Nominal and real wage rigidities. In theory and in Europe

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ABSTRACT

In this paper I study the relation between real wage rigidity (RWR) and nominal price and wage rigidity. I show that in a standard DSGE model RWR is mainly affected by the interaction of the two nominal rigidities and not by other structural parameters. The degree of RWR is, however, considerably influenced by the modelling assumption about the structure of wage contracts (Calvo vs. Taylor) and about other institutional characteristics of wage-setting (clustering of contracts, heterogeneous contract length, indexation). I use survey evidence on price- and wage-setting for 15 European countries to calculate the degrees of RWR implied by the theoretical model. The average level of RWR is broadly in line with empirical estimates based on macroeconomic data. In order to be able to also match the observed cross-country variation in RWR it is, however, essential to move beyond the country-specific durations of price and wages and to take more institutional details into account.

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1. Introduction

The simplest explanation for the existence of real wage rigidities sees them as a consequence of two nominal rigidities: a nominal price rigidity and a nominal wage rigidity. Although this type of real wage rigidity is a crucial element of the current generation of DSGE models (cf. Christiano et al., 2005; Smets and Wouters, 2003) it is usually not in the focus of these papers and has so far not been analyzed in any detail. In this paper I want to fill this gap. In particular, I am going to study how the two nominal rigidities interact to create real wage rigidity (RWR), how sensitive real wage rigidities react to changes in the nominal rigidities and to what extent the use of available information on price- and wage-setting is able to generate degrees of RWR that are in line with the empirical evidence.

Nominal and real wage rigidities have a long tradition in the explanation of business cycle fluctuations. While the concept of nominal wage rigidity is commonly related to the speed with which nominal wages can be changed in reaction to economic shocks, there exists less unanimity about the exact meaning of real wage rigidity. In this paper I define RWR as the speed with which the real wage approaches its equilibrium value after being hit by shocks to aggregate demand or aggregate supply. This formulation follows related definitions by Ball and Romer (1990) and Blanchard (2006).

1 Some discussions about this issue can be found in Woodford (2003), 231f and in Rabanal and Rubio-Ramirez (2005). The main exception is Riggi and Tancioni (2010) that will be discussed below.

2 “Real wage rigidities” [capture] the speed at which real wages [adjust] to changes in warranted real wages” (Blanchard, 2006, p. 16). Ball and Romer (1990) refer to real rigidity in the context of price-setting: “We define a high degree of real rigidity as a […] small responsiveness of an agent’s desired real price to changes in aggregate real spending” (Ball and Romer, 1990, p. 186).
The recent years have shown an increased interest in the issue of RWR. This has to do with the fact that the introduction of RWR improves the explanatory power of otherwise standard models (cf. Hall, 2005; Blanchard and Gali, 2007). As far as the reasons behind the rigidities of real wages are concerned, however, there does not exist much agreement. Blanchard and Katz (1999), in an early contribution, present a model in which unemployment benefits and wages react differently to changes in productivity growth. Hall (2005), on the other hand, uses a model where RWR follows from the existence of social norms while Hall and Milgrom (2008) present an argument based on sequential (real) wage bargaining. Blanchard and Gali (2007), finally, simply assume as a short-cut that the real wage $\omega_t$ can be written as: $\omega_t = \gamma \omega_{t-1} + (1 - \gamma) \text{indexation}$, where $\gamma$ is their measure of RWR and $\text{indexation}$ stands for the marginal rate of substitution between consumption and leisure. In an appendix they motivate this short-cut formulation by referring to a model with “real wage staggering”. Interestingly, however, none of these papers deals explicitly with the possibility that RWR could simply be understood as the consequence of two nominal rigidities: a nominal price and a nominal wage rigidity. This parsimonious explanation is, however, a core element of New Keynesian (and also old Keynesian) models of the business cycle and it is the starting point of this paper. In particular, I will investigate whether the parsimonious model implies a RWR that is broadly in line with the empirical evidence.

In related work Riggi and Tancioni (2010) have compared the performance of the short-cut model by Blanchard and Gali (2007) to a model with two nominal rigidities. They show that the latter model is better able to replicate the observed wage and employment dynamics. In particular, the short-cut model fails to account for the negative correlation between productivity improvements and employment conditional on technology shocks (a phenomenon called the “productivity-employment puzzle”). While Riggi and Tancioni (2010) derive their results in a medium-scaled DSGE model (including a search-and-matching labor market) I focus on the smaller model by Erceg, Henderson and Levin (EHL) (2000). This is the benchmark model in the DSGE literature where both nominal price and nominal wage rigidities are introduced via Calvo contracts (Calvo, 1983). The EHL model leads to a solution of the form $\omega_t = \delta \omega_{t-1} + f(\text{output gap}, \text{productivity})$, where $f(\cdot)$ is a linear function of the stated measures of aggregate demand and aggregate supply. The parameter $\delta$ measures RWR in the EHL model. I show that the two nominal rigidities are the main determinants of the degree of RWR and that $\delta$ reacts rather insensitively to changes in the other structural parameters. The solutions of the forward-looking New Keynesian model can also be written in a form that is very similar to a backward-looking Phillips curve specification. I show that the derived expression is closely related to the traditional “triangle” model (cf. Gordon, 1998) and that the weight of past inflation in this expression is identical to the measure of RWR $\delta$. In an appendix they...
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