

ELECTRONIC MARKETS FOR HOME MORTGAGES

by

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ABSTRACT

Much has been written in recent years about the changes in corporate strategies and industry structures associated with electronic coordination of market activities. This thesis considers the advent of electronic market coordination in the home mortgage industry, focusing on Computerized Loan Origination systems (CLOs). CLOs give home buyers an automated means to compare, select, apply for and close mortgage loans. CLO terminals, often found in real estate agencies, provide mortgage information and application services from several lenders at the point of sale of the property to be mortgaged.

A theoretical model regarding CLOs' impact on the home mortgage industry was developed, based on the literature concerning electronic market coordination. This model was then tested against five case histories of CLO systems that were introduced from 1981 to 1989. It was found that the introduction of CLOs has not yet significantly lessened or alleviated the imperfections in the market, or changed its fundamental structure. The model predicts that financial intermediaries are hurt or replaced by electronic market coordination. This was not substantiated by the current data. However, the intermediaries' strong negative reaction to CLOs suggests that they do perceive a threat. The model predicts that home buyers will have strong incentives to favor electronic markets over other forms of coordination. This was not substantiated. It is likely that the effects predicted by the model will occur only if CLO use becomes much more widespread in the future.

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TABLE OF CONTENTS

I.	Introduction	4
II.	Introduction to Mortgage Banking	7
	2.1 Porter Analysis of Mortgage Banking	11
	2.2 The Secondary Market	15
	2.3 Summary	16
III.	Theoretical Background	
	3.1 The General Model of Electronic Markets	17
	3.2 Summary of the General Model	24
IV.	Examples of Computerized Loan Origination Systems	25
	4.1 Shelternet (First Boston)	25
	4.2 Realtors National Mortgage Access System (American Financial Network)	28
	4.3 Mortgage Power Plus (Citicorp)	31
	4.4 CLOS (Prudential Real Estate Affiliates)	33
	4.5 LoanExpress (Planning Research Corporation)	35
	4.6 Summary of CLO Systems	37
V.	Analysis	38
	5.1 The General Model Applied to Mortgage Banking	38
	5.2 Evolutionary Models of Electronic Mortgage Markets	41
	5.3 The General and Evolutionary Models Applied to CLO Systems	48
	5.4 Summary Analysis	53
VI.	Conclusion	55
	References	56

I. Introduction

William Bolt of Cinnaminson, N.J., knows well the anxieties of buying a new house. In three such transactions, he waited an average of six agonizing weeks for loans to be approved. It was with a certain foreboding, therefore, that Mr. Bolt faced buying another new house last August---this time before the lease on a rented house ran out. "By the time we found the home we wanted, we had to settle in two weeks," he recalls. "Everyone said it was impossible." But everyone was wrong. Mr. Bolt's mortgage banker turned to a nationwide, computerized mortgage-search service to process the Bolt loan application. The mortgage was approved just eight working days later (Lipman, 1984).

Although he may not have been aware of it at the time, Mr. Bolt had happened upon an innovation that many in the early to mid-nineteen eighties felt was destined to revolutionize the market for home mortgages. Computerized Loan Origination systems, or CLOs, were heralded as mortgage banking's savior by some and as a dire threat by others. For years, mortgage lenders had benefitted from computerizing the "back end" of their operations, where records were archived, balances were transferred, and bills were sent out. The "front end," whereby loans were contracted for by a home buyer and a lending officer, was dominated by face-to-face interaction, piles of paperwork, and, as Mr. Bolt experienced in his three previous outings, a lot of waiting.

CLOs promised to change that. Automation first crept into the front end of the mortgage business through the local lending officer's door. Large lenders offered their agents terminals they could use to tap into centralized databases in order to have to latest information about volatile interest rates, and to transmit application information

back to the corporate underwriters. These early CLOs generally offered loans from only one lender, and left the task of picking that lender and travelling to his or her office to the borrower. The critical change that made CLOs the source of hope and controversy occurred when the systems went back out the lender's door and set up shop at the local real estate office.

Suddenly, CLOs were much more interesting. The new systems linked the entire loan production value chain, from its beginning at the point of home sale, to the lenders' back offices where loans were underwritten and approved. In a 1984 Wall Street Journal article, the pronouncements and predictions about CLO-induced changes to the fundamental characteristics of the industry came fast and furious:

We're talking about a situation where the anxiety level of the customer has dropped to zero. They no longer worry about where their (application for a) loan stands. ---Senior Vice President of a CLO company (Lipman, 1984).

Financial-services networks will mushroom until real-estate agent and the banker melt into one, providing buyers with one-stop shopping...The transformation has already begun. ----Wall Street Journal (Lipman, 1984).

*These national networks will become the rule rather than the exception.
---President, financial research firm (Lipman, 1984).*

*Once computerized mortgage searches become more widespread...anyone can---
and will---originate mortgages. ---The "experts," (Lipman, 1984).*

This paper offers an objective view of Computerized Loan Origination systems, drawn from the history of five major CLOs and based on a theoretically grounded hypothesis concerning the impact of information technology on market structures and activities. Section II presents a brief introduction to the mortgage banking industry, intended as background for subsequent sections. Section III summarizes recent research on the advent and attributes of electronic markets and hierarchies, developing a general model upon which to base consideration of the industry in question. Section IV recounts the experience of five CLO systems, and Section V considers those systems in the context of the model put forth in Section III.

II. Introduction to the Mortgage Banking Industry

The word *mortgage* is from the Old French meaning "dead pledge." Today, mortgage means any loan collateralized by real property (Janik and Rejnis, p. 309). There are mortgages for both commercial and residential property. This paper will be primarily concerned with the market for residential mortgage financing, specifically loans made to owners buying a property in which they will live. Although many of the concepts that will be discussed apply equally well to other kinds of mortgages, the focus is on the market comprised of residential, generally single-family, buyers and the unique opportunities CLOs provide for reaching them.

The "product" of the mortgage banking industry is different for its various constituent groups. The mortgage lender (the mortgagee) and the intermediaries that serve as a conduit for loans are selling money, essentially, by letting the borrower use their funds to purchase homes. More than \$400 billion in home mortgages were originated in 1986. The price paid for this product takes the form of interest paid over the life of the loan and settlement costs, paid at the beginning of the loan, that might include application fees, "points," and other charges that serve to increase the lender's up-front yield on the loan. The borrower (the mortgagor), conversely, sees the services of the mortgage lender as a means to an end, the buying of a home.

Home financing is an information intensive business. Every stage in the process by which loans are made depends heavily on the transfer of voluminous, often complex information from one party to another. The potential home buyer searching for a loan faces thousands of available loan programs from a multitude crowd of lenders. Although for many years loan descriptions were relatively homogeneous, in recent history there has been a profusion of variations on the traditional fixed-rate, 30-year

formula: ARMs, ZIPs, GEMs, FLIPs, and buy-downs, totalling more than 200 different loan-type choices (Lipman, 1984). However the means by which borrowers select their loans has been slower to evolve than the products they must choose from. Today, many home buyers scour local newspapers looking for the right rate and terms, and spend hours on the phone with lending officers, trying to determine if they qualify for specific programs.

Figure 2.1 shows the relationships, activities and participants that characterize the traditional home mortgage process.

Lender and loan selection is only the first of five steps in the process of home mortgage origination. Subsequent steps are application, pre-qualification, underwriting, and closing. In submitting an *application*, the potential mortgagor provides the mortgagee with information about the property in question and his or her present financial situation, including income, current housing costs, job, assets, and debts. The application form used by most lenders is a standardized document developed jointly with federal government agencies. It raises several issues of particular concern to mortgagees: if the applicant has gone bankrupt or been foreclosed upon in the last seven years, if he or she is party to a lawsuit, and if part of the down payment is to be borrowed (Miller, p. 46).

Pre-qualification is the process whereby some lenders will, for a fee, review a borrower's finances prior to buying a home and make a binding loan commitment, good for 60 or 90 days, contingent on a satisfactory property appraisal. Often this process can be accomplished in as little as three days. This gives borrowers added buying power in the home real estate market, since they can make a more credible

Traditional Mortgage Market

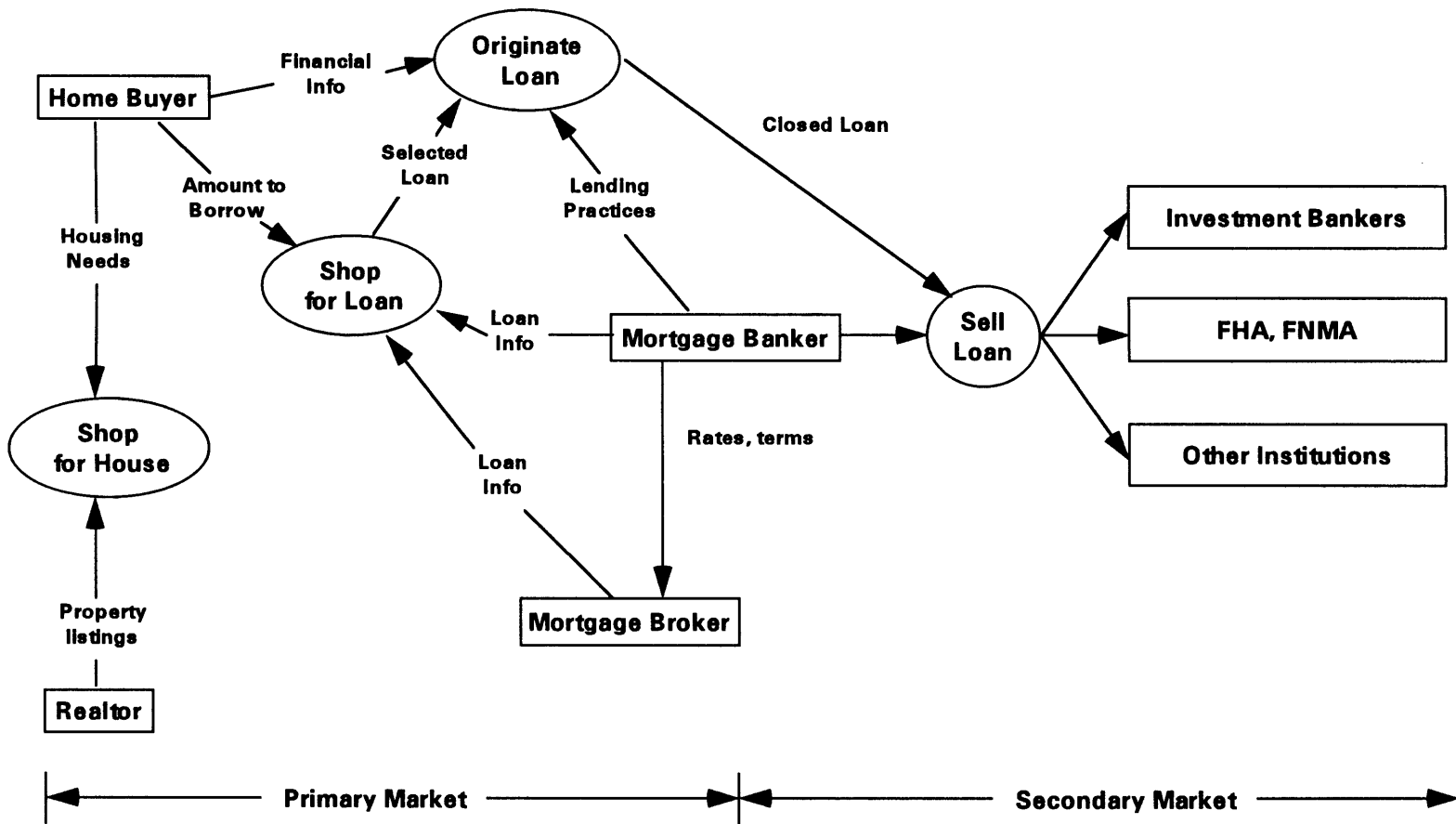


Figure 2.1

purchase offer based on their pre-qualified status. Prequalification is a subset of underwriting, carried out without a particular property in mind.

During *underwriting*, the lender verifies the claims made on the application, and determines if the applicant and the property meet the firm's approval criteria for the loan program in question. Mortgage programs fall into four categories with regard to the intensity of information transfer during the underwriting process: *full documentation*, where almost every fact and figure is verified, *alternative documentation*, which requires the same level of documentation, but less verification, *low documentation*, which eliminates a great deal of the paperwork, and *no documentation* loans, which eliminate most, but not really all, of the paperwork and require substantially higher down payments to offset the risk of less rigorous verification. A truly "no doc" home mortgage does not yet exist. Underwriting is arguably the most information-intensive step in the home mortgage process, particularly in the "full-doc" category, requiring the collection and analysis of high volumes of data from disparate sources including employers, landlords, banks, appraisers, and others.

Closing a home mortgage loan involves the actual transfer of the funds in question and signing of various loan documents. Again, there is a high level of information intensity, in the preparation and distribution of legal documents and the electronic transfer of funds.

After a loan is closed, the chief task remaining for lenders or intermediaries is *servicing* the loan, which entails processing the periodic loan payments and foreclosing, should the borrower default on the loan.

2.1 Porter Analysis of Mortgage Banking

Michael Porter's "five forces" framework provides a good starting point for considering this market. Porter identifies the following as the factors shaping any competitive business landscape: buyer power, supplier power, the threat of potential new entrants to a market, substitute products and services, and the internal competition among established players (Porter, 1980). These forces are dynamic, interdependent variables rather than static factors that can be analyzed in isolation. A "five forces" analysis of the market for home mortgages follows.

2.1.1 The Players

The Thrifts. Savings and Loan associations and savings banks have traditionally provided the largest portion of mortgage financing. Because thrifts generally offer slightly higher returns on savings accounts than other banks, they could attract depositors more readily. Furthermore, federal regulation traditionally limited the investment choices available to S&Ls in such a way that mortgages provided the highest yield on their deposits.

Commercial Banks. Although demand deposit accounts are the primary focus of commercial bankers' attention, mortgages are an important secondary activity, more so in the face of opportunities made available by the recent collapse of many S&Ls. Mortgages are attractive to commercial banks both as relatively conservative loans, and as additional services to be offered to the banks' demand deposit customers.

Insurance Companies. Insurers provide a significant portion of the nation's home finance dollars, either through mortgage subsidiaries or separate intermediaries.

Mortgage Bankers. Mortgage bankers use their own funds and/or capital from other sources (Banks, pension funds, etc.) to originate home mortgages. Often, they act in the capacity of middle-man, seeking out borrowers who meet the desired risk profiles of the investors who provide loan capital. In these cases, it is not uncommon for the mortgage banker to retain the servicing of the loan, for a fee paid by the investor.

Other Sources. Large organizations outside of financial services are building large home mortgage portfolios, motivated by perceived economies of scale and desire for diversification. Many of these non-traditional players, such as Sears and K-Mart, have large retail organizations that seem well suited to geographically wide-spread origination networks. Other examples include conglomerates like General Electric and credit unions.

Other important entities. Real estate brokers have to rank first among parties influencing home mortgage finance but who do not actually provide mortgage funds. Brokers are particularly important to mortgage lenders for a number of reasons: they act as intermediaries between home buyer (the borrower) and seller, they are at the "point of sale" throughout the home-buying process, and their success depends on their ability to help their clients find attractive financing. One study showed that 60-70% of home mortgages result either directly or indirectly from Realtor referrals (Lewis, 1991), and in a poll conducted by the Mortgage Bankers Association, 90% of responding Realtors said they made recommendations on financing sources (Anderson, 1987). Real estate brokers and others often act as *mortgage brokers*, matching borrowers with lenders for a fee.

2.1.2 Buyer Power

Buyers have power in the home mortgage market because mortgages are commodity-like in that one lender's loan at a particular rate and with certain terms is as good as another's. Borrowers tend to be price sensitive, in that they will actively seek loans that cost less in the short term, the long term, or both, depending on their financial situation. However, this price sensitivity is tempered by the relatively high search costs associated with finding the least expensive financing option. It is important to remember that the borrower's ultimate goal is not to borrow money, it is to own a home. If a borrower is under time pressure from the seller of a home, for example, it is likely that the search for financing may be shortened in favor of closing the deal. For many home buyers, the money-saving instinct gets focused on negotiating a lower price for a home, rather than finding a cheaper loan. Once a loan is closed, there are significant switching costs associated with refinancing, in the form of origination costs and application fees just like those associated with the original loan.

2.1.3 Supplier Power

This market is characterized by a great deal of supplier power, in that without investment capital, there would be no loans to make, and also because relative to the investment capital markets, mortgage bankers are highly fragmented. The relative competitiveness of a particular lender is closely tied to their ability to get money readily and on good terms. This favors mortgage lenders with cash-rich parent companies or well established conduits into the capital markets.

2.1.4 Threat of Entry

Barriers to new entrants to the home mortgage market, especially to smaller firms, are quite high. New players face a four-fold challenge. First, they must have access to investment capital, and at prices low enough that they can compete with incumbent players. Second, there are plant and personnel costs associated with starting a loan servicing operation. For this reason, many newer, smaller firms find it advantageous to sell the servicing rights to the loans they originate. Third, new entrants are likely to lack the resources necessary to establish an origination network that can produce loans in quantities that provide good cash flow. However, as mentioned above, some new entrants come to mortgage banking precisely because they have a well-established retail network that can be adapted to loan production. Finally, new entrants are likely to be much more susceptible to the risks inherent in mortgage banking. Smaller firms will lack reserves that enable them to weather adverse market conditions, and also experience in responding to volatile interest rates and other unpredictable factors. In a market where the cost of capital can change by more than a full percentage point in a two-week period, bad decisions and shallow pockets can be a dangerous combination.

2.1.5 Substitutes

If a buyer lacks the money to buy a property outright, there are not many substitutes to borrowing money and paying interest on the outstanding principal. One substitute to borrowing from any of the players listed above is *seller financing*, where the seller of a property "takes back" a portion of the purchase price as a loan obligation of the buyer. When interest rates soared above 16% in 1980 and 1981, many sellers whose efforts to sell their properties were frustrated by tight money resorted to seller

financing. It was estimated that in excess of 60% of all resales during this period were facilitated in this way.

2.2 The Secondary Market

There are two markets for home mortgages. Home buyers are most familiar with what is called the *primary market*, where lenders and home buyers meet to finance the purchases of properties. What most home buyers may not be aware of is the *secondary market* for mortgage money, where their loan may be bundled with others like it and sold to a mammoth public or private institution, either to be held in its loan portfolio or perhaps used as the basis for mortgage-backed securities.

Chief among these secondary market players are Fannie Mae, Ginnie Mae, and Freddie Mac. Fannie Mae is the nickname of the Federal National Mortgage Association, which began life as a government agency sponsored by President Franklin D. Roosevelt in 1938 and was subsequently privatized thirty years later. As of May, 1991, Fannie Mae held a mortgage portfolio of \$119.1 billion and had created almost \$430 billion in mortgage-backed securities. Fannie Mae buys loans guaranteed by the Federal Housing Administration (FHA) or the Veterans Administration (VA), second trusts, and adjustable rate mortgages.

Ginnie Mae, the Government National Mortgage Association, operates under the US Department of Housing and Urban Development. Ginnie Mae was created by the Housing Act of 1968, which split Fannie Mae into private and public entities. Ginnie Mae assembles and guarantees pools of FHA and VA loans, which then back pass-through securities which may be purchased by investors. By April, 1991, \$410 billion of these securities were outstanding.

Freddie Mac is the Federal Home Loan Mortgage Corporation, part of the government agency responsible for oversight of federally chartered thrifts. Freddie Mac was chartered by Congress in 1970, to create an additional market for conventional (30-year, fixed rate), FHA and VA loans, financed by mortgage-backed bonds sold to private investors. Since its founding, Freddie Mac has purchased in excess of \$695 billion in mortgages.

While the primary market is often a local one, the secondary market is nation-wide. These three players, plus the smaller private firms who compete in the secondary market, provide much of the investment capital for home financing. The secondary market also provides loan standards that originators use to produce mortgages that will be readily accepted into the secondary market. Mortgages meeting these criteria are known as "conforming" loans. The secondary markets make funds involved in home finance much more liquid: loans can be turned into cash with relative ease, the proceeds going to new loans or other applications.

2.3 Summary

Mortgage banking is an information intensive business, traditionally dominated by local markets and middle-men. Considering the immense amounts of money moving through the market, it is not surprising that some firms have tried to re-route some of that money using information technology. Section III presents prevailing theories of electronic market coordination and transformation on which our consideration of CLOs in mortgage banking will be based.

III. Theoretical Background

3.1 The General Model of Electronic Markets

The advent of high-speed, high capacity computer processing and data transmission technologies brought with it important benefits for firms expending significant resources on information management. There are a myriad of examples of the application of information technology providing cost and speed breakthroughs, and these are perhaps the benefits most widely associated with IT. However, some authors have suggested that there are higher-order benefits available to market participants who rethink and recast the very nature of their organizations' activities based on the emerging capabilities of IT. (Malone, et al., 1987) The basic argument is that by decreasing many of the coordination costs associated with doing business both within the firm and without, IT will provide opportunities for cost reduction and revenue expansion that entail either changing the structure of markets or the boundaries separating the firms in those markets. *Coordination costs* refer to the resources expended processing information in order to select suppliers, enter into contracts, schedule deliveries, and other activities associated with doing business with others. Some have referred to computers and telecommunication as *coordination technology*, because they are well suited to facilitating coordination activities (Clemons, 1991).

Malone and his co-authors identify two varieties of market transformation made possible by relatively recent improvements in coordination technology. *Electronic markets* and *electronic hierarchies* both coordinate "the flow of materials through adjacent steps in the value-added chain." (Malone et al., p. 485) In markets, the basic forces of supply and demand determine how products and services are transferred between multiple firms and customers and in what quantities. Customers compare

offerings from as many vendors as possible in order to find a good match for their specific needs with regard to product attributes, service, price, and other factors. In electronic markets, IT facilitates customers' comparison of purchase alternatives. Generally speaking, electronic markets can improve both the amount of information available to customers and their ease in accessing it, in volumes and at speeds that human middle-men could never hope to achieve.

It may not be immediately clear why the movement toward electronic markets often represents a transformation of existing market structure. The case of the shift to an electronic market at London's International Stock Exchange (ISE) is a good illustration of the sorts of profound changes that can occur. (Clemons, 1991) Following the deregulation of the United Kingdom's financial services industry in October of 1986, a new technology was introduced to the ISE. SEAQ, the Stock Exchange Automatic Quotation system, enabled stock purchasers to immediately display the prices offered by a dozen or more market makers for a particular security. Until SEAQ, customers had depended on securities firms, acting as middle-men, to direct them to the best source for a given stock. Needless to say, the middle-men were not necessarily as committed to finding the best possible price as their clients might have hoped.

The changes catalyzed by SEAQ were rapid and far-reaching. Trading could now be carried out remotely, from private rooms in the Exchange building, away from the confusion of the trading floor, or from other cities and countries, for that matter. Trading in foreign securities soon came to represent more than half of the exchange's total volume. The securities firms that had acted as middle-men for purchases soon found themselves losing money at a brisk clip, as their former customers used the new system to circumvent them. Clemons sees the situation as one likely to be repeated in other industries in the future: specifically, he suggests that the refinement of

coordination technology bears "a clear and overwhelmingly depressing message concerning the future of financial intermediaries." (Clemons, p. 10) SEAQ did much more than lower the cost of doing business on the ISE. It increased the overall volume of products and firms on the exchange, changed the geographical playing field, and made obsolete the services of an entire category of participant. IT changed the structure of the market. Clemons identifies the firms who are likely to benefit from electronic markets as those that focus on eliminating market imperfections. The "losers" in electronic markets, will be those firms that have relied on such imperfections to sustain their business.

In hierarchies, managerial control, rather than market forces, dictates how goods and services are transferred between a purchaser and one supplier. Buyers are linked by computers and telecommunications technology to a predetermined source for the product or service in question. Although this arrangement forfeits the access to multiple providers that markets feature, it eliminates all the costs associated with identifying and doing business with more than one firm. For some firms and some industries, this is a worthwhile tradeoff.

Malone and Smith (1984) summarize the cost tradeoffs between markets and hierarchies as shown in Figure 3.1:

<i>Coordinating mechanism</i>	<i>Production Costs</i>	<i>Coordination Costs</i>
Markets	Low	High
Hierarchies	High	Low

Figure 3.1 Relative Costs of Markets and Hierarchies

"Low" and "high" are only relative measures within cost categories. The basic notion conveyed by the chart is that as customers move from one to many suppliers, the cost of coordinating business rises, and conversely, as the number of competing suppliers falls, production costs tend to rise because price competition no longer encourages firms to cut production costs. From this analysis, it follows that if coordination costs are decreased (by IT or some other factor) customers will naturally tend to favor markets, because they will pay lower prices without paying as much in coordination costs.

In addition to coordination costs, two other factors, *asset specificity* and *complexity of description* influence whether customers will favor markets or hierarchies in a given industry. (Malone et al., 1987) A good or service exhibits asset specificity with regard to a particular customer if it cannot be readily used by another customer for the same application. Categories within asset specificity include *site specificity* (which describes a good or service that is only useful to a customer at a particular location), *human asset specificity* (exhibited by specialized human skills that are not transferrable to other uses), and *time specificity* (characterizing goods or services whose value to the customer depends on delivery within a specified period of time).

Complexity of description is simply the amount of information that must be transferred between buyers and sellers of a given good or service in order to describe its attributes in sufficient detail that buyers can make an informed choice between competing suppliers. Malone et al. suggest that stocks and bonds as examples of products with low complexity of description, and large business computer systems as examples of high complexity of description (Malone et al., p.486).

Malone et al. argue that as either asset specificity or complexity of description rises, so does the likelihood that trade in a particular good or service will be coordinated by a hierarchy instead of a market. Figure 3.2 shows this relationship between asset specificity, complexity of description, and the choice of coordination scheme.

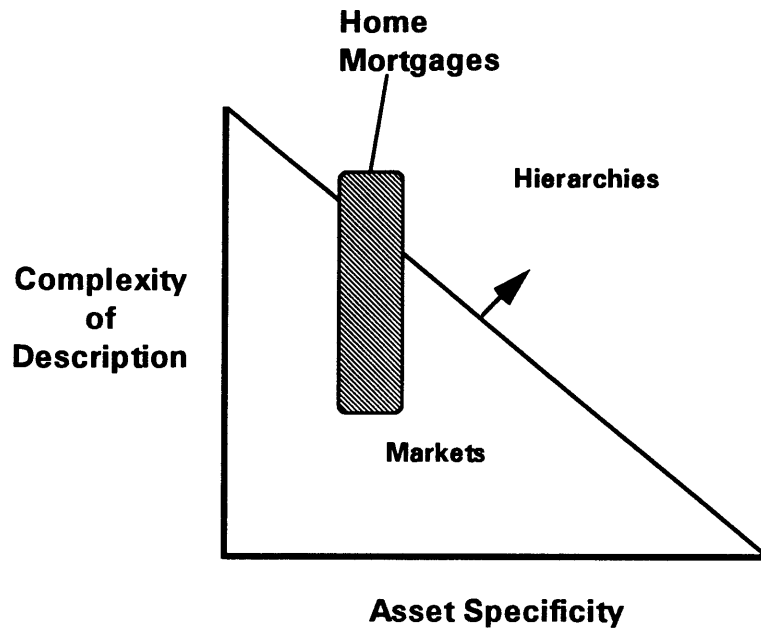


Figure 3.2 Product attributes affect choice of coordination scheme

The shaded box represents the approximate location of home mortgages relative to the two axes. Mortgages exhibit low relative asset specificity. A loan for \$100,000 can buy \$100,000 worth of home equally well in virtually any real estate market. The shaded area is not at zero asset specificity because often there is an aspect of time specificity when a potential home buyer must secure a loan quickly in order to close on a house that might otherwise go to another bidder. As indicated by Figure 3.2, mortgages' complexity of description shows a larger range. Many loans, chiefly the traditional fixed-rate, thirty-year variety, are easily described, such that the average home buyer using an amortization table or financial calculator can readily determine

monthly payments, interest charged, and principal paid at any stage in the life of the loan. Other loans are much more complex, such as ARMs indexed to volatile standards. Such programs require much more information to be passed between mortgagee and mortgagor prior to closing the loan.

The arrow in Figure 3.2 represents a general trend that Malone identifies: as coordination technology improves the speed and cost of moving information between buyers and sellers, trade in goods and services with higher relative asset specificity and complexity of description will begin to be coordinated by markets rather than hierarchies, as the additional costs associated with markets are outweighed by the price benefits customers can achieve by shopping around. Although there has always been a market for home mortgages, for most home buyers it has been a local one, due to the high degree of effort required to explore loans from lenders outside the local area. CLOs simplify this process, helping loan shoppers consider more information from more lenders, thereby decreasing the effort associated with both vendor selection and complexity of description, and pushing the industry farther out along the spectrum lying between pure hierarchies and perfect markets.

Malone et al. argue that producers are, in general, highly motivated to support hierarchies as the coordinating scheme of choice. Producers do not like price competition with other firms which drives down margins and makes them focus more of their resources on controlling production costs and advertising. When linked to customers in a hierarchy, producers experience less uncertainty about their future business and associated cash flows, since customers are in some sense "locked in."

As mentioned above, buyers generally favor markets for offering more opportunities to compare goods and services from different sources, but recognize that the coordination

costs of market participation may be high. Malone et al. suggest that the benefits to buyers will increasingly outweigh the benefits to suppliers, especially as IT drives down the costs of coordination through electronic markets. Malone maps out the evolutionary path that industries will follow from hierarchy or non-electronic market to electronic market. The first step is the *biased electronic market*, where suppliers, often the providers of the coordinating technology, use the technology to push customers toward their product or service, while providing access to other firms' offerings as well. The airline reservation systems SABRE and APOLLO both passed through this phase after they initially included other carriers on their systems. The next step is the *unbiased electronic market*, where all vendors are given equal chance to win over customers based on the merits of their goods and services. Malone et al. suggest a third and final evolutionary step, the *personalized electronic market*. A complication that may accompany the advent of electronic markets is that customers may find that they now have more product and vendor information than they can possibly search through. A personalized electronic market provides decision support for customers facing such a situation, possibly in the form of a search facility, whereby customers can specify certain selection criteria, and leave the task of comparing those criteria with voluminous vendor offerings to a computer.

3.2 Summary of General Model

The General Model of Electronic Markets is summarized below:

- *Electronic markets* coordinate the flow of goods and services via supply and demand; *electronic hierarchies* are coordinated by managerial direction.
- On a relative scale, production costs are generally higher in hierarchies, while coordination costs are higher in markets.
- All other things being equal, customers will favor markets, producers will tend to favor hierarchies.
- *Asset specificity* and *complexity of description* are two key factors affecting the likelihood that a market or hierarchy scheme will prevail in a particular market. Both factors can be influenced by IT.
- There is a trend toward electronic markets, away from hierarchies, driven by technology and customer preferences.
- Firms that exploit market inefficiencies in order to prosper will likely be hurt by this trend.
- Firms that focus on eliminating market inefficiencies by initiating, implementing or participating in electronic markets are likely to prosper.

IV. Examples of Computerized Loan Origination Systems

This section presents an account of the experiences of five leading CLO systems, beginning with First Boston's Shelternet, the first commercially operable CLO. Rennie Mae was developed by the Realtors' trade association as a non-profit service to their members, but soon was transformed into a successful for-profit venture. Citicorp's Mortgage Power Plus is particularly interesting as a "one-lender" system. Prudential developed their system, CLOS (said to rhyme with "hose"), as an enticement to potential real estate franchisees. Planning Research Corporation's LoanExpress was an effort to leverage the firm's success selling multiple listing terminals to Realtors, and was distinguished by its rapid retreat from loan origination. In this section, each system's initial functionality and scope of operations is recounted, as well as some of the details of system implementation and the changes that were made in the systems over the years. In Section V, the systems will be considered in the context of the theoretical framework set out in Section III.

4.1 Shelternet

Parent: First Boston Capital Group

4.1.1 Functionality and Scope of Operation

Shelternet was developed to be a nationwide automated network offering home buyers access to mortgage financing from a wide variety of originators from across the country. At its peak in 1985, Shelternet processed approximately \$1 billion worth of home mortgages, from 125 originators to borrowers in 44 states, using 140 real estate brokers' offices as the points of contact (*The Economist*, 1986; *Money*, 1986). In addition to having the greatest geographical scope, Shelternet was one of the few CLO

systems that took borrowers through all five steps of the mortgage process: lender/loan selection, application, pre-qualification, underwriting, and origination. Shelternet received considerable publicity in the literature on strategic information systems. (Ives and Learmonth, 1984; Wiseman, 1985; Kemerer and Sosa, 1991).

Shelternet took as input a borrower's financial data, the cost of their intended home purchase, estimations of homeowner's insurance premiums and property taxes, and the amount of money the borrower had available for a down payment and closing costs. The system applied this information to various loan programs, and could immediately generate monthly payments, amortization schedules, closing costs, private mortgage insurance premiums, and even the tax implications to the borrower. Within an hour of taking an application for a selected loan, the system could pre-qualify the borrower, issuing a loan guarantee good for 60 days. The system then automatically generated and mailed processing documents, such as appraisal requests and salary verification forms, to the underwriter. Loan processing took 15 to 20 days, during which time Verex Corporation, a private mortgage insurer under contract with Shelternet, would assess the loan and either approve or reject it for insurance. If the loan closed and was approved for insurance, Shelternet would then buy it from the originator and sell it to an investor. Shelternet typically owned each loan for approximately 15 days.

4.1.2 Implementation

Shelternet was developed by Andreas V. Kissal in the late 70's, while he was working for the mortgage finance subsidiary of a construction company (LaGesse, 1984). First Boston, the investment banking firm, purchased the system from Kissal in 1981, and subsequently invested roughly \$10 million in the network and their new data center in Tarrytown, NY. The software was written almost entirely in BASIC, and ran on IBM

personal computers that had been modified to include 1200 baud internal modems. The personal computers, which were located in real estate brokers' offices, dialed into First Boston's IBM 4381 mainframe over Tymnet, the public packet-switched network. First Boston developed the project in secret, presumably to gain competitive advantage and defer the negative reaction from mortgage bankers who were customers of other First Boston products or services. As late as a year prior to roll-out, First Boston representatives denied the project's existence (Guenther, 1983).

Shelternet was tested in the real estate markets of Atlanta, Minneapolis, and New Jersey. The system was rolled out nationally in April of 1983 (Brownstein and Lore, 1984). The fee structure to member Realtors was as follows: \$16,000 initiation, which included the hardware, software, and marketing materials, \$100 per hour usage fee, \$500 staff training fee, \$100 per month maintenance. Offsetting these fees are the origination fees to the borrowers, which in the traditional lending process would go to a hometown lender or mortgage banker. A broker charging one point on a \$60,000 loan would collect \$600 (Guenther, 1983).

Most sources agree that Shelternet was originally marketed to Realtors as a conduit to connect them (and their clients) directly to the capital markets, bypassing mortgage lenders in the process (LaGesse, 1984). Kissal, hired by First Boston to run the network, publicly disputed that the system was designed to exclude traditional mortgage lenders from the loop. What is certain is that First Boston met with enormous resistance from the mortgage banking community, which initiated a boycott of First Boston and Verex's services (Basch, 1985). The roll-out also raised regulatory issues, regarding the legality of real estate brokers accepting fees for loan originations.

4.1.3 System Evolution

Either to ameliorate the mortgage bankers' concerns or simply to provide more primary mortgage funds for the network, First Boston quickly tempered its revolutionary stance, focusing on providing service to the traditional mortgage lenders and selling the software to other network managers. By 1986, private-label versions of the system were in operation in the realty offices of Coldwell Banker, Century 21, Better Homes and Gardens, Finance Partners and Realty World, who together accounted for 30% of the residential market (Nelson, 1986). Shelternet proper originated \$800 million in home mortgages in 1984 (Nelson, 1986), \$1 billion in 1985, and \$650 million in 1986. By 1987, the system's origination rate had dropped 50% since the peak, and First Boston cut the Shelternet work force by 20% (*National Mortgage News*, 1987). By the end of 1988, the system had been repositioned to deal solely with the secondary market, acting as a conduit between originators and investment banks wishing to sell mortgages to their clients (Petramala, 1988; Miller, 1992).

4.2 Realtors National Mortgage Access System

Parent: American Financial Network, licensed from National Association of Realtors

4.2.1 Functionality and Scope of Operation

The Realtors National Mortgage Access System, nicknamed "Rennie Mae," was developed by the National Association of Realtors (NAR), the US's largest trade organization, for use by member brokers. As originally conceived, Rennie Mae was to be a non-profit service that would automate the first two stages of the home mortgage process, lender/loan selection and application. The system also allowed loan applicants

to track the progress of their applications. Unlike Shelternet and systems like it, Rennie Mae initially left the processing, underwriting, origination, and securitization tasks to traditional mortgage lenders. Although intended for use by NAR members across the US, after three years of operation only a few states had many subscribing Realtors. However, despite this limited geographical presence, Rennie Mae processed \$182 million in home mortgages in 1987 (Roosevelt, 1988). By 1990, the system had expanded to more than 100 lenders, 2,000 loan programs, and over \$1 billion in loan volume (Finkelstein, 1991).

In its initial configuration, Rennie Mae was essentially analogous to the Multiple Listing Service that many local realty boards use. It allowed borrowers to compare rate and fee information, sorting loan programs by type, rate, loan-to-value ratio or other criteria. Once a loan was selected, an application could be transmitted using a standard form. The system sent Federal Express an electronic order to pick up the original signed documents and deliver them to the lender. From then on, the loan was a matter between the lender and borrower.

4.2.2 Implementation

NAR developed the system in cooperation with Salomon Brothers, at a cost of approximately \$3 million (Guenther, 1986). Rennie Mae was written in C in order to be compatible with a broad base of business computer platforms. General Electric Information Systems Company and Zebec Data Systems developed the proprietary network backbone. Rennie Mae ran on IBM and Apple desktop computers, as well as the MLS terminals that many Realtors had already installed.

The system's roll-out did not go smoothly. The system's pilot installation was finally announced more than two years after the NAR made its initial system announcement. Rennie Mae was first tested in San Diego, with 40 Realtors and 25 lenders participating. The response was favorable, and a limited national roll-out, into five or six key markets was planned.

The fees associated with Rennie Mae were initially quite modest, in keeping with the system's positioning as a "public utility" focused primarily on supporting NAR members. The fee to connect to the network was \$50, and there was a \$10 per month use fee. Status check requests cost \$5 each, as a disincentive to apply for multiple loans (Bender, 1985).

4.2.3 System Evolution

Shortly after the San Diego pilot, in late 1985, NAR signed an exclusive licensing agreement with American Financial Network (AFN), a Dallas based firm, to market and manage the system. The licensing arrangement represented a major shift of focus for Rennie Mae, from non-profit to for-profit and from listing service to origination system. A complex, unorthodox fee structure was adopted to insure profitability for AFN and circumnavigate regulations regarding origination fees collected by agents not approved by federal licensing boards. Lenders agreed to take 70 basis points off their origination fees which would instead be paid to AFN, which in turn would distribute up to 50 basis points to the originating Realtor. So, on a loan of \$100,000 originated through Rennie Mae, AFN would get \$700, \$500 of which it would pay the Realtor.

Rennie Mae's strategic shift came at a time when other networks, such as PRC's LoanExpress and Shelternet, were backing away from direct participation in the

origination process. AFN felt that Rennie Mae would be less susceptible to resistance from the traditional mortgage lending community because the parent company, unlike, for example, Shelternet's sponsor, First Boston, was not in the business of originating loans. Considering the system's success and expansion, it appears that the firm was right.

4.3 Mortgage Power Plus

Parent: Citicorp Mortgage

4.3.1 Functionality and Scope of Operations

Among the networks examined here, Mortgage Power Plus is the most biased toward one particular lender: Citicorp Mortgage, the only lender carried on the system. By 1990, it was also the fastest, returning a legally binding loan agreement to the Realtors' offices in 15 minutes and closing many loans in three days.

Citicorp Mortgage's Mortgage Power program, minus the "Plus," was started in 1981 as an automated system to originate low documentation jumbo loans at an accelerated pace to back the Citicorp parent's private mortgage-backed securities. Jumbo describes mortgages that do not conform with Freddie Mac or Fannie Mae guidelines because their balances exceed the limits established by the quasi-public secondary market makers. By 1989, Mortgage Power had 4,000 member Realtors in 37 states, who processed approximately 75% of Citicorp's \$11.9 billion home mortgage business. Loan closing took from 12 to 15 days (Miller, 1989).

In 1989, Citicorp initiated a pilot program called Mortgage Power Plus, designed to shorten the time required to close loans even further. The idea behind the enhanced

functionality was an electronic linkage between the Mortgage Power mainframe and credit verification firms. Immediately upon receiving an electronically transmitted application, the system automatically pulled the applicant's credit history from several sources. If the credit and financial information were verified and met the loan requirements, the system sent a binding loan guarantee, conditional on further verification of all information provided. Three days later, the loan was closed through the mail.

Citicorp referred to the Plus system as "our most junior underwriter." The 30-40% of applications that were not immediately guaranteed by the system's approval routine were passed to human analysts for further scrutiny. Often, these applications were approved in just a few days. After the pilot, Mortgage Power Plus became available in Pennsylvania, Massachusetts, and Florida.

4.3.2 Implementation

Mortgage Power and the enhanced Plus system is perhaps the CLO provoking the most opposition from industry players and regulators. Perhaps because the network was 1) very successful and 2) limited to loans offered by the parent, citizen's groups and other lenders labelled it "anti-competitive," and accused Citicorp of price-gouging, especially on loans for lower income buyers (*BNA's Banking Report*, 1990). Mortgage Power also became the focal point for the regulatory dispute over brokers receiving fees for selling properties and directing buyers to loans. In legalese, Citicorp was accused of violating the principle of dual agency, meaning that they represented two parties with conflicting goals. In the press, one group, Citizen's Action, called Mortgage Power "an elaborate kickback scheme." Citicorp withdrew from the Mortgage Bankers Association over the CLO dispute.

4.3.3 System Evolution

Despite the external resistance, Mortgage Power was very successful, originating more loans than any other network. In 1991, Citicorp underwent a massive restructuring, and Citicorp Mortgage was dissolved. Home financing came under the aegis of the regional Citicorp consumer banking operations. Citicorp publicly announced that the network would not be abandoned in the changeover (Sichelman, 1991).

4.4 Computerized Loan Origination System (CLOS)

Parent: The Prudential Real Estate Affiliates

4.4.1 Functionality and Scope of Operations

In 1987, The Prudential Insurance Company (Pru) announced it was going into the real estate franchise business, and that by 1993 it would sell 3,000 franchises, placing it between Century 21 and Coldwell Banker in number of member offices (Sichelman, 1987). One component of Pru's franchise strategy was a comprehensive computerized broker support system that franchisees would be required to install and use. One of its subsystems was CLOS, an electronic mortgage network that gave the prospective home buyer access to loan programs from different lenders. CLOS supported the first three steps of the home financing process: lender/loan selection, application, and pre-qualification. In January of 1988, Prudential Real Estate Affiliates (PREA) had 180 members and CLOS went into operation, carrying six national lenders (Roosevelt, 1988). By 1992, PREA had installed CLOS in 700 local realty offices and had expanded the lenders carried to include regional players, so that in any given office a

home buyer might have access to loan programs offered by three to five lenders (Thompson, 1992).

CLOS' loan selection function allowed borrowers to enter selection criteria; an adjustable rate mortgage, the lowest closing costs, or lowest monthly payments, for example. The system would then display, anonymously, the loans that best matched the specified criteria. Once a loan program was selected, the borrower could then transmit an application electronically. Approval came in 2 to 4 days and closing in 20. Many loan documents were not transmitted electronically. Underwriting and Closing documents were handled by the selected lender.

4.4.2 Implementation

PREA spent \$3.5 million developing the system, which runs on 286 and 386 DOS-compatible personal computers. The software was developed and is maintained by a third party, Interlink.

CLOS is unique among electronic mortgage networks in that it was developed as a tool to help its parent get into the real estate business, rather than the mortgage lending or brokering business. Pru was a latecomer to the franchise market, and as such, needed something to lure top franchisees into its stable. CLOS was the answer. The network was included in the franchise purchase price, which was "in the low 20's." There were no transaction or monthly fees to the Realtors. Lenders paid PREA \$450 for each application transmitted, and PREA forwarded \$100 of that to the originating franchisee, thereby attracting negative attention from the same mortgage bankers, regulators, and citizen's groups that had been badgering Citicorp and the other CLOs since 1981. Like Citicorp, PREA obtained a letter from HUD stating that their fee structure was not in

violation of the Real Estate Settlement Procedures Act of 1974, but the controversy continues.

4.4.3 System Evolution

Considered to be a member of the so-called "second-wave" of CLOs, the Pru system is interesting in that it has changed little, except for scale, since its inception.

4.5 LoanExpress

Parent: Planning Research Corporation, a subsidiary of Emhart Corp.

4.5.1 Functionality and Scope of Operation

Planning Research Corporation (PRC) was already successful as NASA's chief supplier of ground-based systems and one of the largest vendors of Multiple Listing Services to local realty boards, so it seems somehow logical that they would try to bring space-age technology to mortgage banking. LoanExpress, PRC's mortgage network, was originally developed as a support service for the first four steps of the home financing process: lender/loan selection, application, pre-qualification, and underwriting. The system was introduced in September of 1983 and by the end of 1984 carried information about 350 loan programs from 40 lenders into more than 2,000 Realtors' offices (Mariano, 1984). There, home buyers used the system to select a loan, and then had to visit the local LoanExpress office to fill out an application and other processing documents. The system expanded from the Washington DC/Northern Virginia market into Tacoma, Phoenix, and Memphis.

4.5.2 Implementation

LoanExpress was developed in-house, and ran on the same terminals that PRC had already installed in 12,000 realty offices to run their MLS system. Data was carried over the GTE Telenet network.

The system was well-received initially, due in part to the fact that for MLS users, there was no cost associated with hardware. Realtors paid \$20/month, borrowers \$150/application. Participating lenders paid \$450/month to be listed plus 1% of the value of any loans (i.e. 1 point) originated over the system. Borrowers liked the system primarily for the wide range of loans it could access quickly.

4.5.3 System Evolution

An interesting, though minor, change in the system came when PRC decided to list loans by lender name rather than anonymously as it had originally. The rationale behind this change was that it would encourage local lenders to participate if they felt that name recognition would give them a marketing advantage over other lenders without a local presence (Naylor, 1985).

In September of 1985, PRC announced a major strategic shift for LoanExpress. Mortgage origination activities were completely abandoned, leaving the network as an automated rate listing service. PRC spokesmen described origination as being outside of their firm's core competence. The refocused network continued to expand into new markets, but positioned as a customer-service enhancement for Realtors, as opposed to an origination tool.

4.6 Summary of CLO systems

Table 4.1 summarizes the features of the five CLO systems profiled in Section IV.

	First Boston's Shelternet	AFN's Rennie Mae	Citicorp's Mortgage Power Plus	Prudential's CLOS	PRC's LoanExpress
Year Started	1981	1985	1989	1988	1983
Peak Annual Loan Volume (Approx)	\$1 Billion	\$1 Billion	\$9 Billion	\$120 Million	\$250 Million
Parent Firm	Investment Bank	System Provider	Commercial Bank	Insurer	System Provider
Peak # of lenders	125	100	1	Approx. 5 per geog. market	40
Strategic History	Originally designed to circumnavigate other lenders, who boycotted parent firm in response. Repositioned to include other lenders. Abandoned originations in 1986, focusing on wholesaling in secondary market.	Developed by Nat'l Assoc. of Realtors as a non-profit loan listing service to members. Sold to AFN after pilot program, shifted to comprehensive for-profit origination network.	Conceived of and operated as a one lender system, facilitating complete origination process for Citicorp loans. Met with much regulatory and citizen's group resistance, but very successful nonetheless.	Developed to lure franchisees to the newly formed Pru Real Estate subsidiary. Supports first three stages of origination process.	PRC tried to leverage experience with Multiple Listing Service terminals. Began as comprehensive origination tool. After two years, refocused as simple interest rate listing service.

Table 4.1

V. Analysis

This section applies the theoretical framework presented in Section III to recent developments in the market for home mortgage financing. First, the general model of electronic markets is applied to the industry in question, generating a set of predictions regarding the mortgage market's various attributes including structure, level of efficiency, and the activities carried out by market participants. Next, three theoretical models of the mortgage market are developed, each representing a stage on the evolutionary path toward electronic coordination. Finally, the systems profiled in Section IV are considered in the context of the general model and the three evolutionary models, enabling an assessment of the validity of the predictions put forth at the beginning of the section.

5.1 The General Model Applied to Mortgage Banking

Until CLOs came along, the primary lending activity of mortgage banking could be described as being coordinated by a "local market" dominated by intermediaries. Generally, prospective home buyers chose among the loan programs of nearby lenders, with guidance from newspaper advertisements, Realtors, or possibly mortgage brokers. In essence, even mortgage bankers could be considered to be intermediaries, channelling investment capital from the secondary market to borrowers.

It is not surprising that electronic markets and hierarchies became an issue in mortgage finance. For one thing, the market was characterized by two critical imperfections. First was the geographic fragmentation of the market. Price competition was intense primarily among neighboring lenders. A particularly low rate offered by a lender in California would pose little competitive threat to a lender in Philadelphia. Second, the

aforementioned intermediaries were able to be quite profitable acting as middle men between the huge pools of investment capital in the secondary markets and home buyers. In some cases two layers of intermediaries, primary lenders and brokers, took a share of the profits generated by loan originations, leading to higher origination costs to borrowers than would be the case if borrowers had more direct access to the capital markets.

Another factor favoring electronic coordination of primary mortgage lending is the nature of the product being sold. From the beginning of the value-added chain to the end, mortgage banking is concerned with managing only one resource: information. Fund transfers, applications, underwriting, monthly payments---all are just in essence transmitting or verifying information.

It may be beneficial to briefly define what is meant by electronic coordination of this market. In an electronic market for home mortgages, prospective borrowers would be able to use computer technology to search through and compare various loan programs from a wide variety of lenders. In an electronic hierarchy, these same borrowers could compare all of the loan programs of one lender. Under both schemes, subsequent steps (application, pre-qualification, and underwriting) in the origination process could be automated as well, saving time for the borrower and lender alike. The user hardware in both cases could be found in a Realtor's office, a mortgage broker's office, or in the office of a lender. Most of the systems profiled in Section IV feature systems installed in Realtors' offices.

What changes does the general model developed above predict for the home mortgage market? *First and foremost, it suggests that coordination technology provides opportunities to lessen or alleviate the market imperfections mentioned above.* This

could occur if lenders from across the country included their loans on CLOs. They could then compete with lenders in any locality where the CLO was available. A related effect of electronic coordination would be a significant reduction in the search effort required on the part of loan shoppers to compare a larger number of available loans. This may seem like a relatively simple effect. However, it would push the industry, which is characterized by a great variety of available products, but no standard method of comparison, much closer to a perfect market.

It also follows from the general model that there will be fundamental changes in the market's structure catalyzed by electronic coordination. The model predicts that financial intermediaries, in this case mortgage brokers and mortgage bankers, are threatened by electronic coordination, and should expect to be hurt or even made obsolete by electronic markets. Furthermore, the model suggests that managers who take advantage of electronic coordination may have some initial competitive edge over their counterparts who do not.

Finally, the model predicts that customers, in this case borrowers, will be driven by their desire for lower interest rates and closing costs to favor electronic markets over electronic hierarchies and other forms of industry coordination. If this prediction holds true, there should be a migration away from the traditional loan selection methods mentioned above, through electronic hierarchies and biased electronic markets, to CLOs providing unbiased, efficient national markets for home mortgage financing. This should occur despite producers' (lenders') wish to establish hierarchies that secure a noncompetitive distribution channel for loans.

5.2 Evolutionary Models of Electronic Mortgage Markets

No matter how powerful this trend toward electronic markets may be, it simply cannot revolutionize a multi-billion dollar industry overnight. The changes will be at least incremental, if not gradual. Section II presented a diagram of the "traditional" mortgage origination process. In order to facilitate understanding of the evolutionary process that is a likely byproduct of the general model, and to provide a framework in which to analyze the CLOs that were described in Section IV, three market diagrams that are alternatives to the traditional model are presented. Each represents a step along the evolutionary continuum, away from hierarchies, middlemen, and localized markets and toward efficient competition in an electronic market. It is important to understand that these market prototypes are neither discrete nor exclusive possibilities, but rather signposts along the evolutionary journey. It is likely that some CLOs will exhibit characteristics of more than one model.

5.2.1 CLO1: The Loan Listing Service

At this stage, only the lender and loan selection process is automated by the CLO system. Application, pre-qualification, underwriting and closing all occur just as they did under the traditional scheme: through the time consuming, personnel-intensive transfer of reams of paper documents. Figure 5.1 diagrams the CLO1 process, and shows a CLO-equipped Realtor brokering the loan. While a traditional mortgage broker could subscribe to a CLO and broker loans via that channel, there are several reasons why CLO1 shows a Realtor performing this function. The first reason is the simplest: most CLOs have thus far been targeted at Realtors. System operators and lenders favor this approach because it moves the CLO as a marketing mechanism

CLO1: Loan Listing Service

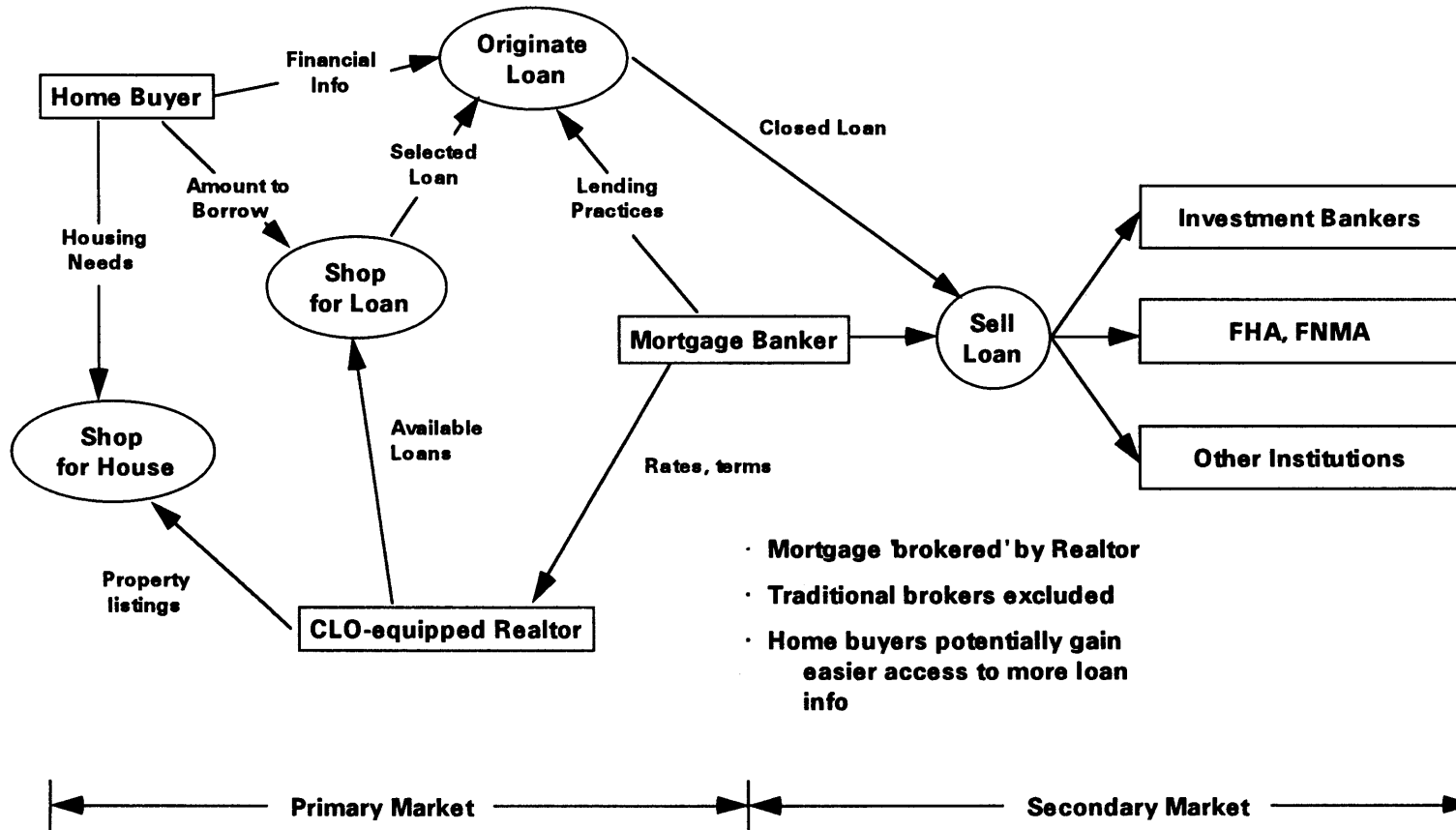


Figure 5.1

to the point of sale of the home purchase that initiates the need to borrow in the first place. This in theory gives the CLO an advantage over traditional marketing channels like brokers and newspaper advertisements, because it gets to the prospective buyer first.

A more important reason for diagramming the CLO1 process this way is that it shows that even at this initial step in electronic market evolution, an intermediary entity's business is hurt or made obsolete. Simple logic suggests that if home buyers can compare many loans from many lenders in their Realtor's office, it is unlikely that they will expend the money and effort to visit a mortgage broker's office to do exactly the same thing, unless the broker provides some other incentive. CLO1 speeds up only lender selection, and therefore does not offer a significant time savings over the traditional scheme from beginning the mortgage search until closing a loan. The major benefits to consumers are the amount of information made more readily available and presumably a better decision resulting in a cheaper loan.

There are two key benefits to participating lenders. As mentioned above, the marketing of their loan programs now occurs at the point of sale, conveying a competitive advantage over non-participants. Also, CLO1 offers lenders the chance to market their programs more widely without incurring bricks-and-mortar expense for new loan offices. Apart from a shift in their marketing focus, CLO1 does not significantly change the activities of the participating lenders. Once a prospective borrower selects them, the process is basically the same as the traditional model.

5.2.2 CLO2: Application Processor

In the CLO2 model, as shown in Figure 5.2, much more of the origination process is automated, and information flows both ways between borrower and lender across the CLO. After the prospective borrower selects a lender and loan, he or she then uses the CLO to transmit an application back to the lender. Document requests, necessary to verify the information provided on the application are also carried over the network.

Under the CLO2 model, some lenders may pre-qualify borrowers, issuing a legally binding commitment to loan money at a particular rate and under certain terms, provided that the information in the application and the property in question are verified. This pre-qualification can be a powerful bidding tool for home buyers, serving as proof that their offer on a home is backed by proven borrowing power. Another benefit to mortgagors using CLO2 is that processing time is decreased significantly in comparison to the traditional process.

CLO2 includes the features and implications of CLO1, plus several others. Much of the work associated with originating loans, including taking applications and processing document requests, moves from the lender to the Realtor. In exchange for taking on this added responsibility, the Realtor receives some portion of the origination fees assessed by the lender to the borrower. An additional bonus to the borrower is that he or she can now make status requests over the CLO. Because the system tracks loan status, the reply can be generated automatically, decreasing labor effort for the lender and providing a quicker response to the borrower. It is also more convenient for the borrower to have the Realtor acting as a clearing house for information about the status of both purchase bids and loan requests. Lenders benefit because they can originate

CLO2: Application Processor

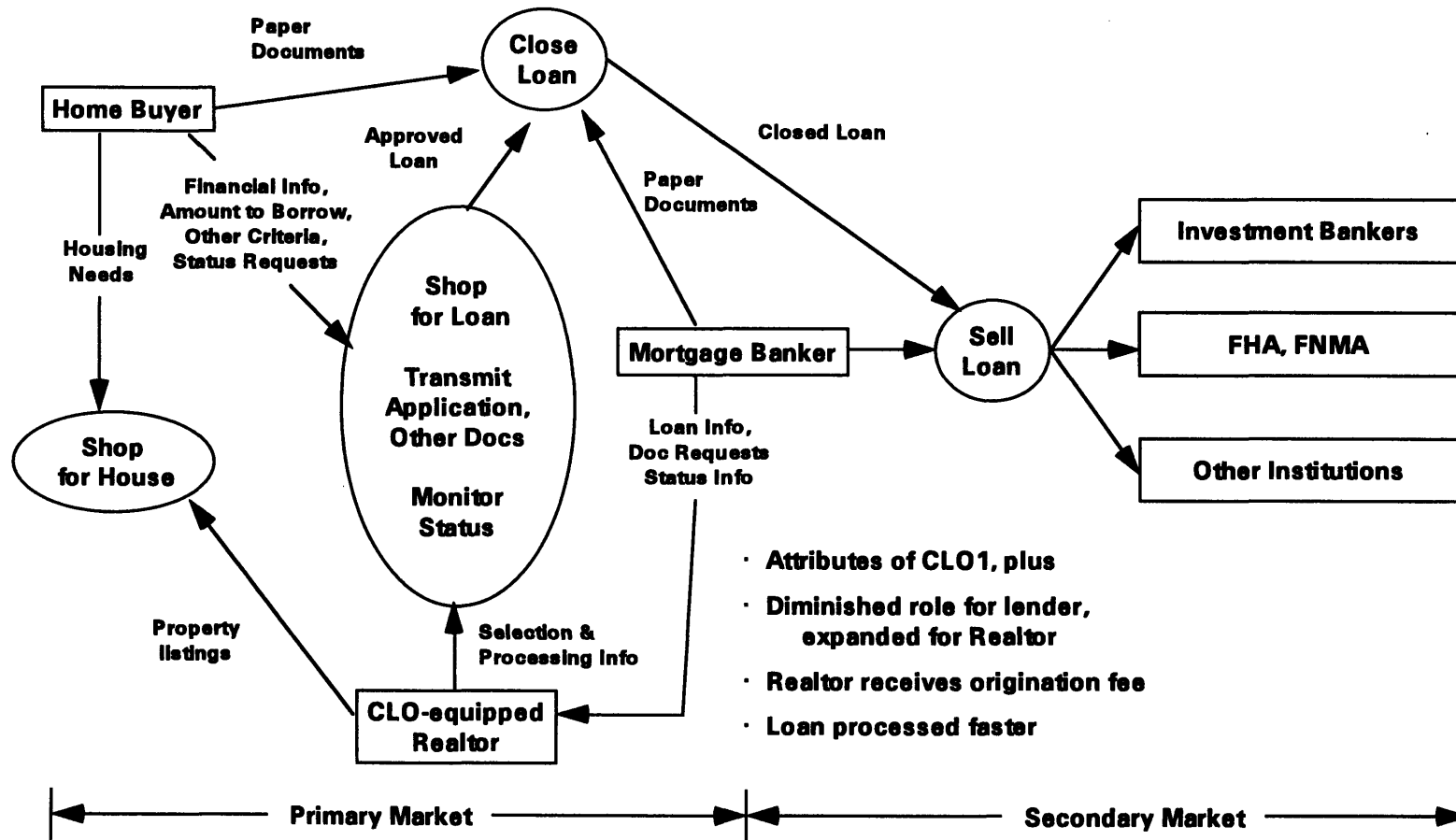


Figure 5.2

mortgages faster and more economically. Much of the approval process is automated by including decision logic in the system. Credit checks are conducted via electronic ties to credit service bureaus. Although the final decision to approve or reject a loan application remains in the hands of a human underwriter, the CLO2 system allows the human participants in the process to spend less time coordinating information, freeing them to spend more time on individual loans or processing a higher volume of applications.

5.2.3 CLO3: The Transformed Market

CLO3 represents the ultimate realization of the general electronic market model as applied to home mortgages. The CLO links the Realtor's office directly to investment capital available in the secondary market. The Realtor performs the entire origination, closing the loan using a credit line made available through the CLO operator. The CLO system, in turn, bundles loans for sale into the secondary market. As shown in Figure 5.3, both intermediary entities from the traditional model, mortgage brokers and mortgage bankers, are excluded.

As in CLO2, the Realtor, now the Realtor/Lender, is the conduit for information about both the loan and the home purchase. This model offers faster and cheaper loan processing, because more of the process is automated and there are fewer middle-men handling information.

Should this model be widely realized, it would increase the volatility of the primary mortgage market. Without the layers of middle men to buffer home buyers from fluctuations in the capital markets, interest rates would be likely to rise and fall much

CLO3: Transformed Market

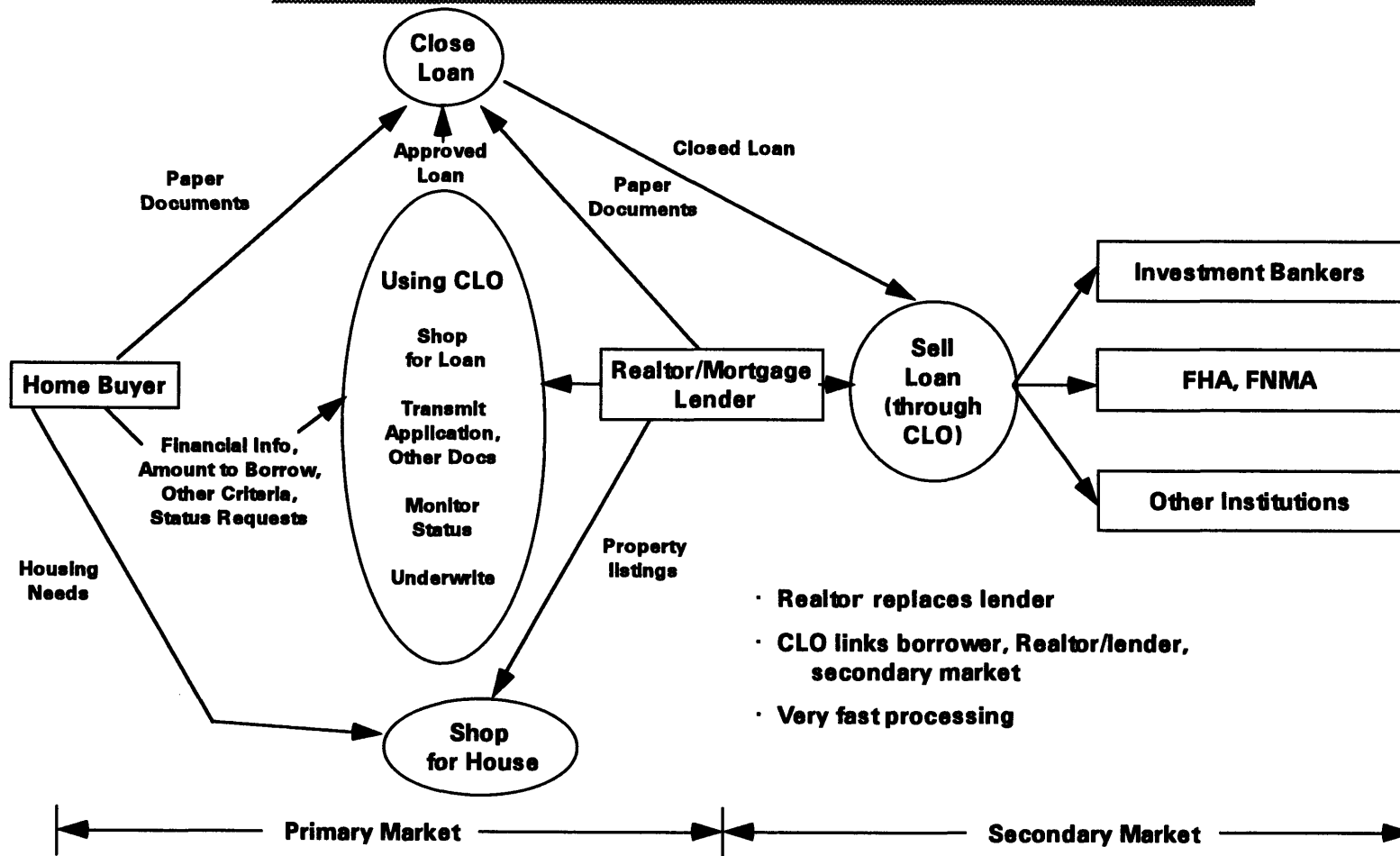


Figure 5.3

quicker than they do in the traditional system.

5.3 The General and Evolutionary Models Applied to CLO Systems

With the theoretical framework of the general model and the evolutionary stages in place, it is time to consider five CLO systems that were introduced in the 1980's. At different times in their operation they have run the gamut from CLO1 to something approximating CLO3. By analyzing these systems, their successes and failures, and the ways their operators chose to position and reposition them, the remainder of this paper will be devoted to determining whether the general model of electronic markets has been and is being borne out in real life, and to the degree that it is, then what developments the model predicts for the home mortgage business in the future.

5.3.1 First Boston's Shelternet

Shelternet was the first CLO to receive much national attention and was therefore the impetus for many other systems and much of the controversy surrounding CLOs in the 1980's. As originally conceived, Shelternet came as close to a CLO3 system as any has since. First Boston, an investment bank, intended to build a direct pipeline between its vast pools of investment capital and home buyers, bypassing mortgage lenders and mortgage brokers in the process (Guenther, 1983). This accounts for the high level of secrecy surrounding the project in its early stages. First Boston probably hoped to defer the negative reaction of traditional mortgage lenders, many of whom were customers of other First Boston services. The mortgage lenders' eventual boycott is just one indication of how serious a threat Shelternet was perceived to be. As mentioned in Section III, an overnight revolution in market structure was unlikely. First Boston had threatened the home mortgage industry with drastic change and the

industry resisted: the middle-men wanted to preserve their positions, the Realtors were reluctant to take on additional work to learn and run the system, and the home-buying public never showed a distinct preference for shopping for mortgages electronically. Shelternet's first repositioning brought the system closer to the CLO2 model: facilitating lender and loan selection and application processing, but keeping traditional mortgage lenders in the loop.

There were aspects of a *personalized electronic market* evident in Shelternet from the beginning: given a prospective borrower's financial data, the system could generate a list of loans that the user might be interested in and qualify for. However, because Shelternet originally carried only First Boston mortgages, *personalized electronic hierarchy* might be a more accurate descriptor. The system's first repositioning, which expanded the loan programs offered to include other lenders, is very much in keeping with the tenets of the general model of electronic markets: there was indeed a powerful impetus to move from hierarchy to market. But, contrary to the model, it occurred not because of pressure from customers seeking a wider variety of alternatives, but instead as a result of pressure applied by competing suppliers who saw their business threatened.

The general model as outlined in Section III makes no provisions for looking at the failure of electronic markets, and as such offers little guidance for assessing the second and final repositioning of Shelternet as a wholesale system dealing solely with customers in the secondary market. All of the anti-CLO forces outlined in Section I are relevant, as are three additional factors. First, Shelternet was expensive to join and use relative to the low or nonexistent costs Realtors paid to refer clients to local lenders, and as such may not have commanded as much interest on the part of Realtors as it might have at a lower price point. Second, it is important to remember that

mortgage banking is not First Boston's primary business, so that when investment banking profits fell in the late 1980's, the primary mortgage lending operation was one of the first activities to be cut back (in the form of a 20% personnel reduction). Third, First Boston was acquired by Credit Suisse. Shelternet's final repositioning may have been to a large extent the result of a new corporate-level conception of the business unit's function.

5.3.2 Realtors' National Mortgage Access System

Rennie Mae initially was slightly less than a CLO2. As indicated in Section IV, it facilitated loan selection and transmitted applications, but went no farther into the origination process. Perhaps seeing Shelternet's chilly reception deterred NAR from choosing a more aggressive posture.

The most interesting thing about Rennie Mae is its repositioning from non-profit to for-profit and from listing service to full-blown origination system at a time when other CLO systems were retreating from origination activities. The strategic shift made Rennie Mae an aggressive CLO2, but the system never generated the level of resistance other systems like Shelternet and Mortgage Power did, perhaps because the parent company was not in the business of making loans, and was therefore not perceived to be as serious a threat.

Another interesting point is that Rennie Mae was developed by the Realtors association. The general model predicts that financial intermediaries will be threatened by coordination technology (Clemons, 1991), but in this case an intermediary is proactively promoting it. This makes sense in the context of the NAR's real mission. They want to sell properties. Providing ready access to financing is a key way that

Realtors can encourage the sale of more properties, thereby generating more sales commission revenue. Via Rennie Mae, Realtors tried to usurp the role of mortgage intermediary in order to promote their core business. It is also possible that they perceived CLOs as a threat and are addressing the problem proactively. It is clear from the economical pricing of the system that it was never intended to make money solely through loan originations (Bender, 1985).

5.3.3 Citicorp's Mortgage Power Plus

Mortgage Power Plus (MPP) is unique among the CLO systems examined here in that it was conceived as and remained an electronic hierarchy rather than an electronic market, carrying only Citicorp loans. Because it was created to produce loans primarily to provide raw material for Citicorp's mortgage-backed securities, MPP is in essence an hierarchical version of the CLO3 model, providing almost direct access to the capital markets and excluding other lenders from the loop.

Because it was perceived to be so completely anti-competitive, MPP met with strong opposition from government regulators, citizens groups, and competing lenders. One group that did not seem to offer much resistance was the borrowing public, who made MPP the most successful CLO in existence. It is hard to imagine that Citicorp would ever seriously consider including other lenders on the system, following the prediction of the general model, unless drastic changes in the system's performance or the regulatory climate took place.

5.3.4 Prudential's Computerized Loan Origination System

CLOS is a solid example of the CLO2 model, implemented with a moderate number of participating lenders by a non-lender firm. Whereas other systems met with some resistance from Realtors for one reason or another, CLOS was conceived as an inducement to Realtors to purchase a Pru real estate franchise. Like some of the others, the CLOS system offered services associated with a personalized electronic market. Borrowers could use the system to screen loans based on their personal selection criteria. The system's designers were committed to providing an unbiased market, and to that end built CLOS as a vendor-blind system, meaning that loans were displayed anonymously until one was selected.

5.3.5 Planning Research Corporation's LoanExpress

Planning Research Corporation's LoanExpress began life as a CLO2 system, supporting loan selection, application, pre-qualification, and underwriting. The system did not, however, alleviate as much borrower effort as other CLO2s, because it required borrowers to visit a PRC office to apply for a loan after selecting one through a terminal in a Realtor's office. Furthermore, LoanExpress carried primarily local loans, so that it effectively automated the existing local markets it operated in, rather than providing a communication backbone for a national market.

PRC's decision to change from listing loans anonymously to listing them by name seems contrary to the general model's prediction that markets will evolve from biased to unbiased forums. The anonymous listings exhibited somewhat less "tilt" than the lender-named listings. This might be interpreted as a victory of sorts of producer needs over customer needs, if it is assumed that customers would prefer an unbiased market.

After just two years of operation, PRC announced a drastic change in LoanExpress' positioning. All origination activities were dropped, moving the system from the high side of CLO2 to a new orientation squarely in the middle of CLO1. Under its new definition, LoanExpress became basically just a multiple listing service, which was PRC's business prior to the system's debut.

5.4 Summary Analysis

An electronic market for mortgage banking has not yet revolutionized the industry in the way the general model suggests. The overall results of the introduction of electronic coordination to home mortgage loan origination have been mixed.

Some of the general model's predictions have been borne out quite clearly. In all five cases, coordination technology drove down the time and effort required on the part of prospective borrowers to select and secure a loan. In Shelternet and Mortgage Power Plus, hierarchies did indeed meet with substantial opposition, but more from competitors than customers. In no cases did a market evolve into a hierarchy. When change occurred, it was in the other direction, as per the model. Although intermediaries are still in business in this industry, in the form of mortgage bankers and mortgage brokers, it's clear that they agreed with the model's suggestion that electronic markets posed a powerful threat to their livelihood.

Other aspects of the model have not been substantiated at all by CLOs. First, there has been no significant outcry in favor of CLOs from home buyers, despite the model's prediction that customer needs would be the key force driving the evolution toward electronic markets. Neither of the most aggressive systems which ventured into the

realm of CLOs continues to exist in that form, although only time will tell what will become of Mortgage Power Plus. It seems likely that mortgage banking, a highly fragmented industry, will require more time before it sees any significant structural changes due to electronic markets. The evolutionary retreat of LoanExpress and Shelternet suggests that the industry, especially the Realtors that would operate CLOs and the home buyers who would benefit from market transformation, is simply not yet ready.

There is no clear evidence that electronic coordination has yet reduced the monetary price of securing mortgage financing. Some would argue that hierarchies, as in Citicorp's case, actually promote and enable higher prices. It is unlikely that electronic markets and hierarchies will have a widespread impact on origination costs and interest rates until CLOs represent a bigger portion of the total market.

VI. Conclusion

Steve Thompson, National Accounts Manager for Prudential Real Estate Affiliates, said he believes that CLOs will become every bit as successful as Multiple Listing Terminals already have, but that we are currently still very early in the acceptance process 10 years after the first systems were introduced. Even after the retreat of Shelternet and other systems, CLO use is on the rise: approximately 31% of the market's sales force now use CLOs (Lewis, 1991).

As CLO use increases, there will be ample opportunities for future research. It will be interesting to see if more efficient markets do emerge, bringing with them lower prices in the form of lower origination costs and interest rates, consolidation of smaller, regional players, and a decline in the fortunes of the industry's intermediaries. Often in modern life, there often exist problems whose solutions must wait for advances in technology. Electronic markets for home mortgages are one instance of a technology waiting for the market to catch up.

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