The Firm as a Specialist Contracting Intermediary: 
Application to Accounting and Auditing

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Accounting and auditing are institutional phenomena, so it is reasonable to assume that they derive many of their properties from the nature of firms as economic institutions. Progress in understanding accounting and auditing, at all levels of abstraction from broad conception of their economic function through to an understanding of the reasons for specific accounting and auditing techniques, seems likely to require a theory of the firm that views institutional phenomena as its domain. Several accounting scholars, ranging in scope from Chambers (1966) through to Watts and Zimmerman (1986), have adopted this view, developing hypotheses concerning accounting and auditing from propositions concerning the nature of firms as institutions.

This paper attempts to develop an articulated and coherent view of accounting and auditing, based upon Coase's (1937) theory of the firm. Following Coase, the firm's economic function is to minimize contracting costs. The economic role

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1 The seminal nature of Coase's work is well-known. Other major contributions to the contracting approach include: Alchian (1984), Alchian and Demsetz (1972), Arrow (1974), Cheung (1983), Fama and Jensen (1983a,b), Hayek (1945), Jensen and Meckling (1976), Klein, Crawford and Alchian (1978), Knight (1921), Watts (1977), Watts and Zimmerman (1978) and Williamson (1964). These authors seek to explain various aspects of the existence and form of firms as a contracting-cost minimization problem.
of the firm is modeled as a specialist contracting intermediary, intermediating between consumers and suppliers of factors of production, exploiting scale economies in repetitive contracting by centralizing contracting in one institution. Firms engage in non-market contracting, on their own internal terms (here labeled "quasi-prices"). These are not market prices and need not resemble market prices in either form or magnitude; and market prices are not sufficient to guide firms' decisions. Hence, a whole range of institutional phenomena, including the sets of "transfer prices", standard costs and the numbers on firms' income statements and balance sheets, are hypothesized as being neither market prices nor estimates of market prices. In this model, accounting is viewed as a specialist function for providing information that assists firms in establishing their quasi-prices, or even for providing the quasi-prices themselves. Auditing is viewed as a specialist adjudication

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2 The unqualified term "price" is not used because it connotes "market price" and implies the existence of exogenous (to firms) market signals to guide their decisions, whereas a central proposition of this paper is that in general firms do not use market prices. Thus, the term "price" is retained to indicate that, economically, transactions within firms fulfill a similar economic function to (and are as worthy to study as) transactions in markets; but the strong qualifier "quasi" (meaning "as if", or "having some resemblance to, but different than") is used to signify that contracting differs on substantial dimensions from contracting in markets. The alternative term "shadow price", though frequently used to denote rates of exchange within firms (e.g., in a linear programming model), does not connote the explicit use of such within-firm rates of exchange such as transfer prices and standard costs, and hence is not used.
function, used in completing contracts whose payoffs have been defined in terms of accounting numbers. It therefore is used in establishing *ex post* quasi-prices. Accounting and auditing practices, ranging from the general (e.g., auditor independence) through the particular (e.g., the accounting treatment of research and development expenditures) are interpreted in a within-firm contracting framework.

An hypothesis maintained throughout is that the observed institutional structure, including the observed types and forms of institutions and their practices, is an efficient contracting equilibrium. Firms are solutions to contracting problems; likewise, accounting and auditing are viewed as integral but specialist contracting functions of firms, their existence and form being determined by considerations of contracting efficiency. Accounting and auditing practices, including the concept of GAAP and its specific composition, also are viewed as components of an efficient institutional solution to a contracting-cost problem.³

Firms, together with their institutional functions and practices such as accounting and auditing, are viewed as voluntary creations of economic agents. The coercive role of the political process is ignored. Consequently, the explanation is incomplete to the extent that the political process has influenced the nature of the firm and accounting

³ For a similar approach, see Watts and Zimmerman (1986, chapter 8), including their comparison of the contracting and stewardship approaches.
and auditing practices, via legislation, regulation, pressure on firms or accountants and auditors, and taxation. In this context, the actions of voluntary professional bodies such as the AICPA, and of bodies such as the FASB, are not per se coercive and can be viewed economically as franchise-like structures. Nevertheless, the omission of coercion leaves the analysis incomplete and is made in the interest of tractability.

The paper begins by modeling the firm as a specialist contracting intermediary, obtaining scale advantages in repetitive contracting. It introduces the notion of "functional completion" of contracts, which is hypothesized as being important in understanding firms' contracting advantages and auditing in particular. It then analyses the economic nature of accounting and auditing in firms, in the provision of non-market-price information. Several results are derived concerning both "financial" and "managerial" accounting, including: accounting numbers, such as net income, balance sheet asset amounts and depreciation expense, are not (and exist because they are not) sets of market prices or estimates of market prices; and dispersion in accounting techniques across firms and changes in accounting techniques by firms are contracting-efficient, rather than occurring primarily due to "opportunism". Contracting-economics interpretations are provided for important accounting concepts, including "independence", "true and fair", "verifiability" and
"generally accepted accounting principles", which to date have escaped cohesive economic analysis. The paper ends with a discussion of the nature of evidence and testable hypotheses concerning institutional phenomena.

I. The Firm as a Specialist Contracting Intermediary

This section outlines a model of the firm as a specialist contracting intermediary. It builds on the celebrated thesis of Coase (1937), that firms exist because the price mechanism is costly to operate. It specifies the source of the firm's comparative advantage as increasing returns to scale in repetitive contracting, which makes it efficient to centralize contracting in intermediaries; equivalently, firms develop specialized learning about optimal contracting. Firms' acquired knowledge is reflected in their structures, strategies (defined below), procedures and specialist functions such as accounting and auditing.

The following assumptions are maintained throughout:
1. Contracting is costly;
2. Factors are in competitive supply;
3. There are no coercive restrictions on contracting or on the entry of firms;
4. There are fixed costs (independent of contracting volume) of establishing and operating firms;
5. Contracts, both with factor owners (e.g., managers, debt suppliers) and with consumers, have multiple optimal attributes; "strictly repetitive contracting" is defined as operating within a set of contracts with identical attributes;
6. There are increasing returns to scale in strictly repetitive contracting, where scale is defined as the
firm's accumulated volume to date in strictly repetitive contracting of a particular type;\(^4\)
7. Contracting is not homogenous: there is cross-sectional dispersion in contracts' optimal attributes;\(^5\)
8. There is uncertainty, in the form of a "large" number of feasible future states; and
9. The observed institutional structure is contracting-efficient.\(^6\)

Contracting costs are defined as the sum of the costs incurred by both contracting parties in:

1. Searching for a party interested in contracting;
2. Negotiating a contract;
3. Executing the contract in an acceptable form;
4. Bonding one's own performance and monitoring the other party's performance;
5. Enforcing performance;
6. Making the contracted payoffs; and

7. The residual loss from feasible contracting

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\(^4\) In assuming that contracting costs are a decreasing function of accumulated repetitive contracting to date, the intent is to model the firm's experience, or learning, in conducting its businesses. This assumption is used extensively in the corporate strategy area (for a forceful advocate of the "experience curve", see Henderson (1982, pp. 16-18)). It often is unclear whether this literature is referring to scale economies in production or in contracting. A more structured analysis is Alchian (1959), though Alchian appears to refer to production economies. Production and contracting economies will not be independent, however.

\(^5\) For example, optimal contracting with unionized labor is a different than optimal contracting with the CEO, or with an oil and gas exploration team. Optimal contracting with consumers in a geographically-dispersed cash business (e.g., a movie theatre chain) than in a single credit business (e.g., a high-margin boutique).

\(^6\) That is, given consumer preferences and factor supply, contracting costs (including the residual loss) are minimized. This assumption guides the analysis away from "normative" statements on what the institutional structure, including accounting and auditing practices, "ought to" be.
opportunities foregone in order to avoid any of the above contracting costs.7

In practice, it can be difficult to distinguish contracting costs from factor costs (or even from consumption). For example, the costs of contracting to produce "producer goods" in a competitive economy will be built into those factor prices. This does not render the distinction useless.

I.1 Existence of Firms.

Coase's fundamental contribution was to observe that the very existence of firms is an economic datum to be explained. His explanation (1937, p. 390) was in terms of relative contracting costs: "The main reason why it is profitable to establish a firm would seem to be that there is a cost of using the price mechanism."

As a thought experiment, consider a world with zero contracting costs. Then, all production/investment actions could be undertaken in a market. Cheung (1983, p.4) provides this illustration:

Consider, for example, the classic "pin factory" in which each of the multiple input owners specializes by working on only one part. If all costs of transaction were zero, a customer buying a pin would make a separate payment to each of the many contributing to its production. Comparative advantage guides each to specialize in his own skill, and if it appears desirable to hire a coordinator of activities, the buyer of the pin will simply make an additional payment to him. In such a case, a large number of product

7 Jensen and Meckling (1976) introduce the concepts of bonding and monitoring costs and residual loss. The only change here is to extend the analysis beyond a principal/agent relation to any set of contracting parties.
prices would direct the production of the single pin.

Among the market prices that the consumer would pay, contracting directly with factor owners, would be: the prices of a length of wire and a cap; the unit price for renting a pin-capping machine for the (very small) interval in time required to cap the wire for one pin; the price for renting the requisite space in a factory over that interval; the price of the required amount of electricity in producing one pin; the unit price charged by coordinators; and the price of research and development (i.e., a royalty) per pin. Thus, in the absence of contracting costs the production of pins, or any product, can and will occur via a sequence of market contracts, with the consumer as the nexus.

However, this is simply a thought experiment. Contracting is costly and pin production generally is undertaken by firms. The Coasian insight is to connect these observations: contracting occurs in firms when it would be more costly to contract in markets. If firms survive in competition with markets, and with other firms, then they must have comparative advantage in contracting in their chosen domains. This

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8 Without contracting costs, patents for all inventions would be costless to establish. Consumers could costlessly locate the current patent owners and purchase from them the right to use specific R&D inventions for the production of one pin. The patent owner could costlessly monitor that all contractual provisions were being honored, including any restrictions on on-selling the knowledge or producing more than the agreed number of pins using that invention. Thus, if firms engage in R&D, then they do so because they have contracting-cost advantages in relation to R&D.
important proposition now occupies a central role in the economics literature.\textsuperscript{9}

I.2 Scale Economies of an Intermediary in Repetitive Contracting.

Coase did not address the source of the firm's comparative advantage in contracting. It is modeled here as arising from increasing returns to scale achieved by intermediating in contracting.

The firm is as an institution that contracts on its own behalf. In law, the firm is an artificial person, endowed with the same right to engage in and enforce contracts as real persons.\textsuperscript{10} This right allows it to intermediate in contracting: to contract with owners of factors (e.g., suppliers of debt and equity capital, labor, materials) and with consumers. In doing so, it replaces direct contracting across a market between factor owners and consumers. The firm by its very nature is a contracting intermediary.\textsuperscript{11}

\textsuperscript{9} The proposition is the basis of the classic works cited in fn. 1. For surveys of the contracting literature, see Williamson (1981) and Holmstrom and Tirole (1987).

\textsuperscript{10} As such, the firm is a comparatively recent economic invention, the form of which has evolved over time (and presumably will continue to evolve). See, for example, Rosenberg and Birdzell (1986).

\textsuperscript{11} The approach taken here is to define the firm exogenously, as a datum to be explained by the theory. That involves seeking an economic explanation, not definition, of the firm. Coase (1937, p. 393) defines the firm as "the system of relationships that comes into existence when the direction of resources is dependent on an entrepreneur." This definition has encountered several problems, including its failure to distinguish firms and markets: in a costless contracting world, consumers could contract directly with entrepreneurs,
Why then is it contracting-efficient to incur the costs of creating and operating an intermediating institution, and of that institution contracting with factor owners on the one hand and with consumers on the other, when they could contract directly across a market interface? Since intermediation involves the centralization of some aspects of contracting in one institution, the source of the firm's comparative advantage must lie in contracting scale economies: decreasing unit costs of repetitive contracting.

Imagine the production of a P-factor product in a market economy, in which each of K consumers contracts separately with each of P factors owners. There then would be P*K market prices involved. Now introduce a contracting intermediating, whose production process bundles the P factors and sells them in the form of a product. This reduces the number of market contracts and prices to P+K: the intermediary contracts once with each of the P factor owners and once with each of the K consumers. In addition, the firm creates its own version of what we can imagine would have been market prices in a contracting-costless world. Each of the K units of product (..continued)

who could direct resource allocation without firms. See, for example, Cheung (1983, p.4, quoted above). Jensen and Meckling (1976, p. 311) view the firm as "the nexus of a set of contracting relationships among individuals," which also fails to distinguish firms and markets. As in most approaches, the firm here encompasses a variety of forms of contract intermediation between factor owners and consumers, including public and private corporations, franchises and not-for-profit corporations.

12 Two important points of interpretation are required. First, this is simply a thought experiment to assist in
involves the firm making P resource allocation decisions: an implicit or explicit decision to use each of the P factors in producing each unit.\textsuperscript{13} The firm therefore generates P*K implicit or explicit factor values, which are here labeled "quasi-prices." Quasi-prices arise from the process of resource allocation in the firm, rather than market exchange, and consequently differ from market prices in important institutional dimensions, discussed below. The total number of quasi-prices and market prices thus has increased by P+K, as a result of the contracting intermediation. The offsetting economy comes from repetition of transactions within the firm, exploiting contracting scale economies. Under the assumption of decreasing unit costs in repetitive contracting, the intermediary's function is to understand the role of the firm and its structure and practices. While we can imagine a parallel set of market prices existing, they do not: the firm has its own quasi-prices. Second, quasi-prices generally do not resemble market prices; they are produced by and reflect the firm's institutional structure (e.g., a bonus or a standard cost). These points are developed more fully below.

\textsuperscript{13} There are good reasons to expect much of the firm's quasi-pricing to be implicit. Firms routinize many decisions, thus obtaining scale economies from repetition, so the quasi-price of a factor frequently will be implied by an institutional procedure or rule for its use. In contrast, market prices are more likely to be explicit. For an analysis of the economic role of rules, see Nelson and Winter (1982). Second, and more fundamentally, Hayek's (1945, 1948) important thesis, that economic order (including the nature and practices of economic institutions) arises more from human action than from human design, suggests that economically-rational prices and quasi-prices can emerge from action in markets and firms, in contrast to being explicitly articulated. See also Alchian (1950).
homogenize and centralize (and thus reduce the unit cost of) contracting.

The firm incurs the fixed (with respect to contracting volume) costs of establishment and administration, plus the cost of increasing the total number of implicit and explicit contracts by the order P+K (a consequence of intermediation). These are offset by scale economies from homogenizing and centralizing contracting. Contracting intermediation thus occurs (i.e., firms are created) when the unit fixed costs of establishing and operating the firm are offset by the unit cost reductions from increased scale.\(^\text{14}\) The latter depends upon both the volume of repetitive contracting and the rate at which contracting costs fall with volume (i.e., the learning rate).

The economic role of the firm thus becomes one of creating

\(^{14}\) The existence of economies of scale in the design and construction of factors of production (e.g., telecommunications equipment, research and development) is neither sufficient nor necessary to explain the existence of firms. In a world of costless contracting, firms are not necessary to obtain factor scale economies: they can be obtained via a set of market contracts between factor owners and consumers. It does not matter how finely one defines a factor in this context: for example, consumers could contract directly with the labor involved in constructing the factory in which the telecommunications equipment is assembled, regardless of scale. Without contracting costs, the economy is indifferent to the degree of bundling of factors into products. Only in a costly-contracting framework is there a unique solution to the factor bundling problem: that is, to the observed set of products. Consequently, it is scale economies in contracting, not in factors per se, that explains the existence and form of firms (though the scales of contracting and factors might be correlated).
institutional technologies for repetitively and efficiently determining quasi-prices, in order to effect contracting-efficient intermediation.\footnote{Under the assumption of increasing returns to scale in contracting, it is demonstrated below that market prices are not sufficient to guide firms' decisions. Hence, in contracting domains where firms exist they must develop their own internal terms of trade. This point has been made frequently, in a variety of contexts, including Johnson (1981). The point made in the text, however, is stronger: the economics does not have one first establishing firms and then solving their contracting problems; firms are established \textit{because of} their inventive solutions to contracting problems. That is, firms' technologies for determining internal quasi-prices (for example, management compensation schemes or standard costing systems) are the only economic reason for their existence. It does not seem to make much sense to ask which came first (the firm or its quasi-pricing technologies), when they in effect are the same economic phenomenon. (Here, "technology" is broadly defined, to include implicit and strategic decisions, for example).} One institutional invention for determining (or assisting in determining) quasi-prices is "standard costs", which are dealt with in section II below. The pin producer, for example, might establish and use the per-unit "standard" cost of pin-capping, perhaps as the unit depreciation component of a bundled unit overhead cost. There are many feasible institutional inventions for efficient contracting. They include formal systems, such as capital budgeting systems, transfer pricing and divisional profit measurement systems and management compensation systems. They also include for example the creation of leadership roles for individuals or groups who chart corporate strategy. Corporate strategy is defined in this model as the selection of a contract-mapping from a subset of all feasible factors to a
subset of all feasible consumers. Corporate strategy thus involves judgment about products (bundles of factors offered to consumers) and about the firm's comparative advantage in contracting to produce those products. Note that the firm's contracting technology is not limited to its formal systems and specifically includes its acquired knowledge in charting strategy. Note also, in the spirit of Hayek (1945), Alchian (1950), and others, that optimal contracting is not a static technology, but an inventive, evolutionary process.

Under the present explanation for their existence, the components of the firm's contracting technology share several things in common: they produce quasi-prices, which are not market prices (and, it is argued below, will not resemble market prices in either form or magnitude); in creating them, the firm has been able to extract important repetitive features of the contracting involved, to take advantage of the scale economies (i.e., learning) that can be obtained; and their contracting efficiency is central to the survival of the firm.

I.3 Contracting Diversity, Differentiation of Firms and Firm Size.

If there are increasing returns to scale in contracting, then why (as Coase (1937, p. 394) first asked in this context) do we not observe only one large firm? An answer lies in the assumption that contracting is a heterogeneous activity, which implies that there is no globally-optimum contracting
In this model, firms specialize their contracting (and thus their accumulated experience, or learning, in contracting). Consider two firms engaging in identical contracting. The assumption of increasing returns to scale in contracting, due to accumulated experience, implies that both cannot survive: either they merge or one firm liquidates. The implication is that surviving firms are differentiated in their contracting.

Different products require different "bundles" of contracting, with different subsets of factor owners and consumers. Production of a new product thus involves contracting attributes for which the firm has potentially differing degrees of comparative advantage. (A "product" here is defined in general terms, and could include for example a new geographic region, if that requires significantly different contracting attributes). The boundaries of the firm then result from a tradeoff between: the scale economies obtained from the contracting attributes shared by the new and the old products; and the scale diseconomies from comparative


17 Contracting differentiation across firms, due to scale economies in strictly repetitive contracting, has all surviving firms as natural monopolists in their specialist contracting domains. The model thus differs from, but shares some overlapping implications with, Chamberlin's (1933) model of product differentiation.
inexperience in any new contracting attributes required by the new product. This tradeoff determines whether the firm diversifies, where diversification is defined as production of heterogeneous products.\textsuperscript{18} (Since "product" is defined in general terms, so is "diversification").

Under the assumptions of increasing returns to scale in strictly repetitive contracting and cross-product diversity in contracting, firm size is determined by two factors: demand for individual products for which its specialist contracting technology is optimal; and cross-product correlation in optimal contracting.

The proposition that surviving firms are differentiated with respect to their contracting technologies, which is broadly consistent with the literature on corporate strategy and the stylized facts reported in that literature, provides a useful basis for predicting and analyzing cross-sectional diversity in firms' structures, including their accounting technologies.

I.4 Transactions Within the Firm: Quasi-Pricing

This analysis leads directly to a simple proposition, with extensive implications for the accounting literature, that surviving firms contract at non-market prices. In the contracting equilibrium that we observe, contracts between

\textsuperscript{18} This analysis is consistent with the distinction between "related" and "unrelated" diversification drawn by Salter and Weinhold (1981). It is similar to that of Coase (1937, pp. 395-96).
consumers and factor owners are separated into two classes: those conducted through firms as intermediaries and those conducted directly across a market. Firms dominate in domains (homogeneous contracting sets) where they achieve lower unit contracting cost, including the residual loss. In those contracting domains, markets are more costly contracting mechanisms and thus are not observed. Firms and markets therefore are mutually exclusive for any type of contracting, provided we maintain the assumption of strictly increasing returns to scale.¹⁹

It is not an equilibrium to observe firms incurring the additional costs of contracting intermediation, when there exist sets of market prices that are sufficient to guide their decisions. Quasi-prices, not market prices, therefore are used in contracting within firms, either implicitly or explicitly, and there exists no set of market prices that is sufficient for firms' contracting.²⁰

Equivalently, the type of contracting we observe in firms differs from the contracting we observe in markets. With increasing returns to scale, it is not an equilibrium to

¹⁹ An indifference result, with firms and markets coexisting for identical contracting, is ruled out by increasing returns to scale. Equilibrium would require liquidation or expansion of the firm.

²⁰ This proposition, while not novel, is seldom formulated fully. Cheung (1983, p.5), for example, states: "...observed market prices cannot directly guide the owner of the input to perform in the same manner as if every activity he performs were measured and priced." (emphasis added).
observe both firms and markets engaging in homogenous contracting (i.e., contracting with identical attributes). Differences between market prices and quasi-prices therefore are not simply a matter of magnitude: the contract attributes must differ. This we know from even casual observation. Consider the case of compensation (in present value terms, including salary, bonus and promotion prospects) of divisional general managers, in those firms where: (1) compensation is a partial function of divisional earnings; (2) compensation also is a partial function of judgment by corporate-level managers; and (3) the firm makes judgments about transfer prices, cost allocations and other determinants of reported divisional earnings. These mechanisms are part of the firm's quasi-pricing technology and are not duplicated in markets. Consider next the case of the overhead component of the unit standard cost attached to a product during a phase of its production process (e.g., materials procurement overhead costs, added to raw material acquisition prices before the materials enter the physical production cycle). While one can construct a thought experiment in which, with costless contracting, material procurement is contracted separately by the consumer and thus is priced in a market, and while the attachment of overheads to standard costs is in some sense analogous to a market pricing mechanism, these competing mechanisms would by no means be identical. The model predicts that they must differ; and even casual observation confirms
that they do.

I.5 Information about Quasi-Prices

There are many sources of information that firms can use in determining quasi-prices. Their relative usefulness will vary across firms in testable ways.

i. Market prices can be informative, though by the propositions in I.4 above they cannot be sufficient. They are more informative for firms whose strategies create less value, because market prices then exist for contracting that is similar to that conducted in the firm. By construction, the more specific the firm's factors of production, the less its internal contracts will resemble contracts observed in external markets and the less it will find market prices to be informative. For highly specific factors, quasi-prices will bear little resemblance (in contract form or attributes, as well as magnitudes of payoffs) to any observable external market prices. Thus, market prices can provide useful, but not sufficient, information for determining quasi-prices, and their usefulness varies as an inverse function of factor specificity.

ii. Other firms' quasi-prices will tend to provide information for firms with similar strategies. One proxy for similarity of strategy could be industry groupings. For example, retail firms are interested in how their competitors cost floor space to their various stores and departments. However, firms adopt strategies that differ from those of other firms, since returns to scale in repetitive contracting imply that surviving firms are differentiated in their internal pricing technologies, so that even similar firms' quasi-prices are not a perfect

21 Specificity here is defined along the lines of Klein, Crawford and Alchian (1978) and Alchian (1984). Specific factors are those whose owners' wealths are reduced by ceasing to contract with the firm per se (i.e., by the mere act of "exiting the coalition", using those authors' phrase). In a world of costly contracting, all factors are specific, due to positive recontracting costs in replacing factors. Of course, factors differ in specificity.
iii. The firm's own accumulated experience with determining quasi-prices will allow it to use efficient techniques that are not available elsewhere. In areas that involve highly specialist forms of contracting (e.g., rewarding a member of a medical research and development team), the major source of information will arise from institution-specific learning: markets and other firms' practices will be poorer guides for quasi-prices. There will be variance across the firms in the amount of firm-specific information used in internal pricing, though all surviving firms do not simply duplicate contracts available elsewhere.

This analysis suggests the existence of a variety of techniques for determining quasi-prices, which in turn suggests variation in the extent of reliance upon accounting information and variation (across firms) in techniques for producing accounting information. Consistency in accounting and auditing thus will not be found at the level of the specific techniques that firms use; consistency occurs at the level of the economics of the determinants of cross-sectional variation in accounting and auditing techniques.

The analysis also suggests variation across time in accounting and other institutional-pricing techniques, in response to two factors. First, the firm learns over time and attempts to improve its techniques. Second, the revelation of new states of the world requires new techniques. If contracting were costless, then contracts using accounting numbers simply would pre-specify the complete set of accounting techniques for each and every state. The
techniques selected would arise naturally from state revelations. Since the complete set of techniques is not pre-specified in a world of costly contracting, the ex post optimal technique set varies with realizations of the state variable.

I.6 Functionally Completed Contracts: Adjudication Functions

Contracts that are completed by enumeration identifying every feasible future state and provide an unambiguous mapping from states to payoffs, ex ante. “Functionally-completed contracts” are completed in part by specifying, ex ante, functions to determine at least a subset of payoffs ex post. These functions are not mere formulae to determine payoffs; they involve specialist judgment in the fashion described below. Functional completion of contracts is proposed as an important contracting-cost-minimization mechanization in markets and firms. As a concept, it appears to be central to an understanding of several important institutional arrangements, ranging from the Law of Contract through commercial and labor arbitration, management compensation committees, professional actuaries and valuers, and auditing.

The cost of completing contracts by enumeration is assumed to be “large.” A priori, the human processing cost of even

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22 This section builds upon the analyses of Cheung (1983), Williamson (for example, 1975, pp. 75-76, and 1985, p. 10, among others). Its point of departure is its insistence that all contracts ex ante are completed, one way or another, and the notion of “functional completion.”
imagining the most unlikely of the logically feasibly future states seems unbounded.\textsuperscript{23} However, all contracts must be \textit{ex ante} complete, since the contracting parties know at the outset that there will be a payoff (perhaps zero), whatever realization of the state variable transpires. There is no such thing as an “incomplete” contract: contracts are completed in complex and inventive ways.\textsuperscript{24}

Contracts are functionally-completed along the following lines. First, the nature of the completion function is agreed upon by the contracting parties. This entails both parties accepting a set of implicit and explicit rules that govern the completion function’s behavior. Consider the case of management compensation. The accepted rules might include, for example, the establishment of a management compensation committee with some direction in awarding compensation, the determination of its constitution (including membership rules), the determination of implicit as well as explicit rules for it to follow and (if compensation is to be a function of reported earnings) the determination of a set of implicit and explicit rules concerning how the firm will

\textsuperscript{23} For analyses of the role of human information processing costs in the theory of the firm, see Hayek (1945), Simon (1957), Williamson (1981), and Meckling and Jensen (1984).
\textsuperscript{24} There are, however, contracts that are not completed by enumeration. The existence of such contracts presents difficulties for models that assume that contracts can only be completed by enumeration, to the point where the term “incomplete contracts” has become widely used. The term is not descriptive of reality: it is not contracting that is incomplete; it is these models’ description of contracting. For a review undertaken from this perspective, see Holmstrom and Tirole (1987).
choose its techniques for calculating earnings. Since payoffs are not specified _ex ante_, functional completion involves a form of adjudication among parties contracting with the firm: it entails allocating the firm’s _ex post_ wealth among those contracting parties.²⁵ For example, the compensation committee will award compensation among managers, subject to the limits of its discretion. The accounting-technique choice also will require some form of adjudication, since it is not efficient to pre-specify the optimal accounting technique set for every feasible future state.²⁶ Second, the adjudication function waits for and observes the realization of the state variable. While observation of the realized state variable is costly (and therefore is undertaken with error), presumably this is more efficient than attempting to identify the possibly infinite number of feasible states _ex ante_. Third, the function follows the agreed rules in determining payoffs under the contract. Fourth, provided the function has followed “due process” (i.e., it has followed the set of explicit and agreed rules), the determination of the payoffs by the function is binding on all parties, since they have contracted into this process.

Consider initially the variety of institutional mechanisms

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²⁵ The role of adjudication in contracts is discussed in Cheung (1983), among others.
²⁶ It is common for compensation and audit committees to overlap in membership (which is not surprising, given the overlap in their functions) and for them to comprise only non-executive directors (for the independence reasons discussed below). See Smith and Watts (1982).
by which market contracts provide for “functional completion.”

First, negotiation between the contracting parties themselves is one mechanism for determining payoffs after the state variable has been realized. For example, it is common for long-term supply contracts to explicitly provide for parties to enter “good faith” negotiation in a broad range of specified and unspecified states. Negotiation also is an implicit possibility in all contracts.

Second, all contracts are construed in terms of the Law of Contract, which is a pervasive and important functional completion mechanism. In its common law sense (i.e., ignoring statute law and thus the political process), this body of law is a broadly defined contracting function that determined payoffs in states that are not explicitly provided for on the face of a contract. When individual contracts are found not to provide for a state that has eventuated, the courts attempt to determine ex post the contractual provision that the parties to the contract would have provided ex ante, had they explicitly anticipated the realized state. In doing so, the courts consider the realized state in the context of the circumstances and the contract that the parties wrote at the time. This presumably is more efficient than identifying all such states and specifying all payoffs at the time of entering the contract, no matter how unlikely and how difficult some feasible states are to even conjecture.27 Further,

27 This presumption ignores the regulation of contract through statute law and other mechanisms. The implicit
centralization of this function in the courts takes advantage of learning (i.e., costs decreasing with accumulated experience) in contract completion.

A further source of efficiency in the mechanism of Common Law is provided by the use of precedent. Contract law provides that a substantial body of precedent, too costly to explicitly write into individual contracts, is “read into” and thus is implicit in all contracts. Legal precedent is a technology for obtaining scale economies in contracting; it is an efficient method of determining payoffs in a subset of states for which payoffs have not been unambiguously defined ex ante.

Third, contracts frequently provide for arbitration in the event that they are found to have not explicitly provided for payoffs in the revealed state. Arbitration occurs in the framework of the common (and, if the political process is admitted) statute law of arbitration, and can be viewed as a specialist form of legal adjudication involving specialist adjudicators (e.g., labor arbitrators or oil and gas industry specialists).

There thus exists a variety of specialist functions for determining payoffs from market contracts ex post, ranging from negotiation to the law of contract. This observation helps explain why, from a zero contracting costs perspective, (..continued) assumption is that these mechanisms have the effect of codifying common law. See Posner (1986) for a legal and economic analysis of related issues.
contracts typically appear to be “too simple,” in that the number of specified payoffs appears “small” relative to the number of logically feasible states. The economy has evolved various forms of functional completion in contracts, which are not completed by enumeration, presumably on contracting-cost grounds.

Functional completion of contracts involves a process of adjudication, since determining payoffs after the state variable has been realized involves allocation ex post wealth among contracting parties. This provides an interpretation of terms such as “fair” in describing payoffs (e.g., the notion of “fair market value” in circumstances where this requires some estimation by the court) and “independent” in describing specialist functions (e.g., the judiciary). This terminology, which we shall see is important in accounting and auditing, is interpreted here in terms of the independence and competence of the adjudicator: a “fair” outcome is one in which an adjudicator who possesses the degree of competence specified or implied by contract follows due process (i.e., the specified and implied rules of adjudication) and is not unduly biased by the interest of any contracting party. By construction, there is no demand for an “unfair” arbitrator in voluntary contracting.

Note that “fairness” here is not defined as an absolute

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29 This analogy has been recognized by several researchers. Cheung (1983, p. 8) describes the process of arbitration. Williamson (1985, 1986) makes frequent reference to adjudication and arbitration.
concept, but is formulated relative to the contracted degree of competence and independence. Competence involves the acquisition of skills and experience and hence is not in limitless supply. Absolute independence is not feasible when the contracting parties possess information that is relevant to the adjudicator’s decision and that is costly for the adjudicator to replicate, so the adjudicator will rely upon information supplied by individual contracting parties to an optimal degree. Conversely, the adjudicator will undertake only an optimal amount of independent verification of tendered evidence. Adjudication, itself a contracting-cost minimizing function, thus is costly to implement and is subject to an agreed optimal, but not absolute, level of fairness.

The relative costs of completion by enumeration and by function will determine the equilibrium extent of each. Enumeration costs include the costs of identifying states and specifying precise state-dependent payoffs. Functional completion costs include the costs of operating the adjudication function, the costs of the adjudicator bonding to complete the contract fairly (e.g., by establishing a reputation for fairness), and the residual loss resulting from the \textit{ex ante} uncertainty of the adjudicated state-dependent payoffs. The residual loss in functional completion does not arise from state uncertainty but from payoff uncertainty, given states. It takes the form of contracting opportunities foregone, due to the additional risks to the contracting
parties from unspecified state-dependent payoffs. The greater the contracted degree of competence and independence of the adjudication, and the risk of an “unfair” adjudication, the greater the likelihood of contracting occurring. The optimal level of adjudication thus is determined by a tradeoff between: (1) the costs of increased competence and independence, plus the costs of bonding and monitoring the fairness of the adjudication; and (2) the residual loss from foregone contracting.

Functional completion thus takes many institutional forms in market contracting. A similar conclusion holds for contracting in firms. Firms’ adjudication mechanisms include management compensation committees, personnel functions and the audit process. The latter is discussed in more detail below. As in markets, functional completion in firms presumably exists because it is a cost-efficient method of contracting, relative to providing for all feasible states \textit{ex ante}. For example, an exploration firm might possess skills in assessing separate rewards for members of exploration teams under a range of circumstances, such as when a reasonable gamble has been taken by the team as a whole but has failed. There will not normally be a compensation contract that lists \textit{ex ante} the precise factors to be employed in the \textit{ex post} evaluation and the precise mapping from those factors to compensation payoffs. The firm’s skill in making these payoffs can be an important determinant of its success. The
relative efficiency of the firm’s functional completion technology (i.e., for determining rewards, contingent upon the revelation of the actual state) is proposed as a prime reason for its existence.

Functional completion of contracts, in both forms and markets, is the normal method of completing the contractual mapping from states to payoffs. There exist a variety of institutional mechanisms for this purpose. Their prevalence suggests that models of the firm that assume that contracts are completed by enumeration are deficient in institutionally important ways. First, they over-predict the number of unambiguously-enumerated payoffs in contracts and imply that observed contracting, relative to the complexity of the state space, is “too simple.” Second, they provide no logical structure in which adjudication processes, including concepts such as independence and “fairness,” can be viewed.

I.7 Summary

Contracting is assumed to be costly. The economic role of firms and their institutional features, including accounting and auditing, is assumed to be one of minimizing contracting costs. The firm is viewed as a specialist contracting intermediary, minimizing the costs of contracting between factory owners and consumers. Implications that are potentially relevant to our understanding of accounting and auditing include: (1) firms do not transact at market prices; (2) there is diversity across firms in optimal contracting;
(3) firms vary in the extent to which market price information is used in determining their internal, quasi-prices; (4) contracts are not normally completed by enumeration, but express or imply adjudication functions to determine some payoffs ex post; (5) adjudication functions use precedent as an efficient learning function; and (6) adjudication functions preserve their independence from the contracting parties whose wealths are affected by the adjudication. The following section develops these implications further.

II. Application to Accounting and Auditing

In this section, accounting is viewed as a specialist function for providing information used in firms’ contracting (and thus in establishing quasi-prices). Auditing is viewed as a specialist adjudication function, used in completing contracts whose payoffs have been defined in terms of accounting numbers but which do not prespecify the exact accounting technique set to be used in calculating those numbers. The assumptions of Sec. I are maintained, including the assumption that the observed institutional structure (of which accounting and auditing are part) is contracting-efficient.

II.1 The Nature and Sources of Accounting Information

Payoffs under a range of contracts are a function of calculated accounting numbers. Formal contracts with suppliers of debt and of management services frequently define
rights and payoffs as an explicit function of accounting numbers, and thus have attracted empirical research.\textsuperscript{30} A contracting logic also underlies firms’ disclosures to the capital markets: absent regulation, stockholders and bondholders would contract for the public dissemination of an optimal amount of information. Their incentive is reduce risk and increase liquidity (i.e., create an informed secondary market for their investments).\textsuperscript{31}

The contracting demands for disclosure extend to all parties contracting with the firm as an intermediary. With positive contracting costs, every factor owner and every consumer who has contracted with a firm has made a specific investment of contracting costs in its survival. Similarly, every factor owner or consumer contemplating contracting with a firm is contemplating a firm-specific investment of contracting costs. All actual and potential factor owners and consumers thus have a derived demand for information relevant

\textsuperscript{30} Watts and Zimmerman (1986) survey the role of accounting numbers in these contracts. See also De Angelo (1988).

\textsuperscript{31} Regulation of disclosure obscures the underlying supply and demand for accounting information. Watts (1977) and Watts and Zimmerman (1978) demonstrate the existence of these underlying forces by an historical analysis of voluntary disclosure prior to regulation. Note that the common law obligations of the directors to disclose initially arose in a voluntary-contracting setting (including decisions of the courts, interpreted here as specialist adjudication decisions that complete contracts functionally) and subsequently formed the basis of much statutory disclosure law, so the marginal effect of regulation is unclear. Unlike Watts and Zimmerman (1986, pp. 197-98), no distinction is drawn here between “contracting” and “information” hypotheses: absent regulation, the distinction is empty.
to assessing their contract-cost investments in the firm, potentially including accounting information. While that demand is a function of the magnitude of the factor owner’s or consumer’s contracting-cost investment in the firm, it is positive for all contracting parties. Hence, firms voluntarily undertake “public” disclosure of information, including accounting information.\footnote{This observation helps explain the courts’ extension of the liability of auditors to a wide range of contracting parties.}

The contracting framework developed in Sec. I provides some insights into the nature of accounting information. In contrast, neither the classical works on accounting theory [for example, Beaver and Demski (1979) and Staubus (1985)] allow for the economic difference between contracting in firms and contracting in markets. If this distinction is not made, then not even the existence of firms can be explained, let alone the form taken by their institutional functions such as accounting and auditing.

It follows from the arguments in Section I.4 that the accounting function in firms does not report either sets of market prices or estimates of sets of market prices. Some accounting numbers can be market prices and indeed some are easily recognized as such (e.g., cash, foreign currency), but the set cannot be. While market price information can be useful in establishing quasi-prices, as argued in Section I.5, this does not imply that accountants report market prices or
estimates of market prices. This thesis has potentially widespread implications for a range of accounting issues.

A prime example is provided by the classical literature on accounting theory, which contains extensive debates about which of several variants of market price “ought to” be used in so-called “external” accounting reports to the contracting public at large (actual and potential). The variants of market price debated include replacement cost, realizable value, and present value of cash flows. Setting aside the positive/normative distinction raised in this context by Watts and Zimmerman (1978), there is a fundamental logical flaw in these arguments. If the market prices referred to in these debates are construed as prices of the individual assets owned by the firm, then in equilibrium such prices do not exist: the debate is empty.

Consider first the proposal that market prices be incorporated in income statements. If market prices existed for all factors used by the firm, then the firm itself would not exist: consumers would contract directly with factor owners. For example, if there existed market prices for the use of a pin-capping machine in capping the pins sold during the accounting period, then pin-capping would not be undertaken in firms. There would be no demand for a specialist contracting intermediary, because the fixed plus additional contracting costs of establishing and operating the

33 For a survey, see Hendriksen (1970).
firm would not be incurred and there would be no entity creating a derived demand for income calculation. This is an example of the general proposition, that a framework without contracting costs is devoid of any predictions concerning the nature of institutions, including the existence and form of income measurement.

Consider next the balance sheet. If there existed market prices for all of the factors owned by the firm, such as semi-completed inventories or individual items of equipment on an integrated production line, then there would be no economic role of the firm in owning factors as an intermediary: consumers could contract directly for factor ownership services (i.e., for those who hold inventories of factors). Provided the firm’s strategy is viable (i.e., provided it is not optimal for the firm to liquidate its assets; in accounting language, provided the firm is a “going concern”), there simply do not exist market-prices for the numbers in firms’ income statements and balance sheets. Recall, however, that market prices can be informative (particularly for firms with a high probability of liquidation).

Hence, in a world of costly contracting, the classical debates are empty, since the alternative prices being debated do not exist. But the debates also are empty in a world with costless contracting, since all markets then are perfect and complete and firms do not exist (nor do accounting functions in firms and accounting reports about firms). In addition, as
argued in Ball (1975), necessary conditions for market prices to be of universal interest (perfect and complete markets) are conditions under which the market price variants being debated (replacement cost, realizable value, present value) are identical.\textsuperscript{34}

Conversely, the only feasible fruitful debates are those concerning the use of accounting numbers in contracting, including disclosure to investors and all other actual or potential contracting parties, in a costly-contracting world. The classical debates about the relevance of different market price information then can be interpreted as debates about which market price information is most useful in setting the firm’s quasi-prices, along the lines of Sec. 1.6.

Staubus (1985) argues that accounting numbers \textit{simulate} market prices. This argument seems to ascribe some arbitrary authority to market prices, even in contexts where they do not exist and are not used. It makes no more sense to view quasi-prices as simulating market prices than it does to view market prices as simulating quasi-prices. Each survives in its own domain; furthermore, the analysis in Section I predicts that equivalent market and quasi-prices do not simultaneously exist.

For example, since FAS 2 in 1974 the amount shown on U.S. firms’ balance sheets for assets created by in-house R&D expenditures has been zero. Similarly, since APB 11 in 1967

\textsuperscript{34} See also Beaver and Demski (1979).
the amount shown for deferred future tax obligations arising from current book income has been the estimated undiscounted amount. The amounts reported under theses accounting rules cannot be explained as market prices or as estimates of market prices. The question, deferred to Sec. III below, is whether these rules (and thus the numbers they produce) can be explained in the present framework.

The proposition that accounting and auditing do not provide information about market prices is not contradicted by the partial use of market prices in producing such information, provided it is not exclusive. As noted in Section 1.6 above, the firm will obtain useful information for determining its quasi-prices from many sources. They will include its own specialist technology and its knowledge of the practices of other firms. When there exist market prices for contracting that is similar to contracting conducted within the firm, then they also will provide useful information. While market prices might be useful, their usefulness is restricted to providing information about the firm’s quasi-pricing, otherwise it will not survive in its present form. The objective of the accounting function thus is not to provide information about market prices per se.

Thus, to understand the nature of accounting and auditing, which are specialist functions of the firm, it is necessary to first understand the nature of the firm and its internal contracting. Because the firm's contract set cannot be
written at market prices, it is difficult to see how the purpose of the accounting and auditing functions could be to provide information about market prices.

Propositions:

1. Accounting is a specialist technology for determining either quasi-prices or information that is relevant to determining quasi-prices.

2. Accounting reports (including income statements and balance sheets) contain neither sets of market prices nor estimates of sets of market prices.

3. Market prices of individual factors owned by the firm (its assets) are only of interest to shareholders under perfect and complete markets. Then, price is equal to buying (input) price, selling (exit) price and present value of cash flows. Hence, there can be no debate about which market price concept is relevant to shareholders: the answer always is either none or all. In both cases, the assumption of perfect and complete markets implies that there is no demand for accounting information.

4. Once positive contracting costs are admitted, there can be a debate concerning the types of market transactions that are used by the accounting function in obtaining information for determining firms' quasi-prices.

II.2 Industrial Cost Accounting and Management Accounting.

As a contracting intermediary, the firm replaces direct market contracting between factor owners and consumers with:

(1) its contracts with factor owners and consumers separately; and (2) its own allocation of factors to products. Production is a process of factor bundling that, in the absence of contracting costs, would arise from a set of market contracts between factor owners and consumers. Since market prices to guide production in firms do not exist (see sec. I.4), the
firm determines its own quasi-prices, which are not to be confused with prices. This subsection explores the nature of management accounting in this context.

Industrial cost accounting appears to have arisen from the record-keeping of operating managers (including engineers), who increasingly employed specialist costing clerks and cost estimates for this function.\textsuperscript{35} The costing techniques initially employed by managers were \textit{ad hoc} solutions to their needs, but as managers began to find commonality among their problems there emerged a common body of costing technique that was written into texts. Wells (1978, p. 74) notes the use of diary records by engineers, to obtain job costings that would be useful for future job cost estimation and quotation. It was not until the late nineteenth century that "costing" and "accounting" were integrated. Johnson (1981, pp.512-14) describes how labor productivity/cost estimates and overhead cost estimates replaced market prices, as integrated textile mills replaced household production in the early nineteenth century. For example, labor piece-rates were replaced by calculations of unit labor costs, adjusted for overheads. To the extent that these calculations were used in firms' production/investment decisions (and it would be strange if the accounting costs were incurred for no purpose), they produced either quasi-prices or information used in establishing quasi-prices. Under the Coasian hypothesis,\textsuperscript{35} See Wells (1978), Johnson (1981) and Chandler (1977).
production in firms replaced production in markets because it was more economical to contract in firms. Under the present variant of that hypothesis, contracting economies arise from scale in repetitive contracting. To illustrate how industrial cost accounting offered such economies, consider the development of standard costs, which was an important step in the evolution of cost accounting.

Standard costing is an accounting technique in which the firm establishes a dollar amount that is attached repetitively to every unit of product that receives a particular production process. As the product advances in the process, the accounting system adds factors to it at standard cost. These amounts are determined by the firm's accounting function. They are analogous to, but fundamentally different from, the market prices of the factors added if the assembly of the product had occurred by market contracting. The standard cost of a particular process is applied equally to all units produced, so there are scale economies in repetitive application of an amount that does not need to be contracted separately by each consumer. For example, instead of each consumer independently contracting for (say) the labor in operating a pin-capping machine to cap one pin, the firm contracts once to hire labor and establishes one quasi-price for labor in the pin-capping operation, which it uses repetitively in the production of all pins. The standard cost need not equal the calculated average cost per unit produced.
over any period (i.e., there normally will be cost "variances"). It is the firm's promulgated quasi-price, analogous to a quoted market price. Standard costs are not obtained by measuring market prices for each production stage, because such prices do not exist. The invention of standard costing thus can be viewed as an institutional invention to economize in contracting, by the repetitive quasi-pricing of factors of production.\(^{36}\)

**Propositions:**

1. Standard costs and other cost accounting numbers are not sets of market prices or estimates of sets of market prices.

2. Standard costs are an institutional invention by which firms obtain scale economies in repetitive contracting for production.

3. The development of standard cost accounting and other industrial costing techniques is an integral part of the firm's comparative advantage over markets in conducting repetitive contracting for production.

**II.3 Overhead Cost Allocation.** Zimmerman (1979, p.505) poses the important and intriguing problem of finding "some plausible reasons why rational, maximizing individuals would want to allocate cost," whereas "the accounting literature\(^{36}\) tends to see accounting as a solution to the problems created when firms displaced market contracting.

A stronger view is that accounting techniques such as standard costing are one of the reasons for the firm's very existence, providing a repetitive, low-cost means of contracting that allows it to survive as an intermediary. Under this view, the firm, its products and its quasi-pricing technologies are joint inventions. The historical sequence is not necessarily proof of economic causality.

\(^{36}\) Johnson (1981)
generally recommends avoiding cost allocations." Overheads are costs that the firm's accountants do not directly trace to products and that are attached to products by some rule, known as an "allocation" rule. Examples of overhead costs are: labor costs of factory cleaning or maintaining plant; compensation of factory supervisors; depreciation of plant; and factory rentals, utility charges and property taxes. While the costs of materials that are put into production are more directly attributed to individual products or production processes, overhead costs are only indirectly attributed. For example, it is common to allocate overheads proportionally to products' consumption of directly-attributed labor costs.

Zimmerman's pioneering contribution stands apart as an attempt to provide a rational economic explanation of overhead cost allocation. His (1979, p. 519) proposition is that in general overhead cost allocations proxy for errors in measuring other (non-overhead) costs:

... cost allocations appear to proxy for certain hard-to-observe costs that arise when decision-making responsibilities are assigned to and vested in various individuals (i.e., decentralized) within the firm.

Several examples of this general proposition are given. One example is due to Williamson (1964). A principal employs an agent, with compensation tied to reported profits, and cannot observe the agent's personal consumption of factors owned by the principal/firm. Personal consumption of factors, otherwise known as "perquisites" (examples being "thick carpets, air conditioning, congenial employees" and the
agent's own time that has been contracted to the principal/firm), is a cost potentially borne by the principal, who takes protective action. Overhead allocation is proposed one means of accomplishing this. In this model, management compensation is an increasing function of reported profits, so the principal allocates overhead against reported profits, thus decreasing the agent's compensation and -- given reasonable assumptions about the agent's utility function -- decreasing the agent's personal consumption of factors. In effect, the allocation of overheads imposes a tax on the agent's income, though not on consumption of perquisites (which is difficult to observe), the indirect effect being a reduction in perquisite consumption.  

In this example, overhead costs proxy for other costs that are difficult to observe. They are not legitimate costs in their own right, but are used to proxy for (remedy biases in) other costs. The implicit assumption is that firms, in the absence of biases in estimating non-overhead costs, would not

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37 Why this is not done by simply reducing the agent's compensation is not explained, even though the two schemes would have equivalent effects on managers' actions. (In defining the agent's utility over reported profit and assuming concave, continuous utility functions, the analysis implicitly assumes that compensation is a continuous, monotonic function of profit.) Because net income is used in a variety of other contracting, it seems reasonable to predict that the preference-distorting tax would be imposed directly on the manager's compensation, without distorting net income. Note that Zimmerman (1979, p. 510) does not present his analysis as "a complete formal model of the problem, but ... to stimulate further work in the area" and that this is the first "contracting" paper to provide an economic explanation for the existence of overhead allocation.
allocate overheads to products and would not even deduct them from reported income (more specifically, from the income number used to compensate managers).

The present analysis provides an alternative explanation of overhead allocation. Under this interpretation, the firm's overhead allocation techniques are efficient methods of determining quasi-prices for factors whose usage in production cannot be directly metered in a cost-efficient fashion.

Recall that if contracting was costless, then production could be effected by elaborate contracting in markets. The equivalent of the overhead costs of firms then could be contracted at market prices. For example, the utility company could costlessly send and collect separate accounts to individual pin consumers, for the electricity used by a pin-capping machine in capping individual pins. But because contracting costs exist, we observe firms that calculate cost-efficient estimates of the equivalent of the utility bill for one pin, without incurring the prohibitive costs of direct metering. These overheads typically are aggregated into "bundles" (or sub-products) of individually-allocated factor costs, some of them trivial, presumably as a cost-efficient procedure. Thus, overhead allocation is proposed as a cost-efficient institutional invention for establishing coarse quasi-prices for factors.

Provided there is no reason to question the firm's "going concern" basis for assessing positive quasi-prices for its
factors (as outlined below), the firm in essence supplies its own factors to its operations and quasi-prices them on a variety of bases, known as allocation rules. The basis could be square footage used, weight, or volume. In this sense, quasi-prices and market prices share a common characteristic: there is no uniquely efficient basis of quotation.

The cost allocation problem only arises because the cost of more finely metering each product's consumption of each factor exceeds the benefits of doing so. Other things remaining equal, the likelihood of being classified as an "overhead" cost, rather than a "direct" cost that is more finely metered, therefore is an increasing function of factor specificity.

Within this framework, the case against overhead allocation is weak. It is no stronger than the case for the proposition that the market prices of machinery rental, factory rental, electricity, coordinators etc. are zero. When contracting for these factors is brought within the firm because of its lower contracting costs, the prices of the factors themselves do not disappear: they merely take on a different (and more efficient) shape. It would be ironic in the extreme if firms replaced markets, because contracting for the pricing of machines, factories etc. was more efficient in the firm than in markets, and firms then treated those factors
as free goods.\footnote{Coase himself was an early advocate of direct costing. In a series of articles in The Accountant, Coase (1938) argued for the concepts of "avoidable cost" and "marginal cost" and against the allocation of "oncosts."}

**Propositions:**

1. Firms allocate overheads to provide cost-efficient quasi-prices for factors of production whose use is relatively costly to meter more finely. Firms "full cost".


3. Other things equal, the likelihood of a factor cost being classified as an "overhead" is an increasing function of factor specificity.

II.4 Allocation Across Time: Accounting Accruals.\footnote{The analysis in this section is similar to Watts and Zimmerman (1986, pp. ).}

Accounting accruals involve the allocation of costs and revenues across time. Together with operating cash flows, these techniques determine the reported income statement and balance sheet numbers of the firm. Examples of techniques for allocating costs across time are: depreciation; interest imputation; the inclusion of "fixed" overhead costs in inventory values; provisions for doubtful debts; rules for expensing versus capitalizing outlays such as research and development expenditures; and accounting for pensions,
deferred taxes, leases, inventories and exchange rate variation. Why do firms incur the cost of accounting for accruals?

Within the present framework, accounting accruals exist because the resulting accounting numbers form a more efficient basis for contracting. For example:

1. Adjusting cash purchases for changes in inventories and receivables reduces incentives for managers to hold suboptimal inventory levels or pursue suboptimal credit policies, when their compensation is tied to reported income.

2. Including among liabilities the estimated present value of capital lease obligations allows suppliers of capital and other factors to have a more accurate measure of the claims upon the firm's assets. They then can more effectively contract to limit firms' leverage ratios.

If the underlying time series of interest to all contracting parties is cash flow from operations, then it is difficult to explain firms devoting positive resources to accounting accruals.

It follows from sec. II.1 above that the allocation of costs and revenues between the income statement and the balance sheet is not directed at reporting either market prices or information about market prices. In some cases, market prices will provide useful information (e.g., the market prices of foreign currency holdings) and in others they will not (e.g., depreciation). In general, exogenous market prices for all factors owned by the firm, at each and every stage of production (including, for example, R&D assets and
work in progress), do not exist. Hence, there exists no exogenous standard that the accounting numbers seek to emulate through the accrual process, such as "true income", "economic income" and "ungarbled earnings". These neither exist nor enrich our understanding of the economy we observe.\textsuperscript{40}

Propositions:

1. Accounting accruals exist because cash flow accounting provides a less efficient basis for at least a subset of contracting.

2. Accounting accruals do not exist in order to make accounting numbers better emulate exogenous standards such as "true income" and "economic income".

II.5 Depreciation and the Valuation of Individual Assets.

An important case of accrual accounting is depreciation. From I.1, we can conclude that surviving (i.e., non-liquidating) firms' accounting systems do not use "economic depreciation," defined as the change over time in the market value of an individual factor. Consequently, surviving firms depreciate assets according to a range of accounting formulae, as part of their accounting technology for determining quasi-prices, or at least information about quasi-prices, their objective not being to emulate change in the market value of assets. Even in the extreme case of an asset (a store of

\textsuperscript{40} A similar conclusion applies to the "ungarbled earnings" concept of Beaver, Lambert and Morse (1980). If this concept is based on exogenous market prices of individual factors and products, then the above arguments apply. If it is a transformation of reported earnings, dividends and/or share prices, then it is redundant, with zero demand. See also Ohlson (1989).
factors) that is totally firm-specific, in that it has zero net liquidation value, the present hypothesis is that firms do not account as if it has zero value: it is given a positive quasi-price.

This analysis explains why accountants view assets of surviving firms as stores of "probable future economic benefits" or "service potentials" -- that is, as stores of factor inputs to the firm's production function, not as individually marketable factors.\footnote{In Statement of Financial Accounting Concepts No. 6, the Financial Accounting Standards Board (1985, para. 26) states: "An asset ... embodies a probable future benefit that involves a capacity, singly or in combination with other assets, to contribute directly or indirectly to future net cash inflows ... ."} For surviving firms, assets generally are seen as being liquidated through use in internal production of saleable product, not through direct market trading.\footnote{Ball and Zimmerman (1989) test the corollary proposition that firms' depreciation numbers are correlated with their product selling prices.} As before, a subset of factors can be evaluated at market price, but that cannot be true for the set of factors owned by surviving firms, since in equilibrium such firms have been liquidated.

\textbf{Propositions:}

1. Firms do not use "economic depreciation," defined as the change over time in market value of a factor owned by the firm.

2. Depreciation and asset valuation are calculated under accounting rules that are accepted by participants in the firm for the determination of its quasi-prices, or for producing information.
II.6 Going Concern Convention and Asset Write-offs.

The going concern convention is a fundamental accounting rule for the valuation of factors. Under this convention, factors are valued at their cost, even if that exceeds their liquidation value, provided there is no reasonable evidence that the firm is likely to be liquidated. What constitutes "reasonable evidence" is not discussed here.

The going concern convention reflects the economics of factor specificity. Provided the firm's strategy is successful, factors are internally evaluated at non-market prices: at their marginal value products under the firm's strategy. An asset write-down thus reflects a reduction in the quasi-price that the firm attaches to a factor. Subsequent depreciation charges then reflect reduced per-period quasi-prices. These changes in quasi-prices should be reflected in the firm's product price and output decisions, as tested in Ball and Zimmerman (1988). Asset write-offs and write-downs thus are not motivated entirely by "external" reporting to suppliers of debt and equity capital.

Propositions:

1. The going concern assumption reflects the economics of factor specificity: assets of surviving firms generally are evaluated as stores of factors of production, not as directly marketable goods.

2. Asset write-offs are associated with reductions in firms' product prices, other things remaining equal.
II.7 Auditing. A variety of contracts, surveyed above, specify or imply payoffs that are dependent on future realizations of accounting numbers such as net income, long term debt and net tangible assets. These numbers are unobservable at the time of contracting, so implicit or explicit *ex ante* agreement is required regarding the technology for their calculation. The accounting technique set thus is an integral part of all contracts in which payoffs are direct or indirect functions of accounting numbers.

How then is the accounting technique set incorporated into contracts? Note that the accounting technique set is complex, ranging from the broad (e.g., accounting conventions such as representational faithfulness and freedom from bias) to the particular (e.g., detailed procedures for determining the inventory of a dealer in edible oils). Note also that the optimal accounting technique set is unlikely to be independent of the realization of the state variable (e.g., the future rate of inflation, the invention of leasing, or the creation of new production processes), which adds another dimension to its *ex ante* complexity.

One process for completing contracts in which payoffs are accounting-dependent would be to enumerate every feasible future state and specify the entire agreed accounting technique set for each state. This is not an efficient contracting equilibrium, since we do not observe it. An alternative, along the lines modeled in section I.6, is to
create a specialist adjudication function to determine the accounting technique set \textit{ex post}. This is proposed as a central role of auditing.

Following the model described in section I.6, the process is as follows. First, contracts either explicitly (as in the case of debt capital) or implicitly (as in compensation of divisional managers based on divisional earnings) provide for the establishment of a particular audit function (e.g., the appointment of independent CPAs), as specialist adjudicators of accounting issues. It is inefficient for adjudicators to collect all information anew, so they take evidence from the contracting parties. In firms, much of the relevant accounting information is known by managers, so the auditor reviews the firm's accounts, which have been prepared by (and essentially are evidence tendered by) managers. Second, the audit function observes the realization of the state variable (e.g., it observes the increasing use of financial leases). Third, the audit function determines the \textit{ex post} accounting technique set (e.g., it determines that financial leases are to be capitalized in the accounts or, at a more detailed level, it determines an acceptable technique for physically counting a new type of inventory). The optimal technique set might be chosen from techniques known \textit{ex ante} or, if the state realization is sufficiently unfamiliar, some elements might be invented \textit{ex post}. Finally, while this determination allocates wealth among owners of factors (e.g., lease capitalization is
a ruling in favor of debt and against equity and a particular transfer price makes one divisional general manager better off relative to another), it is binding on all contracting parties, provided it is "fair". Fairness requires the auditor to have employed the contracted degree of competence and to have followed the contracted audit process, both of which could be implied by generally-accepted standards, and to have not been biased by the interests of any party: that is, to have been "independent" and "objective". (Recall from sec. I.6 that this is a contract-relative, not absolute, standard).

Thus, in SFAC No. 6 the Financial Accounting Standards Board (1980, para. 107) defines neutrality as not being "slanted to favor one set of interests over another".

While "independence" in principle means uninfluenced by the interests of any individual party, in practice the demand for independence from managers in particular predominates. This is due to the managers possessing "large" quantities of information, relative to other contracting parties. Consequently, the auditor potentially relies to a upon information supplied by managers, or by the accounting system under their control, than on information supplied by others.

The labels "fair", "independent", "neutral," and "objective" thus can be explained in this framework.43 In

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43 Some aspects of this interpretation have been derived elsewhere. Watts and Zimmerman (1986, p. 206) address the role of "objectivity" and Antle (1984) addresses auditor independence. Compared with the principal/agent approaches to auditing of Watts and Zimmerman (1983) and Antle (1984), this interpretation stresses the derived demand for audit
several countries, the auditor of the firm's public accounting reports also certifies that they are "true and fair". "Truth" in this context can be interpreted in terms of the auditor verifying the information upon which the audit opinion relies. Recall from section I.6 that an adjudicator will perform an optimal, but not absolute, amount of evidence verification. "Truth" thus means that, using accepted practices such as sampling, the auditor is satisfied with the veracity of the evidence tendered, including information supplied by managers from the firm's accounting system. It does not mean that the reported numbers correspond to some external reality, such as "economic income" or other transformations of non-existent market prices. "Truth" and "verifiability" thus are overlapping concepts.

In the United States, the auditor of the firm's public accounting reports certifies that they conform to "generally accepted accounting principles". GAAP is interpreted here as a codified set of precedents for firms in general, (..continued)

**independence** and provides explanations for important audit conventions such as "fairness". In the principal/agent framework, the auditor is hired by and answerable to one party (the principal, who typically is modeled as the stockholders) and hence would not be accepted as "independent" or "objective" by the agents (typically, managers). These approaches typically concentrate on opportunistic behavior, curiously by the agents; yet an auditor answerable only to a principal seems not only lacking independence (i.e., is not an adjudicator as modeled here, but has an incentive to act opportunistically against the agent). The prediction of the framework in this model is that managers would not accept contracts in which their wealth was exposed to the ex post determinations of a biased adjudicator: i.e., the equilibrium demand for such an auditor is zero.
incorporating the accumulated experience of independent CPAs. Thus, GAAP is a specialized version of case law. Contracts feasibly could be completed by enumeration; alternatively, they can provide for functional completion mechanisms that use accumulated experience, in similar contracting elsewhere, as a cost-efficient contracting technique.

The certification that a public accounting report is consistent with GAAP is not a statement that the firm's accounting technique set is identical to that of other firms (the present framework predicts the contrary). The GAAP certification says that the firm's accounting technique set is generally accepted, rather than generally used: that accumulated experience in like states suggests that the firm's accounting technology is appropriate. GAAP therefore is a specialized form of case law. Precedent is persuasive in this context because it embodies the learning of other firms in similar states of the world. Presumably, being "persuaded" by precedent is a cost-effective procedure, relative to the alternative of constructing an entirely new solution.\(^4\)

In qualifying an audit opinion, as not being "true and fair" or in accordance with GAAP, the auditor rejects the firm's accounts, or parts thereof, as a binding basis for

\(^4\) Relative to Watts and Zimmerman (1986, chapter 9), I am more inclined to view GAAP as arising in a voluntary contracting framework, as noted in II.12 below. That is, GAAP is modeled here as resembling the evolved rules of a franchise more than a politically-imposed solution. Consequently, this analysis of GAAP corresponds to their analysis of "accepted" accounting policies, as distinct from "mandated" policies.
contracting. For example, the trustee for debenture holders then is not legally obliged to accept the firm's accounts for the purposes of a debt agreement that calls for audited accounts.

Modeling auditing as a specialist form of functional completion, for contracts in which payoffs are accounting-dependent, reveals the similar roles of "internal" and "external" auditing. "Internal" accounting technique choices affect the wealths of managers whose compensation or promotion prospects are dependent on segment-level accounting numbers. Calculation of segment costs and earnings, for example, requires cost allocation techniques, transfer prices and other "internal" accounting techniques, not all of which are efficiently specified \textit{ex ante}. This creates a demand for an independent adjudicator on "internal" accounting issues such as inter-segment cost allocation and transfer pricing. While "internal" and "external" auditing have different institutional roles (and therefore forms), they both are specialist forms of adjudication of functionally-completed contracts with accounting-dependent payoffs.

\textbf{Propositions:}

1. Auditing is a cost-efficient specialist institutional function for completing contracts that implicitly or explicitly use accounting numbers, by \textit{ex post} completion of the accounting technique set.

2. The demand for auditing is an increasing function of the cost of pre-specifying the firm's accounting technique set for all feasible future states. (Proxies would be duration of contracts [perhaps
explaining the growth of auditing with the joint stock company, novelty of contract, and amount of state uncertainty).

3. Various accounting and auditing concepts can be explained in terms of the economics of adjudication. These include: GAAP, independence, neutrality, fairness, objectivity, truth and verifiability.

II.8 Historical Cost, Conservatism and the Lower of Cost or Market Rule.

The lower of cost or market rule introduces apparent asymmetry in firms' accounting numbers: assets are written down but, in the U.S. at least, they are not written up. An explanation for this apparent inconsistency rests on three premises: (1) managers possess information about the "probable future economic benefits" arising from assets, under the firm's strategy; (2) managers have asymmetric incentives to disclose favorable versus unfavorable information concerning expected future benefits; and (3) auditors face a derived demand for independence, including independence from managers.

The price mechanism is costly to operate and thus does not provide continuous, exogenous (to the firm's contracting parties) prices for stores of factors owned by the firm, such as inventories that have completed production or are in process. In general, managers possess information concerning the future benefits derivable from assets such as specialized plant and equipment and unsold inventories. This

45 Watts and Zimmerman (1986, p. 206) make this point, and tie it to conservatism and accountants' concerns with objectivity
information is not costlessly verifiable by the firm's auditors. To preserve their independence (see II.7 above), auditors only accept information as usable in the firm's accounts, and thus in contracting that uses accounting numbers, when the information runs against the interest of incumbent managers. This generally amounts to information that decreases reported earnings and equity. As a cost-effective technique, auditors thus follow a general rule, known as "lower of cost or market": accept write-downs, but not write-ups, by managers as supplying independently-verifiable information about future economic benefits.\(^{46}\)

When contracting costs are ignored, the asymmetry in accounting rules is puzzling.\(^{47}\) Advocates of including holding (..continued)
and verifiability. See also De Angelo (1988).

\(^{46}\) An alternative explanation, which also relies on contracting costs, is as follows. Factors are in competitive supply but are specific, in the sense that they lose the firm's investment in contracting costs (and thus decrease the value of the firm) when they are sold. This generates an alternative form of asymmetry. If the firm's derived demand for the factor exceeds expectations, then additional units can be purchased at the competitive price, which places an upper bound on the economic benefit that the firm, which faces competition from other firms, can obtain from the factor. If the derived demand is below expectation, and factor sale is contemplated, then the lower bound to the value of the factor to the firm is limited only by the extent of factor specificity. Hence, holding factor supply price constant, firms write down but do not write up the book values of factors.

\(^{47}\) Davidson, Stickney and Weil (1988, p.141) state: "The inconsistent treatment of unrealized gains and losses does not seem warranted. The arguments used against recognizing unrealized gains apply equally well to unrealized losses. If gains cannot be measured objectively before a sale, how can losses be measured before the sale?"
gains on inventory in reported income implicitly assume that it is costless to independently verify the gains or that there is no derived demand for audit independence. Absolute verifiability of holding gains in turn assumes costlessly observable market prices for inventory, or complete markets for firms' stores of factors and products, an assumption that is contradicted by the very existence of firms.

It is not sufficient to explain the lower of cost or market rule in terms of accounting conservatism, since that does not explain the existence of conservatism itself as a property of accounting numbers. In the present analysis, accounting numbers are conservative because accountants contract for them to be conservative, the reason being the fundamental asymmetry in available independently-verifiable.

Similar reasoning explains the historical cost rule. Managers' assessments of future economic benefits from factors are not independently observable. However, provided the auditor can verify that a factor was acquired in an arm's-length transaction (i.e., that managers had no other interest), the price paid is a minimum bound to managers' assessments at the time of purchase. This number is used in the accounts, subject only to subsequent write-downs.

**Propositions:**

(continued)

48 The notion that accountants **contract** to be conservative is consistent with the low frequency of law suits for under-statement of net assets, relative to suits for over-statement.
1. The lower of cost or market rule reflects the fundamental asymmetry in the ability to independently verify managers' superior information.

2. Accounting reports are prepared conservatively because, recognizing the fundamental asymmetry in independently verifiable information, accountants contract to provide conservative reports.

II.9 Cross-sectional Differences in Accounting Techniques. Recall from sec. I.3 that, in equilibrium, firms adopt different contracting strategies which means, by definition, that they adopt different technologies for determining quasi-prices. The fundamental argument is that if any two firms share identical contracting technologies, then one cannot survive, due to increasing returns to scale in strictly repetitive contracting. This leads to the proposition that, in the absence of regulation, there exists cross-sectional dispersion in accounting techniques, as firms respond optimally to their strategies. The existence of differences among firms' accounting techniques thus is "good".49 Because participation in the firm is voluntary, its ex post accounting technique set (subject to review by the audit function) is accepted by factor owners. This implies that factor owners do not adjust the firm's accounting numbers merely because its accounting techniques differ from those of other firms. They

49 The predicted existence of dispersion is not at all novel. For example, it underlies the large and growing literature surveyed in Watts and Zimmerman (1986) on the choice of accounting policies. The departing point of the present analysis is the focus on the contracting-efficient degree of cross-sectional dispersion, as a function of dispersion in corporate strategies.
have contracted for payoffs to depend upon reported accounting numbers. They have declined to incur the costs of fully enumerating a state-dependent accounting technique set. Instead, they have contracted into an independent adjudication process to complete the accounting technique set *ex post* and they are bound to accept a "due process" determination. If, as we have hypothesized, there are local optima in efficient contracting technologies (including accounting technologies), then factor owners have contracted to accept "due process" accounting technologies that differ from those of other firms. While they might contract on the basis of different accounting numbers (e.g., earnings before or after tax), the implication is that they do not adjust reported numbers for cross-sectional dispersion in accounting technique sets.

**Propositions:**

1. In the absence of coercion (e.g., regulation and taxation), cross-sectional dispersion in accounting techniques exists as an implication of firms pursuing different strategies.

2. In the absence of coercion (e.g., regulation and taxation), parties contracting with the firm do not adjust accounting numbers for cross-sectional dispersion in accounting techniques.

II.10 Changes in Accounting Techniques. This framework also suggests the proposition that changes in accounting techniques reflect a rational adaptation by the firm of its technology for determining quasi-prices, in response to change in the world in which the firm operates.\(^{50}\) If a time sequence of

\(^{50}\)For a more detailed analysis, see Ball (1980). This suggests that changes in accounting techniques are both
revealed states exhibits changes in an important dimension, then the firm might need to adapt its technology for determining quasi-prices. For example: the source of obsolescence of a depreciable factor might be changed by technological invention, leading to a change in depreciation method; a firm might adopt a new strategy of more fully integrating several businesses that are conducted in subsidiaries, thus implying increased contracting on a group basis (management compensation, raising debt) and creating a derived demand for consolidation); or shifts in strategy over time lead the firm into new businesses with new optimal accounting techniques. The firm's response will depend upon the effect upon all contracts; and its auditors (internal and/or external) will adjudicate the change. Rather than being "bad," accounting changes are "good" in this context. Absent coercion, accounting changes in this model are rational responses to state changes.

This analysis suggests that changes in the firm's accounting technique sets do not impose adjustment costs upon participants, as is commonly assumed in the accounting literature -- but that accounting changes, like all institutional changes, are contract-cost minimizing. Under (.continued) actions that influence the value of the firm (supply of accounting technique) and responses to factors that influence the value of the firm (demand for accounting technique), thus posing a classic identification problem for empirical researchers interested in estimating either "determinants" or "effects" of accounting changes.
the assumption that accounting changes are rational responses by firms to changes in states of the world, accounting's failure to make those changes requires participants to attempt them themselves. Furthermore, if the changes pass the scrutiny of the (internal and/or external) auditors, then they must be accepted by all participants as leading to "fair" payoffs.51

Propositions:

1. In the absence of coercion (e.g., regulation and taxes), accounting changes are rational responses by the firm to changes in state variables or are attempts by the firm to better adapt to its state.

2. In the absence of coercion, contracting parties accept audited accounting changes, and the accounting numbers arising from such changes, as contractually-binding. For example, debtholders do not adjust accounting numbers for accounting changes that affect numbers used in debt contracts.

II.11 Effect of Coercion; Role of FASB. This analysis has ignored the effect of coercion on the firm's contracting technology, including its accounting technique set. Coercion can take several forms: regulation, taxation and political pressure among others. The firm has been viewed as a specialist contracting intermediary in a competitive environment, contracting with consumers and owners of factors

51 The above analysis is complicated by the existence of a secondary motive for accounting changes: the firm learning how to better adapt to its environment. This leads to different predictions about adjustments.
in an unimpeded fashion.

In the United States, the Congress, the SEC, the Treasury, other government agencies and (to some degree) the FASB together act to regulate accounting technique choice. It seems reasonable to conjecture that coercion generally reduces both cross-sectional and cross-temporal dispersion in accounting techniques, due to the planner's preference for a tidier landscape, though Watts and Zimmerman (1978) argue that differential political costs can increase cross-sectional dispersion in preferences for techniques. The present analysis is silent on this issue.

The effective extent of regulation of accounting technique choice is unclear. While professional bodies such as the FASB provide a focus for and presumably reduce the costs of political intervention, this is not their primary economic role. In the absence of coercion, professional bodies minimize costs of invention and codification of accounting techniques. Scale economies create incentives to centralize some aspects of adjudicating on accounting techniques and they create a demand for codification of precedent. It is helpful to think of the accounting profession as structured as a multi-level franchising operation, with the FASB executing the fundamental product design, individual CPA firms specializing it, and individual CPAs adapting it to particular circumstances. One role of professional accounting associations such as the AICPA thus is to provide scale
economies in accounting, whose economic role is based upon
efficiency in contracting. It therefore is difficult to
assess the extent to which the FASB acts in a coercive fashion
or as an uncoerced inventor and codifier of "generally
accepted" accounting techniques.

As an example of the difficulty of distinguishing coercive
and voluntary accounting choice, consider the 1974 ruling in
FAS 2, requiring immediate expensing of R&D costs. The
stylized facts suggest that the change occurred during a time
of increased technological uncertainty for U.S. firms (greater
uncertainty in the rate of obsolescence of investments in
research and development, due in part to increased difficulty
with foreign competition) and increased political and economic
uncertainty (1974 was the period of Watergate, the OPEC
embargo, increasing inflation, and increased stock market
volatility, among other things). They also suggest that
managers possess information about the success or otherwise of
their R&D efforts that is difficult for auditors to
independently verify. Other things being equal, these
stylized facts imply that in general auditors might now be
more likely to request that research and development expenses
be written off over shorter periods and that they might be
more likely to write them off within one year (i.e., expense
them immediately). The decision might involve disagreement
between managers and the firm's independent CPAs as
adjudicators and, due to the costs of making the choice, need
not be made identically by all firms. Centralization of the adjudication decision by the accounting profession would render the choice less costly and more homogeneous across firms. Two interpretations of FAS 2 thus are: (1) coercive restriction of choice; and (2) efficient, centralized decision in a franchise system.

Thus, GAAP is due in part to coercion and in part to voluntary membership of CPA firms in a franchise system that gains scale economies from accounting technique invention and codification. The effect of omitting coercion from the present analysis thus is unclear and, in my view, over-rated.

III. Nature of Relevant Evidence

The analysis offered in this paper is an incomplete and preliminary treatment of the economic role of accounting and auditing, as specialist components of the firm's specialist technology for intermediation in contracting. Contracting technology is all that distinguishes firms from markets, and firms from each other, and thus is the source of the firm's survival as an economic institution. Consequently, accounting and auditing derive their existence and form from the contracting economics of the firm.

The empirical domain of an analysis of this type is institutional data. Some data will be simple institutional "facts". Other evidence can be collected through more currently-conventional research designs. The nature of the relevant evidence therefore is varied.
At the most basic level, propositions of the following character are readily testable, some by casual observation:

1. Firms exist.
2. Accounting and auditing exist.
3. Income numbers and other accounting reports exist.
4. Firms are contracting intermediaries.
5. Functional completion of contracts using accounting numbers creates a demand for independent auditors.
6. The accounting profession is structured as a franchise, to obtain scale economies in centralized invention and codification of accounting technology.
7. Firms allocate overheads and "full cost".
8. Cross-sectional dispersion in firms' accounting techniques exists, as a rational component of firms' specialized contracting.
9. Accounting technique changes occur, as rational responses to changes in state variables.

Recall that several of the seemingly-obvious propositions, including the existence of firms, are inconsistent with zero contracting cost approaches.

Other institutional data relevant to this "testing" type of framework include the basic conventions, principles and terminology used in accounting and auditing. For example, the framework is consistent with the notions of "independence", "verifiability", "fairness", "true and fair", "generally accepted accounting principles" and "going concern valuation". These are important institutional data.

Some propositions are testable by simple observation of the composition of "generally accepted accounting principles". For example, the proposition that accounting numbers are neither market prices nor estimates or market prices can be evaluated against accounting techniques such as R&D expensing rules under FAS 2. The amount shown on corporate balance
sheets for non-purchased R&D assets is zero, for all companies. This is difficult to reconcile with the alternative hypothesis, that zero is the market price, or accountants' price estimate of all firms' non-purchased R&D assets. The non-discounting of deferred tax obligations is another example of this type of relevant datum.

The hypothesized adjudication role of the auditor is consistent with several apparent inconsistencies in accounting techniques. For example:

1. FAS 2 requires expensing of non-purchased R&D assets, but allows capitalization of purchased R&D in the form of patents. This is consistent with the derived demand for audit independence. If capitalization of R&D expenditures is allowed by the auditors, then managers' incentives are to describe them as successful, thus increasing reported earnings and net assets. Because managers are more informed about the outcome from their R&D expenditures, the auditor cannot independently verify the existence of an R&D asset for reporting to contracting parties, and does not do so (i.e., they are expensed). In contrast, there is verifiable evidence of managers' assessments when they purchase completed R&D in the form of patents. If the patent is acquired in an arm's-length transaction (which can be verified), then there is clear evidence that managers assess the patent's worth as at least equal to the amount paid, so the auditor allows capitalization.

2. GAAP provides for the discounting of pension and lease obligations, but not deferred tax obligations. The difference again is predicted by the derived demand for audit independence: deferred tax is the single case in which the present value is a function of information possessed by managers and not verifiable independently of them. The required information is their plans for future production, financing and investment, which influence the timing (and thus the present value) of future tax payments.

Thus, apparent inconsistencies within GAAP, which plagued the
classic "true income" school of thought for an entire
generation, can be predicted and explained from a contracting-
cost perspective.

Finally, several propositions are amenable to testing in
more conventional research designs. These include:
1. Asset write-offs are associated with reductions in
firms' "internal" values attached to those factors.
2. Depreciation expense and product prices are
 correlated.\(^5\)
3. The likelihood of a cost item being classified as an
"overhead" is an increasing function of factor
specificity.
4. The demand for independent audit is an increasing
function of contract duration, contract novelty and
state uncertainty.
5. Contracting parties do not adjust accounting numbers
for accounting technique differences or changes that
have been approved by the audit function.

The relevant data therefore range from simple observations
concerning the nature of firms and their specialist functions,
through conventional cross-sectional and time-series research
designs.

\(^5\) See Ball and Zimmerman (1988).
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