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# Economic Letter

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*While U.S. productivity recovered most of the ground lost during the downturn, the same thing didn't occur in the euro zone.*

## Economic Rebounds in U.S. and Euro Zone: Deceivingly Similar, Strikingly Different

by Anthony Landry and Carlos E.J.M. Zarazaga

**T**he global downturn following Lehman Brothers' failure in September 2008 has become known as the Great Recession for good reason: It was the most severe global economic contraction since the Great Depression. As the dust settles, patterns among key macroeconomic variables have emerged. Identifying them may make it possible to understand the nature of the downturn and, thus, determine which policies might best address its fallout.

We analyzed the trajectory of two widely watched macroeconomic variables—real (inflation adjusted) output per working-age person (16 to 65 years old) and productivity—during the Great Recession and its aftermath. We looked at two major world economies, the United States and the euro zone. On both sides of the Atlantic, real gross domestic product (GDP) per capita has rebounded anemically from the Great Recession's trough.

This similarity, however, is deceiving because the trajectory of productivity in the two regions has differed. While U.S. productivity recovered most of the ground lost during the downturn, the same thing didn't occur in the euro zone. This discrepancy is puzzling and holds important implications for the outlook in these two regions as well as for measures that could invigorate the slow and fragile recovery.

### Output Performance: Deceivingly Similar

The 2008–09 recession and its aftermath have been particularly difficult, as shown in Chart 1. The natural logarithms of real GDP per member of the working-age population (multiplied by 100) for the U.S. and the euro zone are represented by the solid lines, along with corresponding prerecession trends, depicted by the dotted lines.<sup>1</sup>



The logarithmic transformation is handy for two reasons. First, the natural logarithm of the real GDP series grows linearly instead of exponentially. Second, we can easily calculate the percentage difference between any two points by subtracting the values associated with them. Thus, it is straightforward to establish that at the trough of the latest U.S. recession, in third quarter 2009, real GDP fell 12 percent relative to trend. Real GDP per member in the working-age population was 125, and the trend value was 137. A similar calculation for the euro zone indicates that real GDP per person in the working-age population was approximately 7 percent below trend in second quarter 2009.

These large declines from trend are not the only features of the Great Recession that the U.S. and the euro zone share. After touching bottom, the two economies started growing again but at a rather dismal pace. The rebounds have been so anemic that real GDPs have been moving along trajectories parallel to, but below, pre-recession trends.

This suggests that something is wrong in the U.S. and euro zone. Several studies have documented that usually the more severe the downturn, the stronger the subsequent recovery.<sup>2</sup> The fact that output per capita in two major world economies is not tracing a typical V-shape—but one closer to an L-shape—deeply concerns policymakers.

The International Monetary Fund reported similar output performances following most past recessions involving financial-sector crises.<sup>3</sup> Therefore, it is tempting to conclude that there is nothing anomalous about the U.S. and euro zone recoveries: They are proceeding as expected, at the snail's pace typical of past similar episodes.<sup>4</sup> This evidence is often presented as supporting the view that financial crises are inevitably associated with slow recoveries and, therefore, policymakers can do little to speed the subsequent rebound.

But viewing only the trajectory of GDP may be misleading. It is necessary to look further. According to theory, a key determinant of the prosperity

of nations is the efficiency with which they transform labor and capital inputs into output. This dimension reveals a striking departure between the U.S. and euro zone recoveries.

### Productivity Performance: Strikingly Different

A key difference between rich and poor nations is that rich ones combine their capital and labor inputs more efficiently than poor ones do, economic literature has shown. This efficiency is called total factor productivity (TFP). It seems reasonable to infer that TFP performances during the Great Recession are as important as those of output for understanding this contraction and weak recovery.

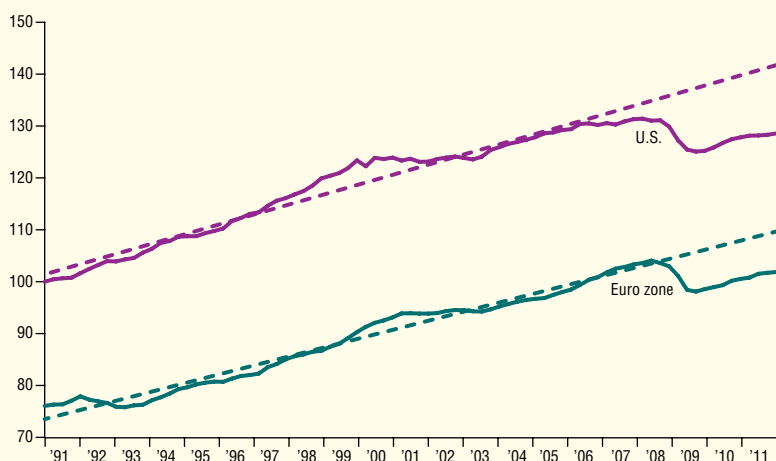
We lack the data needed to assess the recent dynamics of TFP in the euro zone—figures, when available on a regular basis, are published with a long lag. One way around this is to use labor productivity—measured as real GDP per worker—as a proxy for TFP. If we could use TFP, we would measure the efficiency of the economy by taking into account variations in capital stock (capital input) and hours worked (labor input). Labor productivity takes into account only variations in employment—that is, in the number of workers rather than hours worked.

In the case of the U.S., these two series tend to display similar patterns over periods of two to three years—the time frame studied here—because hours worked by the average household are relatively stable and investment flows are typically too small to induce significant fluctuations in the capital stock over short time spans. In the euro zone, the use of labor productivity as a proxy for TFP is somewhat more problematic. A recent study showed that hours worked per household are less stable over the business cycle in many countries of this region than in the U.S.<sup>5</sup> Still, it is reassuring that after taking into account the potential bias introduced by this measure, the study's authors came to the same conclusion from their analysis

Chart 1

### U.S. and Euro Zone GDP Deceptively Similar

100 x natural log of GDP per member of the working-age population



NOTE: Dotted lines indicate pre-recession trend.

SOURCES: Organization for Economic Cooperation and Development; U.S. Bureau of Economic Analysis.



of the Great Recession downturn as we did from our examination of the available evidence for the subsequent recovery. That evidence includes the admittedly imperfect gauge of true productivity plotted in Chart 2.

The chart shows the natural logarithms of labor productivity in the U.S. and the euro zone—again multiplied by 100—alongside their prerecession trends. Euro zone labor productivity traced the same L-shaped pattern as real GDP did in Chart 1: Labor productivity fell sharply during the Great Recession and never recovered relative to its prerecession trend. This pattern of labor productivity is consistent with economic theory because a decline in productivity decreases output as well. If capital and labor inputs are combined with less efficiency than before, the resulting output will be lower.

The behavior of U.S. labor productivity, however, is strikingly different. Labor productivity fell modestly during the Great Recession and quickly recovered to its prerecession trend. The combination of an anemic recovery in real GDP with a strong rebound in labor productivity is inconsistent with economic intuition. If capital and labor inputs are combined with more efficiency, why isn't output higher?

In fact, productivity and output not moving in sync seems to be an anomaly relative not only to the euro zone, but also to past experience in the U.S. (Chart 3). The dotted lines in the chart display the percentage deviations from trend of private sector TFP (not just labor productivity measured by output per worker) around the trough of the country's two most severe recessions in the last 30 years—the Great Recession, shown in blue, and the one that occurred in 1980–82, depicted in orange. The solid blue and orange lines provide the analogous information for private-sector output per member of the working-age population.

The chart seems to confirm that TFP rising above trend—shown as the horizontal line extending from “0”—

Chart 2

### U.S., Euro Zone Labor Productivity Strikingly Different

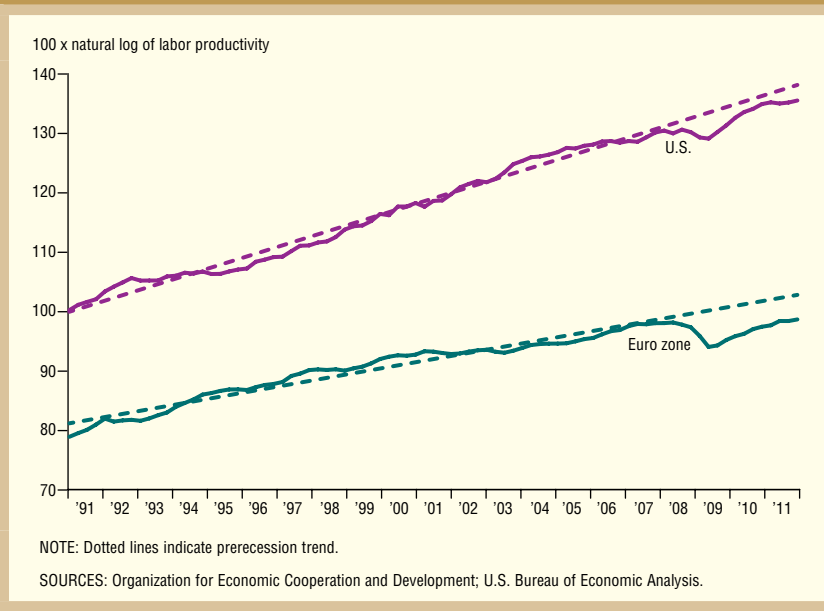
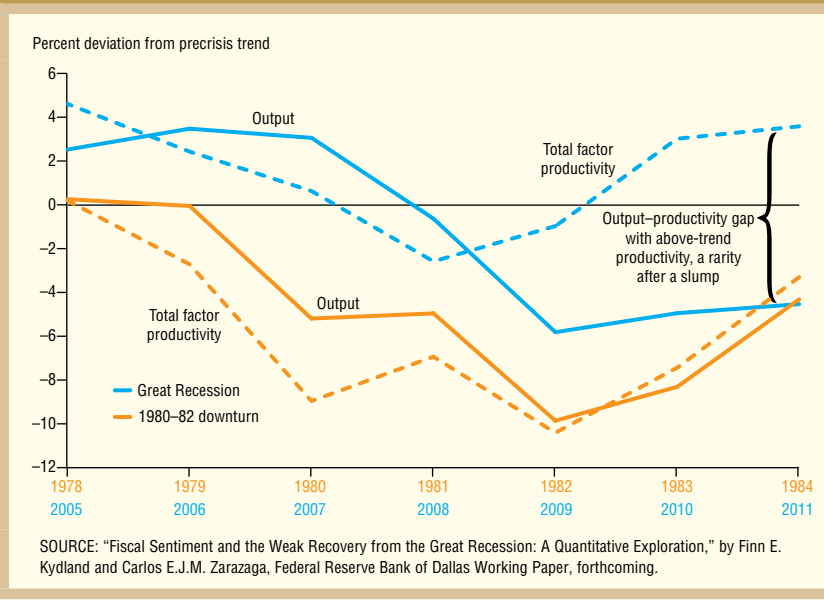


Chart 3

### U.S. Productivity and Output Not Moving in Sync As They Did After Earlier Slump



and output staying below it is a rarity.<sup>6</sup> It didn't happen in the euro zone this time around. It didn't happen in the U.S. during an earlier slump of similar

magnitude. It's hard to make sense of this anomalous development in the wake of the Great Recession. The fact that machines and workers seem to

be more productive in the U.S. should induce that country's firms to invest, hire more workers and expand production. Instead, U.S. employment and output lag, suggesting either TFP measurement errors or economic friction that stymies the transmission of productivity gains to output gains.

Nevertheless, productivity advances in the U.S. may explain why it has better navigated the financial headwinds blowing from the euro zone, where a sovereign-debt crisis is prolonging the downturn's upheaval. By the same token, the weak euro zone recovery is exactly what can be expected given labor productivity's poor performance. Provided the measurement errors are not so large that they invalidate the use of this variable as a proxy for TFP, the low-productivity problem is one that euro zone policymakers must address to eventually engineer a recovery strong enough to restore output to its prerecession trend. Meanwhile, the challenge for U.S. policymakers will be to figure out why, despite large TFP gains, that hasn't happened yet in their own country.

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## Notes

<sup>1</sup> The U.S. and euro zone prerecession trends are linear from first quarter 1991 to fourth quarter 2007, when U.S. real GDP peaked.

<sup>2</sup> See, for example, "Are Deep Recessions Followed by Strong Recoveries?" by Mark Wynne and Nathan S. Balke, *Economics Letters*, vol. 39, no. 2, 1992, pp. 183–89.

<sup>3</sup> International Monetary Fund, *World Economic Outlook*, October 2009. It's important to note that the results of this study are influenced by the inclusion of episodes in which output was above trend before the financial crisis. To the extent that output was converging to its deterministic trend from above in the aftermath, no recovery should be expected. Neither should it be when the output trend is stochastic rather than deterministic. In that case, any recession, whether associated with

a financial crisis or not, will permanently shift that trend downward.

<sup>4</sup> Mark Wynne advances this conjecture in his analysis of the performance of GDP in the aftermath of financial crises in "The Sluggish Recovery from the Great Recession: Why There Is No 'V' Rebound This Time," Federal Reserve Bank of Dallas *Economic Letter*, vol. 6, no. 9, 2011.

<sup>5</sup> "Aggregate Hours Worked in OECD Countries: New Measurement and Implications for Business Cycles," by Lee E. Ohanian and Andrea Raffo, *Journal of Monetary Economics*, vol. 59, no. 1, pp. 40–56.

<sup>6</sup> The trends underlying Chart 3, as calculated by the source, are implied by theoretical relationships between TFP and output in a model calibrated to long-run features of the U.S. economy and are, therefore, not comparable with the empirical linear trends of the previous charts. Furthermore, the measure of output in Chart 3 is not real GDP per member of the working-age population, as in Chart 1, but real GDP, net of the value added by the government sector, per member of the working-age population.

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