Retrenchment, Labor Laws and Government Policy:

An Analysis with Special Reference to India

by

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Contents

Section 1. Introduction.

Unlike in most East-Asian countries, India has over the years enacted and implemented a variety of legislation meant to protect the well-being of the worker. Thus there are laws protecting trade union rights, laws that abolish bonded labor and child labor from hazardous industries, legislation guaranteeing a minimum wage and laws to prevent retrenchment, layoffs and dismissal of labor. In this paper we evaluate the consequences of this last set of laws concerning retrenchment.

In India firms employing more than 100 workers must seek government permission for any retrenchments they wish to make, and the workers in these firms are entitled to three months notice of any such action. As for plant closings, companies employing more than 100 workers must receive government permission before any closure; the government may grant or deny permission for such a closing, even if the company is losing money on the operation.

The traditional view of such legislation is that it protects labor welfare, but has a down side in making the Indian economy less flexible. In particular, so the popular argument goes, desirable activities and adjustments do not take place. When companies encounter adverse business conditions, the retrenchment legislation compels them to maintain bloated work forces, leaving fewer resources for investment in new production processes and lines of activity. Companies that may wish to close current operations and re-deploy their resources elsewhere cannot do so. This paper demonstrates that anti-retrenchment legislation may have even more paradoxical effects. Because the legislation raises labor costs, companies may hire

fewer workers than they might otherwise have, and they may not enter a particular product line in the first place. This last consequence of the legislation is ironic because it suggests that, in terms of overall impact, this seemingly protective law may actually be harming laborers rather than helping them, by causing a cutback in employment and lowering of the wage.

These presumed negative side-effects of current Indian law must be weighed against the intended main-effect, which is to provide greater labor market protection to Indian workers. It is the purpose of the present study to weigh the pros and cons of the Indian legislation, using a model specially designed for this purpose and based on realistic institutional assumptions and empirical information. We should state at the outset that we are not arguing for no legislative intervention. There are important labor market interventions which are well justified, as we have argued elsewhere (Basu, 1995; Fields and Wan, 1989). However, it is easy to make an intervention which at first sight helps workers, but in reality, does not.

What we have found is that one particular special case is itself theoretically ambiguous from a welfare point of view: for some parameter values, labor is helped by the legislation, while for other parameter values, it is hurt. The special case presented in this paper is nested within a larger model, and thus once the special case has been shown to generate theoretical ambiguities, the larger model nesting it is necessarily ambiguous as well. The implications of this fact are discussed further in Section 3. But before moving on to these substantive issues, it may be useful to briefly recount India's anti-retrenchment legislation and past writings on such laws.

There have been various theoretical and empirical studies done at the firm level to determine the impact of government policies that increase the cost of retrenching workers. One important study is by Bentolila and Bertola (1990). Using aggregate data from France, Germany, Italy and UK, they analyzed the labor demand of a single monopolist in the face of changing hiring and firing costs. The conclusions, based on a partial equilibrium analysis, were that a dismissal cost actually increased long-run employment. Hopenhayn and Rogerson (1993) in a closely related study using micro-data found, using a general equilibrium framework, that a tax on lay-offs significantly reduces steady-state employment. None of these studies has, however, considered the pros and cons of restrictive labor retrenchment policies. Our study weighs the presumed negative side-effects of the current Indian retrenchment laws against its intended main-effect, which is to provide greater labor market protection to Indian workers.

Many observers have claimed that India's protective labor legislation has hurt India's overall growth and efficiency (see, e.g. Lucas, 1988; Ahluwalia, 1991; Papola, 1994). Basu (1995) has shown in a theoretical framework, that the labor legislation may have actually hurt the very labor it was meant to protect.

The rigid retrenchment laws increased the costs of adjusting a firm's employment level and led firms to consider not only current market conditions, but also future labor needs while making their labor decisions (This fact is introduced into our intertemporal general model presented in Section 4). A firm will therefore be reluctant to hire additional workers during an economic upturn if it anticipates

significant costs in reducing its work force during a subsequent downturn. Nickell (1986) developed some of these ideas in detail using dynamic labor demand theory.

As is documented in the works of Papola (1994), Ramaswamy (1984), Datta Chaudhuri (1994) and Mathur (1989; 1991) employers in India, have responded to these restrictive retrenchment laws in many ways including: (i) greater use of contract, temporary and/or casual labor, (ii) the expansion of leasing-in capacity of small firms, (iii) the increase in capital intensity and the adoption of new labor saving technologies, (iv) the use of golden handshakes, (v) the setting up of production in states where labor is not organized or militant, and (vi) the increasing resort to corruption and bribery in order to avoid the legal consequences of retrenchment.

Fallon and Lucas (1991) examined, empirically, the job security regulations in India and Zimbabwe, two countries with very restrictive retrenchment laws. Using a dynamic labor demand framework, they found that the retrenchment laws significantly reduced the demand for workers for any given level of output. In particular, they estimated that in India, the 1976 amendment to the Industrial Disputes Act (1947) reduced the demand for labor by 17.5%, increasing the pressure on the unorganized sector to absorb excess labor supply. They were, however, unable to find evidence to suggest that firms adjusted to the retrenchment laws by lowering wages or by increasing hours per worker.

Section 2: Factual and Analytical Background

According to the Indian constitution both union and state governments can enact labor laws, but most laws are national and their effects in the local labor market

depend upon how well they are implemented. Typically, the government has played a pivotal role in the labor market. Aspects of industrial relations which are governed by collective bargaining in the West are often determined by legislation in India. Broadly, the government has legislated on union recognition, some terms and conditions of employment, wages and bonuses and on exit and layoff procedures.

The Industrial Disputes (ID) Act, 1947, which was the first legislation on exit, layoffs and closures, initially applied with different degrees of severity to firms employing between 50 and 100 workers and to firms with 100 or more workers. Firms employing fewer than 50 workers fell outside the scope of this clause. When first introduced, the ID Act did not restrain employers from laying off or retrenching workers or closing down unprofitable businesses provided they notified the workers and the unions of the intended changes well in advance.[1] The provisions relating to payment of compensation for layoff and retrenchment were introduced in 1953. An amendment in 1964 standardized the compensation at 15 days' average pay for every year of continuous service, and required the employer to give the worker and the government a month's notice.

Currently, the ID Act (chapter V-A) requires an establishment employing 50 or more workers, in the case of valid retrenchment, to provide the workers with thirty days' notice and 15 days' pay for every year of continuous work by the worker at the firm. In the case of closure or sale, the employer must fulfill the same conditions,

[1] In Indian legalese "layoff" refers to dismissal of workers because of slackness in demand and with the intention of re-hiring these workers when business picks up. "Retrenchment" refers to more permanent laying off of workers.

unless the successor takes on these obligations (Sections 25FF and 25FFF). For an establishment employing 100 or more workers, the ID Act, under chapter V-B, requires prior permission from the government before firm closure or worker retrenchment.

Applications for retrenchments and layoffs with government seldom succeed and, of course, knowing that in advance, firms do not make too many such applications. This is evident from a short subsection in the Indian Labour Year Book 1992, (p. 82). We quote the entire subsection.

> Retrenchment and Lay-off
>
> During the period January - August, 1992, four proposals, two each for retrenchment and lay-off were received for consideration by the Ministry of Labour. One proposal seeking permission for retrenchment was rejected whereas the other remained under consideration of the Government. One proposal for lay-off was withdrawn while the other was found to be not maintainable.

The ID Act did not restrict completely the right of the employer to close an unprofitable business. The amendment in 1957 required the employer to compensate the workers affected by closure in the same way as if they were retrenched. In the case of firm closure, the government declares the establishment "sick" and the firm is required to continue functioning on the basis of government subsidies.

Each of the three amendments of the Act in 1972, 1976 and in 1982 seemingly gave greater protection to workers than the preceding one. In the current amended version employers employing 100 or more workers must give notice of a closure to workers or their representatives and to the government, 90 days prior to the date of intended closure. The employer, in his request, has to state in detail the reasons for

closing down the business. The government inquires into them, hears both parties and either grants or refuses the permission to close - usually the latter (see Datta Chaudhuri, 1994). Refusal has to be communicated to the parties in writing within 60 days of the notice from the employer. Employers with 50-99 workers need only to notify the government, while those with less than 50 employees need not even do that to close their business. However in practice workers in such firms can appeal to other laws, such as the Indian Contracts Act, 1972, to resist dismissal.

Table 1: Number of Workers by Firm Size
Firms with Gross Investment 0 to 2 million Rupees

Firm Size (measured by employment range)	No. of workers 1982 - 83	No. of workers 1990 - 91	Percent Change
0 - 49	807,421	957,922	18.6
50 - 99	467,418	443,276	-5.2
100 - 199	392,592	280,631	-28.5
200 +	505,727	288,135	-43.0

Source: Annual Survey of Industries 1982 - 83: Summary Results, CSO Government of India, New Delhi, August 1986.
Annual Survey of Industries 1990 - 91: Summary Results, CSO Government of India, New Delhi, May 1994.

It is instructive to look at a few numbers relating to employment in Indian industry. Table 1 gives the numbers of workers employed in firms of different sizes, size being measured in terms of the size of employment for 1982-83 and 1990-91. For reasons of comparability of the data we restrict attention to firms which have a gross investment in plant and machinery not exceeding two million rupees. What these numbers show is quite striking. There is a sharp drop in employment in firms employing more than 100 workers and a mild decrease in firms employing between 50 and 99 workers. There is, however, a clear increase in employment for small firms - those employing between 0 and 49 workers. While on needs detailed analysis to

ascertain the causes of this, it is interesting to note that this changes are well in keeping with the amendments in the ID Act which made retrenchment and layoff harder for firms of employment size 50 to 99 and more so for firms sized 100 and above.

Despite these laws, continuous attempts were made by the employers to circumvent the law and escape penalties. A few case studies bring to light the strategies used by management:

(a) Use of Lockout as a means Towards Closure: The Murphy Electronics Company in Bombay (Mumbai) fearing that the Government would not grant permission to close down one of its plants, which produced television and radio equipment, decided to use lockouts and promoted inter-union rivalries as the pressure tactic to get rid of workers. During the period of lockout, the management made arrangements to carry on production of Murphy products produced completely by small sub-contractors by stamping its own label. The result was that out of the 2,500 workers only 497 remained and the strategy helped the management to get the plant to be declared a sick unit by the Board of Industrial and Financial Reconstruction (BIFR) in 1988.

(b) Sub-contracting: Sub-contracting out production by big firms to small firms has become a major technique by which the large firms try to reduce their costs and pressure the unionized workers to leave or accept voluntary retirement schemes. The retrenchment law is silent on sub-contracting and management can effectively force a lock-out or face a strike without a major loss to them.

(c) Transfer of Ownership: While Section 25(O) makes it obligatory to seek permission for closure, it does not require any permission in cases of transfer of ownership from one company to another. It is not incumbent on the new owners to retain all the workers/employees of the old company. This strategy was successfully used by Alembic Glass Works in Bangalore and Baroda to retrench workers.

(d) Total Closures: The workers of Mafatlal Engineering have waged a long struggle against the management. Recently Mafatlal Engineering was converted into an employee-owned corporation after a long legal struggle. The earlier management wanted total firm closure against the wishes of the workers.

These cases are just a representation of a large number of ways firm management have addressed the rigid retrenchment laws. What is interesting and, from our point of view, the relevant point in all these examples, is how little contracts play a role in the Indian labor market. The existence of exogenous rules governing employer-employee relation has relegated independent contracts to a relatively unimportant position, robbing the labor market of flexibility.

Section 3: Labor Market Equilibria With or Without Retrenchment

3.1: A Simple Model

In this section we model the likely effects of these anti-retrenchment laws. We shall, in particular, consider two alternative legal regimes: one in which employers are free to retrench workers at will and another in which no retrenchment is allowed. These will be referred to as the "free retrenchment (F) regime" and "no retrenchment

(N) regime" respectively. Reality is, of course, more complicated, where retrenchment laws take shades of gray instead of being black and white. However, formalizing the two polar cases helps us fix our ideas and gives us some benchmarks to use. Once we have formalized these we shall go on in subsequent sections to formulate intermediate cases, where retrenchment has some costs and is not fully free nor impossible and also to discuss the case where retrenchment is not a matter of law, but one of contract, that is, the employer and employees may agree ex ante on any scheme of retrenchment compensation, but would be required to abide by the agreement when the time comes.

Our aim in this section is to model the kinds of equilibria that arise in the labor market under the F and N regimes. In particular, we want to study the impact of alternative legal regimes on the wage. Since anti-retrenchment laws are enacted with the aim of enhancing the welfare of labor it is worth checking formally whether this is actually so once everyone has had time to adjust to the new laws. As stated in intuitive terms earlier, it turns out that anti-retrenchment laws do not always help workers. The formal model below illustrates how a switch from regime F to regime N can actually lower the wage under certain parametric configurations. In other words, if such parametric configurations occur, the anti-retrenchment legislation would, paradoxically, work to the laborers' detriment. It is shown that there are also parametric configurations where the non-paradoxical result occurs.

As a base case, let us suppose there are n identical firms, each endowed with a production function as follows:

$$x = \varphi f(L); \quad f'(L) > 0, \quad f''(L) < 0. \qquad ...(1)$$

L is the amount of labor used by the firm, x the firm's output, and φ a stochastic variable which takes values of 1 and 0 with probability p and (1-p) respectively. To keep the algebra simple we model this stochastic shock as being independent across firms and across time, thereby ruling out industry-wide fluctuations and intertemporally correlated shocks. Then, appealing to the law of large numbers, we assume that in each period a randomly selected pn firms have φ = 1 and (1-p)n firms have φ = 0. We ignore the integer problem here by assuming that pn is an integer.

It is also assumed, for the time being, that in each period or year each firm gets to see φ before making its hiring decision, If for a certain firm φ = 1, we shall describe that as a <u>good year</u> for the firm. A <u>bad year</u> is one in which φ = 0.

Let us first model the F regime. Each firm is free to hire and lay off workers as it sees fit. In a good year, a firm's demand for labor is given by solving the following problem:

$$\text{Maximize} \quad f(L) - wL.$$

The first order condition is given by:

$$f'(L) = w. \qquad ...(2)$$

Since $f''(L) < 0$, the function, $f'(L)$ can be inverted and written as g(w). Hence, in a good year, with market wage w, a firm's demand for labor is given by

$$L = g(w). \qquad ...(3)$$

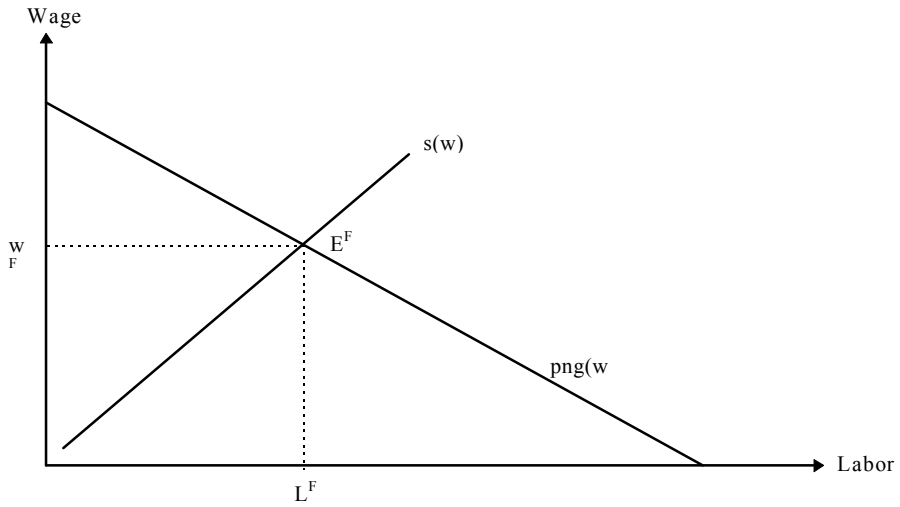
In a bad year since φ = 0, a firm's demand for labor is obviously 0. Hence in the F regime, the aggregate demand for labor is given by png(w).

Let the aggregate supply function of labor be given by s(w) such that s′(w) >0. Assuming that the usual equilibrating forces are free to operate in the F regime, the market equilibrium is one where aggregate labor demand equals aggregate labor supply. Clearly, w^F is the equilibrium wage in the F-regime if and only if

$$png(w^F) = s(w^F). \qquad ...(4)$$

Figure 1 depicts this equilibrium; the equilibrium amount of labor demanded and supplied is denoted by L^F.

Figure 1



Let us now depict the equilibrium in an N-regime. We are therefore considering an economy in which there is a law requiring that once a firm hires a laborer it cannot retrench him.

Since we already know what the aggregate supply curve is, namely, s(w), all we have to do is to work out the demand for labor in this legal regime and then look for the wage that equates demand and supply.

A short-cut method for working out the demand for labor in an N-regime is to assume that each employer must decide how much labor to hire before φ is revealed. The reason why this method works is that apart from the first period, the employer will effectively be stuck with a certain amount of labor in all periods without knowing each period's realization of φ. So if the future is not too heavily discounted, the fact that φ is known in one period, namely, the first period is of negligible importance. Hence our method causes an error, but of a sufficiently small order, so that it may be ignored. (This is demonstrated in the Appendix.)

For a risk neutral firm that does not know the value of φ in advance, in the N-regime, the firm's problem is to maximize expected profits

$$\text{Maximize} \quad pf(L) - wL.$$

Hence, by the first-order condition we get

$$f'(L) = w/p. \qquad ...(5)$$

Hence, the firm's demand for labor is given by:

$$L = g(w/p), \qquad ...(6)$$

where g is as before the inverse of $f'(L)$.

Because each firm is identical ex ante, the aggregate demand for labor is ng(w/p). So w^N is an <u>equilibrium wage</u> in an N-regime if the amount of labor demanded equals the amount supplied at that wage:

$$ng(w^N/p) = s(w^N). \qquad ...(7)$$

On inspecting (4) and (7) it appears possible that w^N may exceed w^F, be less than w^F , or be the same as w^F depending on the value of p and the shape of the g(.) function. This is formally proved in Section 3.2.

Section 3.2: The Case of Linear Labor Demand Functions

To establish formally the claim made at the end of Section 3.1 that w^N may be greater than, equal to, or less than w^F, consider the following special case of the above model. Let the production function, $f(L)$, be the following quadratic one.

$$f(L) = (A/B)L - L^2/2B \qquad ...(8)$$

with A, B >0. As long as L is less than A (and we shall assume this), (8) is a reasonable production function, satisfying $f'(L) > 0$ and $f''(L) < 0$. It is easy to verify that (8) implies that the firm has a linear labor demand function

$$g(w) = A - Bw. \qquad ...(9)$$

Using (9) the aggregate demand for labor in the economy is given by

$$L^F = pn[A - Bw] \qquad ...(10)$$

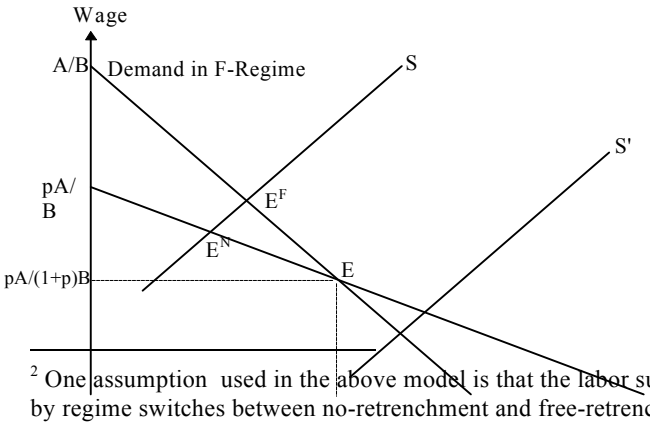
in the F-regime, and by

$$L^N = n[A - Bw/p] \qquad ...(11)$$

in the N-regime. These two labor demand curves are illustrated in Figure 2. One sees that they necessarily cross (at the point labeled E).

Suppose we begin with a world in which retrenchments are freely allowed. Hence, the aggregate demand curve of labor is given by the steeper demand curve in Figure 2, marked 'Demand in F-regime'. If the laws of the land are changed and firms are not allowed to retrench labor, the effect on wages depends on where the initial equilibrium was. Suppose first that the labor supply curve was like the curve marked SS in Figure 2, so that the equilibrium lay to the left of E, at the point labeled E^F in the figure. Then a switch to the N-regime would move the equilibrium from E^F to E^N, thereby lowering wages and hurting workers. On the other hand, if the labor supply curve lay to the right of E, as for curve S'S', and the equilibrium was at $E^{F'}$, a switch to the N-regime moves the equilibrium to $E^{N'}$, raising the wage and benefiting workers.[2]

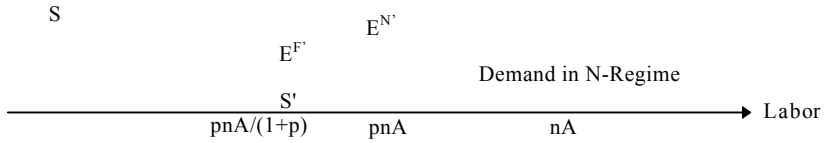
Figure 2



[2] One assumption used in the above model is that the labor supply function, s(w), remains unaffected by regime switches between no-retrenchment and free-retrenchment. At one level this is fine since, in the aggregate, there is no involuntary unemployment in our model. But, if we assume that workers mind the transactions cost of switching jobs, the same wage w is more attractive to the worker when it comes with a no-retrenchment clause. Extending our assumption that a better offer elicits a greater labor supply, we may assume we have two supply functions, $s^F(.)$ and $s^N(.)$, for the two regimes, and that, for all w,

$$s^F(w) \leq s^N(w).$$

This complicates the analysis in Figure 2. If the original equilibrium were at E^F, then a switch in regime to no-retrenchment causes an even more precipitous fall in the wage, since SS shifts right as the regime changes. Similarly if the original equilibrium were at $E^{F'}$, a change of regime to no-retrenchment will now exert a smaller upward pressure on wages. Indeed wages may now fall. This will happen if the rightward shift of S′S′ is sufficiently large.



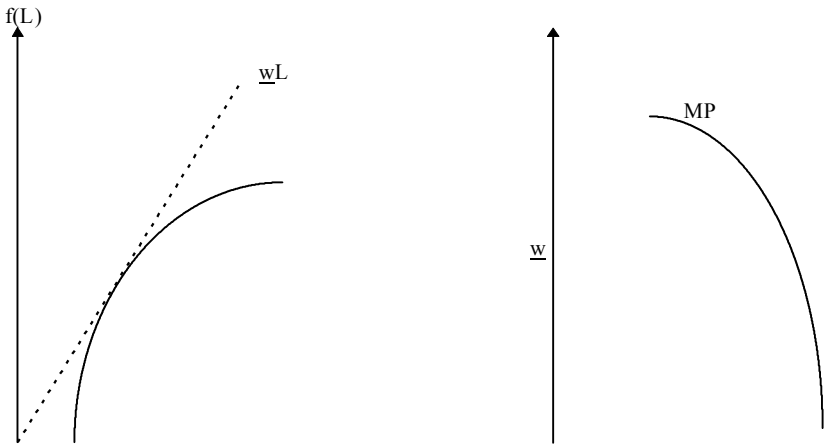
Consider the special case where p=1/2. By filling in this number in Figure 2, we get a very well-specified rule. If, in an F-regime, the equilibrium wage is more than one-third the wage at which demand for labor goes to zero, then and only then does a law that bans labor retrenchment lower wage and work to the detriment of workers.

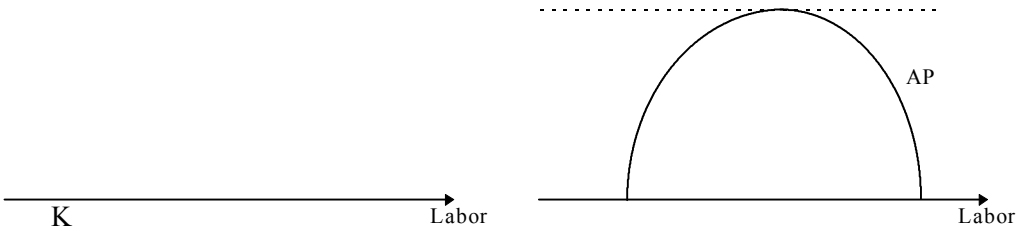
It is interesting to note that this "one-third rule" does not depend on the values of A and B and is also immune to different specifications of the labor supply curve. Nevertheless, it is a special rule for a special class of models. Our aim in deriving the rule is not to present it as a general result, but to illustrate that even when there is full employment and the welfare effects can be judged purely in terms of wage rates, the goodness or badness of an anti-retrenchment law is theoretically ambiguous.

Section 3.3: Endogenizing Industry Size

In the above exercise we assumed industry size to be fixed at n. Let us now suppose, as is often assumed in models of perfect competition with free entry, that there is a very large number of firms and, in equilibrium, industry size gets determined endogenously by using a zero expected profit condition.

Figure 3





To avoid some trivial equilibria with zero production, we shall make a small modification to the function $f(L)$. We assume that there exists some positive number, K , such that, for all $L \leqq K$, $f(L) = 0$, and for all $L > K$, $f'(L) > 0$, $f''(L) < 0$. In other words, the total product curve, f(L), the marginal product curve, $f'(L)$, and the average product curves, $[f(L)/L]$, look as in Figure 3 above. Now define,

$$L(w) \equiv \text{argmax} [\, f(L) - wL \,].$$

How do the equilibria in the F and N regimes compare?

Maintaining the assumption of free entry of firms, consider first a free-retrenchment (F) regime. If the wage is w, in the F-regime each firm earns a profit of

$$f(L(w)) - wL(w).$$

If this exceeds 0, we do not have an equilibrium, since new firms will keep entering the industry. Likewise if the expected profit is less than zero we do not have an equilibrium since firms will be exiting from the industry. In other words, in an F-regime, an equilibrium wage is $\underline{w}$, where this is defined implicitly by,

$$f(\, L(\, \underline{w}\,)\,) - \underline{w}\, L(\, \underline{w}\,) = 0.$$

$\underline{w}$ is illustrated in Figures 3 and 4.

Now consider the no-retrenchment (N) regime. A firm in an N-regime facing wage w, expects to earn

$$pf(L) - wL$$

if it hires L workers. As the appendix shows, this can be justified in a limiting sense even in a dynamic model. Define

$$\ell(w) \equiv \text{argmax } [\, pf(L) - wL \,].$$

If the wage is w in an N-regime each firm expects to earn a profit of:

$$pf(\ell(w)) - w\,\ell(w).$$

Hence, using a justification as above, we find that in an N-regime, $\underline{w}$ is an equilibrium wage if:

$$pf(\ell(\underline{w})) - \underline{w}\,\ell(\underline{w}) = 0.$$

We now have the following:

Claim: $\underline{w} < \underline{w}$ and $\ell(\underline{w}) = L(\underline{w})$.

To prove this claim observe that to define $\underline{w}$ as opposed to $\underline{w}$ we simply have to pretend that the production function $f(L)$ is instead $pf(L)$. Whatever we do with $f(L)$ to get to $\underline{w}$, we have to do with $pf(L)$ to get to $\underline{w}$. It is obvious from Figure 3 that

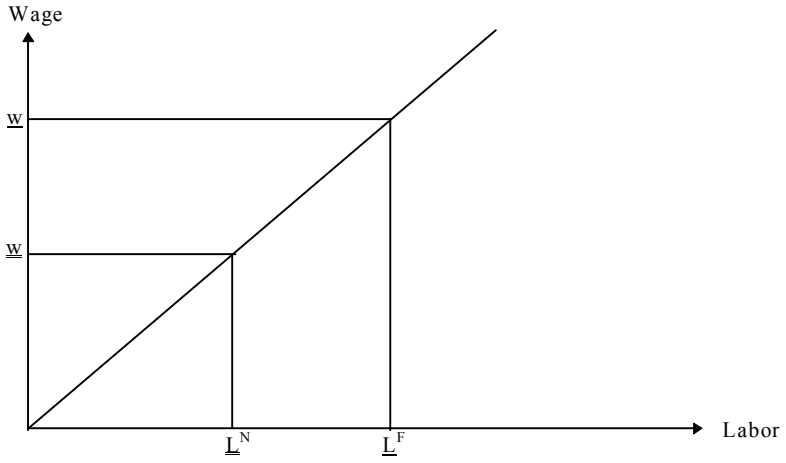
$$\underline{w} = \max [\, f(L)/L \,]$$

Hence, $$\underline{w} = \max [\, pf(L)/L \,]$$

Since $p < 1$, it follows that $\underline{w} < \underline{w}$. Clearly, the value of L that maximizes $f(L)/L$ also maximizes $pf(L)/L$. Hence, $\ell(\underline{w}) = L(\underline{w})$. This establishes the above claim.

Figure 4

s(w)



In Figure 4, let $\underline{w}$ and $\underline{\underline{w}}$ be as shown and let s(w) be the aggregate supply curve of labor. Hence aggregate employment in the F-regime will be $\underline{L}^F$ and in the N-regime $\underline{\underline{L}}^N$ as shown. Therefore, allowing retrenchment benefits workers (through a higher wage) and also the economy (through a larger production).

What happens to industry size as we switch regimes from N to F? The number of firms in the N and F regimes are given by, respectively, $\underline{\underline{L}}^N / \ell(\underline{\underline{w}})$ and $\underline{L}^F / L(\underline{w})$. Since by the above claim $\ell(\underline{\underline{w}}) = L(\underline{\underline{w}})$ and given $\underline{L}^F > \underline{\underline{L}}^N$, it follows that

$$\underline{L}^F / L(\underline{w}) > \underline{\underline{L}}^N / \ell(\underline{\underline{w}}).$$

Therefore, as expected, the industry is larger under the F-regime.

Section 4: Compensating Retrenched Workers: A General Model

4.1: The Case of No Frictional Unemployment

In this section we generalize the preceding model by assuming that, as in reality, the government does not ban retrenchments nor make them totally free, but instead insists that when a firm lays off a worker, it make a severance payment of 's'

to the worker. In this model we also make the inter-temporal decision of the firm explicit. Suppose a firm, after one or more good years, finds itself in a bad year. It can then retrench workers by paying them s or it can hold on to the workers in the hope that a good year will come up soon and thereby save the cost of the severance payment. This is the decision problem that the firm has to solve through dynamic optimization.

As before, we shall assume that there are n identical firms each facing a production function as in equation (1). As before, a 'good year' is one in which $\varphi = 1$ and a 'bad year' one in which $\varphi = 0$. Let us denote the representative firm's discount factor by $\delta = 1/(1 + r)$, where $0 < \delta < 1$.

Now, let L and M be the number of workers that a firm employs in a good year and in a bad year, respectively. Denoting the present value of a firm's profits starting from a good year by G and the present value of a firm's profits starting from a bad year by B, we get the following two equations

$$G = f(L) - wL + \delta [\, pG + (1-p)\{ -s(L - M) + B \} \,] \qquad ...(12)$$

$$B = -wM + \delta [\, pG + (1-p) B \,] \qquad ...(13)$$

To understand G, note that if we start with a good year, then the firm's profit in that year is $f(L) - wL$. In the following year, if the firm is lucky and has another good year (which occurs with probability p) then from that year on, the firm's expected present value is G. This explains the third term on the right-hand side of equation (12), δpG. Next note that if the next year is bad, then the firm spends $s(L-M)$ in

severance payments and thereafter expects the payoff of B. Hence the last term, $\delta(1-p)\{-s(L-M)+B\}$. Equation (13), is likewise easy to interpret, remembering that profit in a bad year is -wM, because the firm produces nothing, but must pay for the wages. Solving (13) for B we have,

$$B = [\ \delta pG - wM\ ] / [\ 1 - \delta(1-p)\ ].$$

Inserting this in equation (12) and rearranging terms, we get

$$G = f(L) - wL - \delta(1-p)sL + \delta(1-p)\ [\ s - w/\{1 - \delta(1-p)\ \}]\ M. \qquad ...(14)$$

Since a firm may come into existence in a good year, the firm's problem is to choose L and M to maximize G subject to $0 \leqq M \leqq L$. From equation (14), it is clear that the relation between G and M is affine. Hence,

$$M = 0 \text{ if } s < w/\{\ 1 - \delta(1-p)\ \} \qquad ...(15)$$

and

$$M = L \text{ if } s > w/\{\ 1 - \delta(1-p)\ \}. \qquad ...(16)$$

If $s < w/\{\ 1 - \delta(1-p)\ \}$, set M = 0 in equation (14). Then we have the following first-order condition:

$$\partial G/\partial L = f'(L) - w - \delta\ (1-p)\ s = 0,$$

$$\text{or } f'(L) = w + \delta\ (1-p)\ s.$$

If $s > w/\{\ 1 - \delta(1-p)\ \}$, set M = L in equation (14). Then we have

$$\partial G/\partial L = f'(L) - w - \delta\ (1-p)\ s + \delta(1-p)\ [\ s - w/\{\ 1 - \delta(1-p)\ \}\ ] = 0,$$

or, upon rearranging,

$$f'(L) = w/\{ 1 - \delta(1-p) \}.$$

If $s = w/\{ 1 - \delta(1-p) \}$, M takes any value between 0 and L.

To sum up, the firm's demand for labor in good and bad years (that is, respectively, L and M) are given as follows.

$s < w/\{1 - \delta(1-p)\} \Rightarrow [M = 0$ and L is chosen so that $f'(L) = w + \delta(1-p)s$

...(17)

$s > w/\{1 - \delta(1-p)\} \Rightarrow [M = L$ and L is chosen so that $f'(L) = w/\{ 1 - \delta(1-p)\}$

...(18)

$s = w/\{1 - \delta(1-p)\} \Rightarrow [M \in [0, L]$ and L is chosen so that $f'(L) = w/\{1-\delta(1-p)\}$.

...(19)

Equations (17), (18) and (19) tell us what each firm's demand in a good and bad year will be, given the wage, w, and severance payment, s. Our next task is to solve for w and check the effect of varying s on the equilibrium wage and employment.

Let us write the solution from equations (17) - (19) as L(w, s) and M(w, s). The aggregate demand for labor in any single period is

$$pnL(w, s) + (1-p)\, n\, M(w, s).$$

For simplicity, let us take labor supply to be perfectly inelastic at N. That is, no matter what the wage, the supply of labor equals N.

In equilibrium w must be such that aggregate labor demand equals aggregate labor supply:

$$pnL(w, s) + (1-p)\, n\, M(w, s) = N. \qquad ...(20)$$

We can now solve (20) to get the equilibrium wage as a function of the severance payment: $w = w(s)$,

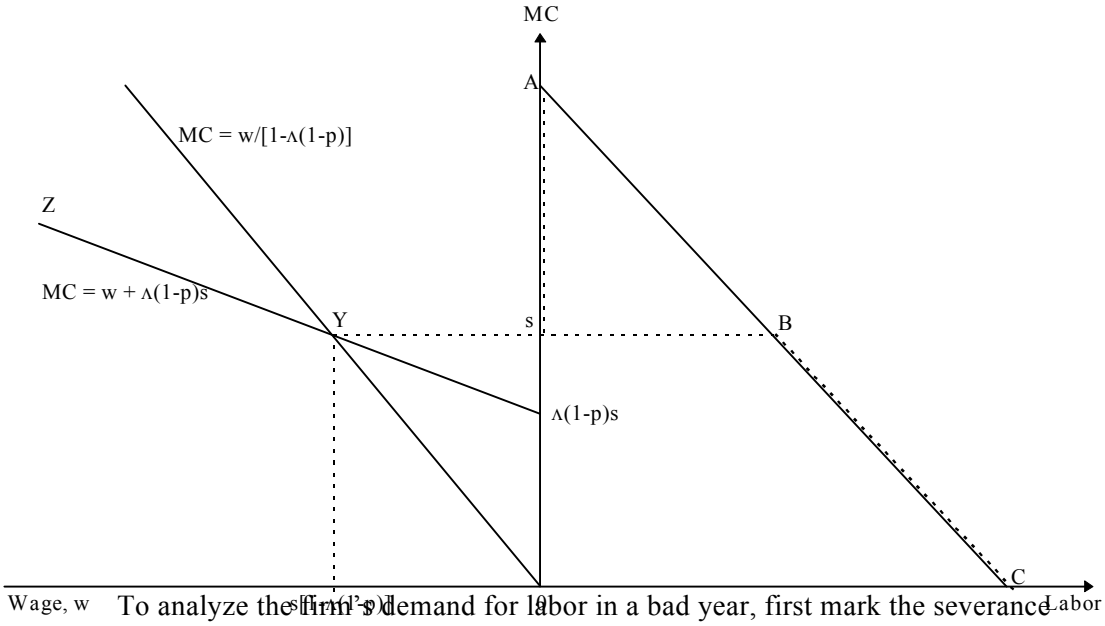
the properties of which are derived below.

In Figure 5, let ABC be the marginal product of labor curve, $f'(L)$. The marginal cost of labor, MC, is given by the last terms in (17) - (19):

$$MC = \begin{cases} w + \delta(1-p)\, s, & \text{if } [\,1-\delta(1-p)\,]s < w \\ w/\{\,1 - \delta(1-p)\,\} & \text{otherwise.} \end{cases}$$

Given the marginal product function ABC, in a good year, a representative firm demands labor up to the point where marginal product equals marginal cost. Hence, the good year demand for labor, L, by a representative firm as a function of MC is given by ABC.

Figure 5



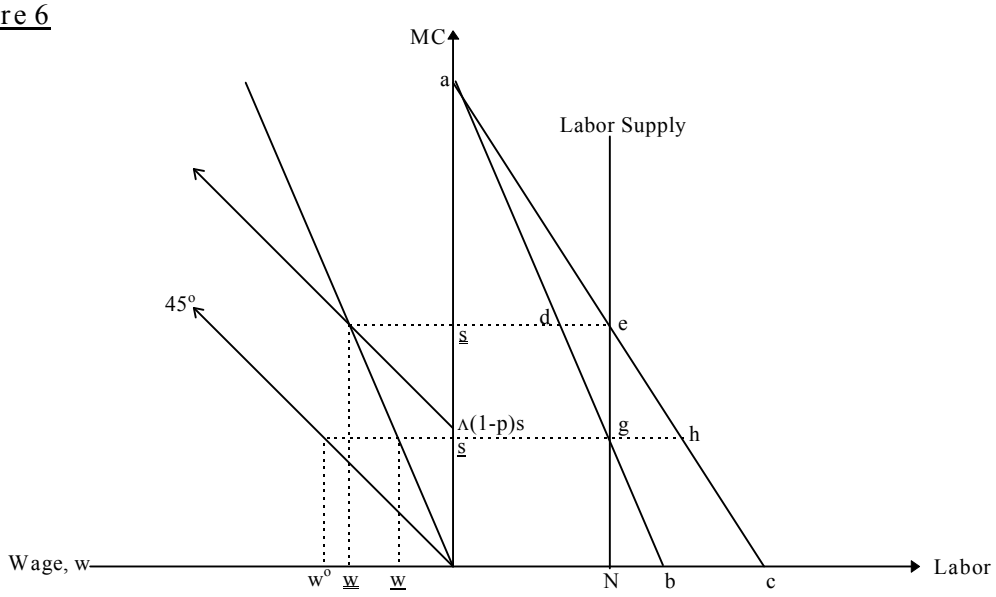
To analyze the firm's demand for labor in a bad year, first mark the severance payment, s, on the y-axis. Note that if $s <$ MC, it is cheaper to pay the severance

payment than employ existing workers, and therefore M = 0. However, if s > MC, the workers will be retained and therefore M = L. Hence the bad year demand for labor, M , as a function of MC is given by AsBC.

The left-hand panel in the same figure shows how w translates into MC. Given a wage, w, the MC may be read off by moving up from w to the line marked ZY0 and then going horizontally to the y-axis.

The aggregate demand curve for labor is easily constructed from the right-hand panel of Figure 5 and is shown in the right-hand panel of Figure 6. In Figure 6, ab is the pn times horizontal blow-up of the line ABC in Figure 5, and ac is the n times horizontal blow-up of ABC. The aggregate demand depends on the size of the severance payment. If it is $\underline{s}$, then the aggregate demand is adec. If it is $\underline{s}$, then it is aghc.

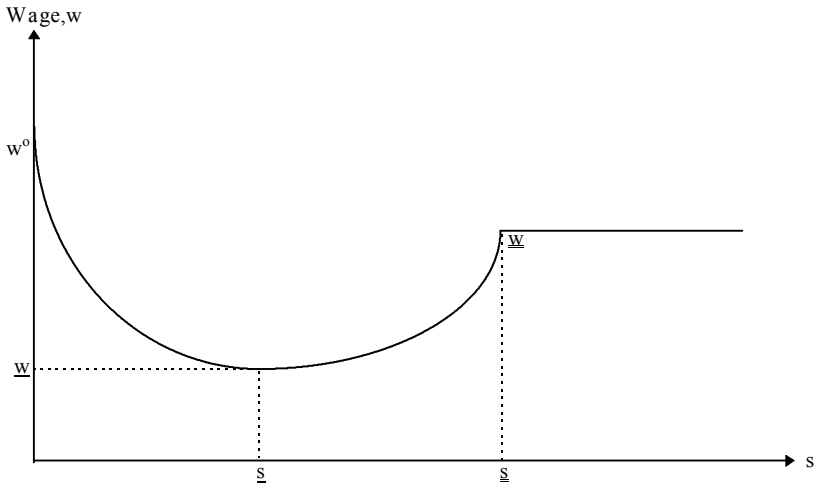
Figure 6



Superimpose the aggregate labor supply curve in this figure. The relation between s and w is now easily read off Figure 6. Clearly if s = $\underline{s}$, the equilibrium wage is $\underline{w}$. If s = $\underline{s}$, the equilibrium wage is $\underline{w}$. As s rises from $\underline{s}$ to $\underline{s}$, the wage rises from $\underline{w}$ to $\underline{w}$. If s rises above $\underline{s}$, the wage remains fixed at $\underline{w}$. If s falls below $\underline{s}$, the equilibrium MC clearly remains at $\underline{s}$, but the equilibrium wage rises. Thus if s=0, equilibrium occurs at g, MC = $\underline{s}$ and the wage = w^o. It follows that the w(s) curve looks as in Figure 7.

Whether w^o exceeds $\underline{w}$ or not depends on the parameters of the model. But as Figure 7 shows, if the severance payment is zero the wage is quite high. As s rises, w falls. But after a certain point as s rises, w rises.

Figure 7



4.2: The case of frictional unemployment

Up to now we did not discuss who gets the severance payment. We could either assume that government collects it as a kind of tax or the worker gets it as

compensation. If it is the latter, then being dismissed is always desirable from a worker's point of view, since equilibrium always being at full employment, the worker gets immediately absorbed by the labor market and, in addition, he gets the severance payment.

To avoid such a phenomenon, let us introduce some frictional unemployment in the model. Assume that once a worker is laid-off, he needs to spend one period searching before he finds a new job.

Let E be the number of people employed in each period. Given the assumption that frictional unemployment lasts one period, it follows that (1-p)E people are unemployed (and searching for new jobs) in each period. Since N is the total labor force, it must be that

$$N = E + (1-p)\,E,$$

from which we have

$$E = N / (2 - p). \qquad \ldots(21)$$

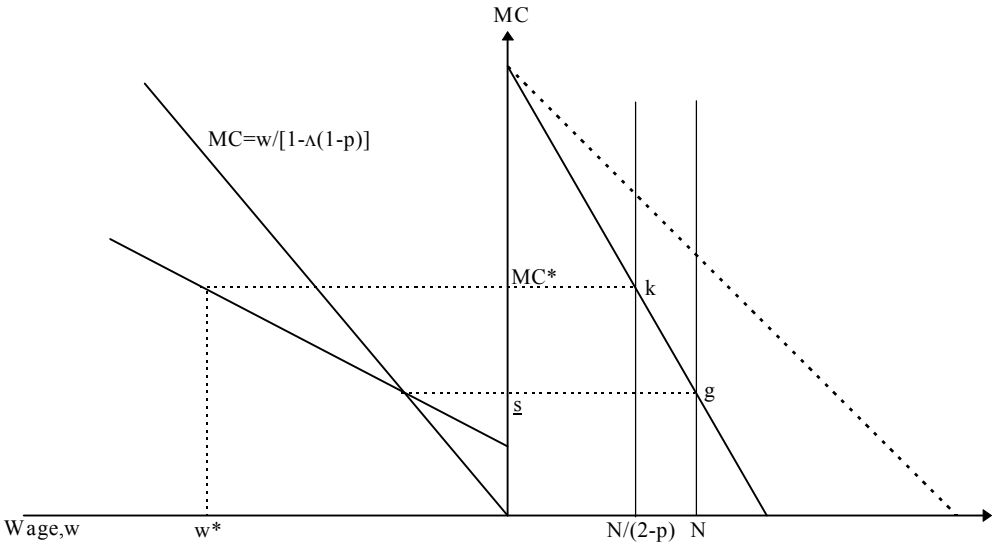
Therefore, if $s < w/\{ 1 - \delta(1-p) \}$, from (17), we know that the fraction (1-p) of the labor force gets retrenched in each period. Hence, (21) holds in that case.

To see what the equilibrium looks like in that case, suppose $s = \underline{s}$ (in Fig. 6 and 8). By (21), $E = N/(2-p)$. Draw a vertical line at $N/(2-p)$ as shown in Figure 8.

Equilibrium occurs at k. Hence the equilibrium wage is w* and the total unemployment in the economy is $N - N / (2 - p) = N (1-p) / (2 - p)$. If s is lowered below $\underline{s}$, unemployment will remain unchanged, but the equilibrium wage will rise.

The reader may also note that once we allow for frictional unemployment of the kind just described we may have a model with multiple equilibria: one with low wage, full employment, and another with high wage, frictional unemployment and retrenchment.

Figure 8



4.3: Welfare Analysis

The welfare analysis of this model is quite simple. Our assumption of a vertical supply curve of labor contributes to the ease of analysis. In the case with no frictional unemployment, the labor market is efficient. The total output is pn f(N/pn). The only relevant question is that of distribution between the entrepreneurs' income and the workers' income.

In the case with possible frictional unemployment, we find that a high severance cost can contribute to efficiency by cutting down retrenchment and, via

that, cutting down frictional unemployment. This happens because of externalities - a firm retrenching labor does not take into account the economy-wide cost of greater frictional unemployment.

Section 5: Conclusions and Implications for Future Work

In India the labor market has been characterized by disputes, recurrent strikes and work stoppages. The working days lost in India per thousand workers due to industrial disputes in 1979 was 1280 as against 10 in Sweden, 60 in Japan, 200 in France, 370 in West Germany, 840 in U.K. and 1080 in USA (ILO, 1979). It is argued in this paper that, by severely limiting the scope of voluntary contracting between workers and employers, India's labor laws may have, far from mitigating strife, contributed to it. In particular, the incidence of lockouts in the private sector has risen sharply. In 1973, there were 6,764 work days lost to lockouts. In 1988, the figure was 21,417 (Ministry of Labor, 1989). In part this may be a response to the amendments to the Industrial Disputes Act, 1947, in the 1970s and 80s, as discussed above (Section 2). Even if we ignore the effects of such laws on the economy as a whole and focus instead on labor welfare, it is difficult to come out with unequivocal results.

The models presented in this paper have shown that anti-retrenchment and anti-closure laws do not always help workers nor do they always hurt workers. This theoretical ambiguity means that we do not need to look further to find that labor can

be helped or hurt by legislation against retrenchments and plant closures. Rather, the task changes to that of determining under what conditions each result obtains.

In a project of this scope, it is impossible to perform an exhaustive taxonomy of all of the special cases of a model which is known in advance to be theoretically ambiguous. What we have done in this paper is to look at some of the most interesting special cases. Among the extensions that would be worth pursuing in the future would be to allow for the following: a dual labor market consisting of a covered (large firm) sector and an uncovered (small firm) sector; stochastic shocks which are correlated across firms; and strategic 'interactions' between private firms and the government.

To elaborate briefly on the last observation, it is worth noting that one important factor that has influenced the behavior of managers in India has to do with strategic play between firms and governments. The literature on firm-government games is still in its nascency (see Anant, Basu and Mukherji, 1995). Yet it plays a major role in shaping market outcomes in all economies and especially in less-developed mixed economies such as India's. In India, managers know that if profit becomes negative they can count on government subsidies. This is equivalent to government underwriting all ventures with a limited liability clause. This may not only artificially prop up labor demand, but may encourage firms to take excessive risks since they do not pay the full price of bankruptcy, but with workers (and managers) being sheltered via subsidization. This points to an interesting link between our microeconomic model and macroeconomic policy, especially fiscal

policy, but its detailed analysis will be complicated and remains at this stage as an open research topic.

Appendix

This appendix demonstrates the claim made at the end of Section 3.1 concerning aggregate labor demand in an N-regime with an infinite horizon.

Suppose a firm takes the decision concerning how much labor to employ only after the value of φ has been revealed. Hence, there are two alternative scenarios for which we have to solve the firm's problem: $\varphi = 1$ or $\varphi = 0$. Let the firm's discount factor be a constant δ. If the firm employs L units of labor in each period, the present value of its profits will be

$$[\varphi f(L) + \delta p f(L) + \delta^2 p f(L) + \ldots] - [wL + \delta wL + \delta^2 wL + \ldots] =$$

$$\varphi f(L) - p f(L) + p f(L)/(1-\delta) - wL/(1-\delta).$$

Maximizing this with respect to the choice of L, we get the following first order condition

$$[\varphi - p + p/(1-\delta)]\, f'(L) = w/(1-\delta)$$

or

$$f'(L) = w/[(\varphi - p)(1-\delta) + p].$$

...(A1)

If we wanted to work out the N-regime case in this manner we would have to replace (5) with (A1) and proceed with the exercise in section 3 with this replacement.

Note however that a law which prevents retrenchment makes significant difference only if the firms' discount factor, δ, is large. If the next period is unimportant to the firm (i.e. $\delta = 0$) then clearly the firm's demand for labor is

unaffected by whether regime F or N is in place. To study the effect of a regime switch in its extremity we therefore need to consider large δ. Let us therefore consider the case where $\delta \to 1$. In that case the denominator in (A1) goes to p:

$$(\varphi - p)(1-\delta) + p \to p, \text{ as } \delta \to 1.$$

Therefore in the limit (as $\delta \to 1$), (A1) becomes

$$f'(L) = w/p. \qquad \text{...(A2)}$$

But this is exactly equation (5). Hence (5) and (6) can be thought of as an expression for labor demand in the N-regime, if there were virtually no discounting of the future.

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