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Introduction

Peter Temin

All too often business enterprises are considered to be the "atoms" of economics, the irreducible unit of analysis. This is a procedure that works well in many contexts, which is why it persists. When competitive industries are the subject of analysis, for example, then the assumption that business firms are unitary has proven a fruitful starting point. But this approach also has drawbacks, since enterprises are complex organizations. This volume contains essays that explore a different view. They look inside the business enterprise.

The concept of a firm as a simple decision unit has been encouraged by the formal similarity between the analysis of the individual and of the enterprise in elementary economic theory. In each case, the person or the business firm is represented by a function representing either preferences (for individuals) or costs (for enterprises). The description proceeds symmetrically as the parallelism between the preference and cost functions is exploited. The analysis begins to differ only when individuals confront their budget constraints and enterprises seek to make profits.

This symmetry can be overdrawn. Many business enterprises have grown to be vastly larger and more complicated than individuals or even families. They involve the activities of many people, organized into several layers of authority over often diverse locations, product lines, and productive facilities. The modern business enterprise can now rival countries in size.

To understand this complex organization, it is necessary to look inside the business enterprise to examine behavior within the enterprise's boundaries. One cannot assume that a message delivered to one part of a large enterprise will make its way to all others. One cannot assume that information generated at the shop floor will be clear to top management. One cannot assume that

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plans made in the board room get implemented swiftly and uniformly throughout the enterprise.

Different levels of abstraction are appropriate for different problems. The view of the business enterprise as a "black box" is still useful for many questions. But there are other problems for which the internal operation of business firms matter. If we seek to learn about employee compensation, for example, then a look inside the firm is needed. Simple wage payments are only the most basic way of compensating employees. More complex alternatives are used widely, for reasons related to the internal needs of the enterprise.

Alternatively, if we are investigating how new technology is used by enterprises, we may well want to look inside the firm. As some of the papers in this volume show, enterprises can be organized in ways that allow only certain kinds of information to be used. The absorption of new techniques may be rendered difficult by the established patterns of communication within the enterprise.

Finally, the question of American "competitiveness" hovers around all discussions of economic progress today. American enterprises operate differently from those in, say, Japan. This observation has been widely repeated but not yet analyzed enough to know its importance. We need to characterize the way in which American enterprises conduct their business in order to evaluate the role of internal processes in the fate of nations.

The essays in this book make a start in this direction. They all in various ways direct their attention to activities inside the business enterprise. They try to organize their observations in ways that will be useful to others studying these operations. They provide insights for economics students studying the American economy, guides for business historians chronicling the progress of specific firms, and material for theorists trying to understand how enterprises and countries respond to stimuli.

Even though the essays were written by different people and draw on varied materials, they form a unified introduction to the study of the business enterprise. They are drawn together by two underlying themes.

The first theme is analytic. The essays argue for a specific approach to the study of business enterprises. In this view *information* is the key element to the functioning of an enterprise. The scarcity of information gives rise to institutional arrangements to economize its use. The complexity of information induces simplifications and abstractions, notably in the form of accounting. The use of information evolves as enterprises grow and change, and the ability to retrieve and use existing information increases as well.

The second theme is historical. The modern business enterprise is a creature of the last century. Historical examples from a century ago, from the Gilded Age before the First World War, give us a window on the early years of this unique organization. Most of the essays in this volume concentrate on the years around the beginning of the twentieth century, providing a picture of industry and finance of the time. Individual papers reach back into the early nineteenth century and forward into current events. But the center of attention is the Gilded Age.

These two themes combine to provide a model for the investigation of complex business enterprises. This approach can help business historians see the common elements in the history of any single enterprise. It may inspire theorists to model concrete practices of actual firms. And it should help students of economics and economic history to understand how those large organizations go about responding to the demands upon them.

The papers in this volume were presented at a Conference on Microeconomic History at the National Bureau of Economic Research in October 1990. The conference was organized by Naomi Lamoreaux, Thomas McCraw, Daniel Raff, and myself: two economists and two historians from departments of economics and history and a business school. We all hope that this conference will be the first of a series on related topics of microeconomic history.

The six papers fall into three groups. The first two, by Daniel M. G. Raff and myself and by H. Thomas Johnson, present the underlying themes of the volume. They discuss the agency problems arising from scarce information, and accounting as a primary means of communication within large enterprises. The second two papers, by Margaret Levenstein and JoAnne Yates, discuss the demand for and supply of information in two growing enterprises of the Gilded Age. They show how the use of accounting and other information is conditioned by the overall strategy of the enterprise and the technology of information transfer and storage. The final two papers, by Naomi R. Lamoreaux and J. Bradford De Long, turn to the interaction between industrial firms and financial intermediaries. They show how some of the important financial institutions of the Gilded Age responded to the changing availability of information and how these changes affected the financial environment within which business enterprises operated.

Raff and I argue in "Business History and Recent Economic Theory" that the vertical relations within business enterprises have many important common characteristics. These traits derive from the scarcity of information available to a superior (often called the principal) about the activities of a subordinate (called the agent). Limited information gives rise to what economists call the principal-agent problem, which renders many simple wage contracts inefficient. Raff and I describe various arrangements that have been used to preserve incentives in the absence of full information. We argue that the problems and the solutions are similar at the level of employee compensation, the direction of business units, and the finance of enterprises as a whole. In fact, the solutions to these information problems are important determinants of where the boundaries of business enterprises lie.

Johnson, in "Managing by Remote Control," traces the history of accounting within American business enterprises from the early nineteenth century to today. He finds, rather paradoxically, that nineteenth-century accounting practice was in some ways superior to the accounting techniques that followed it.

As Johnson sees it, accounting serves (at least) two functions. It informs owners and top management about the profitability of the firm and its major activities. And it communicates between these owners and top managers on the one hand and plant managers on the other. These functions are very different, and the modern practice of using the same accounting conventions for both of them has distorted incentives at the plant level. Managing "by the numbers" gives rise to long production runs and large inventories; it reduces the communication between producers and their customers.

These two papers emphasize the consequences to the internal functions of business enterprises of scarce information. The general point is that institutional arrangements can offset but not eliminate the problems of insufficient information. The specific point is that accounting tools have been developed to summarize the available information and that these tools in turn affect how enterprises operate. Examination of principal-agent problems and of accounting provides a way to understand how enterprises respond to new challenges.

Levenstein, in "The Use of Cost Measures," traces the beginning of accounting in the Dow Chemical Company before World War I. She argues that the company's strategy determined its need for information. Cost accounting therefore grew and changed as the company grew and changed its position in the industry. Her study shows the effects of the demand for information within the enterprise. She provides numerous concrete examples of internal reports, interesting both for what they contain and what they omit.

Yates, in "Investing in Information," describes the changing communications within the Scovill Manufacturing Company from the mid–nineteenth century to the early twentieth. She emphasizes the supply of information in a complex organization, noting that information does not exist if you cannot find it. Levenstein documents the effect of changing manufacturing technology on the demand for internal information; Yates analyzes the effects of changing information technology on the supply of internal reporting. She follows the transition from handwritten messages to printed forms, from daybooks to vertical files. Even the limited information assumed by the other authors to be present would not be useful in the absence of the techniques for reproduction, transmission, and storage that she describes.

The two papers by Levenstein and Yates provide detailed case studies of individual enterprises. They show how the general problems outlined in the earlier papers were worked out in particular cases. And they complement each other by emphasizing the demand and supply of information, respectively.

Lamoreaux looks at financial enterprises in "Information Problems and Banks' Specialization in Short-Term Commercial Lending." She traces the development of commercial banks in New England throughout the nineteenth century. Scarcity of information about investments in the early nineteenth century led banks to operate as a primitive mutual fund of investments by bank directors. As information became more plentiful, in part for reasons outlined by Yates, banks changed their function. They loaned less to insiders who now had access to broader markets, and they loaned more to outsiders about whom there was much less information. To reduce the risk of lending on this open market, the banks restricted their loans to short terms. They became modern commercial banks. The changing American market and the resulting change in information availability led banks to shift their role within the financial structure of the United States and separate the concerns of banks and industrial firms. Investment financing was done increasingly outside of commercial banks as the twentieth century opened.

De Long examines investment financing in the Gilded Age in "Did J. P. Morgan's Men Add Value?" He analyzes the institution that replaced the investment function of commercial banks as they specialized in short-term funding. He discusses the conflicting views held by Morgan's supporters and his critics of the balance between his anticompetitive and efficiency-enhancing activities. De Long subjects these views to a test, finding that the presence of a Morgan man on the board of a corporation increased its value by about 30 percent. The higher stock price was accomplished by higher earnings, but the mechanism by which the presence of a Morgan man raised them is unclear. Morgan's men seemed to provide a guarantee to investors of corporate quality. They provided the information that commercial banks no longer could furnish.

These essays provide a view of the business enterprise that exposes some of its internal workings. They suggest a variety of hypotheses and frameworks for further analysis. And they provide a picture of American industry in the Gilded Age. This picture is a rough mirror of the economy today. The accounting rules described by Johnson may constrain American firms from adapting to new technologies and procedures today. The revolution in information technology described by Yates is similar to the revolution going on today with desktop computers and fax machines. And the absence of investment bankers like Morgan may possibly inhibit industrial progress in the United States today.

All of these topics deserve further study. They have been introduced here from a vantage point that stresses the importance of scarce information and the institutions created to utilize and economize it. This approach is designed to be the "atom smasher" of economics and of business history, to provide a way to peer inside the business enterprise and analyze its operation.

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