Access to Homeownership in the United States:
The Impact of Changing Perspectives on Constraints to Tenure Choice

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Access to homeownership is an important social and economic issue in many countries around the world. However, the factors determining that access vary across countries. In the United Kingdom, where Duncan Maclennan (1977, 1991) played an important role in terms of research and policy advice, key factors included the privatization and pricing of council housing to make it affordable to lower income households. In the United States, there is relatively little public housing, so the affordability debate has centered more around what constrains renter households from transiting into owner occupancy. This chapter reviews and discusses the marked change in emphasis in U.S. research and policy policy circles on what constitutes the relevant budget constraint facing households making a tenure choice decision.

Specifically, the American focus has shifted from permanent income to (non-human) current wealth as the binding constraint on access to homeownership. This change has had three important impacts that have influenced the scholarly literature and U.S. public policy surrounding home ownership. Given that Duncan Maclennan has played such a prominent role in both the academic and policy worlds, this makes the topic especially relevant for this volume in his honor.

The first impact of the change has been on research into tenure choice generally and has involved a recasting of the driving forces in theoretical models of tenure transition. Rather than permanent income and the relative user costs of ownership and renting driving the decision, Jones (1995) provides a new characterization in which current net worth and the asset price of the home drive the transition from renting to owning. This new perspective is commented on more fully below. Empirical work by Jones (1989) and Linneman & Wachter (1989) confirms that current non-human wealth is

extremely important in explaining tenure differences across households and that it dominates permanent income as an explanatory factor.

Beyond that broad confirmation of the new theoretical insights, there also has been an important change in how racial differentials in home ownership rates in America are viewed—the second prominent impact of the new view of budget constraints in tenure choice. Recent research using micro data finds that racial differentials in home ownership narrow considerably, or are eliminated altogether for the mean household, in specifications with good household wealth controls. This is particularly relevant in the U.S. context, where large aggregate differences of 25 percentage points in home ownership propensities still exist by race. Building upon this work, Charles & Hurst (2001) recently have concluded that it is racial differences in mortgage application propensities that account for the bulk of the black-white difference in homeownership outcomes. Racial differences in income, in family structure, and in intergenerational transfers involving parental weath help explain the mortgage applications gap. Hence, wealth—this time of parents—again plays a critical role. Naturally, this has important implications for policy makers interested in narrowing the aggregate racial gap in home ownership in the United States.

The third major impact of the new perspective that current wealth is the primary binding constraint on the transition to home ownership has been on our understanding of housing affordability. The dominance of wealth over income in empirical tenure choice studies strongly suggests that relaxing down payment constraints, not policies that help households meet payment-to-income requirements (e.g., via lower interest rates), is what is needed to expand home ownership. Very low down payment loans have proliferated in

the United States recently, and the overall home ownership rate has increased. This is not to say that this is good policy, as the default experience for these loans is not yet known and has not been cycle tested (although that probably is changing as this chapter is written). Nevertheless, this real world development definitely has been influenced by recent research that has helped change our perspective on what really constrains the transition from renting to home ownership.

The remainder of this chapter is organized as follows. Section I introduces and discusses the new theoretical developments that have been associated with the view that current wealth is the key constraint to tenure choice. This section also includes a brief discussion of the key initial empirical work testing the theory. Section II then focuses on the impacts of the new view on racial differences in home ownership in the United States. Affordability issues are raised in Section III. Finally, there is a brief summary and conclusion.

I.   Constraints to Tenure Choice—Theory and Empirical Evidence

The literature on tenure choice is a long and venerable one because of its importance in housing economics.[1] The traditional model of tenure choice is one in which the rent-own decision is a function of the relative user costs of housing services obtained by owning versus renting and by permanent income, along with life cycle traits that reflect utility-based preferences for owner-occupancy.

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[1] The literature is voluminous and attempting to provide an exhaustive bibliography will not be attempted here. That said, the interested reader can obtain an excellent understanding of the key issues from a review of the following selected articles: Artle & Varaiya (1978), Weiss (1978), Rosen (1979), Hendershott (1980), Brueckner (1986), Poterba (1991), and Henderson & Ioannides (1993).

Rosen (1979) provides an especially clear elucidation of this model in which households pick the tenure mode offering them the greatest utility. Utility from ownership is given by

(1) $V_o = f(p_o, p_x, y)$

where V_o is the indirect utility function conditional on owning, p_o is the user cost (or price per unit) of housing services associated with ownership, p_x is the price of all other goods (with x being the numeraire good), and y is permanent income. Analogously,

(2) $V_r = f(p_r, p_x, y)$

where V_r is the indirect utility achieved conditional on renting and p_r is the user cost (or price per unit) of housing services associated with renting.

A household chooses to own if $V_o > V_r$. Empirical implementation of the model typically is done as part of a binary choice modeled in equation (3)

(3) $V^* = V_o - V_r = v(p_o/p_r, y, z)$

in which the price of housing services is put in terms of the numeraire good and z is included to capture household traits that might affect the utility associated with a particular tenure mode independent of the quantity of household services actually consumed. Equation (3) then is expressed as a likelihood function, with a logit or probit model estimated.

Underlying this structure is some uncertainty or imperfection that creates a preference for one tenure mode over another.[2] The lumpiness of housing, incomplete rental markets, and non-neutral taxation have been offered as candidates for why tenure

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[2] See Arnott's (1987) review for the details. With perfect knowledge and complete markets, neutral taxation, divisible housing and other assets, and no transactions costs, households would be indifferent between owning and renting.

preferences would arise.[3] For our purposes, it is noteworthy that permanent income is the

essential constraint on the tenure decision in this model. With housing being lumpy and

its demand essentially determined from a multiperiod optimization of housing

consumption, if households are not liquidity constrained, then some threshold level of

permanent income is required. Hence, in the absence of liquidity constrained households,

higher permanent income is expected to be associated with a higher probability of

owning.

       Jones (1995) provided a different perspective on tenure choice, arguing that tax

nonneutralities in particular do not provide a solid foundation upon which to base a

theory of tenure choice.[4] Building on a series of primarily empirical studies indicating

that many households were credit constrained[5], on data showing that a very large fraction

of American and Canadian households past a certain age were owners and remained

owners even in the face of substantial changes in incomes, interest rates, and the like, and

on the theoretical implications of newly developed asset pricing models with illiquid

durable goods[6], he suggested that there was a fundamental preference for ownership. In

this view, stable households that are not especially mobile across housing markets are

presumed to receive higher utility from ownership (holding constant the amount of

housing services across tenure, of course).

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[3] Because housing is heavily subsidized under the U.S. tax code, tax nonneutralities are particularly well studied in the American literature. Rosen (1979) is the canonical example of this strand of research. The interested reader should see Follain & Ling (1988) and the cites therein for a review.

[4] Jones (1995) noted that the empirical literature is ambiguous at best regarding the hypothesis that the probability of ownership is decreasing with relative user costs (p_o/p_r). Linneman (1985) also provides strong evidence that the tax sorting implications of the tax-based models are not borne out in reality.

[5] In particular, see Jones (1989), Linneman & Wachter (1989), Haurin (1991), and Duca & Rosenthal (1994).

[6] See Grossman & Laroque (1990).

Who rents in this world? The answer is primarily younger, less permanently formed households, those households with little wealth available to make a down payment, and those households with a relatively undiversified portfolio of assets comprised of highly leveraged, illiquid, risky assets. When do these households switch to owner-occupancy? They change tenancy when the net change in their utility from switching is non-negative. In an influential paper on asset pricing by Grossman & Laroque (1990), the agent purchases a home only after a threshold amount of a riskless, liquid asset has been accumulated.[7]

Current liquid wealth, not the wealth associated with human capital embedded in permanent income, is the essential constraint to home ownership in this world. The difference in utility between owning and renting can be written as

(4) $V^* = v(w, p_h, z)$

where w is the net wealth of the household, p_h is the stock price of housing (not the relative prices of a unit of the service flows)[8], and z captures demographics that reflect how permanently formed and/or mobile the household is. In Jones (1995), the implied wealth threshold in (4) is endogenously determined. Other researchers have proposed models with exogenous constraints, typically in the form of down payment requirements.[9]

While there are many other interesting conceptual issues underlying the differences in these theoretical perspectives on tenure choice, we now turn to the recent

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[7] Households need to hedge housing price risk in these models. See Plaut (1987) for an early version of this insight applied to the tenure transition decision.
[8] User costs are omitted from the pure form of this model because owned versus rental units are viewed as weak substitutes at best. In addition, it must be the case that one cannot expect a higher return to owner-occupied versus rental housing (regardless of one's tax bracket). See Jones (1995) for the details.
[9] See Artle & Varaiya (1978), Brueckner (1986), and Engelhardt (1994).

empirical evidence, as it is that which motivates the changing views on race and home

ownership and on housing affordability discussed in the introduction. While there were

indications that wealth constraints might be relevant to the tenure choice or tenure

transition process[10], Jones (1989) and Linneman & Wachter (1989) provided direct

evidence that down payment requirements themselves not only were very important, but

were dominant factors empirically.[11]

Jones (1989) estimated the probability of owning as a function of household net

worth (w), permanent income (y_p, itself estimated), illiquid asset holdings (ia), and a set

of demographic controls (z) as in equation (5)

(5) $\Pr(\text{Own}) = g(w, y_p, \text{ia}, z)$.

Importantly, net worth (w) was specified as a series of dummy variables indicating by

how much household net worth was less than or greater than house prices in the relevant

market area. Illiquid asset holdings were included to test for the presence of a Grossman

& Laroque (1990) and Plaut (1987) effect whereby households need to hedge housing

price risk. The models were estimated on Canadian cross sectional data, focusing on

younger households.[12]

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[10] For example, Dynarski & Sheffrin's (1985) finding that transitory income affects the probability of ownership hints that this complements net worth and that there is more than permanent income to the constraint story. Similarly, Henderson & Ioannides's (1987) conclusion that the steepness of one's permanent income path affects the probability of owning also suggests that permanent income alone is not all that is relevant.

[11] Credit should also be given to Bossons (1978), who Jones (1989, 1995) drew on for inspiration, and who provided the very first empirical evidence of which I am aware that household wealth strongly influenced the choice of tenure mode.

[12] Specifically, the micro data were from Statistics Canada's 1977 and 1984 Surveys of Consumer Finances (SCF).

Linneman & Wachter (1989) pursued a similar approach using U.S. data[13], but modeled their constraints based on the Federal National Mortgage Association (FNMA or Fannie Mae) and Federal Home Loan Mortgage Corporation (FHLMC or Freddie Mac) underwriting criteria for conventional loans. That is, they used the fact that these two agencies require mortgage insurance before they purchase any loan on a property with a loan-to-value (LTV) ratio of greater than 80 percent to guide their specification of the borrower's wealth constraint. This 20 percent equity down payment requirement implies that the maximum home purchase price that satisfies the underwriting wealth criterion is five times household net worth. The authors then devised a series of variables to reflect the degree by which a household was wealth constrained. Similar measures were included to capture the extent to which the household was constrained by income-related underwriting requirements of Fannie Mae and Freddie Mac.[14] Linneman & Wachter (1989) then estimated their models using the Federal Reserve Board's 1977 *Survey of Consumer Credit* and its 1983 *Survey of Consumer Finances*. They restricted their sample to recent movers in both cross sections.

The results from both of these papers strongly indicated that wealth constraints dominated income constraints in terms of influencing tenure status. Stated differently, the negative impact of being wealth constrained on the probability of ownership was far greater than that of being income constrained. A representative result from Linneman &

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[13] Caution is in order here, as Linneman &Wachter (1989) did not estimate the pure tenure transition model advocated by Jones in his 1989 or 1995 papers. In particular, they included a user cost measure that Jones has argued is inappropriate. While we do not wish to completely ignore issues such as this, they are not especially germane to our point here, which is that the general nature of the results—namely, that wealth constraints are hugely important empirically—is very similar across the papers. See the discussion immediately below for the details.

[14] Fannie Mae and Freddie Mac underwriting requirements stated that annual mortgage payments needed to be no more than 28 percent of the borrower's annual family income. See Linneman & Wachter (1989) for the details.

Wachter (1989, see their results from the 1977 sample in their Table 3) is that the probability of ownership was about 32 percent lower among highly income-constrained households than among unconstrained households (*cet. par.*). Thus, income constraints can and do matter, although the impact is weaker is more recent years, and it still pales in significance to the impact of being highly wealth constrained. For example, they report that highly wealth constrained households were 61 percent less likely to own that otherwise identical unconstrained households. This is an extremely large impact for a country in which just over 60 percent of all households own. Essentially, if an American household is wealth constrained as determined by standard underwriting criteria, the probability that it owns is quite low in absolute terms—even if it has all or many of the demographic traits such as being well educated, over 35 years old, and a married head with minor children in the home that typically are associated with owner occupancy.

In every sample examined in either study, the adverse impact of being highly wealth constrained exceeds that of being highly income constrained. Linneman & Wachter (1989) suggest that this is due to the fact that if a family cannot make the required down payment on its desired home, its most viable alternative is to rent. However, this is not the case if the family is income constrained, but not wealth constrained. In this situation, the family can reduce its loan-to-value ratio below 80 percent in order to satisfy the payment-to-income criteria. This explanation that there is another alternative to renting when the household is income constrained, but not wealth constrained, is intuitively appealing.

Other empirical work that followed has confirmed these initial results.[15] If anything, further refinements in the way wealth constraints are specified have led to increased empirical dominance of those variables. Thus, it is now clear to all that liquefiable wealth is the critical factor influencing the access to home ownership—for Americans and Canadians, at least. And, it is equally obvious that this is due to equity-related needs associated with down payment requirements.

This immediately suggests that savings behavior and savings ability, not merely current income and the level of interest rates, are important factors in determining who can own their residence. Moreover, the savings history of parents, not just younger households could be important because of the extent of intergenerational transfers. As the next two sections highlight, these factors are crucial to our understanding of racial differences in ownership propensities in the United States and to our understanding of what really drives housing affordability.

II.   Wealth Constraints and Racial Differences in Ownership in America

Aggregate racial differences in home ownership propensities long have been large in the United States. Decennial census data from 1970 show that the 61.2 percent of households with white heads owned versus 38.3 percent of households with black heads, so that the percentage of whites households owning was about 1.6 times that of black households. By 1990, ownership rates had increased roughly proportionately for both races so that the percentage of white owners still was nearly 1.6 times that of black owners (69.4 percent versus 44.5 percent).

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[15] For example, see Duca & Rosenthal (1994) and Gyourko, Linneman & Wachter (1999).

Racial differences generally are of interest in the United States for obvious historical reasons. Those pertaining to differences in ownership outcomes are especially so for at least three reasons: (a) the tax-favored status of owner-occupied housing[16]; (b) the important role that home equity plays in the creation and retention of household wealth[17]; and (c) the social benefits that many people attach to owning one's home.[18]

The empirical work discussed in the previous section is relevant to this issue because it raises the possibility that controlling for wealth could substantially narrow the estimated racial difference in the probability of owning. Aggregate-level racial differences in net worth are known to be substantial. Using data from the 1994 wave of the *Michigan Panel Study of Income Dynamics* (PSID), Charles & Hurst (2001) calculate that the mean wealth or net worth of black households is $43,365 versus $220,428 for white households. Skewness in the distribution of wealth certainly affects the means, but the wealth differential is large for the median black and white households, too. Specifically, the median black household's net worth is $9,435, while that for the median white household is $77,371.[19]

Thus, racial differences in wealth should be controlled for using micro data to see if this might help account for the large aggregate racial difference in the propensity to own. Results in Linneman & Wachter (1989) suggested that this might be very important. In

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[16] Poterba (1991) estimates that tax benefits lower the user cost of owning by about 15 percent for the highest income (and highest tax bracket) households.

[17] Even with the great boom in equities in the U.S. in the 1990s, recent research by Tracy et. al. (1999) shows that home equity still constitutes virtually all of household wealth for the vast majority of households, including the median household.

[18] See White & Green (1997) and DiPasquale & Glaeser (1999). They find that owning one's home is associated with better social outcomes for children and enhanced political and community involvement. That said, Oswald (1997, 1999) believes there is a downside to this social capital, primarily in terms of higher unemployment.

[19] See Charles & Hurst (2001) for the details behind their calculations. They use definitions and techniques typical of reseach into household wealth.

fact, when evaluated at the mean values of the relevant parameters, Linneman & Wachter's (1989) logistic function results indicate that there are no racial differences in ownership rates (*cet. par.*). That is, once wealth is carefully controlled for, an otherwise typical household with a black head was no less likely to own than an otherwise observationally equivalent household with a white head.

Gyourko, Linneman & Wachter (1999) investigated more fully the possibility that the entire aggregate racial difference in ownership rates is due to racial differences in wealth that allow whites to more easily meet down payment requirements. Using three cross sections of the Federal Reserve Board wealth surveys from 1962, 1977, and 1983, they estimated a series of models that allowed them to measure racial differences in ownership probabilities for households away from the mean sample values.

Wealth constraints in their paper were developed following the 'regulatory rule' perspective adopted in Linneman & Wachter (1989). Thus, a household is considered wealth constrained if its net worth is insufficient to fully fund the down payment implied by standard secondary market agency underwriting criteria for the purchase of loans. Given the 20 percent equity requirement imposed by Fannie Mae and Freddie Mac before mortgage insurance is needed, this means the household is categorized as constrained if the value of the home typically owned by other households with the same socioeconomic trait set is more than five times net worth.[20] In addition, this study included two other sets of variables to help control for the degree of wealth constraint (i.e., whether the household is barely constrained or hugely constrained in terms of its wealth shortfall, with unconstrained households having a zero shortfall) and for the degree of wealth

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[20] We abstract here from a host of empirical issues such as closing costs and the estimation of the 'desired' home. See Gyourko, Linneman, & Wachter (1999) for the details.

'cushion' (i.e., for unconstrained households, a measure of how much net worth exceeds the down payment requirement of the household).[21]

Gyourko, Linneman, & Wachter (1999) then estimated binomial logistic functions with all wealth constraint-related variables (and permanent income) interacted with a race dummy. Consistent with previous research, the results showed that wealth constraint status had a huge impact on the probability of owning. For an unconstrained household with a white head and other traits typical of an owner-occupier, the propensity to own was estimated to be 96 percent in the 1962 cross section. Changing the wealth constraint status of that household is estimated to reduce the probability of ownership by 51 percentage points to 45 percent. For the analogous minority-headed household, the impact of being constrained is even larger at 80 percentage points (i.e., the probability of owning drops from 100 percent to 20 percent).

However, the racial differences in implied ownership probabilities among unconstrained households are very small. The top panel of Table 1 reproduces results from Table 6 of Gyourko, Linneman & Wachter (1999) for the earliest and latest years they studied. Among unconstrained households, minorities are estimated to own at slightly higher propensities than their white counterparts[22], but the differences are quite small and the probabilities are quite high for all. This is the result implied in Linneman

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[21] Consistent with the results in Jones (1989) and Linneman & Wachter (1989), this study found non-linear effects associated with the extent to which a household was constrained. The negative impact on the probability of owning starts out very large, but then declines. Basically, once the household is quite constrained, being constrained by another dollar has little further impact on tenure outcomes. The results for the wealth cushion variables were consistent with Grossman & Laroque (1990) effects, as households with net worths just barely above their implied down payment requirements had lower probabilities of owning compared to households with more substantial wealth cushions. Thus, the data are consistent with the implication that households prefer not to be cornered in illiquid and risky housing.

[22] The slightly higher estimated ownership propensities among unconstrained minorities probably reflect sample selection bias. Particularly in 1962, but in later years, too, widespread discrimination in labor markets prevented many minorities from amassing enough wealth to be unconstrained. Minority households able to surmount that discrimination probably possess unobserved traits making them disproportionately likely to own.

& Wachter (1989) when the regression findings are evaluated at sample means. Stated differently, there are no economically meaningful *ceteris paribus* differences in ownership rates among white and minority households who possess sufficient wealth to meet down payment and closing cost requirements associated with standard mortgage underwriting criteria.

The bottom panel of Table 1 shows this is not the case for wealth constrained households. Among this group, whites own at much higher rates than observationally equivalent minority households. The difference was 25 percentage points in the 1962 sample and 12 percentage points in the 1983 sample. These are not only large differences, but it is quite relevant to minority households as they are overrepresented among constrained households. That is, these differentials apply to about one-third of the white households in the samples and to well over one-half the minority households.

Thus, racial differences in wealth cannot account for all of the racial difference in ownership propensities. Moreover, the fact that many wealth constrained households, white-headed ones especially, own suggests some type of systematic measurement error exists. Households categorized as constrained tend to have very low measured net worths—barely above zero. This indicates that households with low measured wealth have greater access to down payment resources than is captured by household wealth in the Federal Reserve Board surveys.

Other research suggests that intergenerational transfers from parents are a logical source of such unmeasured resources.[23] Not only are such transfers large, there is no

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[23] Research on intergenerational transfer is part of a broader literature on savings behavior. See Kotlikoff (1988) for a review. In the housing context, see Engelhardt (1994a, 1994b, 1995) and Mayer & Engelhardt (1994, 1995) for analysis of how savings behavior interacts with parental gifts and down payment constraints.

doubt that the parents of young minority households tend to have much lower net worths than the parents of young white households. While Gyourko, Linneman, & Wachter (1999) speculated that racial differences in transfers from parents could account for the racial differences in ownership rates among constrained households, the fact is that the results cannot be thoroughly convincing as to the direction of causality because they arise from a cross sectional analysis.

A recently completed study by Charles & Hurst (2001) addresses these issues using the PSID to follow a sample of black and white renters over time. They analyze the factors causing the racial gap in housing transitions that occurs among their sample of renters. Importantly, they are able to separately investigate racial differences in the likelihood of applying for a mortgage and in the likelihood that a mortgage application is accepted or rejected. While there is a significant racial difference in the probability of having a mortgage application rejected, Charles & Hurst (2001) find that this has very little explanatory power with respect to the much lower black transition to owner-occupancy. Rather, the bulk of what they term the housing transitions gap is due to the fact that blacks are far less likely to apply for mortgages in the first place. Their investigation then shows that differences in income, family structure, and in parental transfers to help with down payments are the primary reasons for the applications gap. Thus, parental wealth, not just younger household wealth should be considered when modeling the budget constraint to the tenure choice decision.

Just as the findings in Jones (1989, 1995) and Linneman & Wachter (1989) raised an important policy question regarding what was necessary to expand home ownership rates, those in Charles & Hurst (2001) raise the same issue with respect to blacks. There is a

huge literature on discrimination in the mortgage market[24], and while Charles & Hurst (2001) do find evidence that blacks and whites are not treated equally by lenders, this appears to have little impact on actual ownership outcomes. Consistent with much previous work begun by Jones (1989, 1994, 1995) and Linneman & Wachter (1989), it is wealth—either their own or of their parents—that appears to be so constraining for minorities. The evidence is more convincing now because it has shown up in panel data that can be exploited to more carefully identify the direction of causality.

Thus, finding ways of relaxing those constraints should be a priority for those who believe that the aggregate racial difference in ownership probabilities is a serious social problem for the reasons outlined at the beginning of this section. While discrimination in the lending market certainly should be stamped out wherever and wherever possible, policy makers and households should be under no illusion that that alone will do much to narrow the racial gap in ownership.

III.   Implications for the Affordability Debate

In the 1980s, the affordability of single family housing joined traditional issues such as housing quality and racial discrimination as a focus of housing policy debates in the United States. While an aging population led many to predict rising home ownership rates during the decade, the aggregate ownership rate actually declined by 1 percentage point, marking a reversal of a trend that dated back to the end of the Second World War.

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[24] Examples of recent work include that by Munnell, et. al (1996) on mortgage acceptance and rejection and by Berkovec, et. al. (1994) on default. Quigley (1995) provides an excellent review of the literature accompanying the debate on whether there is discrimination. Finally, Kain & Quigley (1972) is the pioneering work on racial differences in ownership and location outcomes.

While concern over affordability problems for lower- and middle-class households led to a national housing bill entitled the National Affordable Housing Act of 1990, the fact was (and still is) that what is meant by housing affordability is not precisely defined. And, as Linneman & Megbolugbe (1992) have noted, how affordability is defined can have important policy consequences.

Prior to the research on wealth constraining the transition to owner-occupancy, interest rate policy was seen as the key to the affordability issue. This is implicit in the most widely-known affordability index in the United States, which is published by the National Association of Realtors (NAR). This index is constructed such that an index value of 100 implies that the median income family qualifies for the median value home. Because interest rates are much more variable than income, changes in the NAR Housing Affordability Index over time primarily reflect changes in interest rates. This is evident in Figure 1 which is reproduced from Gyourko & Tracy (1999). Whenever long-term mortgage rates are low, the NAR series signals excellent affordability conditions (and *vice* versa). Given the continued low long-term interest rates in America, this series suggests that housing is now more affordable than at any time in the last quarter century.

However, various economic changes including a substantial increase in the dispersion of income by skill group cast doubt as to whether it is sensible to focus solely on the affordability of the median-priced home. While lower interest rates certainly do reduce the income necessary to purchase a home, they do not directly reduce the down payment-related requrement. Thus, consistent with the implications of the research cited above, the levels and growth rates of savings and incomes (in addition to house prices and interest rates) are key components of housing affordability.

Two articles by Gyourko & Linneman (1993) and Gyourko & Tracy (1999) try to use the insights of the new view of wealth constraints as the key to tenure choice to move beyond the NAR Housing Affordability Index. Using decennial census and *American Housing Survey* (AHS) data, Gyourko & Linneman (1993) tried to answer a simple question: Is a home of a given quality from 10-15 years ago more affordable or less affordable today to a household similarly situated to the one that occupied the home then. To perform their analysis, they constructed unadjusted and quality-adjusted price indexes for five types of homes. The latter series were developed using standard hedonic techniques described in their paper.

A first point of note from that research is that real house price appreciation varies significantly over time and across the house price distribution. That is, cheap and expensive homes have fared far differently over time in terms of their price growth. This is illustrated in Table 2 which reproduces results from Table 4 of Gyourko & Linneman (1993). These data are for raw, unadjusted prices that do not hold constant the quality of the homes in the 10th, 25th, 50th, 75th, and 90th percentiles of the house price distribution. It is clear that the 1980s witnessed a dramatic reversal in the pattern of consistently positive real house price appreciation in the United States, with the percentage declines being especially large among lower valued homes. In fact, the drops in real value for the cheaper homes at or below the 50th percentile were so large that by 1989 their real prices had reverted to 1974 levels.

The constant quality price series estimated by Gyourko & Linneman (1993) then tell a different story.[25] Table 3 reproduces results from their paper that compare constant

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[25] Ten quality bundles were priced via hedonic regressions. Five trait bundles from 1974 were priced going forward and five 1989 trait bundles were priced going backward in time. Traits controlled for were the

quality and unadjusted price appreciation for the different types of homes. Note that

constant quality real price growth is significantly greater than the appreciation in actual

(or unadjusted) prices for lower quality bundles.[26] Not only does this indicate that the

raw price series may seriously misrepresent the affordability of a specific low- or

moderate-quality unit over time, it also suggests that there may have been a serious

erosion of housing quality among lower priced homes. Whether this was due to changes

in demand fundamentals or to the inability of many lower-income households to

adequately maintain their homes after expending most of their wealth to purchase them is

unknown. At a minimum, it raises the specter of savings and wealth once again

importantly influencing the ability to own and to protect the equity in one's home.

Table 3 also shows the pattern of actual versus constant quality prices is very

different for more expensive and, presumably, higher quality homes. At the upper end of

the price distribution, appreciation in the unadjusted series exceeds that for the constant

quality series, suggesting that quality improvements can help account for the huge price

growth. Consistent with much research in labor economics, Gyourko & Linneman

(1993) also showed that real wages of the least-skilled workers (defined as those without

a high school degree) had actually declined between 1960-1989. Combined together, the

constant quality price data and the earnings data suggested that households headed by

low-skilled workers could afford to own single family housing at the end of the 1980s

number of bathrooms, the number of bedrooms, the number of other rooms, whether the unit was detached, whether there was a garage, whether there was a cellar, the type of heating system, whether there was central air conditioning, neighborhood quality, overall house quality, whether the home was in the central city of its metropolitan area, and house age entered as a quadratic. The specific bundles themselves were determined by the traits typical of homes in the 10th, 25th, 50th, 75th, and 90th percentiles of the single family house price distribution in 1974 and 1989, respectively. See Gyourko & Linneman (1993, Appendix Tables 1 and 2) for the details.

[26] The 1974 and 1989 bundles associated with the lowest quality homes appreciated by 28.1 percent and 33.2 percent, respectively, over the 1974-1989 period, while the unadjusted price for the home in the 10th percentile of the price distribution actually declined by 4.7 percent (in real terms).

only by having two earners or by reducing the quality of the home consumed (or both). Since there are limits to how far down the quality spectrum one can shift from the 10th or 25th percentile home, it seems likely that this is where the affordability problem has become most serious. These households simply cannot afford to save for a down payment, and the data are at least suggestive that they may be allowing their housing capital to depreciate if they are able to become owners.

Gyourko & Linneman (1993) concluded that there was not a similar change in affordability conditions for the typical occupant of a home at or above the median quality. Wages and salaries for these earners were stagnant or growing, and the real prices of high quality, constant-quality housing bundles barely rose. Hence, the moderate or high quality home from the mid-1970s still is affordable to these households, even if the higher quality stock that has been built since then is not.

Gyourko & Tracy (1999) further examined the affordability issue by updating the analysis with data from the 1990s and by employing a quantile regression approach in addition to the mean regression approach standard in the literature. The quantile regression approach uses methodology similar to the mean regression approach, but relaxes the restriction that only average trait prices are used to construct the constant-quality price indices. That is, each individual price index (e.g., the one for the 25th percentile home) is constructed using its own trait prices. More specifically, the trait prices for the 25th percentile are selected so that 75 percent of actual home prices are higher than what one would predict based on the house traits and on the 25th percentile trait prices. In addition, 25 percent of actual house prices are lower than what one would predict based on the house traits and on the 25th percentile trait prices. Thus, if a trait

such as bathrooms tends to contribute relatively more value to high-quality homes than to low-quality homes, then this will show up as differences between the quantile-specific price for bathrooms at the upper and lower ends of the house quality distribution.[27]

Figures 2, 3, and 4 reproduce Gyourko & Tracy's (1999) findings for the raw price series, for the constant quality series using the mean regression approach, and for the constant quality series using the quantile regression approach. While the latter two approaches share many common features, there are some important differences in results in the upper and lower tails of the price distribution. In the upper tail, the quantile approach suggests there was more rapid real price growth between 1974 and 1997. While the average hedonic measure indicates that the 90th percentile constant quality price was only 1 percent higher in 1997 than in 1974, the quantile hedonic measure suggests the increase was 31 percent. Figure 2 indicates that the unadjusted series for the 90th percentile home was 35 percent higher in 1997 than in 1974. The implied increase in quality among higher-end homes looks to be considerably smaller when estimated using the quantile regression approach.

At the bottom of the price distribution, the average hedonic price index (Figure 3) suggests that a constant quality house at the 10th percentile was 33 percent more expensive in 1997 than in 1974. The quantile specific index plots a similar, but less stark picture, as the analogous appreciation measure was 20 percent. The fact that the 10th percentile unadjusted series is well below both constant quality series suggests that

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[27] The specification itself was identical to that in Gyourko & Linneman (1993). See footnote 24 for the details.

average quality has worsened at the bottom of the house price distribution, with the magnitude varying by estimation strategy.[28]

In sum, this research and the work discussed above that confirms the importance of wealth constraints should lead us away from reliance on affordability measures that focus on the median household or which rely exclusively on income or interest rates in their composition. While the NAR's affordability index suggests that home ownership opportunities have improved steadily throughout much of the past two decades, other evidence suggests skepticism is in order in this regard, especially as one moves down from the median home or the median earner. While the quantile regression results of Gyourko & Tracy (1999) indicate the constant quality price of the 10th percentile home did not rise as much as implied by the mean regression approach used in Gyourko & Linneman (1993), both papers conclude real constant quality prices of that lower quality home have risen. And, the data from the labor market continues to show a widening dispersion in wages, with low skilled workers performing the worst in absolute and relative terms. It is difficult to imagine that wealth constraints will not continue to be binding for such households. If we care about such households owning, then it must be recognized that series driven by interest rates will not give an accurate picture of affordability conditions for these households.

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[28] All that said, one still cannot simply conclude that quality changes must underpin any differences between unadjusted and constant quality price growth rates. The average hedonic method may miss demand-induced price changes, but the quantile hedonic method may price up quality changes in qaddition to demand-induced price effects. See Gyourko & Tracy (1999, p. 9) for the details. The average and quantile hedonic methods may provide a way to bound the true unobserved constant quality price index.

IV.   Summary and Conclusion

Much has been learned over the last decade about the constraints involved in the transition from renting to owning. New models and abundant empirical work show that wealth constraints, especially as they relate to down payment constraints imposed by government sponsored enterprises (GSEs) in the United States, are the critical hurdle facing most households. This new insight from the academic literature has important practical implications for those who believe that expanding home ownership will bring valuable social and economic benefits to new owners. With respect to basic affordability, it is clear that low interest rates alone cannot make ownership affordable, particularly to low wealth households. While it is not at all clear that very low down payment loans of the type that has proliferated in the United States in the latter half of the 1990s will turn out to be a good idea—financially or socially—it is clear that something like this structure is needed to surmount the most basic of affordability constraints.

In addition, recent research suggests that racial differences in wealth play a large role in accounting for the wide aggregate racial differences in home ownership that exist in the United States. In this case, parental wealth is an important factor, not just that of the younger household wishing to become an owner. At a minimum, policy makers in America should be aware that an end to alleged discrimination in the mortgage market is will not substantially narrow the racial gap in home ownership, absent a policy that deals with the very uneven racial distribution of liquid wealth.

Finally, it is clear that future research should not focus so squarely on the median household. Increasing wage dispersion in the labor market, among other factors, has acted to make affordability conditions vary across the income distribution. Different

estimation techniques should be used to provide better insight in to just how affordability

various across different types of households.

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Table 1: Predicted Ownership Probabilities and Differential Implied Probabilities of Ownership by Race		
	1962	1983
	Typical Unconstrained Head	
Minority Head	1.00	0.97
White Head	0.96	0.91
Differential Implied Probability	0.04	0.06
	Typical Constrained Head	
Minority Head	0.20	0.17
White Head	0.45	0.29
Differential Implied Probability	-0.25	-0.12

Source: Gyourko, Linneman & Wachter (1999, Table 6). See their paper for the details and definitions of the underlying reference households.

Note: Gyourko, Linneman & Wachter (1999) used a white versus non-white characterization of race. More detailed racial categories were experimented with (including a black versus non-black breakdown), but none of their essential results were changed.

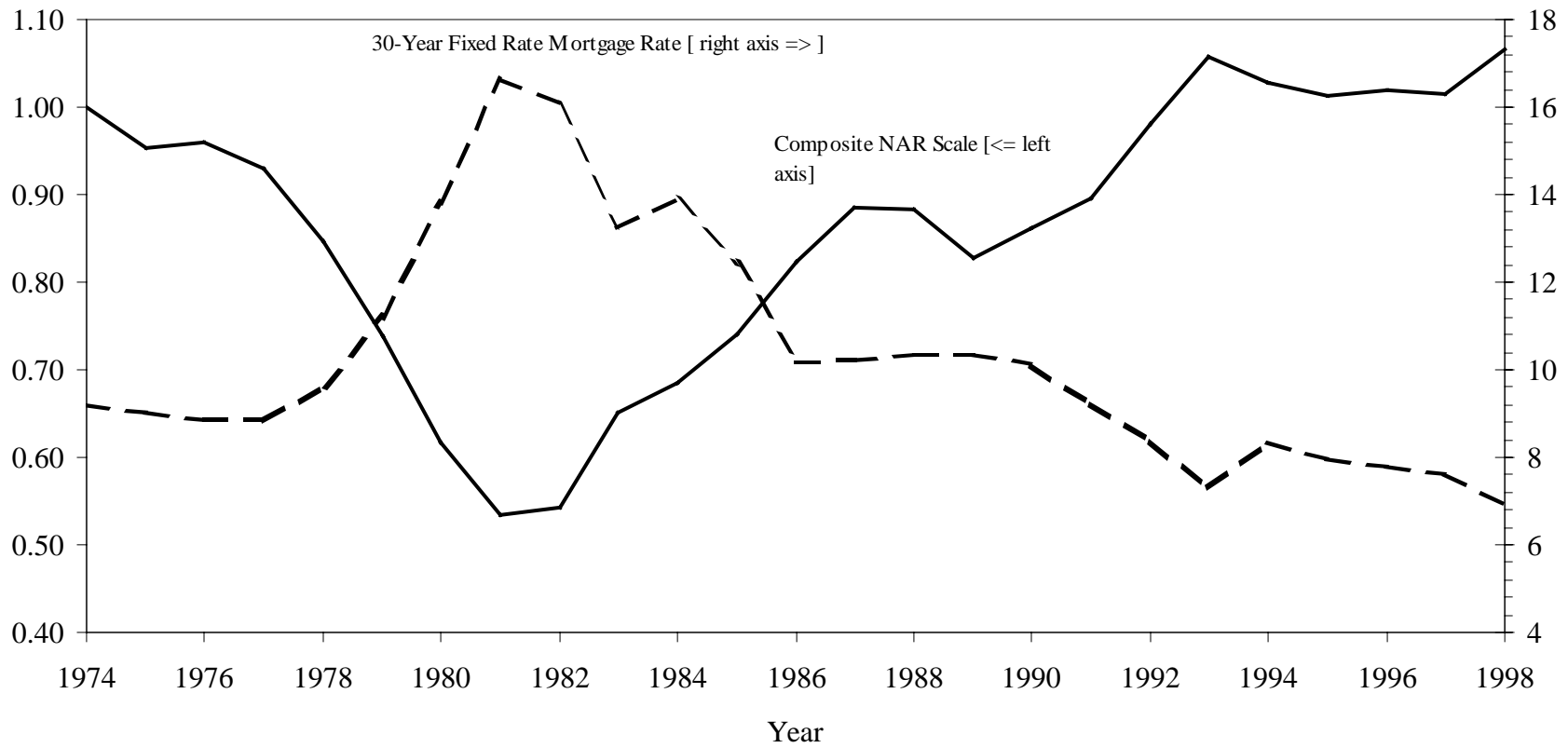| Percentile of the House Price Distribution	Table 2: Real House Price Appreciation—U.S. National Data Aggregate and Average Per Annum (in parentheses) Figures		
	Time Period		
	1960-74	1974-81	1981-89
10th	35.1 (2.2)	54.1 (6.4)	-38.1 (-5.8)
25th	48.8 (2.9)	39.6 (4.9)	-28.7 (-4.1)
50th	44.5 (2.7)	17.3 (2.3)	-16.8 (-2.3)
75th	46.5 (2.8)	19.2 (2.5)	-1.5 (-0.0)
90th	49.2 (2.9)	41.2 (5.1)	-2.0 (-0.0)

Source: Gyourko & Linneman (1993, Table 4). Calculations made from decennial census and American Housing Survey data.

Table 3: Constant-Quality and Unadjusted Price Appreciation: Homes and Trait Bundles from Various Percentiles of the House Price Distribution						
	1974 Trait Bundles			*Unadjusted Prices*		
	1974-1989 (%)	1974-Peak (%)	Peak-1989 (%)	1974-1989 (%)	1974-Peak (%)	Peak-1989 (%)
10th Percentile						
Total appreciation	28.1	54.6	-17.2	-4.7	54.1	-38.1
Avg. annual appreciation	1.7	6.4	-2.3	-0.3	6.4	-5.8
25th Percentile						
Total appreciation	13.1	20.2	-5.9	-0.5	39.6	-28.7
Avg. annual appreciation	0.8	4.7	-0.6	-0.0	4.9	-4.1
50th Percentile						
Total appreciation	13.7	22.8	-7.5	-2.5	22.6	-20.4
Avg. annual appreciation	0.9	5.3	-0.7	-0.2	4.2	-2.3
75th Percentile						
Total appreciation	4.4	29.2	-19.2	17.4	48.3	-20.1
Avg. annual appreciation	0.3	6.6	-1.9	1.1	10.4	-2.0
90th Percentile						
Total appreciation	4.4	28.7	-18.9	38.3	41.7	-2.4
Avg. annual appreciation	0.3	6.5	-1.9	2.2	7.2	-0.2

Source: Gyourko & Linneman (1993, Table 6). Calculations made by the authors based on 1974-1989 *American Housing Surveys*.

Note: Calculations also made using trait bundles from 1989. The implications for quality changes are unaffected. See Gyourko & Linneman (1993) for the details.

Figure 1. National Association of Realtors (NAR)
## Housing Affordability Indices

Source: Gyourko & Tracy (1999, Chart 1).

Figure 2. Real House Price Distribution--Unadjusted Series

90th Percentile

75th Percentile

50th Percentile

10th Percentile

25th Percentile
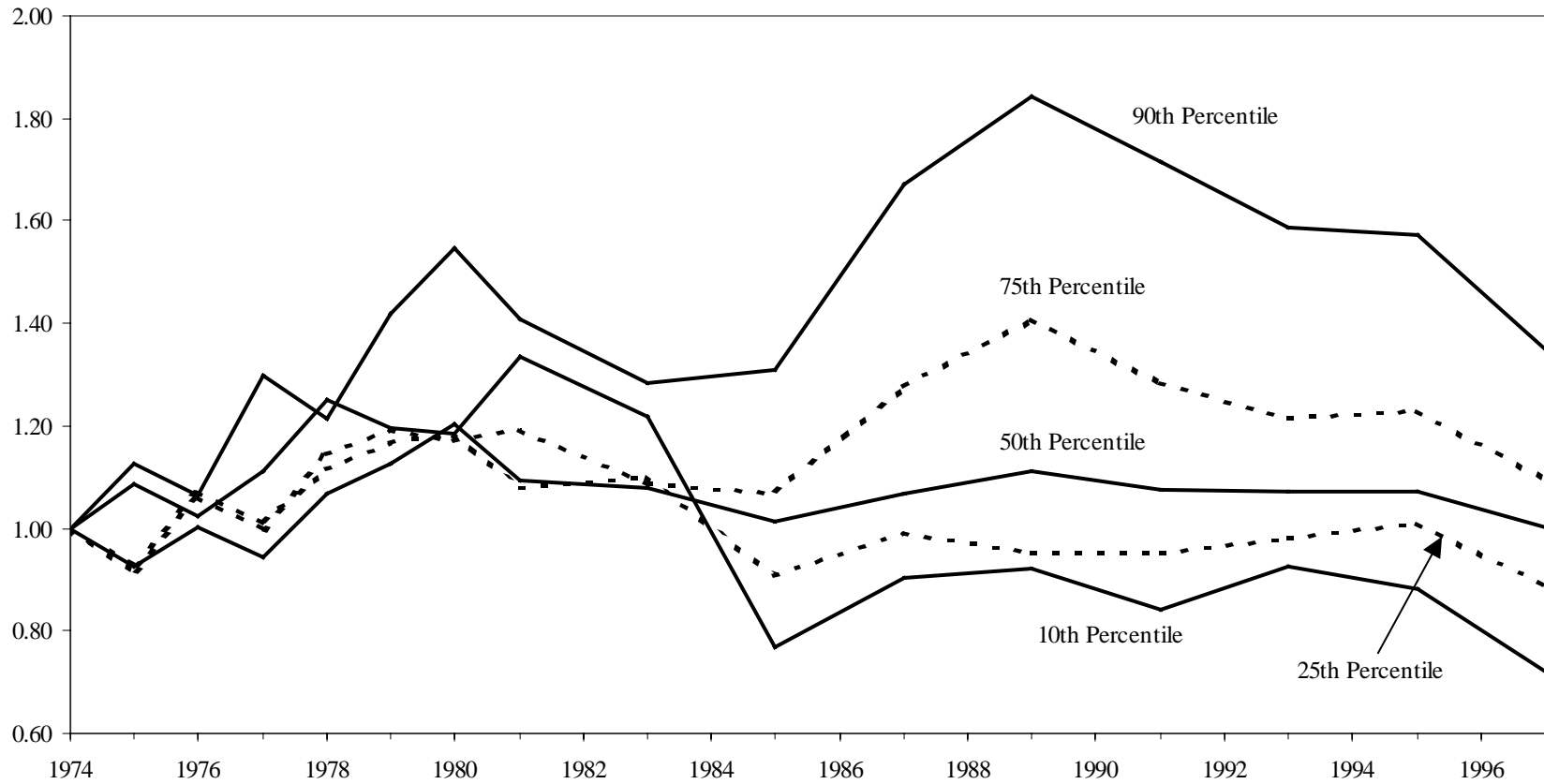
Source: Gyourko & Tracy (1999, Chart 5); underlying data are from the AHS national series

Figure 3. Constant Quality House Price Indices

Mean Regression Method
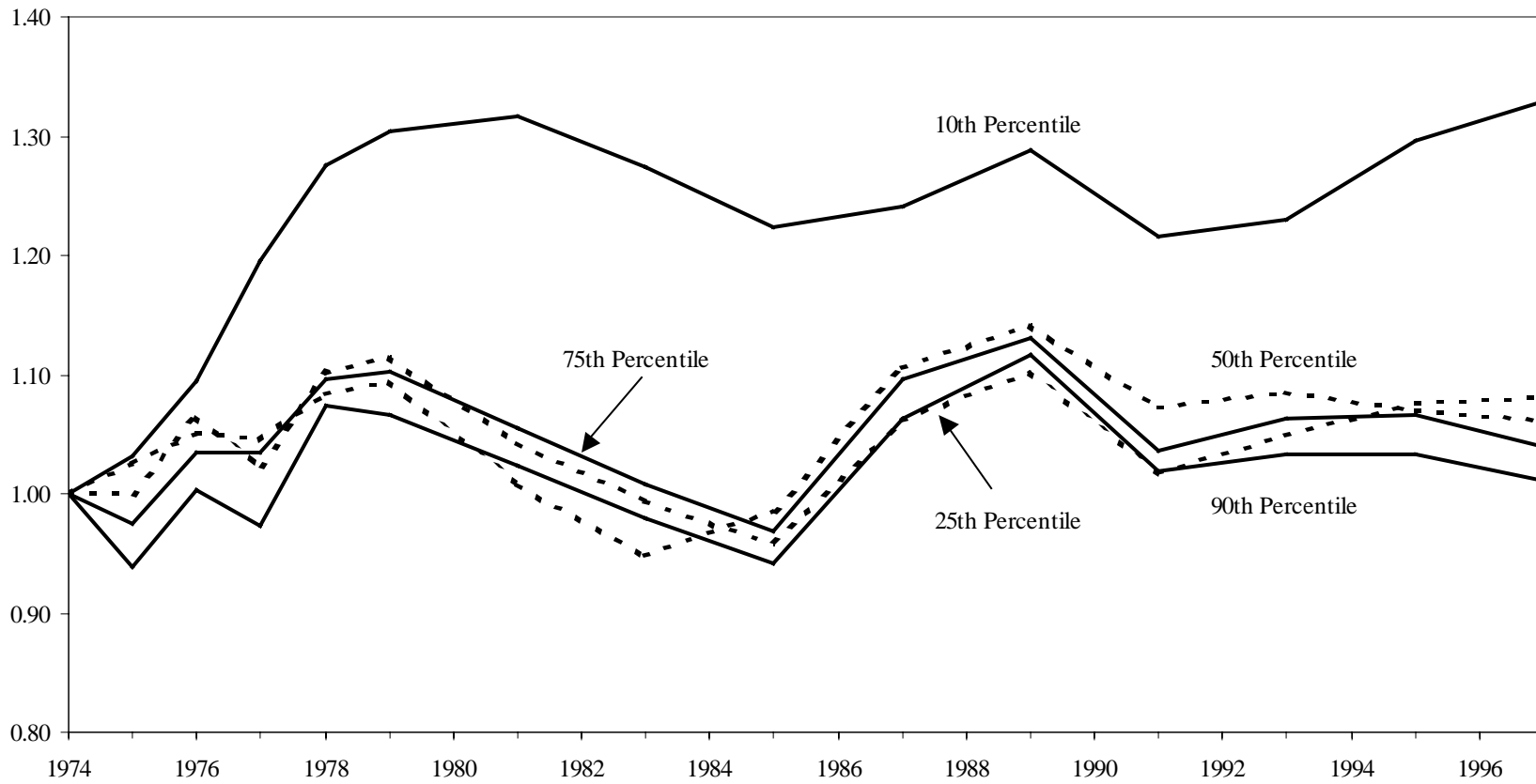
Source: Gyourko & Tracy (1999, Chart 6); series estimated by authors using the AHS, National surveys.

Figure 4. Constant-Quality Price Indices

Quantile Regression Method
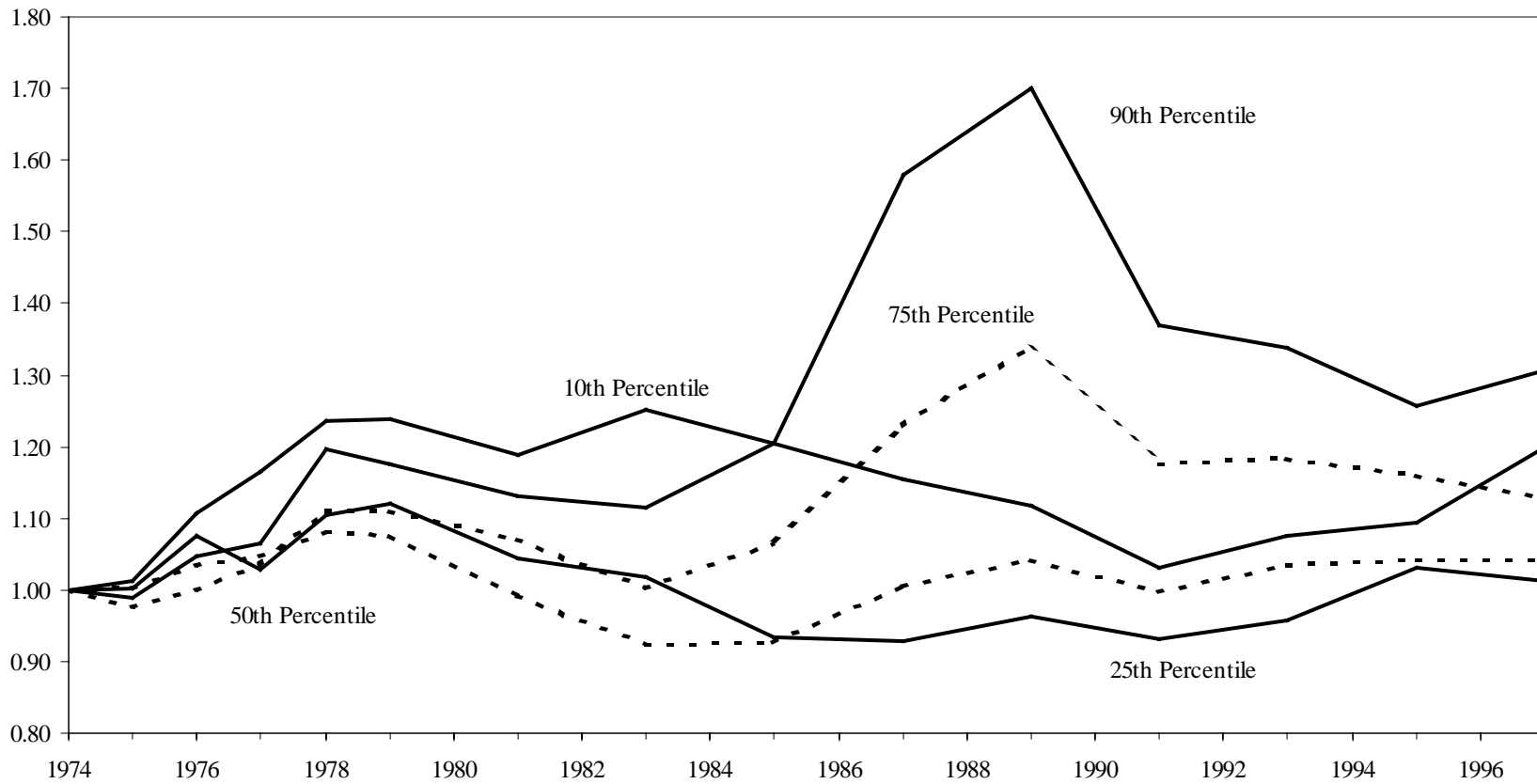
Source: Gyourko & Tracy (1999, Chart 7); series estimated by authors using the AHS, National surveys.