An Internal Labour Market Approach to Assessing the Gains from Outsourcing

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Abstract

This paper considers an aspect of the assessment of net gains from outsourcing, which has received, it is argued, inadequate attention in the analytical and empirical literature: This aspect is the analysis of team *productivity, the essential element for the existence of 'the firm' in economic theory. The simple model presented here derives from the labour market literature of internal labour markets and insider-outsider models. The net gains from outsourcing within this framework are assessed by comparing the cost saving from production synergies within the administrated internal labour market, with cost savings from exploiting relative wage differentials in the external labour market. This analysis seeks to identify the determinants of the magnitude of these cost savings and provide a framework to allow their assessment to contribute as one facet of the 'make or buy' decision.*

Introduction

Cost-Benefit analysis of the 'make or buy' decisions for organizations, and assessments of the net gains from outsourcing, must address a variety of aspects. Despite the extensive developments of the theory of the firm, these aspects still extend beyond the capacities of economic analysis. The decision as to whether the various interests of the organisation are better

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served by outsourced rather than in-house production of inputs must also consider political and legal aspects (e.g. Microsoft and its recent anti-trust problems), issues concerned with capital markets and finance (e.g. private-public joint provision of infra structure, and the funding of social services), and operational management and control aspects (e.g. the newspaper industry's union-busting strategies in the UK in the 1980s). Thus such decisions will be *managerial* in the sense of requiring subjective assessments of the relative significance of different aspects – the assessment of costs and benefits of alternatives on the basis of economic analysis is but one contribution to an informed decision. Even within economic analyses of the 'make or buy decision' there are various perspectives on the issue, reflecting various approaches to the theory of the firm within the discipline.

Here we concentrate on only one aspect of the net gains from outsourcing, which has received, it is argued, inadequate attention in the analytical and empirical literature. This perspective on outsourcing derives from the labour market literature of internal labour market and insider-outsider models. A simple model can demonstrate that the gains from outsourcing within this framework derive from trading-off the cost saving from production synergies within the administrated internal labour market, against cost savings from exploiting relative wage differentials in the external labour market. This analysis seeks to identify the determinants of the magnitude of these cost savings and provide a framework to allow their assessment to contribute as one aspect of the make or buy decision.

Outsourcing in the Theory of the Firm

Developments in the analysis of the 'make or buy' decision have reflected developments in the theory of the firm. Until Knight's *Risk, Uncertainty and Profit* (1921) and Coase's 'The Nature of the Firm' (1937), the existence of the 'firm' in economic theory had been based on Adam Smith's notions of specialisation and the extent of the market. Knight's concept of the firm as an institution for efficiently distributing risk arising from uncertainty and information asymmetries, and Coase's identification of the costs of using markets to form contracts, have led to the development of transactions costs based theories to explain both the existence of firms and the limits to integration in production (see for example Williamson 1985, 1996). The decision as to whether resources are managed within the firm or price-directed across markets is seen as depending on a comparison of the management and transactions costs of the two alternative forms of contracting. For example Hegji (2001), following Williamson (1996),

provides a model of the outsourcing decision which incorporates transaction costs theory into the neoclassical framework. In Hegji's model, the decision to outsource a component of production depends on relative factor prices, fixed asset specificity, factor productivity and scale economies, as well as governance and contracting costs.

In a seminal paper, Alchian and Demsetz (1972) argue that, in 'seeking to explain the conditions that determine whether the gains from specialisation and co-operative production can better be obtained within an organisation like the firm or across markets'(p119), transactions costs theory is inadequate because it ignores the very essence of the firm's existence: the productivity benefits of *team production*. In the terminology of Alchian and Demsetz, 'team production of Z involves at least two inputs Xi and Xj with $\partial^2 Z/\partial Xi\partial Xj \neq 0$'. More simply and more generally, team production generates higher output than the sum of the separable outputs of inputs used independently, and the separate marginal contributions to this gain cannot be identified. Unobservability of marginal products implies that joint production generates 'metering' and incentive problems and leads firms to develop systems of *directing* input processes – to 'estimate marginal productivity by observing or specifying input behaviour' (p126). 'Team production will be used if it yields an output enough larger than the sum of separable production of Z to cover the costs of organising and disciplining team members' (p121).

Alchian and Demsetz devote most of their paper to analysis of shirking opportunities as an augmentation to differences in transaction costs in explaining the existence and extent of within firm production and the organisational structure of firms. However the essential factor generating the firm is the unobservable productivity of team production. The other necessary characteristics listed by Alchian and Demsetz (one party being common to independent multi-contractual relationships with several input owners; ownership claim to residual rewards) define the firm as an institution for dealing with the resulting problems of metering and consistent incentives. In a later paper Demsetz (1988) bemoans the lack of emphasis the previous paper gives to the productivity benefits of team production: 'The reason for firm-like production is to be found in the special productivity it offers in some circumstances. Alas, although Alchian and Demsetz make this clear, they fail to discuss the sources of this special productivity' (p154).

It is clearly the view of Demsetz that economic analysis of the costs and benefits of outsourcing which omits to explicitly recognise and assess the productivity benefits of team production is seriously inadequate. For Demsetz, 'The degree to which coordination is vertically decentralised is

no longer simply a matter of transaction cost, or even of transaction cost relative to management cost'(p149). Transaction cost theory by itself has more to say about *contract design* than about whether intermediate good production should be within the firm or not. (See for example Bajari and Tadelis (2001), for an analysis in which a transactions cost approach is used to compare 'cost plus' contracts and 'fixed price' contracts for projects under conditions of differing process complexity and risk.)

In contract design theory it is possible to see contract characteristics as part of a continuum or spectrum, running from 'within-firm' type contracts to 'external market' type contracts, with the former having stronger implicit, relational, and long term elements, than the latter, which require more explicit specification of contingencies. In this view the distinction between 'in-house' and 'out sourced' is less distinct.[1] Where there is team productivity and the consequent inability to devise efficient risk-sharing reward schemes for individual elements of a team, then there should be some joint contract with all members of the team[2] – a contract whose characteristics place it towards the 'within firm' end of the contracting spectrum. This is not the approach taken in this paper. Here a dichotomous distinction between 'in house' and 'outsourced' production is made on the basis of whether the productive service or input is supplied by an external market at market-determined terms, or whether it is provided by an 'internal market' in which the terms of supply are a matter of administrative rules and procedures. The defining characteristics of the internal market with respect to labour are discussed below.

Applications of transactions cost-based theory to the 'make or buy' decision have concentrated on the question of vertical integration. Thus the firm is seen in terms of a hierarchy of processes ordered by their stage of production (rather than their attractiveness as a candidate for outsourcing). There is also a consequent emphasis on two-party bargains. (See for example Grossman and Hart (1986), who analyse vertical integration in terms of an optimal contract which maximises the sum of 'net benefits' to two managers, without ever analysing the determinants of each manger's 'benefit').

In general terms, applied analyses see the gains from outsourcing deriving from:

•Least-cost competitive supply of inputs and the benefits of economies external to the firm;

•Efficiency gains in resource allocation through the removal of cross subsidisation and transfer pricing distortions within the 'internal market' of the organisation;

•Efficiency gains through specialisation and concentration on 'core

competencies' (See Milgrom and Roberts 1992 p553 -555).

These benefits are compared to the benefits of vertical integration:

•The avoidance of 'hold-up' problems (derived from asset specificity) and the costs of specifying, monitoring and enforcing external market contracts (especially when asset specificity generates rents to be distributed) – a 'reduction in opportunism' (see Demsetz (1988, p168); and

•Improved coordination and protection for investments (see Milgrom and Roberts,1992, p556).

Empirical case studies of the cost and benefits of outsourcing typically concentrate on estimating the difference between the identifiable and observable cost of the in-house production of an intermediate product, and the cost of external market supply – what is termed below in this paper the 'Raw Cost Differential'. (See, for example, Domberger, Meadowcraft and Thompson (1986,1987). Quiggin (2002) provides a sceptical assessment of these studies.)

Estimating the Raw Cost Differential and its determinants is a necessary and difficult first step. The assessment of comparable costs is confounded by issues involved with measuring outputs and controlling for quality – especially in government and service sectors where most of the recent debates and action on outsourcing have occurred. (See Hart 1996 for analysis of the trade-off between cost saving and quality improvement in the provision of government services, and the implications of this trade-off for assessing the benefits of privatisation.) There are also dangers of distortions in internal costing procedures in relation to transfer pricing within the firm. (See Milgrom and Roberts (1992, p550), for analysis of transfer pricing in the context of vertical integration.) In empirical case studies the estimated Raw Cost Differential is then ascribed to such factors as input capacity utilisation economies, inventory efficiencies, more efficient work practices, and lower wage and employment conditions costs, for the external supplier in comparison with internal production.(See for example Domberger, Jensen and Stonecash 2000).

To the extent that the 'savings' are identified as coming from operational and work practice sources, this methodology is not analysis of outsourcing *per se*, but rather an analysis of the results of different production techniques. Unless some attention is paid to the reasons why the firm is not able to adopt the production techniques of the external supplier (more generally the costs and benefits of such adoption) such an approach is inadequate for addressing the question of outsourcing. Similarly, to the extent that the cost savings reflect a 'raw wage differential' between wage rates for in-house labour and those for the external supplier, the issue is why the firm cannot adjust its wage structure to match that of the external

supplier. It is true, of course, that industrial relations or political considerations may mean that it is impossible (or too costly) to implement adjustments to within-firm wage structures and work practices, and outsourcing is then the *strategic* solution to a management problem (as in the UK newspaper industry example cited above).

Transactions cost theories of the firm point to additional costs for external contracts which may outweigh identified production cost savings. But even when explicit attention is given to the expected present value of the transaction costs of contracting out, this sort of analysis has more to say about *contract design* rather than outsourcing per se, as has been argued above. Most importantly for the argument of this paper, both the Internal Labour Market theory discussed in the next section, and Demsetz's approach to the theory of the firm, emphasise that it is in-house production benefits which justify the existence of 'firms' whose contractual relationships differ qualitatively from those of external supply. The estimation of the Raw Cost Differential between internal and external-source production is a necessary first step, but even within the confines of economic analysis, explicit recognition of the benefits of joint production is required for a more informed analysis of the outsourcing decision.

Internal Labour Market Theory

Within the labour market literature, the concept of the internal labour market (ILM) began with the seminal work of Doeringer and Piore (1971), who define the institution as 'an administrative unit within which the pricing and allocation of labour is governed by a set of rules and procedures'. The reasons for the existence of such institutions lie in the characteristics of joint production and the problems of monitoring and consistent incentives. ILMs develop to deal with these problems in the face of specificity in human capital investments, and opportunistic behaviour in the context of information asymmetries. Here ILM theory parallels transaction cost theories of the firm – indeed it is in terms of transactions costs and bounded rationality that Williamson analyses Internal Labour Markets (Williamson 1985).

Since joint productivity benefits cannot be metered, the institution directs the way in which inputs are used – here ILM theory is consistent with Demsetz's view as to the essential nature of the firm. But ILM theory also provides a richer analysis of the basis for the productivity enhancing-synergies that occur in joint production.

The sources of these synergies are:
•The provision of crucial On-the-Job Training by fellow workers;

•Job idiosyncrasies;

•Accommodation of intra team idiosyncracies;

•Motivations of loyalty, trust, team pride;

•Personal interaction synergies (fruitful personal contacts and relationships – the existence of which helps to explain why, even with the sophisticated electronic interactions of the IT industry, which would seem to require no geographical proximities, there is a Silicon Valley);

•Familiarity and information reservoirs (see Demsetz 1985 who argues that information is the crucial element for team productivity).

The characteristics of an ILM require an incentives scheme based on ethical concepts of fairness and justice, and make crucial the structure of *reward relativities* within the ILM reward system. In order to achieve the maximum productivity benefits of team production, the reward structure must be based on accepted relativities, so as to engender 'consummate cooperation' rather than 'perfunctory performance' (or worse, shirking).

In ILM theory, the existence of this within-firm wage structure, with accepted relativities, provides a dilemma for the management of the firm. Because employers have to recruit and retain labour they cannot wholly be free of the influences of the external labour market. If the within-firm wage (adjusted for non-pecuniary benefits) for a particular skill or category of labour (whose supply is less than perfectly elastic) fails to match the external labour market wage, then the firm will not be able to retain its workers. Thus in a simple ILM model, the firm will have to pay the market wage to some categories of labour, and higher than market wages for other categories, the latter based on the given wage relativities of other categories of labour to the former categories. In terms of the analysis of Brown et al (2001) 'raising the pay of one group (to meet external labour market conditions will) have disruptive effects on established differentials with other groups in the workforce' with 'costly consequences in terms of morale or strike action'. But 'it may be prohibitively expensive to solve the problem by conceding a uniform pay rise for all groups'.

For the purposes of this paper the reward structure can be simply modelled as follows:

Assume there are n categories of labour, i, each associated with an element of a firm's production.

The external market wage for a category of labour is W_i^*

The ILM wage of any category (W_i) will be equal to the market wage for that category, or equal to a relativities factor times an internal reference wage, whichever is the higher.

The reference wage, W_r, is the wage for that category of labour for which its market wage is higher than the wage that would be obtained by

applying its relativities factor to the market wage of any other category.

$$Wi = \rho_i Wr \qquad \text{if} \quad \rho_i Wr > Wi*$$
$$Wi = Wi* \qquad \text{if} \quad \rho_i Wr \leq Wi*$$

Where $\boldsymbol{\rho}$ is the vector of given relativities, $\rho_r = 1$,

and $r, j \in \{ i \}$ such that $Wr = Wr*$ and $Wr* > \rho_j^{-1} Wj*$ for all $j \neq r$,

The simple implication is that each category of labour in the Internal Labour Market will be paid a wage (adjusted for non-pecuniary benefits) at least equal to the external market wage, and higher than the external wage if this is necessary to maintain accepted internal relativities:

$Wi . \geq Wi*$ for all i.

$Wi = Wi*$ for the reference wage.

Comparisons of the distribution of wages within the ILM with the external market wage distribution may be undertaken in terms of their respective moments about the reference wage.

More simply categories of labour may be ranked according to the size of their raw wage differential, $Wi - Wi*$.

Any change in relative wage differentials in the external market will have the effect of re-ordering any ranking of labour categories according to their raw wage differential, and therefore some elements of production will, given no change in the ILM relativities vector, become more attractive and some less attractive as candidates for outsourcing.

The ILM model predicts then, that a period of increasing wage dispersion and changing relativities in the general labour market will generate increased activity both in outsourcing, and in the 'insourcing' of previously externally supplied inputs.

Adjustment to the relativities vector ρ is a possible cost saving response for the firm to a change in relativities in the external labour market. As has been noted above, outsourcing may be a strategy for forcing relativity change. However, in the model of outsourcing costs presented in the next section, the relativities vector is taken as given.

A Model of Outsourcing Costs

The firm is defined to encompass both the notion of an administered internal labour market, and the characteristics of Demsetz's firm. In particular, we assume separably unobservable joint productivity and a central agent with residual reward entitlement and authority to direct production, in contractual arrangements with the asset (human capital) owners who supply inputs. (For simplicity of discussion we will take inputs to be various categories of labour).

Assume that a unit of production of given quality is produced by n 'elements' of production, i, each requiring a quantity of input units L_i (a category of labour, say), each unit paid a 'wage' W_i. Elements are assumed to represent the finest possible decomposition of in-house production. (The basis on which 'elements' of the production process can be usefully defined in practice is an issue addressed by Venkatesan (1992).)

The production function is of the Robinsonian 'blueprints' type (Robinson 1964), with fixed input intensities for a given technique. Therefore the outsourcing decision is modelled as a (0,1) for each element of production i, and a marginalist approach to determining the optimal proportion of any element to be outsourced is excluded from this analysis. (It is true however that in some industries partial outsourcing takes place, for example in large scale grocery retailing. In these cases, a marginalist approach to the degree of outsourcing may be useful.)

L_i reflects the technical and operational conditions of production. Initially we assume that these are the same for internal and external production. Some implications of L_i being different depending on whether production is external or internal are considered below.

The observed, identified standard unit cost function for internal production is:

$IC = \Sigma_i W_i L_i$

The market wage for each element's input is W_i^*

Because of ILM implications $W_i > W_i^*$ except for those elements for which supply constraints make $W_i = W_i^*$.

Assuming the input contribution to an element of unit production is the same whether produced externally or internally, the competitive cost of supply of an outsourced element to the firm is:

$OC_i = W_i^* L_i$

On the basis of Demsetz and ILM theory, it is assumed that internal (joint) production yields spill-over productivity gains which are represented here by a matrix of intra firm 'synergies'

$$\lambda ij$$

whose element λij is the cost saving coefficient for a synergy received by element i from element j.

These coefficients are unobservable and not measurable. Their determination is beyond the ken of economic analysis – they are more issues for operational engineering design, process and systems control analysis, and human resource management. But in any adequate economic assessment of costs and benefits, there is a need for a judgement about the relative size and significance of these synergies, and the manner in which they impact on the net benefits of outsourcing,

Note that $0 < \lambda_{ij} < 1$

$\lambda_{ij} = 0$ for $i = j$

Each element i will have *received synergies* $SR_i = \sum_j \lambda_{ij}$

and *generated synergies* $SG_i = \sum_j \lambda_{ji}$

If the cost saving coefficient λ_{ij}, representing the synergy flowing from j to i because of productive interaction between i and j, is unaffected by interaction between i and any other element k (k≠j) it is defined as *simple synergy*.

If the cost saving coefficient λ_{ij}, representing the synergy flowing from j to i because of productive interaction between i and j, is affected by interaction between i and any other element k (k≠j) it is defined as *complex synergy*. (CSGij|k)

The difference between $\lambda_{ij} \big| \lambda_{ik} \neq 0$ and $\lambda_{ij} \big| \lambda_{ik} = 0$ is denoted

$$\Delta_k \lambda_{ij}$$

This represents the loss of within-firm productive synergy for i generated by j, if the element k is supplied by outsourced production rather than produced in-house.

Again this unobservable but some assessment can be made of its significance on the basis of the existence of interaction between i and j which also involves k. For example the synergies between two elements are not likely to be affected by the activities of the office tea trolley, even though this element has interaction with both. But the synergies between two elements *are* likely to be affected by the activities of an in-house IT maintenance service, and the synergy benefit is quite likely to be reduced if the IT maintenance service is outsourced (See Earl (1996) for analysis of the consequences of outsourcing IT services.)

The true (synergy-adjusted) cost of a standard unit of product produced within the firm is:

$$SIC = \sum_i (1 - \sum_j \lambda_{ij}) W_i L_i$$

The difference between IC and SIC is the essence of the firm's existence and accrues to the residual reward claimant essential in Demsetz's definition of the firm, as a (separably unobservable) component of management reward or profit. The Demsetz assumption of residual reward entitlement implies that the aim of the firm is to minimise SIC.

The synergy adjusted cost of an individual element produced in-house is

$$SICi = (1 - \sum_j ij) \, Wi \, Li$$

This is not observable – here we have a fundamental source of the 'metering' and 'shirking' problems of the theory of the firm – but this does not mean it cannot be conceptually distinguished, and then taken into account in the assessment process.

The net benefit from outsourcing an element i (in terms of the ILM aspect only) is

$$\sum_j (1-\lambda_{ij}) Wi \, Li - \; Wi*Li - \sum_j \lambda_{ji} \, Wj \, Lj - \sum_j [\sum_k (\Delta_i \lambda_{jk}) \, Wj \, Lj] \quad (1)$$

alternatively,

$$(Wi - Wi*)Li - \sum_j \lambda_{ij} \, Wi \, Li \qquad - \sum_j \lambda_{ji} \, Wj \, Lj - \sum_j [\sum_k (\Delta_i \lambda_{jk}) \, Wj \, Lj] \quad (2)$$

Considering the four terms of Equation (2):

$(Wi - Wi*)Li$ is the Raw Cost Differential for element i.

$\sum_j \lambda_{ij} Wi \, Li$ is the adjustment to internal production cost of element i due to production synergies received by i. (SRi)

$\sum_j \lambda_{ji} \, Wj \, Li$ is the loss, when i is outsourced, of internal production cost savings for elements other than i due to the loss of simple production synergies generated by i. (SGi)

$\sum_j [\sum_k (\Delta_i \lambda_{jk}) \, Wj \, Lj]$ is the loss, when i is outsourced, of internal production cost savings for elements other than i due to the reduction in synergies between elements other than i,. That is, the reduction in those complex synergies which have a dependence on i, for the remaining elements of production. (CSGjk|i).

We now consider the determinants and the estimation each of the four terms in Equation (2). The Raw Cost Differential, $(Wi - Wi*) \, Li$, is the result of the raw wage differential and any difference between Li for in-house production and Li for external production. Abstracting from the latter for the moment, leaves the raw wage differential as the source of outsourcing benefits. It may seem an obvious point that it is the *difference* between internal and external wages which is crucial, but Equation (2) does emphasise that elements for which internal production costs are highest, or for which costs are rising disproportionately greater than other costs (a commonly expressed justification for outsourcing), are not necessarily the most attractive candidates.

Indeed, as long as there are some synergies received or generated by the element of production, or some other within-firm synergies that depend

on its presence, *an element whose wage cost is rising because the firm must match external labour market conditions should not be outsourced.*

i.e   If any of SRi, SGi or CSGjki are non zero, element i should not be outsourced if $Wi - Wi^* = 0$.

Here we have one factor which is relevant in explaining the recent apparent attractiveness for large financial services conglomerates of 'insourcing' legal services – a rapidly increasing component of operational costs, but a situation where in-house lawyers will be paid in line with their outside brethren. For example, in 2000 PriceWaterhouseCoopers Australia moved the provision of all legal services within the firm by take-over of its main external supplier Dunhill Madden Butler.

So far we have abstracted from the question of whether Li differs between in-house and outsourced production. Applied and case study analysis of 'make or buy', suggest that significant contributors to raw cost differentials are differences in operational behaviour, and/or economies of scale for the external supplier, which yield higher average input productivity (a lower Li) than that achievable in internal production. Identification of cost advantages due to more x-efficient operations provides the firm with information on the option of internal operation reform, as previously discussed.

If the source of the external production cost advantage is economies of scale, then the issue arises as to whether the firm should expand internal production of an element to supply its own need *and* sell to the external market. In many industries this is a common phenomenon (for example Australia's communications corporation Telstra has business activities in both the telecommunications service and components industries). Such strategy involves a host of additional considerations, including the efficient allocation of employee time and effort between production for internal requirements and for the external market, and the agency problems arising from supplying inputs to product market competitors. These considerations are not pursued in this paper. Here it is merely noted that identification of the role and significance of economies of scale in generating the raw cost differential is useful information in assessing broader management options.

Within the scope of this analysis it is the *synergy adjusted cost differential*

$$\Sigma_j (1-\lambda_{ij}) Wi\, Li\,,$$

that really determines the cost-saving gains from outsourcing. The synergy adjustment $\Sigma_j \lambda_{ij} Wi\, Li$, depends on the unobservable and

unmeasurable $SR_i = \sum_j \lambda_{ij}$.

As has been argued above, the assessment of the size of λ_{ij}'s requires judgements beyond the capacities of economic analysis.

However some indication of the size of SR_i can be provided by noting that it increases (ceteris paribus) with the number of elements j for which $\lambda_{ij} \neq 0$. Thus the number of other elements of production with which element i has interaction (measurable by observation or survey) provides some quantitative input into assessment of whether the synergy adjustment is significant or not. Additionally for given synergy coefficients the value of the synergy adjustment depends on the size of the element's unit labour cost, $W_i L_i$.

Thus an element which has extensive interaction with other elements, even if it receives small synergy benefits from each, may have a significant synergy adjustment to its Raw Cost Differential, and be a less attractive candidate for outsourcing, particularly if it is a high value, substantial component of total unit production cost.

The loss of synergies generated by i (SG_i) is similarly unobservable and unmeasurable. Assessment of its likely size can be assisted by noting that it increases with the number of elements j for which $\lambda_{ji} \neq 0$. Thus the number of other elements which have productive interaction with element i (measurable by observation or survey) provides some quantitative input into assessment of the significance of the lost synergy benefits to other elements when element i is outsourced. And the value of these lost synergy benefits increases with the size of the unit labour costs of those elements with which i is observed to have interaction – i.e with the value of $W_j L_j$ for which $\lambda_{ji} \neq 0$.

Thus, for example, the in-house 'tea trolley' service may generate very small individual synergy benefits to other elements of production. But if these benefits are felt by a large number of other elements, especially if these other elements are themselves high cost elements, then the value of cost saving synergies lost by outsourcing the 'tea trolley' service (using a rented dispensing machine, say) are likely to be significant, and this reduces its attractiveness as a candidate for outsourcing.

Finally, although the value of the reduction in productivity synergies between remaining elements when i is outsourced, $\sum_j [\sum_k (\Delta_i \lambda_{jk}) W_j L_j]$, is unobservable and unmeasurable, it increases with the number of complex synergies with a dependence on i – that is with the number of elements (other than i) which have interactions with other elements (other than i), and these interactions involve i. This number is observable or obtainable

by survey. (For example, survey questions of the type: 'Does your department make use of Facility X?' Does your department make use of Facility Y? Does your department's use of Facility Y involve using facility X?'.) The value of the reduction in productivity synergies between remaining elements when i is outsourced also increases, the higher the value in production of those elements with non zero complex synergies with a dependence on i. (that is, the higher the value of Wj Lj for those elements j for which $\Delta_i \lambda jk$ for those elements $\neq 0$). This is observable.

A framework for cost benefit analysis

The theme of this paper is that the inclusion of explicit systematic analysis of the benefits of within firm production synergies adds value to an economic assessment of the costs and benefits of outsourcing. The model of the previous section suggests a simple practical framework for providing such an assessment for an element of production which is being considered as a candidate for outsourcing.

The framework entails the provision of both quantitative estimation of observable measurable costs differentials, and qualitative ratings of the likely significance of the qualifying or offsetting synergy losses – such qualitative ratings being supported by some quantitative data which provide an indication of the basis and the reliability of these qualitative ratings. (See Venkatesan (1992) for a similar approach to providing a framework for ranking elements of production in terms of attractiveness for outsourcing, according to a number of criteria. The benefits of team productivity are not considered by Venkatesan). The framework here can be seen as assessing the element's attractiveness as a candidate for outsourcing successively against each component of Equation (2).

The first stage is a careful estimation of the raw cost differential for the element – the difference between its identified in-house production cost, and the cost of external supply for equivalent product quantity and quality (as is attempted in the studies of Domberger Hall and Li (1995), Domberger, Meadowcraft and Thompson (1986, 1987) and Domberger, Jensen and Stonecash (2000)).

The second stage is the provision of a qualitative rating of the element according to whether the synergy adjustment which qualifies this estimate of raw cost differential is significant or not. This assessment is augmented by the provision of quantitative data on the existence and extent of interaction between the element and other elements of the firm's production.

The last stage is the provision of a qualitative rating of the element

according to the significance of its effect on the productivity (and hence cost) of other elements' productive activities. This assessment is also augmented by some quantitative data on the number, and the relative contribution to production costs, of those elements who have interaction with the potentially outsourced element, and of those pairs of elements whose interactions involve interaction with the potentially outsourced element.

The argument of this paper has stressed the view that the outsourcing decision involves a range of considerations which extend beyond the contributions of economic analysis. However, it is hoped that the framework suggested here can improve the contribution economic analysis can provide to an informed strategic management decision.

Notes

1 This is particularly so in the recent Australian context of increasing use of individual contracts between firms and their employees.
2 I am indebted to an anonymous referee for suggesting this point.

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