E-Finance: An Introduction

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Abstract

E-finance is defined as “The provision of financial services and markets using electronic communication and computation”. In this paper we outline research issues related to e-finance that we believe set the stage for further work in this field. Three areas are focused on like the use of electronic payment systems, the operations of financial services firms and the operation of financial markets. A number of research issues are raised. For example, is the widespread use of paper-based checks efficient? Will the financial services industry be fundamentally changed by the advent of the internet? Why have there been such large differences in changes to market microstructure across different financial markets?

Introduction

How important are electronic communication technologies and the Internet for finance? Is the Internet the most significant development for many decades or is it just one among many?

One view is that it will fundamentally transform the financial services industry and financial markets. Another is that the net represents the latest in a long line of electronic technologies that have reshaped the financial industry. These issues were addressed before at several conferences held across the world. The purpose of this article is to frame the issues related to the use of the Internet and other types of electronic communication technologies in finance, and stimulate future research. We attempt to draw out the many interesting questions to be answered below.

What exactly is e-finance? The definition that is used as the basis of this article is:

E-Finance is the provision of financial services and markets using electronic communication and computation.
The developments in the e-finance world can be divided into two broad areas. The first is the impact on banking and financial services. The advent of the internet and other electronic communication means has fundamentally altered many aspects of the banking industry. Many of the services traditionally provided by banks are being provided by other entities.

The second broad area is the transformation of financial markets. These no longer need to be associated with a physical place. As a result trading systems for equities, bonds and foreign exchange are becoming global. All these changes have important significance for public policy towards the financial services industry and financial markets. They consider the implications for safety and soundness regulation, competition policy, consumer and investor protection, and global public policy.

Three important trends in the financial services industry have been accelerated by the emergence of the internet. These are:

1) Improved price transparency,
2) Differential pricing
3) Transformation of distribution channels.

Improved price transparency potentially increases competition and reduces profit margins. Evidence from other industries that make extensive use of the internet, however, suggests that there are limits to this process. It appears that transaction costs of search remain sufficiently high that differential pricing is possible and this will become increasingly important in financial services. As increased use of the internet leads to the unbundling of services and promotes disintermediation, there will be a transformation of distribution channels and an important restructuring of the industry.

Now let us consider broadly the impact of e-finance technologies on financial services firms. Online banking began in the mid 1990s and is steadily becoming more important. In contrast to banks, however, insurance companies have used the internet a relatively small amount. Electronic brokerage services have been an important development in recent years. Firms such as Schwab and E*Trade have developed significant discount brokerage businesses over the net. While the internet is new and exciting, we discuss how other e-finance technologies,
many of which have been around longer than the internet, have also reshaped the financial services industry, particularly the banking sector.

I. E-Finance and the Financial Services Industry

This section begins by describing how different kinds of financial services firms, depository institutions, insurance companies and securities companies, have deployed e-finance technologies.

Adoption of e-finance by financial services firms:

1) Financial Intermediaries

By the end of the 1990s, e-finance technologies had arguably affected all aspects of the business of banking and financial intermediation, with the possible exception of lending to large businesses. Depository institutions have used electronic information technologies, for example, to make credit decisions to consumers since the 1980s. Having computation abilities that allow the use of large databases has made this possible. For consumers, the application and approval process for both mortgages and credit cards has become sufficiently automated so that it can be done without any personal contact with the lender. The ability to make these credit decisions in this way depends crucially on standardized information provided to lenders by a small number of credit bureaus that keep track of individuals’ credit histories. With respect to credit cards, their use as a medium to make payments, along with debit cards, has grown dramatically, fueled by rapid communications technologies that allow vendors to validate a person’s credit worthiness in seconds.

In recent years, information technologies have also been used systematically for lending to small businesses.

The widespread use of these information technologies have made it increasingly easy for banks to remain at “arm’s length” from their borrowers. Over the past two decades, for example the probability that a bank communicates with its small business borrower in person rather than with the phone or mail has declined from 45 percent in 2000 to 20 percent in 2010.
The rapid increase in the use of the internet represents a continuation of banks' efforts to replace their costly branch network with alternative distribution channels such as the telephones, the mail and Automated Teller Machines

1. Insurance

Like the securities underwriting business, the insurance industry also has not seemed to adopt e-finance technologies in large numbers yet. Insurance companies tend to buy and hold securities (mainly debt securities) issued or originated by someone else, thus limiting the potential usefulness of e-finance on the asset side of the business.

On the liability side, slow adoption of e-finance technologies may reflect the relative infrequency with which an insurer and retail customer interact. In contrast to bank depositors, policyholders generally interact with their insurer only at the time of sale and when filing a claim. Also in contrast to banking services, insurance policies tend to be quite heterogeneous and consumers tend not to be well informed about the products, making automation of the sales process difficult. Differences in regulation may also play a role. The issue of why the insurance industry has been relatively slow to use the internet needs further study..

Securities Firms

E-finance has also affected the securities industry, particularly for the broker-dealers in the secondary securities markets. During the 1990s, the discount brokerage business rapidly gained market share. Discounters typically rely on fees from retail customers with few ancillary services, thereby allowing individuals to trade securities at very low cost. From 2000 to 2010, employment at discount brokers rose from 2.4 percent to 5.3 percent of total employment in the securities industry. Moreover, the discounters enjoyed a higher profit rate (pre-tax return on equity) than national full-line securities firms or large investment banks in every year from 2000 to 2010. Will e-finance technologies reshape the primary securities markets to the same extent that it has affected the brokerage business?

The traditional approach to bringing a new security to the primary market involves “book building,” a process by which investment banks assess the demand for a security issuance from a small number of well-connected institutional investors before finalizing the terms of the offering. Wilhelm (1999) argues that the relationship-based approach to book building
II. E-Finance Technologies in Payment Services

Electronic communications technologies have been used in the banking sector for many years, particularly in inter bank payment systems. One of the early applications of electronic communication networks to finance was the Fedwire payment system. By 1918 this linked the accounts of banks held at the twelve Federal Reserve Banks across the U.S. using leased telegraph wires and inaugurated electronic settlement of accounts. This facility, combined with the ability to settle in central bank balances, eliminated the fluctuating exchange rates that had previously been common between bank balances due from banks located in different regions of the country. This early application of electronic communication in finance displays one of the heralded features of Internet communications: the importance of distance was reduced as telegraphic instructions to adjust central bank balances replaced the need to physically ship coin and currency. In this case, the advent of the specialized intermediary, the central bank, and the electronic communication method served to substitute for existing currency exchanges.

Electronic payment systems have evolved over the decades and have reduced the Herculean task of the paper work to just a few clicks in the mouse of the computer. Inter bank payment systems in the industrialized countries typically utilize dedicated telephone networks and mainframe computer systems to manage their payments, which are characterized by high volumes and values of payments.

Another type of electronic technology banks have invested in is the automated teller machine (ATM) and the network facilities that allow depositors remote access to their bank accounts at any time of day.

III. E-Finance and the Financial Markets

In this section we consider the impact of electronic communication and computation on stock markets, bond markets and foreign exchange markets.

Most of this literature is concerned with understanding the operation of stock markets.
Traditionally stock markets were at physical locations and operated with face-to-face communication. The development of the over the counter market for stocks into the NASDAQ trading system was an early example of e-finance in the context of markets. Subsequently most stock exchanges in the world including the London Stock Exchange, The Tokyo Stock Exchange and the Frankfurt Stock Exchange have moved to electronic trading. The New York Stock Exchange, which is the largest by market capitalization in the world, still uses physical trading. However, even they have introduced the Network NYSE platform that allows retail and institutional investors to engage in electronic trading.

The foreign exchange (FX) and bond markets provide an interesting contrast to stock markets. These have traditionally been dealer markets that operate over the telephone. There has not been a physical location and trading is done directly by pairs of dealers or with the help of brokers that intermediate between them. In recent years the foreign exchange market has started to rapidly move to electronic trading. In contrast the bond market has been slow to change and is still largely a telephone market.

A. Stock Markets

Many stock markets around the world have adopted electronic trading methods. In the U.S., the NASDAQ market was created in 1971 to allow dealers to make over-the-counter trades on an electronic system of linked screens. It has grown rapidly and has become one of the main equity markets in the U.S. Regulatory pressures in the mid-1990s led to the entry of many Electronic Communications Networks (ECNs) in the trading of NASDAQ-traded stocks. These electronic systems allow a wider set of participants to view limit orders (orders to buy or sell specific amounts of stock at various prices), as well as allowing for the possibility of executing trades electronically. In more recent developments, exchange based markets (including the New York Stock Exchange) has implemented various automated order execution systems, either to trade small orders, supplementing their floor-based trading systems, or as the primary means of trading.

ECNs allow traders to transact directly with each other at a small fee in an electronic marketplace, thereby eliminating the need to compensate the dealer via the bid-asked spread.
ECNs allow traders to view the bids and offers in their limit-order book. In some cases these electronic limit-order books are available to the public on the Internet. Traders can “hit” these bids and offers if they offer attractive prices, and “crossing” trades are automatically matched, thereby short-circuiting the traditional role of the securities dealer. ECNs can also allow traders to route orders to the dealer that offers the best price for the order.

B. Foreign Exchange Markets
The foreign exchange market has traditionally been a multiple dealer market. A large proportion of the trading, roughly two thirds, is inter dealer trading. For many years it was a telephone-based market. Two major systems (Reuters and EBS) were developed for providing quotes. Initially, trades were still done over the telephone. However, these systems have developed into full trading platforms. Dealers are able to observe the best bid and offer in the market. Although the inter dealer market for FX has largely become electronic the market between large corporations and dealers has been less affected and communication over the telephones remains important.

C. Bond Markets
Similarly to the FX market, compared to stock markets relatively little academic work has been done on the operation of bond markets. The structure of bond markets has traditionally been very similar to that of foreign exchange markets. The secondary trading in government, municipal and corporate bond market is done over the telephone in multiple dealer markets. To illustrate the operation of bond markets we will focus on the markets for government securities. These are large in terms of volume. The primary market involves auctions that are open to all but where a special role is played by primary government securities dealers. They are expected to participate meaningfully in the Treasury auctions and interact directly with the Central Banks in open market operations. They also supply market information to the Central Banks. The principal market makers in the secondary market are the primary dealers. Inter dealer brokers provide dealers with
electronic screens that post bid and offer prices. Trades are typically executed over the telephone.

**Conclusion**

E-finance is not new. For example: The Fedwire used electronic communications system as early as 1918. The NASDAQ market involved the electronic trading of stocks as early as 1971. The difference today is that electronic communication and computation is now used much more widely than before. A large number of people have access to the internet and this has vastly changed the opportunities for the use of electronic payments systems, the operations of financial services firms and financial markets. We have argued that this change raises a number of important research issues. For example: Is the widespread use of paper-based cheques efficient? Will the financial services industry be fundamentally changed by the advent of the internet? Why have there been such large differences in changes to market microstructure across different financial markets? We look forward to these and other questions being answered as the emerging field of E-finance develops.

**References**