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Wage-setting and capital in unionized markets: Evidence from South Europe[☆]

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ABSTRACT

The present paper analyzes the optimal response of real wages to the installed capital stock in a dynamic monopoly union. We use data from five Southern European countries during the period 1970–2010. We explore how this rent-extraction response changes over time and across countries depending on the labor market regulatory environment or regime. Regimes are allowed to be determined endogenously by the econometric methodology and seem to be consistent with relevant anecdotal evidence. We find that wages responded positively to the capital stock during periods of heavy regulation, while this response was significantly lower or even negative when labor markets became more flexible.

1. Introduction

It has long been recognized that, in non-competitive markets, the wage is chosen so as to extract rents created by firms. The degree of rent-extraction depends, among other things, on firms' initial conditions and labor market institutions. For instance, a trade union is expected to raise its wage demands when there is evidence that the firm is doing well and has invested heavily in the recent past (see Grout, 1984, and Van Der Ploeg, 1987, for early papers) and/or when higher wage claims do not risk a rise in unemployment because of labor market restrictive regulations (see Blanchard, 2004, for regulation and rent-extraction in European labor markets).[1]

The present paper investigates the optimal response of real wages to the installed capital stock, and shows how this rent-extraction response changes over time and across countries depending on the labor market regulatory environment or regime. Regimes are allowed to be determined endogenously by the econometric methodology. More specifically, we apply the instability test of Hansen (1992), the residual based test of Gregory and Hansen (1996) and Bai and Perron's (2003) methodology to investigate the existence of multiple structural breaks in the postulated cointegrating relationship. These regimes seem to be consistent with anecdotal evidence from a number of South European countries. We focus on installed capital due to its important role as an economic fundamental in wage setting. Although the wage–capital relation has been studied by Arestis et al. (2007), here we show that this relation can change depending on the labor market regulatory environment.

We begin with a theoretical model that characterizes time-consistent optimal wages in a dynamic monopoly union model. We then let the data decide how wages are affected by the installed capital stock. We use annual data from five Southern European countries (France, Greece, Italy, Portugal and Spain) during 1970–2010. These countries have been chosen because of their similarities in their labor market structure, such as the wage bargaining system, high unionization or coverage rates, generous social welfare systems and stringent employment protection legislation (Bentolila et al., 2010; World Economic Forum, 2011).[2] Changes in these institutions are used as signals to detect regime switches in the labor market.

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[1] This might be linked with reduced investment incentives, and consequently with the persistently high European unemployment rates of the last decades (Blanchard & Wolfers, 2000).

[2] The relevant summary EPL indicator index is for all these countries very close to the max (2.9–3.5). For a more detailed analysis of other common characteristics of these countries see Miaouli (2001).

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The empirical analysis shows that, in all the above countries, during periods of heavy regulations (e.g., strong employment protection legislation, generous social welfare state and high minimum wages), real wages have responded positively to accumulated investment, with long-run coefficients of around 0.20 (France), 0.83 (Greece), to 0.06 (Italy), 0.9 (Portugal) and 0.29 (Spain). This is consistent with the findings of Arestis et al. (2007). By contrast, wages have had a lower, or even negative, response during periods of enhanced labor market flexibility and a less protective welfare state. This seems to be the case in France in the period after 2001, in Spain in the period after 1997, in Greece after 1996, in Italy after 1998 and in Portugal after1996.

Thus, the message from the data is that when the labor market is relatively sclerotic, so that there is a relative low risk of higher wage demands causing unemployment, trade unions can safely extract rents from capital by pushing for higher wages. On the other hand, this extractive response ceases to exist when the labor market becomes more flexible, so that pushing for higher wages may be a risky activity.[3]

The rest of the paper is organized as follows. Section 2 presents the theoretical model. Section 3 presents econometric estimation and results. Section 4 closes the paper.

2. Theoretical model

This section presents the theoretical model and characterizes its solution. This will provide a conceptual framework to guide our econometric work. We use a dynamic monopoly union model within a partial equilibrium environment. This has been a popular setup within the class of union bargaining models and has been extensively used in describing unionized labor markets.[4]

Consider a Stackelberg game between a competitive firm and a trade union. In each time-period t, the trade union acts as a Stackelberg leader by choosing wages, w_t to maximize a utilitarian utility function. In turn, the firm moves. By taking w_t as given, the firm chooses employment, ℓ_t and the end-of-period capital stock, k_t. Since binding wage agreements are rarely observed in the European labor markets and hence optimal strategies can be time inconsistent (see e.g. Lockwood & Manning, 1989), we solve for Markov strategies (MS) and a Markov perfect equilibrium (MPE). As is known, MS are subgame perfect and hence time-consistent.

The intertemporal objective of the trade union is:

$$\max \sum_{t=1}^{\infty} \delta^{t-1} [\ell_t w_t + (n - \ell_t) b_t] \tag{1}$$

where $0 < \delta < 1$ is the discount rate, n is labor membership and b_t is the alternative wage rate at t. We assume that n is constant over time, while b_t follows an exogenous stochastic AR(1) process specified below in the empirical part. Thus, effectively, the union's payoff in each period is $\ell_t(w_t - b)$ which denotes wage rents.

The intertemporal objective of the firm is:

$$\max \sum_{t=1}^{\infty} \delta^{t-1} \left[A k_{t-1}{}^{\alpha} \ell_t{}^{1-\alpha} - w_t \ell_t - r_t k_{t-1} - \frac{\phi}{2}(k_t - k_{t-1})^2 - \frac{\psi}{2}(\ell_t - \ell_{t-1})^2 \right] \tag{2}$$

where $A > 0$, $0 < \alpha < 1$, $\varphi \geq 0$ and $\psi \geq 0$ are parameters. The last two terms capture capital and labor adjustment costs respectively and they are as in e.g. Sargent (1987, chapter 9).[5] The real interest rate, r, is exogenous and for simplicity is assumed to be constant over time.Working with backward induction, we solve first the firm's problem and then the problem of the union within each period.

2.1. The firm

While, at the market level, the state variables at any time t are k_{t-1}, ℓ_{t-1}, b_t, the state variables from the firm's viewpoint are $k_{t-1}, \ell_{t-1}, w_t, b_t$. Let then $V(k_{t-1}, \ell_{t-1}; w_t, b_t)$ denote the firm's value function at t, where k_{t-1}, ℓ_{t-1}, are the endogenous state variables for the firm. This value function solves the Bellman equation:

$$V(k_{t-1}, \ell_{t-1}; w_t, b_t) = \max_{k_t, l_t} \left[\begin{array}{l} A k_{t-1}{}^{\alpha} \ell_t{}^{1-\alpha} - w_t \ell_t - r_t k_{t-1} - \frac{\phi}{2}(k_t - k_{t-1})^2 - \frac{\psi}{2}(\ell_t - \ell_{t-1})^2 + \\ + \delta V(k_t, \ell_t; w_{t+1}, b_{t+1}) \end{array} \right]. \tag{3}$$

If there is a solution to this problem, it is of the form:

$$k_t = k(k_{t-1}.\ell_{t-1}; w_t, b_t, w_{t+1}, b_{t+1}) \tag{4}$$

$$\ell_t = \ell(k_{t-1}.\ell_{t-1}; w_t, b_t, w_{t+1}, b_{t+1}). \tag{5}$$

Since the firm's optimal responses in (4–5) include the next period wage rate, w_{t+1} they are not Markov strategies (MS). To transform them into MS, we work like in e.g. Froot and Obstfeld (1991) and more recently Klein et al. (2008). Specifically, in a Markov-perfect equilibrium, w_{t+1} will eventually be a function of the market's state variables at time $t + 1$, namely k_t, ℓ_t and b_{t+1}. Thus, and this is confirmed below when we solve the union's problem, we guess $w_{t+1} = W(k_t, \ell_t, b_{t+1})$ in equilibrium. Using this guess solution into (4–5) and since the exogenous b_{t+1} depends on b_t only, Eqs. (4–5) can be written as:

$$k_t = k(k_{t-1}, \ell_{t-1}; w_t, b_t, w_{t+1}, b_{t+1}) \equiv K(k_{t-1}, \ell_{t-1}; w_t, b_t) \tag{6}$$

$$\ell_t = \ell(k_{t-1}, \ell_{t-1}; w_t, b_t, w_{t+1}, b_{t+1}) \equiv L(k_{t-1}, \ell_{t-1}; w_t, b_t) \tag{7}$$

which they summarize the behavior of the firm in a MPE.

2.2. The union

The state variables from the union's viewpoint are k_{t-1}, ℓ_{t-1}, b_t at each t. Let then $U(k_{t-1}, \ell_{t-1}; b_t)$ to be the corresponding value function. This value function solves the Bellman equation:

$$U(k_{t-1}, \ell_{t-1}; b_t) = \max_{w_t} [w_t \ell_t + (n - \ell_t) b + \delta U(k_t, \ell_t; b_{t+1})] \tag{8}$$

subject to (6)–(7), namely, subject to the MS of the firm.

If there is a solution to this problem, and since b_{t+1} depends on b_t only, it has the form:

$$w_t = W(k_{t-1}, \ell_{t-1}; b_t). \tag{9}$$

Eqs. (6–7) and (9) summarize the optimal behavior of the two players and are three equations in the paths of wages, w_t, end-of-period capital, k_t, and labor, ℓ_t, as functions of the endogenous state variables, k_{t-1} and ℓ_{t-1}, and the exogenous changing over time variable, b_t.

In what follows, we let the data determine the sign of the associated partial derivatives and, in particular, how k_{t-1} affects w_t. Common economic intuition leads us to expect that: w_t is non-decreasing in k_{t-1}, although the magnitude of this response changes across

[3] In other words, appropriability here has been approximated by the optimal response of wages to capital stock.

[4] See Grout (1984), Van Der Ploeg (1987) and Miaouli (2001) for similar partial equilibrium dynamic models. See Mafezzoli (2001) for a dynamic stochastic general equilibrium model. For the monopoly union model, see e.g. Kidd and Oswald (1987) and Booth (1995).

[5] Labor adjustment costs can be associated with firing or hiring costs and other labor market regulations (see e.g. Bentolila & Bertola, 1990).