

# **Disaggregation of the Beveridge Curve: The Skills Gap and the Duration of Unemployment**

**By**

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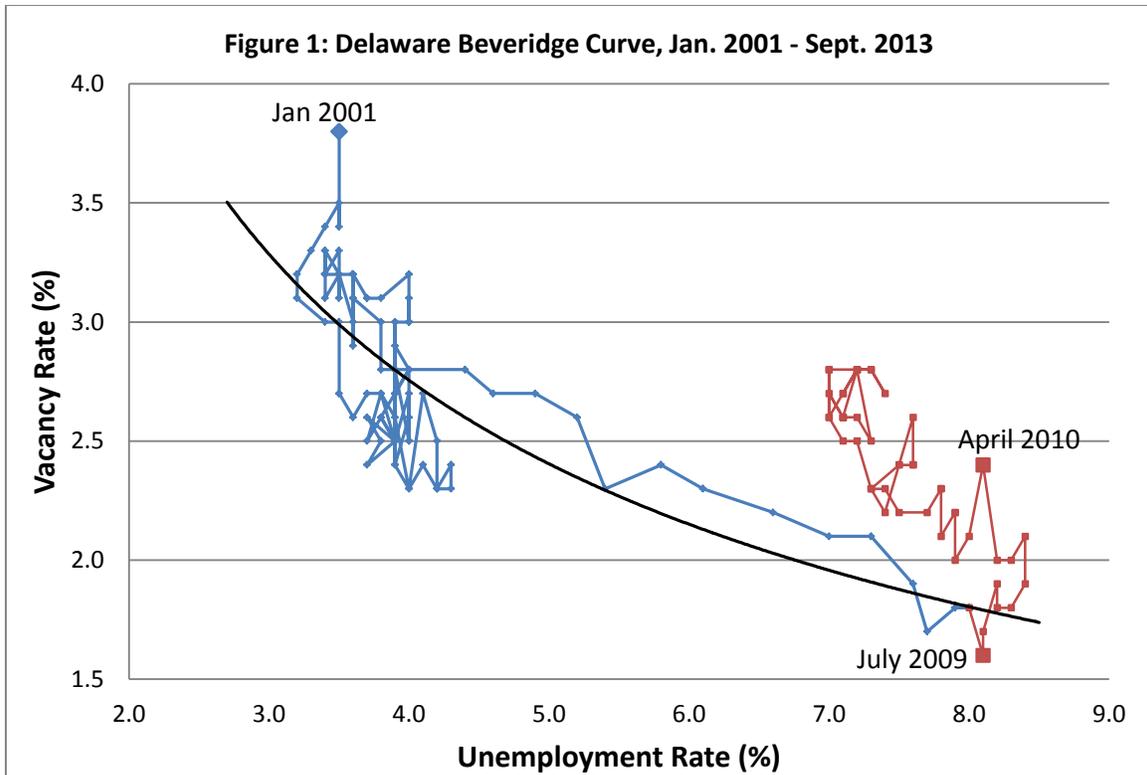
## **Disaggregation of the Beveridge Curve: The Skills Gap and the Duration of Unemployment**

This article will look at the unemployment rate and vacancy rate relationship for Delaware. We will see that this relationship, called the Beveridge curve, has been relatively stable for much of the last decade, but recently there has been an outward shift in Delaware's Beveridge curve. The cause of the shift in the unemployment rate/vacancy rate relationship will be under investigation. Using Delaware Current Population Survey data, the unemployment rate will be disaggregated by skill level and duration of unemployment.

The Beveridge curve is the inverse relationship between the unemployment rate and the vacancy rate. The vacancy rate is the total number of job openings employers are attempting to fill for work divided by the total number employed plus the number of job openings. Vacancy rate data come from the Job Openings and Labor Turnover Survey (JOLTS) produced by the U.S. Department of Labor's Bureau of Labor Statistics. JOLTS vacancy data are not published at the state level, so national vacancy rate data are used as a proxy for the Delaware vacancy rate. The Delaware unemployment rate is from the Local Area Unemployment Statistics program. Both the vacancy rate and the unemployment rate are seasonally adjusted. The disaggregated unemployment rate data are calculated using Delaware's Current Population Statistics.

The Beveridge curve is an indicator of how well workers are matching with job vacancies in the economy. In times of low unemployment, the vacancy rate tends to rise, as it is relatively more difficult for employers to fill job vacancies when there are fewer unemployed workers seeking work. When unemployment is high there are more people searching for jobs and vacancies tend to fall because employers have an easier time filling job openings. So, movements along the Beveridge curve tend to fluctuate with changes in the business cycle. Plotting the unemployment rate and vacancy rate on a graph one would see that with an expanding economy, the unemployment rate falls and vacancies increase and the unemployment rate/vacancy rate relationship moves to the north-west portion of the graph, signifying a tight labor market. When the labor market and economy are weak, the unemployment rate/vacancy rate relationship moves to the south-east portion of the graph.

Beyond movements along the Beveridge curve, there are also shifts in the entire curve either inward toward the origin or an outward shift away from the origin. An outward shift of the Beveridge curve can be a sign of labor market inefficiencies as vacancies are open for longer periods of time and there are more people unemployed for every level of vacancies than before.



Source: Delaware Department of Labor and U.S. Department of Labor, Local Area Unemployment Statistics. U.S. Department of Labor, Job Openings and Labor Turnover Survey

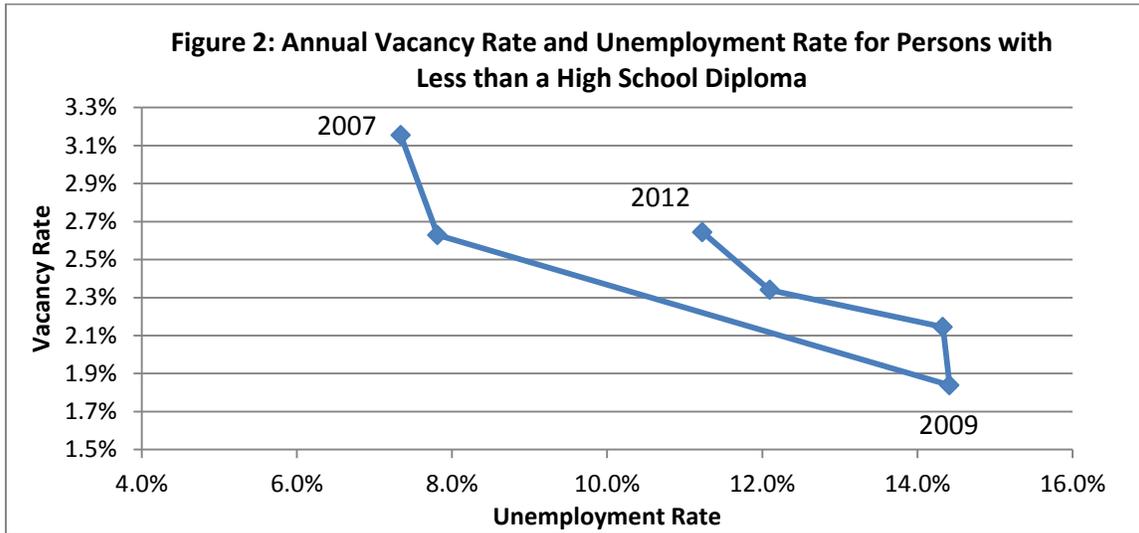
Delaware's Beveridge curve is presented in Figure 1. Delaware's unemployment rate has been plotted against the vacancy rate from January 2001 to September 2013. Superimposed on top of Delaware's unemployment rate/vacancy rate relationship is a fitted line that represents an idealized Beveridge curve. Starting in the second half of 2009, there is a counter clockwise rotation of the plotted unemployment rate and vacancy rate relationship that results in an outward shift in Delaware's Beveridge Curve. This shift happens relatively quickly and occurs in less than one year. What this represents is some inefficiency in Delaware's labor market. After the shift outward, each vacancy rate is now associated with a higher unemployment rate than previously. An outward shift in the curve means there are more unemployed workers for any given amount of job vacancies. Therefore, it has become more difficult to match workers to job vacancies.

What will be looked at next is a disaggregation of the unemployment rate/vacancy rate relationship to see what might be the cause of the change. By disaggregating the unemployment/vacancy rate relationship by skill level and duration of unemployment, we will investigate what is causing the shift in the Beveridge curve.

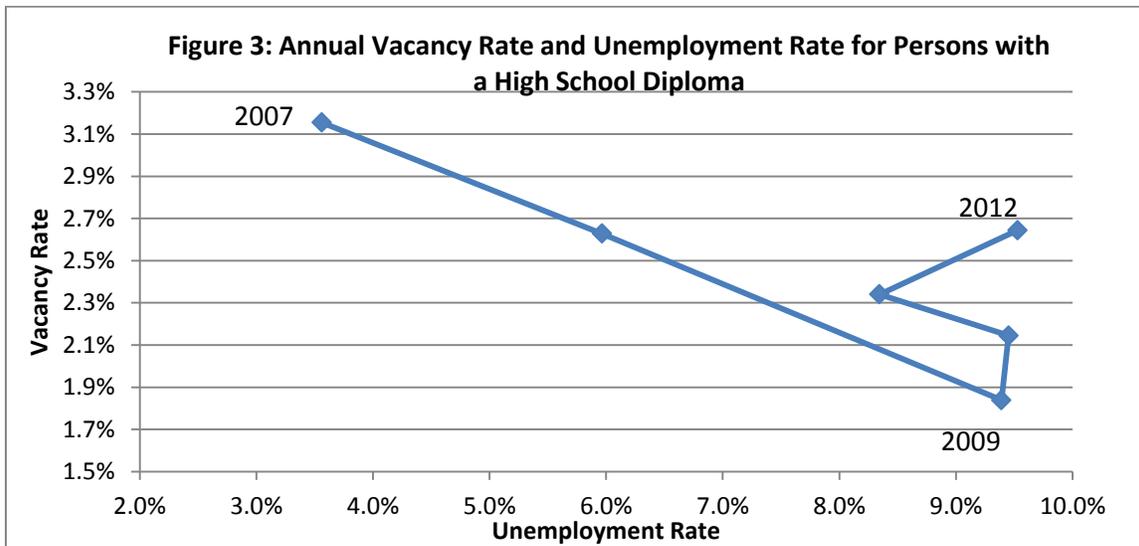
### **Disaggregation of the Beveridge Curve by Skill Level**

If workers' skill level was a cause for a shift in the Beveridge Curve, then we would expect to see those with the most skills benefiting at the expense of those with fewer skills. As the vacancy rate increases, as it does from 2009 through 2012, we would

expect to see the Beveridge curve for high skilled workers not shift outward and there might perhaps even be an inward shift in the unemployment rate/vacancy rate relationship if there were a skills gap. So, by disaggregating the Beveridge curve by skill level, we are expecting to see different movements of the curve based on the level of education. If all skill levels shift outward, then the difference in the level of skill is not a deciding factor as to whether there is a mismatch between workers and vacancies.



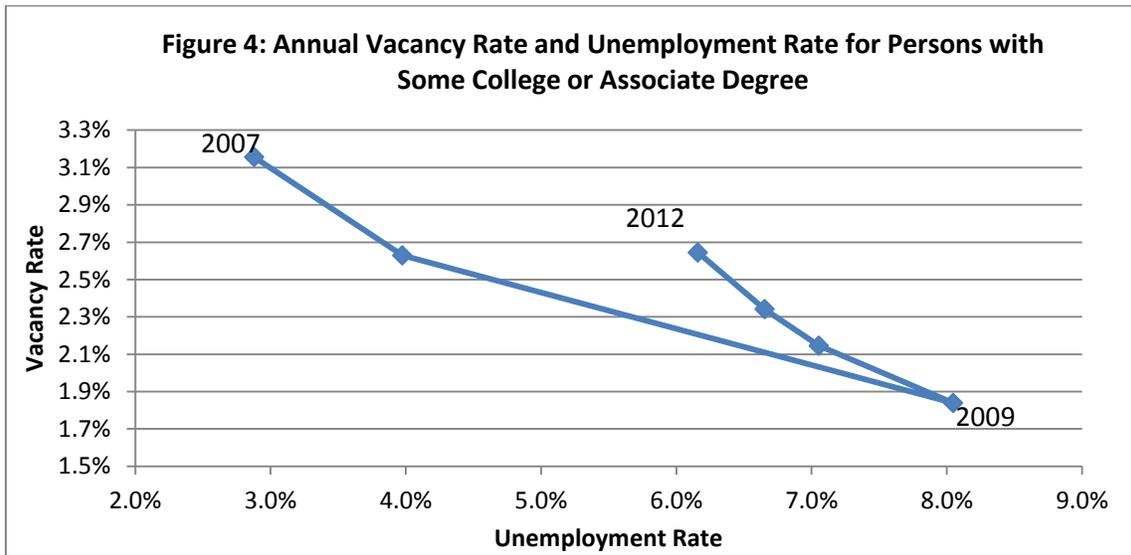
Source: U.S. Department of Labor, Delaware Current Population Survey. U.S. Department of Labor, Job Openings and Labor Turnover Survey



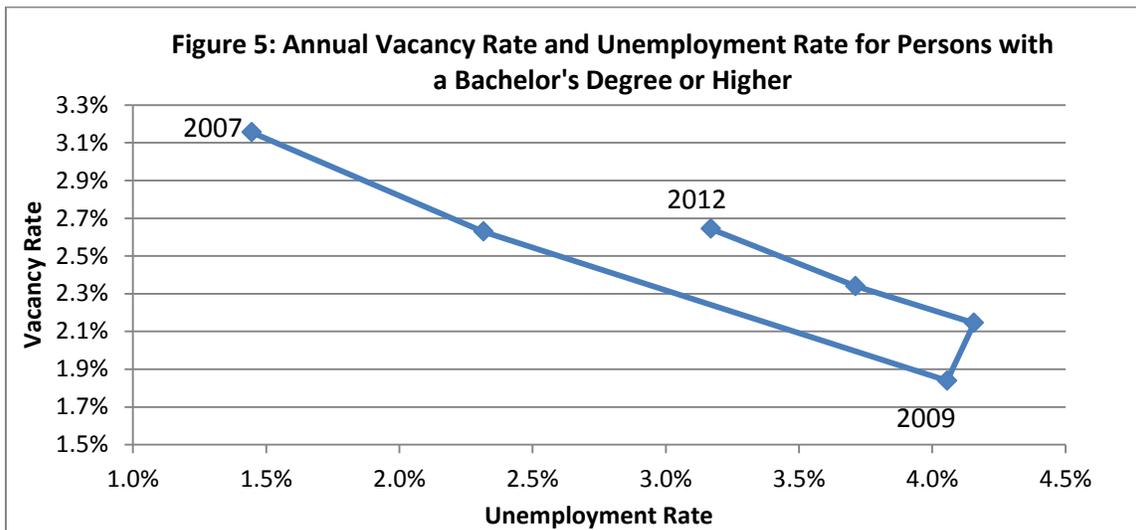
Source: U.S. Department of Labor, Delaware Current Population Survey. U.S. Department of Labor, Job Openings and Labor Turnover Survey

There is no good measure for the amount of skills that one possesses. So, educational attainment is used as a proxy for skills. Educational attainment refers to the highest level of education a person has completed. Those with more educational attainment have a greater amount of marketable skills than those with less educational attainment. Data on

the unemployment rate by level of educational attainment are available at the state level. The Delaware Current Population Survey was used for the rate of unemployment for the Delaware population 25 years and older with four types of educational attainment or skill level: less than a high school diploma, high school diploma, some college or associates degree, and those with a bachelor's degree or higher. Annual averages for unemployment rates and vacancy rates were used. The vacancy rate is taken from JOLTS and is used as a proxy for the Delaware vacancy rate.



Source: U.S. Department of Labor, Delaware Current Population Survey. U.S. Department of Labor, Job Openings and Labor Turnover Survey



Source: U.S. Department of Labor, Delaware Current Population Survey. U.S. Department of Labor, Job Openings and Labor Turnover Survey

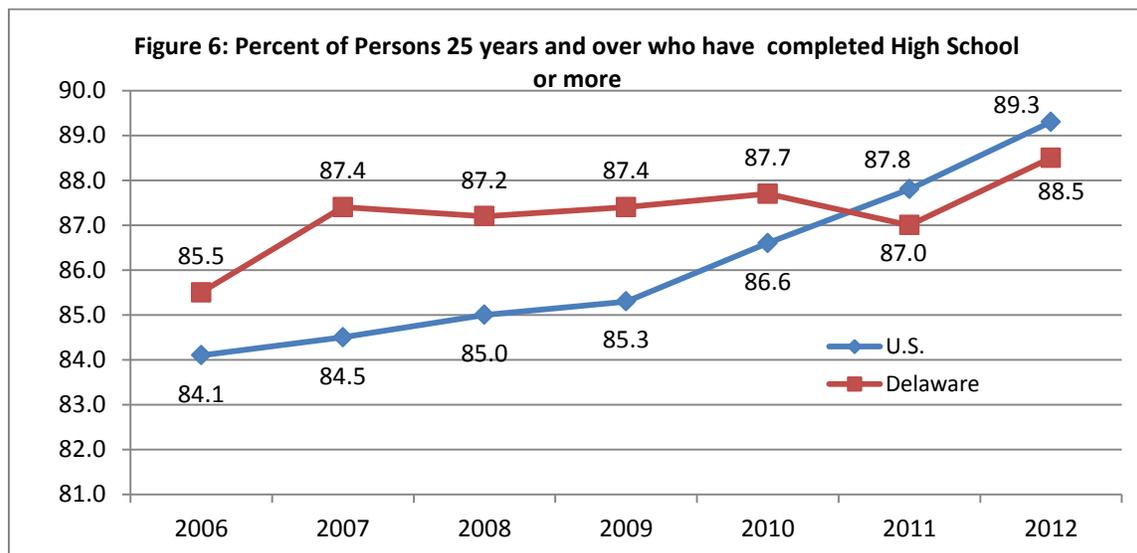
All four levels of educational attainment (Figure 2 - 5) – from less than high school to bachelor's degree or higher - have an outward shift in the curve from 2009 through 2012. Although the some college or associates degree curve shifts outward the slowest, by 2012

even this curve has shifted outward. One would expect to see bachelor's degree or higher to benefit the most at the expense of other education levels – as seen by an inward shift or no shift of the Beveridge curve from 2009 to 2012 – if there were a skills gap causing the mismatch between the unemployment rate and the vacancy rate. An excess demand for the highest educated and most skilled workers should cause a sharper decline in the unemployment rate than those with the least skills as vacancies increase. But those with the most skills, as represented by those with a bachelor's degree or more, have a Beveridge curve that looks similar to those with the least skills, as represented by those with less than a high school diploma. The data do not appear to provide evidence that the skill level of workers is causing the mismatch between workers and vacancy, because if this was the case one would expect to see either no shift or an inward shift of the Beveridge curve for the most skilled Delaware workers as they take advantage of the excess demand for highly skilled workers as the vacancy rate increases from 2009 to 2012.

Other evidence against a mismatch of employers and employees due to a lack of skilled workers is that the Beveridge curve shifts over a very short time period – less than one year. It is unlikely that the skills of unemployed workers have deteriorated over a short span of time. It is more likely that some other factor has caused the jobs mismatch. But before we move on from the skills gaps we will look at how the educational attainment of Delaware's workers has changed over time.

*Educational Attainment:*

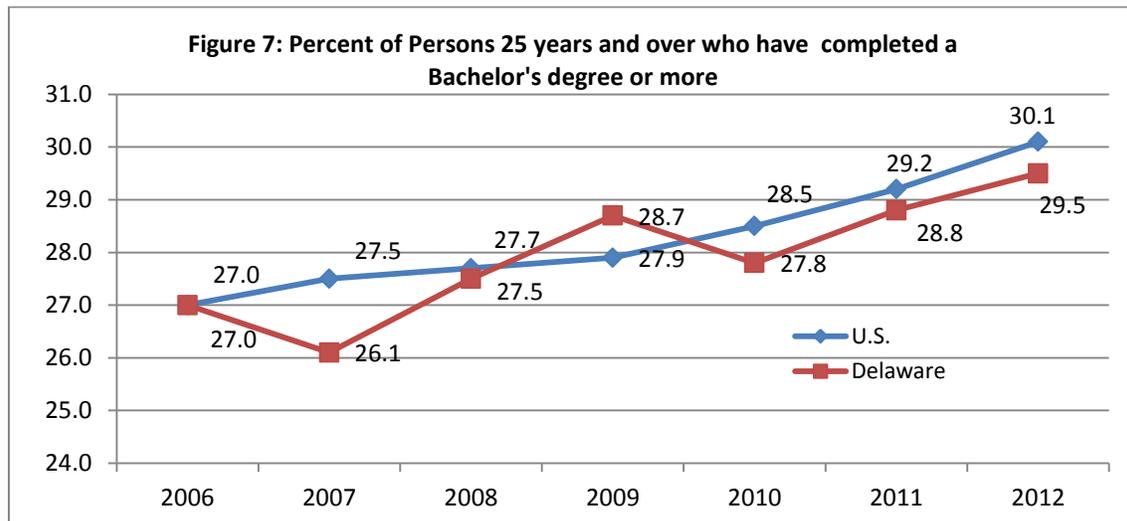
The unemployment rate remains relatively high even though the recession officially ended more than four years ago. One argument put forth for the cause of the prolonged high unemployment is that Delaware suffers from a skills gap. This argument claims that jobs vacancies are being unfilled because workers in Delaware do not have the skills required to fill the open positions. Next, we will look at the how the educational attainment of Delaware workers has changed to see if skills have been declining.



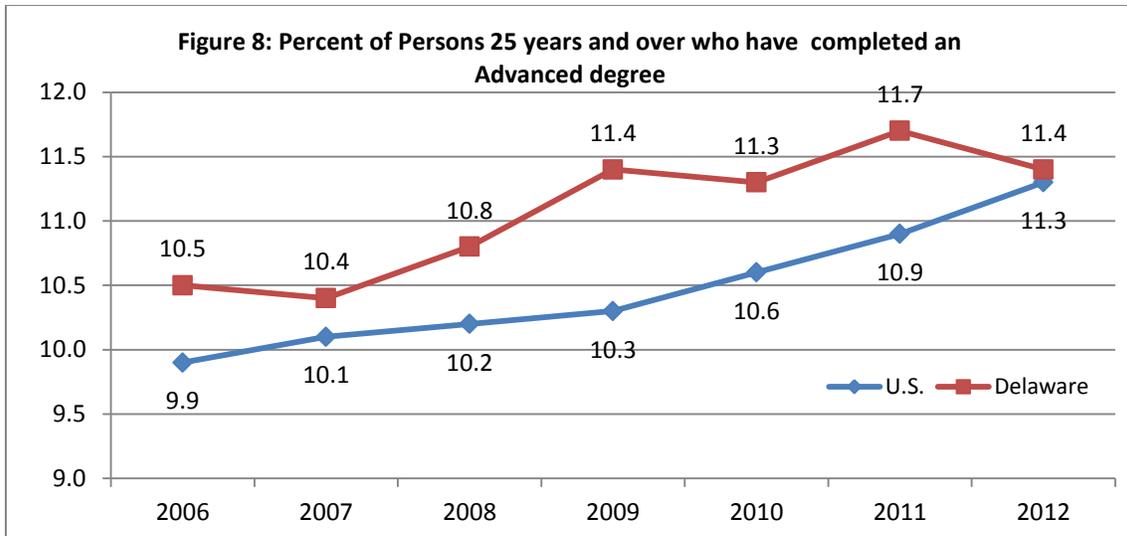
Source: U.S. Census Bureau, American Community Survey 2006-2012

According to the Census Bureau's 1990 Census, 77.5 percent of Delaware residents had a high school diploma or more; by 2000 that had risen to 82.6 percent. Figures 6 through 8 show the percent of persons 25 years and over by educational attainment. The data are from the U.S. Census Bureau's American Community Survey. In 2012, 88.5 percent of Delawareans had completed high school or above. An increasing percentage of Delaware residents have at least a high school diploma. Delaware has also been above the national average in the percentage of its population in this category with the exception of 2011 and 2012 where Delaware has fallen slightly behind.

Next, we will look at those whose educational attainment is a bachelor's degree or more. Referring back to the Census, Delaware residents with a bachelor's degree or more in 1990 and 2000 was 21.4 percent and 25.0 percent, respectively. With 29.5 percent of Delaware residents with a bachelor's degree or more in 2012, Delaware workers have an increasing amount of education, which provides additional evidence against the claim there is a skills gap explanation for the mismatch between workers and vacancies.



Source: U.S. Census Bureau, American Community Survey 2006-2012

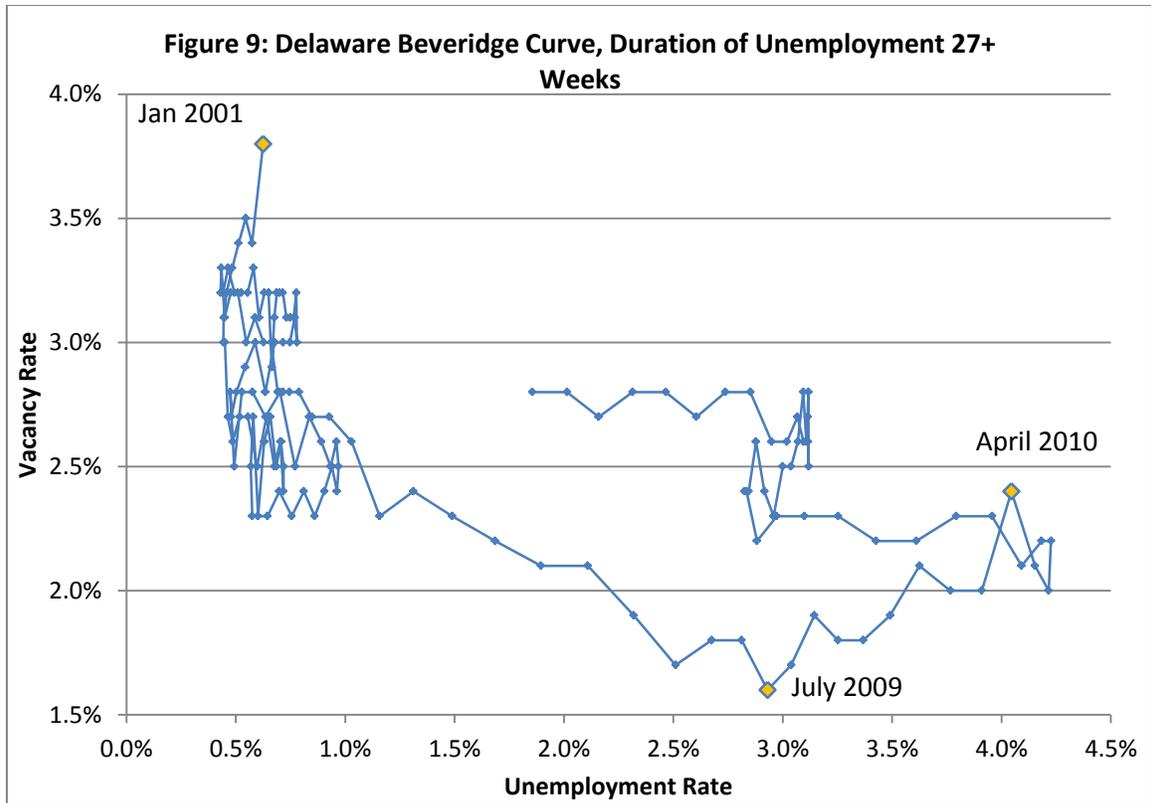


Source: U.S. Census Bureau, American Community Survey 2006-2012

The general trend for the educational attainment of Delaware's residents has been increasing over time. The evidence that there is a skills gap is not borne out in the Beveridge curve analysis or by reviewing the educational attainment data. Delaware's workforce is overall more educated today than it was in 2006 when Delaware's unemployment rate was 3.5 percent.

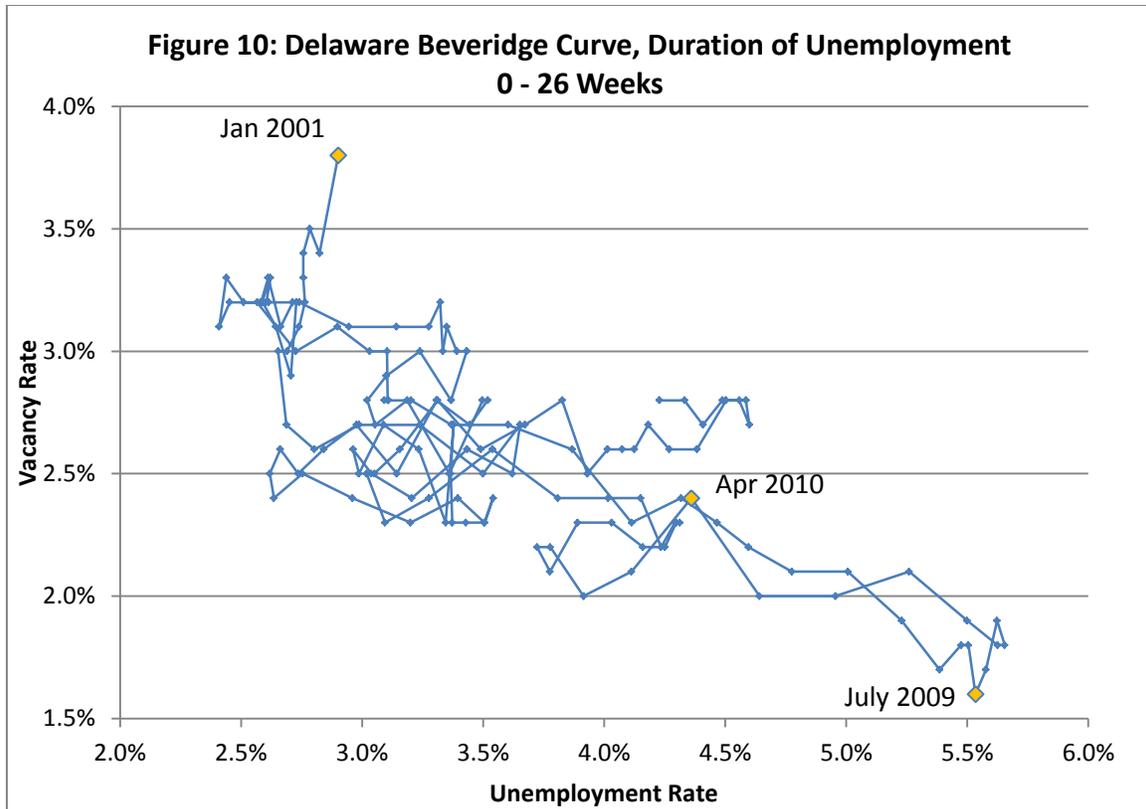
### **Disaggregation of the Beveridge Curve by Duration of Unemployment**

Next, we will look at how the duration of unemployment has impacted the Beveridge curve. The unemployment rate will be disaggregated by the duration of unemployment and plotted against the vacancy rate. Unemployment rates for duration of unemployment are calculated from the Delaware Current Population Survey (CPS) data and the vacancy rate comes from JOLTS. The unemployment rate was calculated by dividing the number of unemployed Delawareans by duration of unemployment by the total number of all employed Delawareans plus the unemployed by duration of unemployment. The monthly CPS data are not seasonally adjusted, so seasonality was removed from the data by extracting the trend. This was done by using the Census Bureau's X12 seasonal adjustment program and extracting the trend cycle from the CPS unemployment rate.



Source: U.S. Department of Labor, Delaware Current Population Survey. U.S. Department of Labor, Job Openings and Labor Turnover Survey

In Figure 9, the Beveridge curve begins to shift out in 2009 for the long-term unemployed. The unemployment rate/vacancy rate relationship for these workers is very similar to Delaware workers as a whole (as seen in Figure 1). There is a counter clockwise rotation of the unemployment rate/vacancy rate relationship beginning in the second half of 2009 as the Beveridge curve shifts outward away from the origin. Contrast this to those who had been unemployed for a duration of 26 weeks or less, in Figure 10. For those who had been unemployed for a duration of 26 weeks or less, there is no outward shift in the Beveridge curve. By disaggregating the unemployment rate by the duration of unemployment, one can see a difference in the movement of the curve between the long-term unemployed (27 weeks and longer) and the short-term unemployed (26 weeks or less). The unemployment rate by duration of unemployment makes a difference in the outward shift in the Beveridge curve. On the other hand, disaggregation of the Beveridge curve by skill level showed no difference for the different levels of educational attainment for the outward shifting of the Beveridge curve. Only when the unemployment rate was disaggregated by duration of unemployment do we see that the duration of unemployment having a differential impact. The short-term unemployed have taken advantage of the increase in the vacancy rate with a reduction in the unemployment rate for this group of workers.



Source: U.S. Department of Labor, Delaware Current Population Survey. U.S. Department of Labor, Job Openings and Labor Turnover Survey

### Conclusion:

Delaware's Beveridge curve has shifted outward since 2009. By disaggregating the unemployment rate by skill level one expected to find those with the most skills benefiting from an increase in vacancies from 2009 to 2012 if there was an excess demand for the most skilled workers caused by a skills gap. However, the most skilled workers had the same movement in the Beveridge curve as those with the least amount of skills leading to the conclusion that there is a lack of evidence that there is a skills gap in Delaware. Further investigation of the level of educational attainment to see if the skills of Delaware workers have in fact degraded in recent years revealed the opposite finding, that is, that Delaware's workforce today has more education than they have had in the past. Disaggregating the unemployment rate by the duration of unemployment has shown that the duration of unemployment does have a differential impact the Beveridge curve. For the short-term unemployed (26 weeks or less), the Beveridge curve did not shift outward away from the origin as it did for the long-term unemployed. For the short-term unemployed, the increase in vacancies is associated with a reduction in the unemployment rate among this group. However, the long-term unemployed did not see the same type of reduction in the unemployment rate as the vacancy rate increases, as had occurred for the short-term unemployed. For the long-term unemployed, as the vacancy rate has increased in recent years, the unemployment rate has been much slower to respond. Disaggregating the unemployment rate by duration of unemployment suggests

that the outward shift in the overall Delaware Beveridge curve is caused at least in part by the long-term unemployed.

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