Entrepreneurship, the Firm,
and the General Market Information Problem

by

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The firm form of market structure arises as a means of optimizing
the production, transmission, and validation of information about the quality
of inputs to the production process. Recent research in the economics of
information has focused attention on the diversity of goods and services
which may be sold in the market as of a particular type given the costs
of identifying the precise properties of a good. Several recent articles
have discussed competition among forms of market structure which minimize -
or, more generally, optimize - the total production and transactions costs
for the market output. The entrepreneurial purchasing task is to exercise
selection and apportion rewards so that the cost of market inputs purchased
is minimized for the vector of quality-corrected technical inputs utilized
in the production process. Competition among potential entrepreneurs reduces
the reward - the difference between the value of output and the costs of
other inputs - to the marginal value of the entrepreneur's skill in the
purchasing task. These skills may be acquired through investment in human
capital or by free gift of nature or both. It is reasonable to assume that
special entrepreneurial skills will be limited to the monitoring of a
small subset of all market inputs so that firms will normally be specialized
in products which use similar types of inputs.

It is useful to distinguish inputs between those responsive to incentives and those which are not, say "labor" and "land." Alchian and Demsetz have emphasized the entrepreneur as a monitor of the inputs rendered by labor given the potential shirking inherent in team production. The nature of this sort of monitoring is best viewed within the general market information problem in which X produces information of value to Y more cheaply than Y, but has an incentive to falsify the information transmitted. It is demonstrated that contractual arrangements which eliminate the incentive to falsity through sampling and large penalties create an incentive for Y to oversample so long as Y receives the penalty and there is a chance to rule a true statement false. This inherent symmetry of the problem results in the domination of contractual arrangements among atomistic competitors by relations based on continuing relationships and the creation of valuable reputations on the part of the sellers or the buyers or both groups. Firms establish reputations as honest buyers and enter into client relationships with their employees, or, more generally, suppliers. Thus continuity of existence over time is of the essence of the firm as a monitor of resources.

For inputs which are not responsive to incentives, those individuals with special talents in the selection of those resources can acquire a part of the rent to superior quality inputs. The size of the rent acquired is also determined by competition among potential expert buyers.

Entrepreneurs can monitor not only productive inputs but also other entrepreneurs. The residual shirking implicit in pyramiding of entrepreneurs can be used to rationalize comparative static limits on optimal firm size. The compensation of the chief executives of widely held corporations is analyzed as the yield on the wealth value of his reputation

which gives a direct incentive for self-monitoring despite absence of direct residual ownership. The residual owners receive rewards above or below the market rate on capital according to their abilities to choose among executives with similar reputations those who are underrated or overrated in the market.

Finally the speculative task is discussed. This refers to the rewards to accuracy in prediction of future demand and cost conditions due to better choice of intertemporal output plans. Here too, speculation of this sort is carried out within the context of the firm where monitoring difficulties preclude the use of rental arrangements.

Sections I and II develop and model the concept of the purchasing task of entrepreneurship. Section III analyzes the general market information problem and its applications to team production. Relations among entrepreneurs within the firm are considered next. The speculative task as an explanation of the firm is considered in Section V. Section VI summarizes the results.

I. The Entrepreneurial Function

The entrepreneurial function is the maximization of the wealth value
of the firm. Economists generally treat this task as a somewhat trivial
maximization problem to be carried out by "the entrepreneur."[1] In fact,
this is generally a quite difficult problem which may be solved by
individuals who specialize in different areas of the total function. The
two major tasks grouped under entrepreneurship are: (1) the choice of an
output program which involves the prediction of the future course of prices[2]
and the production function so that an optimal program of purchase and util-
ization of plant can be derived; and (2) the selection and monitoring of
factors of production so as to minimize the cost of any given vector of
inputs to the productive process. I denote the former the speculative task
and the latter the purchasing task. It is the purchasing task that is the
core reason for the existence of the firm and the discussion will initially
focus there, delaying analysis of the speculative task to section V.

Ronald Coase in his article on "The Nature of the Firm" pointed out
that the explanation for the existence of the firm must lie in its ability
to carry out specialized production in such a way that, given the savings on
contracting costs, the firm's performance is superior to that of organizing
production through market exchange. The existence of entrepreneurial activity
which selects and rewards factors of production so that output will be
produced more nearly according to the marginal conditions for an optimum
gives content to these hypothetical savings. Alchian and Allen (p. 282)
and Alchian and Demsetz discuss important aspects of this activity as the
monitoring of team production so as to avoid shirking of duties.

It is rewarding to consider the precise nature of the contracting costs that the entrepreneur is supposed to reduce. These are basically the costs of acquiring information about a heterogeneous commodity. If there were no way to distinguish the quality of services which will be rendered by a particular unit of labor for instance, then it would be impossible to reward high quality inputs by payment of a higher price than paid to low quality inputs. As a result there would be considerable tendencies toward malingering and underinvestment in production of high quality inputs. Recent work on related problems has been carried out by Akerlof, Nelson, Spence, and Darby and Karni. The work by Darby and Karni is of particular interest in the current case, as it concentrates on market reactions to the tendency toward fraud and incompetence in the production of services and commodities, the quality of which cannot be discerned without significant cost even after use. This is always the case in true team production when either the production function has a random element or the qualities of cooperating factors are uncertain or when both occur. In this situation competition among alternative forms of market organization may eliminate atomistic competition as a method of organizing production and allocation. In particular "client relationships" may arise, on the one hand, to provide better ability for the buyer to judge the quality of his purchase, and on the other hand to provide an interest to the seller in providing higher quality services so as to retain the value of the buyer's "good will."[3] Since expertise in judging the quality of services increases the quality of services received at a given price, and the firm may be purchasing considerable quantities of services, a reward will accrue to the ability to judge resources more expertly than competitors. Some entrepreneurs

may be expert judges of certain types of labor, and will specialize in the monitoring of that resource, while another entrepreneur may have a "nose" for selecting land which, after combination with labor and derrick, yields oil.

The entrepreneur thus receives a reward commensurate with the value of his expertise in choosing and retaining the "best" resources out of a mixed bag available at the market price.

II. Entrepreneurship and the Production Function

The analysis may be clarified by reference to a simple model of the purchasing task.[4] Earlier I argued that the purchasing task consists of the selection of resources and the apportionment of rewards so as to transform market input units into technical input units. This is not a part of the production function, but rather is a determinant of the factors of production. Therefore, entrepreneurial capacity should not be treated as a noncontrollable factor,[5] but as the determinant of the transformation from market input units to technical inputs.

The technical production function is

(1) $$x = f(\underline{a}) \ ,$$

where x is output and $\underline{a} = (a_1 \ a_2 \ \dots \ a_m)'$ is the vector of technical inputs. By technical inputs, I refer to the quality corrected units which are appropriate to the production function. An entrepreneur's selection and monitoring of resources can be interpreted as purchasing a vector of market inputs $\underline{b} = (b_1 \ b_2 \ \dots \ b_n)'$ so as to produce a particular value of technical inputs $\underline{a}$.[6] Note that in general n will be much larger than m and considerable substitution among the elements of $\underline{b}$ to obtain a given $\underline{a}$ will will take place. The problem can be divided into two parts: (1) The entrepreneur's transformation possibilities determine the isocost boundary for efficient uses of $\underline{a}$ to produce a given output. The tangency points determine the cost function and hence output of the firm.

Let the firm be defined by its isocost map for production of all economically relevant technical characteristics. An industry is defined by a production function[8] that is available to all potential firms. Then a firm will produce in the industry or industries using most intensively technical inputs for which it has a comparative advantage in monitoring.

The returns attributable to entrepreneurship will be the difference π between the revenue from the output and the cost of the market inputs. The amount π -- or its expected value if we admit uncertainty into the analysis--will be capitalized to obtain the wealth value of entrepreneurship. There is no general reason to call the return to entrepreneurship a form of rent since resources can in fact be invested in increasing one's abilities to evaluate and monitor resources, and this type of investment in human capital will in fact be carried out until the marginal increase in wealth value is equated to the marginal costs.[10]

The model also indicates the determinants of the choice of entrepreneurship in general and in particular the industry on the part of a given individual. Just as some individuals have--and develop--a comparative advantage in acting or tool-making; so other individuals will have a comparative advantage in the evaluation of certain types of resources. These individuals will maximize the value of their earnings stream by becoming an entrepreneur in an industry in which the evaluation of those particular types of resources are most valuable.

III. The General Market Information Problem

The analysis so far has suggested that purchasing or, in Alchian and Demsetz's term, monitoring activities may improve on competitive market organization of team production. This follows from an assertion that evaluation of the qualities of certain inputs is cheaper within the context of the firm. In order to support this assertion, it is necessary to examine the general market information problem.

The great wealth of recent research in the economics information has been dealing with the effects upon the organization of specific markets of a much more pervasive informational problem: The general market information problem -- If X and Y are potential transactors and X can produce and transmit information of value to Y more cheaply than Y can produce the information for himself, but X has an incentive to transmit false information,[11] show what organizational form will result. The informational problem arises from the cost of validating information produced and transmitted from X to Y. Self-produced information is automatically validated but Y's total production and (null) transmission costs are greater than for information produced by X. Therefore the locus of production of information will be determined by whether the minimum costs due to validation and any remaining falsity of X's information are lower than the extra expense of self-production of information by Y.

A given validation method may or may not allow a residual element of falsity to remain in messages from X to Y. There can be falsity which imposes no costs - for instance if all repairmen submit bills for twice as many hours as actually worked, then there are no effects other than the hourly rates being halved by competition. The more interesting case occurs

when for the given validation method there remains falsity which affects
the real distribution of resources such as shirking under a monitoring system
which provides less than full valued incentives to additional units of work.
Such additional costs from "inefficient" resource allocation must be
compared at the margin with increased costs of greater accuracy in
validation.

Analysis of whether the validation system will leave incentive to
falsity - the problem of fraud or moral hazard or shirking - gets at the
basic nature of the informational problem. The information problem arises
because of the high costs of explicitly testing the information provided.[12]
If there were a perfect sampling procedure which never classed a true state-
ment as false, then the validation problem can be solved by imposing a
very high penalty if a dishonest statement is found and carrying out little
actual sampling. For a given probability of being caught if false infor-
mation is given, a sufficiently high penalty can be agreed upon - perhaps
through state enforcement - that will eliminate all dishonesty with no risk
to honest producers of information. But in the normal case, the perfect
test is not available and estimates of input can be made only by imperfect
correlates with true input.[13] In this case the most honest of men risks
being found guilty of dishonesty; or in statistical terms the probability
of Type I error[14] is positive for any feasible test, and it is this factor
which leads to the existence of positive amounts of shirking, dishonesty, or
fraud in equilibrium compared to what would occur if we were all perfectly
honest.

This point can be demonstrated by a simple variant of the Darby-Karni
model. Let the total expected returns R equal a lump sum payment $W(b)$
based on the claimed quality s less the cost of the actual quality provided

$C(r)$ less the expected loss from being found dishonest $F(s - r) \cdot P$:

$$(2) \qquad \mathcal{E}R = W(s) - C(r) - F(s - r) \cdot P.$$

Here both the quality claimed s and provided r will be chosen so as to maximize $\mathcal{E}R$.[15] The cost function may include the dollar value of foregone leisure as well as other costs. The expected value of the penalty is equal to its amount P times the subjective probability of paying it $F(s - r)$ which is an increasing function of the amount $s - r$ by which the claim exceeds actuality. The first order conditions require that the marginal cost of producing units of r to be equal to the marginal effect on the expected fine from reducing r which is also equated to the marginal return from increasing the claim:

$$(3) \qquad C'(r) = F'(s - r) \cdot P.$$

$$(4) \qquad W'(s) = F'(s - r) \cdot P.$$

On our assumption that F is a well-behaved cumulative probability function with $F(0) > 0$, there is some unique P for which s and r are equated and the classical optimal condition holds:

$$(5) \qquad C'(r) = W'(r).$$

For lesser values of P, claimed s will exceed the actual r produced and vice versa. If the (certain) alternative to selling in this market is taken as $\bar{R}$ then the net benefits $[W(s) - C(r)]$ at the optimum must exceed $\bar{R}$ by the amount of the expected penalty, and the buyer can pay that excess without expected cost so long as he receives the penalty with the same probability. This is the crux of the informational symmetry. The buyer will have an incentive to deceive the seller about the probability distribution F, since by increasing the sampling activity he increases his return due to Type I errors as well as from any true fraud. Therefore the buyer would

secretly increase his enforcement activity under this scheme unless the
rewards were reduced. A seller would therefore face a severe information
problem if he were to enter into such an arrangement on a contractual basis.[16]
Indeed the only acceptable level for P would be so low that increases
in sampling beyond the claimed (higher) level would not be expected to
cover their costs. This large amount of sampling, however, conflicts
with efficiency for the validation process. This market information problem
is analogous to Jack Hirshleifer's discussion of overproduction of information
about states of the world in response to possibility for private - but not
social - gain.

If atomistic competition based upon contractual guarantees involves an
unduly large amount of validation activity, then what other form of organ-
ization can improve the result? The answer is a continuing relationship which
neither party has an interest in breaking. In the cases that have been
studied in the past, this has involved creation of a brand name or client
relationship which the seller has an incentive to maintain with his many
buyers. This incentive is the higher price which he can charge to cover
the capital cost of creating and maintaining a reputation for honesty and
fairness. But the information problem is symmetric as we have just seen,
and a buyer's reputation can serve as a guarantee against unfair imposition
of penalties upon a guaranteeing seller. In team production, there are
typically many more buyers than sellers so that it would be cheaper for the
firms to establish and maintain a reputation for being good monitors than
for individual workers to establish a brand name in their own honesty.
Thus workers will be willing to guarantee their performance to a reputable
employer by taking part of their compensation in forfeitable pensions,

specific human capital, or the like. The employer can reduce his labor costs by actions which increase his reputation as a fair employer, such as establishment of explicit, nonarbitrary personnel policies and merit increases and promotions to especially productive workers. The employer typically adjusts the standards applied in any particular case to the individual employee's past performance and reputation so that a bilateral or client relationship is involved rather than simple branding.

There are other forces making for the continuity of the firm's relationship with its employees, of course. Particularly important in this regard is the value of creating and maintaining specific human capital in the form of knowledge of the firm's operations.[17] As mentioned above, the employees may be willing to finance a considerable fraction of this investment as a sort of surety bond for their good performance; so that these are mutually reinforcing considerations. Additionally one way for the firm to guarantee its interest in judging fairly the employee's performance is to invest in the employee's specific human capital.

Similar relations apply to other factors of production than labor, but in relationships with other firms the relationship is frequently much more clearly bilateral with the reputation of the seller guaranteeing quality and the reputation of the buyer guaranteeing the reasonableness of any claim.[18] Stewart Macauly has discussed the widespread use of noncontractual relations in business purchasing. Steven Cheung noted such bilateral relations in the Chinese share-cropping case so as to reduce or eliminate shirking.

Some shirking may exist in equilibrium given the significant information costs of any "perfect" enforcement scheme. This is in addition, of course,

to the possibility of universal porportional "puffing" which effects neither the total payment nor the services rendered. Also, as shown in Darby and Karni, to the extent that resources can be devoted effectively to reducing the probability of detection, there will be misallocation compared to the "free information" case, though not relative to feasible alternatives.

The general market information problem applies only to resources which can vary their quality in response to incentives. For these resources, the reward to the purchasing function is determined by the firm's relative ability to improve on strictly contractual arrangements, through repu- tation as a "good buyer", to the mutual benefit of the parties. For those resources which do not respond to incentives, such as oil in the ground, there will be an opportunity to acquire part of the potential pure economic rent by exceptional skill in choice.

Exceptional skills in monitoring or selecting resources will generally be restricted to a few classes of inputs or even a few types of subentre- preneurs. Also the value of a good reputation as a buyer will be highest in those markets where the firm is active. Therefore multiproduct firms would be expected on this analysis to make products or services which use intensively similar types of inputs.[19]

IV. Entrepreneurship and Residual Returns

In the classical firm, the exercise of entrepreneurship is specific to a single individual. Under a functional conception of entrepreneurship however, entrepreneurial activity can be carried out within the firm by specialists. Just as direct inputs are monitored by an entrepreneur with specialized knowledge, so can a superior entrepreneur exercise expertise in monitoring these subentrepreneurs and so forth in pyramid fashion. In each case both a direct bilateral client relationship between individuals as well as the general reputation of the firm serve to reduce shirking. That shirking which remains under these arrangements can be used to rationalize Oliver Wiliamson's variable α, "the fraction of work done by a subordinate that contributes to objectives of his superior" (p. 128), and hence a static optimal firm size. In a more general model of the type outlined in section II above, the value of α is a function of the resources monitored at each level given a finite time limit on the individual monitors. The simultaneous determination of the optimal level of shirking and span of control will determine the firm size.

Entrepreneurship has long been associated with residual ownership in the literature. In this model the results are indeed greatly simplified by envisaging the central monitor at the top of the pyramid as self-monitored in view of residual claimant status. Alchian and Demsetz specifically assume residual claimant status for the monitor in their rationalization of the classical firm. Coase dissents from the relevance of this association, arguing (p. 392) that "[o]ne entrepreneur may sell his services to another for a certain sum of money, while the payment to his employees may be mainly or wholly a share in profits." In terms of informati

theory, it is possible to analyze the argument readily. It is indeed
possible for the central entrepreneur to not be a residual claimant once
the existence of a wealth value to reputation is conceived. A chief execu-
tive of a widely held corporation thus receives a fixed salary based upon
the value of his reputation. If the wealth of residual owners should fall,
then the wealth value of his own reputation will be affected... If he does
not adjust his income to the changing value of his reputation, then
take-overs will appear profitable and he will be out of a job. To be
sure, this process is imperfect but the imperfections would appear to be
due to the real costs of a take-over and the real information costs of
distinguishing between bad management and bad luck.

Consider the virtually unknown manager of a young firm. He may be
very good indeed, but this is not obvious in any way. The early investors
recognizing his abilities and providing the money to go with his brains
will obtain large returns to their entrepreneurship until the manager
acquires such a track record - and compensation - that it no longer requires
much brilliance to realize that he is very good. This is a thumbnail sketch
of the history of many firms which have yielded large returns at early
stages, but have become merely sound investments as the manager's talents
become generally recognized. The residual owners of such a firm will
change over such a period also, with early owners, who have above average
entrepreneurship in the choice of managers to back, moving on to another
small firm while the new owners choose the firm from among many similar
"blue chip" investments. A similar argument could be made with respect to
declining firms and below average entrepreneurial ability for choosing
managers. Therefore residual owners must carry out certain entrepreneurial
activities in choosing among many firms with managers of similar reputation.

Owners with exceptional talents can regularly achieve above average returns as payment from young managers for the opportunity to build up reputational wealth.

The entrepreneur with exceptional skill in purchasing particular types of "land" can either use this skill to purchase the land for his own production or to certify the land to other entrepreneurs. If he uses the land for his own production, he gains the benefits of his skill in purchasing land but at the potential cost of subpar skill in monitoring cooperant resources. Where the use of cooperant resources is of a simple, limited character, as in the early days of oil exploration, purchasing on one's account would be the normal pattern. But where the resource yielding the pure economic rent is not so predominant in the productive process, the expert buyer without particular skill at monitoring the cooperative factors must choose among monitoring a submonitor, being monitored by a superior monitor, entering into a bilateral monitoring relationship (partnership), or investing in the establishment of a general reputation. The two man partnership, whatever the precise legal form, converts the total team production into two parts with each man responsible for one; thus the dual relationship[20] is established which reduces or eliminates the information problem. Where the expert buyer's talents cannot be used effectively by any one firm, it may be worthwhile to establish a reputation as a sort of employment agency providing recommendations for unusually high quality inputs for their price.

This points out that purchasing and production within a firm eliminates the requirement for establishment of general market reputations which would be required were intermediate products or services laden with credence

qualities sold across markets. Vertical integration would, technical factors aside, be most attractive where it eliminates investment in a general reputation as good sellers and good buyers. This once again points out the essential symmetric, bilateral nature of the market information problem.

V. The Speculative Task

Predictions of future cost and demand conditions faced by the firm
will determine the choice of production plans which the firm should adopt.
Better predictions will in fact increase wealth as a result of a better
production program in which plant size is more closely adapted to changing
conditions.[21] This explains what was termed the speculative task of
entrepreneurial activity. Just as individual entrepreneurs may specialize
in only part of the purchasing task and select or be selected by other
entrepreneurs with different talents, so can selection take place between
specialists in the two tasks of speculation and purchasing.

Arrow (pp. 138-39) has asserted that there is a market failure because
of the inability of an entrepreneur, certain of production costs of a new
product, to obtain insurance as to sales level except by issue of common stock
which "shares the fruits of his special knowledge of production methods ...."
This is in no way different from the situation of any entrepreneur confident
of his ability to carry out the purchasing task, but not at all certain
about the speculative task. If his claims of expertise are demonstrable
to potential speculators,[22] then he can in fact shift the responsibility for
speculation to others by offering shares in a corporation with which he has
executed a management contract at a rate which will cover the value of his
expertise.

Speculation of essentially the same sort could be achieved by an
investor who purchased and rented out plants and equipment to firms, but
there may be significant monitoring problems on the use of the equipment
by the firms which makes this method unattractive. Since purchasing
task difficulties bring the speculative task within the firm, it is fair to
say that the purchasing or monitoring task is the essential aspect of the
firm as a firm, even in those cases where the speculative task is of a very
great significance.

VI. Summary

The central function of the firm is to convert market inputs into the technical inputs of the production process. This conversion varies both with the ability to monitor the quality of resources which respond to incentives and to select higher quality nonresponsive resources among those available as of the same type in the market. Those who have exceptional purchasing skills with respect to certain types of resources will be rewarded for their ability to improve on the atomistic market.

The general market information problem occurs when X produces information of value to Y more cheaply than Y, but X has an incentive to falsify the information which he transmits. Effective contractual guarantees by X to Y create incentives for Y to cheat on the agreement to increase the probability that X, though honest, will forfeit the penalty. As a result, continuing relations and valuable reputations are established. Monitoring in the firm is seen to be a direct application of this general principle.

Chief executives of widely-held corporations who have only trivial residual ownership rights will still be induced to self-monitor by the effect of shirking upon the value of their reputation and, hence, compensation.

The entrepreneurial function can be specialized within the firm or across markets so as to shift risk, reward, and responsibility for various entrepreneurial decisions to those with special talents for making those decisions, through the use of reputation or continuing relationships or both.

The speculative task enters the firm when monitoring problems make the use of rental arrangements an ineffective means for speculating on future demand and cost conditions. Similarly, the selection or resources not responsive to incentives is carried out within the firm because of the market information problem involved in the sale of information on quality of the inputs as opposed to the products of the inputs.

FOOTNOTES

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[1] William Baumol has made this point with particular eloquence.

[2] Or more generally, demand and suply conditions for price searching firms. For certain products the price received by the firm depends not only on the general price level of the output but also on the premium or discount paid for the particular qualities of the product as preceived by the purchasers. Darby and Karni present a detailed analysis of major aspects of this problem, but for the current discussion it presents an unnecessary complication and will be omitted.

[3] The informational problem will be analyzed in detail in Section III below.

[4] By confining the model to the purchasing task of entrepreneurial activity, I am able to avoid the complications present in the more general variational problem which includes the speculative task.

[5] The customary argument posits the firm as having a fixed amount of entrepreneurial capacity which may be explicit or implicit in the firm's production function (See Friedman, pp. 136-38).

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[6] This involves not only judging and motivating high performance of individual factors of production, but also choosing factors (particularly labor inputs) which will work well together as a team. This model is analogous to the consumption theory which views goods as being used to produce characteristics which are the arguments of the utility function as developed by Lancaster and others. In the current model, however, the transformation will generally be nonlinear.

[7] Certain a-characteristics may be available only in combination so that the feasible set may not extend to the boundries of the positive orthant except at the origin. '

[8] Or more generally by a set of potential production programs.

[9] See also the related discussion at the end of Section III.

[10] Finis Welch discussed education as a means of increasing "allocative abilities" or "entrepreneurial capacity" in a similar model.

[11] In the literature this incentive has been provided by making the informaion concern the properties of a good produced or sold by X, but my colleague Bryan Ellickson has pointed out that the public goods problem revolves around the same sort of incentive to transmit false information about personal valuations of public goods.

[12] This excludes the case of Nelson's experience good where the information is known as soon as the good is experienced. Here the main difficulty arises from the high cost of transmitting information. Another exception involves two-person team production. Information about the other team member's input can be derived from knowledge of ones own input and the production function, at least on average where the production is repeated enough to produce a large sample relative to any stochastic element in the

production function. This ability of each member to assess the other's input breaks down, however, when the team contains three or more members. In dual team production a continuing relationship of the type discussed below can work very well indeed.

[13] If no such correlates exist, the market level of information quality will fall to zero; see Akerlof on this point.

[14] Type I error consists of rejecting the null hypothesis of honesty even if it is correct. The repeated sampling possible in a continuing relationship reduces the amount of dishonesty permitted by increasing the power of the test. Thus Darby and Karni suggest the existence of client relationships and the like in the market for credence goods.

[15] More generally r and s could be taken as vectors describing the actual and claimed properties of the good with the analysis carried out in matrix notation. The assumption that the expected returns instead of the expected utility of returns is maximized implicitly assumes risk neutrality. Risk aversion would strengthen the point made in the text, but is not necessarily present ahd hence omitted.

[16] Put simply, whoever is making an imperfect evaluation will have an incentive to shade his judgement in his favor.

[17] See Walter Y. Oi on this point. Gary Becker (pp. 19-20) has noted that acquisition by the employer of information about the talents of an employee is a specific investment in human capital. A good employer can reduce the amount of job sampling and the like used in obtaining that information, however.

[18] A worthwhile example of the value of such relationships is differences in the treatments of claims by motor freight companies according to who is

making the claim. For irregular customers, the procedure is quite involved with inspections, bids, and legalistic forms. With a regular, trusted customer extralegal arrangements are normally made to eliminate these costs on a shared risk basis. Of course, if the customer perceives more careless treatment or the carrier observes deterioration of packing quality, the arrangement breaks down.

[19] The effect of reputation thus reenforces the effects of comparative advantages in monitoring skills as discussed in Section II and by Richardson.

[20] See footnote 12 above.

[21] Jack Hirshleifer (1971, 1972) has distinguished this type of speculation affecting production from speculation which effects no changes in production (inclusive of intertemporal reallocation) but only determines allocation in alternative states of the world.

[22] If they are not, then it is not clear in what sense others are not bearing risk with respect to production costs, mitigated by their relative expertise in choosing entrepreneurs as discussed in Section V above.

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