Performance of Financial Institutions

EFFICIENCY, INNOVATION, REGULATION

EDITED BY Patrick T. Harker
AND Stavros A. Zenios

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Efficiency, Innovation, Regulation

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Performance of Financial Institutions

Efficiency, Innovation, Regulation

The efficient operation of financial intermediaries – banks, insurance and pension fund firms, government agencies, and so on – is instrumental for the efficient functioning of the financial system and the fueling of the economies of the 21st century. But what drives the performance of these institutions in today's global environment? This volume brings an interdisciplinary and international perspective to developing a deep understanding of the drivers of performance of financial institutions. World-renowned scholars from economics, finance, operations management, and marketing, and leading industry professionals, bring their expertise to bear on the issues. Primary among these issues are the definition and measurement of efficiency of a financial institution, benchmarks of efficiency, identification of the drivers of performance and measurement of their effects on efficiency, the impact of financial innovation and information technologies on performance, the effects of process design, human resource management policies, and regulations on efficiency, and interrelationships between risk management and operational efficiency.

Patrick T. Harker is Professor of Operations and Information Management and Senior Fellow in the Financial Institutions Center at the Wharton School, University of Pennsylvania. He is currently the Dean of the Wharton School. He previously directed Wharton's Fishman-Davidson Center for the Study of the Service Sector from 1989 to 1994 and chaired the Systems Engineering department in the university's School of Engineering and Applied Science. Professor Harker has published five books and more than 80 professional articles and serves as editor-in-chief of *Operations Research*, the leading journal in the field. He is currently co-principal investigator of a multi-million dollar project funded by the Sloan Foundation to study productivity and technological impacts in financial services.

Stavros A. Zenios is Professor of Management Science at the University of Cyprus, where he also served as the first Dean of the School of Economics and Management, and Senior Fellow in the Financial Institutions Center at the Wharton School, University of Pennsylvania. He has published six books, including *Financial Optimization* (Cambridge University Press, 1996), and more than 130 professional articles. Professor Zenios is currently principal investigator with the HERMES Laboratory for Financial Modeling and Simulations, and is internationally known for his work in computational finance and operations research. He has taught at Wharton and held visiting appointments at the Massachusetts Institute of Technology and the Universities of Vienna, Haifa, Bergamo, Milan, and Urbino.

Advance Praise for *Performance of Financial Institutions*

"Research on bank efficiency and financial sector innovation has advanced rapidly in recent years. This book provides a thorough review of the state of the art. It is a group of up-to-date papers that present the methodologies for analyzing the issues and summarize the results in the literature. *Performance of Financial Institutions* will give the reader a thorough understanding of the factors that are changing the structure of the banking industry. Banking in the United States and elsewhere is undergoing a fundamental change and this book tells you why."

– Paul Wachtel, *New York University*

"I found the papers in this book both interesting to read and a very valuable source of summaries and critical reviews of research. I know of no comparable volume nor any more efficient way for one to understand what has been learned about the performance of financial institutions."

– George Benston, *Emory University*

FOREWORD

The Wharton Financial Institutions Center (WFIC) has been studying the dynamic changes in the financial sector for the past seven years through a generous grant from the Alfred P. Sloan Foundation. With a group of more than two dozen faculty and an equal number of professional staff and graduate students, the Center has engaged in basic, yet relevant research on this important sector of the economy.

Its work has been divided into three parts. The first and most advanced area of its portfolio is the efficiency and performance issues facing the sector. The second analyzes financial risk management systems employed in the industry, while the third looks at the regulatory and competitive issues. In each case, under the direction of Wharton faculty and affiliated scholars, the Center studies the key drivers of change within the sector and seeks to add new understanding of its revolutionary transformation.

The issues surrounding efficiency and productivity were some of the first studied, because of both their importance and the industry's awareness of their impact on performance. Led by Professor Patrick Harker, the team investigated the key drivers of performance from both the macro level of the industry and the micro level of firm-specific processes and structures. The results of this work can be found in a number of research papers and the message has been spread by many of the involved scholars.

To further the academic work on efficiency and to link it to performance of the firm, a major international conference took place at Wharton in May 1997. The results of this event are the subject of this volume, edited by Patrick Harker and Stavros Zenios, two of the key investigators on the project. The research that it contains is cutting edge in technique and in the quality of the contributions. However, it is also relevant and vital to the future viability of firms operating within the financial sector. It pushes the field of knowledge to new lengths and offers insights to practitioners in a way unique to the WFIC project design. The papers ask vital questions and offer answers that are "actionable" and relevant to management within the sector.

I trust you will enjoy reading the results of our efforts. For sure, the volume will be a benchmark in financial institution research and "must reading" for scholars in the field. Moreover, it will prove pivotal in the research agenda as it brings researchers to the question of performance from diverse fields and with many different kinds of expertise. In the end, the message should be clear that performance is the result of many different factors all properly aligned to enhance product quality, delivery, and value. Understanding performance goes beyond one discipline, e.g., finance, and encompasses a knowledge of the diverse drivers of performance from operations, technology, human resource practices, as well as finance. Regulation and government policy also play a role.

For all of us who toil in these fields, I wish to thank the researchers who have added to our understanding through their contribution to this volume and to the organizers for their efforts to bring them all together.

Anthony M. Santomero
Richard K. Mellon Professor of Finance
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PREFACE

While the efficiency of *financial markets* is widely and extensively studied, little has been done to develop our understanding of what drives the performance of the *institutions* that operate in these markets. Unavoidably, however, the efficient operation of financial intermediaries – banks, insurance and pension fund firms, government agencies, and so on – is instrumental for the efficient functioning of the financial system.

This volume brings an interdisciplinary and international perspective in developing a deep understanding of the drivers of performance of financial institutions. Scholars from economics, finance, operations management, and marketing bring their expertise to bear on the following issues: definition and measurement of efficiency of a financial institution, benchmarks of efficiency, identification of the drivers of performance and measurement of their effects on efficiency, the impact of financial innovation and information technologies on performance, the effects of process design, human resource management policies, and regulations on efficiency, interrelationships between risk management and operational efficiency, and so on.

The contents of this volume were compiled from papers presented at a two-day conference organized by The Wharton Financial Institutions Center, The Wharton School, University of Pennsylvania, in May 1997. The published articles went through the usual scholarly refereeing process, and were also assessed by practitioners to establish that each published article develops our understanding of some aspects of the performance of financial institutions.

Patrick T. Harker, Philadelphia
Stavros A. Zenios, Nicosia and Philadelphia
June 1998

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Part 1

Introduction

1

What Drives the Performance of Financial Institutions?

Patrick T. Harker[a], Stavros A. Zenios[b]

Abstract
While the efficiency of financial markets is widely and extensively studied, little has been done to date to develop our understanding of what drives the performance of the institutions that operate in these markets. Unavoidably, however, the efficient operation of financial intermediaries – banks, insurance and pension fund firms, government agencies, and so on – is instrumental for the efficient functioning of the financial system. In this chapter we present in a coherent framework our current understanding on *what is* and *what drives* performance of financial institutions. The chapter provides the necessary background and the wider context for the remaining chapters of this book.

1 Introduction

The financial services sector is perhaps the most significant economic sector in modern societies. In the more advanced service economies – like the United States' – the financial sector employs more people than the manufacturing of apparel, automobiles, computers, pharmaceuticals, and steel combined; 5.4 million people are employed by financial services firms in the U.S. Financial services account for almost 5% of the Gross Domestic Product in the U.S., about 5.5% in Germany, 3.5% in

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Italy, and similar statistics are found for other European Union economies with highly developed financial intermediaries. The Japanese financial sector accounted for almost 9% of the GDP until 1993 (recently it has experienced severe decline), and the Singapore sector is 6.5% of the GDP. (Data are obtained as the sum of all entries in the rows of Table 5 of Demirguc-Kunt and Levine, 1996.) In smaller economies – especially those that aspire to a significant presence in the international markets through offshore banking activities – the financial services sector could be even more significant. The Swiss financial sector accounts for over 9% of the country's GDP. Cyprus – a small Mediterranean economy offering off-shore banking services to the former Soviet Union states and Eastern European countries – has more than 18% of its GDP arising from financial and business services, and these sectors employ almost 10% of the population. Eighteen percent of the Israeli GDP is due to the combined financial and business services sectors, which employ 10% of the population.

Impressive as these statistics may be, they belie the much larger *indirect* role that this industry plays in the economy. In a nutshell, the financial sector mobilizes savings and allocates credit across space and time. It enables firms and households to cope with economic uncertainties by hedging, pooling, sharing, and pricing risks, thereby facilitating the flow of funds from the ultimate lenders to the ultimate borrowers, improving both the quantity and quality of real investments, and thereby increasing income per capita and raising our standards of living. Herring and Santomero (1991) give a comprehensive contemporary analysis of the role of the financial sector in economic performance.

It is therefore well justified that the performance of the financial sector receives extensive scrutiny from scholars and industry thinkers. While the efficiency of the financial markets has been studied and debated at length, much less has been done in understanding the performance of the institutions that operate in these markets; see, e.g., Merton (1990). Under intense competitive pressures, financial institutions are forced to take a careful look into their performance and the role they are called upon to play in the economies of the 21st century.

Banking institutions face today a dynamic, fast-paced, competitive environment at a global scale. This environment is the catalyst for major restructuring of the industry. Table 1.1 summarizes the changes in the U.S. banking industry over the 15-year period from 1979 – the aftermath of financial deregulation and the collapse of the Bretton-Woods agreement. The total number of banking institutions shrunk by one-third, but more than half of the small banks were eliminated in the process. The

Table 1.1. *Changes in the U.S. banking industry 1979–1994.*

Item	1979	1994
Total number of banking organizations	12,463	7,926
Number of small banks	10,014	5,636
Industry gross total assets (trillions of 1994 USD)	3.26	4.02
Industry assets in small banks	13.9%	7.0%
Total number of employees	1,396,970	1,489,171
Number of automated teller machines	13,800	109,080
Cost (1994 USD) of processing a paper check	0.0199	0.0253
Cost (1994 USD) of an electronic deposit	0.0910	0.0138

Source: Berger, Kashyap, and Scalise, 1995.

total number of employees increased by a meager 7% while the number of automated teller machines increased almost ten-fold.

Liberalized domestic regulations in the U.S., financial unification policies in Europe, intensified international competition, rapid innovation in new financial instruments and changing consumer demands, and the explosive growth in information technology fuel these changes. In response, firms are forced to adapt in order to survive, and firm-level innovation brings about more change of the competitive environment. Frei, Harker, and Hunter (1997) discuss various forms of innovation of retail financial institutions in response to these competitive pressures.

Where are the competitive pressures coming from? A recent study on the future of retail banking by Deloitte and Touche (1995) argues that the banking industry is today fragmented due to its inability to exploit *economies of scale and scope*. Before we elaborate on the implications of this argument, we add that studies by Berger and colleagues (see, e.g., Berger and Humphrey, 1991, and Berger, Hancock, and Humphrey, 1993) claim that inefficiencies are far more important than unexploited scale and scope economies. Further work (Berger, Hunter, and Timme, 1993; Soteriou and Zenios, 1999) shows that serious inefficiencies are on the output side, reducing revenues, than on the input side, raising costs. A number of recent indicators lead us to believe that retail banking is increasingly becoming susceptible to scale economies. Declining costs of information technology – hardware and software – and the gradual shift of banking operations from hybrid paper-electronic systems to seamless end-to-end automation lead to restructuring and disaggregation of retail banking. It can be argued that today's mergers and acquisitions do not necessarily add value, but are reactions to competitive threats (Frei, Harker, and Hunter, 1997; Singh and Zollo, 1997). However, evidence is gradually emerging (Pilloff and Santomero, 1997) that consolidation does add value, thus lending credibility to Deloitte and Touche's somewhat speculative study.

The economies of scale that lead to more integrated automation cause further *economies of scope* effects. As financial institutions – in agreement with all other retail services – realize that customer satisfaction and customer loyalty lead to long-term growth, they aim at maximizing the share of customers' wallets that they are servicing. With platform automation, an employee can get a single view of the entire customer relationship; economies of scope can be created when a firm offers suitable product mix to support its client base. Mergers and acquisitions become powerful forces impacting geographical scope and product variety, while also affecting the underlying technological and managerial infrastructures of the institutions. The recent megamerger of Citibank with Travelers Group is a manifestation of economies of scope leading to industry restructuring.

Technological innovation adds more competitive pressures. First, it opens up new delivery channels, and while those are not necessarily more cost effective for the firm, consumers get to depend on them and demand access. Whereas in the past the bank branch was the only channel for the distribution of financial services, we see today a variety of channels eroding the branch's dominance.

Furthermore, as banks struggle with the technological issues and complex organizational choices that surround the introduction of, say, PC banking services, they see the emergence of new competitors. Off-the-shelf home finance software – such as Intuit's Quicken and Microsoft's Money – provide some of the services that were traditionally offered by banks, and radically transform the way in which the client interacts with the firm. It is not sufficient for the CEO of Chase Manhattan to be concerned about the competitive strategies of Deutsche Bank or Banque Nacionale de Paris; he also has to ponder whether Microsoft is also a bank. The Deloitte and Touche study argues that technology revolutionizes the moving and storage of money and the distribution of financial products, and more complex software permits more integrated automation. However, the complexities of large software projects create some of the scale effects that reshape the industry. It is likely that new entrants, better equipped with state-of-the-art technology than current banking giants with 1970's technology, can quickly achieve leadership in the retail banking field. Bank executives who wish to maintain their firm's franchise should be aware of Microsoft's and other firms' acquisitions in the area of financial software and network management, and their active interest in possibly buying a bank.

Competitive threats are likely to emerge from more unsuspecting places. Logistics firms, such as Federal Express and UPS, are well equipped to deal with the transfer of goods and information and the management of money. They currently own the process for transferring goods and information; we could expect them to take ownership of the transfer of money as well. The Deloitte and Touche study speculates that "it would not be surprising to see a joint venture between say Deutsche Telecom and Quelle, the large German mail order firm, in which they jointly undertook to design and distribute financial service products." (This hypothetical merger was the subject of a recent article in *The Economist*.)

Perhaps the strongest force of change, however, is the *consumer*. Consumers are demanding anytime-anywhere delivery of financial services, while demonstrating a rapid evolution of their needs and desires. In 1980, almost 40% of the U.S. consumer financial assets were in bank deposits. By 1996 bank deposits accounted for less than 20% of consumers' financial assets with mutual funds and insurance/pension funds absorbing the difference. As a result of changing consumer needs, we have seen an accelerated growth of financial innovation. See, for instance, Allen and Gale (1994) or Consiglio and Zenios (1997) for a discussion of financial innovation and security design. The emergence of new and diverse financial products creates new challenges for financial institutions that now face a host of product-mix and marketing questions along with new competitors. Whereas the typical bank offers a dozen or two different choices of mutual funds, institutions such as Fidelity Investment or Merrill Lynch each offer over 100 different products.

Modern consumers also demand access to more than one delivery channel. While a personal visit to the branch remains the predominant way of doing business, a significant percentage of U.S. households use non-branch channels as well (phone, electronic transfer, ATM); see Figure 1.1.

Some interesting case studies amplify the point we are making on the significant transformation of the banking industry and the challenges facing its institutions. Marks and Spencer, the famous retailer in the United Kingdom, made a significant entry into financial services. By restricting in-store payment to cash, check, or the store's own card, Marks and Spencer has recruited a large number of cardholders. Ana-