Economic Brief

September 2014, EB14-09

Putting the Beveridge Curve Back to Work

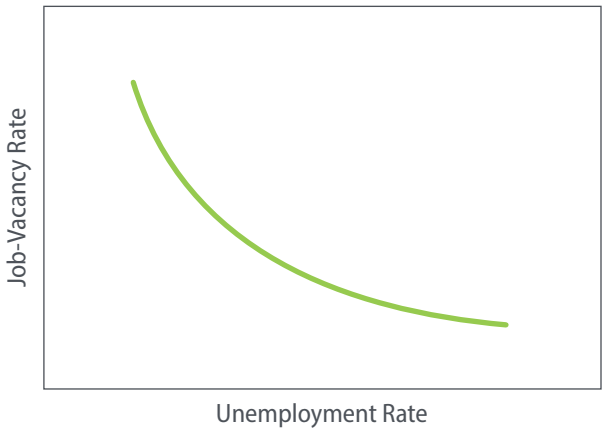
By Thomas A. Lubik and Karl Rhodes

After the recession of 2007–09, the Beveridge curve seemed to shift significantly outward as the job-vacancy rate increased with no corresponding decrease in the unemployment rate. A new time-varying analysis of the Beveridge curve from the early 1950s through 2011 could lend support to the idea that skill mismatch due to technological change is the most likely driver of the curve's outward shifts, including its most recent movement. This analysis suggests that expansionary monetary policy has done little in recent years to reduce the unemployment rate.

The Beveridge curve reflects the highly negative correlation between the job-vacancy rate and the unemployment rate. When economists plot these two variables on a graph with the unemployment rate on the x axis and the job-vacancy rate on the y axis, the pattern consistently takes the shape of a downward-sloping, concave curve. (See Figure 1.)

This curve was developed by British economists J.C.R. Dow and L.A. Dicks-Mireaux in 1958.[1] Researchers started calling it the Beveridge curve in the 1980s in honor of William Henry Beveridge, another British economist who studied the difficulties of matching workers to jobs in the 1930s and 1940s.[2]

Figure 1: The Stylized Beveridge Curve



The simple search-and-matching model of labor markets explains movements along the Beveridge curve quite well. At the peak of a business cycle, the unemployment rate is low, and the job-vacancy rate is high, reflecting many unfilled positions. As the economy slows, companies post fewer vacancies, causing the job-vacancy rate to decline and the unemployment rate to rise. This combination produces a downward movement along the Beveridge curve. At or near the bottom of the business cycle, firms start posting more vacancies again, causing the vacancy rate to increase and the unemployment rate to fall. This combination produces an upward move along the Beveridge curve.

The Time-Varying Beveridge Curve

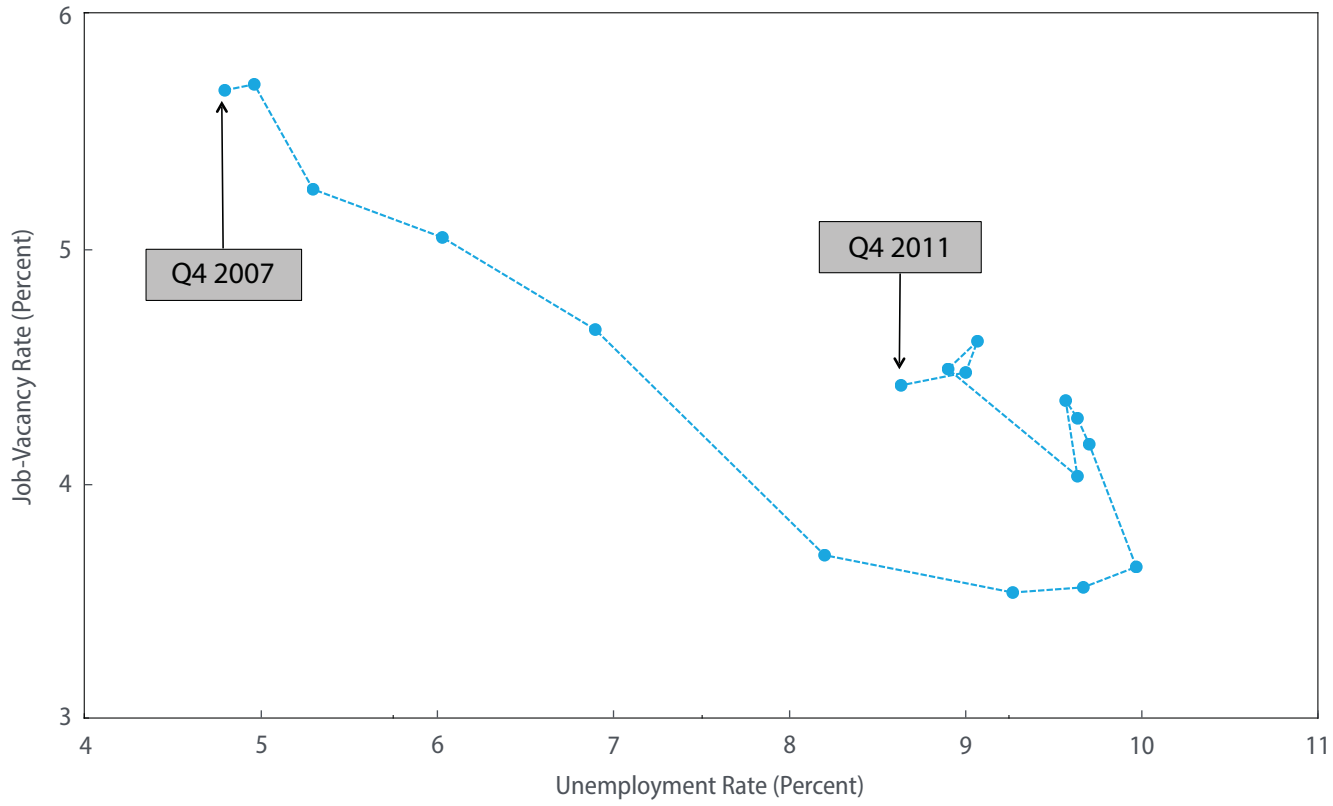
Federal Reserve Chair Janet Yellen once called the Beveridge curve "the neglected stepsister of macroeconomics." She was commenting on research by MIT economists Olivier Jean Blanchard and Peter Diamond, who noted in 1989 that the

Beveridge curve "has very much played second fiddle" to the Phillips curve. They declared that the Beveridge curve "comes conceptually first and contains essential information about the functioning of the labor market and the shocks that affect it. … Examination of the joint movement of unemployment and vacancies can tell us a great deal about the effectiveness of the matching process, as well as about the nature of shocks affecting the labor market."[3]

After the recession of 2007–09, the Beveridge curve seemed to shift to the right as job vacancies increased substantially while the unemployment rate remained elevated. This apparent deviation from the two variables' long history of negative correlation caused the bottom of the Beveridge curve to develop a large outward hook. (See Figure 2.) Some economists attributed this big hook primarily to expansions and extensions of unemployment benefits, while others attributed it primarily to a mismatch between the skills that employers needed and the skills that unemployed workers offered.[4] This type of mismatch occurs when technological change reduces demand for commonly held basic skills while increasing demand for advanced skills that are harder to find. Such an imbalance causes the unemployment rate and the job-vacancy rate to rise simultaneously, shifting the Beveridge curve to the right. This mismatch also might explain why the Federal Reserve's highly accommodative monetary policy seemed to have little effect on the unemployment rate during and after the recession.[5]

The large outward hook on the bottom of the Beveridge curve surprised many economists. The consistency of the curve had become the most robust stylized fact in macroeconomics, but the big hook following the recession of 2007–09 seemed to suggest that something had changed dramatically in the labor market.

Figure 2: Evolution of the Beveridge Curve from Q4 2007 through Q4 2011



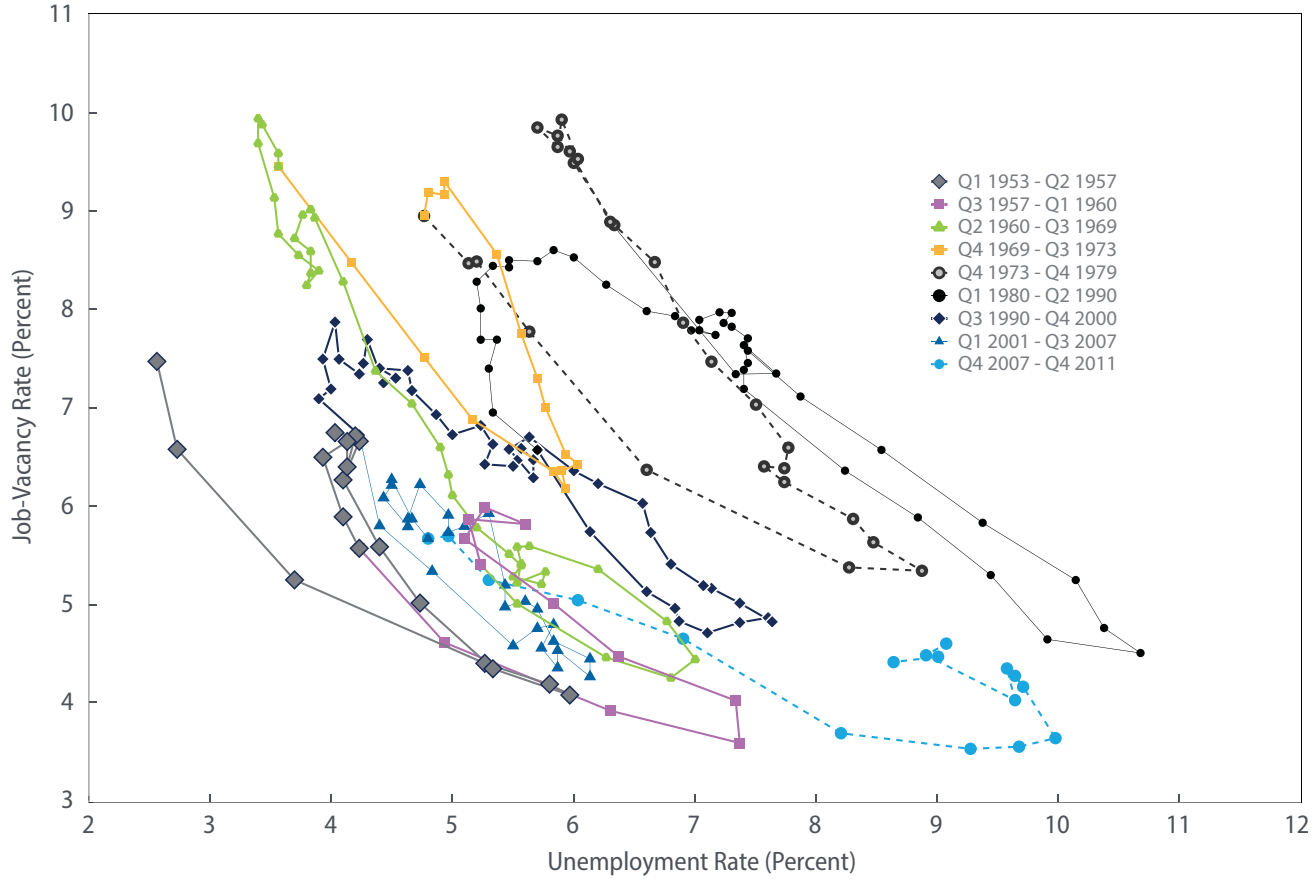
Sources: Bureau of Labor Statistics, Conference Board Help-Wanted Index, and Barnichon's extension of the index.
Note: The vacancy rate equals vacancies posted in the Help-Wanted Index and Barnichon's extension divided by the number of workers in the labor force. All data are seasonally adjusted.

Given this intriguing twist in the data, one of the authors of this *Economic Brief* (Lubik) and Luca Benati, an economist at the University of Bern, decided to study the evolution of the Beveridge curve using a model that allows for the possibility that the curve may have changed over time.[6] They built a Bayesian structural vector autoregression model with time-varying parameters. In other words, they created an empirical model that describes the relationships between the job-vacancy rate, the unemployment rate, and real gross domestic product (GDP) from the early 1950s through 2011. The model's time-varying parameters facilitate the analysis of period-by-period changes in these relationships.

Benati and Lubik base the model's job-vacancy rate on the Conference Board Help-Wanted Index and Régis Barnichon's extension of it.[7] They include real GDP growth in the model to help them identify one permanent shock (which can be thought of as technological change) by tracking permanent changes in real GDP growth rates across business cycles. Benati and Lubik also incorporate insights from the simple search-and-matching model to identify two other types of shocks, those that move the unemployment rate and the job-vacancy rate in the same direction and those that move the two variables in opposite directions.[8]

In the search-and-matching model, an expected increase in production (driven either by higher productivity or anticipation of greater sales) requires a firm to hire more workers. The firm posts more vacancies, and these open positions eventually are filled by job seekers, many of them previously unemployed. So the rise in vacancy postings goes hand in hand with

Figure 3: Evolution of the Beveridge Curve by Business Cycle



Sources: Bureau of Labor Statistics, Conference Board Help-Wanted Index, and Barnichon's extension of the index.
Note: The vacancy rate equals vacancies posted in the Help-Wanted Index and Barnichon's extension divided by the number of workers in the labor force. All data are seasonally adjusted.

a decline in unemployment. This mechanism underlies the negative slope of the Beveridge curve and allows Benati and Lubik to identify a cyclical shock that causes the two variables to move in opposite directions. The other type of shock can be identified by observing that improvements in the matching process—better job-search assistance, for example—lead to a decline in unemployment and a reduction in vacancy postings. With improved match efficiency, firms need to post fewer vacancies in order to hire a target number of workers.

Extraordinary Times

The slope of the Beveridge curve changes somewhat during each business cycle from the early 1950s through 2011. (See Figure 3.) At the bottom of several cycles—including the Volcker disinflation (1979–83)—the curve hooks outward, as it did following the recession of 2007–09. Then the curve circles back toward its previous position. Blanchard and Diamond referred to this pattern as a "counterclockwise loop," but frequently the curve does not quite close the counterclockwise loop. In other words, it shifts outward. The curve loops clockwise (inward) at the top of some business cycles, regaining signficant ground from 1986 through 1989 and again from 1995 through 1999. Even so, the counterclockwise loop at the bottom of cycles is the predominant pattern that has persistently moved the curve outward since the 1950s toward a higher unemployment rate at any given job-vacancy rate.

Benati and Lubik use several statistical techniques to summarize and analyze the information from their model. One of these techniques measures the degree to which the two variables correlate across different business cycles. Another technique measures the degree to which the two variables are driven by the same shock or different shocks across business cycles. Within the context of the model, these statistical techniques help Benati and Lubik compare shifts in the Beveridge curve caused by the one permanent (technology) shock and the two temporary (cyclical) shocks. They find that from the early 1950s through 2011, shifts in the Beveridge curve that were caused by the model's one permanent shock are significantly greater than shifts caused by the model's two temporary shocks. One interpretation of this finding is that the persistently outward shifts of the Beveridge curve have been driven primarily by skill mismatch due to technological change.

Benati and Lubik's analysis suggests that there may be one or two exceptions to this general trend, but the large outward hook following the recession of 2007–09 is not one of them. The clearest exception may have occurred during the Volcker disinflation (1979–83), when Benati and Lubik's analysis indicates that the unemployment rate and the job-vacancy rate were driven by one factor rather than some combination of technological and cyclical shocks. Their model cannot identify monetary policy as that single driving force because monetary policy does not enter into the model in any way. But it is reasonable to assume that the Federal Reserve's contractionary policy under the leadership of then-Chairman Paul Volcker was strong enough to crowd out all other factors at the time.[9] By this same logic, another possible exception to technology's dominant role may have occurred during the Great Inflation of the 1970s.

Policy Implications

Analyzing the evolution of the Beveridge curve by business cycle seems to yield useful information about the types of shocks that have influenced the unemployment rate and the job-vacancy rate over the past six decades.

At first glance, the severe outward hook at the bottom of the Beveridge curve following the recession of 2007–09 appears to indicate that extraordinary forces were driving the labor market. But Benati and Lubik's model lends support to the idea that this hook was caused primarily by skill mismatch due to technological change, the same factor that has been pushing the Beveridge curve to the right since the 1950s.

The truly exceptional outward shift in the Beveridge curve may have occurred during the Volcker disinflation—a time when the Federal Reserve intentionally used monetary policy as a disruptive force to quell inflation. In sharp contrast to the powerful results of monetary policy during the Volcker disinflation, Benati and Lubik's analysis may suggest that the

extraordinary monetary policy response to the recession of 2007–09 has done little to reduce the unemployment rate. ■

Thomas A. Lubik is group vice president for macroeconomics and financial economics, and Karl Rhodes is editorial process manager in the Research Department at the Federal Reserve Bank of Richmond.

Endnotes

[1] See Dow, J.C.R., and L.A. Dicks-Mireaux, "The Excess Demand for Labour: A Study of Conditions in Great Britain, 1946–56," *Oxford Economic Papers*, New Series, February 1958, vol. 10, no. 1, pp. 1–33.

[2] The connection to William Henry Beveridge was made in Green, Jerry, "On the Theory of Effective Demand," *Economic Journal*, June 1980, vol. 90, no. 358, p. 345.

[3] See Blanchard, Olivier Jean, and Peter Diamond, "The Beveridge Curve," *Brookings Papers on Economic Activity*, 1989, no. 1, pp. 1–76.

[4] For a concise summary of this research, see Hobijn, Bart, and Ayşegül Şahin, "Beveridge Curve Shifts across Countries since the Great Recession," *IMF Economic Review*, December 2013, vol. 61, No. 4, pp. 566–600.

[5] To find more Reserve Bank perspectives on this debate, see Barlevy, Gadi, "Evaluating the Role of Labor Market Mismatch in Rising Unemployment," Federal Reserve Bank of Chicago *Economic Perspectives*, Third Quarter 2011, vol. 35, pp. 82–96; and Federal Reserve Bank of Richmond Our Perspective Series, "Labor Market Conditions and Policy," last updated on June 9, 2014.

[6] For more details about this novel approach, see Benati, Luca, and Thomas A. Lubik, "The Time-Varying Beveridge Curve," Federal Reserve Bank of Richmond Working Paper No. 13-12, August 2013. This paper was subsequently published as a chapter in *Advances in Non-Linear Economic Modeling: Theory and Applications*, edited by Frauke Schleer-van Gellecom, Berlin: Springer-Verlag, 2014, pp. 167–204.

[7] The Conference Board Help-Wanted Index measures the number of help-wanted advertisements in 51 major U.S. newspapers. Barnichon built a measure of vacancy postings from 1951 through 2009 based on both print and online help-wanted advertising. For more detail, see Barnichon, Régis, "Building a Composite Help-Wanted Index," *Economics Letters*, December 2010, vol. 109, no. 3, pp. 175–178.

[8] The specific model comes from Lubik, Thomas A., "The Shifting and Twisting Beveridge Curve: An Aggregate Perspective," Federal Reserve Bank of Richmond Working Paper No. 13-16, October 2013. Benati and Lubik organize the interpretation of their empirical findings around the predictions of the model described in Shimer, Robert, "The Cyclical Behavior of Equilibrium Unemployment and Vacancies," *American Economic Review*, March 2005, vol. 95, no. 1, pp. 25-49.

[9] For more on the dominant role of monetary policy during the Volcker disinflation, see "The Only Game in Town" in *Volcker: The Triumph of Persistence* by William L. Silber, New York: Bloomsbury Press, 2012. Also see, "Disinflation" in *A History of the Federal Reserve, Volume 2, Book 2, 1970–1986* by Allan H. Meltzer, Chicago: University of Chicago Press, 2009.