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Is there a skills mismatch in the labor market?

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This article reviews the concept of skills mismatch in the labor market and examines its role in explaining ongoing low levels of hiring and high levels of unemployment during the current economic recovery.

The ongoing U.S. economic recovery has been characterized as a "jobless recovery." In other words, output growth has not yet been accompanied by a significant recovery in employment. Indeed, unemployment has remained persistently high since the official end of the Great Recession in June 2009. This situation has prompted policymakers to consider whether a skills mismatch in the labor market is having a dampening effect on hiring, even as more positions become available as the economy improves.[1] A skills mismatch in the labor market is a misallocation between the attributes of individuals seeking jobs and the attributes employers require for their vacant positions. This misallocation leaves vacant positions open longer and forces job seekers to search longer to find work. This results in higher unemployment because it is harder for job seekers to find suitable work. It also results in weak hiring because it is harder for employers to find qualified applicants. It is important for policymakers to know whether or not there is a skills mismatch in the labor market, because the unemployment it creates is *structural* in nature. Structural unemployment is defined as the amount of unemployment that cannot be affected by changes in monetary policy. Furthermore, as recent news coverage has emphasized, structural unemployment often leads to a rise in the number of long-term unemployed, because these workers' skills become less relevant to employers over time.[2]

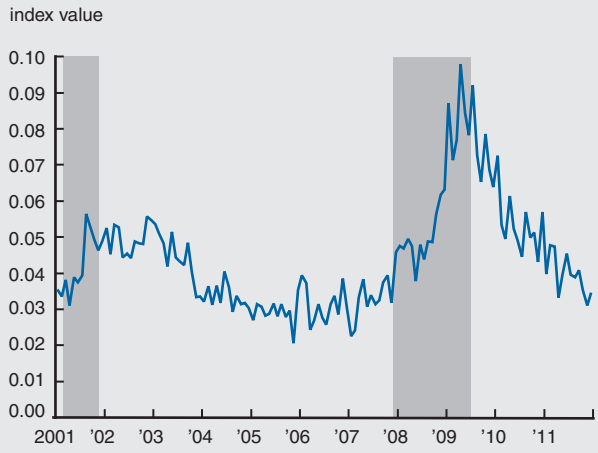
1. Beveridge curve

SOURCE: *Job Openings and Labor Turnover Survey* and *Current Population Survey* data from U.S. Bureau of Labor Statistics.

Economics of mismatch

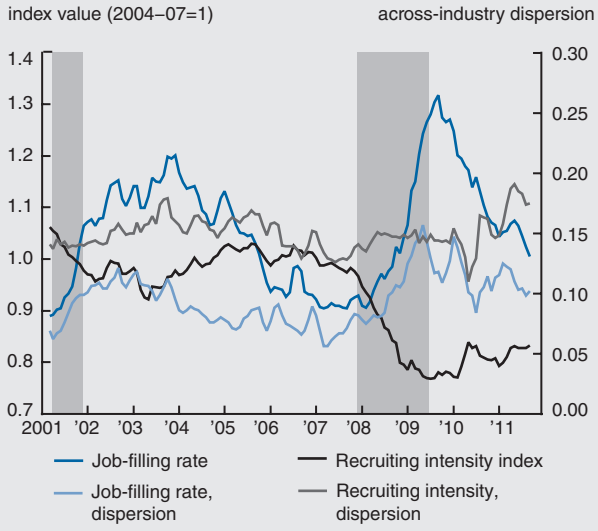
Labor search theory provides the standard framework that economists use to study mismatch. It is based on the premise that there are "frictions" in the labor market that cause the matching of workers to jobs to be a time-consuming process. Search theories have been used in economics to study unemployment, wages, and employment dynamics over the business cycle. They are based on the seminal work by Peter Diamond, Dale Mortensen, and Christopher Pissarides.[3] Subsequent models of labor market search have developed in a variety of ways. In the standard model of search, mismatch is the outcome of a decline in *matching efficiency*. Hiring is the outcome of the matching of vacant jobs and unemployed workers. The model assumes a fairly "black box" process, whereby a *matching function* describes the way in which unemployment and vacancies are transformed into hires. Greater matching efficiency implies

2. Şahin et al. (2011) mismatch index, 2001–11



SOURCE: *Job Openings and Labor Turnover Survey* and *Current Population Survey* data from Şahin et al. (2011).

3. Job-filling and recruiting intensity per vacancy



SOURCE: *Job Openings and Labor Turnover Survey* data from Davis, Faberman, and Haltiwanger (2012).

that the process of transformation occurs relatively smoothly. Lower matching efficiency implies that it is relatively more difficult to generate additional hiring for a given amount of vacant jobs and unemployed workers.

Some search models provide a more explicit exposition of mismatch. For example, Robert Shimer provides a model where mismatch is the outcome of worker and job matching on a range of "islands."[4] These islands represent different subsets of the economy: specific occupations, skill requirements, geographic locations, etc. Workers and employers can only search within their own island, because switching islands is prohibitively costly. The result is that some islands have only vacancies, while others have only unemployed workers. Employers on the former cannot hire until new workers arrive, and workers on the latter cannot find employment until new positions are created. If there was a way to make it possible to move workers and employers across islands (e.g., the retraining of unemployed workers for new careers), the amount of mismatch in the economy could be reduced.

Evidence of a skills mismatch

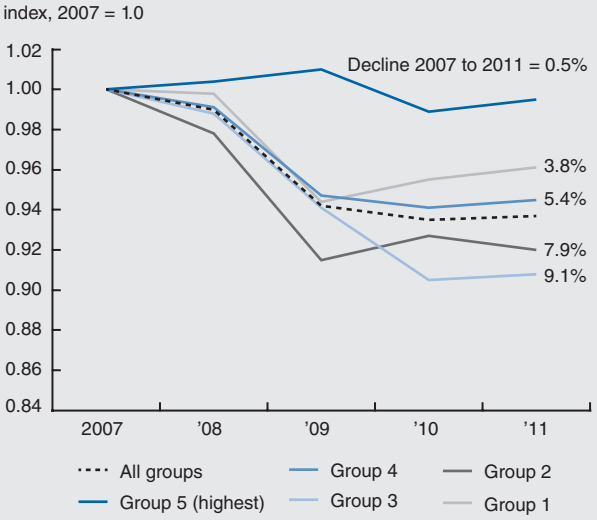
Concerns about a greater degree of mismatch in the U.S. labor market in recent years have arisen partly because of a shift in the *Beveridge curve*. The Beveridge curve describes the relationship between the vacancy rate and the unemployment rate. Figure 1 shows that, after the end of the latest recession, the vacancy rate had been rising while the unemployment rate had barely budged. In fact, it has only been recently that there has been movement along the Beveridge curve that is consistent with cyclical movements along the curve rather than an outward shift in the entire curve. Search theory implies that outward shifts in the Beveridge curve are the result of a decline in matching efficiency and, consequently, a rise in mismatch.

Some recent research by Ayşegül Şahin, Joseph Song, Giorgio Topa, and Gianluca Violante uses search theory to generate an index of the degree of mismatch in the labor market.[5] Figure 2 illustrates their index based the dispersion of industry unemployment and vacancy rates. It shows that mismatch rose sharply during the recession, but it has since abated. Other research shows similarly mixed evidence on mismatch. The results of recent research by Steven Davis, R. Jason Faberman, and John Haltiwanger are shown in figure 3.[6] They find that employers were able to fill jobs relatively easily during the recession, but that their measure of recruiting intensity per vacancy, which captures a variety of efforts employers put into recruiting, remained low well after the end of the recession. One can interpret this as employers imposing relatively high hiring standards despite the abundance of available workers. Davis, Faberman, and Haltiwanger (2012) also find that the dispersion in job-filling rates across industries has fallen since the end of the recession. This suggests that there are relatively smaller differences across industries in the ease with which employers are filling their positions, implying a lesser degree of mismatch in the economy. At the same time, they find that dispersion in recruiting intensity has risen, implying an increasing disparity in employers' recruiting efforts across industries and a potentially higher degree of mismatch.

Finally, we perform our own analysis of mismatch by examining the supply and demand of workers across occupations of varying skill requirements. First, we consider the supply of workers of various skill levels using data from the U.S. Bureau of Labor Statistics.[7] For our sample, employment in 2011 was about 6.2% below its 2007 level. On the one hand, if workers are scarce in particular occupations where skills are highly valued, we would expect that employment would have roughly returned to its 2007 level for those workers. On the other hand, if workers of *all skill levels* are all well below their peak employment levels prior to the recession, then this would provide little support for the skill mismatch hypothesis.

4. Labor market trends by skill group

A. Decline in employment since 2007



B. Index of labor demand

SOURCES: Panel A—*Current Population Survey* data and Occupational Information Network data from the U.S. Bureau of Labor Statistics and authors' tabulations. Panel B—Conference Board; Occupational Information Network data from the U.S. Bureau of Labor Statistics; and authors' tabulations.

Using this approach, we find limited evidence of skills mismatch. For example, the employment levels for workers in occupations that are sometimes claimed to be in scarce supply, such as those classified as "installation, maintenance, and repair workers," were 8% lower in 2011 than in 2007, suggesting that supply was not a constraint. However, it is possible to find pockets where supply may be a constraint. For example, employment among engineers was actually 2% higher in 2011 than in 2007, so it is plausible that engineers are currently scarce. In figure 4, panel A, we aggregate occupations by skill level and show the broad pattern of employment since 2007 for various skill groups. We find that workers in the middle range of skills are precisely the ones for whom employment remains well below the pre-recession level. Employment for low-skilled workers remains below its 2007 level but has not fallen as much; and employment for highly skilled workers is close to its pre-recession level.

In order to measure trends in demand for labor, we use data from the Conference Board,[8] which tracks online help-wanted ads. We then group occupations by skill level. Figure 4, panel B shows that the demand for labor across all skills has been rising, but predominantly for jobs that require a moderate level of skills. Overall, our results suggest that if there is mismatch in the U.S. labor market, it is likely most prominent for workers in the middle of the skills range.

Conclusion

Skills mismatch is an important aspect of the labor market because of the impact it can have on unemployment and the limited ability of monetary policy to mitigate its impact. Economic models of labor market search provide a useful framework for evaluating the extent to which skills mismatch accounts for the high unemployment rates the U.S. continues to experience.

Since the end of the Great Recession, evidence of mismatch in the labor market has been mixed. Studies suggest that the degree of mismatch has abated since early in the recession, and there is evidence that many employers appear hesitant to fully commit to hiring. Our analysis of the supply and demand of workers by skill level points to some limited evidence of skills mismatch. We find that workers in occupations that require a moderate amount of skills have not experienced employment gains, despite the fact that the data from online ads suggest that their skills are in the relatively greatest demand. If there is a skills mismatch in the U.S. labor market, therefore, it may be most significant for this group.

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[1] Federal Reserve Bank of Minneapolis President Narayana Kocherlakota suggested mismatch could be a major issue during a speech in 2010 (see Narayana Kocherlakota, 2010, "Inside the FOMC," speech delivered August 17, Marquette, MI, available at www.minneapolisfed.org/news_events/pres/speech_display.cfm?id=4525). Since then, several economists have attempted to examine the degree of mismatch that is present in the economy.

[2] For example, see Ben Casselman, 2012, "Time not on side of the jobless," *Wall Street Journal*, March 26; Robert J. Samuelson, 2011, "The great jobs mismatch," *Washington Post*, June 19; and Paul Krugman, 2010, "What structural unemployment looks like," *New York Times*, September 26.

[3] See Peter A. Diamond, 1982, "Aggregate demand management in search equilibrium," *Journal of Political Economy*, Vol. 90, No. 5, October, pp. 881–894; Christopher A. Pissarides, 1985, "Short-run equilibrium dynamics of unemployment, vacancies, and real wages," *American Economic Review*, Vol. 75, No. 4, September, pp. 676–690; and Dale T. Mortensen and Christopher A. Pissarides, 1994, "Job creation and job destruction in the theory of unemployment," *Review of Economic Studies*, Vol. 61, No. 3, July, pp. 397–415.

[4] Robert Shimer, 2007, "Mismatch," *American Economic Review*, Vol. 97, No. 4, September, pp. 1074–1101.

[5] Ayşegül Şahin, Joseph Song, Giorgio Topa, and Gianluca Violante, 2011, "Measuring mismatch in the U.S. labor market," Federal Reserve Bank of New York, working paper, revised October.

[6] Steven J. Davis, R. Jason Faberman, and John C. Haltiwanger, 2012, "Recruiting intensity during and after the Great Recession: National and industry evidence," *American Economic Review: Papers and Proceedings*, Vol. 102, No. 3, May, pp. 584–588.

[7] For more information, see www.bls.gov.

[8] For more information, see www.conference-board.org.