Blanchard, O. and F. Giavazzi 2003. Macroeconomic Effects of Regulation and Deregulation in Goods and Labour markets, *Quarterly Journal of Economics*: 879-906

Main message: liberalising product markets may be reinforced by liberalising labour market.
The link between the two markets is provided by rent sharing between monopolistic firms and local unions → prices exceed production costs, and wages exceed the reservation wage.

Key ingredients:
① preference of variety from the consumers (horizontal differentiation). Each consumer wishes to consume (in equal parts given the symmetry of the model) any kind of commodities available. This creates for each variety a local market where a firm is locally monopolistic.

Utility function of consumer j

$$V_j = \left[\frac{1}{m^{1/\sigma}} \sum_{i=1}^{m} c_{ij}^{\frac{\sigma-1}{\sigma}} \right]$$

where m is the total number of varieties, c_{ij} is the consumption of commodity i by consumer j and σ is the elasticity of substitution between two varieties of commodities.

The optimal market demand for commodity i is

$$C_i = \frac{M}{m} \cdot \frac{1}{p_i^{\sigma} \overline{p}^{1-\sigma}}$$

where $M = \sum_{1=j}^{n} M_j$ is the total income of all consumers and $\overline{p}$ is the price index.

② production technology neglects capital and assumes constant returns to scale

$$Y_i = N_i$$

where Y_i is the total production of commodity i and N_i is employment in firm/sector i. Therefore profits are defined as

$$\pi_i = p_i Y_i - w_i N_i = (p_i - w_i) N_i$$

thus a firm makes positive profits if it is able to set prices higher than labour cost.

③ in each firm there is a union, which bargains over wage and employment (so called *efficient bargaining*). The Nash solution of a bargaining problem requires the maximisation of the joint product of the gains with respect to the outside option: a union can gain a wage higher than the reservation wage, a firm can make positive profits.

For a worker the outside option is being unemployed, which entails obtaining the reservation wage $\overline{w} = \overline{p} f(\underset{-}{u})$, which is decreasing function of the unemployment rate u.

The bargaining problem implies

$$\max_{w_i, N_i} [N_i(w_i - \overline{w})]^{\beta} [N_i(p_i - w_i)]^{1-\beta} = \max_{w_i, N_i} N_i (w_i - \overline{p} f(u))^{\beta} (p_i - w_i)^{1-\beta}$$

where β is the bargaining power of the union. The optimal solutions are

$$N_i = Y_i = \arg\max_{Y_i} (p_i - w_i)$$

$$w_i = \beta p_i + (1-\beta) \overline{p} f(u)$$

which implies that both unions and firms have a common interest to set the (optimal) level of production/employment that maximise firms' profit. In addition wages are set through profit sharing (the wage is a weighted average between the maximum wage and the reservation wage).

④ The model is solved in three steps:

- ✓ <u>short-run partial equilibrium</u>: the number of firms is given; each firm sets its price taking price level and unemployment for given, and similarly does the corresponding union with the wage
- ✓ <u>short-run general equilibrium</u>: the number of firms is given; since all firms are identical, they all set the same price, and all the unions set the same wage → price level and aggregate unemployment are uniquely determined
- ✓ <u>long-run general equilibrium</u>: free entry in the market determines the maximum number of firms which is compatible with non-negative profits.

SHORT-RUN PARTIAL EQUILIBRIUM.

We assume equilibrium in the commodity market:

$$C_i = \frac{M}{m} \cdot \frac{1}{p_i^{\sigma} \bar{p}^{1-\sigma}} = Y$$

and therefore firm's profits are then defined as

$$\pi_i = \frac{M}{m} \cdot \frac{1}{p_i^{\sigma} \bar{p}^{1-\sigma}} \left(p_i - w_i\right)$$

Increasing the price reduces the demand (and therefore production/employment) but increases the profit per unit of production.

The optimal price rule becomes

$$p_i = \frac{\sigma}{\sigma - 1} \overline{p} f(u) = (1 + \mu) \overline{p} f(u)$$

The firm sets the price as a "mark-up" over the minimum cost of production, which corresponds to the reservation wage of the worker. The mark-up margin $\mu = \frac{1}{\sigma - 1}$ is a measure of the market power of the firms, and declines with the increase in the degree of substitutability between commodities (which can me thought as a proxy measure for the degree of competition existing in the market). We could make it more precise by assuming that competition increases when there is a greater variety of products

$$\mu = \frac{1}{\sigma\left(\underset{+}{m}\right) - 1} = \mu\left(\underset{-}{m}\right)$$

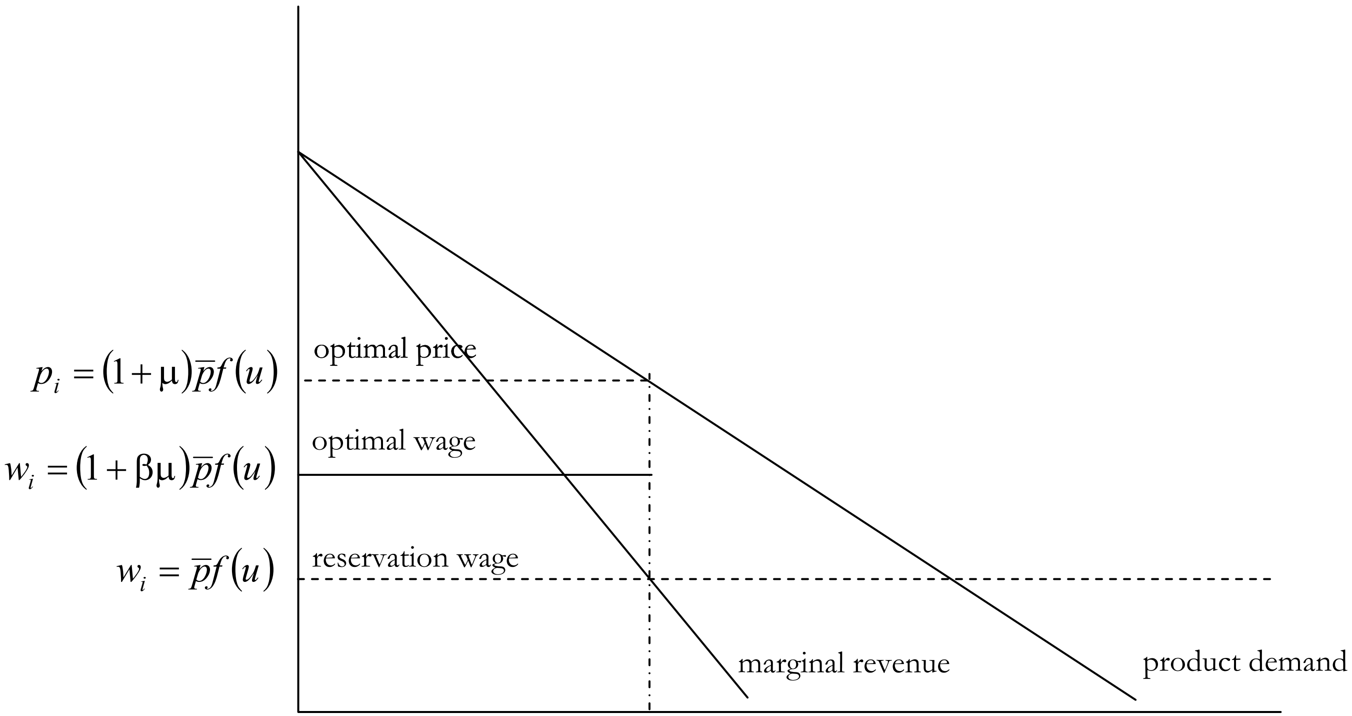
Given the price behaviour of the firm, we obtain the bargained wage

$$w_i = \beta p_i + (1 - \beta) \overline{p} f(u) = \beta (1 + \mu) \overline{p} f(u) + (1 - \beta) \overline{p} f(u) = (1 + \beta\mu) \overline{p} f(u)$$

In short-run partial equilibrium therefore the main conclusions are

$$p_i = p\left(\underset{+}{\mu}\right), \quad w_i = w\left(\underset{+}{\mu}, \underset{+}{\beta}\right)$$

Both firms and unions prefer low competition, because this produces greater profits, and as a consequence higher wages ☞ in each sector, firms and unions support protectionist policies.



SHORT-RUN GENERAL EQUILIBRIUM.

All firms are identical $\Leftrightarrow$ they set the same price $\Leftrightarrow$ $p_i = \overline{p}$.

As a consequence the level of production is uniquely determined, and therefore the unemployment rate becomes (negative) function of the existing level of competition.

$$p_i = \overline{p} = (1+\mu)\overline{p}f(u) \;\Leftrightarrow\; 1 = (1+\mu)f(u) \;\Leftrightarrow\; \frac{1}{1+\mu} = f(u) \;\Leftrightarrow\; u = u\Big(\underset{+}{\mu}\Big) = u\Big(\mu\big(\underset{-}{m}\big)\Big)$$

Now the union's objective is modified, because unions realise that higher prices (which benefit the workers due to higher wages) translates in lower unemployment. In facts the optimal wage becomes

$$\frac{w}{\overline{p}} = \frac{1+\beta\mu}{1+\mu} = w\Big(\underset{-}{\mu}, \underset{+}{\beta}\Big)$$

At the aggregate level the unions prefer more competition, in order to obtain higher employment.

LONG-RUN GENERAL EQUILIBRIUM.

There is a cost of entrance c and firms enter the market up to the point where profits vanishes. By equating profits per firm to the entrance cost we get

$$\frac{\pi_i}{\overline{p}} = \frac{p_i - w_i}{\overline{p}} = \frac{p_i}{\overline{p}} - \frac{w_i}{\overline{p}} = 1 - \frac{1+\beta\mu}{1+\mu} = \frac{1+\mu-1-\beta\mu}{1+\mu} = \frac{\mu(1-\beta)}{1+\mu} = c$$

Since μ depends on the number of firms, the previous equation sets the maximum number of firms that are admissible in the market

$$m = m\left(\underset{-}{c}, \underset{-}{\beta}\right)$$

A decrease in unions' power β raises the per-firm profits, thus admitting a larger number of firms.

In addition from $f(u) = \frac{1}{1+\mu}$ we get $u = u\left(\underset{+}{c}, \underset{+}{\beta}\right)$. Finally $\frac{w_i}{\overline{p}} = 1 - c$.

As a consequence, unions should support labour market liberalisation, because it will raise unemployment in the long run. They also should be in favour of product market liberalisation, due to the positive effect on both unemployment and wages.