Journal of Monetary Economics 60 (2013) 871–886

Contents lists available at ScienceDirect

Journal of Monetary Economics

journal homepage: www.elsevier.com/locate/jme

Downward wage rigidity and business cycle asymmetries

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ARTICLE INFO

Article history:
Received 3 May 2011
Received in revised form
26 July 2013
Accepted 6 August 2013
Available online 20 August 2013

Keywords:
Labor market
Unemployment
Downward wage rigidity
Asymmetric adjustment costs
Non-linear dynamics

ABSTRACT

The growth rates of wages, unemployment and output of a number of OECD countries have a strongly skewed distribution. In this paper we analyze to what extent downward wage rigidities can explain these empirical business cycle asymmetries. To this aim, we introduce asymmetric wage adjustment costs in a New-Keynesian DSGE model with search and matching frictions in the labor market. Increasing wages is less costly than cutting them. It follows that wages increase relatively fast and thus limit vacancy posting and employment creation, but they decline more slowly, leading to a strong reduction in vacancies and employment. The presence of downward wage rigidities strongly improves the fit of the model to the observed skewness of labor market variables and the relative length of expansions and contractions in the output and the employment cycles. The asymmetry also explains the differing transmission of positive and negative monetary policy shocks from wages to inflation.

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1. Introduction

Many variables exhibit asymmetric adjustments around their long-run trend. Nominal wages tend to adjust faster upwards than downwards, and so does unemployment; on the other hand, employment and GDP tend to contract faster than to expand. This paper investigates how downward nominal wage rigidity (DNWR) shapes the adjustment of other variables over the business cycle and how it affects the relative length and violence of recessions and expansions. We introduce DNWR in an otherwise standard New-Keynesian business cycle model with labor market frictions. We find that asymmetric nominal wage dynamics not only are at the core of labor market asymmetries in unemployment and real wages, but also shape the asymmetries of prices, output and investment.

Our empirical analysis for France, Germany, the United Kingdom, the United States and the Euro Area reveals that changes in nominal and real wages, the GDP deflator and unemployment are right (positively) skewed, whereas employment, investment and GDP are left (negatively) skewed and tend to fall more rapidly than to increase. Furthermore, we show that contractionary phases in GDP and employment tend to be shorter but more violent than expansionary phases.

Our findings on the asymmetric adjustment of wages using aggregate series echo the ample microeconometric evidence on the importance of downward nominal and real wage rigidity. In the context of the International Wage Flexibility Project, Dickens et al. (2007) use micro data on individual wage changes to show that asymmetries in wage settings are widespread in industrialized countries. This finding has been confirmed, updated and further quantified for a number of European countries by Messina et al. (2010) in the context of the Eurosystem Wage Dynamics Network. Kaur (2012) finds evidence of downward nominal wage rigidity even in casual daily agricultural labor markets in 500 Indian districts that strongly

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http://dx.doi.org/10.1016/j.jmoneco.2013.08.001

resemble spot markets for labor.[1] Notice however that downward wage rigidities at the micro level do not necessarily translate into asymmetric wage adjustment at the macro level, as the wage asymmetry at the individual level may be mitigated by alternative possibilities of adjustments or by composition effects at the firm or sector level. Indeed, Babecký et al. (2010) find that bonus payments and skill composition serve as important additional margins of cost adjustment. But despite these mitigation effects, Holden and Wulfsberg (2009) still detect nominal and real downward wage rigidities at the industry level for many OECD countries. This indicates that alternative margins of adjustment do not fully absorb the wage asymmetry stemming from the individual level.

We introduce asymmetric wage adjustment costs similar to Kim and Ruge-Murcia (2009) into a standard New-Keynesian framework with frictional labor markets. The convex adjustment cost function exhibits larger costs for cutting nominal wages than for increasing them by the same size. This modelling device captures in a simple but effective manner the evidence at the micro level and makes it possible to study the macroeconomic implications of asymmetric wage adjustments for labor markets, inflation, monetary policy and output.[2]

The main contribution of our paper is to explain the asymmetry in business cycle fluctuations observed in the data by referring solely to DNWR. We show that models with symmetric wage adjustment costs are unable to generate asymmetries and even tend towards the opposite direction of what we observe in the data. On the other hand, DNWR correctly captures the direction of asymmetries and matches quantitative results on skewness measures quite well for nominal as well as for real labor market variables.

The effect of downward wage rigidities depends on the sources of business cycle fluctuations. Following positive productivity shocks, nominal wages grow with few frictions, leading to nominal and real wage increases which limit vacancy posting and employment creation. Instead, during periods in which real wages should fall, DNWR inhibits the adjustment through nominal wage cuts, which leads to a stronger decline in vacancy posting and employment than in the absence of DNWR.

Following demand shocks, the asymmetric effect of DNWR is even stronger. We consider two types of demand shocks, a standard monetary policy shock and a risk premium shock, modelled as a wedge between the return on assets held by households and the policy rate controlled by central banks. In both cases, contractionary shocks induce a strong decline in prices, but nominal wages do not follow suit because of DNWR. As a result, real wages may even increase during the downturn, with strong detrimental effects on employment, investment and output. This mechanism implies that symmetric monetary policy shocks have asymmetric effects on labor markets, output and inflation: expansionary shocks lead mainly to increases in wage and price inflation; contractionary shocks affect more strongly the real side of the economy.

A similar framework of DNWR has been proposed by Kim and Ruge-Murcia (2009) in a model with monopolistic labor supply and wage setters based on Erceg et al. (2000). Their paper studies the question of how much inflation is necessary to "grease the wheels" of the labor market when wages are downwardly rigid. Fahr and Smets (2010) extend the setup to a monetary union to show that downward real wage rigidity have strong detrimental effects for the competitiveness of the country in a currency union. Benigno and Ricci (2011) model the greasing effects of positive inflation in an extreme manner whereby wages can never be cut and they highlight the implications for the slope of the long-run Phillips curve.

The paper most closely related to ours is McKay and Reis (2008), subsequently referred to as MR08. Using US data from 1948q1 to 2005q1, the authors find that contractions in employment are shorter and more violent than expansions, whereas this asymmetry is not present for output. To explain the empirical finding MR08 introduce asymmetric labor adjustment costs and endogenous technology adoption in a real business cycle model.

Our work differs from MR08 on both empirical and theoretical grounds. On the empirical side, using turning points and skewness of growth rates to assess asymmetry, we find stronger evidence for asymmetry in US real GDP than MR08 find. The difference mainly stems from the sample periods considered. A closer analysis of the real GDP series reveals that the three quarterly growth rates for 1950q1–q3 have been among the five highest postwar observations in US real GDP and have brought the annual growth rate to 11.4% in 1950q3, a period strongly influenced by the Korean war which we would consider as outlier. Excluding these observations leads to stronger evidence for negative skewness in US real GDP growth: indeed, the skewness of GDP in a sample starting in 1952q1 is virtually identical and of very similar significance to the one obtained in a sample starting in 1970q1. The choice of 1970q1 to 2011q2 for our sample period is made to compare in a coherent manner a larger set of variables across five countries. The empirical evidence indicates that asymmetries are present across a large number of variables, in particular for unemployment, real wages and real GDP, and are common across countries with very different labor market institutions.

On the theoretical side, we propose a different explanation for the asymmetries of the data. Our model with nominal frictions and DNWR accounts for the observed asymmetric dynamics of both nominal and real variables allowing for

[1] A plethora of theoretical models has been developed to explain the phenomenon of downward wage rigidity, covering institutional features, efficiency wages, implicit contracts and insider–outsider models (see e.g. Bewley, 2004).

[2] In the model we assume that the wages of new hires are tied to those of similarly productive existing workers. Recently Pissarides (2009) and Haefke et al. (2008) show that wages in new matches, which are the relevant wages for the hiring decisions, are more volatile than wages in existing matches. Gertler and Trigari (2009), however, argue that the high relative cyclicality of new hires' wages may reflect cyclical composition effects as opposed to differences of wage flexibility within a firm between new and existing workers. Moreover, a different strand of the literature has found that wages tend to be downwardly rigid even when workers become unemployed (see e.g. Addison et al., 2009; Krueger and Mueller, 2011). See also Pissarides (2009, p. 1362), for the discussion of further evidence on the asymmetric influence of the outside labor market conditions on wage negotiations.

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