

**Measuring Transaction Costs and Institutional Change in the
U.S. Commercial Banking Industry**

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Abstract

There has been considerable theorizing in the new institutional economics about the relationship between transaction costs and institutional change. However, there have been few attempts to measure these changes in particular political economic environments. This paper makes use of a long time series of financial data from a transaction costs intensive industry, commercial banking, to begin to shed some light on these issues. A preliminary analysis suggests that transaction costs can be measured over time in this industry but not perfectly. Banking has two types of transaction costs, which move in inverse relationship and are subject to different political and economic influences. Both types of transaction costs are (almost) always changing even as they appear to be converging to equilibrium. In 1998, total transaction costs were 77% of income, which is 8% higher than in 1934. During a recent period of intense economic and institutional change in the industry, transaction costs moved out of equilibrium, increasing to 90% of total income, and then returned to equilibrium as the intensity of change diminished. An analysis of these events implies that the causal link between transaction costs and institutional change works in both directions.

1 Introduction

The economic importance of transaction costs is widely recognized. Transaction costs, which reflect the costs of economic organization both outside the firm and inside the firm, are one means by which we can measure the efficiency of different institutional designs in achieving economic outcomes in particular environments. While there has been considerable theorizing about the relationship between transaction costs and institutional change, there have been few attempts to measure these changes and the relationship between them. Yet these are important issues in understanding the political economy of institutional change. The goal of this paper is to shed some light on these matters.

Scholarship in the new institutional economics provides the basis for several different hypotheses about the relationship between transaction costs and institutional change. One hypothesis is that changes in transaction costs induce institutional change. However, changes in transaction costs can arise from technological change, other types of relative price change, or policy changes. This suggests a second hypothesis in which institutional change induces changes in transaction costs. A third possibility is that transaction costs and institutional change interact. That is, institutional change could induce changes in transaction costs, which could induce further institutional change to adjust for the cost effects of the prior change.

Speculations about the relationship between transaction costs and institutional change cannot be tested without specifying and measuring these concepts in particular political and economic environments. Recent changes in the U.S. insured commercial banking industry provide a good opportunity to do this kind of analysis. In the period

1960-1998, economic and policy changes reconfigured the competitive environment for financial services in the United States. The availability of annual financial data for much of the period 1934-1998, provides an opportunity to quantify changes in transaction costs, as well as to study the sequence of changes in transaction costs and institutional change.

The first question this paper addresses is the problem of identifying and measuring transaction costs over time in the U.S. commercial banking business. While one might analyze transaction costs in the banking industry from either a micro political-economic perspective or a macro perspective depending upon the issues in question, for reasons more fully described in Section Two, this paper takes the macro view.

Banking activities generate two types of transaction costs, which are subject to different political and economic influences. One type of cost, interest expense, reflects the costs of funds for banking activities. A second type of transaction cost, noninterest expense, reflects the costs of information and coordination. Over the period 1934-1998, interest expense shows an increasing trend, whereas noninterest expense shows a diminishing trend. Total transaction costs, the sum of interest and noninterest expense, increase over this period from 69% of total income in 1934, to 77% in 1998.

When the behavior of both interest and noninterest expense is compared over the entire time series, an inverse relationship emerges. This implies that when the costs of funds increase, banking firms seek to reduce the costs of information and coordination activities. After 1960, there is evidence that the two types of costs are converging to an equilibrium in which each type is about 40% of total income. However, this equilibrium is disturbed between 1972 and 1992, a period of profound institutional change in this industry.

A second question this paper addresses is the relationship between transaction costs and institutional change. An informal analysis of the evidence suggests that there is interaction between transaction costs and institutional change: either could be the cause of change in the other. However, further analysis is required to more precisely estimate the relationship between these two processes.

The main conclusions about transaction costs and institutional change that can be drawn from the analysis in this paper are first, that transaction costs can be measured in the banking industry but not perfectly. The data used in this analysis include the costs of organizational change. While the aggregated data generate some interesting questions, it would have to be disaggregated to investigate the micro foundations of the implications of the analysis in this paper. Given the nature of banking activities, this could prove to be quite difficult.

Second, there are some regularities in the data that suggest that transaction costs are nonlinear and subject, at least in part, to cyclical effects. There is also evidence that suggests that transaction costs evolve over time. More work is required to understand these dynamics.

Third, there is evidence that suggests that transaction costs are sensitive to changes in the political economic environment. Regulatory stance and legislative activity are important signals for those who are engaged in economic organization and transaction cost management. Further work is needed to develop these linkages.

The analysis in this paper is related to and consistent with the work of a number of other scholars. The continuous change in transaction costs and firm size that is apparent in the data for the commercial banking industry over the period 1934-1998, is

consistent with Coase's (1937) prediction that equilibrium firm size is achieved by business managers continually experimenting with alternative ways of organizing economic activities. Moreover, the industry's investment in institutional change is a logical implication of Williamson's (1985, 1997) analysis of the principles of transaction cost economics.

An increase in transaction costs in the U.S. commercial banking industry in the twentieth century is consistent with Wallis and North's (1986) finding that the transaction cost sector in the U.S. is growing over the period 1870-1970. Moreover, their argument that the growth in the transaction cost sector arises from both economic changes and institutional changes has relevance for explaining the behavior of transaction costs in the commercial banking industry.

The complex interaction between economic change, transaction costs, and institutional change in the U.S. commercial banking industry over the period 1960-1998, is consistent with North's (1990) analytical framework for explaining economic performance and institutional change over time. Moreover, it is consistent with the comparative empirical analysis of Berger, DeYoung, Genay, and Udell (Forthcoming 2000), who argue that cross-border consolidation in the banking industry has been fostered by deregulation as well as economic change. The analysis in this paper is also consistent with the micro level analysis of Klein and Saldenberg (1998), who argue that banking firms that reorganize as Multi Bank Holding Companies (MBHCs) solve a diversification problem in a transaction cost minimizing way.

The paper is organized as follows. Section Two analyzes the relationship between transaction costs and institutional change. Section Three discusses measurement

issues. Section Four describes the data and analyzes changes. The last section concludes.

2 Transaction costs and institutional change

Scholarship in the new institutional economics argues that transaction costs and institutions are linked in important ways. However, there is a dearth of empirical and theoretical analyses of the relationship between these two processes and how this relationship changes over time. While it is generally accepted that transactions must be governed and that some institutional arrangements are more efficient than others, the nature and existence of an economizing selection mechanism is usually assumed rather than explained (Shelanski and Klein, 1995). Recent changes in the U.S. commercial banking industry provide a rich source of data for taking a closer look at these issues over time.

Addressing the question of the economic justification for firms, Coase (1937) argues that there are costs associated with transacting and that by internalizing transactions in a firm, efficiencies can be achieved that cannot be achieved by transacting in markets. The organization of credit allocation through banking firms and other forms of financial intermediaries are a well-established demonstration of this fundamental insight that is not inconsistent with more recent information-oriented theories of banking.ⁱ

While Coase predicts that business managers will be "constantly experimenting" with alternative ways of organizing economic activities, his analysis is essentially static. He anticipates that dynamic factors are important in explaining organizational change, but he does not speculate about what these factors might be and how the economics of the

match between a particular set of transaction costs and particular organizational structures might change over time.

Williamson (1985, 1997) explores the important issue of the relationship between transaction costs and institutional design. He inextricably links transaction costs and institutional change by defining the fundamental question of transaction cost economics to be one of operationalizing the economizing problem in particular environments, aligning transaction costs and governance structures in transaction cost economizing ways, and comparing feasible institutional alternatives. Williamson anticipates the potential for interaction between transaction costs and institutional change when he argues that the alignment between transaction costs and governance is nested in an additional set of institutional arrangements. If this set of arrangements change, transaction costs change. Presumably, changes in transaction costs give rise to changes in governance arrangements however, Williamson does not develop the transaction cost implications of this interaction.

Menard (1997) applies transaction cost economics to analyze the internal organization of firms. Reinterpreting Williamson, he develops a taxonomy of governance structures that can be applied to a wide variety of internal contracting dilemmas. While he anticipates the problem of change as well as the interaction between firm governance structures and other governance structures, he does not tackle these issues.

Addressing the question of transaction costs over time from a macro political economic perspective, Wallis and North (1986) measure transaction costs in the U.S. economy and find that the transaction sector grows from 25% of GNP in 1870, to over

50% of GNP by 1970. They attribute this growth intuitively to three main causes: (1) increasing specialization and division of labor that creates more impersonal exchange; (2) technological change accompanied by increasing firm size; (3) the diminishing cost of using the political system to restructure property rights resulting from the development of commissions. Wallis and North do not test the relationship between changes in transaction costs and institutional change, however, their explanation of their empirical findings are consistent with some form of interaction between transaction costs and institutional change.

North (1990, 1997) further develops the empirical context of the relationship between transaction costs and institutional change. He argues that transaction costs change as a function of the interaction between changes in relative prices and existing institutional structures. When changes in transaction costs reconfigure the bargaining power of economic participants, transaction costs act as an incentive to make institutional change. In this formulation, institutional change potentially enters on both sides of a causal argument: changes in an existing institutional structure - institutional change - could alter transaction costs, and changes in transaction costs could create incentives for (additional) institutional change.

In sum, scholarship in the new institutional economic raises interesting questions about the relationship between transaction costs and institutional change. The arguments in the extant literature imply that there is a complex, interactive relationship between transaction costs and institutional change. However, this dynamic has yet to be quantified and investigated empirically over time in particular industries.

3 Measuring transaction costs and institutional change

Transaction Costs

Transaction costs have been defined in various ways. Coase, Arrow, and Wallis and North have provided general definitions. Coase (1937) defines transaction costs as the costs of using the price mechanism, which includes the costs of discovering relevant prices, and negotiating and concluding contracts. Arrow (1969) defines transaction costs as the costs of running the economic system.

Wallis and North (1986) draw a distinction between transformation activities and transaction activities. Transaction costs are the economic value of inputs to a transaction function as distinct from the economic value of inputs to a transformation function. In their taxonomy, transaction costs are the costs of processing and conveying information, coordinating, purchasing, marketing, advertising, selling, handling legal matters, shipping, and managing and supervising.

Others have defined the concept in terms of particular aspects of transacting. Williamson (1985), who focuses on contracting activities, defines transaction costs to include the *ex ante* costs of drafting, negotiating & safeguarding an agreement, and the *ex post* costs of haggling, costs of governance, bonding costs to secure commitments. Davis (1986) defines transaction costs as those costs associated with "greasing markets," including the costs of obtaining information, monitoring behavior, compensating intermediaries, and enforcing contracts. Barzel (1989) defines transaction costs as those costs involved in transferring, capturing, and protecting rights.

In a survey of the transaction cost literature, Alchian and Woodward (1988) transcend these differences by distinguishing between two types of transactions: exchange transactions involving the transfer of property rights, and contracting

transactions involving negotiating and enforcing promises about performance. Broadly, then, we can think of transaction costs as the sum of the costs associated with engaging in exchange and contracting activities, which are distinct from the costs of production.

While scholars seem to agree that the transaction cost concept is important and progress has been made in operationalizing and applying transaction cost arguments, the concept has nevertheless been the subject of considerable debate. Some scholars argue that transaction costs are difficult to define and even more difficult to measure.ⁱⁱ One criticism is that the concept is overly general and does not lend itself to meaningful operationalization. Another criticism is that it is difficult to quantify some transaction costs. Yet another criticism is that transaction and production activities frequently overlap such that it is difficult to distinguish one type of cost from the other.ⁱⁱⁱ

But this type of debate is not unique to transaction cost economics. Like other intuitively appealing concepts in the social sciences, conceptual development depends upon being precise about the question being asked, as well as the context in which it is likely to arise. North (1990, 1997), Wallis and North (1986), and Williamson (1985, 1999) have all argued that transaction costs are embedded in layers of governance structures. Their arguments suggest that one must operationalize the concept of transaction costs in particular political economic environments.

The questions in this paper arise in the context of a form of economic activity that is quite complex from a governance and transaction cost perspective. While some banking activities have a purely private character, systemically, banking is a quasi public good, which is nested in a regulatory structure that could affect transaction cost economics. Banking operates on a fractional reserve system in which banks create money

and act as financial intermediaries, matching depositors' (lenders) risks against borrowers risks and allocating credit in the economy. Commercial banks and other depositories are a primary source of firm finance in most industrialized nations. Moreover, banks are the largest conduit of international capital flows (Berger, DeYoung, Genay, and Udell, Forthcoming 2000).

The position of banks in the financial system means that banks play a key role in maintaining economic stability. Systemic stability is a public concern because of the possibility that the owners of banks will not take into account the potential that the failure of one bank can cause other banks within the system to fail. Simultaneous failures in the banking system can lead to bank runs and panics, which can result in severe macroeconomic disturbances. Because banks might not take these externalities into account in pricing risk and determining the amount of private capital to invest, the socially optimal capital ratio for an individual bank may be greater than the privately optimal ratio.^{iv} The resolution of this collective action dilemma is the rationale for providing a public safety net and prudential supervision.

In short, banks exist because markets fail to allocate credit efficiently due to information deficits and hazards in lending and risk management. They ameliorate the high transaction costs of credit allocation in an economy by collecting and processing information and assuming, pooling, pricing, and trading credit risk, interest rate risk, and exchange rate risk. This unique position in financial exchange and contracting leads Wallis and North (1986) to characterize banking as a pure transaction cost industry.

The public character of banking services implies that there are two distinct orders of transaction cost economics and institutional change in this industry: a macro political

economic order and a micro order. Analyzing banking transaction cost economics from a macro political economic perspective raises a number of interesting questions about regulatory control in the banking industry that do not arise under standard theoretical assumptions. For example, how do regulatory changes affect the alignment between governance structures and transaction costs in banking firms? What happens to transaction costs when policies change? How do banking firms and regulators cope with positive changes in transaction costs when the form of governance structure for banking activities is tightly regulated?

From a micro analytic perspective, banks can be viewed as one alternative type of governance structure for storing particular types of funds and allocating particular types of credit. A micro perspective on the banking industry generates equally interesting but quite different questions regarding banking policy and transaction cost economics. For example, one project would be to analyze the costs of maintaining transaction accounts and allocating credit through banks as compared to other alternatives, such as capital markets. From this perspective, banking expenses are no longer purely transaction related as Wallis and North (1986) argue: some are related to transaction activities but others are related to transformation activities.

Both macro and micro political economic perspectives on transaction costs economics and institutional change are likely to yield interesting insights about the alignment of governance structures and transaction costs in the banking industry. However, they cannot be assumed simultaneously. This paper adopts a macro perspective, and consistent with Wallis and North (1986), treats most accounting expense in the U.S. commercial banking industry as transaction costs.

Institutional Change

Measuring institutions and institutional change is less controversial than measuring transaction costs but not necessarily more common. Institutions are rules or routines that permit, require, or prohibit a set of actions in particular situational contexts (E.Ostrom, 1986; North, 1990; Nelson and Sampat, 1999). Hurwitz (1993) argues that institutions are also mechanisms for social adjustment, which are distinct from the adjustment processes they facilitate. In addition to affecting behavior in different contexts, institutions also work at different levels of order. Some institutions are relatively easy to observe, and others are more difficult to observe.

In the context of a firm, institutions are rules that govern the purpose of an organization, the way that an organization is structured, and the way that it produces and provides goods and services in markets. Examples of business institutions include articles of incorporation, bylaws, operating policies, and standard operating procedures. In the U.S. commercial banking industry, these rules are promulgated and enforced by the Board of Directors of the parent organization and the business unit's officers and managers, subject to constraints imposed by higher level institutions including the firm's charter, bank regulation, and general business law.

In the context of an industry, institutions refer to the rules that affect the way that firms organize to produce and provide goods and services and interact with others. Industry rules include charters, statutes, regulatory guidelines and directives, and standard practices. In the U.S., industry rules are created by state and federal legislators who are publicly elected, and by regulatory agencies whose executives are appointed by public executives and confirmed by legislative bodies. Many regulatory agencies have

considerable discretionary authority, hence regulatory stance, or the position that a regulatory agency takes on a matter, is an important factor in institutional design. Standard industry practices are an emergent property of the structure of an industry that reflect the operating decisions made within individual firms.

Institutions can change in one of two ways. They can change *de jure* by formally rewriting a rule, communicating the change to those affected, and monitoring and enforcing behavior against the new rule rather than the old rule. Alternatively, rules can change *de facto* by ceasing to monitor and enforce an existing rule or by interpreting an existing rule in a new or more liberal manner. Substantively and procedurally, both forms of change are possible in the U.S. political economy.^v

While changing public laws and regulations in the U.S. requires public debate and enforcement requires administrative or judicial review, there are myriad ways in which even heavily regulated firms like banks can change institutional arrangements without government or judicial intervention. A firm can change its ownership structure or its governance structure, reconfigure its use of capital, labor, or technology by making production or transaction process innovations, change the products and services it provides, change the channels or markets in which it provides products and services, change operating policies or procedures, and so on.

Because banking organizations are embedded in regulatory structures that potentially impose nontrivial costs, institutional change in the commercial banking industry must be measured at both the level of the firm and the level of the relevant political economy.^{vi} In the U.S. case, this means looking for changes in the

organizational form of banking activities, and in state and federal regulatory policies and statutes.

4 Data and analysis

Transaction costs in the U.S. commercial banking industry

The main source of data for analyzing transaction costs in this paper is the "Income, Expense, and Net Income of Insured Commercial Banks" report in the Federal Deposit Insurance Corporation (FDIC) historical statistics on banking, 1934-1998.^{vii} The FDIC historical statistics on banking, which are published annually, are constructed from information reported annually by all insured U.S. commercial banks using the "Consolidated Reports of Condition and Income for a Bank With Domestic and Foreign Offices," FFIEC 031 report form (Call Report).^{viii}

The precise definition of an insured commercial bank is defined by statute. It has changed from time to time over the years to reflect changes in the structure of the commercial banking industry and banking regulation. At present this definition includes national banks, state chartered banks and trust companies except savings banks, national and state chartered commercial banks insured by either the FDIC Bank Insurance Fund or by the FDIC Savings Insurance Fund, and other financial institutions which operate under general banking codes or are authorized to accept deposits and do so in practice or which have obligations that are regarded as deposits for deposit insurance.

The number and average size of the insured commercial banks reporting to the FDIC has also changed over time. The number of reporting banks has declined from 14,137 in 1934 to 8,774 in 1998, and the average size has increased as the industry has consolidated. However, compared to other developed countries, the population of

commercial banks in the U.S. is quite large and very diverse: it includes small, community banks operating in very concentrated markets as well as very large money center banks operating in more competitive national and international markets.^{ix}

Several types of expense are reported in the FDIC's income and expense report. Interest expense, noninterest expense, provisions for loan and lease losses, securities losses, income taxes, and extraordinary expense. While expenses related to loan and lease losses, securities losses, income taxes, and extraordinary items are also likely to reflect the costs of organizing in the banking industry, they are less predictable and hence less amenable to management or regulatory control. Over the period 1934-1998, the magnitude of these expenses ranges from 10%-23% of total income. For simplicity, they are excluded from this analysis.

The remaining portion of expense in the U.S. commercial banking industry is reflected in interest expense and noninterest expense. In the analysis that follows, the ratios of these two types of expense to total income are used to estimate changes in transaction costs. Interest expense, which reflects banks' cost of funds, is a direct indicator of the external costs of the way banking firms organize their activities and are situated in a particular political economic environment. It includes total interest paid and accrued on all interest bearing liabilities, and is affected by monetary policy, pricing regulation, pricing competition, and internal funds management practices. The components of interest expense include all interest expense on all liabilities reportable as deposits in domestic and foreign offices, the gross expenses of federal funds purchased and securities sold, the interest expense related to demand notes issued to the U.S. Treasury, mortgage indebtedness, obligations under capitalized leases, and other

borrowed money, and interest expense related to subordinated notes and debentures. Historically, banks derive a significant portion of their funding from essentially free sources of funds, such as equity issues or demand deposits: this is particularly true for retail banks.^x

Noninterest expense directly reflects the internal costs of the way that banking firms organize their activities. It is affected by technology, business and labor laws, banking regulation, and internal management practices. U.S. commercial banks record three types of noninterest expense: (1) employee salaries and benefits, (2) occupancy expense, which includes all expenses related to the use of the banking premises including equipment, furniture, and fixtures, (3) "other" expense. "Other" expense is all noninterest expense not included in the first two categories, including fees paid to directors, trustees and advisory board members, premiums on fidelity insurance and deposit insurance, retainer and legal fees, net losses from the sale or disposition of certain assets including those associated with acquisitions and mergers, management fees assessed by parent bank holding companies, advertising, public relations and promotion, amortization of intangible assets, charitable contributions, net losses on futures and forward contracts, charge-offs and writedowns of securities prior to sale, office supplies, information processing, telephone expenses, examination and audit fees, and other miscellaneous expenses.

Annual interest and noninterest expense data is available for all FDIC insured commercial banks from 1934-1998. However, a number of changes have occurred in reporting practices over the years that are important for interpreting expense data. Complete summaries of these changes can be found in the FDIC reports. The most

significant change relates to the accounting basis for reporting income and expenses. Until 1969, banks with total assets of \$50 million or less were not required to report on an accrual basis. As of 1969, banks with \$50 million or more in assets were required to report on an accrual rather than a cash basis. As of 1972, banks with total assets of \$25 million or more were required to prepare their reports on an accrual basis. After 1984, banks with total assets of \$10 million or more were required to report on an accrual basis. These changes do not appear to significantly affect the aggregate trends in these expenses and so no attempt has been made to adjust the data to reflect these reporting changes.

The behavior of transaction costs in commercial banking over time

Income and expense data for all insured commercial banks over the period 1934-1998 is contained in the Appendix (A.1). In general, interest expense as a percentage of total income increases over the period from 19% of total income in 1934 to 37% of total income in 1998, whereas noninterest expense falls from 50% of total income to 40%. Total transaction costs, which is the sum of interest expense and noninterest expense, increase from 69% of total income in 1934 to 77% of total income in 1998.

Annual changes in transaction costs over the period 1934-1998 tell a more interesting story. Interest expense as a ratio of total income does not begin to increase in this time series until after 1961. In fact, it diminishes after 1934 and remains stable over the period 1942-1955 at about 10% of total income. After 1955, it begins to increase, returning to 19% of total income in 1960. After 1961, the rate of change quickens, and changes are more volatile. In 1981, interest expense reaches 68% of total income, falls to 33% in 1993, and then stabilizes at about 37% of income after 1995.

Noninterest expense increases after 1935 to 61% of total income in 1940, falls to 52% in 1944, and remains relatively stable at about this level until 1960, when it begins to further diminish. After 1960, the rate of change quickens and changes are more volatile. Noninterest expense falls to 22% of total income in 1981, increases to 44% in 1993, and then stabilizes at about 40% after 1995.

A decomposition of noninterest expense shows that the main drivers of change in noninterest expense are salaries and benefits and "other" expense. In the post W.W. II period, occupancy expense falls to about 8.5% of total income, salaries and benefits increase to 61%, and "other" expense remains constant at about 35%. After 1960, occupancy expense increases to 16% of total noninterest expense and remains stable at this level. However, salaries and benefits begin to diminish, falling to 42% in 1992 and remaining stable at this level, while "other" expense continually increases to 47% of total noninterest expense in 1998. Figure 1 illustrates these changes.

When the behavior of both interest and noninterest expense is compared over the entire time series, an inverse relationship emerges. As interest expense diminishes after 1934, noninterest expense increases. Both types of transaction costs are stable in the post W.W. II period. As interest expense begins to increase in the late 1950s, noninterest expense begins to diminish. Both interest and noninterest expense converge to about 40% of total income in 1969 and maintain this level until 1973. From 1973-1981, interest expense increases and noninterest expense diminishes. After 1981, both types of expense reverse direction and reconverge at about 40% of total income in 1992. Figure 2 illustrates these changes.

The inverse relationship between interest expense and noninterest expense over the period 1934-1998 implies that banks adjust internal governance structures in response to changes in external governance structures. While there is evidence to suggest that banking firms seek to economize on transaction costs over the long-term, the process appears to be subject to disturbances in the political economic environment.

Institutional changes in commercial banking from 1960-1998

The U.S. commercial banking industry is highly fragmented and very tightly regulated system of ten federal agencies and fifty state agencies. Every aspect of the commercial banking business is regulated including structure, balance sheet composition, business activities, and pricing. Until recently, U.S. commercial banks were not allowed to offer a full range of financial products and services or to expand geographically, except on a very limited basis.

Given the nature and extent of regulatory control in this industry, it would be unwieldy to quantify institutional change over the entire time series for which accounting data is available. However, the transaction cost data exhibit an interesting inflection point at about 1970, which coincides with a recent period of profound change in the U.S. financial services industry. These changes provide a rich source of institutional change data for exploring the relationship between transaction costs and institutional change.

Changes in the interest rate and in the cost of information processing that began in the 1960s in the U.S. economy reconfigured the competitive environment of commercial banking and created pressure for both organizational and regulatory change. Over the period 1960-1993, the short-term interest rate steadily increased from 2.38% per annum in 1961 to 14.07% in 1981, and then leveled off at about 8% beginning in the mid-

1980s.^{xi} It is particularly volatile over the period 1970-1989. At the same time, the rapid diffusion of information technology changes led to a fall in the cost of information processing in real terms.^{xii}

By the 1970s, changes in the relative prices of funds and information processing had altered barriers to entry in the commercial banking business, increased the availability of substitutes for traditional commercial banking products and services, increased the power of consumers, and increased the intensity of rivalry in the financial services industry.^{xiii} Each of these developments posed new opportunities and very serious threats to commercial banking firms.^{xiv} Geographic expansion and diversification of products and services were the two most obvious strategic responses. However, restrictions on prices and powers limited the ways in which bank managers could implement these strategies.

As competition from less restricted financial service firms intensified, the bank manager's problem was to find ways to expand their activities legally in order to compete effectively. They accomplished this feat in three ways: (1) changing the legal identity and purpose of the firm through the formation of bank holding companies and mergers and acquisitions; (2) implementing service delivery innovations such as Automated Teller Machines; (3) aggressively pursuing favorable regulatory permissions and statutory changes at both federal and state levels.^{xv} Each of these forms of institutional change coincides with changes in transaction costs.

Organizational and Statutory Changes

The devices that the commercial banking industry adopted to change their legal purpose and identity are the Bank Holding Company (BHC) organizational form and

mergers and acquisitions. As long as a state permitted the formation of BHCs (most U.S. states did), this form could be used to expand the size and scope of business activities, avoid certain restrictions on powers imposed by state and federal banking authorities, and reduce the costs of regulatory compliance and tax payments. Under the BHC umbrella, deposit-taking and lending activities could be owned in common but conducted through separate subsidiaries. This structure permitted banking and nonbanking financial services to be combined legally in one financial entity.^{xvi}

In 1960, forty-seven BHCs controlled 11.1% of the total assets of insured commercial banks in the U.S. After 1965, the number of BHCs and the percentage of assets controlled by BHCs increase. By 1992, over six thousand BHCs controlled 93% of the assets in the industry. Figure 3 shows the growth of BHCs for 1960-1992. The rate of growth is most pronounced in two periods. In the period 1965-1970, the average annual rate of growth is 23.2%. The absolute number of BHCs increases from 53 to 121 and the percentage of assets they control increases from 8.7% to 16.2%. This period immediately precedes passage of the 1970 amendments to the Bank Holding Company Act, which modernized BHC regulation. In the second period, from 1978-1984, the average annual rate of growth in BHCs is 17%. Over this seven-year period, the number of BHC triples to over six thousand and the percentage of assets controlled increases to 89%.

The incidence of bank mergers and acquisitions is closely related to the formation of BHCs. Over the period 1980-1992, there were over five thousand bank mergers and bank holding company acquisitions in the U.S. commercial banking industry involving more than \$980 billion in assets. This activity coincides with statutory deregulation of pricing and powers in the banking industry as well as changes in transaction costs.^{xvii}

Service Delivery Innovations and Statutory Changes

The second way that banks could legally expand their activities was to change the way they communicate with customers and deliver services. Innovations in information technologies and falling prices in information processing made it possible for banks to engage in remote transactions with customers by automating transaction service delivery. These innovations took a number of forms, including Customer-Bank Communication Terminals, Automated Teller Machines (ATM), and Point of Sale devices, however, the large-scale installation of ATM networks stands out.

While ATM transactions had to be carefully structured in order to avoid running afoul of branching restrictions, they were generally permissible over a wider geographic area than physical branches.^{xviii} The pattern of growth of ATMs suggests that banks used these networks as another means to overcome regulatory restrictions and respond to competitive challenges. From 1978 to 1995, the number of ATMs increased from about 10,000 to 123,000. As Figure 4 indicates, the most intense periods of growth in ATMS occurred between 1978 and 1984, when the annual rate of growth averaged 35%, and from 1993-1995, when it averaged 12%. The first period precedes liberalization in intrastate branching laws. The second period follows liberalization of interstate banking laws at the state level and coincides with federal interstate banking deregulation.

Regulatory Relaxation

The complex structure of commercial banking regulation in the U.S. dictates three general approaches to regulatory reform in the banking industry: (1) Congress can amend existing law or make new law that supercedes state laws, (2) the states can make permissive law, and (3) regulators can use their administrative discretion to reinterpret

existing law and effectively relax or tighten the extant law. Of these three approaches, regulatory relaxation is the least costly and potentially the quickest means to reform. While the states and Congress did eventually deregulate banking, by the time these changes had occurred, substantial change had already been accomplished as a function of aggressive organizational changes at the firm level and liberal administrative decisions taken by federal bank regulators.^{xix}

There are several ways in which bank managers capitalized on changing conditions in the financial services industry to expand the edges of the regulatory envelope. First, some banks aggressively used the BHC form to position themselves to expand their powers. Exploiting a loophole in the Bank Holding Company Act that excluded One Bank Holding Companies from many restrictions on powers, banks formed OBHCs in the 1960s in order to expand into real estate, brokerage, and securities underwriting activities (Lawrence, 1967). Observing this phenomenon, the Board of Governors of the Federal Reserve worked with Congress to close the loophole, which was accomplished with the 1970 Amendments to the Bank Holding Company Act.^{xx}

In the mid-1960s, bank owners began to adopt the Multi Bank Holding Company (MBHC) form and expand their activities through mergers and acquisitions. The 1970 Amendments to the BHC Act gave the Federal Reserve flexibility to determine whether a proposed activity was “closely related to banking,” and “reasonably expected to produce benefits to the public . . . that outweigh possible adverse effects.” Initially, the Federal Reserve Board hewed rather closely to the letter of the Bank Holding Company Act and the perceived intent of Congress to dampen interstate activities of BHCs (Golembe &

Associates, 1979). It permitted MBHCs to expand into consumer lending activities but not into deposit-taking activities.

However, as competition in the financial services industry increased, regulators relaxed their stance. Over time, the Federal Reserve Board expanded the list of permissible banking activities for well-capitalized MBHCs. The Office of the Comptroller of the Currency took a narrow interpretation of “branch” under the McFadden Act, thus excluding loan production offices, ATMs, and armored car services. Although the courts subsequently disapproved each of these rulings, these activities were often permitted at the state level (Ginsburg, 1981). From the late 1970s through the mid-1980s, a number of decisions by the courts, the Justice Department, and the Federal Reserve moved policy toward permitting mergers and acquisitions that would have been denied in previous years. For example, the Justice Department and the Federal Reserve began allowing bank mergers in highly concentrated markets on the assumption that banks faced substantial competition from nonbank financial intermediaries (Berger, Kashyap, and Scalise, 1995).

The financial crisis in the banking industry in the 1980s stimulated further regulatory relaxation, which was intended to rescue failing banks and to create incentives for large banks to reduce risk by increasing capital ratios. Titles I and II of the Garn-St. Germain Act of 1982 permitted the FDIC and Federal Savings and Loan Insurance Corporation (FSLIC) to approve interstate mergers and acquisitions to aid troubled thrifts and banks. These provisions, which were designed to favor instate, like-institution combinations, particularly in the case of commercial banking, touched-off a boom in merger and acquisition activity. The

Act was the mechanism for four of the nation's largest BHCs to gain an interstate presence that could not have been achieved under the Douglas Amendment (Evanoff & Fortier, 1986). Over the period 1984-1991, the FDIC provided assistance to well-capitalized BHCs to allow them to purchase more than 1,000 insolvent banks.

Summarizing, there are a number of institutional changes in the period 1960-1998, that coincide with and potentially interact with changes in transaction costs in the U.S. commercial banking industry. Beginning in the mid-1960s, banks reorganized as Bank Holding Companies, applied information technologies to expand service delivery, aggressively sought to expand their powers through favorable administrative rulings and legislative change, and made a large number of mergers and acquisitions. When economic changes in the industry began to threaten systemic safety in the 1980s, regulators relaxed restrictions to allow healthy banks to expand their powers. At the same time, Congress and the states began to deregulate banking by removing restrictions on prices, geographic expansion, and diversification of products and services.

5 Conclusions

This paper is a preliminary effort to develop a deeper understanding of changes in transaction costs over time in the U.S. commercial banking industry. Considerably more work is required to develop the implications of this analysis. However, several important issues emerge from this initial work.

First, in industries that produce quasi public goods or services, transaction cost economics can be analyzed from a macro perspective as well as from a micro

perspective. Drawing this distinction is one way to address the problem of operationalizing transaction cost concepts in different political economic environments. While this complicates analysis, questions regarding the political economy of regulatory control would no doubt benefit from investigations of transaction costs economics from both perspectives.

Second, while the analysis in this paper is not definitive with respect to the precise linkages between transaction costs and institutional change, it does reinforce the importance of the theoretical assumption in transaction cost economics that the alignment of governance structures and transaction costs is embedded in a higher order governance structure. The commercial banking data strongly suggest that external governance structures can affect internal governance structures and transaction costs. Moreover, it appears that the alignment of internal governance structures and transaction costs can also affect external governance. Progress in operationalizing transaction cost concepts in a way that makes it possible to measure the economic implications of the interaction between public and private ordering would be quite valuable for policy analysis.

Third, the apparent ambiguity in the relationship between transaction costs and institutional change in the U.S. commercial banking industry is not inconsistent with transaction cost theories, if one thinks about contracting activities from a Schumpeterian perspective. To be sure, the business environment can occasionally produce a quiet life, as it appears to have done for commercial banking in the post W.W.II period. However, sooner or later something is bound to change. Responding to the forces of "creative destruction" to expand revenues or profits, or reduce costs, often requires new

investments, reorganization, and process innovations, which can be quite costly in the short-term.

For a number of reasons that have been well developed by institutional scholars, it is misleading to think of institutional change as an optimal response to changes in economic conditions. Moreover, the thesis that firms economize on the cost of transacting cannot be rejected on the basis of the U.S. commercial banking case: there are trends in the data that suggest that banks have tried to reduce transaction costs over the long-term. However, the behavior of these costs also suggests that in the short and medium term, an industry that is restructuring will exhibit a nonlinear, oscillating pattern of costs. Firms might not be able to adapt successfully and economize on transaction costs with equal rigor, let alone maintain costs at a steady state level. Adjustment in a new environment might require more costly coordination mechanisms than are necessary in a more familiar or more stable environment.

Figure 1: Decomposition of Noninterest Expense

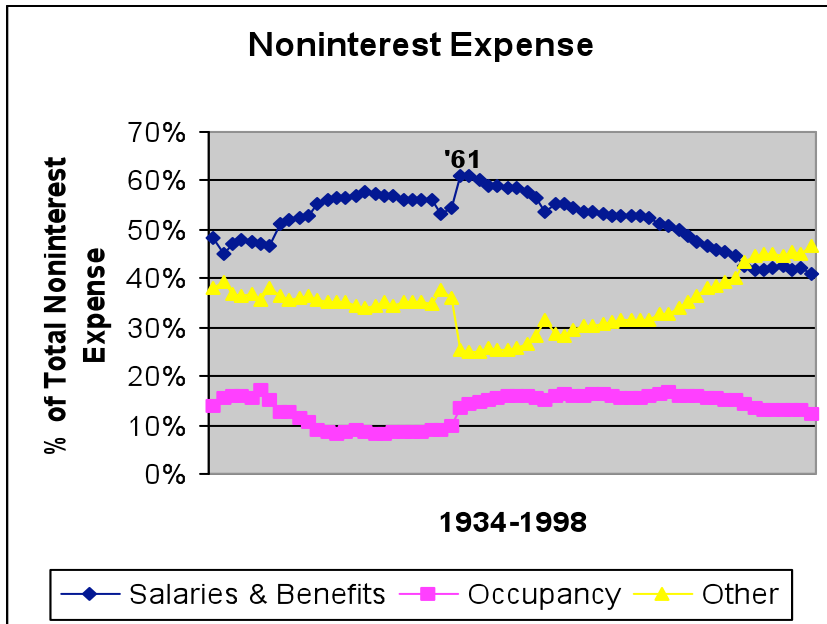
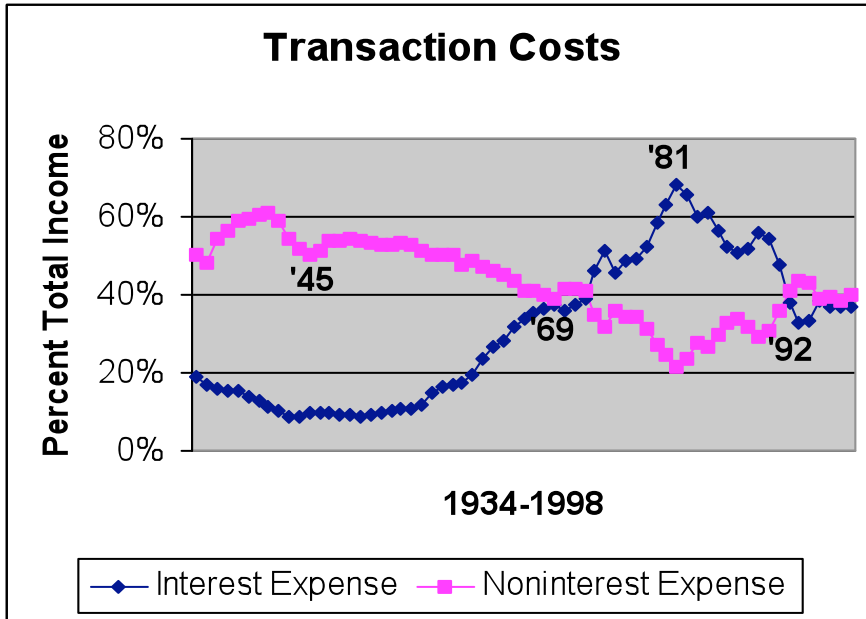


Figure 2: Transaction Costs 1934-1998



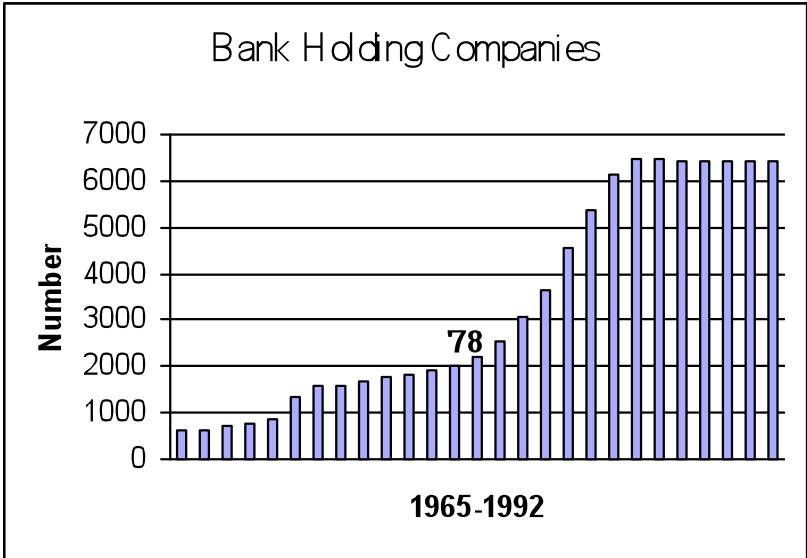
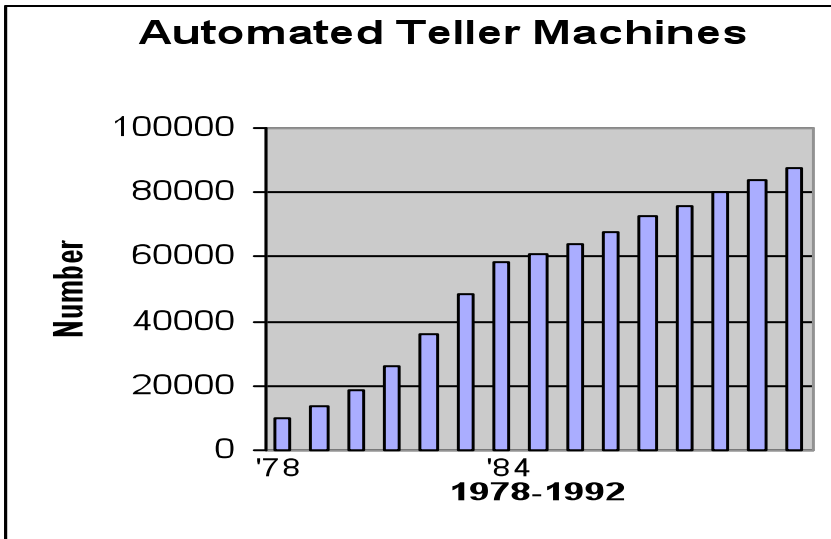


Figure 3: Growth in Bank Holding Company Formations

Figure 4: Growth in ATM Installations



Data Appendix

Income and Expense of Insured Commercial Banks

A.1

Source: FDIC. 1999. Statistics on Banking for the Total United States and Other

Areas

1934-1998 Calendar Year

Basis

(Millions of Dollars)

Year	Non Interest		Total Income	Interest Expense	Interest % Income	Non Interest Expense	Interest % Income	Decomposition of Noninterest Expense:					
	Income	Income						Salaries & Benefits	Percent	Occupancy	Percent	Other	Percent
1934	1241	470	1711	328	19%	863	50%	402	47%	125	14%	336	39%
1935	1191	583	1774	298	17%	854	48%	411	48%	119	14%	324	38%
1936	1237	505	1742	273	16%	950	55%	427	45%	148	16%	375	39%
1937	1282	410	1692	261	15%	958	57%	452	47%	154	16%	352	37%
1938	1237	409	1646	250	15%	968	59%	462	48%	155	16%	351	36%
1939	1249	423	1672	234	14%	992	59%	471	47%	156	16%	365	37%
1940	1269	436	1705	219	13%	1033	61%	485	47%	179	17%	369	36%
1941	1357	446	1803	208	12%	1102	61%	514	47%	168	15%	420	38%
1942	1427	420	1847	190	10%	1085	59%	553	51%	137	13%	396	36%
1943	1567	484	2051	179	9%	1118	55%	582	52%	140	13%	396	35%
1944	1788	519	2307	202	9%	1199	52%	627	52%	139	12%	434	36%
1945	2027	578	2605	248	10%	1309	50%	691	53%	139	11%	479	37%
1946	2346	576	2922	279	10%	1505	52%	831	55%	137	9%	537	36%
1947	2541	602	3143	307	10%	1687	54%	947	56%	146	9%	595	35%
1948	2798	642	3440	325	9%	1852	54%	1044	56%	154	8%	653	35%
1949	2975	651	3626	337	9%	1971	54%	1111	56%	168	9%	692	35%
1950	3249	700	3949	352	9%	2120	54%	1202	57%	188	9%	730	34%
1951	3658	755	4413	399	9%	2345	53%	1351	58%	201	9%	793	34%
1952	4160	787	4947	483	10%	2603	53%	1495	57%	214	8%	894	34%
1953	4661	837	5498	562	10%	2902	53%	1652	57%	233	8%	1017	35%
1954	4861	931	5792	630	11%	3087	53%	1762	57%	261	8%	1064	34%
1955	5382	1020	6402	704	11%	3370	53%	1896	56%	285	8%	1189	35%
1956	6126	1122	7248	854	12%	3725	51%	2093	56%	316	8%	1317	35%
1957	6818	1244	8062	1193	15%	4047	50%	2268	56%	352	9%	1427	35%
1958	7187	1334	8521	1407	17%	4286	50%	2400	56%	390	9%	1496	35%
1959	8247	1456	9703	1662	17%	4853	50%	2577	53%	444	9%	1832	38%
1960	9176	1578	10754	1874	17%	5142	48%	2798	54%	498	10%	1846	36%
1961	9540	1550	11090	2146	19%	5383	49%	3276	61%	736	14%	1371	25%
1962	10570	1660	12230	2911	24%	5746	47%	3493	61%	824	14%	1430	25%
1963	11770	1750	13520	3574	26%	6206	46%	3741	60%	920	15%	1544	25%
1964	13111	1925	15036	4241	28%	6780	45%	4010	59%	1033	15%	1738	26%
1965	14715	2114	16829	5316	32%	7298	43%	4288	59%	1143	16%	1867	26%
1966	17135	2373	19508	6628	34%	8001	41%	4694	59%	1261	16%	2046	26%
1967	19152	2626	21778	7734	36%	8903	41%	5204	58%	1407	16%	2292	26%
1968	22501	2974	25475	9315	37%	10140	40%	5856	58%	1601	16%	2683	26%
1969	27285	3521	30806	11533	37%	12024	39%	6782	56%	1846	15%	3396	28%
1970	30513	4202	34715	12456	36%	14428	42%	7716	53%	2163	15%	4549	32%
1971	31628	4747	36375	13603	37%	15191	42%	8397	55%	2428	16%	4366	29%
1972	35030	5220	40250	15603	39%	16423	41%	9086	55%	2672	16%	4665	28%
1973	47034	6000	53034	24489	46%	18571	35%	10127	55%	2984	16%	5462	29%
1974	61218	6926	68144	35071	51%	21545	32%	11585	54%	3413	16%	6547	30%
1975	57917	8643	66560	30240	45%	23729	36%	12687	53%	3857	16%	7185	30%
1976	73033	7630	80663	39328	49%	27731	34%	14751	53%	4486	16%	8494	31%
1977	82252	8106	90358	44565	49%	30925	34%	16346	53%	4980	16%	9599	31%
1978	103957	9625	113582	59383	52%	35573	31%	18744	53%	5585	16%	11244	32%
1979	138900	11381	150281	87912	58%	40692	27%	21562	53%	6281	15%	12849	32%
1980	176419	14348	190767	120122	63%	46662	24%	24673	53%	7354	16%	14635	31%
1981	231274	17527	248801	169840	68%	53658	22%	28044	52%	8596	16%	17018	32%
1982	238316	20176	258492	169343	66%	61561	24%	31424	51%	10026	16%	20111	33%
1983	217226	23269	240495	143887	60%	66909	28%	33877	51%	11180	17%	21852	33%
1984	250339	26510	276849	169078	61%	73812	27%	36884	50%	11886	16%	25042	34%

1985	248220	31054	279274	157323	56%	82365	29%	40003	49%	13301	16%	29062	35%
1986	237766	35877	273643	142829	52%	90250	33%	42920	48%	14497	16%	32833	36%
1987	244840	41481	286321	144953	51%	97245	34%	45183	46%	15238	16%	36824	38%
1988	272277	44953	317230	165028	52%	101330	32%	46560	46%	15787	16%	38983	38%
1989	317371	50916	368287	205141	56%	108121	29%	49166	45%	16593	15%	42362	39%
1990	320476	54899	375375	204952	55%	115768	31%	51765	45%	17431	15%	46572	40%
1991	289214	59739	348953	167302	48%	124795	36%	53111	43%	17730	14%	53953	43%
1992	255223	65648	320871	121805	38%	130965	41%	54802	42%	17886	14%	58277	44%
1993	245055	74954	320009	105742	33%	139695	44%	58191	42%	18471	13%	63034	45%
1994	257828	76276	334104	111278	33%	144234	43%	60607	42%	18912	13%	64716	45%
1995	302383	82426	384809	148173	39%	149729	39%	63440	42%	19618	13%	66670	45%
1996	312743	93569	406312	149989	37%	160698	40%	67044	42%	20729	13%	72925	45%
1997	339547	104498	444045	165040	37%	169983	38%	71776	42%	21997	13%	76210	45%
1998	362073	123745	485818	179291	37%	194047	40%	79098	41%	24153	12%	90795	47%

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ⁱ The standard rationale for allocating credit through financial intermediaries rather than in markets has three aspects: (1) it is costly to evaluate and monitor credit risk in markets because of information deficits and hazard; (2) in some financing situations, obligational markets with relational contracting can better align information and performance incentives than auction markets; (3) there are potential economies of scale to be realized in the asset transformation process.

ⁱⁱ See for example, Davis (1986) and Masten, Meehan, and Snyder (1991) with respect to economic behavior, and Moe (1984) with respect to political behavior.

ⁱⁱⁱ While it can be difficult to distinguish transaction costs from transformation costs, it is a task that U.S. business analysts routinely undertake in order to analyze business performance and compare the value of one firm to another. In most U.S. business accounting routines, the transaction cost concept is captured in a category described as "non-operating" or "general and administrative" expense, which is distinct from "operating" or production expense. Note that this accounting convention is proscribed under Generally Accepted Accounting Principles (GAAP), which are a set of accounting practice rules and guidelines devised by the American Institution of Certified Public Accountants. Privately held companies in the U.S. are not required to report financial performance in compliance with GAAP, however, securities laws require that all companies that sell stock on U.S. stock exchanges must do so.

^{iv} Since the benefits of system-wide stability accrue to all economic actors, not just to bank owners, it might not be socially or economically appropriate to have only bank owners bear the costs. This potential negative externality provides the justification for government intervention to provide a "safety net." (Kroznor, 1998).

^v Both *de jure* and *de facto* institutional changes are subject to private or public challenge. In some cases, matters that are solved privately can subsequently be challenged in the U.S. legal system. A public challenge can be mounted by any interested party with legal standing. Interested parties can include competitors, public interest groups, regulatory agencies, and governments. Challengers who prevail can often recover the costs of their challenge as well as damages. Hence institutional change in the U.S. is often undertaken in the shadow of judicial review.

^{vi} A study conducted by the American Bankers Association (ABA) found that in 1991, regulatory compliance costs amounted to \$10.7 billion, nearly 60% of banking industry profits. The ABA estimates that this amount could have supported additional loans of nearly \$100 billion. (ABA, 1995.)

^{vii} The most recent statistical reports can be obtained from the FDIC website at <http://www.fdic.gov>. See Tables CB-4, CB-6, and CB-7 and related notes.

^{viii} The Call Report instructions delineate data classification and reporting standards. A special unit of the FDIC, the Call Report Analysis unit, provides technical assistance to reporting banks. While one can never assume that financial data are perfectly accurate, because the financial condition of U.S. banks is regularly examined by bank regulators, their financial reporting is subject to even more monitoring and sanctioning than the typical publicly-held U.S. corporation. Examinations cover financial activity as well as non-financial issues such as management capacity and legal compliance. The examining agency then assigns a confidential rating, which reflects the soundness of the bank's capital, assets, management, earnings, and liquidity. Weakly rated banks are subject to sanction. Banks are examined every 12-18 months, depending upon their performance. In addition to regular examinations, publicly held banks undergo an annual independent audit by a Certified Public Accountant (CPA). A CPA is a licensed accounting professional who is subject to professional censure. A CPA's audit duty is to the shareholder and the public. Moreover, all U.S. firms are subject to audit by the Internal Revenue Service. Under U.S. civil and criminal law, shareholders and the public may prosecute financial reporting negligence and fraud, holding the relevant corporate directors, officers, and CPA personally liable for malfeasance.

^{ix} In a 1993 study of structural change in the U.S. commercial banking industry, Savage finds that concentration is increasing at national and state market levels while remaining stable and high a local market levels. In 1993, the largest 50 commercial banks held 53.1% of deposits and the largest 100 banks held 64%.

^x The average rate paid on funds (RPF) by U.S. commercial banks in 1997 was 3.98% (Standard and Poor's, 11/5/98). The RPF level varies with the level of interest rates and is also affected by the structure of a bank's liabilities. Banks that derive a higher proportion of their funds from consumer deposit accounts tend to have lower RPFs than wholesale banks that purchase most of their funds in the money market.

^{xi} The short-term interest rate is measured using the three-month Treasury Bill rate. The source of data is the U.S. Board of Governors of the Federal Reserve System.

^{xii} For example, the average price of a transistor (which drives computing power) and the average price of long-distance telephone service fell in real terms during much of this period. For a more detailed discussion of these changes, see Polski (2000).

^{xiii} For a more complete analysis of how relative price changes affected the competitive environment of commercial banking and the financial performance of U.S. commercial banks, see Polski (2000).

^{xiv} The magnitude of these challenges is illustrated by a significant increase in closing and assistance transactions in the commercial banking industry. Over the period 1979-1992, 1,515 banks with deposits totaling \$237 billion were either closed or assisted by the FDIC. Ninety-four percent (1427) of these transactions involved commercial banks. (Author's compilation based upon FDIC historical statistics).

^{xv} There were also a number of innovations in financial instruments during this period however, most originated in capital markets. For simplicity, these innovations are not measured in this analysis.

^{xvi} In states with permissive statutes, BHCs that owned more than one bank in a state or across states could effectively sidestep restrictions on geographic expansion. In addition to geographic and product diversification, firms owned by a BHC could potentially realize other competitive advantages such as realizing economies of scale, raising funds free of Regulation Q restrictions on interest rate payments, and avoiding Regulation D reserve requirements (Savage, 1978).

^{xvii} The Depository Institutions Deregulation and Monetary Control Act of 1980 gradually phased out the legal ceiling rates on deposits sold to the public and permitted federally insured banks to offer interest-bearing checking accounts to all customers. The Garn-St. Germain Depository Institutions Act of 1982 permitted banks and nonbank thrifts to offer money market deposit accounts in order to compete with the share accounts offered by money market mutual funds. Both of these acts were efforts to level the playing field between commercial banks and other financial service providers. Over the period 1984-1987, the majority of states liberalized their interstate banking statutes to permit some form of interstate banking through banking holding companies. By the early 1990s, most states had liberalized intrastate branching rules as well. The Riegle-Neal Interstate Bank Branching and Efficiency Act, which permits interstate banking regulation in every state in the U.S. unless a state specifically opted not to be covered (no state did), was signed into law in 1994. For a more detailed description of these changes, see Polski (2000).

^{xviii} For an analysis of the legal and strategic use of automated devices to expand the geographic scope of banking activities, see Ginsburg (1981).

^{xix} Berger, Kashyap, and Scalise (1995) estimate that the average potential reach of an MBHC rose from 6.5% in 1979 to 69.4% in 1994, implying that by 1994 the typical MBHC already had the legal right to operate in states accounting for 69.4% of the nation's banking assets. In other words, the industry had already moved most of the way toward nationwide banking privileges by the time interstate branching was permitted by federal law.

^{xx} The supervisory concerns of the Fed are discussed at length in their Annual Reports prior to the 1970 Amendments and following the Amendments.