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Can sectoral labor reallocation explain the jobless recovery?

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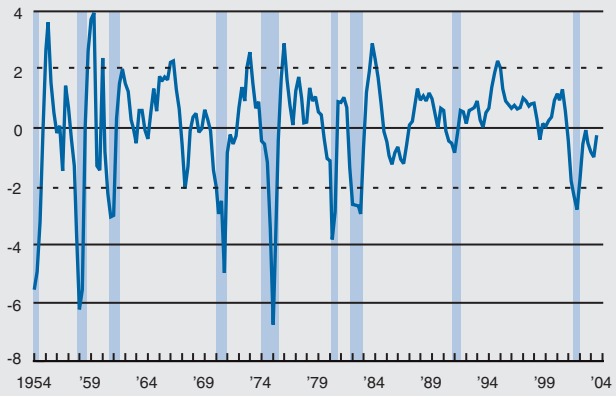
This article finds that structural shifts across broad industry categories are *not* an adequate explanation for low employment growth in this economic recovery.

When the National Bureau of Economic Research (NBER) announced that the trough of the most recent recession was in November 2001, the following headline appeared in the *New York Times*: "Recession is over; jobs aren't trickling down."[1] Now, 22 months after the purported trough, job growth is still proving elusive. In November 2001 total private nonfarm payroll employment was at 109.6 million workers. The latest figure available (for September) shows a *decline* of 1.1 million jobs since then—almost 52,000 jobs lost per month over the expansion.

1. Estimated employment cycle: 1954:Q1–2003:Q3



NOTE: Shaded areas indicate recessions as defined by the National Bureau of Economic Research.
SOURCE: U.S. Bureau of Labor Statistics and author's own calculations.

If the economy is expanding, why is the labor market faring so poorly? Part of the answer lies in the definition of a recession. The NBER defines a recession as a "significant decline in economic activity spread across the economy, lasting more than a few months, normally visible in real GDP [gross domestic product], real income, employment, industrial production, and wholesale-retail sales."[2]

The NBER places considerable weight on GDP, but because GDP is reported only quarterly, the committee also considers a variety of monthly indicators, including employment. From a purely mechanical viewpoint, employment can rise during a "recession" and fall during an "expansion," as it provides a different signal of economic activity from other measures considered.

Understanding *how* such a dichotomy can occur and just *why* it happens are two different things, however. One possibility is that some fundamental structural change in the labor market accounts for its weak response to improving economic conditions. Whatever the source of this structural change, it suppresses employment growth while expanding output. By definition, labor productivity rises.

Cyclical unemployment

The labor market is dynamic. At any point some workers are moving from one job to another—perhaps with some intervening periods of unemployment. During a cyclical downturn, relatively more workers are laid off and searching for work. This cyclical unemployment is widespread across a number of industries, occupations, and areas. Employment is difficult to find. During an expansion, the opposite occurs with workers finding employment relatively easily. Thus, one of the hallmarks of a recession is that employment growth is less than population growth.

Structural unemployment

On the other hand, structural change causes unemployment that is not "normal" from a business cycle point

of view. When this occurs, the unemployed find it even more difficult to locate employment because these jobs are permanently lost. Unemployment increases and employment growth declines relative to what it would have been.

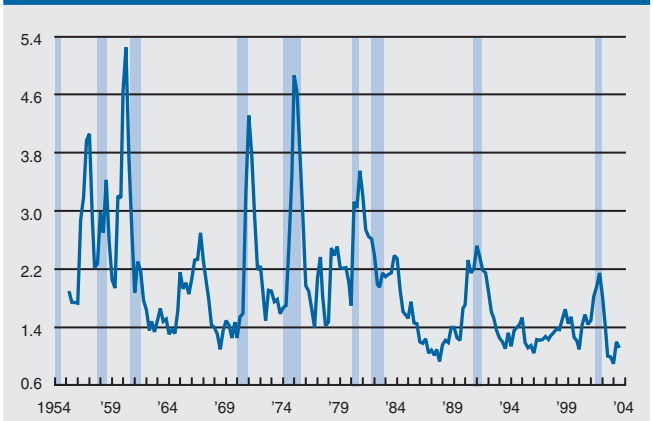
Conceptually, there are two types of structural change. One is aggregate and affects all industries, occupations, or regions simultaneously and in roughly the same manner. An example of this would be a tax increase on labor permanently decreasing labor demand. The other type is a sectoral shift that affects the *relative* demand for labor across industries, occupations, or regions. This results in labor reallocation across sectors. The need for greater reallocation temporarily increases unemployment and reduces employment growth.[3]

Technological improvement that renders some skills or industries obsolete is one example of a structural change that involves a changing distribution of occupations and industries. For instance, the advent of computers ultimately led to the obsolescence of typewriters and those employed manufacturing them. Labor resources were transferred from these declining areas to growing industries.

A relative change in input prices is another example of a structural change requiring labor reallocation across sectors. Such an event occurred with the oil price shocks of the 1970s. Gas-guzzling cars were no longer economical and consumers switched to more compact models and alternative modes of transportation. The shock not only affected all industries simultaneously, but also caused some industries and occupations to grow and others to shrink.

These examples of sectoral shifts clearly entail labor reallocation as relative demand for labor changes. However, even broader, more aggregate types of structural change that influence all firms simultaneously could arguably have some impact on the distribution of employment. For example, increased benefit costs combined with nominal wage rigidities may be one reason why firms are hesitant to add to their work force and could partially account for the relatively poor performance of the labor market. However, industries differ in their mix of employees, benefit packages, and the degree of wage rigidity. Industries with more costly benefit packages that are unable to reduce wages would be experiencing the most drag on their hiring decisions. These high-benefit, high-wage-rigidity industries would experience lower employment growth than their low-benefit counterparts, and industry employment shares would change to reflect this.

2. Index of structural shifts: 1955:Q2–2003:Q3



NOTE: Shaded areas indicate recessions as defined by the National Bureau of Economic Research.
SOURCE: U.S. Bureau of Labor Statistics and author's own calculations.

One way to measure structural change is by evaluating changes in the distribution of employment over time—whether across industries, occupations, or regions. The structural change I focus on affects the industrial composition of employment.[4]

I examine annualized quarterly employment growth net of aggregate employment growth by industry from 1954:Q1 to 2003:Q2. The NAICS industries included are: Construction; Finance, Insurance, and Real Estate; Durable Manufacturing; Nondurable Manufacturing; Transportation and Public Utilities; Government; Retail Trade; Wholesale Trade; and Services.[5] An industry that has a declining share of total employment has a negative value. Durable and Nondurable Manufacturing are examples. Conversely, growing industries such as Services have positive values. In addition to these long-term trends, net employment growth for many industries follows a cyclical pattern.

A complication

Measuring structural shifts would be easy if industry employment shares were not also affected by the business cycle. Some industries are more cyclically sensitive than others, so business cycles are also characterized by relative changes in the distribution of employment across industries. For example, during downturns employment growth in goods-producing industries typically declines relative to employment growth in the service sector. To obtain a meaningful measure of structural shifts, it is necessary to filter out the cyclical changes.

A simple model

I developed a model that distinguishes between cyclical changes and structural changes in employment shares. The growth rate of employment shares within an industry is assumed to depend upon three factors—a constant, the cyclical state of the economy, and a disturbance reflecting structural change in that industry. Specifically,

$$\Delta \ln(s_{it}) \equiv g_{it} - g_t = a_i + C_{it} + \varepsilon_{it}.$$

The growth rate of industry employment shares, $\Delta \ln(s_{it})$, is algebraically the same as industry employment growth, g_{it}, net of aggregate employment growth, g_t. The constant term reflects the fact that industries may follow a long-term trend in which they are growing or declining at a faster rate than the rest of the economy over long periods.

Just as the NBER weighs co-movements in a number of broad economic measures to date business cycle peaks and troughs, changes in the industrial composition of employment provide an opportunity to calculate a different measure of economic activity—one that depends only upon employment growth across industries. This co-movement in employment shares defines the "employment cycle." It is not directly observable but may be estimated from observing

co-movements in relative employment growth across industries.

The employment cycle is a succinct way of capturing common relative changes in employment growth that reflect the level of economic activity. This cycle impacts each industry differently and is captured by the term C_{it} in the above equation. The estimated model permits cyclical downturns to cause declining employment shares in durable manufacturing while simultaneously increasing employment shares in services. Letting some industries lead or lag others in their response to the business cycle permits further flexibility.[6]

The last term in the expression, ε_{it}, is an idiosyncratic shock that captures unexpected changes in industry employment shares that are unrelated to long-term trends or the cycle. This disturbance captures the notion of a sectoral shift. It can be argued that long-term trends, such as declining manufacturing employment, that are captured by the a_i terms are structural as well. However, these longer-term changes in employment shares are steady and are not likely to be as disruptive to employment growth and movements into and out of unemployment as the idiosyncratic portion of net industry employment growth.

The employment cycle

The employment cycle I obtain is in figure 1.[7] This cycle uses only the co-movements in relative employment growth to measure economic activity. It does not include any other information such as industrial production, manufacturing and trade sales, or personal income—all of which are considered by the NBER along with employment when determining recessions. A value of 0 for the estimate of the employment cycle means that industry employment shares would be growing at their long-term trend, if there were no sectoral shifts. In the absence of structural change, positive values mean that the economy is expanding and negative values mean it is contracting.

Clearly, the measure looks quite a bit like the business cycle. Suppose that a contraction is defined as occurring when the employment cycle is two standard deviations below 0 (below –2.0 in the graph). The measure of the employment cycle coincides with the timing of the beginning of NBER contractions in four of the eight contractions since 1954. The employment contraction lags the NBER's by only one quarter in two other recessions, including the most recent. The 1990–91 contraction was relatively mild and did not meet the –2.0 standard deviation threshold.

The employment cycle expansion phase typically coincides with the NBER dating of expansionary periods. Defining an expansion as the period following a significant contraction, the cycle coincides with the expansion phase of the NBER-defined expansions in six of the nine cases. The employment cycle expansion of 1954 started one quarter later than the NBER expansion. Only in 1975 did the expansion phase of the employment cycle start earlier—by two quarters.

Structural change

I define a structural shock as that part of industry employment growth relative to aggregate employment growth that is unaccounted for by trend or cycle.[8] The estimation provides a way to identify these shocks. Some industries are prone to large unanticipated structural shifts in employment growth. Durable Manufacturing is quite volatile, experiencing large swings in the late 1950s and again in the 1970s. Finance, Insurance, and Real Estate experienced a large negative shock in the early nineties as the savings & loan crisis affected the banking sector. Transportation and Public Utilities incurred a large positive shock followed by a large negative shock in the early 1970s. Another large negative event occurred in this industry in 2001—a direct result of the September 11 attacks. Focusing on the most recent period, the sectoral shocks are not large by historical standards nor are they statistically significant.

I use these industry disturbances to construct a measure of turbulence across industries (see figure 2).[9] Higher values of the index indicate the presence of greater sectoral shifts. The late 1950s, the early to mid-1970s, and the early 1980s were relatively turbulent times for the labor market with significant reallocation of labor across industries. Much of the turbulence occurs around the same time as economic contractions—sometimes leading and at other times lagging. This coincidence suggests that the two are interrelated, with restructuring probably occurring when it is least costly. We see a negative trend in structural shifts. This occurs for two reasons. First, within an industry, net employment growth has become increasingly less volatile. Second, employment has shifted from more volatile sectors to less volatile ones.

In contrast to earlier recessions, the two most recent contractions have been accompanied by relatively small shifts in labor resources across industries. The 1990–91 recession is particularly interesting because the model interprets the industry employment growth data as an insignificant downturn in economic activity accompanied by some sectoral reallocation.

The evidence suggests that structural shifts across these broad industry categories are *not* an adequate explanation for the current low employment growth. No individual industry is experiencing abnormally large or small employment growth relative to aggregate employment growth, requiring little reallocation of labor resources. Focusing on the index of structural shifts, the most recent business cycle is characterized by *less* labor market turbulence than other cycles. The measure of the employment cycle

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interprets the most recent contraction as relatively mild. This result is in direct contrast to the argument made by Groshen and Potter (2003), who claim that structural change is largely responsible for the weak employment numbers in the current expansion.

What explains the current low employment growth?

My analysis of sectoral shocks suggests that employment is growing close to its long-term trend within broad industry aggregates.[10] This conclusion is supported by the current low levels of sectoral reallocation and a measure of the employment cycle close to zero.

Whatever factors are keeping employers from adding to their work force in the recovery, they are felt across the entire spectrum of industries and are not specific to just a few. In fact, this is the definition of the business cycle—multiple sectors being affected simultaneously.

Typically, following a contraction there is rapid improvement in employment growth. This pattern can be seen clearly in the measure of the employment cycle I calculate. The current expansion has not yet produced this anticipated employment growth.

One way of looking at the data is to define a strong employment growth environment as occurring when the employment cycle is two standard deviations above 0 (above 2.0 in figure 1). A strong employment growth environment usually occurs some time after the trough of a recession. However, the time between the trough and when the economy is significantly above trend varies considerably from one business cycle to the next. In all recoveries through the early 1980s with one exception, the employment cycle showed rapid improvement and was significantly positive within one to three quarters after the trough. The recession of 1969:Q4 to 1970:Q4 did not produce significantly high employment cycle estimates until seven quarters after the trough. The NBER recession of 1990:Q4 to 1991:Q1, although not registering as a downturn in the employment cycle, didn't exhibit a strong, significant employment cycle expansion for 14 quarters following the trough.

Another way of looking at the employment cycle is to examine how many quarters it takes to go from a significant contraction to positive employment. The employment cycle became positive at the same time as the NBER expansion three times out of nine. It lagged the expansion by one to two quarters three times and led it once by one quarter. The longest period post-trough it took to reach positive employment cycle levels was four quarters in 1970.

With the current recovery being seven quarters underway, the current lack of employment rebound is disconcerting, but it appears consistent with a generally weak labor market rather than an economy undergoing significant amounts of labor reallocation across industries. Thus far, the economy has been able to increase production without adding employment because of high productivity gains. Eventually, as growth continues, productivity gains will slow and workers will need to be added to sustain growth.

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[1] D. Altman, 2003, *New York Times*, July 18.

[2] http://www.nber.org/cycles/recessions.html.

[3] Groshen and Potter argue this point in their article "Has structural change contributed to a jobless recovery?," in the August 2003 issue of *Current Issues in Economics and Finance.*

[4] Other types of structural change that may not influence the industrial composition of employment are not considered.

[5] NAICS is North American Industry Code Standard. I excluded Mining which accounts for less than 2% of total nonfarm employment since 1954.

[6] For a discussion of the estimation specifics, please see Rissman's article in the May/June 1997 issue of *Economic Perspectives* titled "Measuring Labor Market Turbulence."

[7] Imputations have been made for 2003:Q3.

[8] By focusing on the estimated shocks, I am emphasizing unanticipated changes in employment shares.

[9] Details of the calculation are in Rissman (1997). The graphed series is a five quarter moving average with declining weights summing to one to help filter out high-frequency movements.

[10] Possibly shifts are occurring intraindustry that are not captured by the analysis.