

For a given level of turnover cost (as T_0 in fig. 6) we assume a diminishing marginal rate of substitution of P for W . Similarly, for a given level of wage cost (say W_0 in fig. 7) we assume a diminishing marginal rate of substitution of P for T . The employer minimizes C subject to the worker's opportunity utility by choosing the lowest (or outermost) isoturnover cost curve (T_e in fig. 8). The assumed curvatures permit a stable, but not necessarily unique, equilibrium if curvature of the cost function is greater than the curvature of the utility function at the equilibrium point.²⁴

This equilibrium is reached paying the worker a stream of wages W_e and pension costs P_e with total cost $G+T_e$ to the firm. The worker would accept a wage W_0 with no pension giving a total cost W_0+T_0 to the firm. This implies that T_0-T_e (turnover savings) is greater than $P_e-W_0+W_e$ (net pension cost).

As a result of this cost minimization the employer now has an optimal compensation package for each employee and pension contributions accumulate for each worker but belong to the worker only when he gains a vested right.²⁵ This is true even though the worker may have given up some of his current wages (as he will have if $\partial U/\partial P > 0$) in exchange for pension rights. Only if the worker attaches no value whatever to pensions does the employer pay the entire costs.

We can now consider the question, Why should one employer value the worker at more than another employer? When firms and the labor market are in equilibrium, resources should be employed in the firms so that the marginal revenue productivities are equal to prices. A particular worker should be worth the same to two firms with identical technologies unless the worker has firm-specific training. Hence, in equilibrium, the worker's capital value to the firm is the present value of his specific training. If the accumulated unvested pension rights exceed the value of specific training, the employer is exploiting the worker, having established larger pension rights than necessary to compensate the firm for losses in company-financed specific training.²⁶ If the accumulated pension rights are less than the capital value of the worker, the firm is out of equilibrium and it should hire more workers of the same sort as the given worker.

These conclusions follow because, in a firm with unvested pensions, the worker continues to accumulate pension rights (D) as he ages. In contrast, his capital value to the firm (K), or the value of his firm specific training (Z , which in equilibrium is equal to K), peaks well before retirement age and then declines. There is, therefore, a tendency for value of accumulated pensions to the firm to exceed the value of unamortized specific training. Whenever pension rights exceed value

²⁴ The mathematical solution of a problem of minimizing a nonlinear function subject to a nonlinear constraint is slightly more complex than the familiar linear-nonlinear problem treated in microeconomic theory. In particular, the stability (or second order) properties become more complicated. This problem is treated (in its maximizing guise) in H. Folk and J. N. Wolfe, "The Ambiguity of the Substitution Term," *Economica*, August 1964. The first-order conditions in the present problem imply that in equilibrium the last dollar in wages provides the same utility to worker as the last dollar in pensions or in turnover costs. As a result the marginal rate of substitution of wages for pensions for the firm may differ from the marginal rate of substitution of wages for pensions for the worker.

²⁵ There need not be any funds placed in a pension fund, the employer only need recognize the liability.

²⁶ If the worker values pension rights then part of the pension rights represent a reduction in wages.