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FIRM - SPECIFIC HUMAN CAPITAL, EXPERIENCE
AND THE DIFFERENTIAL INCIDENCE OF
UNEMPLOYMENT

by

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ABSTRACT

This paper examines the hypothesis that the structure of unemployment is inversely related to the structure of human capital stock and hence, by implication, is correlated with the structure of earnings.

An empirical analysis involving census data strongly supports the existence of a causal relationship between the differential incidence of unemployment, formal education and general workforce experience. Comparison of the resulting parameter estimates with those reported in studies of the personal distribution of income also strongly endorse the hypothesis of correlation between the wage structure and the structure of unemployment.

These results represent a contradiction of the specific-human capital hypothesis.

FIRM-SPECIFIC HUMAN CAPITAL, EXPERIENCE AND
THE DIFFERENTIAL INCIDENCE OF UNEMPLOYMENT

'Perseus wore a magic cap that the monsters
hunted down might not see him. We draw
the magic cap down over eyes and ears, as
a make-believe that there are no monsters'

Karl Marx (Preface to the
First German Edition of Capital)

1 Introduction

It would appear that the correlation between average earnings and the differential incidence of unemployment and labour-turnover is almost regarded as an established fact.¹ Reder (1964, p.309), for instance, points out that "the unemployment structure is conceptually, correlative with the wage structure", and argues that the inter-relationship between the two structures should form an integral part of any analytical treatment of these phenomena.

One result, however, of Becker's (1964) dicotyledonous distinction between general and firm-specific on-the-job training, has been the emergence of separate theories of income distribution and labour turnover.² Thus Mincer (1974) explains earnings differentials as a function of employee investments in general on-the-job training while Oi (1962) explains the differential incidence of unemployment and labour-turnover as a function of employer investments in firm-specific on-the-job training.³

It is a basic premise of Becker's human capital model that both employers and employees, individually, exercise rational choice in respect of their investments in on-the-job training. There is, thus,

no reason, within this framework, why the distribution of earnings and the incidence of turnover and unemployment should be correlated. The existence of such correlation is, however, typically interpreted as evidence of an underlying correlation between the on-going investments by the firm and 'self-investments' by the employee.⁴ The implicit coincidence of the investment profiles of utility maximising employees and profit maximising firms is surprising to say the least. Nevertheless, Oi (1962, p.547) explicitly assumes correlation between the wage structure and the 'quasi-fixity' of labour. Mincer (1962, p.70) likewise assumes correlation between firm-specific investments and total investments in on-the job training. Rosen (1968, p.514) suggests that earnings, age, experience and firm-specific investments all 'rank in the same way' while Telser (1971, p.336) observes that, "the evidence continues to support the contention that specific human capital per employee rises with the workers annual earnings".

The notion of firm-specific human capital is essentially a hypothetical construct, inferred from the observation of the differential incidence of labour turnover. At this stage, firm-specific human capital has never been measured directly. The assumption of correlation between investment in firm-specific and general training, therefore, has no real empirical basis nor is it an essential precondition of Becker's human capital theory. In other words, the assumption of correlation between firm-specific and general training represents an inference given the observed correlation between the wage and unemployment structures.

Secondly, this assumption provides a convenient method of measuring firm-specific human capital inputs. Clearly, a much stronger endorsement of Becker's distinction between general and firm-specific human capital would have emerged if, in fact, the wage structure and the structure of unemployment and labour turnover were uncorrelated. This would, indeed, suggest that the structures do have different underlying determinants.

At first sight, correlation of the wage, unemployment and turnover structures would appear to constitute a contradiction of the specific human capital model, suggesting that both wages and turnover might be explained by the same variables. Mincer (1962, p.71), as a result of a rather unsuccessful empirical application of the specific-human capital hypothesis, in fact, asks, "Is stability of employment affected by training regardless of whether it is general or specific, acquired at school or on the job?" On the basis of the same rather tenuous empirical results, Burton and Parker (1969, p.208) suggest that, "Because of the ambiguous results which have been obtained to date in attempts to apply Becker's theory to the relationship between specific training and mobility, it is doubtful that the theory can be used as an important concept to explain patterns of labour mobility".

It is the objective of this paper to demonstrate that the structure of unemployment is determined by the same variables as the structure of income. Accordingly, it is hypothesised that the differential incidence of unemployment can be explained largely in terms of the level of formal education and general workforce experience.⁵ Furthermore, it is an explicit assumption of our

analysis that post-school productivity argumentation is largely the product of 'learning-by-doing', that is general workforce experience, rather than specific experience within a particular firm. It should be emphasised that we do not dispute the existence of firm-specific human capital, but merely the exclusive role assigned to it by Becker in respect of the theory of labour turnover.

The following section outlines the labour turnover implications of a labour market in which labour is differentiated solely in terms of general workforce experience. In section III a model of the differential incidence of unemployment is derived. This model is subsequently applied in Section IV to explain the structure of unemployment in Australia as obtained from the 1976 census of population and housing. Section V discusses the implications of the empirical results while Section VI provides a summary and some conclusions.

II Layoffs in the Labour Market

In this section, we focus on the emergence of unemployment at the micro-economic level. Following Mattila (1974), it is assumed that measured unemployment largely comprises employer initiated layoffs and first-job seekers. In other words, it is explicitly assumed that individuals do not voluntarily quit into unemployment.⁶ Accordingly, this section is devoted to explaining the mechanics of the layoff decision.

In the present context, learning on-the-job is considered an unavoidable by-product of the production process. Thus, employees automatically accumulate productivity augmenting experience during

their period in the workforce. To the extent that the productivity of experienced employees exceeds that of inexperienced accessions, the product of experience (on-the-job learning) can be expressed in terms of raw inexperienced labour equivalents.

Let $s(t)$ represent the productive efficiency of an employee with t years of general workforce experience relative to that of an employee with no workforce experience. In other words, $s(t)$ is simply the ratio of the product of the experienced employee to that of an inexperienced accession, all else being equal. Following Becker (1964) and Mincer (1970), productive efficiency can be regarded as an index of the sum of the initial stock of human capital (raw labour) embodied by the individual and the annual depreciated increments to this stock accruing as a result of on-the-job learning; i.e.

$$s(t) = 1 + \int_0^t k(y) e^{-r(y-t)} dy \quad (1)$$

where $k(y)$ represents an index of the gross additions to productive efficiency as a result of learning on-the-job in the y th year of the individual's experience,

and r is the rate of depreciation (cohort effect) of the benefits of post-school learning.⁷

It is assumed that the productive efficiency of experienced labour is at least equal to that of inexperienced labour, so that there is no depreciation of the initial or 'pre-work' stock of human capital,⁸ i.e.

$$s(0) = 1 \text{ and } s(t) \geq 1$$

Assuming that gross annual increments to productive efficiency

decline exponentially with experience then,

$$k(t) = k_0 e^{-\beta t}, \quad k(0) = k_0 \quad (2)$$

where β is the annual rate of decline.⁹

Substituting (2) into (1) and evaluating the integral yields:

$$s(t) = 1 + k_0 (r - \beta)^{-1} (e^{-\beta t} - e^{-rt}) \quad (3)$$

Utilising a quadratic approximation for the exponential terms

(3) becomes:

$$s(t) = 1 + k_0 t - \{[k_0(r+\beta)]/2\}t^2 \quad (4)$$

Differentiating (4) with respect to t , setting the resulting expression to zero and solving for t yields the following expression for T , that is the specific value of t coincident with peak productive efficiency, i. e.

$$T = (r + \beta)^{-1} \quad (5)$$

Substituting (5) into (4) suggests that productive efficiency rises with experience for a period of T years and then declines as experience increases, i. e.

$$s(t) = 1 + k_0 t - (k_0 / 2T) t^2 \quad (6)$$

Assuming that the supply of inexperienced labour is infinitely elastic at an exogenously determined (entry) wage of W , then the ratio of the wage $w(t)$ received by an individual with t years of general workforce experience to that of an inexperienced accession W can also be expressed as a function of general on-the-job learning, i. e.

$$[w(t)/W] = 1 + \phi [s(t) - 1] \quad (7)$$

where ϕ is a parameter which can be intuitively interpreted as the employee's share in the benefits of on-the-job learning.

Conceptually, therefore, labour can be conceived as comprising two quantities, firstly, a unit of raw (inexperienced) labour, and secondly, a quantity of experience (post-school human capital). Expressed in terms of raw labour, the wage-cost to the firm of the former is W per unit, while that of the latter is ϕW per unit. Since no rational employer would offer more than W per unit for experience (in raw labour equivalents) and since any offer below W is infeasible, then it follows that,

$$0 \leq \phi \leq 1.$$

In a perfectly competitive labour market, where all participants possessed complete knowledge concerning the characteristics of all other participants, the wage offers of all firms in the labour market and where there is no unemployment, then competition between firms would inevitably drive ϕ to unity. In such a context, firms would show no particular preference between experienced and inexperienced labour.

In an imperfectly competitive labour market, however, firms can exercise some degree of monopsony power and maintain ϕ below unity. In the first place, individuals do not possess knowledge concerning the nature of their learning curve or the characteristics of other participants. In other words, in a labour market characterised by incomplete information and workforce heterogeneity, the individual may simply be unaware of wage differentials. For instance, an individual may be uncertain as to whether an observed difference in wages reflects a difference in the firm's wage offer or simply reflects differential productive efficiency.

Secondly, at a given point in time individuals do not normally possess complete knowledge concerning available job and wage offers. Moreover, in a labour market characterised by heterogeneous labour, even if the individual is aware of an attractive alternative offer, he may still be uncertain as to his prospects of obtaining the job. In other words, we assume that individuals are averse to uncertainty and risk, and thus only apply for jobs for which they have some chance of success. This tends to limit the scope of employed job search. Furthermore, an employee will, all else being equal, always tend to prefer the certainty of his current employment to the uncertainty of alternative employment.

Finally, it is an explicit presumption of our analysis that individuals do not voluntarily quit into unemployment. It is a logical consequence of this assumption that the unemployed cannot reject a job offer. Accordingly, the existence of unemployment within the labour market must inevitably exert a depressing influence on the value of wage offers.

In the context of an imperfectly competitive labour market, therefore, a value of ϕ less than unity is feasible and reflects the existence of monopsony power on the part of firms.

Let ω represent the firm's unit labour costs, defined as the average cost of labour per unit, expressed in terms of raw (inexperienced) labour, i.e. assuming $\phi < 1$ then:

$$\omega = \{ \phi + [(1-\phi)/S] \} W \quad (8)$$

where S represents average productive efficiency.

and $\omega_S < 0$, $\omega_\phi \begin{cases} > 0: S > 1 \\ = 0: S = 1 \end{cases}$, $\omega_{SS} > 0$, $\omega_{\phi\phi} = 0$,

and $\omega_{\phi S} > 0$

In words, the firm can minimise unit labour costs by lowering the employee's share of on-the-job learning (ϕ) and by increasing the average productive efficiency (S) of its workforce.

It is assumed that individuals wish to maximise the present value of their lifetime earnings (θ), where from (7) it follows:

$$\theta = W \int_t^\tau \{ 1 + \phi [s(y) - 1] \} e^{-\rho y} dy \quad (9)$$

with τ representing expected years in the workforce, and ρ , the market discount rate.

Differentiating θ with respect to ϕ yields:

$$\theta_\phi = W \int_t^\tau [s(y) - 1] e^{-\rho y} dy \quad (10)$$

with $\theta_\phi > 0 \forall t < 2T$.

Since $t > 2T$ implies $s(t) > 1$, the necessary condition for $\theta_\phi > 0$ is simply $s(\tau) > 1$ or $t < 2T$

(10) suggests that individuals will tend to view any variation in the employees' share (ϕ) of the benefits of on-the-job learning as a corresponding variation in the discounted present value of their lifetime earnings stream.

Differentiating (10) with respect to experience (t) yields the result that a variation in ϕ , all else being equal, has less impact on θ , that is the discounted present value of lifetime earnings, the more experienced is the individual, i.e.

$$\theta_{\phi,t} = [1 - s(t)] W e^{-\rho t} \quad (11)$$

with $\theta_{\phi,t} < 0$ for $0 < t < 2T$ and $\theta_{\phi,t} = 0$ for $t = 0$ or $2T$.

It is assumed that all participants in the labour force, at a given point in time, can be allocated to one of the three following states; unemployment, active job search and passive job search.

It is an assumption of the present model that individuals do not voluntarily quit into unemployment. It thus follows that the unemployed are not engaged in job search in the conventional sense, i.e. of evaluating alternative offers. Rather, it is an implication of this assumption that the unemployed must accept any offer of which they become aware. However, it is presumed that no rational employer would knowingly make an infeasible wage offer, that is, an offer which would induce the individual to accept an alternative offer immediately upon leaving the unemployment pool. Secondly, it is an implication of (7) that all employees within the firm receive the same proportionate share (ϕ) of the benefits of general workforce experience. Thus, it also follows that employers cannot discriminate against the unemployed by offering them a lower wage than their employed counterparts. The existence of such wage discrimination would imply corner solutions which are not apparent in the labour market, i.e. a marked preference for accessions with some history of unemployment.

Individuals engaged in passive job search constitute the largest proportion of the workforce. These are employees who, though generally content in their present employment, may still become aware of alternative offers without actively seeking them out. As a general rule, it is assumed that individuals are averse to risk and uncertainty. Since any alternative offer necessarily involves some uncertainty; for instance, regarding the prospects of the offering firm, as well as other non-pecuniary, social and psychological

considerations; then it follows that many offers may still be rejected even though they exceed the current wage of the employee. Secondly, it is an implication of (11) above that higher offers would be required to attract the more experienced than the less experienced passive searchers. In a buoyant labour market, therefore, young, less-experienced, passive job-searchers are likely to be considerably more mobile than their older, more experienced counterparts. A relatively slack labour market, on the other hand, would suggest very little mobility on the part of passive job seekers, that is, awareness of available alternative offers tends to decline.

Individuals engaged in active on-the-job search, represent those employees who have received some form of disincentive in their present employment. Such disincentive might include the lowering of the wage differential (ϕ) between experienced and inexperienced employees or the adoption by the firm of a layoff policy. The latter would tend to reduce the certainty of current employment vis-a-vis alternative offers. It follows from (11) that progressively higher wage disincentives would be required to transform more experienced passive job searchers into active job searchers. Similarly, it is an implication of (8) that the probability of layoff for any individual in a given firm is inversely related to his/her productive efficiency. Accordingly, progressively higher layoff rates would also be required in order to transform the more (productive) efficient passive job searchers into active job searchers. Finally, it is an implication of (11) that 'post-prime age' workers are the least likely

to become active job-seekers while young inexperienced workers are the most likely to become active job-seekers.

Since it is an implicit assumption of this model that the unemployed will accept any (feasible) wage offer, then it follows that competition between new entrants and a vast pool of unemployed for available jobs may, in a relatively slack labour market, drive the entry wage downwards, i.e.

$$W = W(\mu), \quad W_{\mu} < 0 \quad (12)$$

where μ represents the national unemployment rate.

Assuming that the workforce of a firm cannot consist entirely of new accessions (i.e. $S > 1$), then it follows from (8) that unit labour costs, at a particular point in time, are a function of the employees share (ϕ), average productive efficiency (S) and the unemployment rate (μ), i.e.

$$\omega = \omega(\phi, S, \mu), \quad \omega_{\phi} > 0, \quad \omega_S < 0, \quad \omega_{\mu} < 0 \quad (13)$$

For the purposes of the present analysis, it is assumed that the firm's objective is simply to minimise unit labour costs. The role of physical capital and the dynamic aspects of the firm's optimisation are ignored, mainly for reasons of analytical convenience. The latter considerations are treated in Whiteman (1980).

Since the productive efficiency of employees with less than T years of work experience is increasing, then the firm could, all else being equal, reduce unit labour costs by simply retaining these employees. However, the productive efficiency of employees with T or more years of general workforce experience tends to decline

over time. All in all, the firm cannot depend on parametric increases in productive efficiency to reduce unit labour costs or even to maintain constant unit labour costs.

The obvious course of action for the firm is to use its wage policy (ϕ) to adjust the average productive efficiency of its workforce.¹⁰ By raising ϕ the firm can both increase its retention rate of existing employees as well as increase the quality of its queue of willing applicants. The latter represents the queue of unemployed, active and passive job-seekers who would become available to the firm in the event of vacancies arising from retirements, disciplinary discharges or expansion. A high- ϕ wage policy implies that the quality of voluntary separations will be exceeded by that of accessions whereas a low- ϕ wage policy implies that the efficiency of separations will tend to exceed that of accessions.

It is, of course, an implication of our initial assumption that the efficiency of unemployed applicants will be unaffected by the scale of the wage offer. However, it follows from (13) that firms lay off 'bottom-up', that is, lay off the young, inexperienced or the aged, least efficient employees first. Such a strategy minimises any loss in productive efficiency (S) and hence is consistent with the objective of minimising unit labour costs. It follows, therefore, that the quality (productive efficiency) of employed applicants will exceed that of unemployed applicants except where the firm pursues a particularly low- ϕ wage policy in which case there is unlikely to be any employed applicants.

In a recession, where layoffs are widespread, the quality of the

unemployment pool may improve, thereby allowing firms to adopt lower- ϕ wage policies and hence compressing relativities between experienced and less experienced employees generally. In tight labour markets, both the availability and probability of attracting more efficient unemployed applicants declines and firms must compete with other firms both for their own workforce as well as for employed accessions, if they wish to increase their average productive efficiency. In such an environment wage relativities between the efficient and less efficient may tend to widen.¹¹

Although the indirect effect of a rise in ϕ is an increase in average productive efficiency and, hence, a lowering of unit labour costs, the direct effect in terms of the wage-bill is a raising of unit labour costs. The firm is thus confronted with a typical neo-classical trade-off problem. The optimally behaving firm will, therefore, tend to balance the efficiency effects of a variation in the employees relative share (ϕ) of on the job learning against the direct effects of such a variation on the total wage bill. Thus, in an extremely tight labour market, an optimally behaving firm may simply take on inexperienced labour in lieu of competing for more efficient labour. The response of the firm will largely depend upon its current state as well as its expectations regarding the future. As noted earlier, such considerations lie outside the scope of the present analysis.

The major objective of this section is to explain the mechanics of the lay-off decision. At this stage, while the existence of layoffs (unemployment) in the labour market is acknowledged, their origin has

yet to be explained. As a first step, consider a firm which suffers a decline in product demand while the labour market is relatively tight. The immediate reaction of the firm is to reduce the employees share (ϕ). From (11) it follows that a small reduction in ϕ transforms the less experienced of the firm's workforce from passive job seekers into active job seekers without affecting the more experienced (efficient) employees. In a tight labour market, the former will tend to find alternative employment quickly. Thus, such a strategy enables the firm to adjust the size of its workforce as well as reduce unit labour costs in response to a decline in demand, without necessarily resorting to a layoff strategy.

Now, consider a firm faced with a decline in product demand in a relatively slack labour market. A reduction in ϕ , as above, transforms the less experienced employees into active job seekers. However, in a general recession, alternative opportunities for the less (productive) efficient are scarce. Thus, these will remain engaged in on-the-job search. Further reductions in ϕ have the same effect until virtually all of the firm's workforce are actively engaged in on-the-job search. General reductions, however, in the wage relativity between experienced and less experienced labour tend to increase the value of the former both in their existing employment as well as alternative employment. In other words, it is an implication of (8) that a given reduction in ϕ has a greater effect on unit labour costs, the more (productive) efficient the workforce. This provides an incentive for the firm to retain its more efficient employees and also an incentive for firms to take on more efficient employees even while laying off other less efficient workers. It is thus an implication of our analysis that the more efficient (prime-

aged)worker, should he become an active job-seeker, will tend to jump the labour queues which may exist in the external labour market.¹² Moreover, the separation of such employees would tend to raise unit labour costs for the firm.

In such a context, the role of layoffs in the labour market becomes apparent. In a relatively slack labour market, the firm can only reduce wage relativities (ϕ) so long as such reductions do not transform the more productively efficient sections of its workforce into active job seekers. In the event of a decline in product demand, where such wage reductions simply transform the less experienced into unsuccessful, active on-the-job searchers, the firm will adopt a layoff strategy in order to attain the required reduction in the size of its workforce without adversely affecting its more efficient employees.¹³ The role of layoffs is to achieve a quantity adjustment without adversely affecting the quality of the firm's workforce. (13) implies that the optimally behaving firm will lay off inversely in order of level of productive efficiency. From (4) this implies that the young, relatively inexperienced, and the aged, relatively less efficient employees will tend to be most vulnerable to being laid off (unemployment) while prime aged workers at the peak of their productive efficiency (i.e. T years of experience) will tend to be least vulnerable to being laid off (i.e. unemployment).

If firms are uncertain regarding the reaction of their more efficient employees to variations in the share of (ϕ) of on-the-job learning then layoffs could also be interpreted as the

response of risk averse firms to uncertainty concerning the turnover behaviour of employees. In other words, a lack of full knowledge concerning the turnover behaviour of employees, as well as the reactions of other firms in the labour market, may cause a risk averse firm to adopt a layoff policy in preference to wage reductions even in relatively tight labour markets.¹⁴

In summary, the major implication of the model outlined above, insofar as the nature of unemployment is concerned, is that the incidence of unemployment will tend to decline with experience, reaching a minimum at about the same time earnings reach their peak, following which the incidence of unemployment will tend to rise until retirement. In other words, it is the young inexperienced and the aged, or those approaching retirement who experience the greatest risk of being laid off in the event of a general decline in demand. Similarly, it is an implication of our foregoing analysis that prime age workers have the least likelihood of being laid off.

In the following sections, this hypothesis is tested against observations from the 1976 Australian Population census.

III The Empirical Model

The primary objective of this paper is to explore the implications of on-the-job learning for the differential incidence of unemployment. At the empirical level, the first step is to disentangle the separate effects of schooling and general on-the-job learning. Accordingly, we now relax our implicit assumption that the labour force is educationally homogeneous.

Let $h(N, t)$ represent an index of the productive efficiency of an employee with N years of formal education and t years of workforce experience relative to that of an individual with no formal education

and no general workforce experience. Adopting the schooling model of Becker and Mincer it follows:

$$h(N,t) = e^{\alpha N} \cdot s(t) , h_N > 0, h_{NN} > 0 \quad (14)$$

and $h_{N,t} > 0$ for $t < T$, $h_{N,t} = 0$ for $t=T$, $h_{N,t} < 0$ for $t > T$.

where α is interpreted as a rate of return to a year of formal schooling. ¹⁵

Let W_0 represent the hypothetical wage rate of an individual with no formal education or work experience.

From (12) it follows:

$$W_0 = W_0(\mu) , W_{0\mu} < 0 \quad (15)$$

The ratio of the wage rate of an individual with N years of formal education and t years of work experience to that of an individual with no formal education or experience is defined:

$$[\omega(N,t)/W_0(\mu)] = \{1 + \phi [s(t)-1]\} e^{\alpha^* N} \quad (16)$$

where α^* represents the rate of return to an individual for a year of formal education.

Let $\omega(N,t)$ represent average unit labour costs in respect of an individual with N years of formal education and t years of workforce experience then

$$\omega(N,t,\phi,\mu) = \{\phi + [(1-\phi)/s(t)]\} W_0(\mu) e^{(\alpha^* - \alpha)N} \quad (17)$$

In other words, formal education only reduces unit labour costs if the rate of increase in productive efficiency as a result of formal education exceeds the corresponding rate of increase in the

wage rate, all else being equal. If, as in Becker's model, both rates of return are identical, then it follows that formal education will have no effect on unit labour costs and hence firms will be indifferent, all else being equal, to the differential educational attainments of accessions, i.e.

$$\omega_N = (\alpha^* - \alpha)\omega \quad (18)$$

where $\omega_N < 0$ iff $\alpha^* < \alpha$

It similarly follows that the more educated an individual becomes the more sensitive he is, all else being equal, to variations in the employees share of (ϕ) of learning on the job, i.e.

$$\theta_{\phi, N} = \alpha^* \theta_{\phi} > 0 \quad \text{for all } t < 2T \quad (19)$$

We are now in a position to state our hypothesis explicitly. This is as follows. In an imperfectly competitive environment, firms can capture returns from investments in formal education and general learning on-the-job. Accordingly, in such an environment, firms will layoff employees in order to minimise unit labour costs. It, therefore, follows that the odds on becoming unemployed (laid-off) are an inverse function of productive efficiency.. Letting $\mu(N, t)$ represent the unemployment rate of individuals with N years of formal education and t years of work experience, it follows:

$$\{u(N, t) / [1 - u(N, t)]\} = g[h(N, t)] \quad (19)$$

where g is some appropriate functional form.

Since unemployment is essentially a binary variable and the unemployment rate (μ) is governed by the restriction $0 \leq \mu \leq 1$ then

following Cox (1970), we employ the logistic transform of the probability of becoming unemployed, i.e. the log of the odds of becoming unemployed, defined as follows:

$$\lambda(N, t) = \ln \{ g[h(N, t)] \} \quad (20)$$

Let g be a simple function of h , i.e.:

$$g = e^{\delta/h}, \quad \delta \text{ is a parameter} \quad (21)$$

Utilising (6), (14), (20) and (21) yields the following expression for λ , the log of the odds of becoming unemployed by level of education and general workforce experience:

$$\lambda(N, t) = \delta - \alpha N - \ln \{ 1 + k_0 t - (k_0/2T)t^2 \} \quad (22)$$

There is, however, one slight problem with the empirical interpretation of the parameter α in (22). From (18) it follows that if the rates of return, α and α^* , are the same then, all else being equal, the level of formal education has no influence over unit labour costs and, hence, the incidence of unemployment. In such a context, the empirical estimate of α would tend to zero even if the actual return to formal education is significantly positive. It follows, therefore, that the coefficient of formal education (N) in (22) is more correctly interpreted as a measure of the divergence between the rates of increase in earnings and productive efficiency as a result of formal education. Accordingly, (22) is re-specified as follows:

$$\lambda(N, t) = \delta - (\alpha - \alpha^*)N - \ln \{ 1 + k_0 t - (k_0/2T)t^2 \} \quad (23)$$

(23) represents our basic model of the structure of unemployment. It should be noted that the right-hand-side of (23) is very similar to that of earnings functions derived by Whiteman (1981) and Mincer (1974). The variables, formal education (N) and workforce experience (t) as well as the parameter (T) are common to both the unemployment function (23) and the earnings functions. Thus, a strong empirical test of the learning model outlined in this paper would be the extent to which the estimate of the parameter T coincides with equivalent estimates derived from the earnings functions. Similarly, the significance of the coefficient of formal education in (23) would also provide a strong test of our explicit assumption of an essentially imperfectly

competitive market.

IV The Structure of Unemployment: Australia 1976

In this section, the model derived in the previous section is applied to data on the differential incidence of unemployment, derived from the Australian 1976 census of population and housing. The census data provided 123 observations classified by level of formal education and general workforce experience. One observation with zero incidence of unemployment had to be dropped as incompatible with the logistic framework, thereby leaving 122 observations which form the basis for the subsequent empirical analysis. Data transformations are described in detail in the appendix.

Two logistic models were applied to the data. The first (23a), expresses the dependent variable as a linear function of years of formal education and a quadratic function of experience. This model provided the starting values for estimating the following intrinsically non-linear model.

The second model, (23b), is a direct application of our analytical model (23). The results of this model are directly comparable with the results of the earnings function estimated in Whiteman (1981) and the earnings functions estimated by Mincer (1974) and others.

The regression equations are as follows:

$$\lambda(N,t) = c_0 + c_1N + c_2t + c_3t^2 + \epsilon \quad (23a)$$

$c_0 \dots c_3$ are regression constants. Our hypothesis implies $c_1 < 0$, $c_2 < 0$, $c_3 > 0$ and $T = -c_2/2c_3$.

$$\lambda(N,t) = a_0 + a_1N - \ln \{1 + a_2t + a_3t^2\} + \epsilon \quad (23b)$$

where $a_0 = \delta$

$$a_1 = \alpha^* - \alpha$$

$$a_2 = k_0$$

$$a_3 = -(k_0/2T)$$

Accordingly we would expect $a_1 < 0$, $a_2 > 0$ and $a_3 < 0$.

The estimated versions of (23a) and (23b) are given below. Figures in parentheses represent the appropriate "t" test statistics.

$$\lambda(N,t) = \begin{matrix} -0.208 & - & 0.206N & - & 0.088t & + & 0.001t^2 \\ (-1.03) & & (-17.34) & & (-7.55) & & (5.73) \end{matrix} \quad (23a')$$

$$R^2 = .76$$

$$\lambda(N,t) = \begin{matrix} 0.057 & - & 0.209N & - & \ln \{1.0 + 0.214t - 0.003t^2\} \\ (0.24) & & (-17.81) & & (3.62) & & (-2.95) \end{matrix}$$

$$R^2 = .77 \quad (23b')$$

Both regression models perform quite well, each explaining in excess of three-quarters of the variation in the incidence of unemployment by level of formal education and general workforce experience. Excluding the constant term, all regression parameters are significant beyond conventional levels, display the anticipated sign and an order of magnitude consistent with the theoretical framework outlined in the previous section.

The coefficient of formal education (N) is both significant and negative indicating that increasing formal education does significantly lower the probability of becoming unemployed. In terms of our analytical framework, the estimated coefficient suggests that the returns to productive efficiency exceed the returns to earnings by some 21 percentage points. The estimate of α^* reported in Whiteman (1981) is approximately 7 percent per annum which suggests a value for α in the region of 28 percent per annum. This implies that the employees share of the returns from investment in formal education constitute approximately a quarter of the total returns to formal education.

The coefficient of t above provides an estimate of the value of k_0 . The coefficient of experience in the earnings function reported by Whiteman (1981) provides an estimate of the value of ϕk_0 . Combining these two results yields the implication that the average value of the employees share of the benefits of learning on the job is also close to a quarter of total returns.

These results tend to contradict the specific human capital hypothesis which predicts that only firm specific learning influences turnover and the structure of unemployment. Our results definitely imply that the firm shares disproportionately in the benefits of formal education and general workforce experience. Furthermore, the relatively strong influence of formal education tends to support the empirical findings of Mincer (1962, p 72) which, in fact, led him to suggest that maybe, formal education affects unemployment rates and on-the-job training does not?

The implicit estimates of the value of T , corresponding to peak human capital, are 31 and 32 years respectively. The estimate of 32 years from the basic regression model (23b) compares with an estimate of 31 years in the earnings function reported by Whiteman (1981). This result implies that peak human capital (minimum unemployment rates) occurs in the age range of 47 (15 year old school leaver) to 57 (higher degree holder) years. Becker (1964, p 139) and Houthakker (1959, p.26) suggest that the peak in earnings occurs in the '45-54 year age class'; a result which is strongly supported in the findings of Whiteman (1981).

The close coincidence of peak earnings and minimum unemployment rates, implicit in the latter result, represents quite strong endorsement of the model presented in this paper. While it may be possible to argue that general work-force experience and firm specific experience correlate, it would be hard to maintain, within Beckers framework, that they almost exactly coincide, particularly in a labor market where, as Mincer (1974, p.29) observes, "labor mobility is the norm rather than the exception."

In general the above regression results are strongly supportive of our hypothesis that the structure of unemployment can be explained largely in terms of formal education and general workforce experience and hence that the wage structure and the unemployment structure are quite strongly (inversely) correlated.

V Further Analytical Implications

It is a presumption of the model presented in this paper that information and other constraints impede the perfect operation of the labour market. Accordingly, firms are able to exercise dynamic monopsony power and the external labour market, at any point in time, is characterised by a 'non-degenerate' distribution of wage offers.¹⁶ In such a context, as Becker acknowledges, the distinction between firm-specific and general training breaks down.¹⁷ Firms can and, from our empirical results, apparently do expropriate some of the product of 'general' workforce experience.¹⁸ The wage thus apportions the product of the total stock of human capital (regardless of whether it is general or firm-specific) between the firm and the employee. The share of each is a result of optimisation by the firm, in which the likelihood of turnover plays a major role.¹⁹

In the present model, therefore, layoffs and hence, by implication, the structure of unemployment is an inverse function of the total stock of human capital. It necessarily follows that the wage structure and the unemployment structure evolve simultaneously as a result of the decisions of optimally behaving firms operating in an imperfectly competitive labour market in which labour

mobility represents the norm rather than the exception. Our analysis thus provides an explanation of such empirical phenomena as the observed inverse relationship between layoffs and the level of formal education as well as the recurrent observation of an inverse association between the wage and unemployment structures.

The specific human capital hypothesis, on the other hand, emphasises the distinction between general and firm-specific experience as a major factor in the explanation of the differential incidence of turnover and unemployment.²⁰ The division of workforce experience into firm-specific and general components, however, requires the existence of a perfectly competitive labour market. In such a market, firms cannot appropriate the product of general workforce experience and hence there is a direct relationship between the incidence of lay-offs and the stock of firm-specific human capital.

If the firm could appropriate the product of general as well as specific human capital, this would imply the existence of an imperfectly competitive labour market that is, the existence of constraints on the free movement of labour between firms. Secondly, such a result would imply the firm's interest in the total stock of human capital rather than simply the firm specific components as implied in Becker's model. In other words, in an imperfectly competitive labour market, all training can be treated as firm-specific training.²¹ However, to the extent that this training is portable, it can also be considered general training. The major conclusion would appear to be that the firm specific and general training dichotomy tends to be meaningless in the context of an imperfectly competitive labour market.

It is rather paradoxical that although, the notion of firm-specific human capital accounts for the differential incidence of turnover and unemployment in an essentially neoclassical labour market, it also necessarily follows that wages will tend to be higher in the internal labour market than equivalent wage offers in the external labour market. This follows from the contention of human capitalists that the employee receives the complete product of general training as well as a margin for specific training whereas wage offers would only cover the general component. In such a framework, there exists little incentive to job search. Accordingly it follows that the specific human capital hypothesis necessarily implies that, all else being equal, inter-firm labour mobility must be involuntary.²² The existence of voluntary quits would therefore appear to be inconsistent with this theoretical framework. In addition, this analytical result contradicts the basic premise of job search theory, namely that the return to search is positive.

Another puzzling implication of the specific human capital hypothesis is the analytical result that firms have no interest in general training since the product of general training, in a competitive labour market, is appropriated wholly by the employee.²³ It is a fact, however, that in recruiting new employees, firms persistently prefer the more experienced.²⁴ This result would imply that firms do indeed share in the product of general training, thereby suggesting the existence of an imperfectly competitive labour market in which the distinction between general and firm-specific work experience is rather tenuous.

Telser (1971) and Parsons (1972) attempted to restore the credibility of the specific human capital hypothesis after the rather damaging and ambiguous empirical results reported by Mincer (1962). The most damaging of these results was Mincer's observation of a positive relationship between a measure of employment stability and formal education. Whereas Becker (1964, p.24) suggested that, "quit and layoff rates are inversely related to the amount of specific training", Telser and Parsons argued that quits are essentially an inverse function of the employee's share of the investment in firm specific human capital while layoffs are an inverse function of the firm's investment in specific human capital. From an empirical point of view, the resulting analytical 'gymnastics' rendered the hypothetical relationship between specific human capital and the structure of unemployment even more ambiguous.²⁵ Telser (1971, p.355), for instance, suggests that, "with the layoff rates as the dependent variable and wages held constant the sign of the years of schooling coefficient may be either negative or positive although a negative sign is more plausible if the firm invests more specific human capital in those workers having more formal schooling". Parsons (1972) is a little more definite, predicting that

the coefficient of formal education will be unambiguously negative in layoff rate regressions primarily because of the positive association between formal education and the total stock of human capital. Thus layoffs are a function of the firm's investment in human capital, defined as a function of the difference between the total stock of human capital and the wage rate. Parsons defines the total stock of human capital as an empirical function of some dozen variables, not including the wage rate.

It is not apparent that this later work by Parsons and Telser advances the specific human capital hypothesis any further than did the earlier studies of Mincer and Oi. The results remain dependent upon the empirically intractable relationship between formal education and the firm's investment in specific human capital.²⁶ Parsons (1977, pp. 213-215) admits that the human capital explanation of layoffs lacks a 'simple logical model' and suggests that "the specific human capital literature, is, if anything, less developed and, moreover, lacks an easily measured empirical counterpart".

Most of the attempts to empirically validate the specific human capital hypothesis have focused on inter-industry and inter-occupational differentials in labour turnover. Accordingly a variety of variables; including the concentration ratio, physical capital stock per man, unionisation, percentage of professionals, females, youth, whites, southerners and so on; are postulated as being uniquely associated with the firm's investment in specific human capital. The net outcome is that insignificant variables in quit or layoff rate regressions are dropped, while the significance of the remaining variables is interpreted as providing conclusive evidence of the exclusive role of specific human capital in influencing labour turnover.

It is, however, not clear that even if a link between the explanatory variables and investment in specific human capital could be established, that such results would constitute endorsement of the specific human capital hypothesis. As Parsons (1972, p.1123) points out, the essence of the specific human capital concept is, "that workers of the same general skill class are differentiated: workers experienced in a particular firm's operation are more valuable to that firm".

The empirical results reported in this paper do in fact support the contention that workers of the same general skill (education) class are differentiated. However, the estimated structure of unemployment is consistent with the notion that total workforce experience rather than simply firm-specific experience is important to the firm. In other words, our analytical and empirical results strongly endorse the existence of an imperfectly competitive labour market in which the arbitrary distinction between general and firm-specific experience plays no significant role.

VI Summary & Conclusions

The major implication of the analysis presented in this paper is that in an imperfectly competitive labour market, where firms exercise some degree of dynamic monopsony power, firms can expropriate the product of both general and firm-specific workforce experience. Accordingly, in such a labour market there is no distinction, from the firm's point of view, between firm-specific and general human capital. It is thus hypothesised that layoffs and hence the structure of unemployment will be a function of the total stock of human capital, that is initial endowment, formal education as well as subsequent workforce experience. Since the structure of earnings is also a function of these variables, the resulting analysis provides a simple logical explanation of the often observed correlation between the wage structure and the structure of unemployment.

The model presented in this paper also readily accomodates certain labour market phenomena which are hard to reconcile with the conventional human capital framework. These phenomena include the existence of voluntary labour turnover as well as the persistent bias, on the part of firms, in favour of recruiting generally experienced rather than inexperienced accessions. Furthermore, the model outlined in this paper is more consistent with the existence of information and other constraints on the perfect operation of the labour market than the traditional human capital model.

Empirical application of the model to data on the incidence of unemployment derived from the 1976 Australian population census tends to support the hypothesised existence of a relationship between the total stock of human capital and the differential incidence of unemployment. The role of general workforce experience is, in fact, strongly endorsed by the apparent coincidence in reported estimates of 'peak-earnings' age derived from earnings functions and the estimate of 'minimum-unemployment' age derived from the unemployment function estimated in this paper. There is equally strong confirmation of the predicted inverse relationship between the level of formal education and the incidence of unemployment.

These empirical results tend to constitute strong confirmation of the model outlined in this paper as well as a contradiction of Beckers specific-human capital hypothesis which predicts that the incidence of layoffs or unemployment is solely a function of investment in firm-specific human capital. In general our empirical results tend to suggest the existence of an imperfectly competitive labour market in which firms exercise dynamic monopsony power. In such a context the specific human capital hypothesis is inapplicable.

Finally, it is claimed that the present model provides a simple, logical and empirically tractable explanation of the differential incidence of unemployment, ultimately leading to a unified explanation of both the wage and unemployment structures.

Data Appendix

The data for the empirical estimation of the unemployment profiles, by experience and level of education, was derived from the census of population and housing conducted by the Australian Bureau of Statistics in respect of the night of 30 June, 1976. Data was requested and supplied in the form of a special matrix tape.

The observations cover Australian born males, aged 15 to 64 years inclusive who were employed at the time of the census or were classified as being unemployed having been laid off, dismissed or having voluntarily quit their previous employment. First-job seekers were excluded.

Observations were grouped in terms of ten-five year age intervals and thirteen education categories. The latter, based on school-leaving age and post-school qualifications, were subsequently ranked in terms of years of formal education N . An estimate of the workforce experience t for each age interval/education class was then derived as follows:

$$t = \begin{cases} (b_1 - c)/2 & : b_0 \leq c \leq b_1 \\ ((b_1 - b_0)/2) - c & : b_0 > c \end{cases}$$

where b_0 and b_1 represent the initial and final years of the relevant age interval respectively and c represents school-leaving age or imputed age at completion of post-school qualifications.

A-typical groups were excluded. These included 15-19 year-olds claiming post-school academic and technical qualifications, 20-24 year-olds claiming higher degrees and those claiming seven years or less schooling. This yielded 123 observations, the characteristics of which are summarised in Table 1. The associated estimates of the unemployment rate (net of first job seekers) are given in Table 2. The single zero unemployment observation was dropped due to the logistic specification, thereby leaving the 122 observations which form the basis of our empirical results.

TABLE 1: Workforce Experience by Age & Formal Education

Age left School N	13 8	14 9	15 10	16 11	17 12	18 13	19 14	TRADE 15	TECHN 17	NDT 17.5	BD 18	GD 19	HD 20
Age Interval	Experience (t)												
15-19	4	3	2	1.5	1	0.5	0	N/A	N/A	N/A	N/A	N/A	N/A
20-24	9	8	7	6	5	4	3	2	1	0.75	0.5	0	N/A
25-29	14	13	12	11	10	9	8	7	5	4.5	4	3	2
30-34	19	18	17	16	15	14	13	12	10	9.5	9	8	7
35-39	24	23	22	21	20	19	18	17	15	14.5	14	13	12
40-44	29	28	27	26	25	24	23	22	20	19.5	19	18	17
45-49	34	33	32	31	30	29	28	27	25	24.5	24	23	22
50-54	39	38	37	36	35	34	33	32	30	29.5	29	28	27
55-59	44	43	42	41	40	39	38	37	35	34.5	34	33	32
60-64	49	48	47	46	45	44	43	42	40	39.5	39	38	37

(The post-schooling qualifications are Apprenticeship (TRADE), Technician (TECHN), Diploma (NDT), Bachelor Degree (BD), Graduate Diploma (GD), Higher Degree (HD)).

TABLE 2: Unemployment rates (nett of first-job seekers) by Age & formal Education

Age left School N	13 8	14 9	15 10	16 11	17 12	18 13	19 14	TRADE 15	TECHN 17	NDT 17.5	BD 18	GD 19	HD 20
Age Interval	% Unemployment												
15 - 19	26.04	20.31	11.19	6.65	4.80	4.85	8.93	N/A	N/A	N/A	N/A	N/A	N/A
20 - 24	15.72	13.34	8.98	6.59	4.52	4.25	5.30	3.94	1.96	1.20	2.65	0.78	N/A
25 - 29	7.14	5.55	4.60	3.07	2.24	1.92	2.83	2.27	1.21	0.93	1.60	0.82	1.46
30 - 34	4.66	3.86	3.22	1.88	1.51	1.28	1.87	1.62	0.82	0.60	0.75	0.39	0.81
35 - 39	4.44	3.05	2.94	1.75	1.47	1.43	1.58	1.43	0.92	0.44	0.84	0.57	0.29
40 - 44	3.91	3.05	2.80	1.97	1.22	1.28	1.30	1.59	0.88	0.56	0.45	0.76	0.21
45 - 49	3.03	2.71	2.59	1.70	1.48	1.65	2.16	1.50	0.94	0.67	0.45	0.61	0.06
50 - 54	2.59	2.67	2.11	1.81	1.55	0.88	1.89	2.07	1.14	0.65	0.80	0.60	0.54
55 - 59	3.63	2.63	2.03	2.44	1.56	1.85	1.59	2.37	1.63	1.03	0.62	0.16	0.62
60 - 64	2.89	3.11	2.47	2.41	2.37	1.96	1.55	2.95	2.51	1.26	0.45	0.00	0.92

FOOTNOTES

- 1 Reder (1969, p. 19) emphasises that, "It is generally recognized that unemployment falls disproportionately upon low wage earners.... While claims of universal validity for this statement may be too strong, its wide applicability will scarcely be disputed".
- 2 According to Becker (1964, p. 18), "completely general training increases the marginal productivity of trainees by exactly the same amount in the firms providing the training as in other firms", while, "completely specific training can be defined as training that has no effect on the productivity of trainees - that would be useful in other firms".
- 3 Oi's analytical model is expressed in terms of 'quasi-fixity' where fixity is defined as hiring and specific training costs. Oi's (1962, p. 543) fixed cost hypothesis is conceptually identical to the specific human capital hypothesis of Becker (1964, p.24).
- 4 The notion of 'self-investment' simply refers to Beckers (1964, p.12) analytical proposition that trainees bear the cost of general training and profit from the return.
- 5 Both Becker (1964, p.46) and Mincer (1974, p.13) emphasise that the notion of 'investment in human' capital can be interpreted as simply 'learning-by-doing' or 'workforce experience'. In the present context, for reasons which will become obvious in the next section the concept of 'experience' is preferred to that of 'investment'.
- 6 Mattila (1974, p.239) recommends that quits be viewed as having two components, "a fairly small, constant exogenous flow of quits into unemployment (those quitting impetuously after a fight with the boss) and a larger, endogenous flow of utility maximizing workers who move directly from job to job".
- 7 Clark, Kreps and Spengler (1978) provide a detailed treatment of the notion of depreciation of human capital. There is some doubt as to whether the notion ought to be applied to human capital.

Becker (1964, p. 140), Mincer (1958, p.29) and Weiss and Lillard (1978) attribute the decline in cross-sectional age-earnings profiles as mainly due to 'vintage' or 'cohort' effects, that is to secular increases in income due to improvements in technological knowledge and increases in capital per worker over time.

- 8 There is a practical aspect to this assumption. It is observed that the wage rate of experienced employees never falls below the entry-wage of new accessions.
- 9 This is a conventional assumption. Mincer (1970, p.17), for instance, points out that, "The functional form of the investment profile must be fitted by experiment since there is no theory to specify it".
- 10 Gintis (1976, p.51) suggests: "the endogeneity of the wage bill is a real and concrete contingency of profit maximisation". Weiss (1980, p. 527) points out, "the wage offered by a firm affects not only the number of job applicants to the firm but also the expected labour endowment of workers hired by the firm".
- 11 As Parsons (1972, p. 1123), points out, "the firm, in effect, faces two supply relationships, one for new workers and one for experienced workers, the latter being a function of wages because quits are presumably sensitive to the level of wages". Reder (1964, p. 316) suggests that, "... employers always prefer to hire (retain) experienced workers rather than neophytes".
- 12 Hamermesh (1969, p. 128) suggests that, "highly skilled workers will be more likely to find alternative employment since they are generally more acceptable workers". Weiss (1980, p. 527) points out, "if the firm cut its wages, its best workers would quit".
- 13 Thus according to Parsons (1972, p. 1123), "the profit-maximizing firm must choose the wage rates of experienced workers and trainees and the number of layoffs, if any, which will provide the optimal level of experienced worker services at least cost".

- 14 Solow (1980, p.8) points out, "... if employers know that aggressive wage cutting in a buyer's market may antagonise the remaining workforce, hurt current productivity, and make it harder to recruit high quality workers when the labor market tightens, they will be less inclined to push their short-run advantage".
- 15 See Mincer (1970, pp.6-8).
- 16 Mortensen (1970, p.168) points out that, "the firm has monopsony power in a dynamic sense because of imperfect information and the cost of search", and hence as suggested by Burdett (1978, p.213), "... it is assumed that the wage offers made by all firms in the market can be described by a nondegenerate distribution function..."
- 17 Becker (1964, p.29) points out "Monopsony combined with control of a product or an occupation (due, say to antipirating agreements) converts training specific to that product or occupation into firm-specific training".
- 18 Parsons (1972, p.1129) thus suggests, "in a world of imperfect foresight, the possibility of exploitation is quite real".
- 19 For a detailed treatment of the firms optimisation in the context of an imperfectly competitive labour market with heterogeneous labour, see Whiteman (1980). Pencavel (1972) and Salop (1973) also model the role of labour turnover in the firm's optimisation process.
- 20 The classical statement of the specific human capital hypothesis in Becker (1964, p.24) is, "Employees with specific training have less incentive to quit, and firms have less incentive to fire them, than employees with no training or general training, which implies that quit and layoff rates are inversely related to the amount of specific training".
- 21 The popular notion of an 'implicit contract' between employer and employee would have the same effect. Becker (1964, p.27) suggests that, "... a contract, in effect, converts all training into completely specific training". Similarly (p. 18), "protection would serve the same purpose as the creation of monopsonies domestically, namely to convert general into specific capital...."

- 22 As Oi (1962, p.545) points out the specifically trained worker receives a wage above any alternative wage offer but below his marginal product to the firm. Surely, in such a context, voluntary labour mobility will tend to be the exception rather than the norm.
- 23 Becker (1964, p.24) suggests that, "firms are not too concerned about the turnover of employees with general training and have no incentive to offer them a premium above wages elsewhere because the cost of such training is borne entirely by employees".
- 24 Blaug (1976, p.846) for instance remarks that, "the human-capital research program is silent on why there should be such a persistent bias in the preference of employers". Thurow (1976, p.90) also notes that, "With the exception of specific skills, interest in employee quality should not exist in a wage competition model, yet it does seem to exist".
- 25 Telser (1971, p.355) 'cops' out completely suggesting that, "Since Mincer's dependent variable combines the effects of both quits and layoffs, it follows that the theory of specific human capital is consistent with either a positive or a negative coefficient of years of schooling with wages constant". Parsons (1972, p.1139-1140) claims to explain Mincers results on the basis that, "the regressions give more weight to the sharp negative effect of education on layoffs than to the weak ambiguously signed effect on quits". However this 'sharp negative effect' simply derives from Parson's assumption of a positive relation between the total stock of human capital and formal education. In other words there is still no unambiguous endorsement of the exclusive role of firm-specific human capital. Both Parson's analysis and empirical results remain consistent with the alternative hypothesis that it is the total stock of human capital which is the key factor in the incidence of layoffs.
- 26 Telser (1971, p.352) suggests, "It would seem that a direct research objective should be the estimation of the stock of specific human capital but this may encounter almost insurmountable obstacles". Parsons (1977, p.205) similarly suggests, "One major difficulty keeps these firm specific human capital concepts from being vigorously exploited (or at least adequately tested) and that is the lack of a readily observable measure".

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