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Explaining US employment growth after the great recession: The role of output–employment non-linearities

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ABSTRACT

We investigate the relationship between employment and GDP in the United States. We disentangle trend and cyclical employment components by estimating a non-linear smooth transition error-correction model that simultaneously accounts for long-term relationships between growth and employment and short-run instability over the business cycle. Based on out-of-sample conditional forecasts, we conclude that, since the end of the 2008–09 recession, US employment is on average around 1% below the level implied by the long run output–employment relationship, meaning that about 1.2 million of the trend employment loss cannot be attributed to the identified cyclical factors.

1. Introduction

One of the central puzzles following the financial crisis and the ensuing Great Recession has been the sluggish growth in employment during the recovery which began in June 2009. It is somewhat surprising that analysts have worried about how employment growth has recently outpaced GDP, according to Okun's law (Okun, 1962), while others have bemoaned the slow pace of employment growth.[1] Underpinning these discussions is a view that there is instability in this relationship between changes in employment and GDP growth.[2] From mid-2008 through the end of the recession, employment growth was below that predicted by a simple regression of employment growth on GDP growth over the 1987Q1–2007Q4 period; this outcome continuing into the first year of the recovery period. There does seem to be a consistent pattern wherein contractions are associated with employment growth below that implied by the relationship that obtains over both upswings and downswings.

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[1] See, e.g., Sanchez and Thornton (2011), as well as the article "Piecing Together the Job-Picture Puzzle" published in the *Wall Street Journal* in March 12, 2012.

[2] See, e.g., Knotek (2007), McCarthy et al. (2012) and Owyang and Sekhposyan (2012). Strictly speaking, these papers deal with the unemployment-output relationship, not with the employment-output one. However, as we will explain in Sections 2 and 3, we prefer focusing on employment growth rather than changes in the unemployment rate which is a function of both employment growth and labor force participation rates.

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Our analysis is related to the issue of whether structural unemployment[3] has risen in the wake of the Great Recession. This issue is of major importance for policy-makers, and biased estimation of natural levels of employment and unemployment can lead to inadequate economic policies. For example, in terms of monetary policy-making, under-estimates of the degree of labor slack can spur overly-tight monetary policy rates by way of standard Taylor equations. Within this context, disentangling structural and cyclical employment components is a key question. We shed light on this issue by identifying the portion of employment that cannot be attributed to statistically defined trend and cycle components.

To investigate whether our variables of interest share a common trend, we estimate the cointegrating relationship between output and employment. We also specify a decomposition of employment between trend and cyclical factors, wherein one could potentially interpret the trend factors as structural in nature—i.e., as factors that affect the structure of the employment-output nexus.[4] This caveat is necessary because statistically defined trend factors could be structural in origin, but might also conceivably incorporate factors that are not long term in nature, such as enhanced unemployment insurance benefits.[5] Our specification also incorporates non-linear adjustment dynamics to account for potential instability over the business cycle.

Accordingly, relying on a non-linear error-correction specification over the 1950–2012 period, our main findings can be summarized as follows. First, failing to account for the long-term relationship between GDP and employment (i.e., focusing only on the relationship in first differences), results in an overestimate of employment by a substantial amount during the post-crisis, 2008–2012 period. Second, a standard error-correction model (ECM) is able to reproduce the general evolution of employment, but underpredicts the decline in employment during the recession, and therefore overpredicts employment during the recovery. Third, accounting for the US business cycle by using an innovative non-linear smooth transition error-correction model enables a better reproduction of stylized facts, even without imposing priors on the beginning and end of recessions. Fourth, we still overestimate, albeit by a smaller amount, actual employment on average by 1.05% during the post-recession period. This means that the level of employment averages 1.17 million lower than would have been predicted on the basis of the historical co-movement of employment and GDP.

2. A brief review of the recent literature

Several studies have concluded that the cyclical component cannot account for the entire change in employment. In this respect, Stock and Watson (2012) argue that the slow recovery is mainly explained by a decline in the trend growth of the labor force.

A variety of explanations have been proposed regarding the effect of factors affecting structural employment. Estevão and Tsounta (2011) estimate that about 1.75 percentage point of the increase in unemployment between 2006 and 2010 is due to the growing degree of mismatches between labor market demand and supply given weak housing market conditions. In a multi-country framework, Chen et al. (2011) argue that sectoral shocks specific to the Great Recession—namely in the construction sector and, to a lesser extent, in finance—have contributed to increase the long-duration unemployment rate. Various other explanations include the extension of unemployment benefits and high uncertainty about future economic outlook; however these arguments seem to have less explanatory power (see, e.g., Daly et al., 2011).

In contrast, others argue that there is little evidence of structural impediments on the labor market, given that modest employment recoveries are commonplace after balance sheets crises. According to this view, the lack of aggregate demand is the main driver of the current high unemployment rate and consequently the job market will return to its pre-recession equilibrium when economic conditions will improve. Lazear and Spletzer (2012) conclude that "neither industrial nor demographic shifts nor a mismatch of skills with job vacancies is behind the increased rates of unemployment". They recognize that job market mismatches increased during the recession, but argue that those discrepancies diminished at the same pace just after the recession exit.

In a recent work, Ball et al. (2013) defend this point of view and argue that there is no jobless recovery in the US, but only a sluggish economic growth that weighs on the labor market. To support their analysis, they estimate Okun's law for a sample of 20 advanced countries and show that there is a strong and stable relationship between output and employment. Based on empirical findings, Rothstein (2012) dismisses any structural factors to explain the low labor market activity. Farber (2012) estimates as well mobility rates and does not find any evidence that low geographic mobility, due to a deteriorated housing market, explains the weak labor market.

Given this lack of consensus regarding the decomposition of employment between structural and cyclical factors in the wake of the Great Recession, we propose a non-linear econometric model which enables us both to decompose movements in employment into trend and cyclical components, and to account for instability over the business cycle. Indeed, to evaluate the relationship between output and labor market fluctuations, the empirical Okun's law has been a valuable tool, as pointed

[3] By "structural employment", we refer to unemployment caused by non-cyclical factors, including fundamental shifts in an economy (see Section 2 for more details on factors that may induce such changes).

[4] To avoid any confusion, let us specify that we use the term "structural" in this paper to refer to factors that affect the structure of the long-run employment-output relationship.

[5] For instance, CBO (2012) estimates both a long-term natural rate of unemployment, and one accounting for short-run factors. The former is driven by demographics and skill attributes, while the latter is determined in part by extended unemployment insurance benefits. For the sake of completeness, it should also be noticed that regarding hysteresis effects, part of trend employment will depend on long-lasting cyclical effects.