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Optimum organization of the labor market in a small open economy

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ABSTRACT

In Denmark labor has been organized in independent but cooperating craft unions for more than a century. Within an extremely simple model of a small open economy facing imperfect competition, we analyze four different ways of organizing the labor market and show that the Danish model (partial centralization of the wage setting process) may be accounted for as the outcome of a two-stage Nash bargaining game, being robust in relation to changes in market conditions, and likely close to optimum from the point of view of society as a whole.

1. Introduction

In Denmark most workers and employers are organized. Labor is organized in independent, cooperating craft unions (rather than in industrial cartels) and employers are organized in an all-encompassing Employers Association. To mitigate the effects of potential conflicts, unions and firms in conflict get financial support from unions and firms, which are not engaged in the conflict. This way of organizing the labor market has remained largely unchanged since 1899 when the parties signed the so-called September Agreement after a prolonged conflict.

The aim of this paper is to present a model that explains the organization of the Danish labor market as the outcome of a game between wage income maximizing labor organizations and profit maximizing employers. Further, the outcome of this game is most likely (close to) optimal from the point of view of the society as a whole.

The main characteristics of the model include the following: (1) Employers' right to manage, (2) closed-shop unionism, (3) Nash wage-rate bargaining, (4) many, possibly cooperating, craft unions as well as many firms, and (5) endogenously determined financial support for unions and employers in conflict from their non-conflicting counterparts.

The macroeconomic framework is a specialized small open-economy in which there is only one industry. The industry consists of n firms, each producing a differentiated product using identical production technology. The only input is labor. Labor comes in m different skills of equal size. The elasticity of substitution between any pairs of skills is uniform. All production is exported and all consumption goods are imported. The price of imported goods is exogenous and normalized to the value 1. (Export) demand is a declining function of the domestic production price (real exchange rate), which in turn is a function of the domestic wage level and the competition among domestic firms. There is no public sector, and the possible effects on wage setting as well as the optimum way of organizing labor of labor income taxes and tax-financed unemployment benefits are only addressed indirectly.

Within this set-up, we first determine the wage rate as a function of market characteristics (i.e., the number of firms, the competition among firms, the number of skills, the elasticity of substitution among skills, and the bargaining power of the parties) and of the way in which the labor market is organized. We consider four alternative ways of organizing the labor market: (1) non-cooperating local craft unions, (2) local (firm-level) industrial cartels, (3) economy-wide craft unions, and (4) a single national industrial cartel.

Second, we determine the corresponding levels of profits, wage income and national income. Third, we analyze the organization of the wage setting process as the outcome of a bargaining between labor and employers represented by their respective umbrella organizations. Finally, we relax the assumption that all crafts are of equal size and argue that the best attainable, stable way of organizing labor is in the form of independent but cooperating craft unions.

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The model set-up has three salient implications:

1. Real national income depends not only on employment and production but also on the terms of trade. Consequently, the wage rate may be too low not only from the point of view of labor but also from the point of view of society as a whole. The likelihood of this scenario increases in accordance with the degree of competition in the goods market, the substitutability of skills, and the relative bargaining power of the employers.
2. In general, the result of the bargaining is not Pareto-efficient (as it would have been, if there were only two parties and they bargained on employment as well as on the wage rate, see Rubinstein, 1982 and Björnerstedt and Westermark, 2009).
3. In general, full centralization of the wage bargaining process may not be in the best interest of labor (as it would be in the event that labor had the power to set the wage rate unilaterally). Decentralized and uncoordinated wage negotiations between the firms and 'selfish' unions, each of which is empowered with the ability to hurt the firm(s) by calling a strike, may increase the bargaining position of labor and possibly result in a better outcome from the point of view of both labor and the economy as a whole.

The analysis draws on several strands of labor market literature. Andersen and Risager (1990), Iversen (1996) and Scheuer (1992 and 1998) describe wage formation Denmark. They find that the Danish labor market became somewhat less centralized in the 1980s. Flanagan (2002) surveys empirical analyses of the impact of collective bargaining on macroeconomic performance. Contrary to Calmfors and Drifill (1998), he concludes that there is no robust relationship between various indicators of centralization of collective bargaining and macroeconomic performance (inflation, unemployment and rate of growth), that the organization of the labor market cannot be considered a truly exogenous variable, and that the organization of the labor market as well as the outcome appear to depend on societal norms and values and on the interaction between the government and the organizations (See also Moene et al., 1993). Hendricks and Kahn (1982) and Eaton and Kriesky (1998) explain the trend towards less centralization in competitive industries in the US as the result of increased competition. In the wake of the Single Market a number of economists have developed theoretical models to analyze the impact of aspects of economic integration on unionized economies: Zhao 1998 (FDI), Munch and Skaksen 2002 (product market integration) and by Lommerud et al., 2006 (international mergers). They conclude that economic integration weakens the bargaining power of labor and reduces wages.

The contributions to which our paper relates most directly are the seminal paper by Oswald (1979) and the subsequent strand of literature on strategic union behavior, in particular, Hersoug (1983), Gylfason and Lindbeck (1984), Horn and Wolinsky (1988a), Horn and Wolinsky (1988b), Davidson (1988), Dowrich (1989), Jun (1989), Hoel (1991), de Fraja (1991), Machin et al. (1993), and Naylor (1995). However, to our knowledge the combination of distinguishing characteristics and the way in which they are modeled are novel and open to additional insights.

2. The model

The economy consists of n firms. Each firm (exemplified by firm no. 1) faces a linear demand function[1]

$$Q_1 = \frac{1}{n}\left(1 - P_1 - \eta \cdot \sum_{i=2}^{n}(P_1 - P_i)\right). \tag{1}$$

[1] The assumed linearity is crucial. It implies that the higher the equilibrium wage rate (unit cost) the higher the price and, consequently, the higher the elasticity of demand. Dowrich (1989) assumes that the demand function is isoelastic, and Holden and Raaum (1991) assume perfect competition, i.e. that the price level is exogenously determined.

The demand function of the individual firm implies that the macro demand function $Q = \sum_1^n Q_i$ in symmetric equilibrium reduces to $Q = 1 - P$. The parameter η measures the substitution between any pair of goods.

Each firm employs m different skills of labor (and no other factors of production). Production is given by a CES production function

$$Q_1 = m \cdot \left(\frac{1}{m}\sum_{j=1}^{m} L_{1j}^{\frac{\sigma-1}{\sigma}}\right)^{\frac{\sigma}{\sigma-1}}. \tag{2}$$

Eq. (2) is normalized such that in symmetric equilibrium, i.e. $L_{ij} = \frac{L_i}{m}$ and $w_{ij} = w_i$, production is equal to employment, $Q_i = L_i = \sum_1^m L_{ij}$ and, consequently, that the unit production cost is equal to the common wage rate, $c_i = w_i = w_{ij}$.

The firms have the right to manage. Exemplified by firm no 1, its goal is to maximize profits with respect to production Q_1, price P_1, and the employment of each skill L_{1j}, $(j = 1,,,m)$,given the vector of wage rates w_{1j}, $(j = 1,,,m)$, the vector of prices set by competing firms P_i, $(i = 2,,n)$, and the demand and production constraints defined by (1) and (2).

The solution is:

$$P_1 = \frac{1 + (1+\beta)\cdot c_1 + \eta \cdot \sum_2^n P_i}{2 \cdot (1+\beta)} \tag{3}$$

$$Q_1 = \frac{1 - (1+\beta)\cdot c_1 + \eta \cdot \sum_2^n P_i}{2 \cdot n} \tag{4}$$

$$\Pi_1 = Q_1^2 \cdot \frac{n}{1+\beta} \tag{5}$$

$$L_{1j} = \left(\frac{c_1}{w_{1j}}\right)^{\sigma} \cdot \frac{Q_1}{m} \tag{6}$$

$$c_1 = \left(\frac{1}{m} \cdot \sum_{j=1}^{m} w_{1j}^{(1-\sigma)}\right)^{\frac{1}{1-\sigma}} \tag{7}$$

$$\beta \equiv (n-1)\cdot\eta. \tag{8}$$

In symmetric equilibrium, we may express the common price level (P), total production (Q), total employment (L), total income ($Y = P\cdot Q$), profits ($\Pi = Q\cdot(P-c)$), and wage income ($V = L\cdot w$) as functions of the common wage rate (w) and the parameter β, which measures the competition in the goods market. The number of skills (m) and the elasticity of substitution among skills (σ) do not affect these variables directly, but are important determinants of the wage rate:

$$c = w \tag{9}$$

$$P = \frac{1 + (1+\beta)\cdot w}{2+\beta} \tag{10}$$

$$L = Q = \frac{1+\beta}{2+\beta}\cdot(1-w) \tag{11}$$

$$\Pi = \frac{1+\beta}{(2+\beta)^2}\cdot(1-w)^2 \tag{12}$$

$$V = \frac{1+\beta}{2+\beta}\cdot(1-w)\cdot w \tag{13}$$

$$Y = \frac{1+\beta}{(2+\beta)^2}\cdot(1+(1+\beta)\cdot w)\cdot(1-w). \tag{14}$$