

Economics Group

Special Commentary

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Estimating the Cost of a Recession: Temporary or Long Lasting?¹

Executive Summary

Not all recessions/recoveries are created equally. It is important for decision makers to estimate the potential effect (damages/costs) of a recession in order to design and implement appropriate policies that reduce the damages from a recession. For example, the Great Recession was the deepest recession in the post-World War II era and the recovery from the recession has been the slowest one during the same time period. The slow recovery posed serious challenges for decision makers and has resulted in a unique path of policy. The fed funds rate remained against the zero-bound for years, and the path to interest rate normalization has been unusually slow.

Our study develops a framework to estimate the economic costs of a recession for the U.S. economy. The medium-term costs/damages from the Great Recession are estimated in terms of average annual losses in personal income, personal consumption, employment, labor productivity, investment and GDP. Our proposed framework can be utilized to estimate losses from any recession and for any country/region. To estimate damages from the Great Recession, we consider pre-recession estimates as a benchmark and compare these estimates with those published after the Great Recession.

Our analysis suggests that, during the 2008-2015 period, the level of real GDP was, on average, 9.9 percent lower each year, 9.8 percent lower for personal consumption and 10.7 percent lower for real disposable personal income. During the same time period, the average annual reduction in business fixed investment was 20.1 percent, 7.8 percent for employment and 6.9 percent for total factor productivity. The average reduction in the labor force was 2.2 percent, 7.9 percent for labor productivity and 6.4 percent for capital services during the 2008-2015 period.

In sum, our study suggests long-lasting damages from the Great Recession, as the level (trend) of potential series (for all variables) has shifted downward. These results are consistent with the overall economic environment since the Great Recession. That is, a painfully slow economic recovery along with slower growth in personal income, employment, wages and business fixed investment. In addition, 2017 is the eighth year of the current business cycle and monetary policy is still struggling to get back to “normal.”

The Short-Run versus Long-Run Effects of a Recession

Typically, economies follow business cycle phases of recession and recovery/expansion. That is, during a recession, an economy’s output level falls below the potential level and a recovery/expansion phase brings output back to normal (pre-recession trend). In addition, standard macroeconomics textbooks consider recessions as temporary shocks that only reduce the output level (Figure 1) in the short-run, as the economy eventually gets back to the “normal” level in the medium-to-long-run.² However, the economic performance of the U.S. economy (and many other developed nations) since the Great Recession has raised a question regarding the

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¹ This report is based on the conference paper “Can We Estimate the Cost of a Recession?” which was presented at the 2017 American Economic Association annual meeting, Chicago, January 6-8, 2017.

² Mankiw, Gregory N. (2010), “*Macroeconomics*”, 7th edition, Worth Publishers, NY, 2010.



traditional notion that recessions have only short-run effects (Figure 2). Many studies have estimated the output losses in the short- to-medium- run and concluded that the damages from the Great Recession were significant in the short/medium run.³

In addition, most studies have estimated damages from the Great Recession in terms of output, employment and productivity losses. For instance, Ball (2014) estimated the output losses relative to pre-recession potential GDP estimates (assuming as if there was no recession). Ollivaud and Turner (2014) estimated employment and productivity loss in addition to output loss.

Figure 1

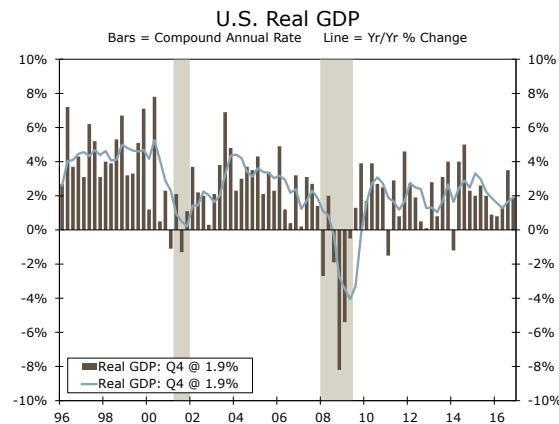
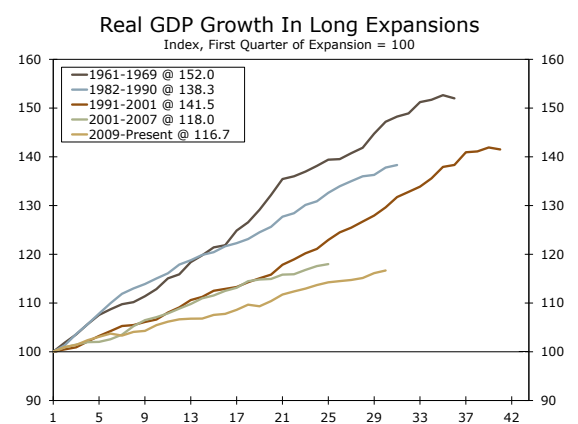


Figure 2



Source: U.S. Department of Commerce and Wells Fargo Securities

Our study includes more variables in its analysis and estimates losses for nine major variables. The main reason to include more variables in the analysis is to show how the effects from the Great Recession may vary between different sectors of the economy. Incorporating more variables allow us to capture the Great Recession effect on the economy more broadly.

Econometric Setup: Estimating Recession Costs

Our proposed framework estimates the losses for nine major variables. We utilize the pre-recession potential level of the target variables to estimate the cost of the recession. The intuition behind this method is that the pre-recession potential level is estimated using expansion phase growth rates and with the assumption of no recession in the near future (or at least for the period under study). Generally, these rates are higher than those which are calculated during recession/recovery times and thereby the gap between these two measures (estimated at two different time periods) is utilized as a benchmark to estimate the cost of a recession.

We estimate damages from the Great Recession for the medium term and for potential long-run implications. That is, average annual losses are estimated for the 2008-2015 period. To estimate damages from the Great Recession, we consider pre-recession estimates as a benchmark and compare these estimates with those published after the Great Recession. For example, we utilize the potential GDP series published by the Congressional Budget Office (CBO) on August 2007, (our benchmark pre-recession estimates), labeled 2007 vintage, and then compare vintage 2007 with the potential GDP estimate published on August 2016, labeled 2016 vintage, (post-recession estimates) as well as with the actual GDP numbers.

We estimate damages from the Great Recession for the medium term and for potential long-run implications.

³ Cerra, V. and S.C. Saxena. (2008). “Growth Dynamics: The Myth of Economic Recovery”, *American Economic Review*, 98(1), pp. 439-57. Ball, L. (2014). “Long-term Damage from the Great Recession in OECD Countries”, *European Journal of Economics and Economic Policies: Intervention*, Vol 11 No. 2, PP 149-160. Ollivaud, P. and David T. (2014). “The Effect of the Global Financial Crisis on OECD Potential Output”, *OECD Journal: Economic Studies*, Vol 2014.

The major reason to use vintage 2007 estimates as the benchmark is that these series were produced before the recession with the assumption of no recession during the next 10 years. That is, the CBO provides estimates for 10 years ahead, i.e., the 2007 vintage includes potential GDP estimates through 2017. Therefore, vintage 2007 series provide estimates for the next ten years absent the Great Recession. Vintage 2016, on the other hand, incorporates the Great Recession. For instance, the 2016 vintage includes potential GDP estimates through 2026 and includes revisions to the previous vintages. We utilize the actual series in the estimation process as well. That is, we include actual real GDP data in the analysis along with potential real GDP from vintage 2007 and vintage 2016. We then estimate the gap between the vintage 2007 series (our benchmark) and real GDP/vintage 2016.

Vintage 2007 series provide estimates for the next ten years absent the Great Recession.

In the next phase, we rebased all three series (vintage 2007, vintage 2016 and actual series) using 2005 as the base year so that all series are equal to one for 2005. Then, we calculated the average annual reduction in the level of each variable for the 2008-2015 period.

The CBO provides the potential level for GDP, labor force, labor productivity, total factor productivity and an index of capital services. Except for the capital services index, we have actual data for all series. Therefore, we estimate recession costs for these series relative to vintage 2007 as well as vintage 2016. For the capital services index, we estimate the gap between vintage 2007 and vintage 2016 and then utilize that gap to estimate potential losses for capital services.

To the best of our knowledge, the CBO does not provide potential estimates for personal income, personal consumption, employment and business fixed investment. These variables represent major sectors of the U.S. economy and therefore we have generated these variables to include them in our analysis. For personal income, personal spending and business fixed investment, we utilize real GDP as a benchmark to generate an estimated potential level for these series. For example, in the first step, we estimate a ratio of personal income to GDP and then multiply that ratio with GDP vintage 2007 (and with GDP vintage 2016) to obtain personal income vintage 2007 (and vintage 2016). Therefore, we have potential personal income levels for the pre-recession period (vintage 2007) and for the post-recession period (vintage 2016) and we can estimate damages from the Great Recession in terms of personal income loss.

We follow the same procedure for personal spending and business fixed investment to obtain vintage 2007 and vintage 2016 estimates for these series. For employment vintages, we obtain the ratio of employment to the labor force and then multiply that ratio with labor force vintage 2007 (and with vintage 2016) to obtain employment vintage 2007 (and vintage 2016). In the final step, we rebase these four variables to 2005 and estimate potential losses for these four variables.

Figure 3

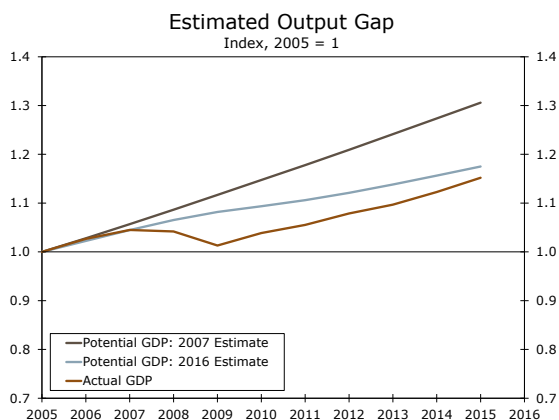
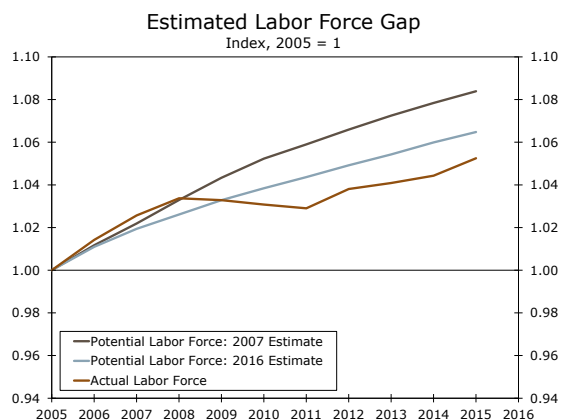


Figure 4



Source: Congressional Budget Office, U.S. Department of Commerce and Wells Fargo Securities

The damages from the Great Recession are not temporary or transitory.

The Estimated Recession Cost: Output, Employment and Productivity

GDP is a common indicator used to judge the overall health of the economy. Figure 3 shows estimated losses from the Great Recession. There are two noticeable observations. First, the actual GDP series remains below vintage 2016 and is significantly lower than vintage 2007. This indicates that the U.S. economy has been unable to recover back to its estimated potential level from 2007. Second, and most important in our view, vintage 2016 is well below vintage 2007 (potential GDP estimate published in 2007), implying that the Great Recession has shifted the potential level of GDP downward. In other words, the damages from the Great Recession are not temporary (or transitory) as the level of potential GDP based on vintage 2007 is significantly higher than the level estimated in 2016. This suggests that damages from the Great Recession are long lived.

The labor market estimates are consistent with the GDP picture, as the labor force today is well below the vintage 2016 and vintage 2007 (Figure 4), consistent with the decline in the labor force participation rate over this period. The damages to the labor market seem long-lived as well because the vintage 2016 labor force line is well below the vintage 2007 line.

Figure 5

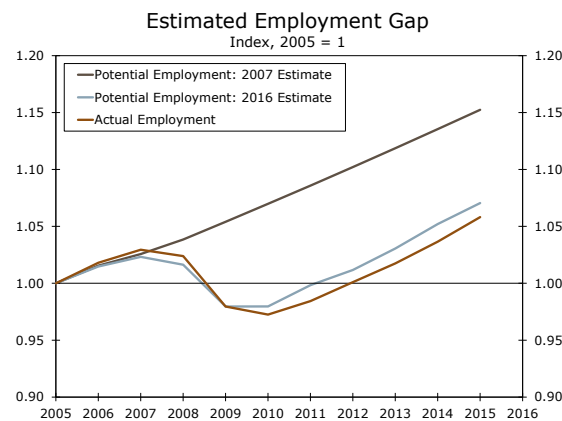
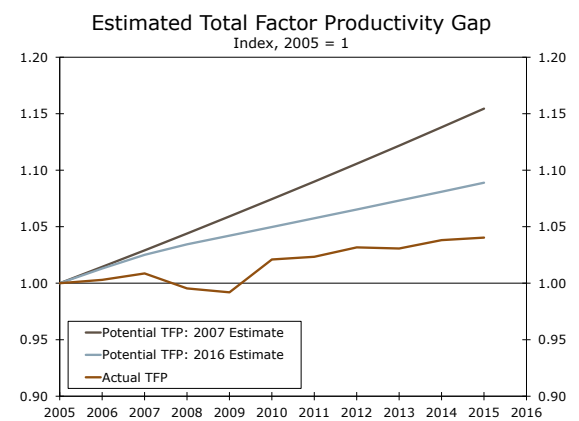


Figure 6



Source: Congressional Budget Office, U.S. Department of Commerce and Wells Fargo Securities

The Great Recession produced the largest employment loss in the post-World War II era. In addition, the labor market recovery from the Great Recession was painfully slow. Figure 5 suggests that the Great Recession left a long-lasting effect on employment growth, as both vintage 2016 and actual employment lines have shifted downward significantly. Total factor productivity suffered from the Great Recession as well (Figure 6). The Great Recession has shifted potential total factor productivity level downward significantly, evidence of long-lasting damages. Actual total factor productivity has yet to cross above the vintage 2016 line.

The Estimated Losses for Consumers and Investors

Private consumption is the largest component of GDP and therefore we include personal income (real disposable personal income) and personal spending (real personal consumption) in the analysis. As mentioned earlier, we estimated the vintage 2007 (potential personal consumption based on 2007) and vintage 2016 to estimate potential losses from the Great Recession for personal income and spending. In Figure 7, the real personal spending line is closing the gap with vintage 2016, which indicates consumption is moving closer to its potential level. However, both the actual personal spending and vintage 2016 lines are well below the vintage 2007 line, which emphasizes the notion of long lasting damages from the Great Recession. The behavior of real disposable income is also consistent with personal spending's behavior and confirms the long-term damages from the Great Recession, Figure 8.

Business fixed investment is another area that shows significant damages from the Great Recession (Figure 9). Both vintage 2016 and actual business fixed investment are well below the vintage 2007 line but the gap has narrowed over the past few years.⁴

Figure 7

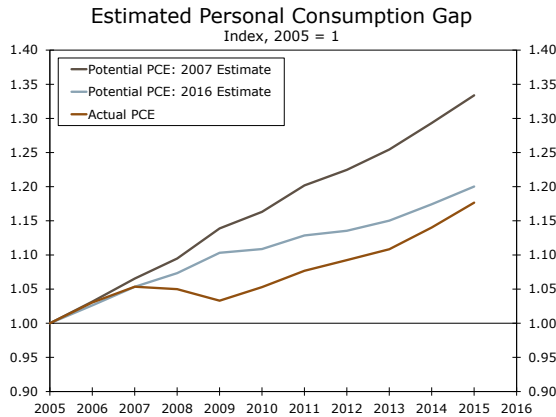


Figure 8

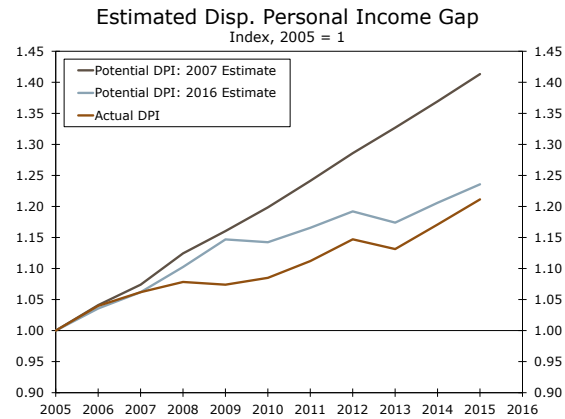
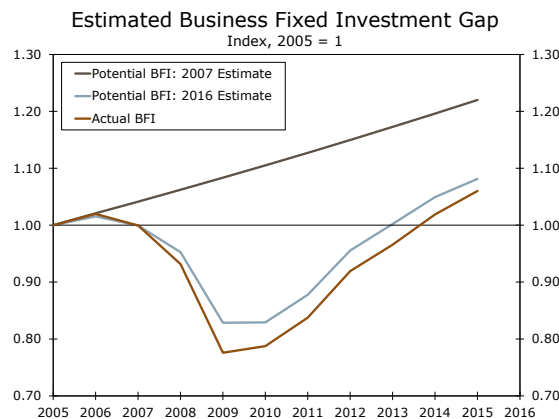


Figure 9



Source: U.S. Department of Commerce and Wells Fargo Securities

The Average Estimated Losses from the Great Recession

We estimated the average annual loss for each of the nine variables for the 2008-2015 period. Results for all variables are reported in Table 1. We calculate two sets of losses. First, we compared the actual series with vintage 2007 that indicate losses due to the Great Recession. For example, the estimated average annual reduction in the level of real GDP compared to vintage 2007 is 9.9 percent. That is, real GDP was 9.9 percent lower, on average, each year during the 2008-2015 period.

The second method compared the actual series with vintage 2016. The average annual GDP loss compared to vintage 2016 is 3.8 percent. The Great Recession has shifted the level of potential series downward for each of the nine variables and thereby there are smaller losses using vintage 2016 as a benchmark. Using vintage 2007 as a benchmark, the largest annual average loss is estimated for business fixed investment (20.1 percent) and the smallest is for the labor force (2.2 percent). Our analysis suggests that, during the 2008-2015 period, the average annual loss is 9.8 percent for personal consumption and 10.7 percent for disposable real personal income.

The estimated average annual reduction in the level of real GDP compared to vintage 2007 is 9.9 percent.

⁴ Note, to save space, we do not include charts for the labor productivity and capital service series. The conclusion for both series is not different from the other seven variables. However, we do provide estimated losses for both series in Table 1.

During the same time period, the average annual loss in employment is 7.8 percent and 6.9 percent for total factor productivity. The average cost for labor productivity is 7.9 percent and 6.4 percent for capital services during the 2008-2015 period.

Table 1

Variable	Estimated Long-term Damages from The Great Recession*	
	Vintage_2016	Vintage_2007
Real GDP	-3.8%	-9.9%
Personal Consumption	-3.5%	-9.8%
Disposable Personal Income	-3.5%	-10.7%
Business Fixed Investment	-9.4%	-20.1%
Labor Force	-0.8%	-2.2%
Employment	-1.2%	-7.8%
Labor Productivity (Ratio_PGDP_PLF)	-3.0%	-7.9%
Capital Services**	N/A	-6.4%
Total Factor Productivity	-3.8%	-6.9%

*Average gap per year for the 2008-2015 period

** Losses are compared to the 2007 Vintage

Source: Wells Fargo Securities

What Is Next? Future Implications of the Potential Losses

Our analysis suggests that damages from the Great Recession are long lasting since the level (trend) of potential series (for all variables) has shifted downward. These results are consistent with the overall economic environment since the Great Recession. That is, a painfully slow recovery in the overall economy (GDP), along with slower growth in personal income, employment, wages, business fixed investment and other variables. In addition, the pace of monetary policy normalization is much slower compared to past recoveries.

In future research, we would conduct a cause-and-effect (feedback loop) analysis to estimate damages from the Great Recession. That is, a drop in output likely leads to a drop in investment and employment. The investment and employment losses would put downward pressure on personal income and spending and so on. Personal consumption is around 70 percent of the U.S. GDP and thus a reduction in consumption would reduce GDP and this cycle may continue. Therefore, an initial drop in GDP may trigger a chain-reaction and the total damages spread beyond the drop in GDP. This scenario may be true for the U.S. economy at least since the 1990s, as the past three recoveries are slower compared to the pre-1990s era recoveries. That supports our thesis to conduct a cause-and-effect analysis to estimate damages from the Great Recession, at least for the major variables/sectors. In other words, we should include the possibility of causality (at least among major sectors of the economy) when we estimate damages from the Great Recession.

Our analysis suggests that damages from the Great Recession are long lasting since the level of potential series has shifted downward.

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