The U.S. Home Mortgage Markets during 1990-2004 and Financial Institutions Participations: Does Assets Size Matter in Mortgage Participation?

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Abstract

This paper focuses on identifying the major participants of the United States mortgage market and the development of market shares. This paper also examines the development of the market share for major financial institutions—commercial banks, savings institutions and life insurance companies—in one-to-four home mortgages during 1990-2004. ANOVA tests are applied to evaluate the comparative market share performance between commercial banks and savings institutions. The results indicate significant differences in the comparative market share between commercial banks and savings institutions and between commercial banks and savings institutions with assets worth more than $1 billion (U.S.) and less than $1 million (U.S.). The equality of means test –among the large, medium, and small commercial banks—suggests a significant difference in the market share of mortgage loans. Large commercial banks with assets of more than $1 billion predominantly dominate one-to-four family housing loans.

I. Introduction

Real estate affects virtually all aspects of the economy and daily life including, where people work, where people live, and how people earn their livelihood. Worldwide, the value of commercial real estate is about 40-50 percent of the GDP. (Conner and Liang, 203). In the United States, real estate as wealth accounts for about 71 percent of the total fixed tangible asset, with the value of total real estate assets at $11,132 billion (Shilling, 2002, p.5). According to a 1991 report from the Bureau of Labor Statistics, employment from real estate and construction markets accounted for 5.87 percent of the total employment in the United States (U.S.) during 1990.

A study of real estate financing and the character of institutional financiers are important for several reasons: The mortgage market occupies an important position in the U.S. economy. Housing sectors alone contribute approximately 20 percent to the GDP[1].

The housing market in past decades witnessed an unprecedented increase in homeownership and boom. For example, homeownership rate increased from 64 percent in 1994 to 68 percent in 2003 (Liang and McLemore, 2004). At the center of the housing market boom the most important contributors are institutional financial investors—savings and life associations, commercial banks, and life insurances.

More recently, improved risk management tools, along with appealing income generation opportunities, have attracted institutional investors into private equity financing in commercial real estate. Institutional investing (financing) in real estate began with mortgages and direct property and then gradually moved into public securities (Conner and Liang, 2003). The institutional real estate financing (mortgage) industry has

[1]The state of the Nation's Housing, 2002, Cambridge, MA (Joint Center for Housing Studies of the Harvard University).

undergone profound changes since investors made their first commitment to equity financing nearly four decades ago, with the structure and composition of institutional investors in real estate (home) financing experiencing the most changes. Savings and loan associations (S&Ls), were a dominant player in home mortgage market in the 1960s, but no longer continue to be a dominant player. Commercial banks among institutional investors have become a significant source of financing real estate (home) mortgages. Within the sphere of real estate (one-to-four family) home financing, the share of small vis-à-vis large commercial banks is not similar. The development of market shares is highly asymmetric and skewed. Large commercial banks with assets of more than $1 billion significantly dominate home mortgage (one-to four home) loans. This difference deserves an examination. A look at the character and the changes in the behavior and the composition of institutional investors in real estate (one-to-four homes) financing is necessary.

This paper is organized as follows: Section II examines the U.S. mortgage markets and identifies principal participants and their market share in mortgage markets. Section III provides descriptions of major participants of financial institutions and their development of market share in residential (one-to-four) mortgages. Section IV identifies the growth of home mortgages and their market share by commercial banks and savings institutions with different asset categories. Section V provides statistical tests and results from the comparative performance of home mortgage market shares.

II. Mortgage Markets and Participants

Mortgage markets are markets which serve the needs of long term loans for 5, 10 or 30 years. There are two types of real estate mortgages, non-commercial and commercial mortgages. Non-commercial mortgages consists of one-to-four family homes while commercial mortgages consist of multi-family homes, offices, hotels, shopping centers, etc. In both cases, loans are secured by mortgages. That is, all mortgage loans are backed by real estate properties on which loans are provided.

Participants (Players) in the Mortgage Market

Demand side participants

The demand for real estate is a derived demand from the need of individuals, households, firms and institutions. The higher the number of households or individuals, the greater the demand for real estate and mortgage loans. Therefore, individuals, households, firms, and institutions constitute the primary participants of real estate mortgages in the demand side of the market.

Supply side participants

The supply side participants of the real estate mortgage market are lending providers, those who supply funds to help purchase real estate. They are lenders who make a claim on mortgages secured by real estate properties. The supply side participants of the mortgage market can be classified into two categories - the primary mortgage market and the secondary mortgage market.

The primary mortgage market: In the primary mortgage market, the lenders of mortgage loans originate and/or service loans for borrowers (individuals, households, firms). The source of funds is the primary market where lenders compete for business/market-share. The principal lenders of the primary mortgage market are regulated financial institutions, mortgage companies and commercial credit companies.

Thus, the most important participants in the primary mortgage market are financial institutions.

Financial institutions

Financial institutions dominate the U.S. home mortgage market and are the main suppliers of real estate loans. The important lenders of the U.S. financial institutions who actively participate in the real estate mortgage loans are the following:

i. Commercial banks
ii. Savings institutions
iii. Life insurance companies

Secondary mortgage participants: The secondary mortgage market is lenders who buy mortgage loans from loan originators in the primary market, or originate loans through someone else. In this market, loan originators sell loans. That is, once the loan originator (lender) closes the loan process, the mortgage instruments (documents) are a salable commodity and sold in the secondary market. The buyers who purchase the mortgage loans in the secondary market have a claim on the interest and the principal of the mortgage amounts. The primary lenders/participants of the secondary mortgage market are federally supported agencies, mortgage pool and trusts, pension funds, and other insured companies.

Federal and related agencies

Federal and related agencies are suppliers of mortgage loans and constitute a small percentage of the total loans. The participants of the federal and related agencies who are actively involved in the real estate mortgage loans are:

i. Government Mortgage National Association
ii. Farmers Home Administrations
iii. Federal Housing and Veterans Administrations
iv. Resolution Trust Corporation
v. Federal National Mortgage Association
vi. Federal Land Bank
vii. Federal Home Loan Mortgage Corporation

Mortgage and Pool Trusts

Mortgage and pool trusts are the second most important source of mortgage loans in the U.S. mortgage market. The members of the mortgage and pool trusts who participate in the real estate mortgage loans are:

i. Government National Mortgage Association
ii. Federal Home Loan Mortgage Corporation
iii. Federal National Mortgage Association
iv. Farmer Home Administration
v. Private mortgage conduits

Private and others

Private individuals and others constitute the third important source of loans in the U.S. mortgage markets.

In summary, participants of the mortgage market—primary and secondary—can be classified into four broad categories. They are:

1. Major financial institutions
2. Federal and related agencies

3. Mortgage pools or trusts
4. Individual and others

Mortgage loans held by each of the above participants, including the percent of the market share is provided in Table 1.

Table 1: Total Mortgage Loans Held by Various Mortgage Participants and Their Market Share in 1990

Mortgage market participants	**Millions $**	**Percent**
A. Financial Institutions	**1,914,315**	**50.8**
1. Commercial banks	884,826	23.5
2. Savings institutions	801,628	21.3
3. Life insurance companies	267,861	7.1
B. Federal and Related Agencies	**239,003**	**6.3**
1. Government. National Mortgage Association	20	5.32E-06
2. Farmers Home Administration	41,439	1.1
3. Federal Housing and Veteran Administrations	8,801	.02
4. Resolution Trust Corporation	32,600	.08
5. Federal National Mortgage Association	104,870	2.7
6. Federal Land Banks	29,416	.07
7. Federal Home Loan Mortgage Corporation	21,857	.05
C. Mortgage Pool and Trusts	**1,079,103**	**28.6**
1. Government National Mortgage Association	403,613	10.7
2. Federal Home Mortgage Corporation	316,359	8.4
3. Federal National Mortgage Association	299,833	7.9
4.Farmers Home Administration	66	1.75E-05
5. Private mortgage conduits	59,232	1.5
D. Individuals and Others	**530,452**	**14.0**
Total	$3,762,872	100

Source: Federal Reserve Bulletin

Highlights of Table 1

Mortgage participants can be ranked in descending order as:

1. Financial institutions are the dominant player in financing mortgage loans. They contribute 58.5 percent of the total mortgage loans.
2. Mortgage pools and trusts are the second most important participants in the mortgage market. Mortgage pools and trusts held 28 percent of the total mortgage loans.
3. Individual and others contribute 14 percent of the total mortgage loans and held the third position in financing mortgage loans.
4. The U. S. federal government and related agencies are the least significant source of mortgage loans. They hold only 6 percent of the total mortgage loans.

The above feature of the mortgage market is not only true for 1990 but also a reality from 1990-2004. Table 2 shows descriptive statistics of the time for mortgage loans and support the above views.

Table 2: Descriptive Statistics of Major Participants in Total Mortgages during 1990-2004 (in million of dollars)

	Mean	Standard Deviation
Financial Institutions	2,242,354.71	512,750.83
Federal and Related Agencies	327,995.0	66,706.05
Mortgage Pool and Trusts	2,442,652.20	1,091,500.0
Individual and Others	621,128.42	93,245.27

Source: Federal Reserve Bulletin

Table 2 shows that financial institutions and mortgage pools and trusts were the most dominant participants in the mortgage market. The average total mortgages held by financial institutions and mortgage pools and trusts were $2.24 trillion and $2.44 trillion, respectively. The third source of mortgage loans is individual and others.

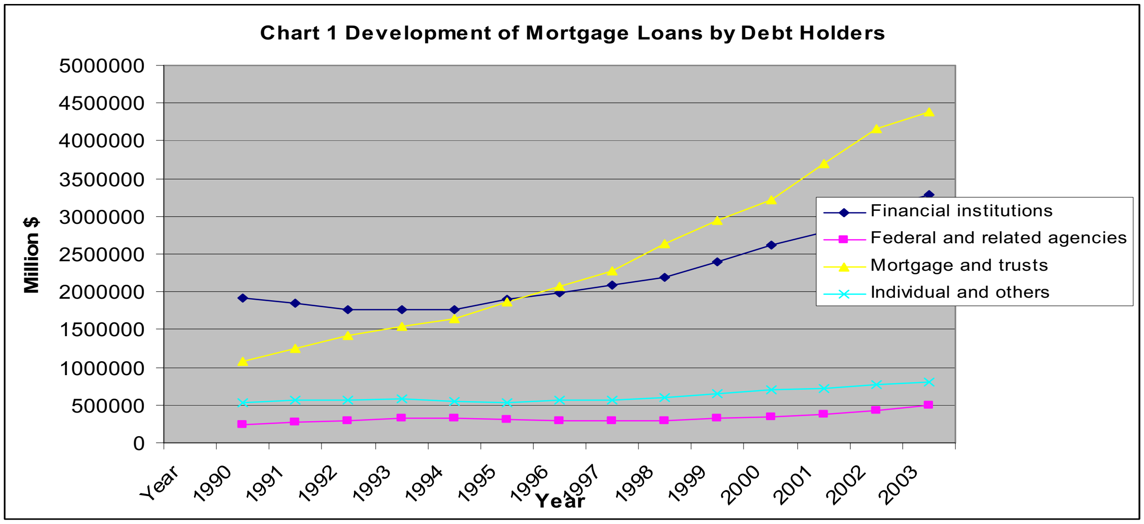
The least significant player in the U.S. mortgage market was federal and related agencies. The average mortgages held by individual and others, and federal and related agencies were $.62 trillion and $.32 trillion, respectively.

The study of relative market share for various mortgage participants between 1990 and 2003 indicate that there had been a noticeable change in the composition of real estate mortgages. Financial institutions were no longer the number one financier. The relative dominance of financial institutions in the market share and in real estate mortgages declined. A comparison of the market share by various mortgage participants during this time period is provided in Table 3. Chart 1 substantiates the undergone changes in the mortgage markets.

Table 3: Mortgages Held by Various Market Participants in 1990 (in billions of dollars)*

	1990		2003	
Mortgage loan participants	Amounts	percent	Amounts	percent
Financial institutions	1914315	51	3279551	37
Federal and related agencies	239003	06	489676	05
Mortgage and trusts	1070103	29	4386908	49
Individual and others	530452	14	810522	9
Total	3,762,872	100	8,966,656	100

Source: Federal Reserve Bulletin.
* percentages are rounded.



Features of Table 3 and Chart 1

1. Financial institutions once were the most important source of mortgage loans and were the dominant participant in the mortgage market in 1990. By 2003, financial institutions were no longer number one. Their relative market share declined from 51 percent in 1990 to 37 percent in 2003.
2. Mortgage pools and trusts held 29 percent of the total mortgage loans and were the number two participant in 1990. Mortgage pools and trusts became the most dominant figure and number one participant in 2003. The relative market share of mortgage pools and trusts increased from 29 percent in 1990 to 37 percent in 2003.
3. The relative market share of individuals and others declined from 14 percent in 1990 to 9 percent in 2003.
4. The market share of federal and related agencies is relatively stable.
5. Mortgage pools and trusts show a continuous development that exceeded the development of financial institutions. The decline in the early 1990s was due to the commercial banks crisis in commercial real estate. According to Zisler (1988), this decline was caused by "misallocation of analytical resources." Mortgage pools and trusts were aggressive and relatively efficient in handling loans that contributed to their increased market share.

III. Home Mortgages[2] and Financial Institutions

In Section I, it was established that lenders (participants) of financial institutions were one of the most dominant lenders in the mortgage market. The paper now focuses on examining the relative market shares in one-to-four family (one-to-four) home mortgages by the various participants of financial institutions. The paper will also explore whether there were significant differences among participants according to asset size.

The reason for emphasizing and considering one-to-four residential mortgage markets can easily be understood from the breakdown of the various categories of

[2]Home mortgages (one-to-four family property) must be distinguished from total mortgages. Total mortgages are loans that are secured in whole or in part by the four major elements of non-commercial (home mortgages i.e. one-to-four family property) mortgages, multi-family mortgages, commercial mortgages, and farm mortgages.

mortgage loans. The break down is provided in Table 4 and the development of one-to-four residential home mortgages in Chart 2.

Table 4: Mortgage Debt Outstanding by Type of Loan during 1990 (in billions of dollars)

Loan Type	Amount	Percent of total
1-4 family residential	2,616,288	70
Multifamily residential	309,369	8
Commercial	758,313	20
Farm	78,903	2
Total	3,762,872	100

Source: Federal Reserve Bulletin

Table 4 shows the four major types of mortgage debt—one-to-four family residential, multi-family residential, commercial, and farm. The mortgage debt outstanding at the end of 1990 exceeded $3.7 trillion. Residential mortgage debt was by far the largest component of the mortgage loans. The total value exceeded $2.6 trillion and accounted for 70 percent of the total mortgage market. Commercial real estate loans were a distant second in the mortgage market. The total value of commercial loans was $ .75 trillion. Commercial real estate accounted for 20 percent of the total mortgage debt. Farm loans were the lowest in the mortgage market. They accounted for only 2 percent in 1990.

Development of Home Mortgages

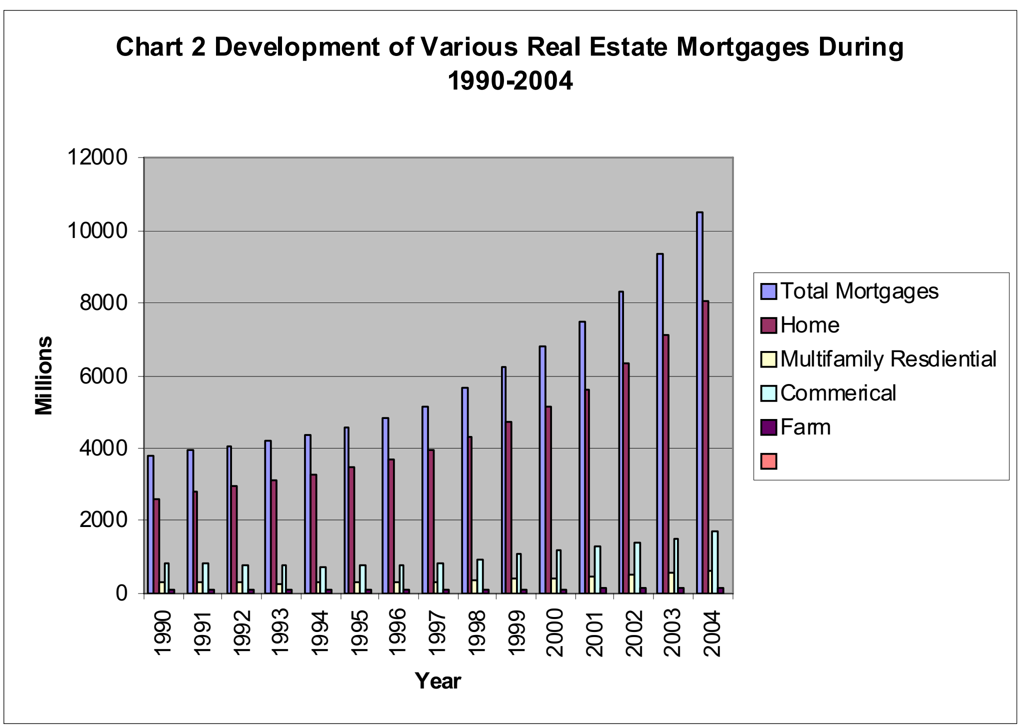


Chart 2 shows that the most vibrant sector of the mortgage market was home mortgages, i.e. one-to-four family residential mortgages. They were the most important leading components of real estate mortgages.

There has been a continuous and rapid growth of one-to-four family residence mortgages. The rapid growth of this sector can be attributed to several factors.

The high growth rate of the baby boomer generation (born between the 1946 and 1965) is an important factor in this sector. During the 1980s, the rapid formation of baby boomer households sustained a strong demand for the housing and mortgage loans (Hu, 1992). The component of the home buying age group of the baby boomers formed a dominant demographic demand in the housing market. The demand for this demographic section accounted for almost 75 percent of the total (Hu, 1992, pp.168-169).

The second factor for a strong demand was met by adjustable-rate mortgages (ARMs). The introduction of low ARMs was more enticing than the prevailing high fixed-rate mortgages (FRMs). ARMs accounted for more than 50 percent of total one-to-four family mortgage loans. Thus, the strong demographic demand by baby boomers and the development of ARMs contributed to the rapid expansion of housing loans during the 1980s.

The continuation of the housing market expansion during 1990-2004 had several contributors. The mortgage rates started to decline and were at the lowest point in more than four decades. Mortgage payments became cheaper than monthly housing rents. The housing market became a good substitute for the stock market. The crash of the stock market in early 2000 created a greater demand for residential real estates. The robust economic growth of the U.S. economy during the President Clinton era contributed another factor to the continuing growth of the one-to-four family housing market. The increase of median family income was linked to the growth of the residential housing during the period. The decline in the housing market in the 1990s was captured by the outflow of funds. Savings institutions accounted for a bulk of the total outflow of $57 billion—about 61 percent of the total outflow (Sinkey, 1998). The decline was very temporary. Neverloff (1996) reported that the real estate lending was back on track by 1996.

Component of Financial institutions

Financial institutions consist of three major participants who are actively involved in residential mortgage loans. They are commercial banks, savings institutions, and life insurance companies. A description of these financial institutions is warranted.

Commercial Banks

Commercial banks are the largest and most important of all financial institutions in terms of numbers and assets. There are slightly less than 8,500 commercial banks in the United States and as a group they are the largest depository institution with a value of assets $8,000 billion in 2005—more than 75 percent of the total assets of all depository institutions (Thomas, 2006). The core function of commercial banks traditionally has been to make short-term loans to businesses for inventory financing and working capital needs. But historically commercial banks did not neglect the need for real estate loans and served various roles in real estate finance (Samad, 2005). In 1990, mortgage debt held by the U.S. commercial banks was $844,826 million and accounted for 44 percent of the real estate loans from financial institutions.

Savings and Loan Associations (S&Ls)

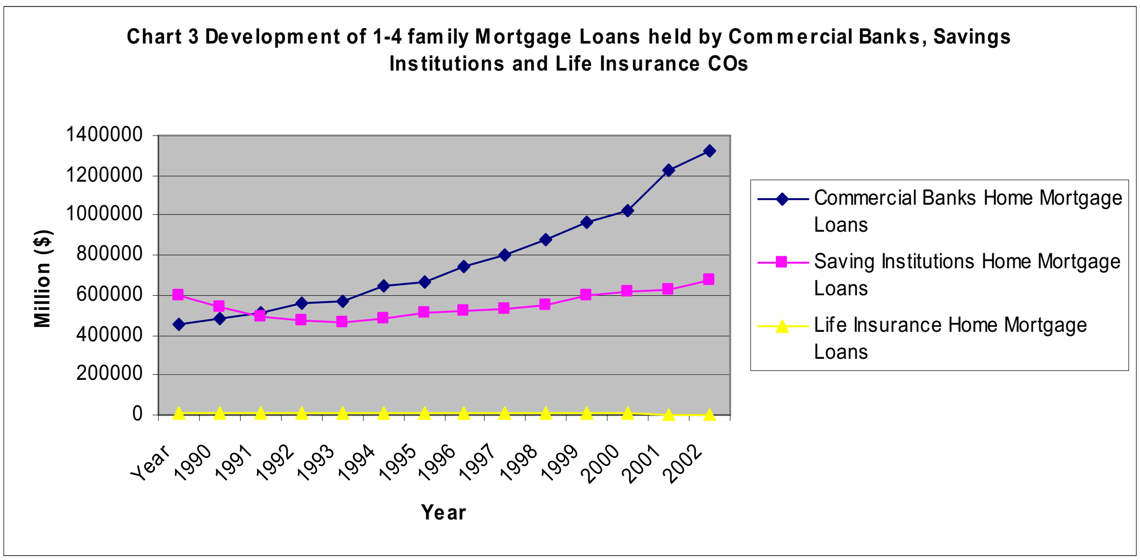
Savings and loan associations are the second largest group of depository institutions in the United States. There are around 1,200 S&Ls with a total asset $1,146 billion in 1999. S&Ls acquire funds by issuing deposit liabilities. These funds have historically been used to make mortgage loans. In fact, S&Ls had been the only specialized institutions to make mortgage loans.

Life Insurance Companies

Among the contractual savings institutions, life insurance companies are prominent. In 2004, there were 2,000 life insurance companies operating in the U.S. with total assets of about $4 trillion. Seven percent of the assets were invested in mortgage loans in 2004. The financial institutions described above provide various categories for mortgage loans. These mortgage loans are broadly classified into four categories, such as residential (one-to-four family), apartment (multi-family), commercial and farm. Residential mortgage loans are issued towards the purchase or improvement of one-to-four family residential homes. Financing for residential real estate is secured by the collateral of the home. Commercial loans are given on property that generates an income stream throughout the life of the property. Commercial loans involve investments in office buildings, shopping centers, and warehouses. Farm-loans are given for the improvement of farmland.

Growth of Financial Institution Home Mortgages

The development of commercial banks, financial institutions, and life insurance companies for home mortgages is presented in Chart 3. Home mortgages are loans secured by one-to four family properties including owner occupied condominium units.

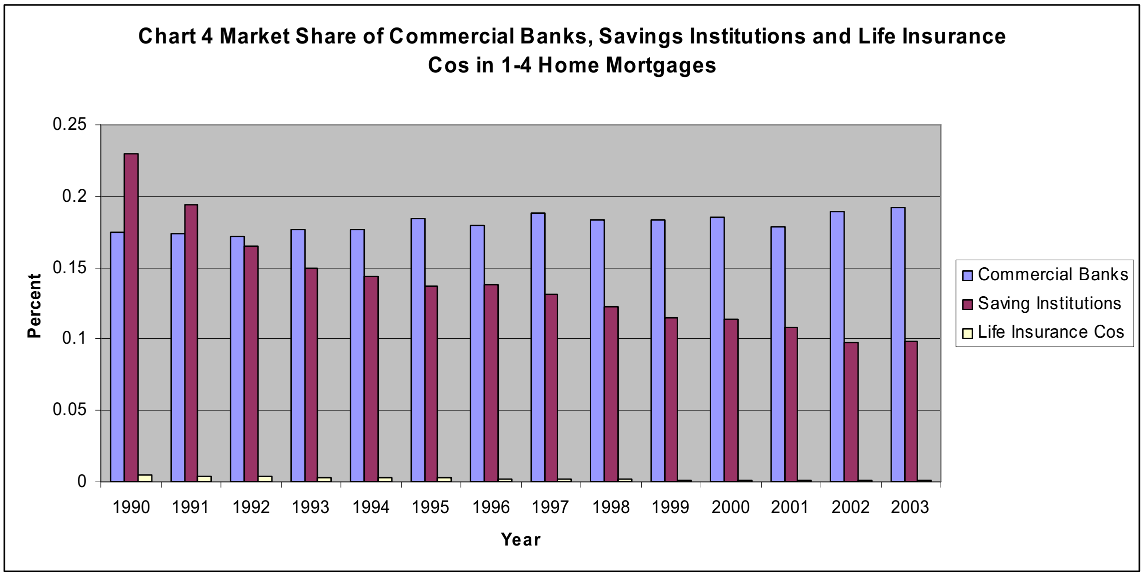


Source: Federal Reserve Bulletin

It appears from Chart 3 that savings institutions were the most dominant players up until 1990. Total mortgages held by savings institutions were $600,154 million compared to $455,931 million held by commercial banks. After 1991, commercial banks become the leading institutions in home mortgages. Commercial bank loans in one-to-four home mortgages exceeded savings institutions, the only time known as the principal lender in home mortgages. In 2004, commercial bank loans in one-to-four home mortgages were $1.3 trillion compared with savings institutions $.67 trillion. Life insurance companies had a role in the home mortgage market. Their part was nominal compared to commercial banks and savings institutions. Total mortgages held by life insurance companies in one-to-four residential homes was insignificant, only $4,710 million.

The development of the market share[3] of commercial banks, savings institutions, and life insurance companies in one-to-four home mortgages is presented in Chart 4.

[3]Market share in home mortgage is calculated by dividing the mortgage loans of the participant by total home mortgage loans.

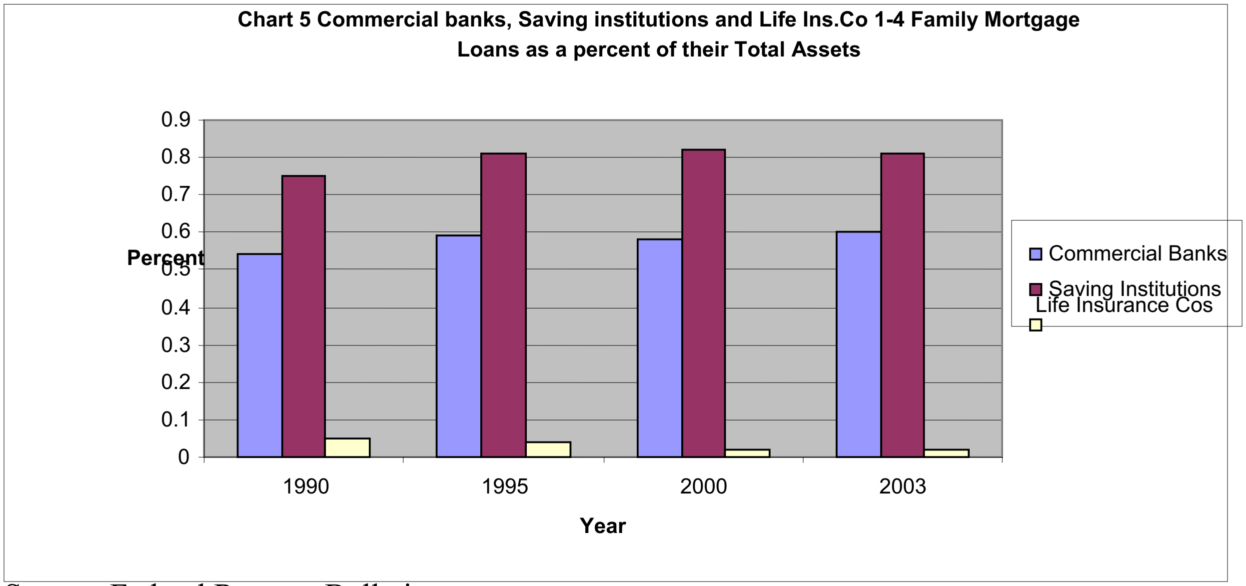


Source: Federal Reserve Bulletin

Chart 4 shows the market share for major financial institutions—commercial banks, savings institutions, and life insurance companies—in one-to-four home mortgages.

The market share of the S&Ls in mortgage loans was significantly dominant from 1950 until 1990. They were the prime sources of residential mortgage loans. The growth of S&Ls was higher than commercial banks during the 1950s and 1960s, but when the market interest rates rapidly rose in the 1970s and 1980s, S&Ls suffered tremendous difficulties. Most mortgages were long-term loans, with maturities exceeding 20 years. They were made at times when interest rates were substantially low and when the interest rate climbed and the deposit interest rate ceiling was removed by DIDMCA in 1980, the gap between the interest earned from mortgage loans and interest payment to deposits became negative. As a result many S&Ls failed in the 1990s. This failure and the volatility of interest rates in the 1980s contributed to S&Ls market share in one-to-four home mortgage market decline.

In spite of the decline of the S&Ls market share, they were still leading investors in one-to-four home mortgage in terms of percentage of total assets. S&Ls investment in one-to-four home mortgages as a percent of their total assets were 74, 80, 82 , and 81 percent during 1990, 1995, 2000 and 2003 respectively. S&Ls higher investment of total assets in one-to-four home mortgages is shown in Chart 5.



Source: Federal Reserve Bulletin

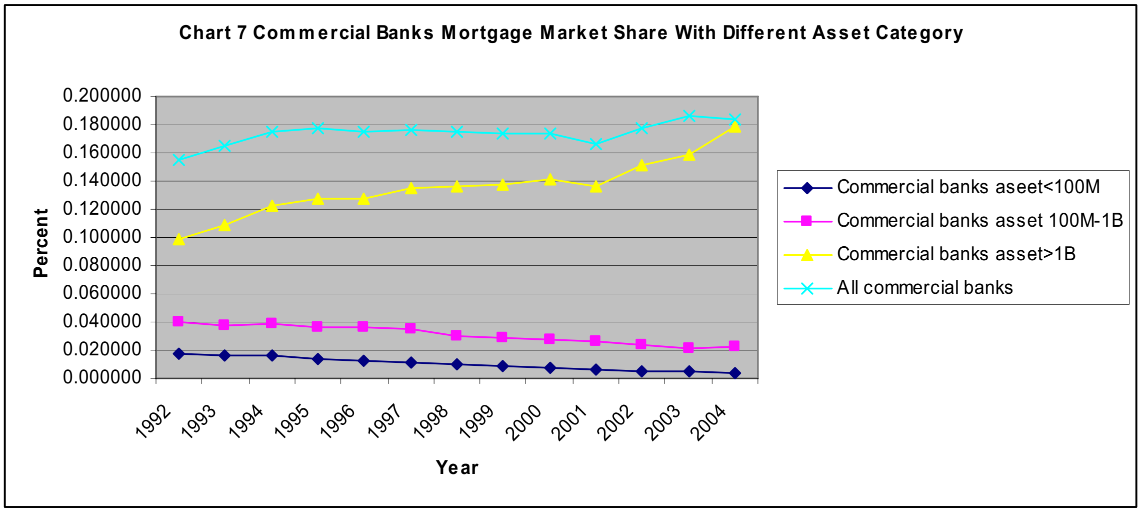
The rapid development of commercial bank home mortgages and their improvement in the market share can be attributed to many factors, both internal and external, as evidenced in Chart 3 and Chart 4. Increased financial muscles and the availability of a large number of mortgage officers are one of the major contributing factors. Commercial banks risk preference in one-to-four home mortgage lending increased due to their increased financial assets and higher returns. Secondly, a large pool of mortgage officers at the disposal of commercial banks and their increased efficiency contributed to commercial banks share increase. Among the external factors, innovation of AMRs and the development of secondary markets were important factors for the market share of commercial banks to increase in one-to-four home mortgages.

The market share of life insurance companies had been very nominal. This is evident in Chart 4 and Chart 5. Life insurance companies most attractive fields of investment were corporate and foreign bonds, and corporate equities. In 2004, life insurance companies allocated 41 percent and 28 percent of their assets in corporate and foreign bonds, and corporate equities respectively. Life insurance companies least preferred one-to-four home mortgages.

IV. Development of Home Mortgages Market Share Commercial Banks and Savings Institutions by Asset Size

It is clear from the above discussions that the principal participants of home mortgages are commercial banks and savings institutions. It is also observed in Section II that there was a tremendous development and growth of market share in home mortgages during 1990-2003.

However, it is interesting that the development of one-to-four home mortgages within the commercial banks—banks with assets less than \$100 million, banks with assets between \$100 million and \$1 billion, and banks with assets more than \$1 billion—are not the same. Similarly, the development of home mortgages with savings institutions with assets less than \$100 million, assets between \$100 million and \$1 billion, and assets more than \$1 billion are not the same. Chart 7 and Chart 8 show the development in home mortgages market shares.



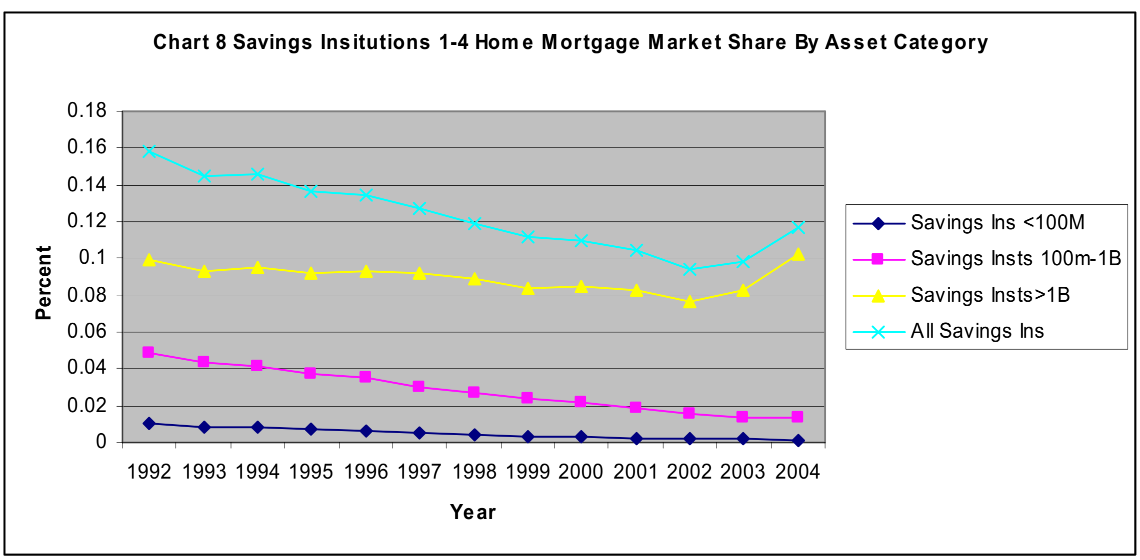
Source: Federal Reserve Bulletin

Chart 7 shows a continuous decline of home mortgage participation by small national banks with assets less than $100 million and medium banks with assets between $100 million and $1 billion. On the other hand, large commercial banks with assets more than $1 billion show a significant improvement and fluctuation in their participation in home mortgages when compared to small and medium banks.

In 2004, commercial banks total of 18.3 percent market share in home mortgages was almost entirely contributed by large commercial banks. Large commercial banks market share in that year was 17.8 percent compared to the market shares 0.04 and 2 percent for small and medium commercial banks.

In 2001, the market share of large commercial banks declined to 13 percent from 14 percent in 2000. This decline reduced the market shares of all commercial banks in the home mortgage market. The decline of commercial banks mortgage market share was attributed to the September 11, 2001 incident.

The development of increased market share by large commercial banks during 2001-2003 was attributed to efficiency and increased number of loan officers. Large banks can undertake more risk in real estate investments compared to smaller and medium banks. This is simply because large banks have large financial assets.



Source: Federal Reserve Bulletin

Chart 8 shows a trend of continuous decline in home mortgages held by all national savings institutions with assets less than $100 million, and assets between $100 million and $1 billion during 1990-2004. These categories of savings institutions have smaller market shares compared to large savings institutions with assets of more than $1 billion. For example, in 1990 the marker share of large savings institutions was 9.7 percent out of a total (savings institutions share) of 15.8 percent. The market share of small savings institutions was only 0.09 percent in 1990.

On the other hand, large savings institutions with assets more than $1 billion showed greater percentage of market share in home mortgages. They were able to reserve the declining trend of the home mortgage market share since 2002. The market share of large savings institutions increased from 7.6 percent in 2000 to 8.3 percent in 2002 and 10.2 percent in 2004.

Large savings institutions with assets of more than $1 billion have significantly larger market share in home mortgages compared to medium and small savings institutions. Medium savings institutions with assets between $100 million and $1 billion have more market share than small savings institutions with assets less than $100 million. This is mainly because large savings institutions can undertake more risk and have more diversified portfolios.

V. Data, Methodology, Statistical Tests and Results

Data

All real estate mortgage data for 1990-2004 were obtained from the Federal Reserve Bulletins. Data for commercial banks and other financial institutions by different asset sizes for housing mortgage loans were also obtained from FDIC. The percentage of mortgage loans by various commercial banks and S&Ls by asset-size are estimated by the authors.

This time period, 1990-2004, was chosen because of the phenomenon growth of the housing market during this time. The homeownership rate increased from less than 64 percent to 68 percent during the period. More than 75 million households owned homes, an increase of more than 13.2 million homeowners by the end of 2003 (Liang and McLemore, 2004, p.3).

Secondly, an unprecedented growth in the housing market witnessed many writings concerning housing market bubbles (Mantor, 2006, Sandler, 2005). The study of mortgage markets and comparative analysis of housing mortgage participants are not covered in any of the previous studies.

Methodology

Since the development of market share between commercial banks, S&Ls, and various commercial banks within the commercial banks is not uniform, the paper applies ANOVA tests for examining whether there are statistically significant differences in the market shares.

The test procedure is: the null hypothesis (H_0) of the equality of means of commercial banks and savings institutions is tested against the alternative hypothesis (H_a). That is, H_0: $\mu_{NCB} = \mu_{NSI}$ vs H_a: $\mu_{NCB} \neq \mu_{NSI}$.

Where H_0: Null hypothesis

H_a: Alternative hypothesis.

μ_{NCB} : Mean home mortgage market share of all national commercial banks.

μ_{NSI} : Mean home mortgage market share of all savings institutions.

The market share in home mortgages is estimated as home mortgages of ith participant divided by total home mortgages. Where ith participants are commercial banks and savings institutions with different asset category

The following variables are used:

ANCBK: All national commercial banks
ANSIN : All national savings institutions
NCB< 100: Assets of national commercial banks less than $100 million
NSI< 100: Assets of savings institutions less than $100 million
NCB100 M-1B: Assets of national commercial banks between $100 million and $1 billion
NSI 100 M-1B: Assets of savings institutions between $100 million and 1 billion
NCB>1B: Assets of national commercial banks more than $1 billion
NSI>1B: Assets of savings institutions more than $1billion
CBK= Commercial banks

Statistical Tests

A total of seven tests were performed for determining whether there were significant differences in the home mortgage market shares. The results of four ANOVA tests for comparing the market share between commercial banks savings institutions with similar assets categories—assets less than $100 million, assets between $100 million and $1 billion, and assets more than $1 billion—is presented in Table 5.

The results of test 5, 6, and 7 show whether there are significant differences between the commercial banks of various asset sizes within the commercial banks and are presented in Table 6.

Table 5: Comparative Market of Share between Commercial Banks and Savings Institutions in One-to-Four Family Housing Mortgages

Test No	Variable	Mean μ	Hypothesis	*ANOVA F-Statistics*	*P-value*	Decision Rule
1	ANCBK ANSIN	0.18 0.12	$\mu ANCBK=\mu ANSIN$	248.44	0.0000	Reject H_0
2	NCB < 100 M NSI < 100 M	0.10 0.004	$\mu_{CBK<100M}=\mu_{SINS<100M}$	123.57	0.001	Reject H_0
3	NCB 100 M-1B NSI 100 M-1B	0.31 0.28	$\mu_{CBK100M-1B}=\mu_{SINS100M-1B}$	0.70	0.48	H_0 can't be rejected
4	NCB >1 B NSI >1 B	0.14 0.09	$\mu_{CBK>1B}=\mu_{SINS>1B}$	137.51	0.000	Reject H_0

Table 6: Test of Comparing Home Mortgage Market Share between Commercial Banks of Various Asset Size

Test No	Variable	Meanμ	Hypothesis	*ANOVA F-Statistics*	*P-value*	Decision Rule
5	CBK<100M CBK>1B	0.01 0.13	$\mu_{CBK<100} = \mu_{CBK>1B}$	457	0.00000	Reject H_0
6	CBK100M CBK 100M-1B	0.01 0.03	$\mu_{CBK100M}=\mu_{CBK100M-1B}$	86	0.0000	Reject H_0
7	CBK100M-1B CBK>1B	0.03 0.13	$\mu_{CBK100-1B} = \mu_{CBK>1B}$	305	0.0000	Reject H_0

Results

ANOVA test results in Table 5 and Table 6 show the following revelations:

1. There is a significant difference between commercial banks and S&Ls in the market share of one-to-four family housing mortgage market. One-to-four family housing mortgages was dominated by commercial banks. This is substantiated by test No1. The result of the equality of mean test in the market share of home mortgages in Test No 1 suggests that there is a significant difference between commercial banks and savings institutions. H_0, null hypothesis of the equality of two means, $\mu_{ANCBK}=\mu_{ANSIN}$, between commercial banks and savings institutions is rejected with a probability of no mistake. This is substantiated by p-value=0.000.

2. The result of the equality of mean test—Test No 2 and Test No 4—between commercial banks and savings institutions with assets less than $100 million and assets more than $1 billion suggest significant differences between the two in the market share of home mortgages. H_0, null hypothesis of the equality of two means, $\mu_{CBK<100M}=\mu_{SINS<100M}$ and $\mu_{CBK>1B}=\mu_{SINS>1B}$, between commercial banks and savings is rejected. The market share of large commercial banks with assets more than $1 billion is dominant over large S&Ls.

The difference can be explained by the drastic decline in the home mortgage market share by the large and small S&Ls. Among S&Ls that went into bankruptcy during the period of crisis were the large and small ones with assets more than $100 million and assets less than $100 million. Most saving institutions issued long-term home mortgage loans at a fixed interest rate when the market interest rate was low. As a result many S&Ls went out business and there was a significant decline in S&Ls participation in one-to-four home mortgages.

3. With regard to medium financial institutions, commercial banks and savings institutions with assets between $100 million and $1 billion, Test No 3, finds no significant difference between the two. H_0, the null hypothesis of equality of two means, $\mu_{CBK100M-1B}=\mu_{SINS100M-1B}$, cannot be rejected with high p-value =0.48.

One of the important reasons for these finding is that commercial banks and S&Ls with assets between $100 and $1 billion did not increase their one-to-four home mortgage loans. One plausible explanation for this finding is that the return of the substitutes of home mortgages could be more attractive. Mortgage investment is always risky for a commercial bank. Similarly, among the saving institutions, medium S&Ls did not increase their investment in one-to-four home loans when they witnessed the crisis of large S&Ls. Thus, there was no observed difference in the home mortgage market share between commercial banks and savings institutions with assets between \$100 million and \$1 billion.

4. The results of the ANOVA test of the comparative market share between commercial banks with various asset sizes is provided in Table 6 and clearly demonstrates that one-to-four family housing mortgage markets were dominated by the large commercial banks. During 1990-2004, large commercial banks with assets more than \$1 billion dominate the one-to-four family housing mortgage. The average market share of large commercial banks was 13 percent and was significantly higher than that of the combined market share of small and medium commercial banks (with assets less than \$100 million and assets between \$100 million to \$1 billion). $H_{0,}$ null hypothesis of the equality of means, $\mu_{CBK<100} = \mu_{CBK>1B}$, $\mu_{CBK100M} = \mu CBK_{100M-1B}$, and $\mu_{CBK100-1B} = \mu_{CBK>1B}$ between commercial banks with different asset categories is rejected with significant credibility supported by p-value=0.0000.

The dominance of market share by large commercial banks over their counterparts can be explained by their vast assets and the allocation of assets in housing mortgages. In 2000, the top 10 largest banks (by assets) in the U. S. held 13.37 percent of their assets in one-to-four family home mortgages. This 13.37 percent was added to the market share of banks ranked 11 through 100 by assets, the top 100 largest banks in the U. S. held about 28 (27.89) percent of asset in one-to-four family home mortgages[4].

Secondly, because of large financial assets, large commercial banks can undertake more risk in their investments of home mortgages.

VI. Conclusions

There are four major participants in the U.S. mortgage market. They are: financial institutions, mortgage pools and trusts, individual and others, and federal and related agencies. Among them, financial institutions are the largest. During 1990, financial institutions held 51 percent of the total mortgages compared to 29 percent of mortgage pools and trusts. In 2000, financial institutions were still dominant participants in the total mortgage market with market share of 37 percent. The relative market share of mortgage pools and trusts increased from 29 to 49 percent in 2004.

Federal and related agencies, and individual and others are less significant participants in the mortgage market.

In one-to-four home mortgages, commercial banks became dominant participants. The market share of commercial banks in one-to-four family housing increased from 17 percent to 19 percent in 2004. Within the domain of commercial banks, large commercial banks with assets of more than \$1 billion significantly dominated the one-to-four family home mortgage market. The market share of large commercial banks during 1990-2004 was 13 percent compared to 4 percent of the combined market shares of small and medium commercial banks with assets less than \$100 million and assets between \$100 million and less than \$1 billion.

Savings institutions, once the number one player in one-to-four family housing mortgages, were no longer dominant. The average market share of savings institutions was 12 percent and decreased to 9.8 percent in 2003. The decline of the market share of S&Ls was due to S&Ls crisis created by an increase in the market interest rate in the 1980s.

[4] Federal Reserve Bulletins, 2003.

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