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Economics of personnel and human resource management

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Abstract

The new economics of personnel and human resource management is analysed, including its current prominence as well as its historical antecedents. The economic paradigm as applied to personnel and human resource economics is illustrated through a variety of examples in the personnel area. These involve economic phenomenon (e.g., fixed hiring costs, asymmetric information, option values) highlighting their implications for personnel issues, as well as personnel phenomenon (e.g., deferred compensation, pensions, mandatory retirement) highlighting their economic rationale. Other phenomenon that otherwise seem difficult to explain or paradoxical are analysed including: superstar salaries; long-hours and overtime coexisting with unemployment and underemployment often within the same organisation; the reluctance of seemingly risk averse workers to accept small wage cuts to avoid the possibility of a layoff; the payment of fringe benefits that may not be valued by many employees; the "regular" hiring of temporary workers when permanent workers are available; egalitarian pay structures and fairness in compensation; the persistent reporting of vacancies on the part of firms but a reluctance to raise wages to fill those vacancies; the use of piece rates in some jobs and salary structures that are based on relative ranking of workers in other jobs; and tenure or "up-or-out" rules where people who are not promoted are required to leave rather than work for lower pay. The concluding section focuses on elements that are common across these applications.

Keywords: Economics of human resource management; Personnel phenomenon; Personnel economics

The field of human resource management is in transition. An institutional and somewhat chatty literature is being replaced by more analytic work, which is based on empirical

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> investigation and rigorous theory. The new material, which is commonly referred to as personnel economics, is being taught at the core curricula at most top business schools. Lazear (1998, p. iii)

Economics is constantly being applied to a wide range of areas that are conventionally thought of as beyond the purview of economics. This is evident in a variety of topics: sleep (people with a high opportunity cost of time sleep less); fertility and family formation (women with high potential earnings power and who would forgo substantial income if their careers were interrupted by having children have fewer children and have them spaced more closely together); marriage (matches are designed to maximise the joint value of the match); beauty (it is a trait that is rewarded in the labour market); religion (religions try to behave as monopolists and reduce competition); suicide (there are elements of rational choice made on the bases of costs and benefits); taboos (they break down when they no longer serve a function); premarital sex (it is discouraged when its negative consequences are higher); and even Christmas (it gives rise to a "dead-weight" loss since transfers in-kind in the form of gifts are less efficient than cash transfers). Few aspects of behaviour seem to escape the economic paradigm. It is no wonder that the phrase "economic imperialism" has been applied to the discipline.

To most economists, these applications — and the extension into the area of personnel and human resource management[1] — are simply the logical application of economic tools to interesting and important behavioural phenomenon. To others, often including those whose disciplines are being encroached upon, it is economic imperialism and snake-oil salesmanship with a cure for everything — whether it needs a cure or not. The typical economist's response, not surprisingly, would be a response grounded in economics. "Let a thousand flowers bloom" — let the paradigms compete, with the market for ideas determining which will survive. Economics entered these areas in large part because there were arbitrage opportunities — gaps in our knowledge that could be filled by economics.

The tools of economics in many ways are both simple and powerful. They are simple in that they are based on the proposition that people and firms make optimising choices subject to constraints of income, time, uncertainty, and legislative and institutional requirements. They are powerful in that these simple propositions can explain a wide range of behaviours of individuals and firms. This is also the case with the subject matter of this paper — the economics of personnel.

As indicated previously, this is a growing area. It has a sufficient literature and theoretical foundations to merit being brought together in a textbook (Lazear, 1998). It has been the

[1] The terms human resource management and personnel are used interchangeably here. In industrial relation, human resource management is generally considered one of the three main "areas," the other two being unions and collective bargaining, and labour market and social policy. International and comparative industrial relations is sometimes regarded as a separate area, and sometimes as spanning all areas. Economics, particularly labor economics, is especially important in the area of labor market and social policy, but it is also important in the other areas. The subject matter of this paper — the new economics of personnel and human resource management — highlights the potentially growing importance of economics in this area, the area that traditionally has been least subject to (some would say subjected to) economics.

subject matter of special issues of journals,[2] prestigious lecture series,[3] and a presidential address.[4] Much of its content has been recently summarised in journals and handbooks synthesising the state-of-the art (science?).[5] It is even incorporated into advanced level economics textbooks (Milgrom & Roberts, 1992, Part V). As part of the web-based Social Sciences Research Network that publishes working papers and published abstracts, personnel economics has been designated as one of three streams within labour economics.[6] The other two streams are: labour markets and human capital; demographics, and economics of the family. In the first three meetings of the Society of Labor Economics, approximately one-quarter of the papers dealt with the economics of personnel (Lazear, 1999, p. 200). Perhaps, the ultimate sign of its arrival is that personnel economics even has a summer camp.[7]

Personnel economics tends to deal with the internal labour "market" of firms,[8] where human resource policies and workplace practices tend to be governed by internal rules and authority more than by prices. Rather than simply describing these practices and their impact, it seeks to explain their very existence — that is, to endogenize what are often thought of as simply internal rules, regulations, and practices. Understanding the underlying *causal* reasons for the existence of such internal practices is important so as to be able to predict the consequences that will flow from changing such practices (e.g., through a legislative ban on mandatory retirement or the decision to recruit externally rather than promote from within). It is also important so as to be able to predict changes in such practices (e.g., workplace teams, employer-sponsored pensions, or executive compensation).

As shown subsequently, the application of economics in this area can provide insights into a wide range of personnel issues from recruitment and hiring to termination and

[2] Blakemore (1997) and Mitchell and Zaidi (1990).

[3] The Wicksell lectures resulted in the publication of Lazear (1995), which laid the more formal foundations for the textbook (Lazear, 1998).

[4] In his presidential address to the Society of Labor Economists, Lazear (1999, p. 201) commented on some of the early references to personnel economics in Slichter (1928), with pioneering work also by Reder (1955) and more recent work by Doeringer and Piore (1971). Kaufman (1998, 1999a, 2000) highlights that early institutional labor economists were actively involved in the field of personnel economics in the late 1910s (e.g., Commons, 1919; Douglas 1919, 1922; Slichter 1919, 1920).

[5] Gibbons (1998), Gibbons and Waldman (1998), Malcomson (1998), and Prendergast (1999). These publications deal with issues of incentives and contracts more generally, and apply them to a wide range of areas such as mutual fund managers, suppliers, and investment bankers. The fact that these summaries and synthesis are recent highlights that currently evolving nature of the work.

[6] The Social Science Research Network web address is http://www.ssrn.com/ with the personnel abstracts being accessed by going to the Economics Research Network, then journals, and then Labor: Personnel Economics.

[7] The first was held at Stanford University, July 14–18, 1998, organized by Edward Lazear.

[8] Kaufman (1999a, p. 108) highlights that there is a separate but overlapping literature on the economics of organization and transaction costs that also seeks to explain many HRM outcomes (e.g., the existence of internal labor markets) from an institutional perspective that "treats the practice of HR as an exercise in optimal resource allocation in a world of incomplete contracts, specialized assets, and imperfect information." He cites this along with the application of business strategy to HRM and models of sociotechnical work systems, as constituting the three leading-edge attempts to provide a more unified, holistic "systems" theoretical framework to HRM.

retirement. More importantly, it can provide explanations for a variety of phenomenon that otherwise seem difficult to explain or even paradoxical: the payment of what appears to be exorbitant CEO salaries to CEOs who are only marginally better than a series of vice-presidents (VPs) who compete for the CEO position; the coexistence of large numbers of employees who work long hours and overtime while others (often from the same organisation) are unemployed or underemployed; the reluctance of seemingly risk averse workers to accept small wage cuts to avoid the possibility of a layoff; the payment of fringe benefits that may not be valued by many employees; the "regular" hiring of temporary workers when permanent workers are available; the persistent reporting of vacancies on the part of firms but a reluctance to raise wages to fill those vacancies; the use of piece rates in some jobs and salary structures that are based on relative ranking of workers in other jobs; and tenure or "up-or-out" rules where people who are not promoted are required to leave rather than work for lower pay.

The economics of personnel eschews such explanations as custom and tradition, historical accident, idiosyncratic practices, norms, irrational acts, or inertia. Rather, it tends to emphasise that such phenomenon can often be explained as the behavioural outcome of the rational[9] choices made by individuals and firms when they are faced with constraints such as limited budgets, asymmetric information, market power, legal and institutional restrictions, monitoring costs, and difficulties in measuring output or performance.

This emphasis of economics is described by Kaufman (1999b, p. 361) "[T]he dominant trend in the discipline of economics was to formalize and axiomatize the model of the human agent, minimize its reliance on or reference to assumptions and theories in psychology, and always look first to differences in environmental states (for example, prices and incomes) rather than differences in tastes." Consistent with the ever expanding application of economics, however, considerable new work in economics is being done on providing "budget constraint" type (as opposed to psychological) explanations for what lies within the "black box" of tastes and preferences (e.g., to explain such phenomenon as addiction, fads, fashions, and social norms).

The economic paradigm as applied to personnel and human resource economics can best be illustrated through a variety of examples in the personnel area. The examples used here will involve economic phenomenon (e.g., fixed hiring costs, asymmetric information, option values) highlighting their implications for personnel issues. The examples will also involve personnel phenomenon (e.g., deferred compensation, pensions, mandatory retirement) highlighting their economic rationale. The concluding section focuses on elements that are common across these applications. The intent is not to provide a comprehensive review of the emerging field of personnel economics. Rather it is to choose examples that can be dealt with in a non-technical fashion, and where the contributions of economics can best be illustrated.

[9] The concept of rationality in economics is usually used to denote the maximization of utility or well being on the part of consumers and of profits on the part of firms. It refers to behaviour that is consistent with attaining these objectives *if* they are the stated objectives. It does not imply a value judgement on the merits of any of the components that give rise to utility (e.g., income over leisure).

1. Fixed hiring costs

At the initial stage of the personnel process, there are a wide range of costs that the firm incurs that are fixed per person or that have a quasi-fixed element in that they do not vary proportionately with how long people work after they are hired. Such costs are associated with recruiting, hiring, orientation, and training. These are well known. What is less well known, but emphasised by economists, is that expected termination costs can be anticipated and factored in at the hiring decision (Lazear, 1990a). In effect, when employers hire new employees, they consider the fact that there may be subsequent termination costs associated with hiring that person, and those costs are factored in at the hiring stage and hence may influence the hiring decision itself. Expected termination costs can be the usual "windup" costs, but more importantly they can include legislative ones associated with such factors as severance pay or legal recourse to unjust dismissal or even antidiscrimination laws. Even though the termination costs are incurred at the "other end" of the personnel function, they are anticipated at the initial hiring stage and hence can influence the hiring decision itself.

Some payroll taxes can also have elements of fixed costs if they have a ceiling such that employers pay no further tax once the ceiling is reached. Prior to the ceiling, employers usually pay a percent of earnings, in which case they are variable costs. However, once the ceiling is reached, they pay no further taxes and the taxes become fixed costs. Such ceilings exist, for example, in workers' compensation, unemployment insurance, and public pension programs. Some fringe benefits, like life insurance and medical and dental plans, also have costs that are fixed per employee.

Fixed costs may also be incurred in the recruitment and training of employees, creating an incentive for employers to amortise the costs by working their employees intensely and for long hours. They also create an incentive to reduce unwanted turnover since such investments are lost if the employee leaves.

Such fixed or quasi-fixed costs can have important implications for various aspects of the personnel function. They can deter the hiring of new employees unless there is a high degree of certainty that product market conditions will sustain that demand (and in a world of global competition such certainty is seldom there). To the extent that employers anticipate the possibility of discrimination charges in subsequent promotion or termination decision, employers may be reluctant to hire minority groups (albeit that has to be traded off against charges at the hiring phase). The fixed costs can also encourage employers to use various forms of nonstandard or contingent employment (e.g., limited-term contracts, temporary help agencies, or subcontracting) that avoid the fixed costs, even though they may involve substantially higher variable costs. Fixed costs can also encourage the firm to work their existing workforce, especially their skilled workforce, long hours, or for extended periods of time so as to amortise those fixed costs over longer periods of time. For this reason, employers may utilise overtime and pay an overtime wage premium or pay high salaries for "commitment" (often meaning a willingness to work long hours and not take vacations), even though others are unemployed or underemployed. Employers may also be reluctant to accommodate worksharing (reduced hours to facilitate employment expansion) or job sharing (two persons sharing the same job) given these fixed costs.

Employers may also rationally engage in "labour hoarding" in times of slack demand, hanging onto redundant workers and underutilizing them rather than laying them off and risking the possibility of having to hire different workers (and incurring the fixed costs) if demand is restored. In order to amortise the fixed costs, employers may work their existing workforce (especially the skilled workforce) not only longer hours, but also more intensely. Increasing the intensive *effort* margin can be just as effective in eliciting more "work" as can increasing the intensive *hours* margin, and both may save on fixed costs relative to expanding the extensive margin of *hiring* additional workers.

Clearly, the existence of fixed costs of employment can help explain the existence of a wide range of personnel phenomenon. In the economics of personnel, these are rationale responses on the part of firms to quasi-fixed costs that, in turn, may be associated with such factors as legislative requirements, fringe benefits, and global competition.

2. Deferred compensation[10]

Casual observation and empirical evidence suggest that firms often pay deferred or "backloaded" compensation in the sense that workers are "underpaid" relative to their productivity when they are young, in return for being "overpaid" relative to their productivity when they are older. This often occurs in the form of seniority-based wage increases that are over and above productivity increases. The compensation may also occur in the form of pension benefit accruals in defined-benefit pension plans, where the value of expected future pension benefits are enhanced by working an additional year and thereby increasing the service credits and the wages upon which pension benefits may be based. Deferred compensation may also occur in the form of stock options that are vested at a future date. These can be especially appealing for start-ups that may have a liquidity constraint, although it is not obvious that workers are a low-cost source of funds.

Such deferred compensation may be a rational compensation policy for a variety of reasons. It may deter unwanted turnover and enable the firm to amortise the quasi-fixed costs of employment as discussed earlier. It may also induce work effort, honesty, commitment, and performance on the part of the employee so as to be able to remain with the organisation to "collect" the deferred compensation. In effect, the organisation holds the equivalent of a performance bond, to be returned after acceptable performance, and in that way it encourages "bonding" with the organisation. Deferred compensation also reduces the need for constant monitoring of performance, requiring only periodic monitoring of past performance which is easily observed. It also gets around asymmetric information problems that may arise when employees have private information on such difficult to measure factors as commitment, motivation, loyalty, and willingness to work hard. Those traits will be revealed over time, with the employee receiving the deferred

[10] The theoretical rationales for deferred compensation are laid out in Lazear (1979, 1981) with evidence discussed in Lazear (1999) and Prendergast (1999).

compensation if they enhance performance. Deferred compensation will thereby discourage applications from employees who know they do not have those traits. It may also circumvent "end-game" problems that may arise for older employees who have more incentive to "shirk" late in their careers and who would lose little if terminated since the alternative value of their time in retirement activity is high. If they are considerably "overpaid" in those final years (perhaps in the form of valuable pension accruals) then they may be reluctant to shirk and risk loosing the overpayment.

Obviously, such deferred compensation policies will prevail only in situations where employees have a reasonable guarantee of receiving the deferred compensation conditional upon acceptable performance. The company has a short-term incentive to behave opportunistically and terminate employees at the point when their wages begin to exceed their productivity — that is, when they begin to "repay" on the performance bond. Such action however would negatively affect the reputation of firms and hinder them from using deferred compensation systems. Employees may also accept such systems only when they have a degree of due process that may be provided through such means as union protection, or legislative protection against unjust dismissal, or an implicit contractual arrangement with firms that tend to have long-term employment relations. In the case of new firms or "start-ups" that do not yet have a reputation, stock options are a way for the firm to commit to future payments, conditional upon the future performance of the firm.

Clearly, deferred compensation at first glance may seem illogical and the result of poor personnel practice on the part of firms — paying wage increases that seem to simply be based on seniority, "overpaying" older workers relative to younger workers, and financing pension benefits rather than giving cash wages. Such a compensation system, however, may be a rational response to situations where turnover is costly, information asymmetries are present, monitoring costs are high, and traits such as honesty, motivation, and commitment are hard to observe and will get revealed only over time. The economics of personnel emphasises deferred compensation as a compensation policy to deal with these issues in the context of what is labelled principal–agent problems — designing efficient contracts between the principal (worker) and the agent (employer) to ensure that they are incentive compatible in that they create the proper incentives for both parties to fulfil their obligations in a manner that is in their joint interest.

3. Pensions and mandatory retirement

Pensions are often thought of as form of forced savings on the part of employees and benevolence or paternalism on the part of employers. Mandatory retirement is often thought of as a company personnel policy that opens up job and promotion opportunities for younger workers, facilitates planning on the part of employers and employees, and — at worst — reflects age discrimination.

There may be elements of truth to these beliefs. The economics of personnel, however, tends to regard pensions and mandatory retirement as integral parts of the personnel function that facilitate deferred compensation with its desirable features as discussed previously.

In deferred compensation systems where wages exceed productivity for older workers, there has to be a termination date to the contractual arrangement. Otherwise, wages will exceed productivity for an indefinite period. Mandatory retirement can be regarded as such a termination date (Lazear, 1979) indicating that the particular contractual arrangement is now over (the equilibrium condition for that arrangement to persist being that the present value of expected wages equal expected productivity over the contract period). Some policies allow workers to continue working under a new contractual arrangement, often on a consultancy or self-employed basis. Of course, workers can also seek employment elsewhere where they almost invariably would be paid at a lower wage that would approximate their productivity because the new employer would have no obligation to continue a deferred wage payment.

The economics of personnel also emphasises the important incentive effects involved in employer sponsored pension plans and how those incentive effects can be used as strategic elements of the personnel function.[11] They may constitute a mechanism for the payment of deferred compensation since the value of pension benefit accruals tends to increase sharply with service and the seniority based wage increases associated with that service. As well, at particular combinations of age and service, there are often large “spikes” or discontinuous jumps in the pension benefit accruals. These can be strategic elements of the personnel function to encourage early retirement and penalise delayed retirement and hence they can be an important personnel tools for downsizing or employee renewal.

In essence, the economics of personnel emphasises that pensions and mandatory retirement policies are endogenous personnel rules that can have important efficiency-enhancing and incentive effects and that can sustain other practices such as deferred compensation. Conversely, banning such policies[12] or regulating them extensively will have implications for the purposes they served. Altering one component of the personnel system can set up a chain of impacts given the interrelatedness and complementarities of the system.[13]

4. Compensation as tournament prizes

Compensation, especially at the top levels, often resembles tournament prizes.[14] The prizes are fixed in advance and contestants compete for the prizes on the basis of their performance relative to other contestants. The increment to the prize get larger as the remaining number of

[11] Lazear (1983, 1990b), Lazear and Moore (1988), Pesando and Gunderson (1988), Pesando, Gunderson, & Shum (1992).

[12] Gunderson (1983) discusses the potential impact on a wide range of personnel practices of legislative bans on mandatory retirement.

[13] The importance of analyzing the personal system as an integrated and complementary package is emphasized, for example, in Gibbons (1998), Holmstrom and Milgrom (1991, 1994), and Ichniowski, Shaw, and Prennushi (1997). The later study provided empirical evidence of the productivity enhancing effect of bundling complementary personnel policies and workplace practices in steel mills.

[14] Lazear and Rosen (1981) and Rosen (1986a), with evidence provided in, for example, Drago and Garvey (1998), Ehrenberg and Bognanno (1990), Eriksson (1999), Hutchens (1987, 1988) and references cited therein.

contestants gets smaller; that is, as one goes from second to first prize, compared to third to second prize, and so forth. The winner usually gets a super-prize.

This prize structure is most apparent, for example, when a CEO is selected from a group of VPs. That CEO is presumably the best of the VPs, but likely by only a small amount relative to the next-best VP. Yet that CEO's salary could be vastly larger than that of the next-best VP. The salary of the CEO seems more like a prize than pay for (slightly) higher productivity.

Such a salary structure may make perfect sense, however, when it is difficult to judge the absolute performance of an individual but it is possible to evaluate their relative performance and rank them in terms of "winner", second, and so-forth. The prize in this case creates positive incentives for the holder of the prize to perform diligently to sustain the prize (e.g., not be subject to a hostile take-over or displaced by a decision of the board of directors). As well, and this is less obvious, the prize creates strong incentive effects for all VPs and even aspiring VPs to perform so as to be viable contestants for the prize. The incentive effects are not so much for the person who holds the prize, but for the other contestants.

The high salaries of some CEOs may also be necessary to ensure that they are sorted into their best match or their highest valued use in cases where they have talents that are specifically useful in particular organisations and other persons are not good substitutes (Rosen, 1982). A US$2 million salary compared to a US$1 million salary may not be necessary to motivate a particular CEO, but it may be necessary to attract that specific CEO to a particular organisations where they have a comparative advantage and their talents are best utilised.

The benefit from having the best match or from even slight enhancements in the performance of a CEO can be tremendous if the impact is spread over a large number of workers or customers, as is often the case in the global marketplace. This has been formalised in the literature on the economics of superstars (Rosen, 1981). Small differences in talents between a superstar and a star (or a CEO and a VP) get magnified into large total effects when the CEO affects numerous employees, for example, when the world market is the stage.

Ranking can also compel supervisors and evaluators to provide variation in evaluations since they cannot take the "easy road" of simply giving everyone the same evaluation.[15] It is for this reason, for example, that those who evaluate academics for promotion are pressured to make relative comparisons to known norms: How would you rank this person relative to others in their cohort? Would this person be promoted in your department?

Relative rankings may also be desirable when it is important to filter out the effect of common shocks or factors beyond the individual's control in determining their performance. Such factors could include the general economic environment, technological change, or the performance of other workers. Because these affect all persons, they will not affect relative performance except in-so-far as different individuals have a different ability to adjust to these shocks, in which case it is a valued trait that should be rewarded accordingly.

[15] Prendergast (1999, p. 30) provides evidence from the personnel literature of the tendency for compression of evaluation ratings because of centrality bias (supervisors given similar ratings to all persons) and leniency bias (supervisors overstating the performance of poor performers).

Such tournament prizes can only work if the organisation can credibly commit to pay the prize and not change the rules in mid-stream. Otherwise, potential contestants will not enter the contest or they would have to be paid higher basic wages to compensate for the uncertainty of the prize money. Tournaments will also work only if the outcomes are likely to be affected by skill and hard work compared to other factors such as luck, random chance, favouritism, or forces beyond the person's control. That is, the relative ranking of tournament schemes may be useful in filtering out the effect of such factors as luck and the general environment, but if such factors are important in affecting the relative ranking, then tournaments will be unattractive to contestants. They will require higher prize money (base salary or expected compensation) to enter the contest. There is little point in putting forth effort if it is not likely to be rewarded. This also implies that higher prizes may be given in new organisations where there is greater uncertainty about future outcomes as well as about the organisation's reputation in committing to the prize.

While tournaments can create positive incentives amongst all players, they can also create perverse incentives. It is possible to win a tournament by improving your own performance or by sabotaging the performance of your competitors. In such circumstances, tournaments can reduce co-operative behaviour and even encourage sabotage. Hiring three junior faculty members and telling them that only one will get tenure can induce them to work hard to win the prize, but it can also discourage co-operative behaviour unless such cooperative behaviour itself can be measured (e.g., good colleague who generates externalities, good departmental citizen). Similarly, telling 10 VPs of particular units that one of them will get the CEO prize can encourage them to try to have the other VPs look bad as well as themselves look good. In such circumstances, it may make more sense to pay bonuses on the bases of the performance of the unit, and to indicate that cooperative behaviour will be explicitly rewarded in bonuses or in promotions, than to simply use tournament prizes based on relative performance. As well, subjective evaluations may be necessary.

Tournaments can also create incentives for the players to collude and all reduce their effort knowing that one of them will still win the prize. Furthermore, if the winner and the relative rankings are already predetermined and well known (i.e., "locked-up") then there is little incentive for contestants to try to improve their performance. In such circumstances, organisations may rationally hire from the outside rather than promote from within, since the threat of such outside hiring can enhance incentives within the organisation. Such a threat may also be effective if the internal competition led to noncooperative behaviour on the part of the contestants. Hiring from the outside, however, can also dilute incentives since the probability of winning the prize is now diluted by the greater number of contestants. This in turn requires higher compensation for the internal personnel to compensate them for the lower probability of promotion.

5. Teams, cooperation, and egalitarian pay structures

In structuring prize money for tournaments, consideration has to be given to the spread amongst prizes. This is also the case if pay is based on absolute rather than relative performance. Too small a spread reduces the incentive to put forth effort to win the prize. A large spread or winning prize may be particularly necessary at the top levels to compensate for the low probability of winning the prize when there are many contestants but few top positions. Thus, the gap between the president and five executive VPs may have to be larger than the gap between the five executive VPs and the 10 VPs, to compensate for the fact that the five executive VPs have a 20% chance of becoming president (assuming internal promotions) compared to the VPs who have a 50% chance of promotion to executive VP and a subsequent 20% chance of promotion to president. Too large a spread reduces the incentive to enter the contest if there is no chance of winning the prize, and it can reduce cooperative team behaviour if only a few can win the prize. Winner-take-all tournaments are rare, as are winner-take all salaries in organisations.

The optimal degree of pay inequality then depends upon the type of behaviour the firm wants to encourage and the ability to monitor performance (Lazear, 1989). Greater dispersion may be merited to induce effort (including the effort of others to be promoted to the higher positions) under a variety of conditions: the person's individual performance can be measured; the individual tends not to affect the performance of others; cooperative team effort is not important; and risk-taking behaviour is encouraged. Conversely, a more egalitarian pay structure may be merited if it is difficult to disentangle the individuals performance from that of the team, if the team members affect each others performance in ways that are difficult to measure and reward, if team effort is important, and if risk-taking behaviour is not important. Furthermore, egalitarian pay structures may reduce internal resistance to efficient changes that may otherwise displace people from higher to lower positions. Egalitarian pay structures that are based on the performance of the team, however, suffer from the $1/N$ problem. Individual effort to the team yields a return of only $1/N$ which can be very small if the team (N) is large (Holmstrom, 1982). Smaller teams, in contrast, can use peer pressure and peer rewards to affect behaviour (Kandel & Lazear, 1992).

Organisations may have to use other personnel strategies to strike a balance between individual and team incentives. They may try to encourage internal competition amongst teams (e.g., separate business units competing for the same project) while encouraging cooperation within the teams or units. They may try to separate the individuals who thrive on competition from those who are cooperative, if their interaction would otherwise be destructive. They may try to "weed out" those who try to enter a cooperative work environment mainly to "free-ride" on the efforts of others or to dominate the more cooperative team members. To these ends, employers may rationally devote considerable resources in their recruiting and hiring decision to identifying personality types and whether the person is a team player or an individualist (Lazear, 1989).

The economics of personnel highlights that the optimal degree of pay dispersion within an organisation depends upon a variety of factors including the importance of individual versus team behaviour, the ability to monitor individual versus team output and the contribution of the individual to the team, the importance of attracting risk-taking individuals, and the importance of pay equality in reducing resistance to otherwise efficient restructuring. It also highlights circumstances in which compensation should be based on relative performance and absolute performance of the individual or group. As well, it highlights why it may be rationale for organisations to use teams in some circumstances and not in others, to foster competition across teams but cooperation within teams, and to devote considerable resources to determining personality types and to "mix and match" them accordingly.

6. Option values

In evaluating the true value of a salary, it is also important to incorporate the option value[16] that is also included in that salary. When a person works 1 more year at a particular salary, they get not only that salary, but also the option to continue working and earning future salaries including the possibilities of a prize salary. A VP who works an additional year at a salary of US$100,000 earns not only that salary, but also the possibility of working an additional year when they may be eligible for promotion to president at a salary of US$400,000. Even at lower levels within the organisation, the option values associated with promotion opportunities to higher level jobs can be an important consideration for motivating employees. Conversely, an organisation that provides few promotion opportunities may have to pay higher salaries to compensate for the lack of such promotion opportunities.

This is another reason that the salaries of top executives may be so high. Since they are already at the top there are no further internal promotion opportunities that would have an option value (Rosen, 1986a). The exception may be if the particular position they occupied was generally regarded as a stepping stone or learning ground for an even more prominent position outside of the organisation. The generally low option value for top executives is augmented by the fact that they are already likely to be in the later stages of their career and hence have fewer remaining possibilities for exercising any options.

Option values can be particularly important for calculating pension benefit accruals and determining the incentive effects associated with such accruals.[17] In deciding upon whether to continue working an additional year, individuals would consider not only their wage but also their pension benefit accruals that would be associated with an additional year of service credits and wage increases that could augment pension benefits. As well, working an additional year gives them the option to continue working and hence be eligible for subsequent pension benefits that could emanate, say, from generous early retirement packages. This forward-looking calculation of an option value can be an important component of total compensation and hence affect the early retirement decision.

Clearly, option values as emphasised in the economics of personnel can be an important strategic factor in a firm's compensation structure. They can be an important component of the compensation of executives who vie for the top prize, and employees who anticipate

[16] The option value is the value of the right to exercise an option at a future date. In finance, this is usually the right to buy or sell a stock at a particular price. In the context used here, it is the value of the right to work an additional year with the organization and therefore to receive the pay, pension benefits, and other perquisites that are associated with the additional year, and possibly subsequent years.

[17] Kotlikoff and Wise (1987), Lazear (1990b), Lazear and Moore (1988), Pesando and Gunderson (1988), and Pesando et al. (1992).

promotion opportunities, as well as employees who are making retirement decisions based on pension benefit accruals.

7. Compensating wage premiums

The economics of personnel has also developed frameworks and empirical procedures for valuing the various nonwage aspects of a job, and converting them into a monetary equivalent.[18] This has been the case for such characteristics as risk, unpleasant working conditions, work schedules, layoff probabilities, pension benefits, workers' compensation benefits, and requirements to accommodate the return to work of disabled workers. The procedures are also used in equal pay for work of equal value calculations. The relationship between pay and job evaluation point scores for the components of skill, effort, responsibility, and working conditions is estimated for male dominated jobs in the organisation. These "pay for points" are then applied to the female dominated jobs so as to ensure equal pay for work of equal value, where value is determined by job evaluation point scores. As stated by Steve Allen (1996, p. 550): "Adam Smith's original insight into compensating wage differentials are now Hay points."

Such compensating wage premiums have important implications for a range of personnel functions. They can induce the organisation to reduce risks and take safety precautions so as to reduce the wage premium for such risk. They can also induce the firm to hide such risks to the extent that there is asymmetric information and they are better informed about the risk. The existence of compensating wage premiums also highlights the potential gains for firms from catering to the preferences of their workforce for such factors as pleasant work conditions, flexible work schedules, job stability, and pension benefits.

Compensating wage premiums are also a mechanism through which payroll taxes are shifted back in part at least to workers even though the taxes may be initially levied on employers. This is the case, for example, for payroll taxes for workers' compensation, unemployment insurance, and public pension plans, all of which may lead to lower wages in return for the program benefits.

8. Asymmetric information: layoffs, strikes, and up-or-out rules

Labour markets give rise to the following puzzle: why do market adjustments so often take the form of quantity adjustments (e.g., layoffs, strikes, up-or-out rules) rather small price (wage) adjustments when risk adverse workers would seem to prefer small wage concessions rather than the costly all-or-nothing quantity adjustments. It may be the case

[18] The basic theoretical framework is the hedonic technique as set out in Rosen (1974). The empirical procedure essentially involves regressing wages on various job attributes with the regression coefficients being estimates of the shadow price of the attributes. Theoretical and empirical issues and applications are discussed in Rosen (1986b).

that layoffs are not so costly especially in a relatively full employment economy as currently prevails in the US; nevertheless, layoffs also were the more common form of adjustment in earlier periods when unemployment was high. Layoffs are also supported by unemployment insurance, while wage concessions are obviously not supported. In unionised situations, the median voter or "insider" may be relatively protected from layoffs, and hence have little incentive to engage in concession bargaining unless a credible threat of a plant closing is imminent. Even in situations where plants are closing, employees may engage in an end-game strategy, being able to extract high wages from the dying firms because the absence of industry profits means that there is no credible threat of new firms entering such a declining industry and undercutting the existing firms on the bases of lower labour costs.

The economics of personnel also offers a coherent explanation for the preference for layoffs over wage concessions as a way of eliciting truth telling in a principle–agent framework where there is asymmetric information in that employers have private information about their true ability to pay and the state of demand they face. In such circumstances, employers would have an incentive to always bluff and plead an inability to pay so as to elicit wage concessions. In such an environment, employees may rationally compel employers to absorb negative demand shocks by engaging in layoffs since layoffs are also costly to the firm. This deters bluffing albeit at the expense of having to incur some costly layoffs. Again, what at first glance appears to be an irrational personnel policy may be a rational response to bargaining under information asymmetries.

Similar arguments have been advanced to explain the existence of costly strikes. Employers always have an incentive to plead an inability to pay the wage demands that are made. In a world of asymmetric information, where employers have private information on their true ability to pay, unions may rationally compel employers to accept a strike to reduce the wage demands since the strike is also costly to the firm. This elicits truth telling on the part of the firm since it is more likely to accept the high wage demands and avoid the costly strike if demand conditions are good.

Up-or-out rules may exist for the same reason. Under such rules (e.g., tenure in universities, promotion to partnership in law firms), employees are evaluated and either promoted with pay increases, or terminated. Those who do not make the grade are generally not allowed to remain with a wage cut or wage freeze. Such a blunt quantity adjustment appears to be a poor personnel policy since it effectively precludes the parties from making what otherwise would appear to be mutually beneficial arrangements whereby poor or medium performers could be kept at lower wages. Even according to basic principles of economics it seems to be a poor policy since it effectively precludes "trades" — low pay for low effort or performance.

When there is asymmetric information and employers have better information on their true ability to pay and the worth to them of the employee, they have an incentive to bluff so as not to promote the employee to a higher paying job. Up-or-out rules may deter such bluffing because employers are no longer given the low-cost option of not promoting the employee. They have to either promote the employee and pay higher wages or (generally) bear some cost when they lose an employee. In essence, while termination is costly to employees it is also costly to firms. Employers are required to incur those costs if they do not want to pay the cost of promotions; they are not given a cost-free alternative.

Tenure as an up-or-out rule in academia has also been rationalised as a personnel policy that encourages senior people to hire and promote people who are better than themselves (Carmichael, 1988). This can be important in environments like universities where peer evaluation is necessary and senior people hire and evaluate junior people. It can also be important in general work environments when senior employees are expected to train and provide mentoring to junior employees. Without a degree of job security there would be no incentive to hire, promote, train, or mentor your potential replacement.

Up-or-out rules in tournament compensation schemes may also be used because tournaments create losers as well as winners. Losers may be embittered and certainly less likely to cooperate with the winner. In such circumstances, it may be best to have them leave rather than be a disgruntled and noncooperative employee who may even engage in dysfunctional behaviour to prove that the wrong decision was made. This is especially the case since when they leave they can become highly motivated employees at their new endeavour to prove that a wrong decision was made. Revenge can be a positive motivator in the right circumstances.

9. Raiding and the winner's curse

The importance of asymmetric information is further highlighted by the phenomenon of the winner's curse when applied to the raiding of personnel from other companies (Lazear, 1986). An organisation that raids another organisation may have to worry about the winner's curse — getting the employee they want only when they have made a mistake. The organisation that was raided presumably has better "inside" information on the employee and yet did not match the outside offer. Presumably, they would match the outside offer for good employees and not match it for bad employees. In such circumstances, the raiding organisation may be successful in the raid only when they made a mistake in evaluating the employee — hence, the phrase "winner's curse."

This would not be the case, of course, if the individual were a better match for the raiding organisation than for the incumbent organisation. In such circumstances, the individual is bid away to their highest valued use, and it makes sense for the incumbent organisation not to try to match such offers. This is especially the case since offer matching will likely generate pressures on the internal salary structure, as well as job search from incumbent employees to obtain outside offers.

While asymmetric information should discourage raiding, common shocks that are known to all parties should encourage raiding. Universities in the U.S., for example, are currently raiding Canadian universities because the devalued Canadian dollar makes it difficult for Canadian universities to match outside offers. This is further exacerbated by the budget cuts that are occurring in Canada where universities are publicly funded. Similar raiding is occurring with U.S. hospitals that are attracting Canadian doctors. The incentives to leave are exacerbated by the much lower tax rates at higher income levels in the U.S. In such circumstances, the raiding organisations are not subject to a winner's curse because all parties know the reasons for the inability to match outside offers.

10. Monopsony market structure

The application of basic principles of economics to the labour market structure in which firms operate can also explain a range of personnel phenomenon that otherwise seem irrational, at least from an economics perspective. This is the case when the firm is a dominant firm (monopsonist) in the local labour market in which it operates.

In such circumstances, the firm is a wage setter and not a wage taker. If it wants to expand employment, it has to raise wages to attract additional labour. Conversely, if it lowers its wage it will loose some but not its entire workforce.

If the firm raises wages to attract additional workers, it has to pay that higher wage to its existing incumbent workforce for reasons of internal equity. In such circumstances, its cost of expanding its workforce is not just the higher wage it pays to the new employees, but also the addition to the wages of its existing workforce. The marginal cost of expanding its workforce rises by much more than the additional wage it pays to its new workers.

Such a situation can give rise to a wide range of personnel phenomenon that appear to be economically irrational, but that are perfectly rational from the firm's perspective. The firm will persistently report vacancies because it would like to hire more workers at the wage it pays, but it will not raise wages to fill those vacancies (because it will also have to pay that higher wage to its existing workforce). The firm will try to attract new workers through nonwage mechanisms that do not involve payments to the existing workforce. It may engage in expensive advertising and recruiting campaigns, rather than just raising wages and hiring from the queue. The firm may also pay signing bonuses and generous moving expenses, since these are specific to the new recruits and do not have to be paid to the existing employees. The firm will also try to differentiate the new hires from the existing workforce in ways that would enable them to pay higher wages only to the new hires (e.g., if they have advanced degrees even though such degrees may not be relevant to the work). In the case of universities, they may give teaching load reductions to new hires under the guise of facilitating their starting of new postthesis research agendas.

Clearly, an economic analysis of the labour market structure in which firms operate may provide insights into explaining a wide range of personnel phenomenon that otherwise may appear economically irrational and difficult to explain.

11. Fairness

Personnel and human resource management tends to emphasise principles of fairness, due process and equity. The economics of personnel also sometimes incorporates these factors, not so much as important goals or ends, but rather as means to achieve other ends, usually associated with efficiency. The emphasis tends to be on the survival value of fairness, due process and equity when they serve other functions that have positive efficiency feedback effects on the performance of individuals and organisations.[19]

Job security may be fair but it may also reduce resistance to otherwise efficient change and it may encourage training and mentoring of junior employees. Reducing "noise," arbitrariness, bias, and favouritism in employee evaluation procedures may seem fair, but they can also facilitate a willingness to compete for promotions, and they can reduce the magnitude of the prize money that may be necessary to compensate people to enter otherwise risky contests. Providing a degree of due process at the workplace may seem fair, but it may also facilitate deferred compensation with its positive incentive effects. Employer pension plans may seem benevolent and paternalistic, but they can also be strategic elements of the firm's compensation policy — facilitating deferred wages, providing incentives for voluntary early retirement and providing a voluntary severance package. Generous early retirement buyouts may seem fair for long-term employees, but they also can preserve a firm's reputation, which has positive feedback effects on hiring and on its ability to pay deferred wages.

The converse may also apply to policies that are not practised because they seem unfair, or to practices that survive even though they do not seem fair. Mixing noncooperative people with cooperative people may seem unfair, but it may also be inefficient if the noncooperative people exploit the cooperative ones and team output decreases. Layoffs and up-or-out rules may seem unfair, but they may serve a positive function even for risk-averse employees to the extent that they elicit truth telling from employers during wage bargaining. Superstar salaries may seem unfair (and even unnecessary to motivate the superstar), but they may serve a number of positive functions: motivating others in the organisation to subsequently win the prize; matching the right person with the right organisation; compensating for the small likelihood of winning the prize when there are a large number of contestants and only one prize; and providing incentives late in people's careers when the options to win further prizes are otherwise reduced.

At a more macrolevel, the economics of personnel also suggests that there should be a "healthy scepticism" about policies that are supported under the guise of fairness, but that serve particular interest groups. The requirement to pay "fair wages" in government contracts protects high wage jobs. The call for "fair trade" through imposing higher labour standards on low-wage countries can be thinly disguised protectionism. Licensing of professionals to "protect" the public interest can protect the salaries of professionals. Labour standards to protect the unorganised can protect the competitive position of firms that already meet those standards.

This is not to say that concepts of fairness are inappropriately motivated or designed to protect the protectors. They may very well have positive feedback effects that serve other positive functions. And even if they do not, it can be entirely appropriate for individuals to have preferences for fairness and to exhibit those preferences individually and collectively. People may find it offensive to work in a job site that discriminates against others even if they personally benefit from such discrimination. They may find child labour offensive, even if the children themselves are better off working given their general plight in some countries.

[19] See, for example, Akerlof (1990), Lazear (1989), and Levine (1993).

The economics of personnel simply emphasises that concepts of fairness, due process and equity need not be abstract concepts that are in opposition to economic principles. In many cases they can be the foundations for sound economic principles. And if they conflict, legitimate trade-offs can be involved.

12. Common elements in the economics of personnel

The previous examples highlighted a number of common elements that prevail in the application of economics to the personnel area. Principle–agent issues are at the heart of many of the applications in that they involve designing contractual arrangements so that both the principal (employer) and the agent (employee) have incentives to act in their joint interest. Such contract design issues are especially important when there is uncertainty, monitoring costs and asymmetric information. In the later situation the contracts are designed to elicit truth telling mainly by imposing costs on bluffing.

Unlike conventional labour economics, which focussed on conventionally observable *quantity* dimensions such as labour force participation and hours of work, personnel economics focuses on the often more difficult to observe *quality* dimension and the intensive *effort* margins. Unlike conventional economics including labour economics, which tends to emphasise positive predictions (e.g., if wages increase firms will reduce their demand for labour), personnel economics has more of a normative, prescriptive and practical bent (e.g., if firms want to increase the effort of their VPs they may have to reward the president even more).

As with conventional economics, personnel economics relies on notions of efficiency-taking advantage of any arbitrage opportunities or "gains from trade" whereby designing different personnel policies can potentially make all parties better off. Notions of equilibrium are also central, whereby there is no further incentive to change the policy since firms are maximising profits and workers are maximising utility subject to the constraints they face. As indicated, much of personnel economics involves the design of mechanisms to ensure that the constraints are incentive compatible so that the behaviour of the parties is in each other's interests.

To a large degree, personnel economics has been motivated by trying to explain certain personnel functions that at first glance seem anomalous and even inefficient (e.g., mandatory retirement, "overpaying" senior employees, constantly hiring temporary help workers, up-or-out rules, and huge CEO salaries). The personnel economists' initial reaction is that if such practices exist in a competitive environment, they must serve some positive function to have survival value. Personnel economics often involves the search for that positive function especially in terms of creating incentives that are in the joint interests of the parties.

This also highlights a potential weakness of personnel economics, at least in its present state. By focussing on anomalous behaviour (in part because these are the interesting puzzles), it tends to ignore some of the more mundane issues that are more prominent for the vast majority of the workforce. As well, the empirical work has understandably focussed on situations where output is observable such as executive compensation and firm performance. However, as stated by Prendergast (1999, p. 57), "most workers don't work in jobs like these. Instead, most workers are evaluated on subjective criteria, where firms choose how to evaluate and how to pay based on those evaluations."[20]

While personnel economics has been successful in constructing theories to explain many of the personnel functions and rules, the fact remains that the existence of such functions and rules are usually consistent with a variety of competing explanations. Empirical testing has seldom been able to accept some explanations and reject others.

The new economics of personnel, like many of the newer applications of economics to explain unusual or anomalous behaviour, has to guard against tautological explanations. There is the danger that something that explains everything explains nothing. It would be vacuous, every time we observed "odd" or pathological behaviour, to say ex post that people must get satisfaction or utility from such behaviour or that it must serve some function to survive.

There is wide recognition that personnel economics suffers from a lack of data. "There are simply no easily accessible data bases with personnel data" (Prendergast, 1999, p. 56). "Most of the early work in personnel economics was theoretical. Primarily because of data shortcomings, research focused on dreaming up theories that might explain the empirical regularities of human resource practices" (Lazear, 1999, p. 200). Or as indicated by the title of one article: "Internal Labor Markets: Too Many Theories, Too Few Facts" (Baker & Holmstrom, 1995). Conventional large-scale micro data files seldom link individual behaviour to the personnel and workplace practices of their organisations and to performance measures within the organisation and of the organisation itself. Firm-level data sets are increasingly being constructed and used,[21] but they are generally not widely available and are often proprietary and hence not subject to verification and replication.

In its current form, personnel economics tends to involve starting with a personnel practice (preferably a puzzling one) to be explained. Then personnel economists go through their analytical toolkit, selecting the specific tools or concepts (e.g., agency theory, option values, asymmetric information, human capital, end-games, repeated games) that are likely to be most insightful for the problem at hand. The tools tend to be restricted to those of economics although there are some efforts to integrate the tools of other disciplines.[22]

[20] The importance of subjective evaluations in dealing with principle-agent problems is emphasized in Gibbons (1998).

[21] For example, Ichniowski et al. (1997), Kahn and Sherer (1990), Kandal and Lazear (1992), Lazear (1999) and Milgrom and Roberts (1995).

[22] Examples cited by Gibbons (1998, p. 30) include Baron (1998) dealing with social relations at the workplace, Krepps (1997) analyzing intrinsic versus extrinsic motivation, and Rotemberg (1994) dealing with human relations in the workplace. Gibbons concludes "Much of the best economics on this subject is still to come, and that it will exhibit stronger connections both to broader literature on organizational economics and to other disciplines that study organizations." Kaufman (1999b) also argues for stronger integration of psychological concepts into the behavioral foundations of labor economics. Examples include interpersonal and intergroup relations in the microeconomic analysis of unions, intrinsic satisfaction from work (especially to explain the long hours of managers and professionals), and relative comparisons, especially in compensation and work effort. Recent contributions along those lines include Akerlof (1990), Barron and Gjerde (1997), Lindbeck (1997), Main, O'Reilly, and Wade (1993), and Piore (1995).

There is an element of cherry picking and ad hoc selection of the tools, rather than the development of a unified theory of personnel economics with logical building blocks and extensions. To a large degree, this likely reflects the nascent nature of the field. It is in its early stages of development and as such, the steps towards a more unified theory will come in stages.

Economic research on personnel issues is slowly percolating into the management literature through the academic journals such as the *Academy of Management Journal* and *the Administrative Science Quarterly*.[23] Some cross-fertilization across fields is also occurring, but it is mainly occurring at the PhD level in graduate programs, with little at the Masters and undergraduate levels. Furthermore, little of the economics perspective is being reflected in standard personnel textbooks or handbooks.[24]

Lazear (1999, p. 201) has argued that "this is a field that is wide open to discovery." This is true, but the barriers to entry are significant at least from the perspective of conventional personnel analysts acquiring the advanced tools of personnel economics including agency theory, contract mechanism design and game theory. Yet, as in most fields, different skills will find a market niche on the basis of comparative advantage, and productive coalitions with complementary skills will form — as predicted by personnel economics.

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[23] Pfeffer (1997 p. 14, 1998, p. 228) provides evidence of the growing component of economics in these journals.

[24] Exceptions are Lewin and Mitchell (1995) and Lewin, Mitchell, and Zaidi (1997). As indicated previously, Lazear (1998) is a textbook that *focuses* on the development of the new economics of personnel; it would not be considered a standard personnel textbook with an economics emphasis.

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