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Growth, unemployment and wage inertia

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ABSTRACT

We introduce wage setting via efficiency wages in the neoclassical one-sector growth model to study the growth effects of wage inertia. We compare the dynamic equilibrium of an economy with wage inertia with the equilibrium of an economy without it. We show that wage inertia affects the long run employment rate and that the transitional dynamics of the main economic variables will be different because wages are a state variable when wage inertia is introduced. In particular, we show that the model with wage inertia can explain some growth patterns that cannot be explained when wages are flexible. We also study the growth effects of permanent technological and fiscal policy shocks in these two economies. During the transition, the growth effects of technological shocks obtained when wages exhibit inertia may be the opposite of those obtained when wages are flexible. These technological shocks may have long run effects if there is wage inertia.

1. Introduction

Wage inertia implies that current wages depend on past wages.[1] This relationship is a well-known empirical fact in labor economics (see Bell, 1996; Blanchard and Katz, 1997 and the survey by Montuenga-Gómez and Ramos-Parreño, 2005). Moreover, wage inertia has been justified in different wage settings. In models of wage bargaining between unions and firms, the wage is set as a markup over a reference wage that is interpreted as a fall back position. This reference wage is typically related to the unemployment benefit, which, in most OECD countries depends on past wages. This introduces the relationship between current and past wages (Burkhardm and Morgenstern, 2000 and Beissinger and Egger, 2004). Wage inertia has also been justified in efficiency wage models, where the wage is set by the firm in order to induce workers to exert the profit maximizing amount of effort (Collard and de la Croix, 2000; Danthine and Donaldson, 1990; Danthine and Kurmann, 2004). In this wage setting, the wage also depends on a reference wage if fairness is introduced in workers' disutility of effort. This reference wage is frequently interpreted as a social norm that depends on past wages. In this way, wage inertia is introduced in the efficiency wage model.[2] This second approach has some empirical support from survey evidence (Bewley, 2002).

Wage inertia introduces a process of wage adjustment that drives the transitional dynamics of wages and modifies the time path of the other variables in the economy, including the GDP growth rate. These differences in the transitional

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[1] The literature also refers to wage inertia as persistence or sluggishness.

[2] In efficiency wage models, wages are typically flexible. By flexible wages we mean that there is no wage inertia and, thus, current wages do not depend on past wages. However, it does not mean that this flexible wage clears the labor market and, hence, there is full employment. The assumption of a reference wage that depends on past wages is then crucial to introduce wage inertia.

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dynamics have been explored in New Keynesian models, where there is also price inertia, to explain facts of the business cycle and the effects of monetary shocks (Danthine and Kurmann, 2004; Blanchard and Galí, 2007). However, wage inertia has not been introduced in growth models to explain facts of the growth process.[3] Therefore, the purpose of this paper is to study how wage inertia modifies the time path of the GDP growth rate, and to show that a simple version of the neoclassical growth model with wage inertia can explain two facts of the growth process that could not be explained if wages were flexible. First, we explain the high growth rates that some emerging economies have exhibited over long periods of time.[4] According to King and Rebelo (1993) the neoclassical growth model requires implausibly high interest rates to explain these large growth rates. We show that taking into account labor market dynamics driven by wage inertia may explain high growth rates with plausible values of the interest rate.

Second, Easterly (1991), Christiano (1989) and, more recently, Steger (2001), Papageorgiou and Perez-Sebastian (2006) and Jeong and Kim (2006, 2008) show that some fast growing economies exhibit a hump-shaped transition of the GDP growth rate. The neoclassical growth model implies a monotonic transition and thus it cannot explain this fact. We show that a version of this model that introduces wage inertia can explain these hump-shaped transitions.

We analyze a version of the neoclassical one-sector exogenous growth model with efficiency wages. In the model, wages are set by firms in order to make workers exert an amount of effort that maximizes profits. These non-walrasian wages cause non-frictional unemployment. We assume that the workers' disutility of effort depends on the comparison between current wages and a reference wage. Therefore, the amount of effort exerted by workers will depend on this comparison and, as a consequence, wages will be set by the firms in relation to this reference wage. Until Section 5, the reference wage is external to the individuals and it is interpreted as a social norm that depends on past average labor income. It follows that current wages depend on past wages, implying that wage inertia is introduced and that wages are a state variable. Therefore, in this version of the neoclassical growth model, two forces drive the transition: first, as in the neoclassical growth model with full employment, the diminishing returns to capital; and second, the process of wage adjustment.

We distinguish between two effects of wage inertia. On the one hand, the time path of the employment rate depends on both capital accumulation and the process of wage adjustment. Capital accumulation increases labor demand and, thus, increases employment. Wage growth reduces employment. Thus, a fast (slow) accumulation of capital in comparison to the speed of wage adjustment will imply an increase (decrease) in the employment rate. Therefore, the interaction between capital accumulation and wage adjustment can explain periods of fast employment creation and also non-monotonic transitions of the employment rate that are not present when wages are flexible.

On the other hand, the returns on capital and wages are related because we assume perfect competition and constant returns to scale. Then, wage inertia modifies the time path of capital accumulation because it changes the returns on capital. In particular, if wages are initially high then the interest rate will initially be low, implying low capital accumulation. The opposite holds when wages are initially low. Moreover, a process of fast wage adjustment also causes fast changes in capital accumulation.

During the transition, the GDP growth rate depends on the exogenous growth rate of technology, capital accumulation and the growth rates of both employment and effort. The particular assumptions of the model regarding the disutility of effort and the reference wage imply a constant optimal amount of effort during the transition. Therefore, wage inertia modifies the GDP growth rate by changing both capital accumulation and employment growth. These changes modify the time path of the GDP growth rate, which may exhibit non-monotonic transitions. In Section 4, we compare this transitional dynamics with the one obtained in a version of the neoclassical growth model with flexible wages. In this case, increases in productivity, due to either capital accumulation or exogenous productivity shocks, translate completely into wage increases and do not affect the employment rate, which is constant. Then, as in the neoclassical model with full employment, the GDP growth rate only depends on capital accumulation, and therefore transitional dynamics will exhibit a monotonic behavior.

In Section 4, we use numerical simulations to study the effects of wage inertia during the transition. First, we show that in economies with an initial high wage, the employment rate is initially low and increasing. As a consequence, in these economies, the growth rate of GDP will initially be large and then decrease during the transition. In contrast, initial low wages imply that the employment rate will initially be high and then decrease during the transition. This implies that the growth rate of GDP will initially be low and will increase during the transition. We conclude that economies with the same initial stock of capital may exhibit different time paths of the growth rate of GDP if their initial wages are different. This suggests that the introduction of initial wages in the empirical analysis of convergence may improve the estimation's fit.

We also show that wage inertia can generate a process of fast employment creation that may cause both a hump-shaped transition of the GDP growth rate and high GDP growth rates. Before this process starts, GDP growth will be low. Then, during the process of employment growth, the GDP growth rate will be high due to the increasing employment rate. Finally,

[3] Growth models with wage bargaining between firms and unions and non-frictional unemployment have been studied by Benassy (1997), Daveri and Tabellini (2000), Braüninger (2000), Daveri and Mafezzoli (2000), Doménech and García (2008) and growth models with efficiency wages have been studied by Van Schaik and De Groot (1998), Alexopoulos (2003), Meckl (2004), Nakajima (2006), Brecher et al. (2002) and Pierpaolo (2010). In all these papers, wages do not exhibit inertia. Two exceptions that introduce wage inertia in a growth model are the papers by Raurich et al. (2006) and Greiner and Flaschel (2010). However, these two papers only study the long run growth effects of the interaction between wage inertia and some particular fiscal policies.

[4] Taiwan, South Korea and Singapore had annual growth rates of more than 6% during the period 1960–2000.