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Explaining the Swollen Middle:  
Why Most Transactions are a Mix of  
"Market" and "Hierarchy"

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Explaining the Swollen Middle:  
Why Most Transactions are a Mix of "Market" and "Hierarchy"

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WHY MOST TRANSACTIONS ARE A MIX OF "MARKET " AND "HIERARCHY"

Why are firms sometimes more efficient than markets at organizing transactions? Why are most transactions arrayed neither at the pure "market" nor at the pure "hierarchy" end of the continuum, but rather in the "swollen middle"? Why don't firms make greater use of price incentives? This paper addresses these three questions by developing a model of the choice of institution.

One key building block is the distinction between organizing methods (hierarchy and the price system) and institutions (firms and markets). Hierarchy and the price system are two distinct methods for organizing transactions. The paper focuses on the enforcement properties of both methods. Hierarchy controls individuals directly by constraining behavior, while prices do it indirectly by measuring output. Each system has its own biases: using prices minimize shirking costs but maximize cheating costs, while relying on hierarchy results in the opposite bias. Organizing costs are the sum of shirking and cheating costs. Any given transaction will be organized by the mix of behavior and price constraints that minimize organizing costs. A transaction will be organized within a firm if the reduction in cheating costs achieved by replacing price constraints by behavior constraints exceeds the resulting increase in shirking costs.

The paper shows that the concentration of transactions in the swollen middle can be explained by the increasing cost of shirking and cheating as one increases the proportion of behavior or price constraints. Examples drawn from agriculture, the exchange of reputation, and the purchase of marketing services show that the model helps explain the particular institutional arrangements common in these industries. Finally, the paper explains the costs of using two types of price incentives in firms, piecework and profit centers, and predicts when they will be used.



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1. Introduction.

Since its emergence in the mid-70s (Williamson, 1975), transaction costs economics (TCE) has shown itself to be a very useful tool for explaining economic institutions, both domestic and international. Yet the paradigm is not without its critics. This paper addresses two fundamental criticisms leveled against transaction costs theory. First, transaction cost theory is only a theory of market failure--it does not explain why firms succeed

(Demsetz, 1988). Second, as Perrow (1986) asserts, the categories of "market" and "hierarchy" used in transaction costs theory are not useful; observation shows that most transactions cannot be categorized as either "pure market" nor "pure hierarchy" (Powell, 1987; Stinchcombe, 1990).

The tendency of some of the writings in TCE has been to rely on the presence of transaction costs in markets to explain why firms internalize a transaction. It seems clear, however, that the presence of market transaction costs is not a sufficient condition for internalization. Organizing exchange and cooperation is costly, and while TCE has mostly focused on organizing costs in markets (transaction costs), one must also realize that firms also incur organizing costs. It is in fact perfectly plausible that firms, in their attempt to internalize market failures, experience higher organizing costs than markets. If organizing costs in firms are so high that they absorb all of the gains from exchange and coordination, then no economic interaction will take place, either within firms or in markets. A complete theory of economic institutions should therefore consider simultaneously the costs of organizing transactions in markets (market transaction costs) and those of effecting exchange within the firm (internal organizing costs), and should explain how firms can achieve lower organizing costs than markets. This requires a theory of the organizing method(s) used by firms, and of the costs and benefits of those methods relative to those used in markets.

Proponents of TCE have argued that a firm can avoid market transaction costs by internalizing the transaction. But a firm that internalizes does not avoid the market. Instead it shifts the transaction from the market for intermediate inputs to that for labor. A firm which fears being held up by a



supplier of raw materials can buy it out, and transform its owner into an employee. While this action eliminates transaction costs in the market for raw materials, the firm must now incur the cost of monitoring the new employee. As Grossman and Hart (1986, p. 692) explain,

Given that it is difficult to write a complete contract between a buyer and a seller, and this creates room for opportunistic behavior, the transaction-cost based arguments for integration do not explain how the scope for such behavior changes when one of the self-interested owners becomes an equally self-interested employee of the other owner.

Why then is organizing within the firm sometimes preferable to organizing in markets? At one extreme, some argue that firms are superior to markets because they can establish an internal market when the external market is missing or is subject to high transaction costs. At the other extreme stand those who argue that what gives firms a comparative advantage is the use of fiat.

Rugman (1981, p. 28) provides a clear statement of the first view. He argues that

Internalization is the process of making a market within a firm...The internal prices (or transfer prices) of the firm lubricate the organization and permit the internal market to function as efficiently as a potential (but unrealized) regular market.

If the reason why firms are more efficient than markets was their replacement of external by internal prices, then we should observe widespread use of internal markets in firms. Although this concept of "internal markets" accounts for some of the features observed in firms, it fails to capture what is distinctive about the way economic activity is organized within firms (Hennart, 1986). The productive activity of most employees is not directed by prices but by directives from their superiors. In multidivisional firms

divisions do not use shadow prices to guide intra-divisional transactions. As shown by Eccles and White (1988), their use for inter-divisional coordination is subject to significant distortions which limit their effectiveness.<sup>1</sup>

If the use of price incentives in firms is subject to serious limitations, what makes firms more efficient than markets? For Williamson (1975, 29-30), it is the use of authority. Disputes are easier to resolve in firms than in markets because a boss has authority over employees: internal auditors have easier access to information than external ones, and their fact-finding missions are likely to elicit more cooperation. Intrafirm disputes can also be resolved by managerial fiat, a procedure that is faster and less costly than adjudication through the courts, the main method available to market participants.

This view that the main advantage of firms over markets stems from the use of authority has been criticized by Alchian and Demsetz (1972, p. 777), who argue that a boss has no more power over his employees than over an independent contractor:

It is common to see the firm characterized by the power to settle disputes by fiat, or by disciplinary action superior to that available in the conventional market. This is delusion. The firm does not own all its inputs. It has no power of fiat, no authority, no disciplinary action any different in the slightest degree from ordinary market contracting between any two people. I can "punish" you only by withholding future business or by seeking redress in the courts for any failure to honor our exchange agreement. That is exactly all that any employer can do. He can fire or sue, just like I can fire my grocer by stopping purchases from him or sue him for delivering faulty products .

Grossman and Hart (1986, p. 695) have also denied that common governance reduces information asymmetries, arguing that "any audits that an employer can have done on his subsidiary are also feasible when the subsidiary is a

separate company".

In short, there is considerable debate on the exact reasons why organizing within firms can be more efficient than organizing through the market.

The problem of isolating what makes firms efficient is also complicated by the presence of market-like processes in firms (such as profit centers and piece work). This brings us to the second major criticism of TCE. Perrow (1986, p. 255) argues that TCE neglects the complexity of actual institutions by focusing on the two extremes of markets and hierarchy. According to Perrow,

There are strong elements of markets within hierarchies. On the other hand, markets have strong elements of hierarchy within them. The distinction between markets and hierarchies is greatly overdrawn. The continuum from market to hierarchy is less like a ruler than a football, with a vanishing small pure type at each end, and a swollen middle that mixes the two (as Sidney Winter once put it in a seminar)...Very little of organizational life remains at the two ends of the 'football'".

This brief review of the literature suggests that a theory of economic institutions must explain why and when firms are more efficient than markets. However, this is not enough. It must also explain the "swollen middle," the fact that a large percentage of economic exchanges are a mixture of market and hierarchy. This paper builds such a theory.

Section 2 develops a theory of what makes firms efficient by contrasting two polar organizing methods, the price system and hierarchy. The model builds upon transaction costs economics (McManus, 1972; Williamson, 1975, 1985; Ouchi, 1977, 1979; Hennart, 1982, 1986; Buckley and Casson, 1985; Barney and Ouchi, 1986; Masten, 1988), property rights theory (Alchian and Demsetz, 1972; Alchian, 1984; Grossman and Hart, 1986; Demsetz, 1988; Barzel and Suen, 1988) and on agency theory (for surveys see Levinthal, 1988 and Eisenhardt, 1989).

Section 3 demonstrates how the model accounts for the wide variety of institutional forms used in organizing two particular transactions: the transfer of reputation and the procurement of marketing services. One important implication of the model developed in this paper is that re-introducing market processes within firms incurs increasing costs. This point is developed in Section 4. Section 5 summarizes the argument of the paper.

## 2. A Model of the Choice between Firms and Markets.

This section develops a model of the factors influencing the choice between firms and markets based on a comparison of the costs of cheating and shirking. The argument consists of six basic propositions:

1. One must distinguish between methods of organizing (the price system and hierarchy) and economic institutions (markets and firms). There is no one-to-one correspondence between the two, and any given institution may, under specific circumstances, use a mix of both methods of organization.
2. The two organizing methods, the price system and hierarchy, use different techniques to organize economic activities. The price system rewards agents on the basis of their outputs; hierarchy rewards on the basis of behavior (inputs). In a world of zero transaction costs, both would be equally effective (Coase, 1937). With positive organizing costs, each technique will experience divergent levels of costs for a given transaction.
3. The cost of using price constraints (cheating cost) is the cost of measuring output, plus the losses due to fraud when measurement is imperfect. The cost of using hierarchy is that of using behavior constraints. This cost, which we call "shirking cost", is the sum of the cost of constraining behavior plus the residual amount of shirking due to imperfect behavior constraints.
4. Price constraints minimize shirking but encourage cheating; behavior constraints minimize cheating but encourage shirking. The choice between using prices and hierarchy will depend on the relative costs of measuring output plus that of tolerating the residual amount of cheating as compared to those of constraining behavior and of bearing the residual amount of shirking.
5. Markets are institutions that predominantly use the price method of organizing. Firms predominantly rely on hierarchy. However, because of diminishing returns to measuring output and constraining behavior, both firms and markets will often use a mix of price and behavior constraints. The firm's mix will contain a high proportion of behavior relative to price constraints;



the mix in markets will be biased towards price constraints.

6. The combination of price and behavior constraints defines a wide variety of institutional forms along a continuum which goes from pure spot markets to traditional firms. The model explains why the most common institutional forms use both methods of organizing.

These propositions are more fully developed in the pages that follow.

## 2.1 Organizing Methods vs. Economic Institutions

The starting point of our analysis is the distinction between methods of organizing (the price system and hierarchy) and economic institutions (markets and firms). Prices and what we call "hierarchy" are methods used to organize economic activities. Markets and firms are institutions which use one or both methods to achieve that goal. Although markets predominantly use prices as methods of organizing and firms rely principally on hierarchy, there is not a one-to-one correspondence between prices and markets and hierarchy and firms. Thus firms may develop internal pricing systems and markets may use behavioral constraints. Indeed, as we will show below, it is generally efficient to use a mix of both methods of organizing in firms as well as in markets.

## 2.2 Markets and Firms in the Absence of Organizing Costs

Cooperation between individuals can be productive, either because some tasks are best achieved through pooling of effort or because individuals have differing abilities and they can exploit these differences through exchange. However, achieving cooperation is not costless. Parties to the interaction must be made aware of the potential gains of cooperation. The gains of cooperation are joint, so a formula for dividing those gains must be imposed on the parties to curb bargaining. And this sharing rule must be enforced. All

of these activities carry a price tag.

Achieving cooperation would be costless if such activities were unnecessary. This would be the case if individuals had unlimited abilities and were perfectly selfless. In the real world, individuals have "bounded rationality" and they are opportunistic (Williamson, 1975). It will then be necessary to incur the costs of informing parties, rewarding them for productive behavior, and curbing bargaining. These information, bargaining, and enforcement costs are the costs of organizing economic activities. They must be borne when using either method of organizing, whether it is the price system or hierarchy. Because the price system and hierarchy use different incentive and information structures, they experience divergent costs when organizing a given transaction. Each method will therefore have a comparative advantage in organizing a particular set of transactions. Assuming some degree of competition which penalizes the use of inefficient methods, then the method of organizing that will be used to organize a transaction will be the least costly.<sup>2</sup>

The following paragraphs briefly describe how the price system and hierarchy organize economic activities in the absence of bounded rationality and opportunism. This allows us to separate the description of the basic method of organizing from the actual performance of these methods of organizing when organizing costs are positive. To simplify our discussion, the emphasis will be on enforcement costs.<sup>3</sup> Let us first turn to the price system.

Prices perform the three tasks of organizing: they inform parties, they curb bargaining, and they provide rewards and punishments. In the absence of transaction costs (when there are perfectly defined property rights with

costless enforcement, zero information costs, and a large number of buyers and sellers), prices convey information on the consequences of one's actions so as to allow parties to reach optimal decisions on the allocation of tasks. The information structure of a market is fully decentralized, and each party receives through prices information about everyone else's needs and desires, and adapts to it in a way that maximizes joint welfare.<sup>4</sup> When markets function in this way, prices are exogenous and bargaining doesn't pay. Prices meter and reward perfectly an agent's behavior; the gross rewards that agents receive is a direct function of their output times those market prices.

In the absence of organizing costs, hierarchy would also organize economic activities perfectly. The hierarchical method of organizing is characterized by centralized information and the use of behavior constraints. (Recall that we define hierarchy as a method of organizing--hierarchy is not synonymous here with "firm" nor with "upper level managers"). Thus, while information is decentralized with prices, it is centralized with hierarchy. Under hierarchy individuals (employees) are asked to channel the information they possess to a central party who assimilates this information and retransmits relevant parts of it back to the employee in the form of directives. With unbounded rationality, this is as efficient a method of making optimal decisions on the allocation of tasks as the decentralized system of market prices.

Individuals who organize their interactions through the price system collect their own information and make their own productive decisions. They are rewarded in proportion to their output measured at market prices. Their rewards serve as incentives to collect the best information possible and to

act on it. By contrast, under hierarchy, the individual agrees to have the central party (the boss) direct the allocation of his or her own resources (such as his or her labor-time and effort). The employee agrees to do as told, within the constraints of social custom. Under these conditions, no rational individual would permit to let someone else direct his productive behavior if he was rewarded by his output measured at market prices. He then would have to bear the cost of being ordered to perform tasks that do not maximize his income. Consequently, employees are not rewarded by their output measured at market prices, but instead by their obedience to managerial directives. In other words, while prices indirectly guide behavior by rewarding output, hierarchy directly controls individuals by specifying behavior and rewarding compliance. Because employees are not rewarded by their output, they will be less concerned about the allocation of their resources. Direction of tasks will therefore be easily performed by fiat.

### **2.3 Prices and Hierarchy with Positive Organizing Costs**

In the real world, with its bounded rationality and opportunism, the price system and hierarchy both incur costs in organizing economic activities. But because of the differences in the way they perform this task, each method of organizing will incur a different type of costs. The efficiency of the price system will be reduced by the cost of cheating, while hierarchy will suffer shirking costs.

For prices to efficiently guide individual action to reap the benefits of exchange and coordination, they must reflect the value of goods and services. This in turn presupposes that the value of the output produced can be perfect-



ly measured by the interacting parties. In reality, bounded rationality will make measurement costs positive and output will be imperfectly measured. Hence prices will not provide the "right" signals: agents will be incited to use too much of the goods whose price is below cost, and too little of the goods priced below its benefit to the group.<sup>5</sup> Similarly, when the number of buyers and sellers falls, prices are no longer exogenous, and it will pay for agents to invest in bargaining. When the number of buyers and sellers is large and consumers are perfectly informed, competition will weed out dishonest traders, since they will not get repeat business. A small number of parties (a thin market), on the other hand, makes it difficult to switch partners, and this reduces the self-enforcing properties of markets.

Because measuring outputs experiences diminishing returns, it will not pay to attempt to measure outputs perfectly. Measurement costs will be incurred up to the point where the marginal cost of measurement equals its marginal benefit. This will make it possible for traders to cheat. For example, farmers may surreptitiously add water to the milk they sell to dairies, or may sell milk contaminated with pesticides, and yet charge dairies the price of unadulterated milk. The dairy could perform extensive tests on each batch of milk, but the cost is likely to be prohibitive. Instead, it may perform limited tests on some of the milk it purchases, and accept some cheating because it is not worth curbing. The organizing costs incurred by the price system (as far as enforcement is concerned) are referred to as cheating costs, and they are the sum of the cost of measuring output plus the cost of the residual amount of cheating due to imperfect measurement.

When cheating costs are high, a switch to hierarchy may reduce organizing

costs. Hierarchy reduces cheating by reducing the incentives individuals have to cheat. It does this by breaking the connection between outputs and rewards. Individuals are paid a fixed sum to follow orders, and thus gain little from cheating.

Such a system of rewards independent from outputs has one unavoidable consequence: while it reduces cheating, it also reduces incentives to work. When agents governed by prices (self-employed individuals) take the day off, their output suffers. Since lowered output decreases their reward, they pay the full cost of their loafing. Employees, on the other hand, have less incentive to generate output, because their reward is no longer directly proportional to that output measured at market prices. As long as their behavior is costly to monitor, employees will have incentives to shirk, i.e to break the spirit or the letter of their promise to do as told. Note that shirking does not necessarily mean loafing. It means that the behavior of an employee will differ from what it would be if he were self-employed.<sup>6</sup> Employers will therefore have to invest resources to monitor and direct the behavior of employees.<sup>7</sup> The amount of shirking will depend on the extent to which the employee's goals differ from those of the employer and on the cost of constraining employee behavior. There are likely to be diminishing returns to constraining employee behavior, so it will not pay to totally eliminate shirking. Shirking costs, one of the costs of using hierarchy, will therefore be the sum of the costs of constraining behavior and of those of bearing the residual amount of shirking. In summary, the two methods of organizing, the price system and hierarchy, are essentially substitutes: switching from prices to hierarchy reduces cheating, but at the cost of increasing shirking.

#### 2.4. The Choice between Firms and Markets

Shirking costs and cheating costs tend to differ across activities. Some activities, for which output is relatively easy to measure but for which behavior is difficult to direct and monitor, will be organized most efficiently through prices. For other activities, it may be difficult to measure all the relevant dimensions of output, but relatively easy to constrain behavior. These activities will be organized through hierarchy.

The argument made so far is summarized in Figure 1. Total organizing costs ( $CS^1$ ) are the sum of cheating costs (line  $CC'$ ) and shirking costs (line  $SS'$ ) (recall that shirking and cheating costs are the sum of the costs of enforcement and the residual amount of loss; alternatively, they can be thought of the total amount of loss sustained in the absence of enforcement). Moving from the left to the right of the figure means replacing price constraints by behavior constraints. As behavior constraints replace price constraints, the level of cheating costs ( $CC'$ ) falls and the level of shirking costs ( $SS'$ ) rises, and vice-versa as price constraints replace behavior constraints. This reflects our assertion that increased shirking is a necessary consequence of reducing cheating, while reducing shirking automatically increases cheating. The institution chosen will be that for which total organizing costs,  $CS'$ , the sum of cheating and shirking costs, is lowest. In the figure, H represents a pure hierarchical solution (zero price constraints, 100 percent behavior constraints). This institution will be chosen if the reduction in cheating costs achieved by replacing all price constraints by behavior constraints exceeds the resulting increase in shirking cost (Figure 1a). Similarly, M represents a pure price solution (100 percent price con-

straints, zero behavior constraints), and will be chosen in the opposite case (Figure 1b). The type of transactions found in markets are clustered at M, while those found in firms are at H. As argued earlier, the level of shirking relative to cheating costs, and hence the institution chosen to govern the transaction, will vary from transaction to transaction.

An example may clarify the argument. Agricultural production requires the cooperation of two inputs, land and labor. In some cases these two inputs can be owned in requisite quantities by the same person (the family farm), but in others the two inputs are held by separate individuals. One observes a variety of ways in which these inputs are coordinated. In the market solution the landowner rents land to the owner of labor in exchange for a fixed payment corresponding to the value of the land, leaving the tenant free to make production decisions as he/she sees fit. Under a hierarchical solution, the landowner hires labor for a fixed salary, directs production, and monitors labor's behavior.

The relative biases observed in these alternative arrangements illustrate the points made above. Land possesses many attributes beyond its physical surface, such as the soil nutrients, the improvements, and the trees growing on it. Since most of these characteristics are inputs into farming, their use can increase the tenant's income. If it is difficult for the landlord to measure the tenant's use of these inputs, then the tenant can obtain them at a low or zero price, and he/she can be expected to maximize his/her income by overexploiting the inputs, depleting their stock faster than the landowner would if he were exploiting the land himself. On the other hand, the tenant farmer has strong incentives to exercise maximum effort and initiative in



farming, since he gets to keep the proceeds (less the fixed rent). Thus, tenant farming maximizes effort and initiative, but it also entails over-exhaustion of those characteristics of the land that are difficult to measure (Table 1).<sup>8</sup>

The biases of employing farm laborers are exactly opposite. An employee governed by hierarchy has no incentives to run down the land, since his pay is not function of the output. On the other hand, an employee has little incentive to expend energy and initiative, for the very same reason. If, as argued above, cooperating parties choose the system of organizing that minimizes the total cost of coordination, then the choice between rental arrangements (the market relationship) and a pure employment relationship (hierarchy) will depend on a comparison of two types of costs: (1) the extent of the losses that can be inflicted by a tenant overexploiting the rented land (cheating costs) and (2) the extent of the shirking losses that result when the employee does not show care and effort in the performance of his duties (Barzel and Suen, 1988).

The factors that govern the choice of actual agricultural institutions seem consistent with this model. Binswanger and Rosensweig (1983) note that rental contracts are rare for land with trees whose continued value depends on pruning and maintenance, as in the case of coffee, cocoa, and apples. On the other hand, coconuts do not require pruning, and tenancy in coconut trees is quite common in India. For the same reasons, land is commonly rented in the U.S. to grow annual crops, but rarely in the case of land planted with fruit and nut trees. These constitute a major investment that could be readily run down by an unscrupulous tenant (Klein, Crawford, and Alchian 1978). Thus land

which could be subject to substantial "cheating" is not rented. Furthermore, evidence shows that employment contracts are used in agriculture only when opportunities for shirking are limited, that is for tasks that are relatively easy to monitor, and where the activity is effort-intensive, but not care intensive. This is the case where a large number of workers are concentrated in a small area, and where the work requires effort, but little care and judgment--for example harvesting cotton (Fenoaltea, 1984). When activities are spatially dispersed, involve the use of capital subject to abuse, or require individual judgment and initiative, shirking costs rise, and the use of hired labor diminishes.<sup>9</sup>

## 2.5 Hybrid Institutions

Figure 1 assumes that there is a linear relationship between the level of constraints and the amount of shirking/cheating. If this is the case, imposing a mix of behavior and price constraints will never minimize total organizing costs. However, most actual institutional arrangements do combine both price and behavior constraints. Transactions commonly referred to as market arrangements are governed mainly by prices but also often include behavior constraints. Borrowing money is a market transaction. Yet it often involves the imposition of a significant number of behavior constraints. For example, bond covenants usually limit dividend payments, future debt issues, and specify minimum levels of working capital (Jensen and Meckling, 1976). Market transfer of knowledge through licensing is usually accompanied by various restrictions on the behavior of the technology buyer, curtailing his right to export the product manufactured under license (Caves, Crookel, and Killing, 1983).

Similarly, employment relationships which consist essentially of directives specifying behavior sometimes use prices to indirectly control some aspect of that behavior. About one-quarter of all workers in U.S. manufacturing industries in the mid-70s (and 23 percent of all farm labor in 1959) were not remunerated solely in function of their obedience to managerial directives, but were paid, at least in part, in relation to their marginal product (Seiler, 1984). Piece work schemes, bonuses paid to employees, and stock option plans, are examples of this type of arrangements. Such pay schemes are especially widespread at upper levels: bonuses made up 31 percent of the total compensation received by Executive Vice-Presidents in 1986 (Reibstein, 1987).

Figure 2 shows what happens when the level of cheating and shirking costs increases non-linearly as one specializes into one method of organizing. The minimum of total organizing costs ( $CS'$ ) is then attained in institutions which combine price and behavior constraints. This is because it becomes prohibitively costly to use either pure hierarchical or price methods. In that case, it will pay to combine the two organizing methods. Hence the use of behavior constraints in what are still thought as market transactions, and the use of price constraints within firms.

To better understand the situation depicted in Figure 2, we return to our earlier agricultural example. Consider the case in which the land attributes that must be protected from overuse (or in which the renter must be encouraged to invest) are so few in number or of so little value as inputs as to make the complete switch from a lease to a full-blown employment contract unprofitable. The landowner may then impose behavior constraints on the few attributes of land which are economically valuable but difficult to measure ex post. The

landlord will draft a lease with clauses stipulating the "type of plowing permissible, the number and type of crops allowed, and instructions concerning manures and commercial fertilizers" (Reid, 1973, p. 119). Limited behavior constraints will thus supplement a core of price constraints. Such "contracts" cluster around T in Figure 2.

The greater the number of ways in which the renter can affect land quality, the more costly it will be to write such contracts. Renters will balk at contracts specifying in detail their behavior, since they alone bear the pecuniary consequences of the agricultural practices followed. Hence a renter will accept increased landowner direction of his behavior only if the landowner can be made to share the monetary consequences. Sharecropping, in which both landowner and renter get paid from the joint product of their inputs (land and labor) will be the preferred solution when land quality can be significantly affected by the renter in ways which are somewhat difficult to detect ex post and when constraining the behavior of workers is relatively costly as well. Compared to a pure rent, sharecropping reduces the renter's incentive to abuse the land; however, because it weakens the link between output and reward, sharecropping may also increase his incentive to shirk (Barzel and Suen, 1988).<sup>10</sup>

As the costs of controlling overexploitation (cheating) by the tenant increase, the landowner may decide to completely replace the lease agreement with an employment contract. But if the cost of constraining employee behavior is very high, the increase in shirking costs may be significant. The landlord may then choose to curb opportunities for shirking through behavior constraints but to incorporate some of the motivating features of the price



system (and put up with the resultant amount of cheating). Piece-work schemes would be introduced into what are essentially employment contracts. An example of this modified employment relationship is found in the Philippines, where labor hired for cutting sugarcane is paid almost exclusively by piece rates. All dimensions of performance are easy to measure: the number of cane points cut reflects the quantity of output. Cane cutters may have a tendency to conserve on effort by not cutting the cane points close to the ground, but this form of shirking can be easily detected by observing the field after harvesting (Roumasset and Uy, 1980).

Figures 1 and 2 show that the imposition of behavior constraints (and the concomitant relaxation of price constraints) is a necessary condition for the reduction of cheating costs, and hence for the existence of firms. Indeed firms make widespread use of pure employment contracts in which employees are rewarded entirely in function of their obedience to managerial directives. Because the level of shirking may in some activities grow more than proportionally as behavior constraints replace price constraints, firms may reintroduce price constraints alongside behavior constraints. Therefore it is the relative emphasis on price versus behavior constraints that differentiates firms from markets: in firms behavior constraints dominate, while in markets price constraints are dominant. It is not because they mimic the price system that firms can sometimes incur lower organizing costs than markets, but because they replace price constraints with behavior constraints. In some cases the high cost of establishing a pure system of behavior constraints may lead them to selectively reintroduce some degree of price constraints, but behavior constraints will still be the firm's primary organizing method.

Lastly, while there are clear conceptual differences between prices and hierarchy as methods of organizing, the distinction between "firm" and "market" is sometimes ambiguous: so-called "market" transactions may take on many "firm" characteristics while "firm" arrangements may have "market" overtones. But this ambiguity does not invalidate the usefulness of distinguishing between markets and firms if a clear distinction is made between organizing methods (prices and hierarchy) and institutions (markets and firms). The costs and benefits of any institution can then be analyzed in terms of its relative mix of the clearly defined and conceptually distinct "pure" categories of "price" and "hierarchy".

### **3. Application to the Sale of Reputation and Marketing Services**

The model sketched above is useful to better understand the wide range of contemporary economic institutions. The section explores the forms taken by the transfer of reputation, and then turns to the institutional arrangements made for the purchase of marketing services.

#### **3.1 Reputation**

When testing of a product results in its destruction (as in the case of restaurant meals or hotel nights), the quality of that good or service cannot be evaluated prior to its purchase. In that case, trademarks become symbols of quality and obviate the need for trial before purchase. Because trademarks economize on search costs, buyers are willing to pay premium prices for goods and services bearing the trademark. Once established, a trademark can be sold to independent producers of the good or can be exploited directly by the trademark's creator.

Production of the trademarked goods requires the joint effort of the trademark owner and of local factors of production. Theoretically this cooperation can be achieved through prices (a pure sale of the trademark to cooperating labor), through hierarchy (having the trademark owner hire labor), or through a mix of those two methods. Two examples of these latter options are contracts under which independent producers rent the use of the trademark subject to a number of behavior constraints (franchising), and bonuses which reward hired labor above and beyond their set wage.

The variables which affect the choice between prices and hierarchy are conceptually similar to those described in our treatment of agricultural institutions. Entrepreneurs who buy a trademark to use it on their product have incentives to run down the goodwill capital of the trademark by reducing the quality of the good produced and sold under the trademark. This is because costs can be reduced by reducing quality, while prices and customers can be maintained because of the reputation of the trademark. If consumers are mobile, changes in quality by one producer will equally affect all other producers using the trademark. If detection of changes in product quality is costly, the producer who reduces quality will be able to capture the gains from his behavior, while shifting the losses to all other producers using the trademark.

In theory, the exchange of trademarks could be organized through the price system. A market for reputation would be set up, in which producers who reduce quality would pay all other trademark users a sum equal to the marginal loss imposed on them (and vice-versa for quality improvements). The high cost

of detecting variations in quality and of pricing their impact on all other producers sharing the trademark--the high cost of cheating-- makes this solution impractical (McManus, 1972).

Pure hierarchy can also be used for the exchange of trademarks. Under this strategy, the trademark owner pays employees a fixed wage to operate his outlets. This drastically reduces cheating because employees running outlets no longer have incentives to reduce quality. But, as argued previously, reducing the link between profits and salary also reduces incentives to work. Hence this solution inflicts shirking costs on the trademark owner. Shirking costs are likely to be particularly high when production must be decentralized and outlets are dispersed, making subpar performance costly to detect.

Whenever shirking costs are substantial, it will be efficient to choose solutions which combine the benefits of price and hierarchy. For example, under a franchising contract, the trademark owner will permit the producer (the franchisee) to make most of the production decisions and to keep most of the profits from the venture. The reduction of shirking costs achieved by franchising is significant: Shelton (1967) reports that, for an unnamed franchise chain, the net revenue/sales ratio was 1.8 percent for outlets operated by employees of the trademark owner, compared to 9.5 percent for those run by franchisees. Sales fell on average by 7.3 percent whenever the trademark owner had to send employees to temporarily operate the outlets, whereas they increased on average by 19.1 percent when new franchisees took over the outlets from company employees.



Although franchising reduces shirking, it encourages cheating. Consequently, trademark owners impose behavior constraints on franchisees. These contractual constraints specify in detail minimum quality standards which must be met by the franchisee. Franchising contracts may also require that inputs be purchased from the trademark owner so as to restrict the franchisee's ability to reduce quality. The level of cheating by franchisees will depend on the trademark owner's ability to write enforceable contracts specifying all relevant aspects of quality. Whenever writing and enforcing such contracts is costly, the trademark owner will operate his own outlets. These considerations explain why trademark-owners operate their own outlets in banking, advertising, accounting and management consulting, while they franchise hotels, employment services, and car rental operations (Hennart, 1982).

Because monitoring costs may vary across outlets, a trademark owner may run some of his outlets with employees, and others with franchisees. We would expect a franchisor to operate the larger, more accessible units with employees, and to franchise smaller, more dispersed units. Indeed Brickly and Dark (1987) found that the probability that an outlet was franchised was greater the greater its distance from the trademark owner's headquarters.

### 3.2 Marketing Services

As in the case of the transfer of reputation, marketing services can be obtained by a variety of methods. Those services can be purchased in the market from independent agents--called manufacturer representatives, or "reps"--or they can be obtained from salaried employees. In practice, most arrangements combine price constraints (commissions) and behavior constraints (employee relationships).

A manufacturer can purchase marketing services from reps. Reps are independent contractors who pay their own sales expenses and are paid commissions on the sales they make. One powerful reason for using reps is the potentially high level of shirking costs in selling. There is very little correlation in selling between behavior and outcome, making it extremely difficult to determine what a salesperson must do to successfully close a sale. Because salespersons often visit customers in a wide variety of locations, close supervision is costly. Using reps frees manufacturers from having to direct and monitor the behavior of salespersons, as reps are incited to use their own methods since they are rewarded in function of their performance (Anderson, 1985). The drawbacks of this solution are as expected: not all aspects of a salesperson's performance are equally easy to measure. Reps rewarded by commissions can be expected to maximize their income by minimizing those aspects of performance which demand their time and effort but are difficult to observe. Reps will minimize product demonstration, instruction, and after-sales service (Wilkins, 1970), and will maximize their income by selling established products (as opposed to new ones) to smaller, regular accounts (as opposed to new and large accounts) (Anderson and Oliver, 1987). They also may indulge in unethical practices, such as misrepresenting product characteristics or customer needs (Anderson, 1988; Robertson and Anderson, 1990).

Costs associated with reliance on reps can be classified as cheating costs, and can, in theory, be overcome by investing additional resources in measuring more accurately the relevant dimensions of sales performance and in

adjusting commissions to reflect the relative costs and benefits to the manufacturers they represent. In practice, however, high measurement costs typically lead manufacturers to complement price constraints with behavior constraints. For example, the contracts signed by British manufacturers with their overseas reps around the turn of the century stipulated minimum input requirements covering the amount of traveling, advertising, and showing the rep was required to do. Contracts also fixed the level of stocks to be held by the rep, required reps to employ engineers or salesmen with technical knowledge of the manufacturer's products, and gave the manufacturer the right to refuse orders, to monitor stocks and to inspect the sales records (Nicholas, 1983).

When the imposition of price constraints on reps results in high cheating costs, it may be necessary to replace most price constraints by behavior constraints. For example, contracts which require reps to promote new products or to adopt low-pressure, expertise-based sales tactics are difficult to draft and to enforce, as the output of reps is then difficult to measure in the short run. Switching to full behavior constraints will reduce organizing costs if the behavior of employed salespersons is relatively easy to monitor (Anderson and Oliver, 1987).<sup>11</sup>

However, the lack of output incentives in an employment situation will encourage shirking. Shirking can be controlled by reintroducing price controls and paying salespeople a salary plus a commission related to the volume of their sales. If constraining behavior exhibits diminishing returns, one would expect most compensation plans to incorporate both price and behavior constraints. A study by Coughlan and Sen (1986) of sales compensation plans in US

industry between 1972 and 1982 confirms this view: salary-plus-commission plans accounted for 70 to 75 percent of all plans (with salary accounting for 80 percent of total pay), salary-only plans for 15 to 25 percent, and commission-only plans for less than 10 percent. The model developed in this paper suggests that the share of commission in an employee total compensation package should increase the easier it is to measure output, the costlier it is to monitor behavior, and the less important are demonstration and service. These three factors were found to be significant in John and Weitz's (1989) study of sales compensation plans.

We have seen that the exchange of reputation and of marketing services takes a variety of forms, but that the most commonly observed arrangements contain both price and behavior constraints. The particular mix that will be chosen will depend on the levels of cheating and shirking costs that result from the transaction.

#### **4. Limits to the Use of Price Incentives in Firms**

One implication of the model sketched in Section 2 and applied in Section 3 is that firms introduce price incentives to reduce the high cost of constraining employee behavior. The higher that cost, the more likely that firms will rely on these incentives. However, using price incentives is not a panacea, for it re-introduces cheating costs.

Under the hierarchical method of organizing, rewarding workers for following managerial directives shifts to the employer the task of knowing how workers are to perform their tasks. Employees are less likely to collect and volunteer information relevant to that process because doing does not benefit



them directly. Employers must also deduce performance from behavior: opportunities for shirking, and hence the use of price incentives in firms, increase if observed behavior does not provide good clues about the quality and /or the quantity of work performed. The level of managerial capabilities should also influence the use of price incentives in firms. Less competent employers will have to devote more resources in learning what employees must do and in monitoring their behavior, *ceteris paribus*, than more competent employers. One would expect greater use of price incentives when management incurs high costs in gathering information on workers' production function and in monitoring their behavior than when management can perform these tasks relatively cheaply.

This brief argument indicates that: (1) the use of price incentives within firms should be relatively greater the lower the level of managerial expertise. Improvements in managerial techniques should reduce their use, *ceteris paribus*; (2) at any point in time, large and diversified firms should make greater use of price incentives than small and non-diversified ones; (3) employers will use price incentives for those activities about which they have limited knowledge and/or those which are costly to supervise.

Price incentives take two main forms in firms. Under piece work and commission schemes, part or all of the pay of a worker is linked to his output. The compensation of managers may also be tied to the performance of their subordinates. This requires that their units be organized as profit centers. The sections that follow discuss these options in detail.

#### 4.1 Piece work

Piecework saves on monitoring costs: it frees management from having to know how workers can best perform their tasks and from monitoring their behavior. Piecework harnesses the idiosyncratic knowledge that workers may have on how to most efficiently perform their job. Whenever it is more costly for employers than for employees to obtain that knowledge, workers paid by the piece should achieve higher output than those paid on salary, and piecework schemes will be implemented. Clark (1984) cites the results of a number of studies which compare the hourly rates of pieceworkers versus hourly workers in a number of different occupations. Overall, pieceworkers earned between 13 and 25 percent more than hourly workers.<sup>12</sup>

Piecework and its variants are found when entrepreneurs experience high costs constraining the behavior of their employees. This is the case when activities are geographically dispersed, such as in sales and in agriculture (as described above) and in construction (Eccles, 1981). Piecework and its associated price incentives were commonplace in the 19th century, before the development of sophisticated management techniques. Under the system of "inside contracting" a capitalist provided floor space, raw materials and machinery to a subcontractor and paid him a piece rate for his output. These subcontractors in turn hired their own employees, and trained, monitored, and paid them (Buttrick, 1952). In mining, inside contracting was known as the "butty" or the "tribute" system (Jenkin, 1948).

The reasons for the existence and the demise of inside contracting are consistent with our model. Inside contracting was chosen because "it supplied

a 'self-acting stimulus' which dispensed with the necessity of incessant supervision of the managing foreman by the employer" (Taylor, 1960, p. 216). In short, it was "a method of evading management" (Pollard, 1965, p. 38). As we would expect, the maximization of effort by inside contractors led them to free ride on the dimensions of performance which were not priced. Workers abused machinery and wasted materials and work-in-process inventories (Buttrick, 1952; Williamson, 1975). In mining, there was a tendency to work only the best quality ore (Hillman, 1984).

Under the influence of "scientific management," inside contracting was displaced at the turn of the century by a system of "straight" piece work where wage-earning specialist supervisors set output norms and piece prices. This system was in turn replaced by hourly pay in the 1920s (Gospel, 1983). In tin mining, the development of scientific prospecting methods made it unnecessary to rely on the miner's tacit knowledge of where to find veins, while the replacement of the pick by the electrical rock drill--a machine too costly to be abused--made close supervision cost-effective. Both factors sealed the fate of inside contracting in tin mining (Burke, 1982).

#### **4.2 Profit centers**

An examination of benefits and costs of hierarchical and price-based methods of organizing can also explain why firms choose to set up profit centers. As firms grow in scope and in geographical reach, the cost of constraining employee behavior increases. Product diversification reduces the technical knowledge that headquarters (HQ) has of the production function used by subunits. Geographical dispersion, especially if it involves foreign

countries, increases the difficulty of evaluating the performance of subunit managers, because both distance and variations in local conditions make interpretation of behavior more difficult.

Using price incentives can help alleviate this problem. Price incentives can be used at the level of the subunit by (1) separating the firm into "quasi firms" (profit centers) which buy their inputs and sell their outputs at arm's length to other subunits; (2) giving full freedom to the subunit manager to maximize the profit of the subunit; and (3) rewarding subunit managers as a function of these results. This solution has been called the multidivisional (or M-form) organizational structure (Chandler, 1962; Williamson, 1975).

What benefits can the M-form structure offer? In situations where subunit managers know better than HQ how to maximize profits, rewarding them in proportion to these profits and giving them free rein to achieve these profits will yield higher profits than directing their actions from HQ. Subunit managers will be incited to make use of their specialized knowledge for their own--and therefore for the firm's--benefit. If all internal interactions are correctly priced, the firm will elicit from its subunit managers exactly the same behavior than it would obtain through perfect behavior control, but with zero monitoring costs. Hence, the higher the cost of monitoring subunit managers, the greater the benefits of M-form structures. Since both product and geographical diversity increase monitoring costs, diversified firms should benefit more from M-form structures than non-diversified ones. Chandler's study of the adoption of the M-form supports this point (1962). Mahoney (1990) found that geographic dispersion and product diversification were significant determinants of the adoption of the M-form by 291 large U.S. firms.



The practical problems of setting up profit centers provide a good illustration of the unwelcome side-effects of using price incentives in firms. To maximize their own income, managers of subunits will maximize the yearly profits made by their units. In the process, they will maximize the use of unpriced (or undervalued) inputs and minimize that of unpriced (or undervalued) outputs. For example, if HQ does not assign a price to a firm's loss of reputation which results from a subunit's unethical behavior, then subunit managers can be expected to engage in profitable, but shady business practices. To avoid such unanticipated and undesirable side-effects, all inputs and outputs used and produced by the profit center--including intangibles such as reputation and experience--need to be priced to reflect their cost and benefit to the firm as a whole. This is an impossible task. The firm owes its very existence to the fact that some interactions between its parts cannot be organized through a price system. If all interactions could be priced, there would be no benefits to organizing within the firm. The number and relative importance of non-priceable interactions will vary across firms and even within firms. The proportion of non-priceable interactions is expected to be high in vertically integrated firms and in those whose subunits receive continuous innovations from a centralized R&D or market research facility. In each of these cases the market for the relevant inputs (tacit knowledge, reputation, or raw materials) is characterized by high transaction costs, making some form of hierarchy the preferred organizing method (Hennart, 1982; 1990). Supplementing hierarchy with intrafirm markets to transfer such inputs and outputs between subunits generates pricing problems and results in suboptimization.<sup>13</sup>

To check the generation of unwanted side-effects and to encourage desirable ones, HQ may supplement transfer prices with behavior constraints. The subunit manager will be told to maximize profits, but, in addition, he will be asked to transfer fixed quantities of inputs or outputs at fixed prices to other subunits, obey HQ directives on ethical behavior, worker safety, pollution control, and the like. This represents a shift back towards hierarchy, and it reduces the advantages of profit centers. As the autonomy of subunit managers declines, so will their incentive to work hard and show initiative. HQ will now have to spend more resources directing and monitoring the subunit's manager's behavior. Both the informational simplicity and the motivational virtues of profit centers will be reduced. Hence the mix of price and behavior constraints faced by profit center managers should vary in direct proportion to the difficulty of pricing internal transactions. When internal transfers of inputs and outputs are few and can be easily priced, profit center managers should have considerable freedom to buy or sell from whomever they like at whatever price they may negotiate. In the words of Eccles (1985), they should have "full exchange autonomy". Conversely, whenever internal transactions are numerous and difficult to price, HQ will dictate from whom managers may buy, to whom they may sell, and the prices for these transactions. There are fewer exchanges of raw materials, reputation, and know-how in diversified firms than in single-business, vertically integrated concerns, and hence profit center managers should have greater autonomy in the former than in the latter.

Studies of profit centers in firms support this view. Eccles (1985, p. 114) found that 39 percent of the heads of profit centers of the US firms he studied had full exchange autonomy. As expected, that percentage was higher (50.5 percent) for highly diversified firms (unrelated businesses) than for single business, vertically integrated firms (29 percent). Another way of evaluating how much exchange autonomy profit centers have (and hence of ascertaining the degree to which price incentives are used) is to look at the type of transfer pricing used in transactions between profit centers. Transfer at market prices are dysfunctional if there are significant non-priceable exchanges between subunits. As expected, Hill, Hitt, and Hoskisson (1990) found that firms that were highly diversified had a greater propensity to use market-based transfer prices for internal transactions than undiversified firms. This supports the view that the use of profit center in firms is limited by the costs of specifying and enforcing market transactions.<sup>14</sup>

Earlier we have argued that using price incentives reduces shirking but necessarily increases cheating. Re-introducing price incentives in firms can take the form of piece-work schemes and of profit centers. Both of these techniques suffer from an unwelcome side-effect, the reappearance of cheating costs. The evidence shows that piece work and profit centers tend to be used whenever they significantly reduce shirking costs with only a minimum increase in cheating costs.

##### 5. Contribution of the model

The preceding pages have developed a "comparative institutional" model in which economic institutions are analyzed as a mix of two pure organizing

methods, hierarchy and the price system. The comparative institutional model defines firms as institutions which rely primarily on behavior constraints, and markets as institutions which use mostly price incentives. The fact that most institutions we observe have both firm and market characteristics and do not fit into the polar categories of firm and market as they are usually described in the transaction cost literature is explained by increasing organizing costs as one specializes into using either pure price or pure hierarchical methods. This paper shows that no special theory is needed to account for hybrid institutions; they can be analyzed as combinations of the two organizing methods of price and hierarchy. For example, the model locates contracts in the continuum between market and firms, and defines them as consisting of limited behavior constraints within dominant price constraints.

The comparative institutional model sketched above differs significantly from some of the other approaches in the literature. In contrast to some agency models--for example Eisenhardt (1985)--it does not argue that differences in risk aversion between principal and agents help explain the choice between price and behavior constraints. The comparative institutional model is based on a general theory of market failure, in which asset specificity is only one cause of such failure. The model not only considers shirking as the main cost of hierarchy, but it also shows that shirking is a necessary consequence of reducing market transaction costs. In that sense, the comparative institutional model differs from Ouchi (1979). The model shows that prices and hierarchy differ in efficiency because they use different methods to organize activities, and that the comparative advantage that firms have over markets in organizing certain transactions derive from their greater reliance on hie-



rarchy. Hence the comparative institutional model answers Demsetz's (1988, p. 149) call for a theory which clearly differentiates between the cost of transacting and that of managing. In the comparative institutional model, the cost of transacting is the cost of measuring output in all of its dimensions; the cost of managing is the cost of directing and observing behavior.

Lastly, the model clarifies the relationship between hierarchy and firms. By reviewing the problems incurred in using price incentives within firms, it shows that the use of hierarchy is a sine-qua-non condition for the existence of firms. Firms arise because some interactions are more efficiently organized by behavior than by price control. Every single interaction that takes place within firms does not, however, require full behavior control, so it is efficient to use prices (fully, or in conjunction with behavior controls) to organize some intra-firm interactions. But, in all cases, a core of transactions will remain organized through behavior constraints.

## ENDNOTES

1. Eccles and White (1988) documents some of the practical problems of using prices within firms and note that the managers of the firms studied judged internal transactions to be more troublesome than external ones. Williamson (1985, chapter 6) has argued that these distortions are of two types. First, there is a tendency for the division manager who is judged by immediate net receipts to maximize short term gains at the expense of long-term ones. Second, the determination of transfer prices is subject to political distortions
2. The model is applicable only to those cases where institutions are not sheltered from competition by monopoly rights or by government intervention. We would, for example, expect the model to have greater applicability to firms in competitive industries than to government bureaus. This is not to deny that there is a varying degree of inertia in economic institutions. At any point, some inefficient forms will be observed.
3. A parallel analysis could be done by focusing on information costs. A complete analysis would naturally require the simultaneous consideration of enforcement, bargaining, and information costs.
4. Note that they do it "in complete disregard of the decision of others, or even the existence of others" (Demsetz, 1988). This is because prices reflect perfectly the social consequences of each agent's actions.
5. In some cases measurement costs may be so high that some goods cannot be priced. They will carry a zero price, as with clean air or noise. This constitutes an extreme case of "market failure."
6. Shirking takes place when the employee offers "perfunctory" as opposed to "consummate" cooperation. Perfunctory cooperation is compliance with directives, while consummate cooperation involves accepting responsibilities and exercising initiative (Blau and Scott, 1962, p. 140; Williamson, 1975, p. 69).
7. Alternatively, employers can persuade workers to internalize the employer's values. For further discussion see Ouchi (1981) and Barney (1986).
8. If landlords increased rents to cover the expected level of damage to the land, the only renters willing to rent would be extremely opportunistic ones. Adverse selection would eventually kill the market. See Akerlof (1970).
9. The record of using large numbers of wage laborers in the production of space-intensive crops is one of consistent failure. As Olson (1964) notes, the big "bonanza farms" of the turn of the century were failures. The disastrous results achieved by Soviet collectivized agriculture are well know. In the 1970s, a number of large corporations entered U.S. agriculture, with similar results (Cordtz 1982).

10. Partnerships, joint ventures, and profit sharing have the same incentive structure as sharecropping.

11. Salaried salespersons are rewarded on the basis of their behavior. The five most common criteria by which sales managers evaluated their employees were (in descending order): attitude, product knowledge, selling skills, appearance and manners, communication skills and sales volume (tied) (Jackson, Keith and Schlacter, 1983).

12. This cannot be due to self-selection, since firms using time rates have the possibility to fire least-efficient workers and to keep the most efficient ones.

13. Intertemporal suboptimization is also a problem. Subunits are not free-standing entities, quoted on local stock markets. There is therefore no easy way to evaluate the impact of the subsidiary manager's present decisions on the subsidiary's future profit stream. If the manager is rewarded on the basis of annual profits, he can be expected to maximize present income at the expense of future profits by a variety of stratagems, such as cutting R&D budgets, or cutting employment and jeopardizing long-term government relations.

14. Only half of all transfers were at market or negotiated prices.

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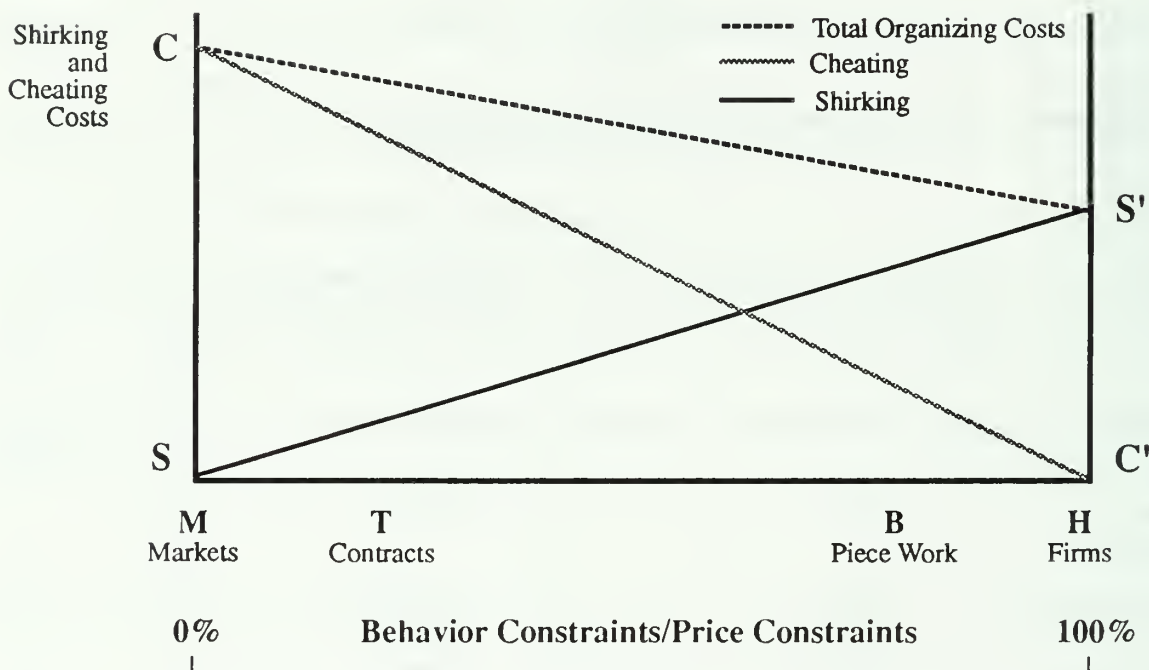


Table 1

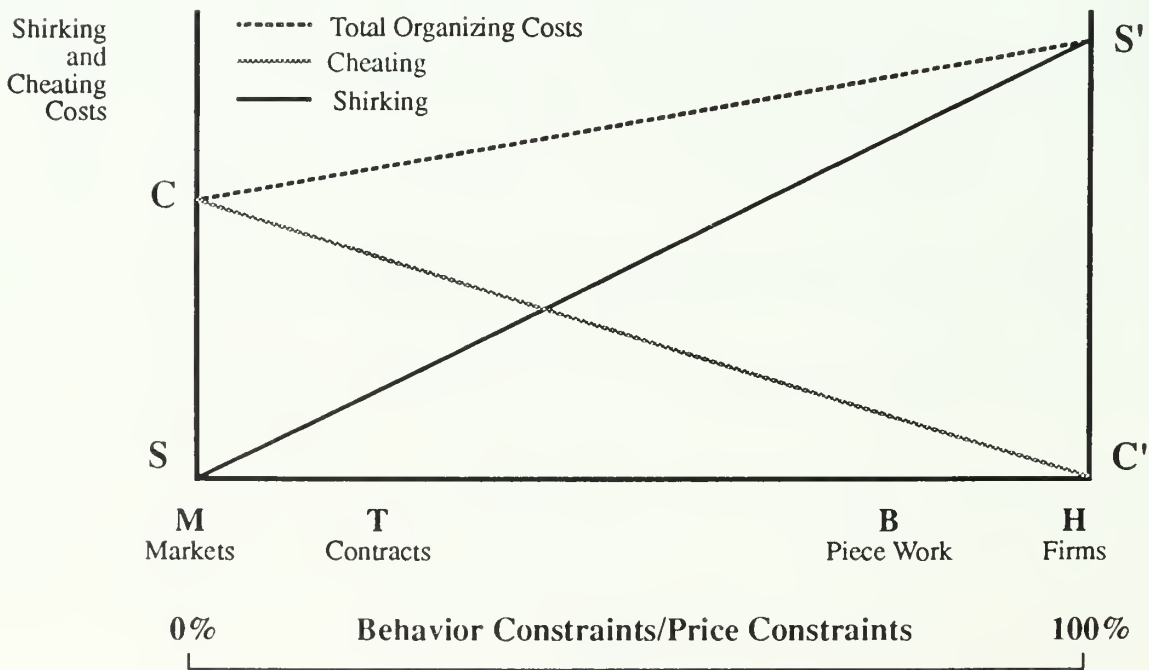
Behavior and Price Constraints in Agricultural Institutions		
	Behavior constraints on land use	Price constraints on work effort
Pure rent	none	full
Rental contract	few	high
Sharecropping	some	medium
Employee paid through piece-work	many	some
Pure employment contract	full	none

**Figure 1**

**Determinants of the Choice of Institution  
With Linear Organizing Costs**



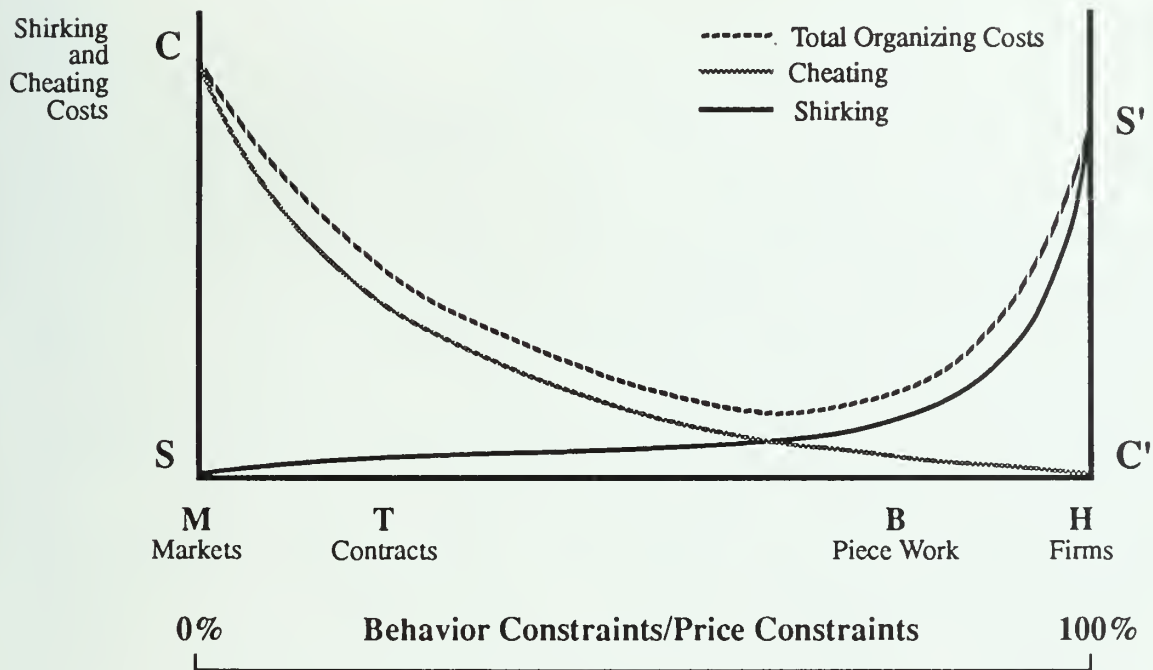
**1a. Transaction handled through hierarchy**



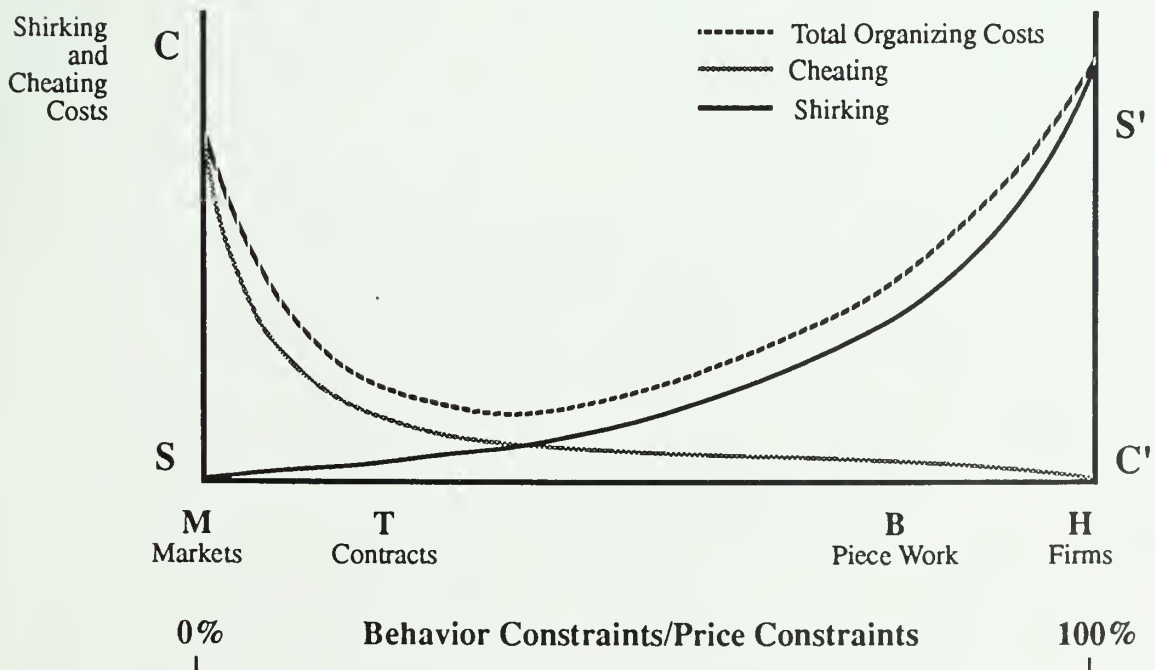
**1b. Transaction handled through prices**

Figure 2

Determinants of the Choice of Institution  
With Nonlinear Organizing Costs



2a. Transaction handled through piece work



2b. Transaction handled through contract















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