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POLICY note

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The current economic expansion has seriously challenged a bedrock assumption in economics. It is a widely accepted view that the growth rate of GDP directly affects employment. If it rises, then employment rises and the unemployment rate falls. Yet, recently, the United States economy has grown stronger without a commensurate growth in employment. Moreover, average wages have been weak. The mystery is deepened because, in earlier time periods, economic growth in the US was usually accompanied by a higher rate of job creation (and higher reduction of unemployment) than in other countries, in particular European welfare state countries such as France and Germany. Yet, recently we observe that job creation in relation to growth has been falling in the US yet rising in Europe.

To many observers, jobless growth in the US reflects a structural change independent of the business cycle. Exactly what drives structural change is inevitably not clear. We will summarize current thinking on this subject, but our first task is to confirm or reject the contention that job growth has been slow in the US. We utilize the basic relationship between unemployment and GDP growth postulated by the economist Arthur Okun a generation ago.

In empirical work, the relationship between output growth and job creation has been widely studied based on what is known as Okun's law. This paper attempts to relate the recent discussion on jobless recovery, observed in the US economy since the 1990s, to the empirical studies on Okun's law, which postulates a specific empirical relationship between economic growth and the change in the rate of unemployment. Our general hypothesis is that if the Okun coefficient for the economy has weakened, it explains the jobless recovery. Our results indeed show a decline in the time-varying Okun coefficient for the US since the early 1990s, which coincides with the weak job recovery starting from the 1991 trough. By contrast, in many other countries, Okun's coefficient is rising.

This Policy Note is organized as follows: section 2 briefly outlines Okun's law and the concomitant Okun's coefficient. Section 3 establishes empirically the existence of a jobless recovery in the US in recent years. In section 4 a brief review of explanations for the jobless recovery is given in the context of the research on Okun's law. Section 5 concludes with policy implications.

Country	Okun Coefficient	Potential output growth	R²	Sample	g_a
France	(3.12)	0.041	0.226	1961–01	0.037
Germany	(5.672)	0.041	0.479	1961–00	0.03
UK	(4.358)	0.026	0.352	1961–00	0.025
US	(9.832)	0.033	0.734	1961–00	0.035

Table 1: Estimates of Okun's Law

2] OKUN'S LAW

As is noted above, it is a widely accepted view in economics that the growth rate of the GDP of an economy increases employment and reduces unemployment. For Germany, France, and the United Kingdom the growth rate of GDP from the 1960s to the middle of 1970s was roughly 3.5 percent and the unemployment rates fell to a range of roughly 3–4 percent. The United States over this period experienced a lower growth rate and a higher unemployment rate of about 6–7 percent. But from the beginning of the 1980s to the current time period, the growth rate of Germany and France has been on average about or below 2 percent. Their unemployment rate has risen to 8–9 percent. In contrast, the US growth rate has moved up to roughly 3.5 percent on average since the 1990s, and the unemployment rate has moved down to roughly 5 percent on average. So economists and politicians alike agree: economic growth is good for employment.

Some forty years ago Okun (1962) summarized the relationship of growth and unemployment in a statistical relationship, which was later labeled Okun's law. It has been discussed and updated by much economic research. This law states that the relationship of growth to unemployment reduction (employment increase) is not one to one. Okun in 1962 postulated that there is only a weak relationship between growth and the reduction of unemployment. He postulated that a 1 percent increase in the growth rate above the trend rate of growth (or the growth in potential output) would lead only to 0.3 percent in the reduction of unemployment. Reversing the causality, a 1 percent increase in unemployment will mean roughly more than 3 percent loss in GDP growth. This relationship implies that the rate of GDP growth must be equal to its potential growth just to keep the unemployment rate constant. To reduce unemployment, therefore, the rate of GDP growth must be above the growth rate of potential output.

We have updated Okun's results with a recent data set (1961–2000). Table 1 summarizes the estimated results for Okun's coefficient. The results are based on the estimation of the difference version of Okun's law.[1] Output is measured by GDP volume at constant prices and quarterly data are used.

As Table 1 shows, in the US, the response of unemployment to an increase in the growth rate of the GDP has been, for a long time period, higher than in other countries. For the time period 1961–2000, roughly a 1 percent growth rate has led to a decline in the unemployment rate by 0.37 percent.

1. *There are typically two specifications of Okun's relationship.* **First, there is the gap** *model takes the following form:* $y_t - y_t^* = -\beta(u_t - u_t^*) + \varepsilon_t$ *whereby* y_t *is actual output;* y_t^* *is some measure of potential output;* u_t *is unemployment rate;* u_t^* *is the natural rate of unemployment; and* β *is the Okun coefficient. The error term is given by* ε_t*. Second, there is the difference model is given by* $\Delta y_t = \beta_0 - \beta_1 \Delta u_t + \varepsilon_t$*. Here again* y_t *is actual output and* u_t *the unemployment rate. The last specification can be reversed by interchanging the growth rate of u and of y. The estimated beta coefficient will then be called the Okun coefficient. The data source for our estimation is the* International Statistical Yearbook.
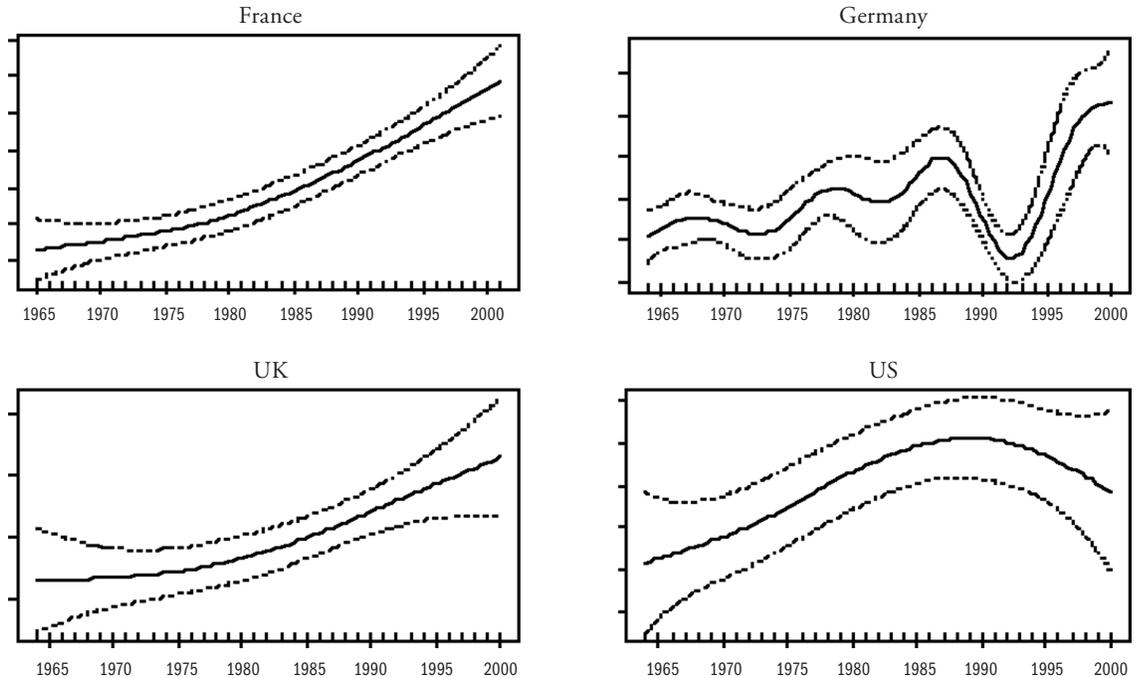
France

Germany

Figure 1:
Time-Varying Okun
Coefficient

UK

US

1965 1970 1975 1980 1985 1990 1995 2000

In Germany, for the same time period, the effect of a 1 percent growth rate on unemployment is on average only 0.22 and for France it is 0.17 percent. For the UK, interestingly, we obtain 0.31 percent, comparable to the US coefficient. The last column in Table 1 shows the average growth rate over the time period considered. There have been many empirical papers on Okun's law that show similar results. See, for example, Lee (2000). Yet overall, it is also clear according to the academic research that Okun's law is not necessarily very stable over different time periods, employment data sets and methods of estimation.[2]

3] CHANGE OF OKUN'S LAW AND JOBLESS GROWTH

Our recent research on Okun's law (see Semmler and Zhang 2005) demonstrates that there appears to be a structural change in the relationship linking growth to unemployment reduction (employment increase) for major countries, including the United States. For some countries the response of employment to economic growth has increased, while for the US it has declined. Figure 1 (solid line) reports empirical results for France, Germany, the UK, and the US. The figure shows the time–varying reaction of unemployment to growth rates (as deviations from the mean). For France and the UK the response has increased, as compared to their mean, since the beginning of the 1990s. For Germany it first went down at the beginning of the 1990s—probably owing to the unification of Germany in 1991 and the large exogenous increase in labor supply. But it has increased since the middle of the 1990s. However, for the US, Figure 1 shows that the response of unemployment to growth rates steadily moved down since the beginning of the 1990s. The US case clearly shows a decline of the response of employment to economic growth—thus, a jobless recovery, as some have called it.

We then compare the job growth since the last trough to previous business cycles upswings. A paper by Groshen and Potter (2003) summarized the recent US trends in an interesting graph. We have expanded this analysis to capture more months after the trough of the recession. Figure 2 graphs the percentage deviation of each observation (twelve months before and forty–five months after the trough) from the payroll number that existed at the trough. The figure shows that payroll job growth just after the trough increased quickly for past recessions. This is not seen to be the case for the last trough (November 2001). The first monthly payroll number that exceeds the trough number occurs in the 29th
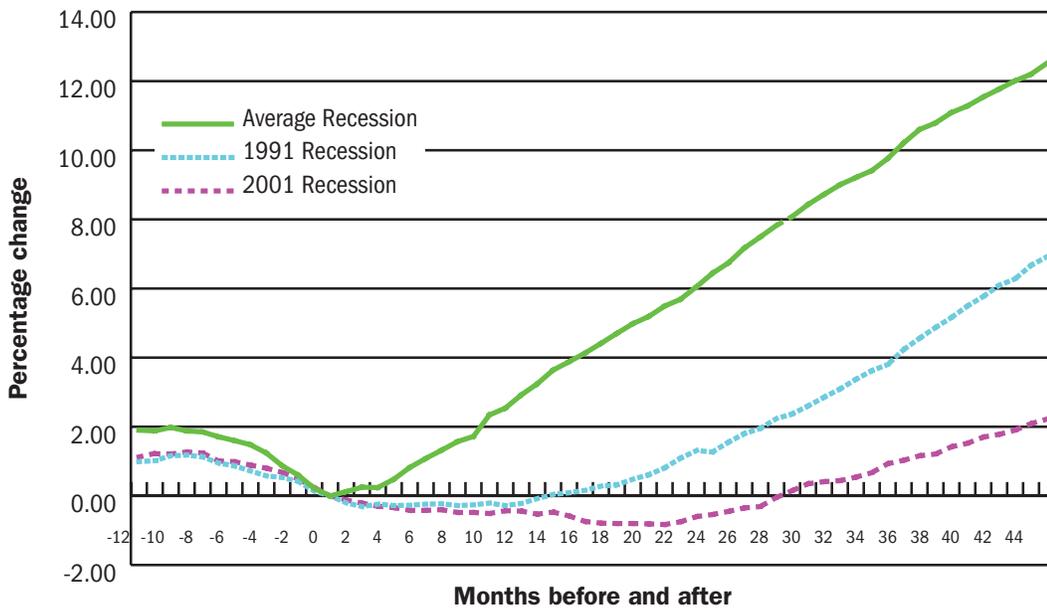
Source: Bureau of Labor Statistics; authors' calculations

Figure 2:
US Payroll Job Growth
During Recoveries

Note:
The average cycles of business cycles with troughs in February 1961, November 1970,
March 1975, July 1980, and November 1982.

month after the official end of the recession. For the 1991 trough, this occurred by the 13th month. For the average of past cycles, there was an immediate pick-up in the payroll numbers. Overall, Figure 2 shows only a slim growth in payroll jobs since 2001.

To complete the picture we add another graph to show how each quarter of real GDP growth—three quarters before the trough and fourteen quarters after—deviates in percentage terms from the position of the trough. This is presented by Figure 3. The chart shows that the pick–up of real GDP was in fact significantly weaker than that of the average of past recoveries. However, it tracks the 1991 recovery fairly closely until the fourth quarter. The similarity ends between the fourth and the eighth quarters, but then once again resumes. Thus, the lower than average output growth would itself explain part of the slower payroll employment recovery, but not all of it.

4] SOME SUGGESTIVE INTERPRETATIONS

Several hypotheses have been proposed to explain the very mild job recovery and, by implication, the reduction of the Okun coefficient. An interesting development of the recent recovery

versus past recoveries is the relatively rapid rise of productivity. This fact is documented in **Figure 4,** which summarizes productivity changes during recessions. We calculate the percentage deviation of quarterly productivity numbers from that which existed at the trough. The recent productivity increase shoots above the average of previous recessions after seven quarters. After six quarters the recent productivity increase did the same vis–a–vis the 1991 recession. This behavior might help to explain—even though we do not ascribe a causal role to productivity growth because this variable itself is driven by several factors—why the job recovery has been so slow. By definition labor productivity rises when there are factors that suppress employment growth while output is expanding.

It is possible that there was a change in the trend of productivity since the 1990s. Of course such productivity trends are hard to measure. There is a long tradition in economics that presumes that productivity increases—and the change in productivity trends—may not create employment in the short run. If prices are sticky in the short run and demand is constrained, then productivity will not significantly increase employment for the economy as a whole. In fact there may be no employment effects (see Francis and Ramey 2003; Gong and Semmler 2006). Productivity increases are advantages for an

25.00

20.00

15.00

10.00

5.00

0.00

-5.00

Percentage change

Average Recession
1991 Recession
2001 Recession

-4 -3 -2 -1 Trough 1 2 3 4 5 6 7 8 9 10 11 12 13 14

Quarters before and after
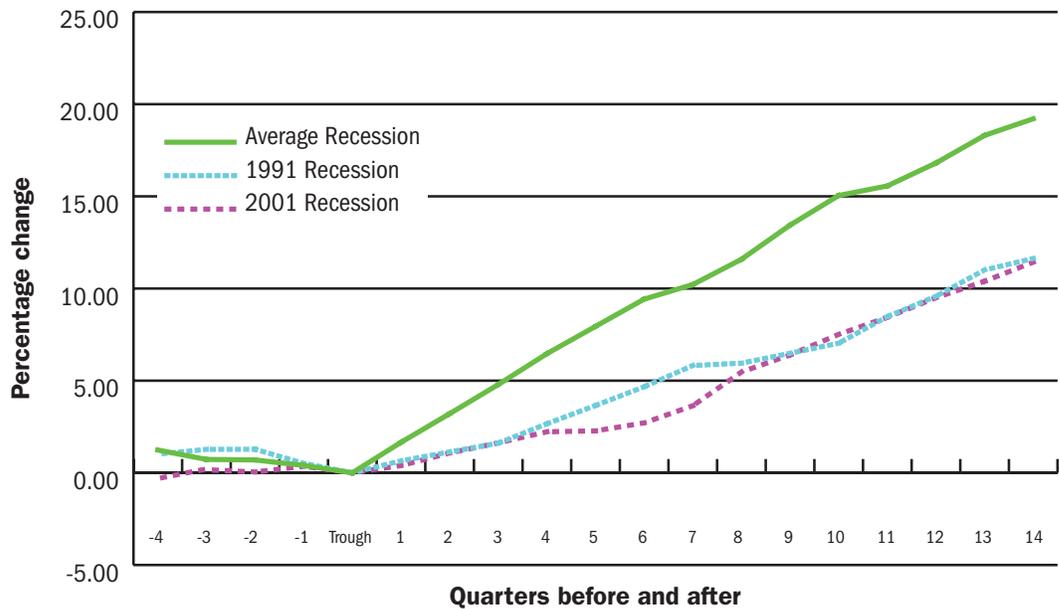
Figure 3:
Change in US Real GDP
During Recoveries

Source: Commerce Department, Bureau of Economic Analysis; authors' calculations

Note:
The average cycles of business cycles with troughs in February 1961, November 1970,
March 1975, July 1980, and November 1982.

economy, but such advantages might only work out in the long run. In the short run employment might not increase and unemployment might not decrease.

The growth in productivity might also reflect the desire of firms to retrench workers in order to minimize costs. There are two versions of this hypothesis. The first emphasizes the rapid growth in health care costs in recent years, which might raise costs above equilibrium. The second emphasizes the role of fixed employment costs per worker that do not vary with hours worked. To avoid high fixed costs, employers cut back on permanent hires and require existing employees to work longer hours. But this explanation can be counteracted by the fact that employers can reduce other costs such as wages and salaries. Therefore, these costs do not necessarily have to contribute to slow job recovery once the employer can shift them away from other expenses.

Another explanation for the jobless recovery is structural change (or structural unemployment)—unemployment not associated with the business cycle. This was hypothesized some time ago by Aghion and Howitt (1994) and empirically studied by Groshen and Potter (2003). Upon analyzing industry–level employment data, Groshen and Potter (2003) suggested that the latest upswing since 2001 occurred while the US economy underwent significant structural change. They claimed that a

significant percentage of layoffs can be attributed to permanent rather than temporary layoffs. Permanent layoffs are a feature of structural unemployment as industries disappear. They explained that symptomatic of structural change are industries that continue to lose jobs after having lost jobs during the last recession or industries that continue to gain jobs after having gained jobs during the last recession.

Exactly what is driving the structural change, however, is not clearly established. One explanation might be the relative position of the US in the international economy. Indeed, Bernanke (2003) suggested trade might be a factor that accounts for the change. Americans, he noted, have a high propensity to consume foreign manufactured goods relative to the Unites States' ability to sell its manufactured goods abroad. For him, though, the explanation of structural change might be due to macroeconomic factors—namely the US current account deficit—rather than microeconomic or labor market factors. The persistence of the current account deficit is the result of both weaknesses and strengths of the US economy. The weakness includes the low national savings rate, which forces us to finance consumption (both private and government) by importing more than we export. However, the deficit also reflects the attractiveness of the US economy to foreign investors, which is itself due
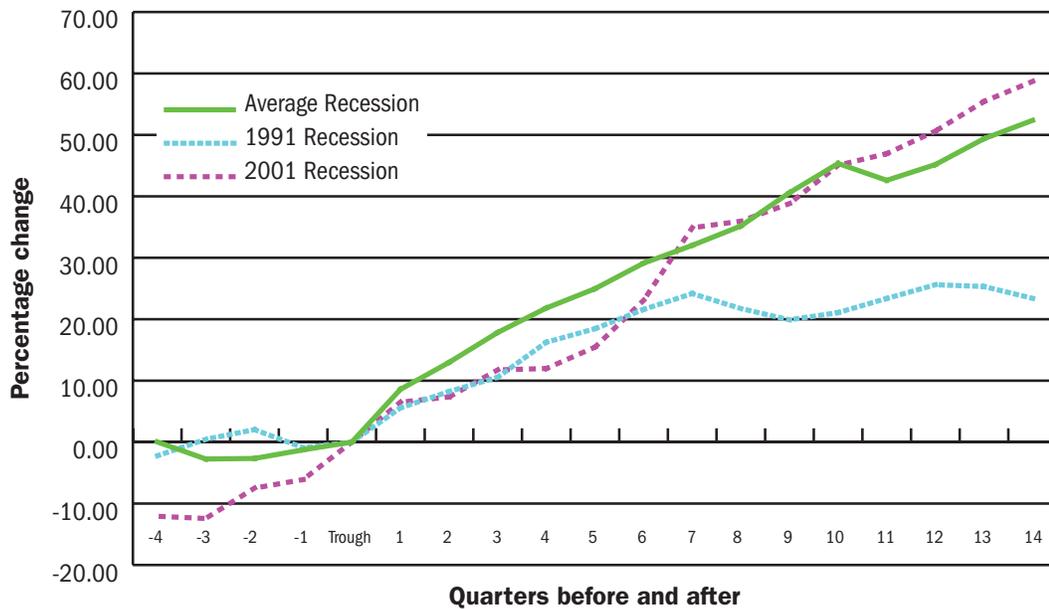
Figure 4:
Change in US Non Farm Productivity During Recoveries (Output Per Hour)

Source: Commerce Department, Bureau of Economic Analysis; authors' calculations

Note:
The average cycles of business cycles with troughs in February 1961, November 1970, March 1975, July 1980, and November 1982.

to the rapid growth of the US relative to trading partners.

Freeman and Rodgers (2005) have also alluded to the US performance in the international economy as a potential candidate to explain the slowdown of job growth. They have noted a substantial drop of FDI inflows into the US with the figure declining from 1.6 percent of GDP in 2001 to 0.3 percent of GDP in 2003.

The growing use of just-in-time hiring (see Schreft and Singh, 2003) is proposed as a further possible explanation for the weak job recovery. This practice involves the employment of temporary and part-time workers and also the use of overtime to achieve a more flexible workforce. Employers are likely to use just-in-time hiring when there is uncertainty about the future, especially when the strength of the recovery is uncertain. While such practices could be widespread at the initial stages of the recovery, it is not so certain that it should persist for many months after the trough. Yet it has. As Figure 2 shows, this recovery has been markedly weaker than past recoveries despite the relatively strong showing of GDP growth.

Overall, in the US, the potential output and potential GDP growth rate seem to have gone up, whereas in the Euro-area countries the potential output and potential growth rate appear to have

gone down. This, at least, holds since the middle of the 1980s, as the preliminary results of the paper by Semmler and Zhang (2005) show. As to Europe, the reasons for this may include the following: weak demand resulting from restricted monetary and fiscal policies, lack of technological innovations, less over-valuation of business firms in the stock market, and so on. If there is a shift in the potential output and potential GDP growth rate, Okun's law will not show a stable relationship any more and we would expect a changing relationship between growth and employment.

When there is stronger structural change, as observable in the last decade and as discussed above, labor market search and matching institutions become important in helping to match the supply of vacancies to the demand for labor through job searches by the unemployed. (Other labor market institutions, such as the type and length of labor contracts, are also important, see also Okun 1962.) It has been argued that, in particular for Euro-area countries in earlier times, labor market institutions have not been flexible enough. As the data shows, vacancies were still fluctuating but the Beveridge curve (defining the relationship between vacancies and unemployed) shifted to the right, to a higher level of unemployment. Yet, as can be seen from Figure 1, for some EU countries, the matching of

vacancies and job searches by the unemployed seems to have improved—due to labor market reforms—and GDP growth appears to add more workers to the payroll of firms. This can be read as an indication that at least matching has improved in Euro-area countries, and it helps explain the improved Okun coefficient.

Finally, it might be interesting to pursue whether the change of the GDP growth rate on unemployment (and employment) might be skill-biased—in the sense that it affects low skilled labor more than high skilled labor. This is also relevant in regard to the differential effects of growth rates on unemployment and employment. In fact as empirical research has shown—see Greiner, Rubart, and Semmler (2004)—there is less inequality in EU-countries than in the US and a differential impact of growth on employment of different skill groups may exacerbate the existing inequality in the US. As Howell, Madrick, and Mahoney (2005) have shown, although some jobs in the US have been created since the last recession, these are jobs at the lower end of the skill ladder.

5] POLICY IMPLICATIONS AND CONCLUSIONS

In this paper we interpret the recent phenomenon of jobless growth in the US in terms of Okun's theory. We demonstrate in Figure 1 that a declining response of job growth stems from a decline in the Okun coefficient. We also show that, in other countries—for example Germany and France, this coefficient has not been falling but rising. The previous higher response of job growth to economic growth in the US has thus been reversed.

Concerning the US, we should stress that there are many links in the chain of causality that we do not understand. Still, what we do know is that governments must provide some security against disasters, such as those arising from natural disasters, health shocks, joblessness, and unemployment.

The large structural change in the last decade suggests such a need for government. Relocating of jobs cannot be achieved solely by re-education and re-skilling of the labor force or by better labor market search and matching institutions. The unemployed need decent income and health care during such periods. The low levels of unemployment benefits and the short duration of unemployment payment in the US—as compared to the European welfare States—make unemployment a more difficult experience than is justified. As Robert Reich, the labor secretary in the Clinton administration recently argued, higher levels of unemployment benefits—and for a longer time period—are essential as precautionary measure against structural and cyclical unemployment.

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