

Economic Impacts of the Housing Sector

Focus: Washington D.C.

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Table of Contents

Introduction.....	3
Real Estate in the National Economy	3
Housing’s Impact on the Economy	4
Impact on Communities	6
Homeownership’s Contribution to Positive Social Outcomes	7
Housing’s Contribution during the Recent Business Cycle	8
Housing’s Impact to the Local Economy: District of Columbia.....	9
Economic and Real Estate Industry Facts	9
Demographics	10
Employment.....	11
Housing Activity.....	13
Mortgage Market	16
Relocation	16
Affordability	17
Real Estate’s Contribution to Tax Revenue	17
Impact of Raising the Transfer Tax	18
Impact of First Time Buyer Tax Rebate	19
Simulation of Higher Tax Credit	21
Conclusions.....	22
References.....	23
Appendix 1: Impact of Higher Transfer Tax.....	25
Appendix 2: Impact of a Higher First-time Homebuyer Tax Credit.....	26
Appendix 3: Econometric Analysis	27
Appendix 4: Housing Affordability Index	28

Introduction

The housing sector makes important contribution to the economy of District of Columbia. In 2000, \$5.19 billion was attributed to real estate related economic activity in the nation's capital. Furthermore property taxes and deed transfer taxes contributed \$788 million to the D.C. government's general fund from tax revenue. Low mortgage rates and special housing tax credits have qualified many new households to purchase a home in recent years. Consequently, home sales have been robust, mortgage approvals have risen, and the homeownership rate has edged up higher. Population in the city declined dramatically over the past three decades. There are 572,059 residents living in the city in 2000 compared to 756,668 in 1970. But population has for the most part stopped declining in recent years. In fact, according to IRS data there were about equal number of tax-paying households moving into the city versus those households leaving the city in 2000 and 2001. Analysis shows that the first-time housing tax credit in D.C. played a crucial role in increasing home sales and is likely to have contributed to a reversal in population and migration patterns.

This paper examines the role of the housing market and its contribution to the overall economy. The report starts with an examination of the scope of the housing market at the national level in order to provide the reader a general picture of the importance of housing to the national economy and to provide a reference point for assessing the local market conditions. The second section covers the D.C. housing market to better highlight the locally specific benefits of the housing sector.

Real Estate in the National Economy

The real estate industry is one of the largest sectors of the economy. It is a significant contributor to the U.S. economy, providing millions of Americans with jobs and generating hundreds of billions of dollars of economic output each year. It is an important source of wealth building and homeownership is an integral part of the "American Dream." There are several different methods of measuring the economic impact of the real estate industry (see below). As large as the resulting numbers may be, many understate the true financial impact of the housing sector. Beyond economic measures, homeownership provides many intangible benefits to our society.

For an appreciation of the scope of the industry, consider the following:

- The housing sector directly accounts for about 15 percent of the nation's total production;
- Indirect contribution from housing-related expenses such as spending for utilities and furniture add another 6 percent to the national economy;
- Home equity constitutes the largest share of household net worth for a vast number of Americans;
- In the fourth quarter of 2002, 74.4 million households owned their own homes, for a national homeownership rate of 68.3 percent;
- The stock of fixed residential assets is worth nearly \$13.4 trillion — more than one-year's worth of U.S. GDP.
- About 40 percent of monthly consumer expenditures are housing related.

Housing's Impact on the Economy

Gross Domestic Product (GDP) is a measure of all goods and services produced in the economy. The housing sector contributes directly and significantly to overall production activity. The two line items in GDP directly associated with the housing sector are residential fixed investment and housing service. Residential fixed investment consists of value-put-in-place of new housing units, production of mobile homes, brokers' commissions on the sale of existing residential properties, expenditures related to improving and additions to existing units, and net purchases of used structures from government agencies. Housing service is a component of personal consumption expenditures, purchased by residents in the United States, usually in the form of rent for tenants or as rental equivalence for homeowners. It is important to note that this approach measures the value to the homeowner of the daily *consumption* of the flow-of-services provided by a home (a place to fix meals, relax, entertain, garden, etc.) and not the value of an *investment* in a long-lived asset (home). Because implicit rent is not a market transaction, such as the payment to a landlord from a renter, it is estimated by measuring the change in market rents for rental housing units with similar characteristics and in similar locations as the homeowner units. In 2002, residential fixed investment

totaled \$470.1 billion and housing service expenditure was \$1071.5 billion. The combined total of \$1.54 trillion represented 15 percent of GDP.

The construction and sale of new homes make direct contribution to GDP, based on the value of construction put in place. However, the sales price for existing homes do not enter into the calculation of the nation's domestic output, just as a used car sales price does not get entered because the transaction does not represent a new production. However, purchases related to the transaction of existing home sale do get included in the GDP. For example, all payments for services rendered, such as real estate agent commissions, home inspector fees, attorney fees, and loan origination fees, are included. These activities involve actual labor hours for the service provided. However, for GDP recording, the transfer payments, such as transfer taxes, escrows, title and other insurance premiums, interest payments, and loan points are excluded.

In addition, all economic activity produces a multiplier effect. That is to say that a sale of a home generates additional consumer expenditures. Home sales naturally involve moving costs, whether through a professional moving company or via "self-move" from renting a moving van. Expenditures accompanying the moves, though they do not show up in the housing sector category of the GDP accounting, also need to be considered. Furthermore, many of the moving households purchase new furniture and spend more than usual for home improvement. According to the National Association of Home Builders (NAHB), a typical new homeowner spends \$8,900 on furnishing and improvements in the first year. The income earned in the other sectors of the economy is then re-circulated into the economy as it gets spent, generating another round of income and purchases. The degree of multiplier depends on the degree of monetary policy accommodation and the "crowding out" effect. NAR's macroeconomic modeling suggests that the multiplier is between 1.34 and 1.62 in the first year or two after an autonomous increase in spending. This means that each dollar increase in direct housing activity will increase the overall GDP by \$1.34 to \$1.62.

Aside from economic activity generated as a result of home building and home sales, homeownership in itself often contribute to economic activity. Homeownership provides individuals with a way to accumulate wealth for the future while at the same time they benefit from the provision of shelter. The wealth that is derived from homeownership is in fact the largest source of wealth for most households. The Federal Reserve's recently published 2001 Survey of Consumer Finances showed that the net worth for homeowners was \$171,700 while that of renters was \$4,800. As such, consumer expenditures arising from the housing wealth effect have gained wide attention recently in light of the wealth collapse in the stock market. Research indicates that consumer spending and the real economy are affected by the rise and fall of equity whether derived from the stock market or from homeownership. The estimated stock market wealth effect is on the order of 3 to 7 cents for each one dollar change in the equity value of the stock market. By contrast, Case, Quigley, and Shiller (2001) have shown that each extra dollar of housing wealth has five times the impact of an extra dollar of stock market wealth.

Given the importance of housing to the economy, it is not surprising that many people's livelihoods depend on real estate. The Bureau of Labor Statistics produces monthly employment reports listing employees on payrolls by industry. The January 2003 report showed that 1.49 million workers were employed in the real estate industry. Furthermore, 6.6 million were employed in the construction industry and 413,000 in mortgage banking. In addition, the secondary employment generated by the multiplier effect and by the housing wealth effect add to the overall employment picture in the other sectors of the economy.

Impact on Communities

Construction of new homes provides jobs and higher tax revenues for local, state, and federal governments. NAHB estimates that the construction of 1,000 single-family homes generates 2,448 full-time jobs in construction and construction-related industries, \$79.4 million in wages, and \$42.5 million in combined federal, state and local revenues and fees. The construction of 1,000 multifamily units generates 1,030 full-time jobs in construction and construction-related industries, \$33.5 million in wages; and \$17.8 million in combined federal, state and local tax revenues and fees. Furthermore, it is

estimated that roughly 30 percent of a new home occupant's income is spent on items produced by local businesses, such as hospitals, daycare centers, dry cleaners, and auto repair shops.

Homeownership's Contribution to Positive Social Outcomes

Homeownership also has positive social and political contributions to American society. Research shows that homeownership raises the owners' sense of commitment to community and their willingness to invest in both the home as an asset and as a place to live and raise a family. Furthermore, a higher overall quality of life among homeowners is believed to contribute to the well-being of both homeowners and their children in a number of ways. For example, children of homeowners tend to have higher levels of achievement in math and reading and fewer behavioral problems. These factors, as well as many others, help explain increased educational attainment and higher lifetime annual incomes of homeowners' children. (Haurin, Parcel and Haurin, 2001; Green and White, 1997). In addition to being more satisfied with their own personal situation than renters (Rohe and Stegman, 1994), homeowners also enjoy better physical and psychological health. (Rohe, Van Zandt and McCarthy, 2001).

Although the extent of community involvement and the benefits that accrue to society are hard to measure, several researchers have found that homeowners tend to be more involved in their communities than renters. For example, owners participate in a greater number of non-professional organizations. They also have higher voter participation rates. In addition to higher civic participation, owners also tend to remain in their homes longer, adding a degree of stability to their neighborhood. Since homeowners reap the financial gains of any appreciation in the value of their home, they also tend to spend more time and money maintaining their residence, which also contributes to the overall quality of the surrounding community (Rossi and Weber, 1996; Rohe and Stewart, 1996).

Research also confirms that adverse social outcomes are less frequent in neighborhoods with high rates of homeownership, community involvement, and access to economic and educational opportunities (Ellen and Turner, 1997). There also is some evidence that

homeownership programs may result in increased property values near subsidized or locally assisted homeownership sites and can, under the right circumstances, draw other non-housing investment to the community (Ellen, Susin, Schwartz and Schill, 2001).

Housing's Contribution during the Recent Business Cycle

Home sales set successive record years in 2001 and 2002 (with 5.56 million existing home sales and 976,000 new home sales in 2002). Such an active housing market contributed significantly in ameliorating the fallout in other sectors of the economy. Furthermore, strong housing activity in 2001 and 2002 led to a sharp increase in home prices. Consequently, home equity build-up from home price appreciation is estimated to be more than \$1.3 trillion in the past two years. The gains are mostly tax-free given the preferential treatment of home purchases/sales in the tax code. The impact on economic activity from home price appreciation has been large and the current consensus suggests a housing wealth effect of 10 to 20 cents spent for each dollar increase in housing wealth. This implies that, the housing wealth effect alone would have added as much as \$90 to \$180 billion in additional spending to the economy. As a comparison, the Bush tax refund checks in the summer of 2001 (the \$300 or \$600 rebate checks to each taxpaying households) totaled \$38 billion. Furthermore, many homeowners refinance their mortgages with the falling interest rates, providing additional spending money to counter the current economic sluggishness.

Housing's Impact to the Local Economy: District of Columbia

The housing sector makes important contribution to the economy of the District of Columbia. In 2000, \$5.19 billion was attributed to real estate related economic activity in the nation's capital. Furthermore property taxes and deed transfer taxes contributed \$788 million to the D.C. government general fund from tax revenue. Low mortgage rates and special housing tax credits have qualified many new households to purchase a home in recent years. Consequently, home sales have been robust, mortgage approvals have risen, and the homeownership rate has edged up higher. Population in the city declined dramatically over the past three decades. There were 572,059 residents living in the city in 2000 as compared to 756,668 in 1970. But population has for the most part stopped declining in recent years. In fact, according to IRS data there were about equal numbers of tax-paying households moving into the city as those households leaving the city in 2000 and 2001. The housing tax credit is likely to have contributed to this reversal in population and migration changes.

Economic and Real Estate Industry Facts

Gross State Product (GSP), in similar spirit to GDP accounting discussed earlier, provides an economic activity measure at a more localized level. GSP is derived as the sum of the gross production of goods and services originating in all industries for a given geographical region. The U.S. Department of Commerce estimated DC's GSP at \$59.4 billion in 2000 (the most recently available data). The real estate sector accounted for \$5.19 billion or 8.7% of this total. The measure of real estate economic output can be further broken down into subcategories. The three major components are compensation of employees and workers, indirect taxes, and property-type income. In 2000, compensation of employees (the sum of employee wages and salaries) was \$548 million. Indirect business taxes, such as general sales and property taxes, that are chargeable to business expense in the calculation of profit-type incomes, amounted to \$814 million. Property-type income or proprietors' income, the largest component since real estate practitioners are usually independent contractors, totaled \$4.73 billion. Over the period from 1980 to 2000, real estate's share of total GSP ranged from 7.8% to 9.5%. Looking

only at the private industries (after subtracting away value-added component from federal and local government employment), real estate’s contribution is a much larger 14% of total *private* industry output.

Another economic measure, though not as in-depth as GSP, but more frequently published is the personal income data. In 2001, total personal income among D.C. residents was \$23.0 billion. Earnings from the real estate industry amounted to \$630.8 million. A separate construction sector added another \$648 million.

Demographics

Many major cities in the past three decades have lost population as more and more persons have moved to the suburbs. The District of Columbia is no exception. From 1970 to 2000, population of DC shrank from 756,668 to 572,059. Based on 2000 Census figures, the median age of D.C. residents is 34.6 years old. The median household income is \$64,355. African-Americans make up the largest ethnic group with 59% of the population. The detail breakdown of the population by age, income, and ethnicity is shown below in Tables 1 to 3.

Table 1. Population by Age Groups

Age	Number	Percent
Total Population	572,059	100
Under 5 years	32,536	5.7
5 to 9 years	35,385	6.2
10 to 14 years	30,018	5.2
15 to 19 years	37,867	6.6
20 to 24 years	51,823	9.1
25 to 34 years	101,762	17.8
35 to 44 years	87,677	15.3
45 to 54 years	75,310	13.2
55 to 59 years	27,803	4.9
60 to 64 years	21,980	3.8
65 to 74 years	35,919	6.3
75 to 84 years	25,004	4.4
85 years and over	8,975	1.6
Median age (years)	34.6	(X)
Average age (years)	37.0	(X)

Table 2. Households by Income Range

Total	248,590
Under 20,000	64,796
20,000-30,000	30,276
30,000-40,000	28,848
40,000-50,000	21,959
50,000-75,000	39,553
75,000-100,000	22,437
100,000-125,000	13,446
125,000-150,000	7,344
150,000-200,000	8,292
Over 200,000	11,639
Average HH Income	\$64,355
Median HH Income	\$40,127
Per capita Income	\$28,659

Table 3. Population by Ethnicity

Total	572,059	100
	<i>Number</i>	<i>Percent</i>
White	159,178	27.83
Black	340,088	59.45
Asian	15,039	2.63
Hispanic	44,953	7.86
Other	12,801	2.24

Employment

Employment in D.C. has declined over the years in step with population declines. As of December 2002, there were 251,338 residents working. This is down from 300,378 workers in 1990. Even with fewer jobs, however, the unemployment rate has edged downward as evidenced in Figures 1 and 2. Even though there are fewer jobs today, there are also fewer numbers on the unemployment line as many residents have migrated out of the city.

Figure 1.

Unemployment Rate, Washington DC MSA 1990-2001

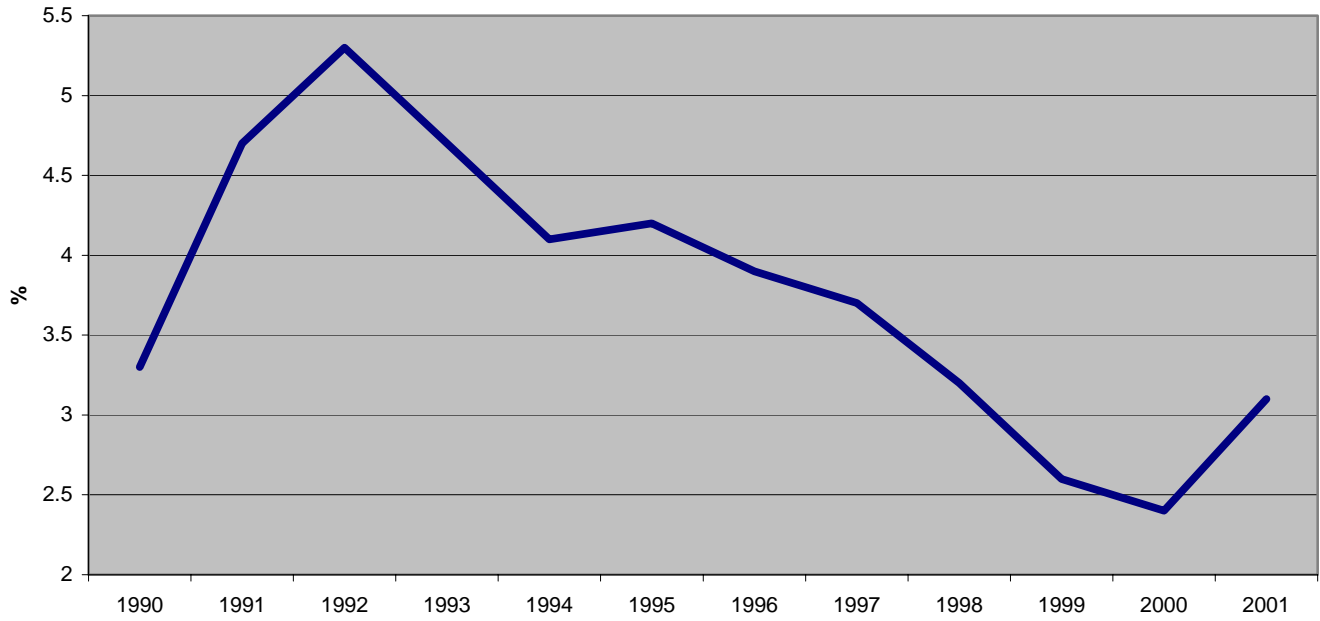
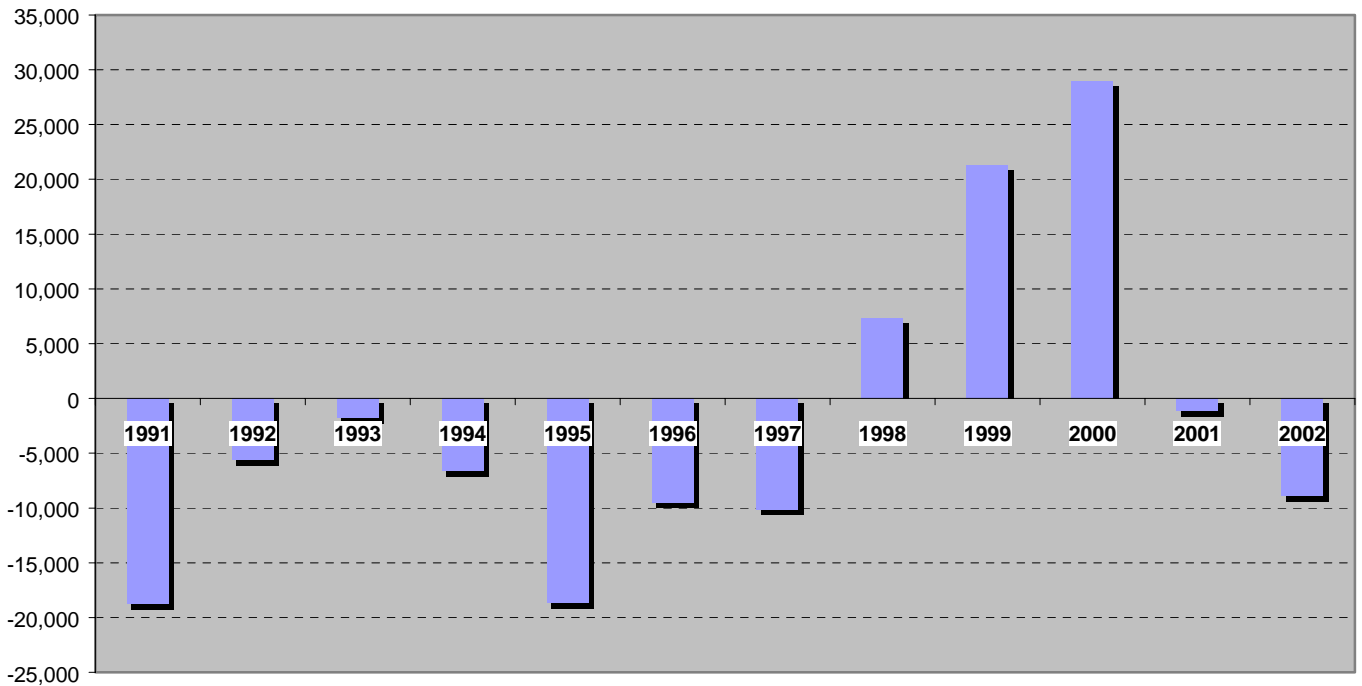


Figure 2.

Household Employment Annual Change, D.C. 1990-2002

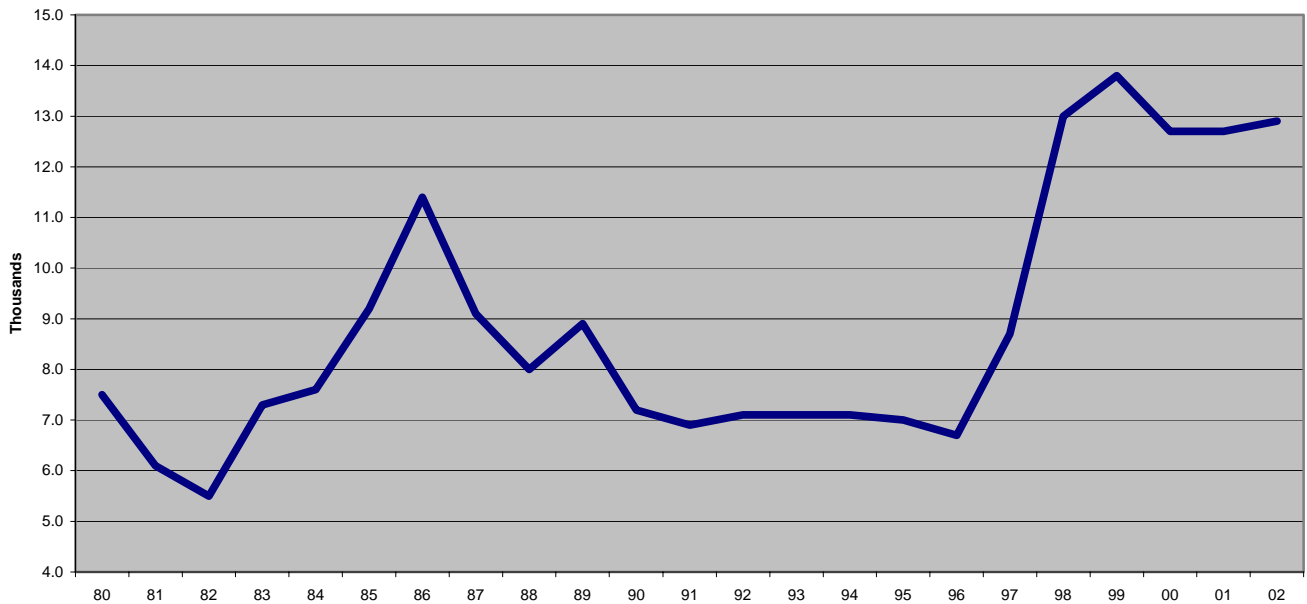


Housing Activity

Home sales in DC have remained at a high and steady level for the past five years, with about 14,000 home sales per year. Home sales fluctuated from 7,000 to 12,000 unit sales for most years from early 1980s to the mid 1990s. So the recent steadiness of home sales at high levels is comforting. One reason for the high level of home sales activity is the falling mortgage rates over the past five years. But the introduction of the \$5000 first-time homebuyer tax credit in 1997 is obviously playing a very important role as sales got bumped up from 10,800 in 1996 to 14,200 in 1997.

Figure 3.

Annual Existing Home Sales, D.C.



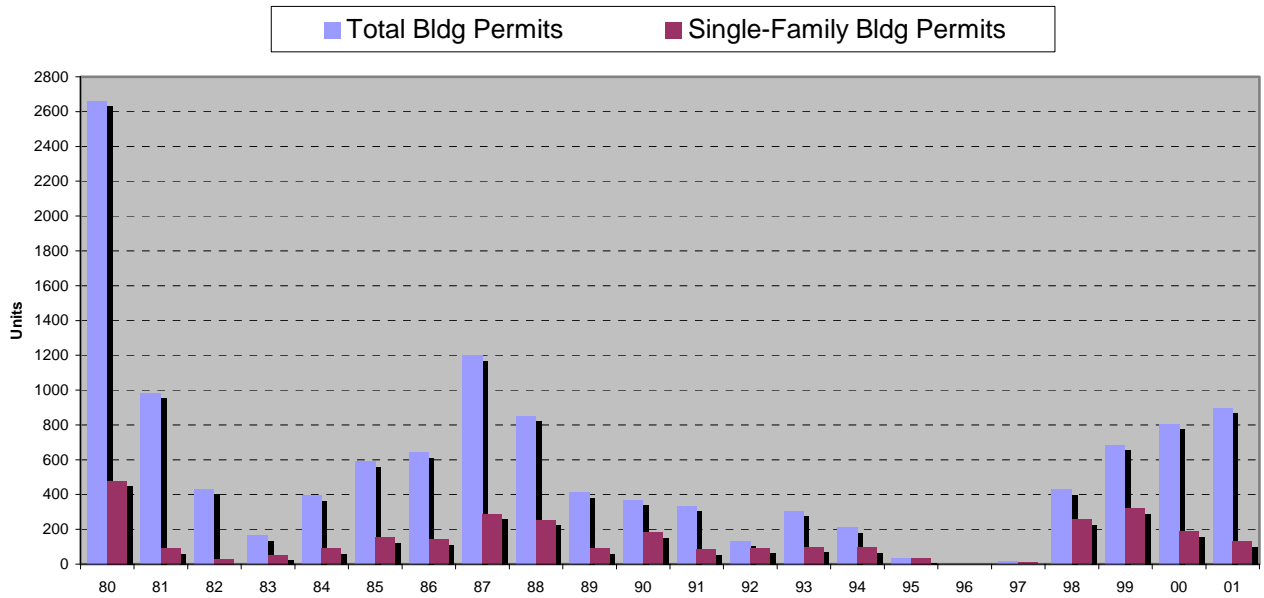
Meanwhile, new home construction in the city has been minimal. There is very little land for development in the city relative to the open land in the suburbs and exurbs. The total number of new housing units added in 2002 was 1,591 of which 383 were single-family units. The 2002 figures were very high relative to what it had been. During the 1990s, only 251 total housing units were added per year on average. Additions to single-family housing units averaged only 117 per year in the 1990s. Also notice on Figure 4 that new housing construction made a leap in 1998. One may again attribute this partly to the introduction of the first-time homebuyer tax credit in 1997, which caused demand

to rise and homebuilders to supply additional homes in the subsequent years to meet that demand.

The active housing market has definitely provided extra economic stimulus to the D.C. economy. Furthermore, Table IV shows solidly upward price movement from about 1997, resulting in an enlarged property tax base. More importantly, the homeownership rate has risen to 40.8% in 2000 compared to 38.9% in 1990. Even though the current

Figure 4.

Annual Building Permits, D.C.



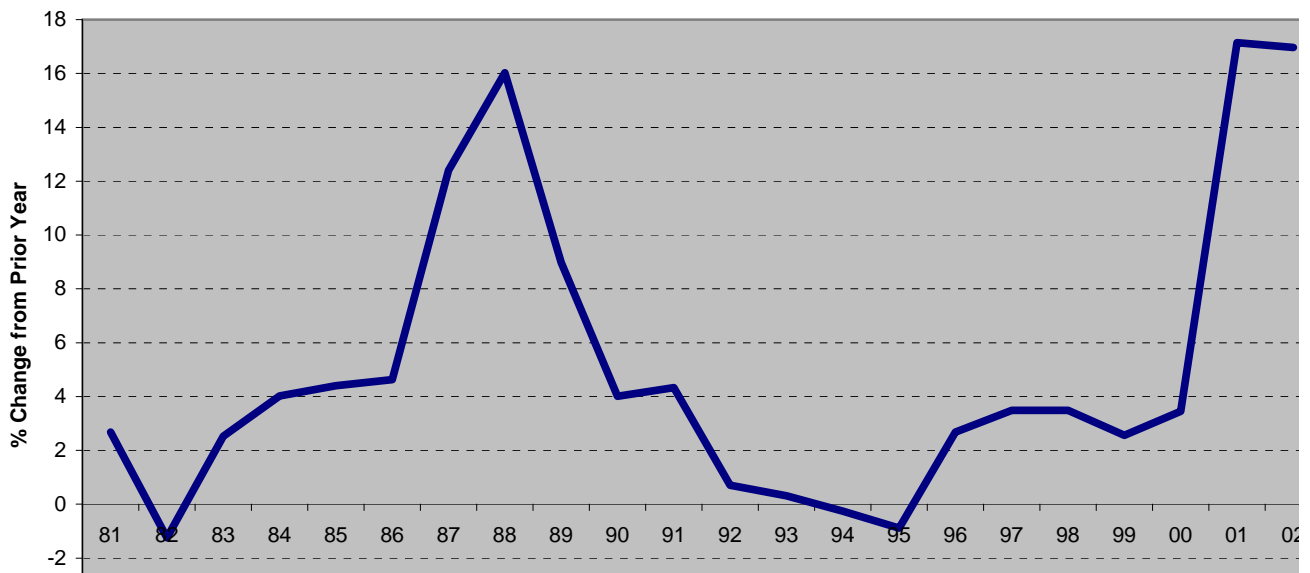
homeownership rate in D.C. is still far below the national average of 68%, homeownership opportunity is definitely moving in the positive direction.

Table IV. Median Single-Family Existing Home Price, Washington, DC

Year	Median Price
1980	86.0
1981	88.3
1982	87.2
1983	89.4
1984	93.0
1985	97.1
1986	101.6
1987	114.2
1988	132.5
1989	144.4
1990	150.2
1991	156.7
1992	157.8
1993	158.3
1994	157.9
1995	156.5
1996	160.7
1997	166.3
1998	172.1
1999	176.5
2000	182.6
2001	213.9
2002	250.2

Figure 5

Home Price Appreciation, Washington, DC



Mortgage Market

According to data collected in compliance with the Home Mortgage Disclosure Act, the number of mortgages approved for a home purchase has steadily climbed in the District of Columbia over the past five years. In 2001, the year of the most recently available data, there were 10,018 new mortgages taken out with a median loan amount of \$148,000. This compares with 6,111 mortgage approvals in 1997 with the median loan amount of \$124,000. (Because some homes are purchased without taking out a mortgage, the number of mortgages counted will be less than that of home sales).

Table 5. Mortgage Data

Year	Number of New Mortgages	Median Loan Amount (in thousands dollars)
1997	6111	124
1998	8323	127
1999	9320	126
2000	9656	132
2001	10018	148

Relocation

The flight to the suburbs has halted in the Nation’s capital. According to 2001 IRS data, 25,085 households moved into the District while a virtually equal number of 25,857 households left. This relative “balance” of inflow and outflow is significant given that for the past 30 years many people – and many jobs – moved away from the city. In addition, the median income of those leaving the city was much higher than those coming into the city. So the stoppage of population decline in the past two years is a very welcome change.

Generally, most of the relocations were to or from Prince George’s County in Maryland. Large movements were also observed with Montgomery County in Maryland and Fairfax and Arlington Counties in Virginia, with more than 1000 households coming and going to these counties each year. New York (Manhattan), Cook (Chicago), Los Angeles, and Middlesex (Boston) Counties also consistently rank in the top ten most active counties with whom D.C. interacts. Foreign destinations also are consistently rank in the top ten

as well. This is not surprising, given the presence of the U.S. federal government and the foreign diplomatic corps in the city. A more detail relocation dynamics between District of Columbia and other county jurisdictions for years 2000 and 2001 are shown in the Appendix. For example, the NAR 2001 Relocation Report for D.C. shows that 4,032 households from Prince George's County moved to the nation's capital while 1,443 DC residents moved out to Fairfax County.

Affordability

The housing affordability conditions have improved in recent years as the required monthly mortgage payments have fallen with the mortgage rate declines. Despite the fact that the D.C. median family income is the highest in the country (according to HUD estimates and according to BLS estimates on average annual pay), due to relatively exorbitant home prices, the affordability condition in D.C. is far from best in the country. According to NAR's affordability index, Washington D.C. is on the less affordable side. San Francisco and San Diego are the least affordable cities, with Washington D.C. metro market ranking as the 34th least affordable among the 113 major metro markets. The full listing of city-by-city affordability comparison is provided in Appendix 4.

Real Estate's Contribution to Tax Revenue

Because many local jurisdictions rely heavily on property taxes for general revenues, real estate makes an important contribution to the local tax base. Property taxes are paid to the state and localities regardless of whether a property is transferred or not. The city currently applies a residential real property tax rate of \$0.96 per \$100 of assessed value. This mill rate, as it is known, is on the lower side compared to the mill rate among the surrounding counties as can be seen in Table 6.

Aside from the property tax, there is also tax collection associated with the selling of a home. Transfer tax and recordation fees also make noticeable contribution to the local tax revenues. The transfer tax rate is 1.5%. The recordation fee is 1.5% if the home price exceeds \$250,000 and 1.1% if lower than that price. According to D.C. government records for the fiscal year 2002, total general fund tax collection was \$3.15 billion. The

tax collection from real property was \$726 million and from deed transfer was \$62 million. The combined total of these two real estate related taxes was \$788 million or 25% of the total general fund revenue. Furthermore, it is worth mentioning that local estate tax collections amounted to \$125 million of which residential property valuation would be a significant part of the estate. Because it is not possible to breakdown the real estate component from the overall estate, a numerical figure cannot be given. Therefore, real estate's contribution to D.C. government's general fund tax revenue can be said to be at least 25%, but could be as high as 28% if assuming that about half of estate is real estate related.

Table 6. Mill Rate

County Name	Mill Rate
DC	0.96
Montgomery (MD)	0.838
Prince George's (MD)	1.046
Fairfax (VA)	1.21
Arlington (VA)	0.993

One unique aspect of the current overall national business cycle is the relative health of the local government budgets. Both the federal and a large number of state budgets are in deep red as the slowdown in economic activity has reduced government revenues. However, the jurisdictions that rely more on property taxes, namely local county governments, have fared much better with either balanced budgets or minimal budget deficits. This fact reemphasizes the very critical counter-cyclical role that housing has played during the recent economic sluggishness.

Impact of Raising the Transfer Tax

Economic textbooks stress that any tax imposition get shifted to buyers if the supply side is considered to be competitive. The transfer tax was recently raised from 1.1% to 1.5% as of January 1, 2003. The recordation fees were also raised from 1.1% to 1.5% if the homes are price above \$250,000. (The median home price in the D.C. metro market was

coincidentally nearly the same at \$250,200 in 2002). In modeling the impact of raising this tax, we assume a complete shifting of tax and fees to home price. This is a reasonable assumption because the real estate transaction can be said to occur in a competitive environment since it meets the important required standards for a perfectly competitive market. First, there are many homebuyers and many real estate agents (working as independent contractors). Second, the entry and exit into and out of the real estate profession is relative easy. The length of training hours is relatively short (sometimes no longer than a month) and the number of new real estate agents entering and the number of older agents existing the market is rather dynamic.

Therefore, the question now becomes how many households get priced-out as a result of higher transfer tax? The median home price in the D.C. region in 2002 according to NAR was \$249,200. Raising the tax by 0.4% (from 1.1% to 1.5%) will increase the home price by \$997. Raising the recordation fees for half of the homes will further raise the home price by additional \$498. The total combined effect of higher transfer tax and recordation fee will raise the home price by \$1,495 or to \$250,695. Assuming other things, such as income, employment, and interest rates, remain the same, the number of households who once qualified to buy a home but can no longer purchase a home as a result of higher transfer taxes is estimated to be 610 households (see Appendix 1 for the details in computing this estimate). Certainly, any positive benefits from additional tax revenue must be weighed against the cost of fewer home sales (and the consequent loss in tax revenue) and fewer homeownership households who will pay property tax.

Impact of First Time Buyer Tax Rebate

The First-Time Homebuyer Individual Income Tax Credit for D.C. residents started in August 1997. The credit is typically \$5,000, though it could be smaller if not all of the eligibility criteria are met.

As discussed in earlier sections, there was a lift to the DC housing sector beginning in the second half of 1997. One can make a causal connection between the introduction of the

tax credit and the subsequent robust housing activity. But in the analysis below, a more thorough economic analysis is provided.

The two most important factors influencing home sales are employment and the mortgage rate. Obviously, more employment will lead to additional people qualifying to purchase a home. Low mortgage rates also affect home sales since low rates lead to lower required monthly mortgage payments and hence enlarge the pool of eligible homebuyers. According to NAR’s econometric model, a 1% increase in employment led to a 1.1% increase in home sales. At the same time, 1% decrease in the average mortgage rate led to a 0.5% increase in home sales. The econometric model and the coefficients are shown in the Appendix 3.

Based on the econometric model, the actual home sales with the tax credit benefits were much higher than what they would have been in the absence of the tax credit. Table 7 shows the side-by-side comparison of home sales with and without tax credit. For example, in 2002 there were 12,900 unit sales in D.C. But according to the econometric model, sales would have been only 10,000 in the absence of the tax credit. That is, employment grew 20% in the city from 2002 to 1997, which would have translated into 22% increase in home sales in 2002 compared to what it had been in 1997. Furthermore, the average mortgage rate dropped from 7.5% to 6.5% (or by 14%) over the same time period. The falling rate would have increased home sales by additional 7%. So the net effect of employment and mortgage rate effect would have increase home sales by 29% (22% from employment effect and 7% from mortgage rate effect). The 29% increase in home sales from 8,700 unit sales in 1997 translates into 10,000 unit sales in 2002. Since the actual home sales were 12,900, the additional home sales can only be explained as a contribution from other factors aside from employment and mortgage rate. Clearly one strong factor was introduced during this time period, namely, the first-time homebuyer tax credit.

Table 7. Tax Credit Effect

Year	Actual Home Sales	Projected Home Sales
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	(with tax credit)	(without tax credit)
1997	8700	8700
1998	13000	8600
1999	13800	9700
2000	12700	11300
2001	12700	10600
2002	12900	10000

Simulation of Higher Tax Credit

It is clear that tax credit has made a significant difference in homesales and in attracting new residents to D.C. Consequently, it would be useful to know what the likely outcome would be if the tax credit is raised to \$7,500 or even to \$10,000.

In modeling this scenario the credit of \$5,000 is seen as downpayment assistance to help lower the overall mortgage amount. After all, it is feasible to borrow \$5000 from, say a relative or a bank, with a guarantee return backed by the federal government. (There could be an interest charge associated from the time of borrowing to the time of repayment, but is not considered in this analysis. Even assuming 10% interest rate over a one year time frame, an unreasonably high interest rate given the government-backed repayment, it would still reduce the credit value by only \$500). Consequently, framing the analysis of tax credit as the reduction in the mortgage-financing requirement is sensible. Therefore, a reduction in mortgage financing will enlarge the pool of eligible homebuyers. Based on 2002 market conditions of a 6.5% mortgage rate and a \$249,200 median home price, this translates into 28,000 additional households living in the Greater D.C. metropolitan area (which extends out to one county in West Virginia as officially defined by the U.S. Bureau of the Census) that would become qualified to buy a home versus if there were no tax credit. Generally, only a small fraction of newly qualifying households actually purchases a home. Past NAR research has suggested between 7% to 17% of newly qualifying households actually purchase a home, which roughly translates into 2000 to 4,800 additional home sales. Earlier, it was shown that home sales in D.C.

had jumped by roughly this amount with the introduction of the tax credit. Appendix 2 contains full detailed logic and calculations.

Separate results with different hypothetical tax credit amounts are shown in Table 8. It says that with a \$7,500 tax credit, the homebuying pool expands by 36,400 of which 2,500 to 6,200 additional households will actually make a home purchase. With a \$10,000 tax credit, the homebuying pool expands by 48,400 of which 3,400 to 8,200 additional households will actually make a home purchase.

Table 8. Effects of Higher Tax Credit Effect

Tax Credit	Expansion in the Homebuying Pool	Likely addition to Home Sales
\$5,000	28,000	2,000 to 4,800
\$7,500	36,400	2,500 to 6,200
\$10,000	48,400	3,400 to 8,200

Note that the overall impact rises with a higher tax credit, as would one would expect, but the impact has diminishing returns. In other words, the impact of a \$10,000 tax credit does not directly double the impact of a \$5,000 tax credit.

Conclusions

The housing sector is very important for both local and national economy. About 15 percent of the national economy is directly attributed to housing market activity. For D.C. the housing contribution comprise 9 percent of total economic output and 14 percent of total private industry output. Housing contributes to job growth, tax revenue, and the benefits of shelter and wealth accumulation for households. In the past two years, even as the overall economy underwent an official recession in 2001 and economic sluggishness in 2002, the housing market remained robust and played a vital role in ameliorating the economic downfall.

In addition homeownership provide additional intangible values. Homeowners do not move as frequently as renters, providing a source of neighborhood stability. Neighborhood stability in turn confers benefits of higher social and community involvement such as crime prevention programs. Homeowners have a stake in their neighborhoods and communities, and so are likely to behave in ways that benefit everyone in the community. The introduction of the first-time home buyer tax credit played a crucial role in increasing home sales, homeownership rate, and is likely to have contributed to population stability in D.C.

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Appendix 1: Impact of Higher Transfer Tax

1. The residential real estate market is a competitive market because there many buyers and sellers and there exists easy entry and exit into real estate profession.
2. The transfer tax will be shifted to home price
3. The median home price in the D.C. metro market was \$249,200 in 2002
4. Raising the transfer tax from 1.1% to 1.5% will result in a 0.4% higher home price.
5. 0.4% of the median home price is \$997.
6. Raising the recordation fees from 1.1% to 1.5% for about half of the homes will result in additional 0.2% higher home price.
7. The new median home price will be \$250,700 (after rounding off).
8. Assume other things, such as interest rate, income, and employment, as constant. This is the standard method for analyzing impacts of policy changes.
9. The average 30-year fixed mortgage rate in 2002 was 6.5%.
10. Traditional lending standards call for mortgage payment to be 25% of income.
11. Assume a 10% downpayment, meaning 90% of the home price must be financed.
12. So for a home price of \$249,200 (the current existing median home price), the mortgage-financing amount will be \$224,280.
13. To borrow \$224,280 at a mortgage rate of 6.5%, the required monthly payment has to be \$1,418 (from mortgage amortization formula).
14. The required monthly gross income has to be four times the monthly mortgage payment, or the income needed is \$5,672. This translates into annual income of \$68,064.
15. With the higher transfer tax, the new home price would be \$250,700. Following the same logic (#11 to #13 above), the required annual income now becomes \$68,448.
16. The number of households who can no longer buy a home due to higher income requirement are those households in the income range from \$68,064 to \$68,448.
17. Assuming linear distribution of household in an income range, there are 610 households who meet that criteria.

Appendix 2: Impact of a Higher First-time Homebuyer Tax Credit

1. The median home price in the D.C. metro market was \$249,200 in 2002
2. Assume other things, such as interest rate, income, and employment constant. This is the standard method for analyzing impacts of policy changes.
3. The average 30-year fixed mortgage rate in 2002 was 6.5%.
4. Traditional lending standards call for monthly mortgage payment to be 25% of income.
5. Assume 10% downpayment, meaning 90% of home price must be financed.
6. So for a home price of \$249,200 (the current existing median home price), the mortgage-financing amount will be \$224,280.
7. To borrow \$224,280 at a mortgage rate of 6.5%, the required monthly payment has to be \$1,418 (from mortgage amortization formula).
8. The required monthly gross income has to be four times the monthly mortgage payment, or the income needed is \$5,672. This translates into annual income of \$68,064.
9. With the \$5,000 tax credit, the new required mortgage-financing falls by \$5,000 or to \$219,280. Following the same logic (#11 to #13 above), the required annual income now becomes \$66,528.
10. The number of households who can not buy a home in the absence of the \$5,000 credit are those households in the income range \$66,528 to \$68,304.
11. Assuming linear distribution of household in an income range, there are 2,806 current D.C. households who meet that criteria.
12. If assuming that existing suburb residents will consider purchasing home in D.C. as a result of the tax credit, then the relevant pool of buyers is all D.C metro area residents. As of December 2002, the labor force in D.C. was 267,100. The labor force in the greater metro Washington, D.C. region was 2.767 million, or about ten times larger. So the number of households affected by the tax credit could be ten times larger than the number of currently residing D.C. residents. In other words, 28,060 households could qualify to buy a home as a result of the tax credit, as compared to without a tax credit. Past NAR research suggests that roughly 7% to 10% of newly qualifying households actually make the home purchase within a year of qualifying. This would then translate into about 2,000 to 4,800 additional home sales in the D.C.
13. Assuming a higher tax credit of \$7,500 and running the same logic, the number of additional households affected would be 3,640 for D.C. residents and 36,400 for the greater metro region. This would then translate into about 2,500 to 6,200 additional home sales.
14. Assuming a higher tax credit of \$10,000 and running the same logic, the number of additional households affected would be 4,840 among existing D.C. residents and 48,400 for the greater metro region. This would then translate into roughly 3,400 to 8,200 additional home sales.

Appendix 3: Econometric Analysis

Home sales volume is a function of employment and mortgage rates. To form an elasticity (express in percentage terms), a regression of logarithms is run. That is,

$$\text{Log (home sales)} = a_0 + a_1 \cdot \log(\text{employment}) + a_2 \cdot ((\text{mortgage rate} + \text{mortgage rate}(-1)) / 2)$$

Annual data from 1973 to 2002 is used, yielding 28 observations. The regression result is as follows:

R-square = 0.7769

Adjusted R-square = 0.7603

Variable	Coefficient	T-statistic
A0	-4.17	-1.2
A1	1.1	6.0
A2	-0.5	-4.1

Appendix 4: Housing Affordability Index

HOUSING AFFORDABILITY

FOR Select MSAs, Third Quarter 2002

Ranked from least affordable to most affordable

MSA NAME	Affordability Index
1 San Diego, CA	66.3
2 San Francisco, CA Area	68.0
3 Boston, MA PMSA	74.7
4 Honolulu, HI	75.5
5 Los Angeles-Long Beach, CA PMSA	79.1
6 NY: New York-North NJ-Long Island, NY CMSA	80.2
7 Bergen/Passaic, NJ	94.1
8 NY: Newark, NJ	101.1
9 Miami-Hialeah, FL PMSA	101.5
10 Nassau-Suffolk, NY PMSA	106.5
11 Monmouth-Ocean, NJ	107.1
12 Sacramento, CA	108.7
13 Providence, RI PMSA	111.0
14 Riverside-San Bernadino, CA PMSA	115.7
15 Ft. Lauderdale-Hollywood-Pompano Bch, FL PMSA	122.7
16 Tacoma, WA	124.8
17 Seattle, WA	125.0
18 Sarasota, FL	125.3
19 Charleston, SC	125.6
20 Denver, CO PMSA	125.7
21 Eugene-Springfield, OR	125.7
22 Middlesex-Somerset-Hunterdon, NJ	127.2
23 Portland, OR PMSA	130.6
24 Colorado Springs, CO	135.6
26 New Haven-Meriden, CT	136.8
27 Chicago, IL PMSA	137.3
28 Las Vegas, NV	139.2
29 Tucson, AZ	139.8
30 Richland/Kennewick/Pasco, WA	142.4
31 Atlantic City, NJ	144.6
32 New Orleans, LA	146.2
33 Reno, NV	146.6
34 Gainesville, FL	147.9
35 Washington, DC-MD-VA	147.9
36 Baltimore, MD	148.7
37 Hartford, CT PMSA	149.5
38 Springfield, MA	151.3
39 Tampa-St.Petersburg-Clearwater, FL	151.8

NAR Research

40 Ft. Myers-Cape Coral, FL	153.6
41 Albuquerque, NM	156.3
42 Salt Lake City-Ogden, UT	157.4
43 Mobile, AL	158.6
44 Birmingham, AL	159.3
45 Milwaukee, WI PMSA	160.0
46 Trenton, NJ	161.6
47 Madison, WI	163.5
48 Pensacola, FL	164.4
49 Orlando, FL	165.2
50 Phoenix, AZ	167.9
51 Philadelphia, PA-NJ PMSA	168.4
52 El Paso, TX	168.5
53 Minneapolis-St. Paul, MN-WI	168.9
54 Spokane, WA	170.1
55 Daytona Beach, FL	170.2
56 Baton Rouge, LA	170.5
57 Greensboro/Winston Salem/High Point,NC	171.0
58 San Antonio, TX	171.1
59 Tallahassee, FL	172.1
60 Raleigh-Durham, NC	172.7
61 Greenville-Spartanburg, SC	174.3
62 Charlotte-Gastonia-Rock Hill, NC-SC	179.1
63 Albany-Schenectady-Troy, NY	179.7
64 Memphis, TN-AR-MS	180.4
65 Shreveport, LA	180.6
66 Corpus Christi, TX	181.3
67 Knoxville, TN	183.0
68 Boise, ID	183.1
69 Chattanooga, TN-GA	183.4
70 Tulsa, OK	183.4
71 Columbus, OH	183.9
72 Charleston, WV	184.1
73 Houston, TX PMSA	184.9
74 Lexington-Fayette,KY	184.9
75 Montgomery, AL	189.3
76 Jacksonville, FL	189.7
77 Richmond-Petersburg, VA	189.8
78 Austin/San Marcos, TX	190.6
79 Amarillo, TX	192.3
80 Kansas City, MO-KS	192.8
81 Pittsburgh, PA PMSA	193.2
82 Akron, OH PMSA	193.7
83 Lansing-E.Lansing, MI	194.0
84 Green Bay, WI	194.1
85 Cincinnati, OH-KY-IN PMSA	196.7
86 Columbia, SC	196.9
87 Gary-Hammond, IN	197.0

NAR Research

88 Oklahoma City, OK	198.3
89 Atlanta, GA	201.0
90 Grand Rapids, MI	201.0
91 Dallas, TX PMSA	202.8
92 Wilmington, DE-NJ-MD	204.8
93 Sioux Falls, SD	206.0
94 Des Moines, IA	208.0
95 Lincoln, NE	208.7
96 Fargo, ND	212.2
97 Omaha, NE-IA	216.5
98 Dayton-Springfield, OH	217.3
99 Beaumont, TX	218.1
100 Indianapolis, IN	222.9
101 Waterloo/Cedar Falls, IA	225.5
102 Appleton, WI	227.2
103 Champaign, IL	229.0
104 Rockford, IL	229.0
105 Davenport/Moline/Rock Island, IA, IL	229.8
106 Cedar Rapids, IA	229.9
107 Syracuse, NY	232.2
108 Rochester, NY	234.5
109 Wichita, KS	244.4
110 Buffalo-Niagara Falls, NY CMSA	245.3
111 South Bend-Mishawaka, IN	246.4
112 Ft. Wayne, IN	253.0
113 Topeka, KS	263.0
114 Peoria, IL	263.4