A Housing Market Without Fannie Mae and Freddie Mac: Effect on Homeownership Rate

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Executive Summary

For decades, Fannie Mae and Freddie Mac followed securitization policies that enabled Americans to make a low down payment when they purchased a house. This study analyzes the impact of affordable lending efforts by government-sponsored entities (GSEs) on national homeownership rate, by race, ethnic group, and census region. The results of this study suggest that despite GSE interventions in the housing market, the homeownership gap among races and ethnic groups persists because economic fundamentals and sociodemographic features, not interest rates, drive homeownership rates.

This paper uses three series of regression models to gain insight into the determinants of home ownership rates. The first regression model analyzes aggregate national-level data for 1980–2010. The second regression model analyzes factors that influence the homeownership rate by race/ethnic group for 1994–2010, where historical data are available. Finally, the third model analyzes homeownership by census region for 1992–2010, where regional homeownership data are available. The results of ordinary least squares (OLS) models with robustness tests indicate:

- Household assets, expectations of future home price appreciation, personal saving rate, effective tax rate (an average of state and local tax burden), vacancy rate, housing starts, and the Wilshire index (a metric of stock market prices) are the most important factors in shaping the homeownership rate at the aggregate national level.

- The results of this study indicate that eliminating GSEs could lead to very small changes in homeownership rate. Indeed, a one percent increase in mortgage interest rate is associated with 0.1 percent lower homeownership at the national level. Therefore, a 25 basis point increase in mortgage interest rate due to shutting down Fannie and Freddie, which has been found in the literature, could lead to only a trivial impact of a 0.3 percent lower homeownership rate at the aggregate national level.

- The results by race/ethnic groups suggest that blacks are more sensitive to mortgage interest rates than whites and Latinos. However, the responsiveness of homeownership to interest rates is at a very low level for all ethnic groups: A one percent increase in

mortgage interest rates is associated with a 0.02 percent decrease in homeownership for whites and Hispanics, and a 0.05 percent decrease in homeownership for blacks. The results indicate that shutting down the GSEs would reduce the homeownership rates for whites and Hispanics by as little as 0.5 percent and by almost 1.2 percent for blacks. The policy question is whether raising the homeownership rate by only one percent is worth spending billions of dollars in subsidies.

- The results also indicate that responsiveness of homeownership rate to down payment is trivial compared to economic fundamentals, such as GDP per capita, the effective tax rate, and sociodemographic features. For instance, a 25 percent increase in the effective tax rate reduces the homeownership rate by 10 percent for whites, 4 percent for blacks, and 12 percent for Hispanics. In other words, changes in the effective tax rate affect homeownership rates far beyond the changes in the mortgage interest rates.

- The results for homeownership rates among race/ethnic groups

indicate that homeownership is driven mainly by fundamentals, such as GDP per capita, the effective tax rate, and sociodemographic features, such as household size, income distribution, marital status, female participation in the labor market, and education. Therefore, intervention by the GSEs to raise the homeownership rate among race and ethnic groups by subsidizing mortgage interest rates seems inconsequential.

■ The results by census regions also suggest that homeownership is relatively non-responsive to changes in mortgage interest rates when compared to economic fundamentals. However, the homeownership rates in the West and Midwest are more responsive to changes in interest rate than the Northeast and the South. A 25-basis-point increase in the mortgage interest rate caused by liquidating the GSEs could lead to a 1.75 percent drop in home-ownership rates in the West and Midwest, a 0.5 percent drop in the South, and a 0.25 percent drop in the Northeast. Put differently, the Northeast is the region least responsive to changes in conventional mortgage interest rates.

In sum, this study casts doubt on the efficiency of subsidizing mortgage interest rates and down payments to raise the homeownership rate or eliminate homeownership gaps among race/ethnic groups because economic fundamentals and sociodemographic features are the main drivers of homeownership. The government is leveraging instruments which have proved to have little impact on homeownership rates.

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Abstract

The increase in the homeownership rate from 63.8 percent in the first quarter of 1994 to almost 70 percent in the first quarter of 2005 and its subsequent fall to 67.1 percent in the first quarter of 2010 has cast doubts on the effectiveness of the government's policy of subsidizing mortgage interest rates and down payments. Although a substantial amount of academic research has focused on the effects of GSE intervention in raising the homeownership rate, less attention has been paid to race/ethnic and regional differences. One of the novel features of this study is that it captures the effects of liquidating the GSEs on homeownership rates not only at the aggregate national level, but also by race/ethnic group and census region.

For decades, Fannie Mae and Freddie Mac followed securitization policies that enabled Americans to make a low down payment when they purchased a house. However, despite the GSEs' intervention, the volatility of homeownership rate during the past decades is undeniable. The homeownership rate increased from 62.9 percent in the first quarter of 1965 to 64.4 percent in the first quarter of 1975 and then fell to 64.1 percent in the first quarter of 1985. It was relatively stable until the first quarter of 1995, when it reached to 64.2 percent. But then it saw an unprecedented increase and reached 69.1 percent in the first quarter of 2005, before falling back to 66.5 percent in the fourth quarter of 2010 due to the bubble burst and a delayed recovery. (See Chart 1.)

Interestingly, the rise and the fall in the homeownership rate has not been correlated with the rise and the fall of the conventional 30-year mortgage interest rate, which fell by

23 percent from the fourth quarter of 2004 to the fourth quarter of 2010. (See Chart 2.) Contrary to expectations, the homeownership rate has fallen by only 3.9 percent over the same period, raising doubts about the effectiveness of subsidized interest rates in raising the homeownership rate. The lack of relationship between mortgage interest rate and homeownership rate can be better understood when economic fundamentals are taken into account, as shown in the econometric section of this paper.

Increasing homeownership rates among minorities and underserved geographic areas has been a goal of policymakers for decades. To achieve this goal, federal agencies have used numerous instruments to ease borrowing requirements: They have routinely purchased mortgages with down payments as low as 5 percent and have introduced programs that allow borrowers to receive loans with monthly mortgage payments that do

not exceed 28 percent of their gross monthly income.[1]

Ironically, despite sustained efforts, homeownership rates have dropped significantly among race/ethnic groups. The data indicate that homeownership among blacks has dropped from 47.7 percent in the first quarter of 2003 to 44.2 percent in the second quarter of 2011. During the same period, homeownership has dropped from 75 percent to 73.7 percent among whites, but has remained relatively stable among Hispanics.[2] In sum, the data indicate that GSE interventions have had no positive effect on homeownership rates, even after controlling for business cycles.

The remainder of this paper is structured as follows. First, it reviews the literature on the determinants of the homeownership rate. Next, the analysis section derives a reduced form equation for the homeownership rate from the supply and demand equations for real estate. The data section reviews the list of

CHART 1

National Homeownership Rate
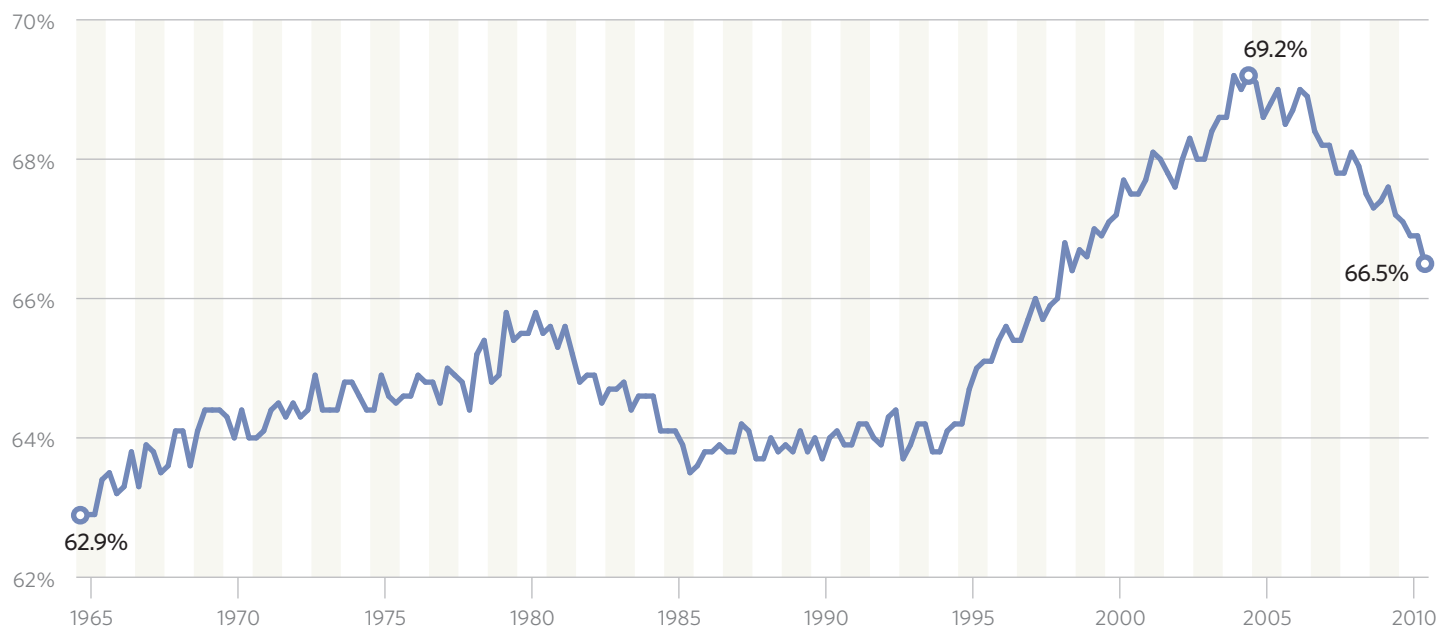
Source: U.S. Census Bureau, "Housing Vacancies and Homeownership (CPS/HVS)," Table 14, at
http://www.census.gov/hhes/www/housing/hvs/historic/index.html (November 1, 2011).

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variables, their summary statistics, and their resources. The econometric section measures the elasticity of homeownership rates at the national and regional level, and among race and ethnic groups to changes in mortgage interest rates and down payments, controlling for a group of economic fundamentals and sociodemographic features. Finally, the analysis ends with a conclusion and policy discussion.

Literature Review

This section reviews the seminal studies on the determinants of the homeownership rate within three categories: demographic features, longitudinal panels, and regional and race differences.[3]

Studies on Demographic Features. Stuart Rosenthal uses a probit model with variables such as household head's race, marital status, age, expected income, health status,

and level of education and finds that credit barriers depress homeownership rates for African Americans and Latinos.[4] Gary Painter and Christian Redfearn focus on the role of interest rates on homeownership rates and find that an increase in the interest rate leads to a higher homeownership rate over time, but income and sociodemographic features are the most important factors in explaining the homeownership rate.[5] Roberto

1. Roberto G. Quercia, George W. McCarthy, and Susan M. Wachter, "The Impacts of Affordable Lending Efforts on Homeownership Rates," *Journal of Housing Economics*, Vol. 12, No. 1 (March 2003), p. 30.
2. U.S. Census Bureau, "Housing Vacancies and Homeownership (CPS/HVS)," Table 16, http://www.census.gov/hhes/www/housing/hvs/historic/index.html (accessed November 1, 2011).
3. For a summary table of the literature review, see Appendix A.
4. Stuart S. Rosenthal, "Eliminating Credit Barriers to Increase Homeownership: How Far Can We Go?" Harvard University, Joint Center for Housing Studies *Working Paper*, August 2001, http://www.jchs.harvard.edu/sites/jchs.harvard.edu/files/liho01-3.pdf (accessed March 12, 2012).
5. Gary Painter and Christian L. Redfearn, "The Role of Interest Rates in Influencing Long-Run Homeownership Rates," *Journal of Real Estate Finance and Economics*, Vol. 25, Nos. 2–3 (September 2002), pp. 243–267, http://www.usc.edu/schools/sppd/lusk/research/pdf/wp_2001-1011.pdf (accessed November 5, 2011).

CHART 2

Conventional 30-Year Mortgage Interest Rate
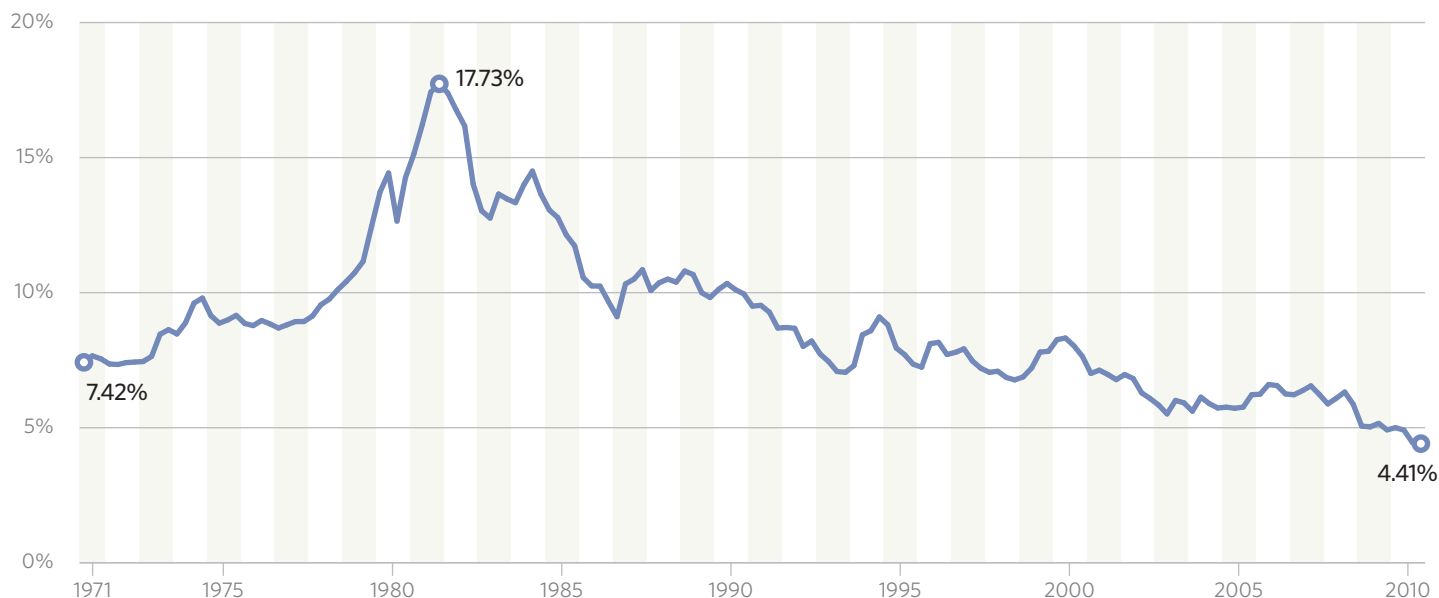
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Quercia, George McCarthy, and Susan Wachter assess the impact of changes in mortgage interest rates on the homeownership rate. Using a number of demographic variables such as household size, male population, and marital status, they find that a 50-basis-point increase in the mortgage interest rate is associated with a 1.1 percent to 2.9 percent lower homeownership rate.[6]

Studies with Longitudinal Panel Data. Christopher Herbert and Winnie Tsen use panel data to investigate the impact of cash transfers to households on the probability of becoming a homeowner. They implement variables such as race, age, education, family structure, household income, interest rate, median home price, annual home price appreciation, financial assets and liabilities, wealth, and debt. They find that liquid assets and saving rates have the greatest effect on the probability of becoming a homeowner.[7] Stuart Gabriel and Stuart Rosenthal use data from 2005 and 2009 to investigate booms and busts in homeownership rates. They use independent variables such as marital status, race, income, educational attainment, employment status, occupation type, work hours, median home value, and home price volatility and find higher homeownership rates in places where home prices are less volatile.[8]

Studies on Regional and Race Differences. Paul Carrillo and Anthony Yezer investigate homeownership gaps across segregated neighborhoods. They use pooled regression with 2000 census data and control for variables such as the share of white population, density of population, share of population older than 65, married portion of

6. Quercia et al., "The Impacts of Affordable Lending Efforts on Homeownership Rates."

7. Christopher E. Herbert and Winnie Tsen, "The Potential of Downpayment Assistance for Increasing Homeownership Among Minorities and Low-Income Households," U.S. Department of Housing and Urban Development, Office of Policy Development and Research, January 2005, http://www.huduser.org/publications/pdf/potentialdownpaymentassistance.pdf (accessed November 4, 2011).

8. Stuart A. Gabriel and Stuart S. Rosenthal, "Homeownership Boom and Bust 2000 to 2009: Where Will the Homeownership Rate Go from Here?" Research Institute for Housing America *Special Report*, September 2011, http://www.housingamerica.org/RIHA/RIHA/Publications/77196_10614_Research_RIHA_Gabriel_Rosenthal_Report.pdf (accessed November 15, 2011).

population, share of population above 25, median income, and unemployment rate and find that sociodemographic features, not mortgage interest rates, have a greater effect on homeownership gaps.[9] Stuart Gabriel and Stuart Rosenthal investigate the impact of GSE activities on homeownership rates in underserved areas. They use socioeconomic attributes and variables such as mortgage interest rates, average income, unemployment rate, and the ratio of race/ethnic group populations and find no positive impact from GSE interventions on the homeownership rate in underserved areas.[10] Sanjaya DeSilva and Yuval Elmelech use the 2000 Integrated Public Microdata Series and find that demographic and immigration characteristics are main factors in understanding differences in homeownership rates among race and ethnic groups.[11]

In short, the literature has paid less attention to homeownership gaps among race and ethnic groups and regional differences. One of the novel features of this study is that it captures the effects of changes in mortgage interest rates and down payments on the homeownership rate, not only at the aggregate national level, but also by race/ethnic group and census region.

Transmission Channels of Interest Rates

To investigate how the GSE intervention in the housing market has affected the homeownership rate, this section examines the transmission channels of the interest rate on supply and demand sides of the housing market. As Gary Painter and Christian Redfearn argue,[12] the interest rate affects the borrowing costs and therefore the overall price of a house. With higher borrowing costs, prices jump up and demand falls proportionately. However, on the supply side, the interest rate is a part of construction costs for the home builders. Therefore, an increase in the interest rate negatively affects housing starts. In this simple model, a higher interest rate is associated with a lower homeownership rate through both supply and demand side.

However, interest rate affects the supply side only if the real estate market is price sensitive or elastic. Otherwise, it would affect only the demand side of the market. Assuming an inelastic supply curve, changes in interest rates lead only to changes in the demand side. Indeed, policies aimed at raising the homeownership rate should focus on both supply and demand side; failure to do so would lead to more subsidies to high-income groups.

More importantly, changes in the demand side occur not only from changes in mortgage interest rates, but also from variations in many economic fundamentals and sociodemographic features, including personal income, household assets, personal saving rate, effective tax rate, family size, distribution of income, expectations of future home price appreciation, and female participation in the labor market. Because these features vary substantially by race/ethnic group and region, this study tries to capture those effects on the homeownership rate not only at the national level, but by race/ethnic group, and census region.

Data

This study uses quarterly data from the first quarter of 1980 through the last quarter of 2010 to estimate the effects of changes in mortgage interest rates and down payments on aggregate homeownership rates, controlling for economic fundamentals and sociodemographic features. Data for race and ethnic groups are available from the first quarter of 1994 through the last quarter of 2010 and for census regions from the first quarter of 1992 through the last quarter of 2010.[13]

The list of the variables, their summary statistics, and their

9. Paul Carrillo and Anthony Yezer, "Alternative Measures of Homeownership Gaps Across Segregated Neighborhoods," George Washington University, Institute for International Economic Policy *Working Paper* No. 7, February 2008, http://www.gwu.edu/~iiep/assets/docs/papers/Carrillo_IIEPWP7.pdf (accessed November 12, 2011).

10. Stuart A. Gabriel and Stuart S. Rosenthal, "The GSEs, CRA, and Homeownership in Targeted Underserved Neighborhoods," paper presented at the "Built Environment: Access, Finance, and Policy" Conference, Lincoln Institute of Land Policy, Cambridge, MA, June 2, 2008, http://www.rhsmith.umd.edu/cfp/events/2011/GSE2011/papers/GSECRAEffects.pdf (accessed November 10, 2011).

11. Sanjaya DeSilva and Yuval Elmelech, "Housing Inequality in the United States: A Decomposition Analysis of Racial and Ethnic Disparities in Homeownership," Bard College, Levy Economics Institute *Working Paper* No. 565, May 2009, http://www.levyinstitute.org/pubs/wp_565.pdf (accessed November 13, 2011).

12. Painter and Redfearn, "The Role of Interest Rates in Influencing Long-Run Homeownership Rates."

13. The data used in this paper are available upon request from the author or The Heritage Foundation.

Theoretical Model

In addition to interest rates and down payments, several authors have argued that the choice to own a house (the "tenure choice") depends on other factors such as household assets, income, expectation of home price appreciation, and the savings rate. Many authors, including Roberto Quercia, George McCarthy, and Susan Wachter and Stuart Gabriel and Stuart Rosenthal have also acknowledged that demographic characteristics affect tenure choices.

To derive the homeownership equation, this section draws up supply and demand functions for real estate based on the findings in the literature review. The demand for real estate is a function of several economic fundamentals and sociodemographic factors including the following:

$$D = f(\overset{+}{Hassets}, \overset{-}{MR30}, \overset{-}{Dpayment}, \overset{+}{GDPPC}, \overset{+}{Ownership}, \overset{+}{Saving}, \overset{+}{SP}, \overset{+}{Rent}, \overset{-}{Etax}, \overset{+}{Female}, \overset{+}{Mhprice1}, \overset{+}{Size}, \overset{-}{Gini}, \overset{-}{Pop}, \overset{-}{BCindex})$$

where:

Hassets is the household assets, $\dfrac{\partial D}{\partial Hassets} > 0$

MR30 is the conventional 30-year mortgage interest rate, $\dfrac{\partial D}{\partial Mr30} < 0$

Dpayment is the national average down payment, $\dfrac{\partial D}{\partial Dpayment} < 0$

GDPPC is GDP per capita, $\dfrac{\partial D}{\partial GDPPC} > 0$

Ownership is the homeownership rate, $\dfrac{\partial D}{\partial Ownership} > 0$

Saving is the personal saving rate, $\dfrac{\partial D}{\partial Saving} > 0$

SP is the S&P 500 Index, $\dfrac{\partial D}{\partial SP} > 0$

Rent is the rent index, $\dfrac{\partial D}{\partial Rent} > 0$

Etax is the effective tax rate, $\dfrac{\partial D}{\partial Etax} < 0$

Female is the female participation in the labor market, $\dfrac{\partial D}{\partial Female} > 0$

Mhprice1 is the expectation of home price appreciation measured by the lagged median home price, $\dfrac{\partial D}{\partial Mhprice1} > 0$

size is the household size, $\dfrac{\partial D}{\partial Size} > 0$

Theoretical Model (Cont.)

$Gini$ is the Gini distribution of income, $\dfrac{\partial D}{\partial Gini} < 0$

Pop is the population, $\dfrac{\partial D}{\partial Pop} < 0$

and *BCindex* is the business cycle index, a measure that captures the effects of macroeconomic cycles on the homeownership rate, $\dfrac{\partial D}{\partial BCindex} < 0$

The housing supply is a function of the vacancy rate, housing starts, the homeownership rate, and the expectation of home price appreciation where:

$$S = f(\overset{-}{Vacancy}, \overset{+}{Housstart}, \overset{+}{Ownership}, \overset{+}{Mhprice1})$$

where:

$Vacancy$ is the vacancy rate, $\dfrac{\partial S}{\partial Vacancy} < 0$

$Housstart$ is housing starts, $\dfrac{\partial S}{\partial Housstart} > 0$

$Ownership$ is the ownership rate, $\dfrac{\partial S}{\partial Ownership} > 0$

Mhprice1 is the expectation of home price appreciation measured by the lagged median home price, $\dfrac{\partial S}{\partial Mhprice1} > 0$

By equating demand and supply equations, a reduced form equation is obtained:

$$Ownership = f(\overset{-}{MR30}, \overset{-}{Dpayment}, \overset{+}{Hassets}, \overset{+}{Saving}, \overset{+}{GDPPC}, \overset{+}{SP}, \overset{-}{Rent}, \overset{+}{Etax}, \overset{-}{Size}, \overset{+}{Pop}, \overset{-}{Female}, \overset{-}{Gini}, \overset{-}{BCindex}, \overset{+}{Vacancy}, \overset{+}{Housstart}, Mhprice1)$$

sources are presented in Table 1. The data on down payments, mortgage loans, and regional home prices are from the Federal Housing Finance Agency (FHFA).[14] The data on effective tax burden in different regions and at the aggregate national level are from the Tax Foundation.[15] The data on median home prices are from

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14. Federal Housing Finance Agency, Regional HPI Data, http://www.fhfa.gov/Default.aspx?Page=214 (accessed March 13, 2012), and "Historical Summary Tables," Table 9, http://www.fhfa.gov/Default.aspx?Page=252 (accessed November 5, 2011).

15. Tax Foundation, "State and Local Tax Burdens: All Years, One State, 1977–2008," February 23, 2011, http://www.taxfoundation.org/taxdata/show/335.html (accessed November 6, 2011).

TABLE 1

List of Variables and Their Summary Statistics

Variable	Definition	Mean	Maximum	Minimum	Standard Deviation	Source
BCindex	Business cycle index	1.28	3.95	–3.74	1.23	Federal Reserve Bank
Blackfear	Black full-time female workers with earnings (thousands)	3,999.74	6,466	1,715	1,608.5	Census Bureau
Blackgini	Gini coefficient among blacks	0.453	0.486	0.411	0.023	Census Bureau
Blacklimit	Income limit for lowest 5 percent income group among blacks	6,767.02	13,000	1,777	3,571.6	Census Bureau
Blackmarried	Population of married (thousands)	3,809.9	4,392	3,264	348.2	Census Bureau
Blackpop	Population of black (thousands)	30,530.3	39,031	22,393	5,320.7	Census Bureau
Blacksize	Average black household size	2.71	2.91	2.57	0.10	Census Bureau
College	Number of people with college degree (thousands)	18,145.6	20,236	14,984	1,536.7	Census Bureau
DJ	Dow Jones Industrial Index	3,921.08	13,516.9	593.9	4,052.08	Federal Reserve Bank
Dpayment	Down payment for single-family newly built mortgages (percent)	24.88	28.70	20.10	2.28	FHFA
Etax	Effective tax burden (percent)	9.73	10.4	9.2	0.28	Tax Foundation
Femaleb	Black female workers with work experience (thousands)	6,925.68	9,532	4,098	1,884.06	Census Bureau
Femaleh	Hispanic female workers with work experience (thousands)	5,045.78	9,127	1,705	2,455.53	Census Bureau
Femalew	White female workers with work experience (thousands)	48,719.14	59,823	29,958	9,216.7	Census Bureau
GDPPC	GDP per capita at constant prices	29,374.67	43,973.09	15,403.57	8,582.43	Federal Reserve Bank
Gdebt	Government debt as a percentage of GDP	20.43	28.9	12.8	4.36	World Bank
Hassets	Household assets (billions of dollars)	6,590.11	22,732.54	475.58	6,469.03	Federal Reserve Bank
Hispanicfear	Hispanic full-time female workers with earnings (thousands)	2,746.81	5,418	629	1,612.5	Census Bureau
Hispanicgini	Gini coefficient among Hispanics	0.426	0.460	0.367	0.027	Census Bureau
Hispaniclimit	Income limit for lowest 5 percent income group among Hispanics	10,086.6	17,500	3,667	4,419.9	Census Bureau
Hispanicmarried	Population of married (thousands)	4,321.0	7,200	1,929	1,786.3	Census Bureau
Hispanicpop	Hispanic population (thousands)	26,508.7	49,972	10,795	12,560.3	Census Bureau
Hispanicsize	Average Hispanic household size	3.46	3.58	3.32	0.09	Census Bureau
Housstart	Privately owned housing starts (thousands)	1,496.1	2,424	526	372.02	Federal Reserve Bank
Incomene	Personal income in Northeast in dollars	75,626.5	202,937	7,061	6,193.7	Bureau of Economic Analysis
Incomemw	Personal income in Midwest in dollars	177,932.3	424,193	23,066	130,619.8	Bureau of Economic Analysis
Incomes	Personal income in South in dollars	306,246	979,375	18,494	286,821.6	Bureau of Economic Analysis
Incomew	Personal income in West in dollars	581,092.8	1,627,319	44,006	503,276.1	Bureau of Economic Analysis
Mhprice	Median home price for a single family (thousands of dollars)	130.86	230.1	64.4	48.61	Realtor Research
Mhprice1	Lagged value of median home price (thousands of dollars)	130.54	230.1	64.4	48.68	Realtor Research
Midwestprice	Home price index in Midwest	155.23	203.4	100.0	34.36	FHFA
Midwestowner	Ownership rate in Midwest	69.80	74.2	66.4	1.96	Census Bureau
Mortgage	Mortgage loan (thousands of dollars)	92.84	224.7	14.8	66.9	FHFA
MR30	30-year mortgage interest rate	8.89	17.73	4.41	2.85	Federal Reserve Bank
M2/GDP	Financial deepening measured by the ratio of M2 over GDP	0.55	0.62	0.46	0.04	Federal Reserve Bank
Northeast price	Home price index in Northeast	150.39	223.56	97.7	50.05	FHFA
Northeastowner	Ownership rate in Northeast	61.49	65.5	57.2	2.22	Census Bureau
Ownership	Total homeownership rate (percent)	0.65	0.69	0.62	0.017	Census Bureau
Ownershipb	Homeownership among blacks (percent)	46.28	49.70	41.20	2.02	Census Bureau
Ownershiph	Homeownership among Hispanics (percent)	47.10	50.10	40.30	2.80	Census Bureau
Ownershipw	Home ownership among whites (percent)	73.81	76.20	69.80	1.86	Census Bureau

Source: Heritage Foundation calculations using data from Federal Reserve Bank of St. Louis, U.S. Census Bureau, Tax Foundation, Bureau of Economic Analysis, Federal Housing Finance Agency, National Association of Realtors, and the World Bank.

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TABLE 1

List of Variables and Their Summary Statistics (continued)

Variable	Definition	Mean	Maximum	Minimum	Standard Deviation	Source
Pricetorent	Ratio of price to rent index	1.07	1.15	0.96	0.04	Federal Reserve Bank
Rent	Primary Resident Rent Index (1982–1984=100)	166.05	250.33	85.26	47.65	Federal Reserve Bank
Saving	Personal savings rate, seasonally adjusted	7.02	12.4	1.30	2.61	Federal Reserve Bank
Southprice	Home price index in South	150.49	210.86	100.0	36.71	FHFA
Southowner	Ownership rate in South	67.38	71.50	63.70	1.81	Census Bureau
SP	S&P Index	456.81	1,497.18	55.33	466.28	Federal Reserve Bank
Taxne	Tax burden rate in Connecticut (Northeast)	10.72	12	9.5	0.77	Tax Foundation
Taxmw	Tax burden rate in Ohio (Midwest)	9.68	10.6	8.4	0.56	Tax Foundation
Taxs	Tax burden rate in Texas (South)	7.61	8.4	6.8	0.43	Tax Foundation
Taxw	Tax burden rate in California (West)	10.37	11.9	9.8	0.45	Tax Foundation
Vacancy	Vacancy rate (percent)	7.38	11.10	5.00	1.60	Census Bureau
Vacancyne	Vacancy numbers in Northeast	2,653.48	3,002	2,369	173.19	Census Bureau
Vacancymw	Vacancy numbers in Midwest	3,119.94	4,106	2,305	542.32	Census Bureau
Vacancys	Vacancy numbers in South	6,335.94	8,384	4,758	1,148.87	Census Bureau
Vacancyw	Vacancy numbers in West	2,818.55	4,061	2,174	487.39	Census Bureau
Westprice	Home price index in West	169.04	282.72	100.0	58.89	FHFA
Westowner	Ownership rate in West	60.49	65.3	57.2	1.80	Census Bureau
Whitefear	White full-time female workers with earnings (thousands)	25,031.47	35,853	13,134	7,502.1	Census Bureau
Whitegini	Gini coefficient among whites	0.428	0.461	0.386	0.026	Census Bureau
Whitelimit	Income limit for lowest 5 percent income group among whites	14,234.1	23,367	4,486	5,968.5	Census Bureau
Whitemarried	Population of married (thousands)	47,579.6	51,119	43,397	2,387.09	Census Bureau
Whitepop	White population	208,294.7	243,323	175,621	21,063.8	Census Bureau
Whitesize	Average white household size	2.56	2.62	2.53	0.02	Census Bureau
Wilshire	Average Wilshire 5000 cap index	17.43	55.05	0.83	17.43	Federal Reserve Bank

Source: Heritage Foundation calculations using data from Federal Reserve Bank of St. Louis, U.S. Census Bureau, Tax Foundation, Bureau of Economic Analysis, Federal Housing Finance Agency, National Association of Realtors, and the World Bank.

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Realtor Research.[16] The data on the homeownership rate at the national and regional levels, the vacancy rate, population, household size, Gini coefficient, marital status, female workers with work experience, full-time female workers, the number of people who have spent some years in college, and income limits for lowest 5 percent among race and ethnic groups are from the Census Bureau.[17] Personal income data by region are from the Bureau of Economic Analysis.[18] The rest of the variables are from the Federal Reserve Bank

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16. National Association of Realtors, "Quarterly Data on Median Price Single-Family Home," received by e-mail, November 2011.

17. U.S. Census Bureau, "Housing Vacancies and Homeownership (CPS/HVS)," Tables 2, 14, and 16; "Historical Income Tables: People," Tables P-8, P-14, P-37, P-39, and P-41, http://www.census.gov/hhes/www/income/data/historical/people (accessed November 6, 2011); and "Historical Income Tables: Households," Tables H-1, H-4, H-11, and H-13, http://www.census.gov/hhes/www/income/data/historical/household/ (accessed November 6, 2011).

18. U.S. Department of Commerce, Bureau of Economic Analysis, Regional Data, GDP & Personal Income, Personal Income (SQ1), http://www.bea.gov/iTable/iTable.cfm?ReqID=70&step=1 (accessed November 6, 2011).

CHART 3

Homeownership by Family Income
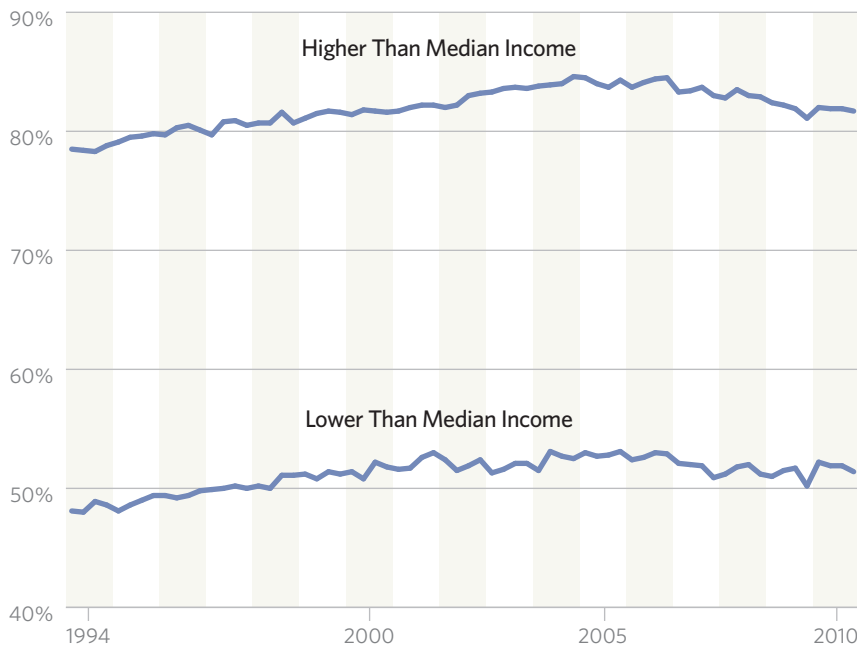
Source: U.S. Census Bureau, "Housing Vacancies and Homeownership (CPS/HVS)," Table 17, at *http://www.census.gov/hhes/www/housing/hvs/historic/index.html* (November 1, 2011).
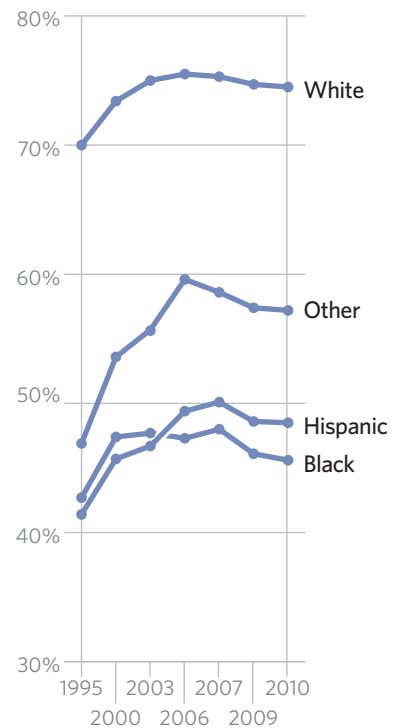
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CHART 4

Homeownership Gaps

Figures shown are for the first quarter of a given year.

BY RACIAL GROUP

Source: U.S. Census Bureau, "Housing Vacancies and Homeownership (CPS/HVS)," Table 16, at *http://www.census.gov/hhes/www/housing/hvs/historic/index.html* (November 1, 2011).

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of St. Louis,[19] except the government debt, which is from the World Bank.[20]

Stylized Facts on Homeownership Rates. The first stylized fact—a simplified presentation of an empirical finding—is that, contrary to the expectations of policymakers, homeownership has increased for families with higher-than-median income from 78.5 percent in the first quarter of 1994 to 81.7 percent in the fourth quarter of 2010, but remained stagnant at around 50 percent during 2001–2010 for families with less-than-median income. (See Chart 3.) The gap between the two groups is substantial, almost 30 percentage

19. Federal Reserve Bank of St. Louis, Leading Index for the United States, http://research.stlouisfed.org/fred2/series/USSLIND/downloaddata?cid=32262 (accessed November 7, 2011); Dow Jones Industrial Average, http://research.stlouisfed.org/fred2/series/DJIA (accessed November 7, 2011); Real GDP per Capita in the United States (USARGDPC), http://research.stlouisfed.org/fred2/search?st=GDP (accessed November 7, 2011); New Privately Owned Housing Starts in the United States, Total One-Family Units (HOUST1FQ), http://research.stlouisfed.org/fred2/search?st=Housing+Starts%3A+Total%3A+New+Privately+Owned+Housing+Units (accessed November 7, 2011); Balance Sheet of Households and Nonprofit Organizations (HABSHNO), http://research.stlouisfed.org/fred2/series/HABSHNO (accessed November 7, 2011); 30-Year Conventional Mortgage Rate, http://research.stlouisfed.org/fred2/search?st=30-Year+Conventional+Mortgage+Rate (accessed November 7, 2011); M2 Money Stock (M2) and Gross Domestic Product, 1 Decimal (GDP), http://research.stlouisfed.org/fred2/popularseries (accessed November 7, 2011); Consumer Price Index for All Urban Consumers: Rent of Primary Residence (CUUR0000SEHA), http://research.stlouisfed.org/fred2/series/CUUR0000SEHA/downloaddata?cid=32416 (accessed November 7, 2011); and Personal Saving Rate (PSAVERT), http://research.stlouisfed.org/fred2/series/PSAVERT/downloaddata?cid=112 (accessed November 7, 2011).

20. World Bank, World Data Bank, http://databank.worldbank.org/ddp/home.do (accessed November 7, 2011).

CHART 5

Homeownership Rates for Single Householders

AGES 25–64 YEARS
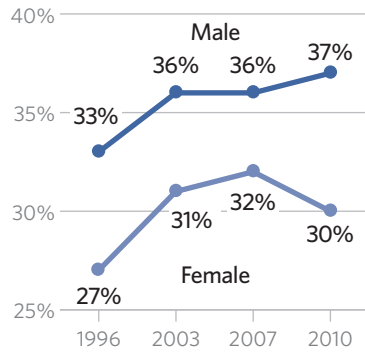
Source: U.S. Census Bureau, "Housing Vacancies and Homeownership (CPS/HVS)," Table 15, at *http://www.census.gov/hhes/www/housing/hvs/historic/index.html* (November 1, 2011).

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CHART 6

Homeownership by Marital Status

Source: U.S. Census Bureau, "Housing Vacancies and Homeownership (CPS/HVS)," Table 15, at *http://www.census.gov/hhes/www/housing/hvs/historic/index.html* (November 1, 2011).
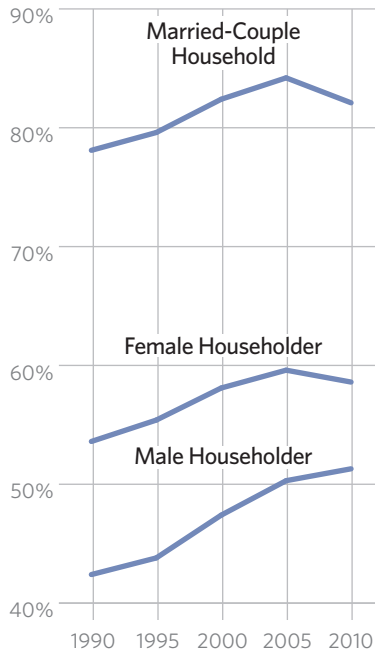
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points. The government's intervention to raise the homeownership rate among low-income families has failed, and a large amount of subsidies have been injected to families with higher-than-median income. The intervention by the GSEs appears to have induced top quintiles to purchase a second or third house rather than help lower-income families to purchase their first house, as evidenced by the much higher homeownership rate among families with higher-than-median income (with 80 percent homeownership) versus families with lower-than-median income (with 50 percent homeownership).

Second, homeownership rates among race and ethnic groups have not changed dramatically despite GSE intervention in the housing market since 1996. Amazingly, the

data indicate that homeownership among blacks has dropped from 47.7 percent in the first quarter of 2003 to 44.2 percent in the second quarter of 2011. Homeownership has dropped from 75 percent to 73.7 percent among whites and remained relatively stable at 46 percent among Hispanics over the same period.[21] In other words, the federal government has failed to meet its goal of raising the homeownership rate to 70 percent. The homeownership rates for blacks and Hispanics were still

below 50 percent in the second quarter of 2011. The homeownership gaps among race and ethnic groups still persist. Subsidizing interest rates and lowering down payments have failed to reduce the homeownership gaps. Indeed, a large amount of subsidies have gone to high-income groups rather than to race and ethnic groups, reinforcing the market disequilibrium and inequality in the homeownership rate. (See Chart 4.)

Third, the homeownership rate for single male householders was constant at 36 percent from 2003 to 2007 and then increased slightly to 37 percent in 2010. For single female householders, homeownership observed a trivial increase from 31 percent to 32 percent between 2003 and 2007 and then fell to 30 percent in 2010. (See Table 2 and Chart 5.) Again, the data underline the failure of GSE interventions to raise homeownership rates for single male and female householders since 2003.

Fourth, homeownership rates have remained steady in recent decades, despite changes in the mortgage interest rate. Indeed, as Gary Painter and Christian Redfearn have argued,[22] the flat ownership rate during the 2000s underlines that the propensity to own a house is driven by other economic fundamentals and sociodemographic features, such as marital status, family size, tax treatment of households, education, participation of females in the labor market, and income—not the interest rate. Despite its marginal role, little evidence indicates interest rates play a significant role in shaping homeownership rates. This notion will be discussed in more detail in the econometric section of this study.

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21. U.S. Census Bureau, "Housing Vacancies and Homeownership (CPS/HVS)," Table 16.

22. Painter and Redfearn, "The Role of Interest Rates in Influencing Long-Run Homeownership Rates."

Fifth, homeownership has been higher among married couples compared to single householders since the 1990s. (See Chart 6.) Moreover, the data indicate that homeownership rates are slightly higher among female householders than male householders since the 1990s. This seems the likely result of increasing female participation in the labor market over the past few decades. This paper tests the hypothesis that female participation in the labor market has played any role in raising the homeownership rate among race and ethnic groups in the econometric section.

Hypotheses

This paper tests two main hypotheses.

First, it examines the null hypothesis that there is no relationship between mortgage interest rates and homeownership rates, controlling for economic fundamentals and sociodemographic features. The alternative hypothesis is that there is a significant relationship between the two. This hypothesis is tested at the aggregate national level, and by race/ethnic group and census region.

H_0 = There is no relationship between the mortgage interest rate and homeownership rate.

H_1 = There is a significant relationship between the mortgage interest rate and homeownership rate.

Second, the paper investigates the null hypothesis that there is no relationship between down payments and homeownership rates. The alternative hypothesis is that there is a significant relationship between the two. This hypothesis will also be

tested at the aggregate national level for race/ethnic group and census region.

H_0 = There is no relationship between down payments and homeownership rate.

H_1 = There is a significant relationship between down payments and homeownership rate.

Econometric Results

Before turning to the econometric results, this study tests whether there is any co-integration vector[23] among mortgage interest rates, homeownership, housing starts, and median home prices among race and ethnic groups. The Johansen co-integration technique has been used to test for co-integration.[24] The results support the existence of at least three co-integration vectors for whites and blacks and one co-integration vector for Hispanics at P = 0.05 level. In other words, homeownership rates, mortgage interest rates, median home prices, and housing starts are co-integrated and move together for all race and ethnic groups.

To investigate the extent to which the homeownership rate is elastic to the mortgage interest rate and down payment, this section estimates three sets of regression models. The first set measures the elasticities of the aggregate homeownership rate to changes in mortgage interest rate and down payments, controlling for economic fundamentals and sociodemographic features at the aggregate national level. The second set of regressions measures the elasticity of homeownership rates to changes in mortgage interest rate

and down payment by race/ethnic group. Finally, the third set captures the effects of changes in mortgage interest rate and down payment on the homeownership rate among census regions.

At the aggregate national level, both the mortgage interest rates and down payments have a significant negative impact on the homeownership rate at P = 0.05 percent level, rejecting the null hypothesis. However, the expectation of future home price appreciation, price-to-rent ratio, household assets, saving rate, effective tax rate, vacancy rate, housing starts, and the Dow Jones Industrial Average are all statistically significant and contribute to driving the homeownership rate. (See Table 2.)

Because the models are not estimated in logarithm forms, the elasticities are calculated and presented in Table 4. The results indicate that the price-to-rent ratio and effective tax rate are the main drivers of homeownership. Interestingly enough, the elasticity to the mortgage interest rate is as low as 0.014 to 0.02, and the elasticity to down payments is in the range of 0.013 to 0.017. The results suggest that the elasticity of homeownership to changes in mortgage interest rate is slightly higher than the elasticity to down payment. This has important policy implications for GSEs and financial institutions because lowering down payments seems to have less effect on homeownership rates than subsidizing mortgage interest rates at the aggregate national level.

In sum, the elasticity of homeownership rates to both mortgage

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23. The co-integration test suggests that there is a statistically significant connection among the variables under investigation. Clive Granger has shown that linear regression on non-stationary data may be dangerous and lead to spurious correlation. Therefore, this test was conducted to ensure that the regression results are not spurious.

24. For the results of the co-integration tests, see Appendix B.

TABLE 2

Aggregate Homeownership Models at the National Level, 1980 Q1–2010 Q4

Robust standard errors are in parenthesis.

Variables	OLS 1	OLS 2	OLS 3	OLS 4	OLS 5	OLS 6
MR30	–0.11**	–0.11**	–0.147**	–0.11**	–0.104**	–0.10**
	(0.05)	(0.05)	(0.053)	(0.05)	(0.05)	(0.05)
Dpayment	–0.05**	–0.05**	–0.048**	–0.046**	–0.037**	–0.04**
	(0.02	(0.02)	(0.023)	(0.024)	(0.01)	(0.02)
Mhprice1	0.00001***	0.00002***	0.00002***	0.00001***	0.00001***	0.00001***
	(6.40E–06)	(7.50E–06)	(7.30E–06)	(6.71E–06)	(6.67E–06)	(6.76E–06)
Pricetorent	–14.2***	–15.07***	–15.42***	–14.97***	–15.73***	–15.33***
	(3.82)	(4.11)	(3.91)	(3.78)	(3.63)	(3.78)
Hassets	0.00008*	0.00007	0.00003	0.00007*	0.00007*	0.00008*
	(0.00004)	(0.00005)	(0.00005)	(0.00004)	(0.00004)	(0.00004)
Saving	0.070*	0.056	0.0466	0.080**	0.095**	0.89**
	(0.04)	(0.05)	(0.044)	(0.042)	(0.042)	(0.04)
Etax	–2.27***	–2.20***	–1.92***	–2.18***	–2.04***	–2.11***
	(0.31)	(0.33)	(0.39)	(0.33)	(0.35)	(0.35)
Vacancy	0.372***	0.357***	0.355***	0.405***	0.420***	0.425***
	(0.12)	(0.128)	(0.122)	(0.12)	(0.11)	(0.127)
Housstart	0.0004**	0.0004**	0.0004**	0.0005**	0.0005**	0.0004**
	(0.0001)	(0.0001)	(0.0001)	(0.0002)	(0.0002)	(0.0002)
M2/GDP	–	1.18		–	–	–
		(2.16)				
Gdebt	–	–	–0.045*	–	–	–
			(0.02)			
Wilshire	–	–	–	0.009	–	–
				(0.009)		
DJ	–	–	–	–	0.00008**	–
					(0.00004)	
SP	–	–	–	–	–	0.00039
						(0.0003)
BCindex	–0.067	–0.069	–0.078*	–0.084*	–0.089*	–0.085*
	(0.045)	(0.044)	(0.044)	(0.05)	(0.051)	(0.052)
Dummy	0.316	0.358	0.241	0.234	0.14	0.217
	(0.22)	(0.23)	(0.22)	(0.22)	(0.212)	(0.216)
No of Observations	112	112	112	112	112	112
R–Squared	0.96	0.97	0.97	0.97	0.97	0.97
F–Statistics	315.3	294.04	321.49	290.43	313.53	292.12

* Statistically significant at 10%   ** Statistically significant at 5%   *** Statistically significant at 1%

Sources: Heritage Foundation calculations using data from the Federal Reserve Bank of St. Louis, Tax Foundation, Global Insight, Federal Housing Finance Agency, National Association of Realtors, and U.S. Department of Commerce.

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interest rates and down payments is very low compared to those of economic fundamentals or sociodemographic features. Therefore, any changes in these two variables will have trivial effects on homeownership rates. Many scholars, including W. Scott Frame and Lawrence J. White, conclude that Fannie and Freddie reduce mortgage interest rates by about 25 basis points.[25] Dwight Jaffe evaluates the impact of limiting the size of GSEs on mortgage interest rates and finds that the likely impact of the proposed change on the U.S. mortgage interest rate is likely to be minimal (less than 10 basis points).[26] Given the

25. See W. Scott Frame and Lawrence J. White, "Fussing and Fuming over Fannie and Freddie: How Much Smoke, How Much Fire?" Federal Reserve Bank of Atlanta *Working Paper* No. 2004-26, October 2004, pp. 7–8, http://www.frbatlanta.org/filelegacydocs/wp0426.pdf (accessed November 25, 2011).

26. Dwight Jaffee, "On Limiting the Retained Mortgage Portfolio of Fannie Mae and Freddie Mac," University of California, Berkeley, June 2005 at http://fic.wharton.upenn.edu/fic/papers/05/0538.pdf (accessed May 4, 2012).

TABLE 3

Homeownership Elasticities to Mortgage Interest Rate, Down Payment, and Other Fundamentals

Variables	OLS 1	OLS 2	OLS 3	OLS 4	OLS 5	OLS 6
MR30	–0.015	–0.015	–0.02	–0.016	–0.014	–0.014
Dpayment	–0.017	–0.017	–0.017	–0.016	–0.013	–0.016
Mhprice1	0.035	0.039	0.039	0.033	0.029	0.031
Pricetorent	–0.232	–0.246	–0.252	–0.245	–0.257	–0.251
Hassets	0.008	0.007	0.003	0.007	0.007	0.008
Saving	0.007	0.006	0.004	0.008	0.01	0.009
Etax	–0.33	–0.32	–0.28	–0.32	–0.3	–0.31
Vacancy	0.041	0.039	0.039	0.045	0.047	0.047
Housstart	0.009	0.009	0.009	0.011	0.011	0.009
BCindex	–0.001	–0.001	–0.001	–0.001	–0.001	–0.001
Dummy	0.001	0.001	0.001	0.001	0.0006	0.0009
M2/GDP	–	0.009	–	–	–	–
Gdebt	–	–	–0.01	–	–	–
SP	–	–	–	–	–	0.002
DJ	–	–	–	–	0.004	–
Wilshire	–	–	–	0.002	–	–

Sources: Heritage Foundation calculations using data from the Federal Reserve Bank of St. Louis, Tax Foundation, Global Insight, Federal Housing Finance Agency, National Association of Realtors, and U.S. Department of Commerce.

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relationship between the homeownership rate and mortgage interest rate, liquidation of the GSEs could lead to a trivial drop of 0.37 percent in homeownership rate, all else equal. It is worth mentioning that all estimated models were tested for robustness.

To measure the impact of the GSEs' liquidation on homeownership rate by race/ethnic group, three regression models were estimated for whites, African Americans, and Latinos, controlling for economic fundamentals and sociodemographic features for each group. (See Table 4.)

The results suggest that mortgage interest rates negatively and significantly affect the homeownership rates for race and ethnic groups, except for blacks, where

the coefficient on down payment is positive. This positive coefficient on down payments might be due to the fact that the data on homeownership rates for race and ethnic groups are available for a much shorter time span, from the first quarter of 1994 to the last quarter of 2010, compared to aggregate national data, available from the first quarter of 1980. The second reason, as discussed in a previous study by The Heritage Foundation,[27] might be that the supply side of the down payment channel may dominate the demand side. In other words, with higher down payments, banks and financial institutions have access to more resources to lend to homebuyers, which ultimately leads to higher homeownership rates.

Another interesting result for race and ethnic groups is that the Wilshire 5000 stock market full cap index (a metric of stock market prices issued by Federal Reserve Bank of St. Louis) has a significant negative impact on the homeownership rate for blacks and Hispanics. In other words, as the Wilshire index goes up, these race and ethnic groups prefer to invest in the stock market over purchasing a house. College education significantly affects homeownership, although of the opposite expected signs for whites and blacks. Female work experience has a significant positive impact on the homeownership rate among whites. Marital status matters for both whites and blacks. The size of household has a significant negative

27. Nahid Anaraki, "A Housing Market Without Fannie Mae and Freddie Mac: Effect on Home Prices," Heritage Foundation *Special Report* No. 105, April 18, 2012, http://www.heritage.org/research/reports/2012/04/a-housing-market-without-fannie-mae-and-freddie-mac-effect-on-home-prices.

TABLE 4

Homeownership Regression Models for Race and Ethnic Groups, 1994 Q1–2010 Q4

Robust standard errors are in parenthesis.

Variables	OLS 1 (White)	OLS 2 (Black)	OLS 3 (Hispanic)
MR30	–0.18***	–0.27**	–0.1
	(0.08)	(0.16)	(0.29)
Dpayment	0.03	0.10**	0.11
	(0.02)	(0.05)	(0.08)
Mhprice1	7.65E–06	8.66E–06	6.15E–06
	(7.80E–06)	(0.00001)	(0.00001)
College	–0.0007**	–0.0015**	0.0012**
	(0.0003)	(0.0006)	(0.0007)
Wilshire	–0.024	–0.06**	–0.076*
	(0.019)	(0.029)	(0.04)
Rent	0.017	–0.022	0.11
	(0.022)	(0.05)	(0.08)
Femalew	0.0005***	–	–
	(0.0002)		
Femaleb	–	0.0015	–
		(0.0016)	
Femaleh	–	–	–0.001
			(0.002)
Whiteincome	–0.00007	–	–
	(0.00018)		
Blackincome	–	0.0006**	–
		(0.0003)	
Hispanicincome	–	–	–0.00004
			(0.00018)
Whitemarried	–0.0007**	–	–
	(0.0002)		
Blackmarried	–	–0.0027**	–
		(0.0014)	
Hispanicmarried	–	–	0.0028
			(0.0021)
Whitesize	–23.90*	–	–
	(15.11)		
Blacksize	–	–8.31*	–
		(4.73)	
Hispanicsize	–	–	10.98**
			(5.29)

Variables	OLS 1 (White)	OLS 2 (Black)	OLS 3 (Hispanic)
Popwhite	0.0001***	–	–
	(0.00009)		
Popblack	–	–0.0001*	–
		(0.0007)	
Pophispanic	–	–	–0.0014*
			(0.0006)
Giniwhite	–36.18*	–	–
	(20.8)		
Giniblack	–	45.50**	–
		(20.2)	
Ginihispanic	–	–	37.4
			(33.86)
Whitefear	–0.0006***	–	–
	(0.0003)		
Blackfear	–	–0.0032*	–
		(0.0017)	
Hispanicfear	–	–	0.0036
			(0.0027)
Hassets	0.0001	–0.0001	0.00023
	(0.00008)	(0.00017)	(0.0002)
GDPPC	0.00037**	0.0014***	0.0005
	(0.00019)	(0.0003)	(0.0004)
Saving	0.04	0.21**	0.09
	(0.053)	(0.11)	(0.23)
Etax	–3.21***	–1.28*	–2.29
	(1.21)	(0.68)	(1.87)
Vacancy	–0.038	0.25	–0.57
	(0.41)	(0.75)	(1.04)
Housstart	0.006***	–0.011***	–0.003
	(0.002)	(0.004)	(0.006)
BCindex	–0.006	0.151	–0.005
	(0.071)	(0.13)	(0.15)
No. of Observations	64	64	64
R–Squared	0.98	0.94	0.95
F–Statistics	335.59	53.19	81.15

* Statistically significant at 10%   ** Statistically significant at 5%   *** Statistically significant at 1%

Sources: Heritage Foundation calculations using data from the Federal Reserve Bank of St. Louis, Tax Foundation, Global Insight, Federal Housing Finance Agency, National Association of Realtors, and U.S. Department of Commerce.

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TABLE 5

Homeownership Elasticities to Mortgage Interest Rate, Down Payment, and Other Fundamentals, by Race/Ethnic Group

Variables	OLS 1 (White)	OLS 2 (Black)	OLS 3 (Hispanic)
MR30	–0.02	–0.05	–0.02
Dpayment	0.1	0.05	0.06
Mhprice1	0.001	–0.002	–0.002
College	–0.17	–0.39	0.47
Wilshire	–0.005	–0.02	–0.03
Rent	0.03	–0.07	0.39
Femalew	0.33	–	–
Femaleb	–	0.22	–
Femaleh	–	–	–0.17
Whiteincome	–0.05	–	–
Blackincome	–	0.045	–
Hispanicincome	–	–	–0.03
Whitemarried	–0.04	–	–
Blackmarried	–	–0.22	–
Hispanicmarried	–	–	0.26
Whitesize	–0.82	–	–
Blacksize	–	–0.48	–
Hispanicsize	–	–	0.8
Popwhite	0.33	–	–
Popblack	–	–0.11	–
Pophispanic	–	–	–0.57
Giniwhite	–0.2	–	–
Giniblack	–	0.44	–
Ginihispanic	–	–	0.34
Whitefear	–0.23	–	–
Blackfear	–	–0.26	–
Hispanicfear	–	–	0.18
Hassets	0.008	–0.014	0.03
GDPPC	0.14	0.63	0.32
Saving	0.003	0.03	0.01
Etax	–0.42	–0.27	–0.48
Vacancy	–0.0008	0.008	–0.02
Housstart	0.01	–0.03	–0.01
BCindex	–0.0001	0.004	–0.0001

Sources: Heritage Foundation calculations using data from the Federal Reserve Bank of St. Louis, Tax Foundation, Global Insight, Federal Housing Finance Agency, National Association of Realtors, and U.S. Department of Commerce.

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impact on the homeownership rates for whites and blacks. The Gini coefficient and female full-time workers have significant impact on the ownership rates of whites and blacks. Of economic fundamentals, GDP per capita and housing starts matter for whites and blacks. However, for Hispanics, the number of people with a college degree, the Wilshire index, population, and household size are the most important factors in shaping the homeownership rate.

Because estimated models are not in the logarithm form, the elasticities are calculated and presented in Table 5. The results suggest that blacks are the most sensitive group to changes in mortgage interest rates, and whites are the most sensitive to changes in down payments. In sum, the results indicate that homeownership elasticities to interest rates and down payments stand at very low levels compared to economic fundamentals such as GDP per capita, effective tax rate, and demographic features such as population, family size, Gini coefficient, marital status, the number of female workers with work experience, and full-time female workers. The effective tax rate is one of the most important factors shaping the homeownership rate among race and ethnic groups. For instance, a 20 percent increase in the effective tax rate reduces the homeownership rate by 8 percent among whites, 5 percent among blacks, and 9 percent among Hispanics. More importantly, GDP per capita is the most important economic fundamental shaping the homeownership rates for whites and blacks.

Regional Homeownership Rates. This section analyzes the effects of GSEs' liquidation on homeownership rates at the regional census level, for the Northeast, Midwest, South, and West. The

TABLE 6

Homeownership Regression Model by Region, 1992 Q1–2010 Q4

Robust standard errors are in parenthesis.

Variables	Northeast	Midwest	South	West
MR30	–0.07 (0.013)	–0.57*** (0.18)	–0.16* (0.1)	–0.499*** (0.12)
Dpayment	0.043 (0.03)	0.15*** (0.07)	–0.01 (0.03)	0.17*** (0.03)
Northeastprice	0.02*** (0.004)	–	–	–
Midwestprice	–	0.032 (0.02)	–	–
Southprice	–	–	0.020* (0.012)	–
Westprice	–	–	–	0.0057* (0.003)
Taxne	–0.86*** (0.18)	–	–	–
Taxmw	–	–0.73* (0.43)	–	–
Taxs	–	–	–2.72*** (0.29)	–
Taxw	–	–	–	–0.186 (0.4)
Rent	–0.018 (0.017)	–0.17*** (0.032)	0.09*** (0.02)	–0.048*** (0.02)
Incomene	0.00001 (0.00001)	–	–	–
Incomemw	–	0.00008*** (0.00001)	–	–
Incomes	–	–	–0.0001 (4.02E–06)	–
Incomew	–	–	–	8.25e-6*** (1.86E-06)
Saving	0.12*** (0.05)	–0.15 (0.11)	0.096 (0.068)	0.062 (0.079)
Vacancyne	0.0006 (0.0005)	–	–	–
Vacancymw	–	–0.0002 (0.0004)	–	–
Vacancys	–	–	–0.0005 (0.0004)	–
Vacancyw	–	–	–	–0.00025 (0.0005)
Housstart	0.006*** (0.002)	0.004 (0.006)	0.007*** (0.0028)	0.015*** (0.003)
No. Observations	72	72	72	72
R–squared	0.91	0.87	0.95	0.94
F statistics	81.67	74.31	164.62	112.45

* Statistically significant at 10%   ** Statistically significant at 5%   *** Statistically significant at 1%

Sources: Heritage Foundation calculations using data from the Federal Reserve Bank of St. Louis, Tax Foundation, Global Insight, Federal Housing Finance Agency, National Association of Realtors, and U.S. Department of Commerce.

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results presented in Table 6 indicate that the conventional mortgage interest rate has a significant negative impact on the homeownership rate in all regions, except in the Northeast, where the effect is not significant. Home prices at the regional level have a positive and significant impact on homeownership rates. With higher prices, people have more incentives to purchase a home as an investment opportunity. Therefore, a positive correlation exists between home prices and homeownership rate. Personal income is statistically significant for homeownership in the West and Midwest. The effective tax rate has a significant negative impact on the homeownership rate in all regions. And finally, housing starts matters for all census regions. Because models are not estimated in logarithm form, the elasticities are calculated and presented in Table 7. It is worth mentioning that all models have been tested for robustness.

The results suggest that elasticities of homeownership rates to mortgage interest rates are very low. However, homeownership rates in the West and Midwest are more responsive to changes in mortgage interest rates than other regions. A 25-basis-point increase in the mortgage interest rate as a result of liquidating GSEs, all else equal, leads to a 1.75 percent lower homeownership rate in the West and Midwest, 0.5 percent lower ownership in the South, and 0.25 percent lower ownership in the Northeast. Indeed, the Northeast is the least responsive census region and the West and Midwest are the most responsive regions to changes in mortgage interest rates because these two regions are highly land regulated and land regulation has important contribution to higher housing prices, which in turn affects the homeownership rate.

TABLE 7

Homeownership Elasticities to Mortgage Interest Rate, Down Payments, and Other Fundamentals, by Region

Variables	Northeast	Midwest	South	West
MR30	–0.01	–0.07	–0.02	–0.07
Dpayment	0.02	0.05	0	0.07
Northeastprice	0.05	–	–	–
Midwestprice	–	0.03	–	–
Southprice	–	–	0.04	–
Westprice	–	–	–	0.01
Taxne	–0.15	–	–	–
Taxmw	–	–0.1	–	–
Taxs	–	–	–0.31	–
Taxw	–	–	–	–0.03
Rent	–0.05	–0.38	0.23	–0.11
Incomene	0.02	–	–	–
Incomemw	–	0.71	–	–
Incomes	–	–	–0.08	–
Incomew	–	–	–	0.01
Saving	0.01	–0.02	0.01	0.01
Vacancyne	0.03	–	–	–
Vacancymw	–	–0.01	–	–
Vacancys	–	–	–0.05	–
Vacancyw	–	–	–	–0.01
Housstart	0.01	0.01	0.01	0.03

Sources: Heritage Foundation calculations using data from the Federal Reserve Bank of St. Louis, Tax Foundation, Global Insight, Federal Housing Finance Agency, National Association of Realtors, and U.S. Department of Commerce.

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The policy question is whether increasing the homeownership rate by at most 1.75 percent is worth billions of dollars in subsidies. A more rational policy would be to increase the homeownership rate by creating jobs, raising personal incomes and saving rates, which are the main drivers of homeownership rates. (See Tables 5 and 7). The government is leveraging instruments which have proved to have little effect on homeownership rates. Nationally, the homeownership rate is mainly driven by economic fundamentals such as income, rent, and the effective tax rate, not mortgage interest rates or down payments.

Conclusion

The stagnation of homeownership rate for below the median income groups during the 2000s and, more importantly, the persistence of homeownership gaps among race and ethnic groups cast doubts on the efficacy of GSE interventions in raising the homeownership rate. Fannie Mae and Freddie Mac have spent billions of dollars on subsidized financing, which appears to have mainly benefited families with higher-than-median income. As a result, the homeownership rate among families with higher-than-median income rose from 78.5 percent in the first quarter of 1994 to 81.7 percent in the fourth quarter of 2010, exacerbating the homeownership gaps with lower than median income and among race and ethnic groups.

In brief, the results of this study indicate that the homeownership rate is shaped by economic fundamentals such as GDP per capita, the tax treatment of households, and the sociodemographic features of families, such as household size, population, Gini income distribution, marital status, female participation in the labor market, and number of females with work experience. The estimated elasticities of the homeownership rate at the regional level suggest that homeownership is mainly shaped by income, rent, and the effective tax rate. Indeed, mortgage interest rates and down payments play trivial roles in shaping homeownership rates. Contrary to the expectations of policymakers, this study indicates that GSEs have failed to reduce homeownership gaps among race and ethnic groups and among regions. The results of this study closely match those of Roberto Quercia, George McCarthy, and Susan Wachter[28] and Gary Painter and Christian L. Redfearn,[29] who found a small negative impact of interest rates on homeownership rates. Indeed, the econometric results of this study are very close to those of Roberto Quercia, George McCarthy, and Susan Wachter, who find that an increase of 50 basis points in interest rate leads to a 1.1

28. Quercia et al., "The Impacts of Affordable Lending Efforts on Homeownership Rates."

29. Painter and Redfearn, "The Role of Interest Rates in Influencing Long-Run Homeownership Rates."

percent lower homeownership rate. Although this paper uses a different technique and time period, the results indicate that a 25-basis-point increase in the mortgage interest rate reduces the homeownership rate at the aggregate national level by less than 0.4 percent.

Policy Discussion

The evidence suggests that the homeownership gap among race and ethnic groups has not vanished despite GSE interventions in the housing market. The reason is that the mortgage interest rate and down payment play a trivial role in shaping homeownership rate compared to economic fundamentals. Contrary to the expectations of policymakers, subsidizing mortgage interest rates and lowering down payments have not been able to raise the homeownership among race and ethnic groups.

To return stability to the housing market, the GSEs should abandon their interventions and allow the housing market to perform under natural pricing mechanism. ☎

Appendix A.
Summary of the Literature Review on Homeownership

APPENDIX TABLE 1

Summary of Literature Review on Homeownership

Author(s)	Dependent Variable	Interest Rate/ Government Support	Financing Measures	Income/ GDP per capita	Own/Rent	Value to Rent	Demographic Variables/Other	Data	Estimation Method
Stuart Rosenthal (2001)	Homeownership rate			Total household income (2.1E–08)			• African American (elasticity: –0.09) • Marital status, divorced (–0.03) • Head in bad health (–0.01) • College degree (elasticity: 0.03)	1998 Survey of Consumer Finances	Probit model
Gary Painter and Christian Redfearn (2002)	Homeownership rate	Interest rate		Median household income (0.105)			• Population (0.02) • Unemployment rate (5.64)	Quarterly data from 1965 to 1999	Co-integration and vector error correction model
Roberto Quercia et al. (2003)	Homeownership rate		Wealth constraint (elasticity: –1.70)	Permanent income (elasticity: 0.0001)	Ownership to rent (elasticity: –5.27)	Value to rent (elasticity: 8.43)	• Family size (elasticity: –0.02) • Male head (elasticity: –0.47)	American Housing survey (1995)	OLS regression
Stuart Gabriel and Stuart Rosenthal (2008)	Changes in homeownership rate	Mortgage interest rate (elasticity: –0.003)		Average income (elasticity: –0.257)			• Unemployment rate (elasticity: –7.5) • Hispanic ratio (elasticity: –11.58) • Black ratio (elasticity: –1.02) • Average age in 1990 (elasticity: 0.15)	Data for underserved areas in the U.S. (2000)	OLS regression
Paul Carrillo and Anthony Yezer (2008)	Homeownership rate	Homeownership rate		Median household income (0.06)			• Unemployment rate (–0.07) • White (0.14) • Density (–0.001) • Older than 65 (0.38) • Family (0.45) • Married (0.51) • Share of population 25 and older (–0.30)	Data from 1996 to 2005	Pooled regression
Sanjaya DeSilva and Yuval Elmelech (2009)	Homeownership rate			Household income (0.61)			• Age (0.43) • Divorced (–0.25) • Unemployed (–0.05) • College degree (0.13) • Immigrate before 1975 (–0.14)	2000 IPMUS data and 2006 American Community Survey	Logit model
Stuart Gabriel and Stuart Rosenthal (2011)	Homeownership rate					Price coefficient (0.73)	• Age coefficient (0.69) • Location shift coefficient (0.47)	Data from 2000, 2005, and 2009 surveys	Regression (OLS) technique

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Appendix B.

Johansen Co-integration Test for Homeownership, Home Prices, House Starts, and Mortgage Interest Rate

APPENDIX TABLE 2

Johansen Co-integration Results for Homeownership

Ethnic Group	Eigenvalue	Probability	Trace Statistics	0.05 Critical Value	No. Cointegration Equations
White	0.369	0.0007	64.388	47.856	None*
	0.238	0.0104	35.335	29.797	At most one*
	0.194	0.0192	18.187	15.494	At most two*
	0.069	0.0334	4.525	3.841	At most three*
Black	0.461	0	79.554	47.856	None*
	0.275	0.002	40.578	29.797	At most one*
	0.212	0.0088	20.265	15.494	At most two*
	0.079	0.0219	5.249	3.841	At most three*
Hispanic	0.374	0.0057	56.883	47.856	None*
	0.227	0.0933	27.352	29.797	At most one
	0.155	0.206	11.09	15.494	At most two
	0.007	0.4911	0.4742	3.841	At most three

* Rejection of hypothesis at 5 percent significant level

Sources: Heritage Foundation calculations using data from the Federal Reserve Bank of St. Louis, Tax Foundation, Global Insight, Federal Housing Finance Agency, National Association of Realtors, and U.S. Department of Commerce.

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