are robust to controlling for observable worker characteristics and for unobservable but time-invariant worker and job characteristics (compensating differentials) by allowing for state and industry-specific fixed effects in all variables.

Our estimates suggest that mismatch is an important reason for unemployment. Of the average unemployment rate of 8% over our sample, between 1 and 8%-points are due to mismatch. Of the 6%-points increase in unemployment in the Great Recession, mismatch contributed between 1 and 6%-points. Thus, mismatch is responsible for anywhere between 15% and all of (fluctuations in) unemployment in the US. While suggestive, these estimates should be interpreted with care. Our framework is not ideal

[3] Some recent studies discuss this issue from a theoretical perspective. Shimer (2007) formally shows that mismatch between the distributions of workers and jobs over segments of the labor market gives rise to a relation between the job finding probability and labor market tightness that is very similar to the relation obtained if there are search frictions and an aggregate matching function. Stock-flow matching, as in Coles, Jones, and Smith (2010), rest unemployment, as in Alvarez and Shimer (2011a), reallocation unemployment as in Carillo-Tudela and Visschers (2011) and waiting unemployment as in Birchenall (2011) are all closely related to this concept of unemployment due to mismatch. As opposed to these studies, the focus of our paper is empirical. One way to think about the contribution of this paper is to provide a set of facts unemployment that can be used to test the theoretical models of mismatch unemployment.

to estimate the overall amount of (changes in) mismatch unemployment for two reasons. First, if we control for fixed effects, the level of mismatch unemployment is no longer identified. Second, the overall amount of mismatch depends strongly on the level of disaggregation, which is limited due to data limitations. Although we do our best to obtain credible estimates for the amount of mismatch given the data we have, these estimates are imprecise and involve a certain amount of guesswork. Nevertheless, our estimates are in line with other studies that use different estimation methods, which are more suitable to answer the question what is the total amount of mismatch in the US labor market (Sahin, Song, Topa, and Violante (2011), Barnichon and Figura (2011)). Compared to these studies, the strengths of our framework are that (*i*) we have a much longer time series so that we can explore the cyclical behavior of mismatch unemployment, and (*ii*) we not only estimate the overall amount of mismatch unemployment but decompose it into its sources. We now turn to our results on these topics.

The cyclical behavior of mismatch unemployment is very similar to that of the overall unemployment rate. This finding is driven by the fact that dispersion in labor market conditions across states and industries moves closely with the business cycle, similar to what Abraham and Katz (1986) documented over two decades ago.[4] The unemployment that derives from this dispersion is as cyclical as the overall unemployment rate and no more persistent. As a corollary, the nature of the increase in unemployment in the Great Recession is no different from previous recessions, although it is of course more severe.[5] In terms of policy implications, this result casts doubt on Kocherlakota (2010)'s claim that stabilization policy is not effective against mismatch unemployment. In terms of the implications for economic theory, the result is consistent with, although of course not sufficient evidence for, the view that all unemployment is due to mismatch.

Our second and most interesting set of results concerns the sources of mismatch. Our framework has strong predictions for patterns we should observe in the data in the absence of the various frictions that can give rise to mismatch. If there are no barriers to worker mobility, we expect a strong negative correlation between wages (measuring how attractive it is to have a job in a given state or industry) and job finding rate (how hard it is to find these jobs). In the data, we find that deviations from this predicted correlation are small and non-systematic. Similarly, if there are no barriers to job mobility, jobs that

[4] In response to the structural shifts view of recessions put forward by Lilien (1982), which holds that recessions are periods of reallocation between industries akin to mismatch, Abraham and Katz show that aggregate shocks can give rise to countercyclical fluctuations in dispersion of employment growth across sectors.

[5] This result is not inconsistent with observation that there was an outward shift in the Beveridge curve, the negatively sloped relation between vacancies and unemployment, which indicates a decline in aggregate matching efficiency and provides much of the basis for the argument that there was an unprecedented increase in mismatch in the Great Recession (Kocherlakota (2010), Elsby, Hobijn, and Sahin (2010)). While an increase in mismatch indeed reduces matching efficiency (Shimer (2007)), there are many other causes for shifts in the Beveridge curve as well, including changes in the separation rate and demographics. Controlling for these factors, the remaining role for mismatch is very small (Barnichon and Figura (2012)).

are attractive to firms should be hard to fill, generating a strong negative correlation between profits and job filling rates. Again, we observe this correlation in the data. Most mismatch is caused by large and systematic deviations from surplus sharing in equal proportions across states and industries. In the data, states and industries with high wages tend to have low profits. This implies that states and industries that are attractive to workers are unattractive to firms and vice versa, generating dispersion in vacancy-unemployment ratios and mismatch unemployment. These findings imply that mismatch unemployment is due mostly to wage setting frictions and not to job or worker mobility frictions. As a result, policies aimed at increasing worker mobility, as advocated e.g. by Katz (2010), are likely to have small effects.

Empirical studies on mismatch tend to focus on shifts in the Beveridge curve, trying to use aggregate data to estimate matching efficiency (Lipsey (1965), Abraham (1987), Blanchard and Diamond (1989), Barnichon and Figura (2012)) and there is little recent empirical work using disaggregated data.[6] Two recent contributions are closely related to this paper. Sahin, Song, Topa, and Violante (2011) use disaggregated data on unemployment and vacancies to construct indices of mismatch, using data from the JOLTS for the 2001-2010 period. Barnichon and Figura (2011) use the CPS to explore how much dispersion in labor market conditions contributes to movements in matching efficiency. Our findings are consistent with these papers in terms of the contribution of mismatch across states and industries to the increase in unemployment in the Great Recession. The finding that geographic mismatch cannot explain why the increase in unemployment in the Great Recession is so much larger than in previous recessions is also consistent with work by Kaplan and SchulhoferWohl (2010), who show that most of the a drop in interstate migration in the Great Recession is a statistical artifact. Compared to Sahin et al., we provide an alternative method to estimate mismatch unemployment, which gives us a much longer time series. Compared to Barnichon and Figura, our focus is on unemployment rather than matching efficiency. We contribute to the results in both papers by providing a framework that allows us to decompose mismatch into it sources and estimating the contribution of each of these sources to unemployment.

This paper is organized as follows. In the next section we present the accounting framework to formalize the sources of dispersion in labor market conditions across submarkets of the labor market. We identify four sources of mismatch, three of which we can estimate: worker mobility costs, job mobility costs and wage setting frictions. Section 3 describes the data used in the estmation, and explains in detail how we construct the empirical counterparts of the variables that define a labor market segment in our model. Section 4 presents the empirical results and Section 5 concludes.

[6] Older studies include work by Padoa Schioppa (1991) and Phelps (1994).