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The Influence of Family and Community Ties on the Demand for Home Equity Conversion Mortgages

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A dissertation submitted to the Graduate Faculty in Economics
in partial fulfillment of the requirements for the degree of Doctor of Philosophy,
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THE CITY UNIVERSITY OF NEW YORK

ABSTRACT

The Influence of Family and Community Ties
on the Demand for Home Equity Conversion Mortgages

by

Kenneth Allen Knapp

Adviser: Professor Michael Grossman

Reverse mortgages are loans against home equity that do not have to be repaid until the borrower moves, sells the home, or dies. The loans generally are available only to older homeowners, usually aged 62 or over. This paper explores whether demand for reverse mortgages is influenced by the strength of area's family and community ties. One type of reverse mortgage is analyzed: the FHA-insured Home Equity Conversion Mortgage (HECM). Several researchers have estimated the potential demand for reverse mortgages. To my knowledge, this is the first study of how actual demand may be determined, and of how it may be related to potential demand.

The unit of analysis is a county in one of 26 selected metropolitan areas in the United States. The primary measures of the strength of a county's family and community ties are those relating to the out-migration of young and old residents. Other variables used to measure family ties include the degree of religious adherence in the county and the percent of its residents that were born in that state. Race and educational achievement are also used in the analysis. Differences in the market development of HECMs across counties are accounted for by including measures of HECM counselors and lenders that are active in each area. Data from a variety of sources are used. The data are analyzed by method of ordinary least squares and two-stage least squares regressions.

Fairly strong evidence that family and community ties do influence demand for HECMs is found. A higher incidence of young out-migration, reflecting weak family and community ties of the young, tends to increase demand for reverse mortgages. The opposite is found for old out-migration, which implies that when the old are not attached to their communities, they will be less interested in reverse mortgages. The percent of persons born in the same state as their current residence is found to negatively influence demand.

Racial composition, educational achievement, and the extent of market development in an area also are found to influence demand for reverse mortgages.

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Ed Szymanoski of the Office of Federal Housing Enterprise Oversight, besides generously providing me with some data of his own, put me in touch with Jeanette Walton, who (along with another individual at HUD who wishes to remain anonymous) went out of her way to cut through red tape to get me data on HECM activity. Without her extreme kindness, this dissertation would not have been possible.

Many others courteously endured phone calls and e-mails from me, a stranger, to provide crucial information and insights. Kristen Hansen of the Census Bureau told me where to obtain and how to extract out-migration data. Sue Purdell of Amston Mortgage Company, Tom Atwell of Fannie Mae, Tom Scabereti of Financial Freedom Senior Funding Corp., and Darryl Hicks and Allison Brant of the National Reverse Mortgage Lenders Association were all extremely cooperative. Barbara Morgan and David Rasmussen described how they defined the metropolitan areas that were included in their study (with Isaac Megbolugbe) of potential demand for reverse mortgages so that I could convert their estimates to the county level.

Three individuals deserve special thanks. Roger Reynolds of Wells Fargo Home Mortgage, Inc., Venessa White of BNY Mortgage Co., and especially Ken Scholen of the

National Center for Home Equity Conversion cheerfully received my numerous phone calls and allowed me to freely dip into their vast pools of knowledge.

The quality of this paper would have been much inferior without the enthusiastic input of the members of my dissertation committee: Michael Grossman, Charlotte Muller, and Benjamin Klebaner. Dr. Grossman disabused me of more than one econometric fantasy. Among other things, Dr. Muller politely insisted that I clarify the distinction between family and community ties, encouraging me to reserve space for logic in my thesis. Dr. Klebaner meticulously combed through every letter and punctuation mark of several drafts of the paper, and convinced me that plain English should prevail in the final version of the paper.

The influence of these three individuals upon my life extends beyond this dissertation.

As all students in CUNY's economics Ph.D. program discover, Michael Grossman is an unbelievable, unmatched combination of competency and accessibility. A supportive word from him restored my confidence during more than one episode of self-doubt.

Charlotte Muller hired me as a research assistant at the ILC in 1998, and has successfully converted me from greenhorn to genuine, budding economist. Generous with her expertise and encyclopedic knowledge, I learn something from her everyday. I'm lucky to have met her and to have been brought into the ILC family.

Benjamin Klebaner was my M.A. adviser at the City College of New York, and taught the first economics course I ever took. Loved and respected by good students, he is the epitome of substance over style, the best teacher I ever had, both inside and outside

the classroom. His tenacious prodding—including the magazine clipping about the new economists' explanation for why people procrastinate—is why I will not be counted among those who remain forever ABD. As much as I value Dr. Klebaner as an educator, his friendship is even dearer.

I thank Pop for teaching me the value of hard work, and for sneaking away from work to come to my high school football games. I thank Mom for her softness, creativity, bunny slippers, and potato salad.

Above all, I am indebted to my wife April, without whose sacrifices I could never have pursued a doctoral degree, and whose patience would be an inspiration were it not so baffling. This dissertation is hers as much as mine.

TABLE OF CONTENTS

LIST OF TABLES AND FIGURES

I. INTRODUCTION

Reverse mortgages are loans against home equity that do not have to be repaid until the borrower moves, sells the home, or dies. The loans generally are available only to older homeowners, usually aged 62 or over. This paper explores whether demand for reverse mortgages is influenced by the strength of area's family and community ties. Several previous studies obtained estimates of the potential demand for reverse mortgages. To my knowledge, this is the first study of how actual demand may be determined, and of how it may be related to potential demand.

The life-cycle model of consumption theorizes that after a certain age, households begin to draw down wealth—including home equity—in order to smooth consumption over time. Homeowners with a bequest motive, however, may be less inclined to do this because they would like to leave an inheritance. In areas of weak family ties, the bequest motive should be relatively weak. Homeowners in these areas will be less concerned about preserving wealth for future generations, and more likely to draw down wealth in line with the life-cycle hypothesis—unless, that is, the homeowners do not want to stay in the community. In areas where their ties to the community are relatively weak, older homeowners will be less likely to exhibit interest in reverse mortgages. Thus, both the strength of an area's family ties and the degree to which its older residents are attached to the community are analyzed for their effect on demand for reverse mortgages.

Reverse mortgages are one way for homeowners in the United States to draw down home equity. In contrast to a conventional forward mortgage, monthly repayments are not required on a reverse mortgage. Interest on the cash

disbursements[1] to the borrower continues to accrue over the life of the loan and to be added to the outstanding debt.[2] The loan becomes due and payable (in full) only when the borrower ceases to use the home as the primary residence, sells it, or dies.[3]

The home equity and not the creditworthiness of the borrower secures a reverse mortgage; therefore, the borrower's ability to repay the debt is not an issue. Nearly all reverse mortgages are restricted to older borrowers, usually aged 62 and over.

The vast majority of older persons would like to remain in their current homes for as long as possible. The AARP found that 92 percent of persons aged 65-74, and 95 percent of those 75 and over, express a desire to age in place.[4] With a reverse mortgage, house-rich, income-poor older homeowners can realize their wish.

I.1. Family Ties, the Bequest Motive, and the Demand for Reverse Mortgages

The perspective of this paper is that both the life-cycle and the bequest motive theories operate in differing degrees in every household: some homeowners reduce home equity as they age, and others will leave their homes to heirs. In areas where

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[1] Usually, the borrower may select from several disbursement options: lump sum, line-of-credit, and monthly payments for life or for a specified number of years.
[2] As noted by Scholen (1996), forward mortgages may be characterized as "falling debt, rising equity," whereas reverse mortgages may be characterized as the opposite, "rising debt, falling equity."
[3] The loan may also be terminated if the borrower fails to maintain minimum property standards or to pay property taxes and homeowner's insurance.
[4] AARP (2000a), p.24-25. The percents refer to those respondents who *strongly* or *somewhat agreed* with the statement: "What I'd really like to do is stay in my current residence for as long as possible."

family ties are strong,[5] evidence of a bequest motive should be relatively prominent, and demand for reverse mortgages should be relatively low.

The further a child lives from a parent, the weaker may be the intergenerational family ties and any bequest motive on the part of the parent. In the aggregate, parents with children living afar are probably less likely than those with children nearby to be concerned about leaving their homes as a bequest to their children. Data on the geographic proximity of children to their parents would improve any study of the relationship between a bequest motive and the consumption of housing by older individuals. Unfortunately, such data are not available.

Of course, a child need not live near a parent to inherit the parent's wealth, including housing wealth. Nevertheless, parents who own homes may be interested not in transferring wealth per se, but in transferring the *physical* property. This desire would be stronger among parents with children living in the same vicinity than among those with children living further away. Parents who feel relatively certain that their children would actually *live in* the homes they bequeath to them have a motive to bequeath their homes that other parents do not. Both types of parents—those who think that their children would inhabit the inherited home and those who do not—may or may not possess a bequest motive insofar as financial wealth is concerned. The parent with a child nearby, though, is more likely to bequeath the home because there is a greater chance that the child would inhabit the home.

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[5] As discussed in Chapter I.2, this study also analyzes community ties. The family and community ties of the old and young may influence demand for reverse mortgages differently, and so their separate influences must be evaluated.

Parents derive utility from bequeathing their homes to their children. The probability that a parent will bequeath the home increases with the utility a child receives from the bequest. The child's utility depends positively not just on the dollar value of the home, which can be sold and converted to financial wealth, but also on the value he or she attributes to living in the inherited home ("consuming" the home).

Both the child living near and the one living afar derive utility from inheriting the financial wealth represented by the home, but the former derives more of this "wealth utility" because disposing of the house would involve greater time and money costs for the child living afar. The child who lives near also derives more utility from consuming the home because he or she is likelier than the child afar to dwell in it.[6] The more distant the child, the larger the disruption caused by the relocation—the sacrifice of proximity to a job, of a preferred community environment, etc.—and this lowers the utility derived from moving into the parent's home. Thus, total utility is expected to be higher for the child living near the parent. On average, then, parents with children living nearby are likelier than other parents to bequeath their homes, and hence less likely to be interested in reverse mortgages.

Rasmussen, Megbolugbe, and Morgan (1995) point out that reverse mortgages may be ideal instruments for accommodating inter vivos wealth transfers. That is, the transfer of wealth from older homeowners to their children or grandchildren need not occur only after the homeowner's death. Thus, the authors claim, the desire to leave a

[6] Even if the child does not intend to live in the parent's house, the option to do so would exist. The value of this option is greater for the nearby child than for the one living afar.

bequest probably will not decrease—and may even increase—demand for reverse mortgages.

HUD does not systematically collect data on the uses of HECM proceeds,[7] so it is not known how many of the loans are used for inter vivos transfers. Anecdotal evidence suggests that the number of HECMs taken out for this purpose is very small.[8] To the extent that HECMs are used to transfer wealth during the lifetimes of borrowers, the hypothesis that the existence of a bequest motive will decrease the demand for HECMs is weakened. However, the argument made above regarding the desire of older homeowners to transfer physical property continues to be relevant: however much reverse mortgages may be used to accomplish inter vivos transfers of financial wealth, they cannot be used to transfer physical property—that is, the home itself. In an area where family ties are strong, the desire to transfer the physical home is relatively strong, and so demand for reverse mortgages—for whatever purpose—is relatively low.

Since many borrowers apparently first learn about HECMs through their children or other family members, it might be argued that older homeowners with

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[7] Ken Scholen, founder of the National Center for Home Equity Conversion (NCHEC), and perhaps the most widely respected authority on reverse mortgages in the U.S., calls the lack of data on the uses of HECM proceeds "the single most disappointing thing about the program." [Personal communication.]

[8] Ken Scholen of NCHEC has encountered a few borrowers who have used reverse mortgages "to make bequests while they're still alive so they can enjoy the process." [Personal communication.] Scholen's guess is that the majority of HECMs are used to pay off existing mortgages (thereby increasing monthly income), to make home repairs or improvements, or to prepare for unexpected financial emergencies. Analyzing borrower feedback from participants in a focus group, HUD (2000, p.83) finds that "the goal of most participants [for taking out the HECM] was to remain independent and to enjoy the same quality of life to which they had been accustomed." (Only 34 borrowers participated in the focus group, so this claim must be regarded as tentative.)

children are more likely than those without them to take out a reverse mortgage.[9] A similar argument is that those with children may take out a reverse mortgage to avoid being a burden on their children, another reason demand for reverse mortgages might be positively related to whether or not an older homeowner has children.[10] These arguments are flawed.

Would the borrower with children really be more likely than the other homeowner to take out a HECM? In order to answer this question properly, everything else about the two prospective borrowers must be held equal—age, home equity, home value, need for additional monthly income, the strength of their areas' family ties, and so on. The only possible differences between the two would be that the one with children: (1) has a bequest motive; (2) may be more likely to have heard about HECMs because of a wider informational network; (3) may not want to be a burden to the children; and (4) may be able to rely on the children for financial and other support. In order for one to conclude that the parent with children would indeed be more likely than the other to take out a HECM, points (2) and (3) would have to weigh more than points (1) and (4). There is no reason to expect that this would be the case.

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[9] Venessa White, vice president of BNY Mortgage Co., said in a personal communication that often, "children are the ones who push for reverse mortgages." HUD's (2000) focus-group analysis finds that while some children bring HECMs to their parent's attention, others regret their parent's decisions to take out these loans.

[10] As Rasmussen, Megbolugbe, and Morgan (1995) suggest.

I.2. OUT-MIGRATION MATRIX

Data on individual households showing the proximity of the householder's children, strength of intergenerational ties of the household, and whether or not the householder has taken out a HECM are not available. Instead, I analyze data on family and community ties and HECM activity of different counties in the U.S., each of which is a component of one of 26 selected metropolitan areas. The primary measures of these ties relate to the out-migration of old and young residents. Out-migration is defined as a move from the county to a location beyond the metropolitan area.[11]

Taken together, a high (low) incidence of out-migration of the young and the old indicates a general weakness (strength) of the area's family and community ties. Each category of out-migration (old and young) must be analyzed separately, though, because they influence demand for reverse mortgages in different ways.

High out-migration of young persons means that their ties to the community and to family members remaining there are weak. Relative to areas where young out-migration is low, high young out-migration is expected to increase demand for reverse mortgages because old homeowners in the community will be less constrained by a bequest motive. Low out-migration of the young has the opposite effect on demand.

High old out-migration indicates that the ties of old persons to the community and to family members there are weak; however, the effect upon demand for reverse mortgages is different than in the case of high young out-migration. As with the

[11] The definition of a metropolitan area as a cluster of counties is discussed further in Chapter IV.

young, weak family ties among the old are expected to increase demand. In contrast to the young, though, the effect of the weakness of the old's community ties is to *decrease* demand. The reason is simple: old residents who plan to move will not be interested in reverse mortgages, which are acquired only by persons who want to remain in their homes. This would be true even if the old's family ties were weak. Regarding the demand for reverse mortgages, the weakness of the old's community ties, as reflected in a high incidence of out-migration, dominates the weakness of their family ties.

The interpretation of a low incidence of old out-migration is somewhat more problematic. On the one hand, low old out-migration suggests that the old are strongly attached to their community; thus, demand for reverse mortgages might be relatively high. On the other hand, low out-migration implies that the old's ties to family members in the area are strong, which would increase the power of a bequest motive for holding home equity, and therefore would decrease demand for reverse mortgages. By simultaneously accounting for the degree of young out-migration, these conflicting implications of how a low incidence of old out-migration might influence demand are resolved, as the following discussion shows.

Figure 1 is a matrix identifying four counties: A, B, C and D. Consistent with the definition of out-migration used in this study, the matrix refers to movers from a given county to a location beyond that county's metropolitan area. A boldfaced, all capitals "**YOUNG**" means that out-migration of young persons is low, and a lowercase "young" means that young out-migration is high. Similar meanings apply to "**OLD**" and "old."

County A (**OLD, YOUNG**) is characterized by low out-migration of both young and old. The low young out-migration has a negative influence on demand for reverse mortgages. The effect of the low old out-migration, though, is ambiguous.

Demand for reverse mortgages in County A, however, is clearly lower than in County B (**OLD,** young). There is low old out-migration in County B, just as in County A. In County B, however, there is high out-migration of the young. As a result, the bequest motive is less prevalent in County B than in County A. Even though the old in Counties A and B are equally attached to their communities (and to family members still there), those in County A are more constrained by a bequest motive, and therefore less likely to be interested in reverse mortgages. Thus, demand for reverse mortgages is higher in County B than in County A.

Demand is also higher in County B than in County C, which is most easily seen by observing that demand in County A is higher than in County C. Both counties (A and C) have low young out-migration, but County C (old, **YOUNG**) has a high incidence of old out-migration. The old homeowners in County C, then, are less likely than those in County A to desire reverse mortgages because they are more likely to want to move. Since, as already shown, demand is higher in County B than in County A, the fact that demand is higher in A than in C implies that it is higher in B than in C.

Demand is also higher in County B than in D (old, young). Both counties exhibit a high degree of young out-migration. The difference is that in County D, there is also a high incidence of old out-migration. Relative to D, old homeowners in B want to remain in their communities, despite the fact that young out-migration is

high. As a result, homeowners in B will be more interested in reverse mortgages than those in D.

The goal of this study is to test whether or not it is true that demand for reverse mortgages is higher in counties similar to B than in other counties. This requires that the incidence of old and young out-migration both be included in the analysis.

Two other indicators of the strength of a county's family ties are included in this study: the percent of residents who belong to a religious denomination, and the percent who were born in the county's state. These are discussed in more detail in Chapter IV, as are other variables not relating specifically to family or community ties, but which may influence demand for reverse mortgages. These include race, education, and the degree to which the reverse mortgage market is developed in the county—as suggested by the per capita[12] number of active reverse mortgage lenders and counselors.[13]

Before discussing these data and the method of analysis, a brief description of the main types of reverse mortgages available in the United States is given, followed by a closer look at the one analyzed in this study—the Department of Housing and Urban Development's (HUD's) Home Equity Conversion Mortgage (HECM).

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[12] As discussed in Chapter IV, these measures are adjusted for the number of homeowners that are potential buyers of reverse mortgages in an area (referred to as "potential demand"). The term "per capita" here refers to these adjustments.

[13] As explained below, borrowers of the type of reverse mortgage analyzed here are required to obtain third-party (non-lender) counseling.

II. TYPES OF REVERSE MORTGAGES

There are three major types of private reverse mortgages [Table 1]: (1) the HECM, initiated in 1989 by HUD and insured by the Federal Housing Administration (FHA); (2) the Home Keeper reverse mortgage, designed and backed by the Federal National Mortgage Association (Fannie Mae), initiated in 1995; and (3) Financial Freedom Senior Funding Corporation's (FFSFC's) Cash Account Plan, a proprietary, non-federally insured loan available in a limited number of states. The presently limited geographic availability makes it unsuitable for the purposes of this study

The HECM's share of the private reverse mortgage market—80 to 90 percent—far exceeds that of the other two.[14] As with the Home Keeper and FFSFC's Cash Account, the minimum eligible age for a HECM borrower is 62. HUD data on the number of HECMs sold by county, lender, and year are analyzed in this study.[15]

The borrower may use the proceeds of a private reverse mortgage for any purpose. Public sector reverse mortgages, in contrast, are single-purpose loans. There are two types of public sector loans [Table 1]: deferred payment loans (DPLs) and property tax deferrals (PTDs). Both are restricted to low- or moderate-income households. DPLs are available from local government agencies and may only be used to pay for home repair or improvements. State- and local-government-sponsored PTDs must be used to offset property taxes. Public sector reverse

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[14] According to Roger Reynolds [personal communication], vice chairman of Wells Fargo Home Mortgage, Inc. and member of the National Reverse Mortgage Lenders Association's board of directors, HECMs represent about 90 percent of all reverse mortgages originated by private lenders in the United States. Tom Scabareti [personal communication], vice president of marketing at FFSFC, estimates the HECM's market share at 80 to 85 percent, Home Keeper's share at five percent, and FFSFC's Cash Account Plan at 10 to 15 percent.

[15] Fannie Mae does not make data on its Home Keeper available to the public. [Quercia (1997), p.202, fn.2.]

mortgages are more numerous than private reverse mortgages, but their dollar amounts are almost always much lower.[16]

Reverse mortgages have several factors in common. The loan is due and payable in full only when the borrower moves, sells the home, or dies.[17] Compound interest accrues on the outstanding balance. The maximum loan for which a borrower is eligible depends on the value of the home, the interest rate charged on the loan, and the expected term of the loan, which is based on the borrower's life expectancy.[18]

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[16]Scholen (1996), Ch.18.

[17] At one time, at least one proprietary lender offered a type of reverse mortgage that did not have to be repaid if the borrower moved—this was Household Senior Services' "Household Plan." Some reverse mortgages are fixed-term loans, which became due and payable after a specified number of years.

[18] The calculation of the maximum loan amount is based on the borrower's age-based life expectancy (the expected term). The longer the life expectancy, the lower the loan amount. Depending on how long the borrower actually lives and remains in the home, the actual term of the loan will be different from the expected term. Only the age of the borrower is used to determine the expected remaining years of life. Other factors such as health status, race, and sex are not considered.

III. THE HOME EQUITY CONVERSION MORTGAGE[19]

The first HECM was closed in October 1989,[20] two years after Congress mandated that the HECM Insurance Demonstration be initiated. Many federal and quasi-federal agencies, advocacy groups, financial institutions, and other interested parties were involved in the design of the HECM program. Besides an interoffice working group created by HUD, these included Fannie Mae, the Federal Home Loan Mortgage Corporation, the AARP, the National Center for Home Equity Conversion (NCHEC), the American Bar Association's Commission on Legal Problems of the Elderly, state housing finance agencies, the U.S. Department of Health and Human Service's Administration on Aging, lenders, private mortgage insurers, housing counselors, area agencies on aging, and other public interest groups.[21]

Consumer advocacy groups—especially the NCHEC and AARP—were the driving forces behind the initiation of the HECM program. Industry representatives, HUD, and other federal agencies "had to be dragged, kicking and screaming" into

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[19]This chapter has relied on several sources. HUD (1990), (1992), (1995), (2000); Scholen (1998); and AARP (2000b) all provide fairly detailed, sometimes overlapping information on the general features of the HECM program including borrower eligibility, mandatory counseling, eligible properties, and the calculation of payments to borrowers. Since federal and state laws and HUD regulations relating to HECMs are ever changing, the older publications are in some ways obsolete, although they sometimes contain details that the others do not.

A wealth of information on HECMs and other types of reverse mortgages is also available from several websites, including those maintained by AARP (http://www.aarp.org/revmort/), the National Center for Home Equity Conversion (http://reverse.org/), and the National Reverse Mortgage Lender's Association (http://www.reversemortgage.org/links.htm).

[20]HUD (1992), p.1-7.

[21] HUD (1990).

accepting the idea of a federal reverse mortgage program, and the advocacy groups did the dragging.[22]

For years leading up to Congressional inquiries into a federally supported program, "massive efforts" by consumer advocates and others to generate interest among private insurers failed.[23] Insurers of reverse mortgages are exposed to a variety of risks. From a lender's perspective, there is tenure risk (the uncertain length of residency by the borrower), appreciation risk (the uncertain property appreciation rates), and loan balance risk (the uncertainty of the future amount of the loan balance).[24] The borrower faces the risk that the lender will not make promised loan disbursements (default risk).[25] Evaluating the combination of these risks and deriving appropriate pricing mechanisms proved too large an obstacle to private insurers.[26] Without a federally supported reverse mortgage insurance program, it is unlikely that the market would have developed very extensively.

The FHA-insured HECM program was created partly as a "laboratory" in which the special risks associated with reverse mortgages could be evaluated.[27]

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[22] Ken Scholen [personal communication]. That consumer advocacy groups were strongly in favor of establishing some type of federal reverse mortgage program is evident from their testimonies before Congress [for example, U.S. Congress, House, (1984) and U.S. Congress, Joint Briefing (1985)].

[23] Ken Scholen [personal communication].

[24] Loan balance risk stems both from uncertain future interest rates and uncertain cash disbursements to the borrower (for example, it is not known when a borrower of a line-of-credit HECM will withdraw funds, or how much the withdrawals will be).

[25] U.S. Congress, Joint Briefing (1985), testimony by Maurice D. Weinrobe, Department of Economics, Clark University.

[26] Ken Scholen [personal communication]. According to Scholen, who was heavily involved in discussions with private insurers, the insurers were uncomfortable with the "radical" nature of reverse mortgages. "Property [insurers] knew about appreciation risk, but not about mortality risk [the uncertainty associated with the borrower's life expectancy]," he said, "and [insurers who knew about] mortality weren't sure about tenure or property risk."

[27] Ken Scholen [personal communication].

Besides attracting private insurers, it was hoped also that the federal program would increase the involvement of private originators, servicers, and investors."[28]

Fifty FHA-approved lenders, each permitted to sell 50 HECMs, were selected by lottery at the initiation of the program. Originally, HUD was authorized to insure 2,500 HECMs through September 1991. A 1990 change in the law expanded the program: the number of authorized HECMs was increased to 25,000 through 1995 and all FHA-approved lenders were allowed to participate.[29] In 1998, the program became permanent, and allowable outstanding loans were increased to 150,000.[30] By the end of year 2000, FHA had insured a total of 44,418 HECMs.[31]

The HECM program is specifically intended:

> to meet the special needs of elderly homeowners by reducing the effect of the economic hardship caused by the increasing costs of meeting health, housing, and subsistence needs at a time of reduced income . . . .[32]

To be eligible for a HECM, the prospective borrower must be age 62 or over.[33] HUD may, at its discretion, set a higher age.[34] Had HUD prescribed a higher age to account for the fact that HECMs should appeal most to older homeowners (as discussed below), it is possible that lenders could have marketed the HECM more

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[28] HUD (2000), p.32.
[29] HUD (1992), p.1-2.
[30] HUD (2000).
[31] Based on data obtained from HUD.
[32] *U.S. Code*, Title 12, §1715z-20(a).
[33] When a couple takes out a reverse mortgage, the youngest borrower must be age 62 or over. There are no restrictions on the number of signatories with a HECM: "Three sisters or four friends would be as eligible as a single individual or a couple, assuming that they are all 62 year[s] of age or older and are all owners of the residence . . . but, in each case, [the amount of the loan] would be based on the age of the youngest borrower." [HUD (1990), p.4-3].
[34] *U.S. Code*, Title 12, §1715z-20(b).

efficiently.[35] By selecting age 62, however, more prospective borrowers learn about HECMs. Even if the younger homeowners learn that the proceeds they can get from a HECM are currently too low to be worthwhile, they may decide, based on the information they gathered during their initial inquiries, that the loan might be useful later, or that it might benefit someone else they know.[36]

Eligible properties include owner-occupied 1- to 4-family homes, manufactured homes built after June 1976, condominiums, and dwellings that are part of Planned Unit Developments. The law was amended in December 2000 to extend eligibility to cooperative housing units.[37]

Among the costs borne by the HECM borrower [Table 2] is mortgage insurance, the premiums of which are collected by the FHA. The insurance not only protects the borrower from the risk of lender default, but also protects the lender from the "crossover" risk that the loan balance will exceed the value of the home when the loan becomes due and payable.[38] All types of reverse mortgages provide that the amount owed cannot exceed the value of the home at the time the loan becomes payable. The value of the home might be less than the loan balance if the borrower lives in the home for longer than expected, if interest rates rise unexpectedly over the life of the loan, or if the home appreciates too slowly.[39] Other costs that must be paid

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[35] Persons at younger ages often discover after visiting and spending time with lenders (and with counselors) that the amount of the loan for which they qualify is too low to warrant taking out a HECM. [Ken Scholen (personal communication).] In such cases, the time spent by the lender educating the prospective borrower goes unrewarded.

[36] Ken Scholen [personal communication]. All the thoughts in this paragraph are his.

[37] National Reverse Mortgage Lenders Association website http://reversemortgage.org (accessed February 20, 2001).

[38] Discussions of crossover risk and its relationship to insurance risk and borrower payments may be found in Szymanoski (1990) and Chinloy and Megbolugbe (1994).

[39] HUD (2000).

by the borrower include origination fees, closing costs, servicing fees,[40] and interest. These costs may be paid for with the proceeds of the loan—that is, the borrower is not required to have the cash necessary to pay for these costs up front.

HUD requires that the interest rate charged on adjustable-rate HECMs must be equal to the one-year, constant maturity Treasury security index plus a lender's margin.[41] Currently, Fannie Mae is the secondary market buyer of virtually all HECMs.[42] Fannie Mae determines the lender's margin that must be applied to HECMs that it will purchase;[43] thus, all mortgagees charge the same interest on newly originated HECMs. Mortgagees could, if they wished, charge a higher lender's margin than that set by Fannie Mae, but then Fannie Mae would not invest in their HECMs. Although, theoretically, mortgagees could charge a lower margin and still sell their HECMs to Fannie Mae, this is very unlikely to occur in practice. The profitability of HECMs is already low—below that of conventional forward mortgages—and market activity is modest. Charging lower interest than the Fannie Mae standard would almost certainly result in lower profits because it is unlikely that loan volume would increase enough—if it increased at all—to offset the reduced revenue generated by each HECM originated.[44]

To date, only a few small lenders—originating altogether a "trivial number of loans"—have chosen to retain their HECM assets rather than sell them to Fannie

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[40] Servicing HECMs includes maintaining data on monthly loan activity, providing borrowers with periodic loan statements, certifying occupancy and property maintenance, changing borrower payment plans, accepting mortgage repayments, declaring the mortgage due and payable, and many other tasks. [Fannie Mae (2000)].
[41] HUD (1994).
[42] HUD (2000), pp.50-51.
[43] Fannie Mae (2000).
[44] Venessa White, vice president of BNY Mortgage Co. [personal communication].

Mae.[45] (Whether the lender's margins on their loans differ from those of other HECM originators is not known.) Capital constraints may reduce the willingness of lenders to hold HECMs or other types of reverse mortgages in their portfolios.[46] Unlike forward mortgages, where monthly cash inflows from the borrower begin approximately one month after the debt is originated, cash inflows from reverse mortgages—one-time, lump-sum repayments—usually occur only after several years.

In March 2001, the Fannie Mae lender's margins were 1.20 percentage points for monthly adjustable loans and 2.10 points for annually adjusted loans.[47] Very few fixed-rate HECMs, which are also permitted by HUD, have been originated because Fannie Mae will not purchase them.

The borrower may elect to receive the HECM loan: as a single lump-sum, as a line-of-credit (that grows over time), as a monthly cash advance for a fixed period ("term" loan), as a monthly cash advance for as long as the borrower lives in the home ("tenure" loan), or as any combination of lump sum, credit line, or monthly cash advance. The borrower has the right to change the method of loan disbursement at any time.

As with all reverse mortgages, the maximum loan allowable with a HECM depends positively on the age of the borrower and the value of the home, and negatively on the interest rate applied to the loan.[48] With the interest rate, home value, and other factors—such as race, sex, and household income—given, the appeal

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[45] HUD (2000), p.50, fn.29.
[46] Tom Atwell, senior business manager for senior products at the Single-Family Marketing division of Fannie Mae [personal communication].
[47] Adjustments are linked to changes in the one-year Treasury index.
[48] For a detailed analysis of how HECM payments are determined, see Szymanoski (1990).

of a reverse mortgage should increase with the age of the homeowner, as older borrowers will receive larger cash outlays.[49] The age-based life expectancy of the borrower is used to estimate the life of the loan when it is originated. Cash outlays to older borrowers are expected to be of shorter duration, and so can be larger in dollar amount to achieve any given loan balance.

Female general population mortality tables are used for all borrowers to determine loan payments under the HECM program.[50] Federal law prohibiting discrimination against loan applicants on the basis of sex means that gender-specific mortality tables cannot be used to determine HECM payments.[51] (The same law covers discrimination by race). In designing the HECM, HUD chose to use the female mortality tables instead of blended tables—which would have been allowable under the law—partly because "a large majority of borrowers [were] expected to be female."[52]

Given their lower age-based life expectancies [Table 3], males essentially get a worse deal from HECMs than do females. For example, with a tenure loan, males will receive the same payments as females, but for fewer years (on average). Insofar as the HECM design should be more appealing to females than to males, HUD's expectation that a high percent of borrowers would be females is at least partly self-fulfilling. As Table 4 shows, females living alone represent a much higher percent of

[49] HUD (Mar. 1995).
[50] HUD (1990) With multiple signatories, payments are based on the age of the youngest borrower.
[51] *U.S. Code*, Title 15, §1691(a).
[52] HUD (1990), p.5-2.

HECM borrowers (56.3% in 1999) than they do of all older homeowners (29.6% in 1997).[53]

As whites have higher life expectancies than blacks[54] [Table 3], the HECM is basically a better bargain for them. Thus, it might be expected that whites would represent a higher percent of HECM borrowers than they do of all older homeowners, and that the opposite would be true of blacks. This was generally true earlier in the HECM program [Table 4], but not later. Whites made up 92.7 percent of HECM borrowers in 1995 (compared to 87.2% of all homeowners), but only 86.4 percent in 1999. Meanwhile, the percent of HECM borrowers who are black rose from 5.9 to 9.2 (7.8% of all older homeowners are black).

It is possible that more effective marketing of the HECM product to minorities than to whites may explain the shift in racial composition. Lenders receive an implicit reward for marketing HECMs to minorities. Fannie Mae, which invests in virtually all HECMs sold, must meet minimum income-based and geographically targeted housing goals when purchasing mortgages. One of the geographically targeted goals relates to "properties located in census tracts within metropolitan areas where . . . minorities comprise 30 percent or more of the residents and the median income of families does not exceed 120 percent of the area median income."[55] HECMs that are sold to borrowers in such areas may be easier to re-sell to Fannie Mae—if not now, when market activity is fairly low and when the ability to re-sell is

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[53] In Table 4, the figures on all homeowners are for 1997 (except for income (1995)), whereas the figures for HECM borrowers are for 1995 and 1999. Using the 1997 figures instead of the 1995 and 1999 figures for all homeowners [available in U.S. Census Bureau (1997) and (2001)] facilitates the comparison to HECM borrowers without affecting the conclusions reached in the text.

[54] The data refer to non-Hispanic white and black persons. Hispanics may be of any race.

[55] HUD (1996), p.23.

not a real concern, then perhaps when market activity expands. Lenders subject to Community Reinvestment Act (CRA) requirements may also target minorities, since HECMs qualify for CRA credit.[56]

Besides race and ethnicity, Table 4 compares other characteristics of HECM borrowers to all other older homeowners. As expected, the average HECM borrower tends to be older than the average of all older homeowners. (The gap is wider than suggested in Table 4, since the total group of older homeowners is aged 65 and over, compared to 62 and over for the HECM group.).

Table 4 also shows that the median income of HECM borrowers is below that of other older homeowners; however, HUD (2000) warns that the data underlying this figure are not reliable.[57] It is possible that lower income homeowners are in greater need of converting their home equity into cash in order to meet daily living expenses, medical bills, etc.

HUD (Mar. 1995) reported that HECM borrowers had an average of 0.59 children, but the data underlying this statistic were later determined to be unreliable.[58] It is reasonable to assume that the average number of children among HECM borrowers is lower than the average among non-borrower since older homeowners with children are likelier than those without to avoid reverse mortgages (because of a higher bequest motive).[59]

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[56] HUD (Mar. 1995), p.3-5.
[57] A later tabulation of the data revealed many cases where values were zero or missing.
[58] As with the income data, a later analysis revealed a high percent of missing or zero values. The zero values for number of children could indicate either that the value is indeed zero or that the respondent did not supply the information.
[59] In other words, HECM borrowers are likelier to have no children, which lowers the average number.

The median appraised property value tends to be greater among HECM borrowers ($107,000 for all loans closed 1989-1999) than among all older homeowners ($87,000 in 1997).[60] The percent of HECMs taken out by residents of central cities (41.3%) is much higher than the percent of all older homeowners that live there (24.1%). In contrast, the percent of HECM borrowers who reside in non-metropolitan areas (11.8%) is lower than the corresponding percent of all older homeowners (18.7%).[61]

[60] HUD (2000).
[61] HUD (2000).

IV. DATA AND METHOD OF ANALYSIS

IV.1. METHOD OF ANALYSIS

The method of ordinary least squares (OLS) is used test whether the strength of an area's family ties influences the demand for HECMs. To address the possible endogeneity of one of the regressors (*LENDERS*), a two-stage least squares (TSLS) regression is also performed.

The unit of analysis is a county in one of 26 selected metropolitan areas in the United States (Table 5). Counties are included within a metropolitan area by the U.S. Office of Management and Budget (OMB) when there are strong social and economic linkages between the counties and a populous core area.[62] This study follows the 1990 metropolitan area definitions.

Appendix A describes of all the variables and their expected signs. Summary statistics of the variables are provided in Table 6.[63]

IV.2. DEPENDENT VARIABLE

The dependent variable, *HECM9000*, is the number of FHA-endorsed HECMs purchased over a ten-year period (1990-2000) by borrowers residing in the county,

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[62]The OMB analyzes the level of commuting to jobs between a county and a central city to determine whether to include that county in a metropolitan area. Counties are convenient building blocks of metropolitan areas both because county boundaries do not change and because of the prevalence of countywide data. [McDonald, 1997, pp.4-5. See U.S. Census Bureau (1998), Appendix II, for a detailed discussion of the OMB standards.]

[63] Data sources are listed just prior to the list of references at the end of the paper.

divided by potential demand for reverse mortgages in the county, times 1,000.[64] In other words, *HECM9000* is the number of HECMs purchased per 1,000 units of potential demand over a ten-year period.

IV.3. POTENTIAL DEMAND FOR REVERSE MORTGAGES

Several studies conducted in the past decade attempted to estimate the potential demand for reverse mortgages. To my knowledge, this study is the first to attempt to explain actual demand for reverse mortgages, and to relate actual demand to potential demand.

Researchers have estimated the number (or proportion) of households with characteristics they considered representative of potential interest in reverse mortgages. In general, potentially interested homeowners are those that are very old, have high housing equity, and receive low incomes. The underlying idea is that households that can increase their cash flows substantially through a reverse mortgage will have relatively high interest in these loans.

Varying estimates have been derived based on different assumptions about which income level, housing valuation, and age of householder should be used to indicate potential demand. Merrill, Finkel, and Kutty (1994) use the 1989 American Housing Survey to estimate a "lower bound" of potential demand in the U.S. equal to

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[64] According to both Ken Scholen of the NCHEC and Venessa White of BNY Mortgage Co., all but a trivial number of lenders charged the same interest rates on HECMs throughout this period. Earlier in the HECM program, when a few investors besides Fannie Mae were active in the secondary market for HECMs, some lenders—very few of them—may have sold HECMs at interest rates different from those required by Fannie Mae. For the past several years, Fannie Mae has been the only active investor in HECMs. Thus, there is no need to correct for interest rate differences across lenders when analyzing demand.

800,000 households. This was the number of householders in 1989 aged 70 and over who had lived in their homes for more than 10 years, with annual income of $30,000 or less, and with home equity between $100,000 and $200,000.[65]

Defining potential demand as equal to the number of homeowners aged 62 and over who could increase their monthly income by 20% or more with a reverse mortgage, Mayer and Simons (1994) estimate potential demand at six million households (1990). The authors' estimates are based on an analysis of the Census Bureau's 1990 Survey of Income and Program Participation.

Kutty (1998) uses data from the 1991 American Housing Survey, and finds that 621,000 homeowners aged 65 and over could have been raised above the poverty level in 1991 if they would have obtained a reverse mortgage. This represented 29 percent of all poor householders aged 65 and over in that year.

Rasmussen, Megbolugbe, and Morgan (1995) use the U.S. Census Public Use Microdata Sample (5%) to derive an estimate of 6.7 million homeowners aged 70 and over with $30,000 or more in home equity (in 1989). These homeowners compose what the authors call the "primary market" for reverse mortgages. The authors' estimates suggest that an additional 4.4 million homeowners aged 62-69 would have entered the primary market group by 1998, bringing total potential demand in the United States to 11 million.

In addition to estimating potential demand for the entire U.S., Rasmussen, Megbolugbe, and Morgan (1995) also estimate potential demand for selected

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[65] Householders with equity above $200,000 were excluded because the authors thought they "are more likely to have other assets and may not want a reverse mortgage." [*op. cit.*, pp.279-280].

metropolitan areas. A weighted average of their metropolitan area estimates was used to derive this study's county-level figures. The weights are based on the percent of a metropolitan area's homeowners aged 75 and over that reside in each county (1990 data).[66]

Rasmussen, Megbolugbe, and Morgan argue that reverse mortgages should be viewed as tools not only for smoothing consumption over time, as predicted by the life-cycle hypothesis, but also as "asset management tools." In their view, the ability to alter the composition of wealth—from illiquid to liquid assets—is an attractive feature of reverse mortgages for prospective borrowers at all income levels. Hence, unlike other researchers, they do not consider income in their estimate of potential demand. Restricting an estimation of potential demand to homeowners whose loan proceeds would represent a "large" percent of their monthly incomes entails making an arbitrary choice of what loan-to-income figure to use as a threshold. This restriction ignores the asset-management feature of reverse mortgages.

Insofar as it is calculated without being truncated at some arbitrary income threshold, Rasmussen, Megbolugbe, and Morgan's estimate represents an upper bound of potential demand for reverse mortgages. In my study, estimation of actual demand is adjusted for this upper-bound measure of potential demand.[67]

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[66] Data on homeowners aged 70 and over were not available, so those aged 75 and over were used. To the extent that the distribution across metropolitan areas is different for homeowners aged 75 and over than it is for those aged 70 and over, the weights are flawed. My analysis of 1,850 counties, including the 129 observations in this study, reveals that it is unlikely that the distributions are different systematically. Two sums were calculated using 1990 Census population data: one of persons aged 70-74 across the 1,850 counties, and one of those aged 75-79. The percents of these totals represented by each county were then determined. The correlation between the two percents is 0.998.

[67] As mentioned, analysis in this paper is at the county level, and Rasmussen, Megbolugbe, and Morgan's estimates for selected metropolitan are used to derive potential demand for each county.

IV.4. INDEPENDENT VARIABLES IN OLS

As discussed in Chapter I, the principal measures of the strength of a county's family and community ties that are used in this study are two relating to out-migration—out-migration of the young (*Y_OUT*), and out-migration of the old (*OLD_OUT*). These variables refer to the percent of residents of a certain age that moved from a county to a location beyond that county's metropolitan area during the 1985-1990 period.

OLD_OUT is the percent of all residents aged 60-79 in 1985 who out-migrated by 1990. In 1990, the beginning of the 1990-2000 period over which HECM loan activity is analyzed in this study, this cohort would have been aged 65-84. HUD (2000) reports that about three-fourths of HECMs purchased through the year 1999 were by persons in this age group. The midpoint of this age group is approximately equal to the median age of all HECM borrowers (75).

The percent of residents out-migrating in one period is probably serially correlated with the percent in previous periods. For example, if the 1985-1990 percent was high, then among the pool of older homeowners living in the county in 1990, a high percent of them probably plan to move. (Out-migration data analyzed here are from 1985-1990; data on HECM loan activity are from 1990-2000.) If they plan to move, then they will not desire a HECM. Thus, the expected sign of this coefficient is negative.[68]

[68] Chapter I.2 provides a detailed discussion of how *OLD_OUT* and *Y_OUT* are expected to influence demand.

Y_OUT is the percent of persons aged 25-39 in 1985 who moved out of the metropolitan area by 1990. Those younger than 25 were not selected in order to avoid individuals of primary college age, who may move temporarily to attend college before returning home. The expected sign of *Y_OUT* is positive because a high percent reflects weak family ties among the young and a weak attachment to the community, reducing any bequest motive among the old homeowners in the area.

Other variables used to measure the strength of a county's family ties are *RELIGION* and *BORN_IN*.

RELIGION is the percent of residents who belong to a religious denomination. By including this variable, the aphorism "The family that prays together, stays together," is taken seriously. When *RELIGION* is high, intergenerational bonds are thought to be relatively strong. The expected sign of *RELIGION* is negative.

BORN_IN is the percent of the county's population who were born in the same state as their current residence. When *BORN_IN* is high, this increases the likelihood that multiple generations of the same family live in the county. As a consequence, demand for reverse mortgages is expected to be relatively low. *BORN_IN* is expected to be negative.

Two other independent variables are included in the regressions: *WHITE* and *ED*. These variables do not relate specifically to family ties, but may influence demand for HECMs for other reasons.

WHITE is the percent of the population who are white. As discussed in Chapter III, whites have higher average life expectancies than do non-whites, so the HECM is basically a better deal for them. As a result, it is possible that demand

among whites will be greater than among non-whites, so the expected sign of *WHITE* is positive.

Whites as a group could have stronger or weaker family ties than non-whites. If family ties among whites are generally weaker, then *WHITE* would still be expected to have a positive impact upon demand for HECMs. However, if ties among whites are stronger, then *WHITE* could be negative.

ED is the percent of residents aged 25 and over who have graduated from college. The expected sign of *ED* is positive because it is assumed that persons with higher educational status are more sophisticated (on average) when it comes to financial investments, and better able to judge the costs and benefits of financial instruments, especially those as complex as reverse mortgages.[69]

It is well known that educational achievement and income are highly, positively correlated. (For the 129 counties in this study, the simple correlation between *ED* and the counties' median income (*INCOME*) equals 0.5909 (Table 7).) Thus, in the regressions reported here, the coefficient on *ED* picks up some of the effect of *INCOME*. As discussed below, *INCOME* is used as an instrument for *LENDERS,* which is possibly endogenous.

Previously, it was mentioned that the demand for HECMs possibly might be negatively related to income. Theoretically, excluding *INCOME* from the regressions may create biased estimators; however, an analysis of regressions that were run with and without *INCOME* reveals that neither the coefficients nor the statistical

[69] When *ED* is high, the percent of older persons (that is, those eligible for HECMs) that are highly educated is assumed to be high also. A similar assumption is made regarding *WHITE*.

significance of the remaining regressors are substantially altered.[70] For this reason, but especially because *INCOME* is considered a fairly good instrument for *LENDERS*, the variable is excluded from the regressions (except as an instrument).

Two measures of the degree to which the HECM market is developed—*LENDERS* and *COUNSMSA*—are included among the explanatory variables. These variables are included to account for variation across observations in the availability of HECMs, the intensity with which they are marketed, and the ease with which prospective borrowers may obtain correct information about them.

The first measure of market development relates to HECM counseling. To ensure that they "understand the full impact of tapping into home equity,"[71] prospective borrowers are required by law to obtain counseling from a HUD-approved housing counseling agency before they can take out a HECM. A party other than the lender must provide the counseling. To prevent conflicts of interest, it is unlawful for counselors to charge a fee for referring a prospective borrower to a lender.[72]

Advocates for the elderly, lenders, and others involved in developing the HECM program generally agree that counseling is warranted both because of "the newness and complexity" of the loans, and because of "[t]he vulnerability of many

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[70] Nor is the overall explanatory power of the regressions much affected by excluding *INCOME*. In fact, the adjusted R-square tends to increase slightly without *INCOME*. In the regressions where *INCOME* is included, it is not statistically significant.

[71] HUD (Mar. 1995), p.4-1.

[72] HUD (2000). Conflicts of interest may exist nevertheless. A majority of counseling agencies interviewed by HUD reported that lenders refer all or most of the prospective HECM borrowers that walk through their doors. Some borrowers interviewed did not realize that they had even received counseling, but had thought they were dealing with representatives of the lender.

elderly households."[73] Some prospective borrowers resent the mandatory counseling as paternalistic.[74] Others who had counseling and then decided to take out a HECM complained later that "they were not aware of the full costs of [the] loans and would not have chosen a HECM if they had been better informed of other options."[75] Although these complaints suggest that the quality of counseling is not always up to par (as discussed below, this is well known), they also suggest that mandatory counseling—when adequate—may not be a bad idea.

The counseling session is intended help the prospective borrower make an informed decision about the suitability of a HECM for his or her financial needs and situation. In the session, the counselor must discuss (a) the availability to the homeowner of other housing options (such as selling the home and moving into a rented apartment),[76] social services, and financial resources; (b) other reverse

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[73] HUD (1992), p.4-1.

[74] HUD (1992).

[75] HUD (2000), p.78. As discussed below, HECM counselors are required to discuss the financial implications of HECMs with the prospective borrower. Counselors and the prospective borrowers both must sign a "Counselor Certificate" certifying that the financial implications and other specific matters (reviewed below) were discussed in detail. Thus, prospective borrowers that are unhappy with the quality of the information provided by counselors have only themselves to blame if they chose to sign the certificate nevertheless.

Federal Truth-in-Lending law requires that HECM lenders disclose to borrowers the Total Annual Loan Cost (TALC) of the loans. This is the annual rate that, when applied to the cash advances received by the borrower, would generate the outstanding debt at a specified future date. (The total debt includes not only the cash advances and accrued interest, but also origination fees, closing costs, servicing fees, and insurance premiums [which all accrue interest] financed by the loan.) The TALC is considered the best indicator of a HECM's cost, and allows borrowers to compare costs across different types of reverse mortgages. [Scholen (1996); HUD (2000), pp.92-94. TALC requirements are discussed in detail on the NCHEC website, www.reverse.org/info.update.tila.html]

That some HECM borrowers complain about not understanding the "full costs" of the loans is not necessarily a reflection of inadequate counseling, since it is the lender's responsibility to disclose the TALC. Since there are strict federal guidelines, it is highly unlikely that any lender would fail to properly disclose TALC rates to borrowers.

[76] HUD is vague about the type of housing options that must be discussed with the prospective borrower. According to HUD's HECM handbook (for use by HUD personnel, counseling agencies, and lenders), the counselor must discuss "[t]he options other than home equity conversion that are available to the borrower, including other housing. . . options." [HUD (1994), p. 2-3]

mortgage programs (such as DPLs and PTDs); (c) the financial implications associated with HECMs; and (d) the consequences of HECMs on tax status, eligibility for public benefits, and estate and heirs of the homeowner.[77] Whenever feasible, face-to-face counseling must be provided. HUD regulations stipulate that "[t]elephone counseling should not even be mentioned as an alternative to the homeowner unless the possibility of face-to-face counseling has been completely ruled out."[78]

COUNSMSA is the number of HUD-approved housing counselors who offered HECM counseling[79] in the county's metropolitan area as of March 2001, per 1,000 units of potential demand in the metropolitan area.[80] A high value for *COUNSMSA* is interpreted as a relatively high degree of market development.

This measure of market development is imperfect. As mentioned in footnote 80, not all counties have HECM counselors, and the number of metropolitan-wide counselors is used to calculate *COUNSMSA*. This means that some homeowners in a metropolitan area will live in the county where counselors are located, and others will not. Those living in the same county as the counselors will likely have better access to counseling services. Another shortcoming with *COUNSMSA* is that it does not account for the quality of the counseling provided, which can vary greatly from one

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[77] HUD (July 1995).
[78] HUD (1994).
[79] HECM counseling is one of several types of counseling that may be offered by HUD-approved housing counseling agencies. These include default/foreclosure counseling, rent delinquency counseling, pre-purchase and pre-rental counseling [HUD (July 1995)].
[80] Many of the counties analyzed in this study have no HECM counselors. For this reason, the number of counselors across the metropolitan area is used.

housing counseling agency to another.[81] Lastly, the number of agencies that are approved by HUD to offer HECM counseling may overstate the number that actually provide the service.[82]

The other measure of HECM market development is *LENDERS*, the number of financial institutions that have sold (originated) one or more HECMs in a county over a ten-year period (1990-2000), per 1,000 units of potential demand. The period 1990-2000 captures all mortgagees that have sold HECMs since the inception of the program except for two sold in 1989.[83]

Any given financial institution can sell one or more HECMs in a county. In six of the 135 counties for which data were obtained, the value of *LENDERS* is zero; by definition, *HECM9000* must also be zero in these six cases. These six counties are excluded from the regressions reported here, leaving 129 observations.

Individual financial institutions may vary greatly in marketing intensity, managerial skill, and customer satisfaction. Moreover, *LENDERS* almost certainly undercounts the number of institutions that have actually entered the HECM market in a county, as those that offer the HECM product but fail to sell any are

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[81] HUD (2000), and Ken Scholen [personal communication], who has trained many of today's HECM counselors.
[82] HUD (2000).
[83] The HUD data used in this study to calculate *LENDERS* and *HECM9000* show that two HECMs were sold to residents of Bernalillo County, New Mexico in 1989, a county that is not among the observations of this study. However, it is well established that the first HECM was closed in 1989 by the James B. Nutter Company to a resident of Fairway, Kansas, which is in Johnson County, one of the counties included in the 129 observations of this study [HUD (1990, p.1-4) and Scholen (1998, p.115)]. The HUD data erroneously show zero HECMs sold in Johnson County in 1989. The one sold in 1989 is almost certainly included in the 1990 data.

unobservable in the data.[84] As with *COUNSMSA*, *LENDERS* should be considered a crude estimate of market development.

IV.5. POSSIBLE ENDOGENEITY OF LENDERS

Ceteris paribus, demand for HECMs will be higher in a county where many financial institutions have entered the HECM market than in a county where few have. Not only are prospective borrowers more likely to have heard about HECMs in counties where the number of active lenders is relatively high, but also the transaction costs for obtaining a HECM are probably lower. Transaction costs would include gathering information about how HECMs work, locating financial institutions that offer them, visiting a lender, and comparison-shopping.[85]

Commercial banks, savings and loans, credit unions, and mortgage companies[86] that choose to offer the HECM product are already in place, and simply offering a new product to their customers. It is unlikely that lenders evaluated any of the independent variables used here when determining whether or not to offer HECMs in a county. In addition to wanting to tap into "the potentially large and growing" HECM market arising from the impending retirement of the baby boom

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[84] That is, financial institutions that offered the HECMs but failed to sell any do not appear in the data. Only lenders that have sold at least one HECM from 1990 through 2000 are included in the data.

[85] While interest rates on newly originated HECMs are equal across lenders, origination fees and closing costs may vary (within limits set by HUD), at least theoretically. According to Venessa White of BNY Mortgage Co. [personal communication], providing customer service, rather than adjusting origination fees and/or closing costs, is the main way that lenders compete for HECM customers. Differences in origination fees and closing costs across lenders cannot be accounted for in the data. It is assumed that, on average, residents across the counties studied are charged the same origination fees and closing costs. Comparison-shopping would include not just comparing origination fees and closing costs across different lenders, but in comparing customer service.

[86] Seventy-five percent of HECMs originated in 1999 were by mortgage companies. [HUD (2000)] The percent sold by credit unions is very small—data obtained from HUD show that of the 44,418 HECMs closed through the end of 2000, only 28 were originated by credit unions.

generation, one of the main reasons lenders decide to offer HECMs is as a hedge against demand fluctuations in the conventional forward mortgage market.[87] For example, if demand for forward mortgages falls because of rising unemployment, then HECM business may offset the consequent reduction in a lender's revenue.

It is assumed that once a financial institution has decided to offer HECMs, its supply of HECMs is completely responsive to demand. That is, the institution will sell as many HECMs as are demanded by borrowers. Given the very modest numbers of HECMs sold thus far in the U.S., it is extremely doubtful that lenders are concerned with putting a cap on the number of HECMs they will originate due to investment portfolio considerations. Indeed, some lenders are dropping out of the HECM program because of low activity.[88]

In other words, *LENDERS* is considered exogenous in the OLS regression. However, to account for the possibility that it is endogenous, a TSLS regression is also performed, with *LENDERS* as the instrumented variable.

IV.6. Instruments in TSLS

In the TSLS regression, *BANKS*—the number of commercial and savings banks in the county (1995 data) per 1,000 units of potential demand—is used as an instrument for *LENDERS*.[89] It is reasonable to suppose that *LENDERS* is more likely

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[87] HUD (2000), p.33.

[88] In 1998 and 1999, for the first time since the initiation of the program, more financial institutions left the HECM market than entered it. The decision to leave has been based mainly on a perceived lack of demand [HUD (2000)]. At least one lender was active in at least one year from 1990-2000 in every county evaluated in the regressions of this study.

[89] The essence of the TSLS technique is that each potentially endogenous right-hand side variable (in this case, only one—*LENDERS*) is replaced by a proxy that is assumed to be uncorrelated with the

to be high when *BANKS* is high. The simple correlation between the two variables is 0.47 (Table 7).

Table 7 suggests that two other variables—*INCOME* and *MARRYKID*—may be good instruments for *LENDERS* (simple correlations with *LENDERS* of 0.40 and 0.65, respectively). *INCOME* is the median income of the county, and *MARRYKID* is the percent of all households composed of married couples residing with their children.

It is not unlikely that financial institutions evaluate income and household composition when making marketing decisions. High-income areas are likely to generate greater business activity for financial institutions on both the liability side (deposits) and asset side (loans) of their balance sheets, and so are attractive to these institutions. Indeed, the Community Reinvestment Act (CRA) was passed to ensure that depository institutions were meeting the credit needs of the low- and moderate-income households located in their communities.[90] Such protections were not needed for high-income households. *INCOME* is used as an instrument for *LENDERS* with the assumption that financial institutions will be drawn to high-income areas.[91]

As mentioned above (footnote 86), mortgage companies have closed about three out of every four HECMs sold to date. Either commercial banks or savings and loans have sold all but a trivial number of the other 25% of HECMs. The main

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disturbance. The proxy is an estimate of the original variable determined by regressing the original on all exogenous variables, including the instruments. [Greene (1997), Ch.16.]

[90] *U.S. Code*, Title 12, §2901.

[91] The CRA does not prevent a depository institution from choosing where to locate; rather, it requires the institution to meet the credit needs of the entire community (including low- and moderate-income neighborhoods) in which they do locate.

business of savings and loans is making conventional home loans. Thus, the vast majority of HECM originators specialize in the residential mortgage market.

Areas where a high percent of households are composed of married couples with children are probably attractive marketing areas for such financial institutions. Demand in these areas for the non-reverse-mortgage products they sell—home purchase loans, refinancing of home loans, and home equity lines of credit—may be relatively high. For example, in 1999, nearly 30% of all homeowners were in this demographic group.[92] For these reasons, *MARRYKID* is used as another instrument for *LENDERS*. There are three instruments for *LENDERS*, then: *BANKS*, *INCOME*, and *MARRYKID*.

[92] U.S. Census Bureau (2001).

V. FINDINGS

V.1.A. OLS—LENDERS INCLUDED

Table 8 shows all of the regression results: OLS with and without the possibly endogenous variable *LENDERS*, and TSLS. The OLS regression including *LENDERS* is reported first, and then the consequences of excluding the variable are reviewed, followed by a discussion of the TSLS findings.

The adjusted R-square (0.235) of the OLS regression including *LENDERS* indicates that the overall explanatory power of the model is modest, but this is a respectable figure for a cross-sectional, small sample-size analysis. All of the variables have the correct signs except for *COUNSMSA* (-3.485) and *RELIGION* (0.054). Neither of these is statistically significant. The measurement problems of *COUNSMSA* that were discussed in Chapter IV.4 may explain the poor performance of that variable in the regression.

The other measure of market development, *LENDERS*, is positive and highly significant. Each additional HECM lender that becomes active in an area is predicted to lead to an increase of HECMs demanded of about 2.3, which represents about 20% of the mean of the dependent variable *HECM9000* (11.44).

WHITE is positive (0.141), as expected, and significant at the five percent level.[93] The regression results also support the hypothesis that education has a positive influence on HECM demand—*ED* is positive (0.346) and significant at the one percent level. The percent of persons born in the same state as their current

[93] Hereinafter, all analyses of statistical significance refer to one-tailed tests.

residence is also found to influence demand. As expected, *BORN_IN* is negative (-0.127), although it meets a lower threshold of statistical significance (10%).

Fairly strong evidence is found supporting the theory that a weak attachment to their community by the old (*OLD_OUT* is high) will result in a relatively low demand for reverse mortgages. The coefficient on *OLD_OUT* equals -1.29. When the percent of old persons that out-migrate increases by one (or by about 16% of *OLD_OUT's* mean of 6.1), then the number of HECMs sold in an area is estimated to decline by 1.29—or by about 11% of the mean of *HECM9000*. *OLD_OUT* is significant at the one percent level.

Weak family and community ties among the young are found to increase demand for reverse mortgages. *Y_OUT* is highly significant (1% level) and positive (0.767). A one-unit increase in *Y_OUT*—seven percent of its mean (14.86)—is predicted to increase demand for HECMs by 0.767—approximately seven percent. Approximating at the means, the elasticity of demand with respect to young out-migration is equal to one. The elasticity of demand with respect to old out-migration is higher at about 1.5.

The OLS results provide rather strong support for the theory that an area's family and community ties influence demand for reverse mortgages. This implies that a bequest motive among old homeowners has an effect on their decisions regarding whether or not to take out these loans.

V.1.B. OLS—LENDERS EXCLUDED

As discussed in Chapter IV.5, *LENDERS* is possibly endogenous. A more rigorous accounting of this possibility is given in Chapter V.2, where TSLS results are presented. It is interesting, though to compare the results from excluding *LENDERS* from the OLS estimation from those described above, where *LENDERS* was included.

The only noteworthy change is that *COUNSMSA* is negative (–3.485) in the previous regression and positive (1.834) in the regression excluding *LENDERS*. The values of the remaining coefficients are similar to those in the previous regression, although the levels of significance are slightly different in a few cases. For example, both *Y_OUT* and *OLD_OUT* are significant at the five percent level, as opposed to one percent previously. The overall explanatory power does not change when *LENDERS* is excluded (adjusted R-square equals .235).

Little harm, then, results from excluding the possibly endogenous *LENDERS*. If no suitable instruments for the variable could be found in order to perform a TSLS, then it could be dropped from the analysis altogether without changing the picture that emerges from the regressions: family and community ties of an area do indeed influence demand for reverse mortgages.

V.1.C. POSSIBLE HETEROSCEDASTICITY IN OLS

The error terms in the OLS regression may be heteroscedastic. If this were true, then OLS might not be the appropriate econometric specification for this study, and an alternative specification such as a weighted least squares or a log-linear form

might be preferred. Although, in the presence of heteroscedasticity, the OLS estimators are unbiased, the estimated variances are biased, invalidating tests of significance.[94]

The possibility of heteroscedasticity in the OLS regressions reported here may be illustrated as follows. Consider a model in which the dependent variable is continuous. Let y_{ij} be the value of this variable for the i^{th} person in the j^{th} county. At the individual level, the model is:

$$y_{ij} = \alpha + \beta x_{ij} + u_{ij}, \qquad \text{[Equation 1]}$$

where x_{ij} is the independent variable or a vector of these variables, and u_{ij} is the disturbance term with a mean of zero. Assume homoscedasticity at the individual level:

$$Eu_{ij}^2 = \sigma^2.$$

Now average Equation 1 over the n_j old homeowners composing potential demand in the j^{th} county to get

$$y_j = \alpha + \beta x_j + u_j,$$

where y_j, x_j, and u_j are means. In this paper, y_j = *HECM9000*. If n_j varies among counties, the error term may be heteroscedastic:

$$Eu_j^2 = \frac{\sigma^2}{n_j}.$$

[94] Maddala (1992), Ch.5.

That is, the disturbance may be inversely related to the size of potential demand in the county.[95]

White's general test of heteroscedasticity was used to+ determine whether or not it is likely that the OLS disturbances are biased in this manner.[96] To conduct the test, the OLS residuals were squared and then regressed on a constant, the inverse of potential demand, and the squared inverse of potential demand. The number of observations was multiplied the resulting R-square to obtain the test statistic, which is asymptotically distributed as $\chi^2[2]$ (the degrees of freedom equals the number of regressors, excluding the constant).

In this instance, the $\chi^2[2]$ statistic equals 0.8643, far below the critical value of 9.22 at the one percent significance level; therefore, the null hypothesis that OLS is homoscedastic is not rejected. The significance tests on the OLS coefficients that were discussed in the preceding section therefore are valid.

V.2. TWO-STAGE LEAST SQUARES

As discussed in Chapter IV.5, *BANKS*, *MARRYKID*, and *INCOME* are used as instruments for the possibly endogenous *LENDERS* in the TSLS regression. An F-test of their joint significance reveals that, as a group, these are strong instruments for *LENDERS* (F-ratio equals 23.04).[97]

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[95] One possible solution to this specific form of heteroscedasticity—if indeed it exists—would be to compute a weighted least squares regression using the square root of n_j as weights. [Johnston and Dinardo (1997), pp.171-172.]

[96] White (1980).

[97] In the first stage of the TSLS, MARRYKID (coefficient of .1133) and BANKS (coefficient of .0568) are significant at the one percent level (two-tailed). INCOME (coefficient of .00002) is insignificant.

The results of the TSLS regression are strikingly similar to the OLS results—all of the coefficients are nearly identical, as are their levels of significance. The only difference—a relatively minor one—is that the coefficient on *LENDERS* is about 10 percent lower in the TSLS regression, and its level of significance is five percent instead of one percent.

Thus, the TSLS regression adds virtually nothing to the story already told by OLS. This, along with the findings discussed in Chapter V.1.B regarding the OLS regression excluding *LENDERS*, suggests that *LENDERS* is not endogenous. A Hausman χ^2-test of the consistency of OLS provides further confirmation that the OLS specification reported in Chapter V.1.A is suitable for the purposes of this study.[98] The findings in that chapter that family and community ties influence demand for reverse mortgages are sound.

[98] The test is sometimes interpreted as testing the endogeneity of a particular variable, but technically this is incorrect. The null hypothesis of the test, which is performed under the assumption that the OLS estimates are efficient and that the TSLS estimates are inefficient and consistent, is that the differences in the coefficients from the OLS and TSLS regressions are not systematic. [Johnston and Dinardo (1997), p.339.]

VI. CONCLUSION

Reverse mortgages are loans against home equity that do not have to be repaid until the borrower moves, sells the home, or dies. This paper explores whether an area's family and community ties influence demand for one type of reverse mortgage—the HECM—but the implications extend to other types of reverse mortgages. Although several previous studies obtained estimates of the potential demand for reverse mortgages, this is the first study, to my knowledge, of how actual demand may be determined, and of how it may be related to potential demand.

The evidence concerning the impact of market development is mixed: although the number of active HECM lenders (adjusted for potential demand in the area) is found to have a significantly positive effect upon demand, the number of HECM counselors is found not to have a significant effect, and is negative in the two regressions that include the lenders variable. This could be due to the measurement imperfections of the variable noted in Chapter IV.5.

Race is found to influence demand—the higher the percent of the population that is white, the greater demand. The overall educational achievement of an area has a significant, positive influence on demand, suggesting that more financially sophisticated individuals are likelier to be receptive to the complicated reverse mortgage loan.

Fairly strong evidence is found that family and community ties do influence demand for reverse mortgages. One exception among the variables relating to family or community ties is the variable on religious adherence. Degree of religious adherence is not found to be significant; indeed, the coefficient on that variable has

the wrong sign (positive) in all three regressions. Perhaps religious organizations—as is true of the Mormons in Utah—are involved in educating their older members about reverse mortgages. If so, then this would have a positive influence on demand that would confound the negative influence of the family ties that the variable is intended to reflect.

The other variables on family or community ties provide more convincing results.

The variable *Y_OUT* is significantly positive in all of the regressions, suggesting that weak family and community ties among the young have a positive influence on demand. *OLD_OUT* is significantly negative across the regressions: when the old's ties to their communities are weak, demand for reverse mortgages will be low. Demand is predicted to fall when the percent of persons that were born in the same state as their current residence rises.

A much more ambitious research project would involve estimating potential demand for many counties throughout the United States. Unless only metropolitan area counties are analyzed, such a project would also entail redefining out-migration, which in this paper has been defined as moving from a county and out of that county's metropolitan area. Also, calculating out-migration figures is quite cumbersome and time-consuming, as the data are not machine-readable, and must be cut and pasted from "user-friendly" tables available on CD-ROMs prepared by the Census. Perhaps new out-migration data that will be available from the 2000 census will be easier to manipulate.

The results of this study suggest that a bequest motive for holding home equity exists in some households. Financial institutions choosing to offer HECMs therefore should be sensitive to the family ties in their marketing areas, both when implementing outreach and informational programs designed for their constituents, and when assessing the viability of offering the HECM product.

The 50 initial lenders—each authorized to originate up to 50 HECMs—in the HECM-demonstration were selected by lottery. Selection was based upon ten HUD regions, and the proportion of the nation's total older homeowners that resided in these regions. According to HUD (1990), "the Department [HUD] could have selected demonstration areas, defined by community or [s]tate. . . [but did not] on the ground that the Department should not prejudge which communities. . . were suitable participants."[99] While this strategy for initiating the demonstration may be understandable, the results of this study suggest that targeting areas of weak family ties, and areas where the old are unlikely to migrate out of the community, might have improved the success of the program.

[99] *op. cit.*, p.4-13.

Appendix A. Explanation of Regression Variables.

The unit of analysis is a county. All counties analyzed are in one of 26 selected metropolitan areas in the United States. The expected signs of the regression coefficients are in parentheses following the variable names.

- *Dependent variable:*

HECM9000

The number of Home Equity Conversion Mortgages (HECMs) endorsed 1990-2000 by the Federal Housing Administration for borrowers residing in the county, divided by potential demand for reverse mortgages in the county in 1989, times 1,000.

Potential demand equals the number of homeowners aged 70 and over who have $30,000 or more in home equity. Rasmussen, Megbolugbe, and Morgan (1995) estimated potential demand for selected (P)MSAs. The county-level figures used in this paper are weighted averages of Rasmussen, Megbolugbe, and Morgan's (P)MSA figures. The weights are based on the percent of a (P)MSA's homeowners aged 75 and over that reside in each county (1990 data). Data on homeowners aged 70 and over were not available, so those aged 75 and over were used instead.

- *Independent variables relating to both family and community ties:*

Y_OUT (+)

The percent of residents aged 25-39 in 1985 who moved to a county outside of the metropolitan area by 1990.

OLD_OUT (-)

The percent of residents aged 60-79 in 1985 who moved to a county outside of the metropolitan area by 1990.

- *Independent variables relating to family ties:*

RELIGION (-)

The percent of residents who belong to a religious denomination (1990 data).

BORN_IN (-)

The percent of the population who were born in the county's state (1990 data).

• *Other independent variables that influence demand for HECMs:*

WHITE (+)

The percent of the population who are white (1996 data).

ED (+)

The percent of residents aged 25 and over who have graduated from college (1990 data).

• *Measures of the degree to which the HECM market is developed:*

LENDERS (+)

The number of lenders who sold HECMs in the county 1990-2000, divided by potential demand for reverse mortgages in the county in 1989, times 1,000.

COUNSMSA (+)

The number of HUD-approved HECM counselors in the county's metropolitan area as of March 2001, divided by the metropolitan area's potential demand for reverse mortgages in 1989, times 1,000.

• *The following variables are used as instruments for LENDERS in TSLS regressions:*

BANKS

The number of (FDIC-insured) commercial and savings bank offices in the county as of June 1995 divided by potential demand for reverse mortgages in the county in 1989, times 1,000.

MARRYKID

The percent of total households composed of married couples living with their children (1990 data).

INCOME

Median household money income (1993 data).

Table 1. Availability of Different Types of Reverse Mortgages.

Type of reverse mortgage	*Availability*
Multipurpose, private sector loans:	
HUD's FHA-insured HECM*	All 50 states and D.C.
Fannie Mae's Home Keeper*	All 50 states and D.C.
Financial Freedom Senior Funding Corporation's (FFSFC's) Cash Account Plan*	*Current availability:* AZ, CA, CO, CT, FL, GA, IL, MD, MI, NV, NJ, OR, PA, UT, VA, WA, WY, and Washington, D.C. *Availability expected to extend to the following states by April 2001:* HI, IN, KY, MA, MN, NM, NC, OH, TX, VT, WI.
Special purpose, public sector loans:	
Deferred payment loans**	Generally offered by local nonprofit or government agencies on housing or community development
Property tax deferrals**	Available in all or parts of CA, CO, FL, GA, IL, IA, ME, MD, MA, MI, NH, ND, OR, SD, TN, TX, UT, VA, WA, WI, WY, and D.C.

*Availability as of February 2001.

**Availability as of October 1996.

Source: Scholen (1997) for public-sector loans; Tom Scabareti, Marketing Vice President at FFSFC, for data on their Cash Account Plan (private communication); National Reverse Mortgage Lenders Association's "Lenders List," accessed at http://www.reversemortgage.org/Lenders%20Lists/lenders1.htm in February 2001, for data on the HECM and Home Keeper.

Figure 1. Out-Migration Matrix

County A: **OLD, YOUNG**	*County B:* **OLD**, young
County C: old, **YOUNG**	*County D:* old, young

Explanation: "**YOUNG**" means that a low percent of young people move out of the county's metropolitan area; "young" means that the percent is high. Similar definitions apply to "**OLD**" and "old."

Table 2. Itemized Costs on a HECM Loan

1. Origination Fee: The maximum allowable is the greater of $2,000 or 2% of the "maximum claim amount," which is the lesser of the home's value or FHA 203(b) limit for the area. Can vary from lender to lender. May be financed by the loan.

2. Closing Costs: These include fees for services such as an appraisal, title search and insurance, surveys, inspections, recording fees, mortgage taxes, etc. Generally range from $1,000 to $1,800, but can be over $3,000 in some states, especially for higher-valued homes. Lenders within the same state generally charge the same fees, but there can be wide interstate differences. May be financed by the loan.

3. Mortgage Insurance: Charge in two parts: (1) an up-front premium of 2% of the maximum claim amount, and (2) a monthly premium of 1/12 of 0.5% of the outstanding principal balance. May be financed with the loan. The insurance premiums are collected by FHA, which protects borrowers from lender default, and lenders from "cross-over risk." May be financed by the loan.

4. Servicing Fee: Generally range from $20 to $30 per month for servicing the loan, which includes making loan advances, transferring insurance premiums to FHA, monitoring compliance of the loan agreement (such as maintaining the home and paying property taxes), and sending account statements. Fee is added to loan balance each month.

5. Interest Rates: Today, all lenders charge the same interest on HECM loans: the 1-year Treasury security index plus a lender's margin. The lender's margin is set by Fannie Mae, which purchases virtually all HECMs (in the secondary market.) In March 2001, the lender's margin was 1.20 percentage points for monthly adjustable loans, and 2.10 points for annually adjusted loans. While the interest rate applied to the outstanding balance changes periodically with changes in the T-bill rate over the life of the loan, *the payments to the borrower do not change.* A fixed rate HECM is also available, but very few have been originated because Fannie Mae will not purchase fixed rate HECMs.

Source: Scholen (1997) except for interest rates, for which Roger Reynolds of Wells Fargo and Ken Scholen of the National Center for Home Equity Conversion provided information in private communications.

Table 3. Average Number of Years of Life Remaining, Selected Ages, Sex and Race, U.S., 1998.

Age	Life expectancy (in years)				
	Total	Females	Males	Whites	Blacks
65	17.8	19.2	16.0	17.8	16.1
70	14.3	15.5	12.8	14.4	13.0
75	11.3	12.2	10.0	11.3	10.5
80	8.6	9.2	7.5	8.5	8.2

Source: U.S. Department of Health and Human Services (2001).

Table 4. Characteristics of HECM Borrowers and All Older Homeowners

Household characteristics	HECM borrowers (1995 HUD analysis)*	HECM borrowers (1999 HUD analysis)*	All older homeowners**
Median age (in years)	76	75	74
Median annual income***	$10,368	NA	$18,607
Sex/household composition:			
Female living alone	59.5%	56.3%	29.6%
Male living alone	12.4%	13.9%	8.3%
Living with others	28.1%	29.8%	62.1%
Race/Ethnicity:			
Non-Hispanic White	92.7%	86.4%	87.2%
Non-Hispanic Black	5.9%	9.2%	7.8%
Hispanic	0.8%	3.1%	3.7%
Other	0.6%	1.3%	1.3%

Note: NA = Not Available.

*Minimum age of a HECM borrower is 62 years. Data are from HECM application materials as of the date of application.

**For householders aged 65 and over. Figures are for 1997 [U.S. Census Bureau (1999)], except for median income, which is for 1995 [U.S. Census Bureau (1997)].

***HUD (2000) warns that the data on the median income of HECM borrowers may not be reliable; hence, the figure here (taken from HUD (1995)) should be viewed with caution. (A later analysis of the data revealed many cases where values were zero or missing.)

Source: For HECM data, HUD (1995) and (2000); for all homeowners, U.S. Census Bureau (1997) and (1999), except for race/ethnicity [HUD (2000)].

Table 5. Metropolitan Areas and Component Counties.

State/County FIPS Code (1990 definitions)	Metropolitan area and component counties	State/County FIPS Code (1990 definitions)	Metropolitan area and component counties
	Birmingham, AL		***New York, NY***
01009	Blount	36005	Bronx
01073	Jefferson	36047	Kings
01115	St. Clair	36061	New York
01117	Shelby	36079	Putnam
01127	Walker	36081	Queens
	Chicago, IL	36085	Richmond
17031	Cook	36087	Rockland
17043	Du Page	36119	Westchester
17111	McHenry		***Newark, NJ***
	Cleveland, OH	34013	Essex
39035	Cuyahoga	34027	Morris
39055	Geauga	34037	Sussex
39085	Lake	34039	Union
39103	Medina		***Oklahoma City, OK***
	Denver, CO	40017	Canadian
08001	Adams	40027	Cleveland
08005	Arapahoe	40083	Logan
08031	Denver	40087	McClain
08035	Douglas	40109	Oklahoma
08059	Jefferson	40125	Pottawatomie
	Indianapolis, IN		***Philadelphia, PA-NJ***
18011	Boone	34005	Burlington, NJ
18057	Hamilton	34007	Camden, NJ
18059	Hancock	34015	Gloucester, NJ
18063	Hendricks	42017	Bucks, PA
18081	Johnson	42029	Chester, PA
18097	Marion	42045	Delaware, PA
18109	Morgan	42091	Montgomery, PA
18145	Shelby	42101	Philadelphia, PA

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State/County FIPS Code (1990 definitions)	Metropolitan area and component counties	State/County FIPS Code (1990 definitions)	Metropolitan area and component counties
	K.C., MO-KS		***Pittsburg, PA***
20091	Johnson, KS	42003	Allegheny, PA
20103	Leavenworth, KS	42051	Fayette, PA
20121	Miami, KS	42125	Washington, PA
20209	Wyandotte, KS	42129	Westmoreland, PA
29037	Cass, MO		***Portland, OR***
29047	Clay, MO	41005	Clackamas, OR
29095	Jackson, MO	41051	Multnomah, OR
29107	Lafayette, MO	41067	Washington, OR
29165	Platte, MO	41071	Yamhill, OR
29177	Ray, MO		***Rochester, NY***
	L.A./Orange Co., CA	36051	Livingston, NY
06037	Los Angeles	36055	Monroe, NY
06059	Orange	36069	Ontario, NY
	Memphis, TN-AR-MS	36073	Orleans, NY
05035	Crittenden, AR	36117	Wayne, NY
28033	De Soto, MS		***Salt Lake City, UT***
47157	Shelby, TN	49011	Davis, UT
47167	Tipton, TN	49035	Salt Lake, UT
	Minneapolis, MN-WI	49057	Weber, UT
27003	Anoka		***Seattle, WA***
27019	Carver	53033	King, WA
27025	Chisago	53061	Snohomish, WA
27037	Dakota		***Tampa, FL***
27053	Hennepin	12053	Hernando, FL
27059	Isanti	12057	Hillsborough, FL
27123	Ramsey	12101	Pasco, FL
27139	Scott	12103	Pinellas, FL
27163	Washington		***Buffalo, NY***
27171	Wright	36029	Erie, NY
55109	St. Croix, WI		

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(Table 5 continued from previous page.)

State/County FIPS Code (1990 definitions)	Metropolitan area and component counties	State/County FIPS Code (1990 definitions)	Metropolitan area and component counties
	New Orleans, LA		***Atlanta, GA***
22051	Jefferson Parish	13013	Barrow County
22071	Orleans Parish	13035	Butts County
22087	St. Bernard Parish	13057	Cherokee County
22089	St. Charles Parish	13063	Clayton County
22095	St. John the Baptist Parish	13067	Cobb County
22103	St. Tammany Parish	13077	Coweta County
	Miami, FL	13089	DeKalb County
12025	Dade, FL	13097	Douglas County
	Phoenix, AZ	13113	Fayette County
04013	Maricopa, AZ	13117	Forsyth County
	San Diego, CA	13121	Fulton County
06073	San Diego, CA	13125	Gwinnett County
	San Francisco, CA	13151	Henry County
06041	Marin, CA	13217	Newton County
06075	San Francisco, CA	13223	Paulding County
06081	San Mateo, CA	13247	Rockdale County
	Milwaukee, WI	13255	Spalding County
55079	Milwaukee, WI	13297	Walton County
55089	Ozaukee, WI		
55131	Washington, WI		
55133	Waukesha, WI		

Table 6. Summary Statistics.

Variable	Mean	Standard deviation	Minimum	Maximum
HECM9000	11.44	12.25	0.37	65.11
Y_OUT	14.86	5.54	5.47	31.38
OLD_OUT	6.10	2.42	1.82	14.61
RELIGION	54.92	13.73	25.90	84.50
BORN_IN	64.27	16.50	18.70	90.02
MARRYKID	29.92	7.10	9.79	47.12
WHITE	85.50	14.21	33.90	99.50
INCOME	38,115	8,924	20,710	63,560
ED	20.94	8.52	6.70	44.00
LENDERS	1.93	1.67	0.15	10.03
COUNSMSA	0.16	0.18	0.02	0.77
BANKS	13.54	7.07	3.79	43.22

n = 129

Table 7. Simple Correlation Matrix.

	Y_OUT	*OLD_OUT*	*RELIGION*	*BORN_IN*	*MARRYKID*	*WHITE*	*INCOME*	*ED*	*LENDERS*	*COUNSMSA*	*BANKS*
Y_OUT	1										
OLD_OUT	0.5126	1									
RELIGION	-0.0922	-0.1836	1								
BORN_IN	-0.5027	-0.4485	0.4809	1							
MARRYKID	-0.2893	-0.01	-0.0179	0.3498	1						
WHITE	-0.2758	0.0645	-0.2581	0.1716	0.5994	1					
INCOME	0.0517	0.501	-0.1421	-0.028	0.5787	0.4817	1				
ED	0.5082	0.507	-0.0773	-0.3746	-0.1758	-0.0516	0.5909	1			
LENDERS	-0.1201	-0.0036	-0.0616	0.1844	0.6535	0.3346	0.4021	-0.0734	1		
COUNSMSA	0.3775	-0.1477	0.2027	0.1287	0.0533	-0.2351	-0.236	-0.1162	0.1006	1	
BANKS	-0.0037	0.0251	-0.0164	-0.0507	0.4613	0.1373	0.4939	0.2853	0.4698	0.0675	1

Table 8. Ordinary Least Squares, with and without *LENDERS*, and Two-Stage Least Squares.[1]

Variable	OLS with *LENDERS*	OLS without *LENDERS*	TSLS[2]
Y_OUT	0.767 ** (0.296)	0.666 * (0.310)	0.756 ** (0.299)
OLD_OUT	-1.290 ** (0.534)	-1.106 * (0.558)	-1.271 ** (0.539)
RELIGION	0.054 (0.087)	0.030 (0.091)	0.051 (0.088)
BORN_IN	-0.127 ‡ (0.086)	-0.097 (0.090)	-0.124 ‡ (0.087)
WHITE	0.141 * (0.081)	0.221 ** (0.082)	0.149 ** (0.086)
ED	0.346 ** (0.144)	0.359 ** (0.151)	0.348 ** (0.144)
COUNSMSA	-3.485 (7.225)	1.834 (7.426)	-2.909 (7.478)
LENDERS	2.265 ** (0.622)	---	2.020 * (1.024)
constant	-9.961 (10.062)	-13.809 (10.501)	-10.377 (10.162)
Number of obs.	*129*	*129*	*129*
Adj R-squared	*0.235*	*0.235*	*0.234*
Root MSE	*10.718*	*10.718*	*10.725*
Hausman χ2-test of the consistency of OLS	---	---	*0.09*
F-ratio from a test of the joint significance of the instrumental variables F[3, 118]	---	---	*23.04*

‡ Significant at 10% (one-tailed test).

* Significant at 5% (one-tailed test).

** Significant at 1% (one-tailed test).

[1] Coefficients are reported (standard errors in parentheses).

[2] Instrumented: *LENDERS.* Instruments: *BANKS, MARRYKID, INCOME.*

Data Sources

•*Potential demand for selected metropolitan areas:*

Rasmussen, David W., Isaac F. Megbolugbe, and Barbara A. Morgan, "The Potential Demand for Reverse Mortgage Products," Fannie Mae Office of Housing Research, Internal Research Report, April 1995.

•*Number of FHA-insured HECMs by county, lender, and year:*

Data were obtained from HUD.

•*Number of HUD-approved housing counseling agencies that provide HECM counseling:*

Data by state and zip code were obtained from HUD's "Housing Counseling Clearinghouse" website, http://www.hudhcc.org/agencies/hcamap.html. Counts of HECM counselors by county (and thus by metropolitan area) were derived by using Insight Software Solution's Zip Express 2000 software to match county names to zip codes.

•*County-level out-migration, by age, 1985-1990:*

U.S. Census Bureau, *County-to-County Migration Flow Files, 1990 Census of Population and Housing, Special Project 312 (SP-312)*, Out-Migration, CD-ROM.

•*Other county-level variables:*

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