Test of Sectoral Shifts Hypothesis Based on Robust Measures of Dispersion and Skewness

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Sectoral shifts hypothesis states that sectoral reallocation of labor demand has a significant effect on the fluctuation of unemployment rate even in the absence of aggregate shocks. Many studies have found strong evidence supporting the hypothesis. In those studies, classical measures of dispersion and skewness of the cross-sectional distribution of estimated sectoral shocks have been used to represent the effect of sectoral shifts on aggregate unemployment rates. However, it is well known that classical measures of moments are strongly affected by the presence of outliers. Consequently, the test of sectoral shifts hypothesis can be distorted by the presence of a few outliers. This paper examines the presence of outliers in the sectoral shocks estimated from the U.S. industrial data, and tests the sectoral shifts hypothesis based on alternative robust measures of the dispersion and skewness. We find strong evidence of the presence of outliers. However, it turns out that sectoral shifts hypothesis is still strongly supported when robust measures of dispersion and skewness are used as a measure of sectoral shifts. We also find that even in the absence of aggregate shocks the natural rate of unemployment fluctuates significantly over time due to sectoral shifts.

Keywords: sectoral shifts, sectoral shocks, robust measures of dispersion and skewness, natural rate of unemployment

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I. Introduction

Sectoral shift is defined as the reallocation of labor demand across industries holding aggregate labor demand constant. When there is a sectoral shock that shifts labor demand from a declining industry to an expanding industry, the former industry lays off workers, and those workers will go through a job search process to find new jobs in the expanding industry. Because of the time associated with the search process, sectoral shift is expected to raise the aggregate unemployment rate. This is called the sectoral shifts hypothesis.

The seminal paper by Lilien (1982) presents a very simple and intuitive example that demonstrates a positive relationship between average layoff rate and dispersion of the distribution of sectoral shocks. Since Lilien (1982), a large number of studies on the sectoral shifts hypothesis employ the classical measure of cross-sectional dispersion of sectoral shocks to represent the effect of sectoral shifts of labor demand on aggregate unemployment rates. In a recent paper, Byun and Hwang (2006) argue that classical measure of dispersion alone is not enough for capturing sectoral shifts of labor demand, and that in addition to dispersion, classical measure of skewness also should be used when testing the sectoral shifts hypothesis. They empirically show that, when measured by dispersion and skewness, sectoral shifts have a significant effect on the aggregate unemployment rate.

It is well known that classical measures of moments are very sensitive to the presence of outliers. Consequently, tests of sectoral shifts hypothesis based on the estimates of classical measures of dispersion and skewness may be distorted by outliers in the estimates of sectoral shocks. By applying various methods of detecting outliers on cross-sectional distribution of sectoral shocks estimated from the U.S. industrial employment data, we find strong evidence