Where did we indulge? Consumer spending during the asset boom

An analysis of where additional consumption occurred as household consumption rose substantially as a share of the economy over the three-decade period from 1980 to 2007, and especially during the "housing boom" of 1997–2007, reveals that wealth effects were particularly strong for spending on vehicles, vehicle services, and appliances

Michael L. Walden

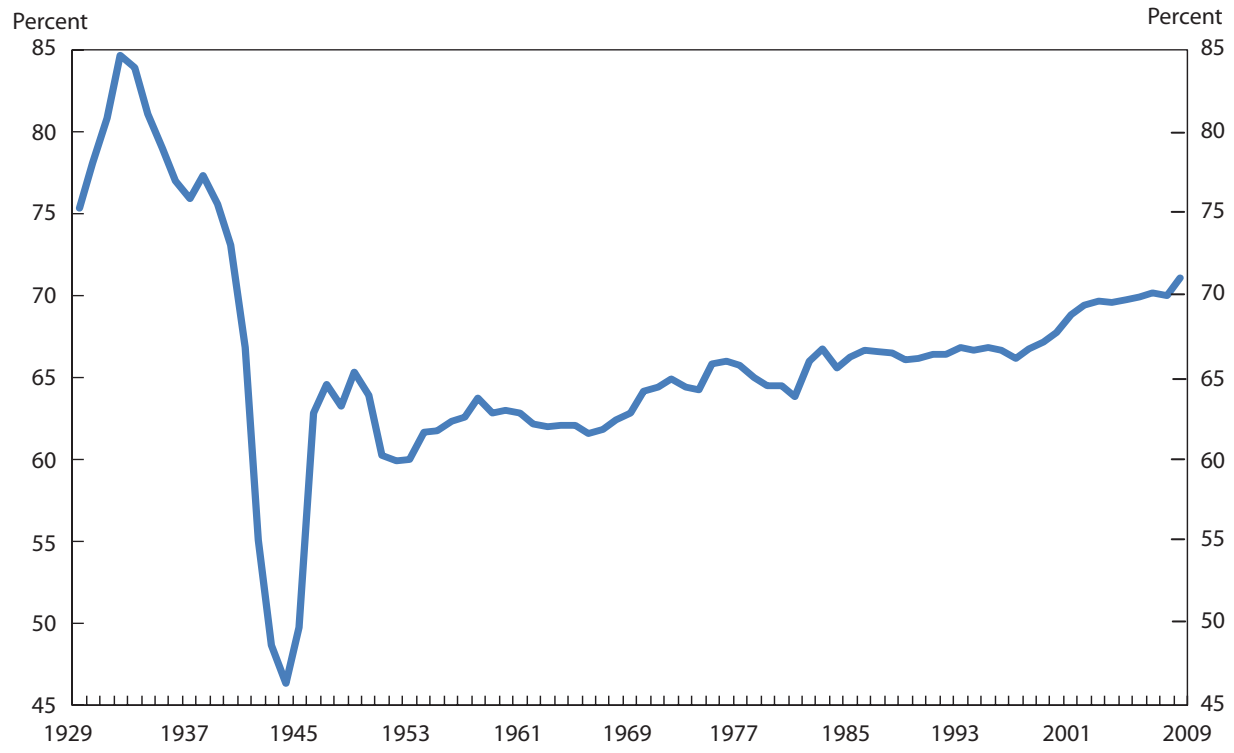
During the almost 30-year period from 1980 to 2007, consumer spending as a percentage of gross domestic product (GDP), or, simply, relative consumer spending, rose from 64.5 percent to 70.2 percent. In the latter part of the period, from 1997 to 2007, the increase was an especially rapid 4 percentage points.[1] Chart 1 shows relative consumer spending from 1929 to 2009. Researchers have attributed the increase seen in relative consumer spending since about the turn of the century—and the consequent decline in personal saving—to many factors: a rise in household wealth and asset values;[2] a relaxation of credit standards and of bankruptcy and penalties thereby incurred, together with an increase in the availability of credit;[3] a change in attitudes about credit and a reduced stigma attached to indebtedness;[4] government policies encouraging an expansion of credit to underserved households, particularly low-income households;[5] and more.

Although substantial research has been carried out on the determinants of aggregate consumer spending in recent decades,[6] there has been no comprehensive analysis of spending trends for individual consumer products and services. That is, if consumers did indulge in higher rates of spending in recent decades, what did they purchase? On what products and services did consumers most increase their spending? Further, if one of the driving forces behind the increased rates of spending was housing asset values—as many have claimed[7]—then what purchases of consumer products and services were most affected by this wealth effect? Also, if the housing wealth effect reversed during and after the 2007–2009 recession, what consumer products and services will most likely be adversely affected by the trend? To date, these questions have not been answered in a rigorous analytical way.

An investigation of the foregoing issues is important not just from a historical perspective, but even more so, for an understanding of how consumer spending is changing and how it may change in the future. Some analysts say that the recession of 2007–2009 is prompting a complete alteration of consumer financial behavior,[8] given that household asset values have not returned to prerecessionary levels. Households are therefore being forced to pay down on debt, increase saving, and moderate spending in order to rebalance their financial sheets. If these trends take hold, then the boom in consumer spending that occurred prior to

Michael L. Walden is William Neal Reynolds Distinguished Professor, Department of Agricultural and Resource Economics, North Carolina State University, Raleigh, North Carolina. Email: michael_walden@ncsu.edu

Chart 1. **Real household consumption as a percentage of real GDP, 1929–2009**



SOURCE: U.S. Department of Commerce.

the recession may turn into a bust for some consumer products and services. It would therefore be useful to investigate where the reduction in consumer spending might occur.

This article presents such an investigation at two levels. First, at the aggregate, or macro, level, the article tracks the changes in spending in major consumer product and service categories during the consumption boom. This analysis provides a first cut at understanding the broad, turbulent changes in consumer spending that took place in recent decades.

However, in order to isolate the wealth effects emanating from household assets due to other factors determining consumer spending, such as prices, income, and demographic characteristics, the article presents a second, microlevel analysis. Here, the determinants of consumer purchases on 84 individual products and services are examined, to ascertain exactly where and why households indulged during the asset boom of the late 20th century. The results of this analysis can then be used to infer which consumer products and services most likely will be affected by the anticipated retreat in consumer spending in the postrecessionary period.

The remainder of the article is organized into four sections. The next section reviews the literature on consumer spending behavior, particularly as it relates to the influence of asset values. The section that follows presents the analysis of aggregate spending changes, and the section after that gives the findings obtained in the microlevel investigation. The last section offers a summary and conclusions.

Consumer spending and asset values

Modern studies of household consumption behavior are based on the works of the American economist and statistician Milton Friedman and the duo consisting of the Japanese-born economist Albert Ando and the Italian-born Nobel Prize–winning economist Franco Modigliani.[9] Departing from John Maynard Keynes's absolute income hypothesis,[10] which posited that consumption is a simple function of current income, Ando and Modigliani added age and wealth as important determinants of consumption. The pair argued that households prefer a smooth path of consumption over their lifetime, rather than the more erratic path dictated by

typical ups and downs in current income. Households will therefore borrow and save to achieve this more constant consumption level. Typically, the members of a household will accumulate debt when they are young, meaning that they will be borrowing against future income. Then, in middle age, they will save (i.e., accumulate wealth) to repay debt and to fund future consumption once current income ceases during retirement. Ando and Modigliani's work serves as the basis for including wealth and age as additional determinants of consumption.

Although Friedman also considered wealth and income to be factors affecting consumption, his major contribution was in identifying their permanent and temporary ("transitory" in Friedman's terms) components. Like Ando and Modigliani, Friedman believed that households preferred consistency in their consumption. Therefore, households would indeed change their consumption, but only if they considered the change in income (or wealth) to be permanent. That is, consumption is related to *permanent* income and wealth, not total income and wealth. Temporary changes in income and wealth would be invested. Friedman expected households to estimate their annualized permanent income and wealth on the basis of some combination of past income and wealth and expected future trends in their income and wealth.

One important implication of Friedman's permanent-income hypothesis is the proper measurement of consumption. Consumption does not equal all spending by households during some arbitrary period. Instead, consumption is the household's use of services flowing from a consumer product or service during a *specific* period, such as a year. The difference between spending and consumption is exemplified by the type of consumer purchase. Expenditures on most food, which is consumed shortly after purchase, would be considered consumption, as would lawnmowing by a landscape service. In contrast, only a fraction of the expenditure made on a new vehicle in a year would be considered consumption in that year, because the vehicle provides services over several years. In general, more of the spending on nondurable consumer products and services, and less of the spending on durable consumer products and services, would be classified as consumption in Friedman's model. The remainder of spending that is not considered consumption would be termed investment by Friedman because the spending provides a future flow of services.

For this article, the major implication of Ando and Modigliani's and of Friedman's theories is that wealth will affect observable consumer spending, but in different ways, depending on the household's view of both the permanency of the wealth and the type of consumer product or service. Therefore, studies of the wealth effect on consumption should account for *both* different types of wealth and different types of consumer products and services.

Empirical studies of the wealth effect on consumption have been numerous, yet have accounted for differences in types of wealth and types of consumer spending to varying degrees. Early studies established a positive link between wealth and consumer spending, with a range of an increase of 3 cents to 8 cents in consumer spending for every dollar increase in household wealth.[11] These estimates have largely been supported by later analyses[12]—not without some dissenters, however.[13] More recent studies have separated household wealth into different types, focusing mostly on differences between financial wealth and real estate wealth.[14] The consistent conclusion is that consumer spending responds more to changes in real estate wealth than to changes in financial wealth.

Only one study has combined the effects of different categories of wealth on different types of consumer spending.[15] The researchers divided wealth into three categories—financial, housing, and other real estate—and considered the wealth effects on total spending as well as on spending only on durable goods. Their pooled results for household-level data spanning 1989–2001 yielded two key findings. First, the wealth effects from housing were greater than they were from financial wealth and other real estate wealth, in terms of both total consumption and purchases of durable goods. Second, the housing wealth effect was generally greater on total consumption than on durable goods consumption.

The conclusion to be drawn from the literature is, then, that although wealth effects have been established, a rigorous analysis of how these effects vary by detailed types of consumer spending has not been conducted. Thus, to understand why and how consumers indulged in spending during the asset boom, fresh estimates of wealth effects are needed.

Consumer spending during the asset boom

As a first cut at examining changes in household expenditures during the asset boom, this section presents changes in household spending shares over the period 1997–2007, the decade when both the asset boom—especially in housing—and the increase in relative consumption (i.e., the ratio of consumption to GDP) were the greatest. Spending shares are measured as a percentage of GDP. Data are taken from National Income and Product Accounts of the U.S. Bureau of Economic Analysis[16] and provide detailed annual information on household consumption expendi-

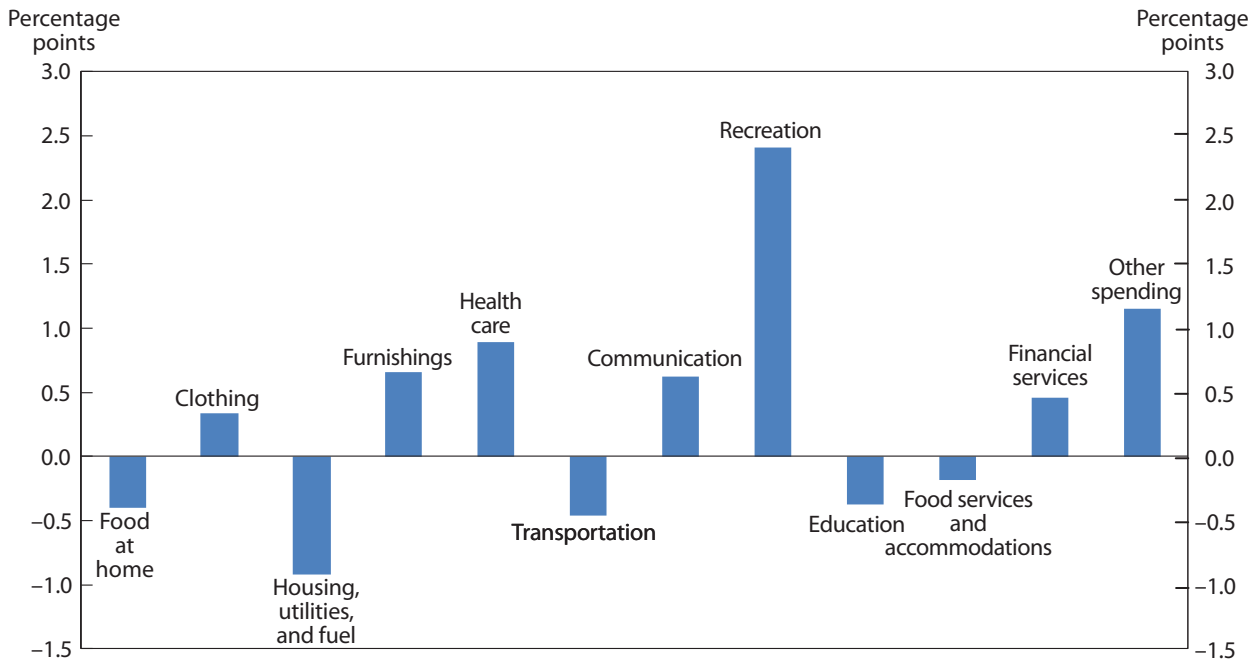
tures for scores of detailed spending categories, beginning in 1929. The "chained price index" series from the Bureau of Economic Analysis is used to adjust spending values for price changes, thereby permitting comparisons of "real," or inflation-adjusted, spending amounts over time. For ease of presentation, the spending categories are grouped into 12 broad classifications.

Chart 2 shows the percentage-point change in the share of GDP of the major consumption classifications from 1997 to 2007. The groups registering the largest percentage-point gains were recreation, the catchall category "other spending," health care, furnishings, and communication. The recreation category includes video and audio equipment, which posted the largest gains. "Other spending" combines expenditures on personal care, professional and legal services, net foreign travel, and purchases from nonprofit organizations; among these categories, the greatest gains were for nonprofit purchases and net foreign travel. Spending on pharmaceuticals led the increase for the health care share, furniture and housewares accounted for the majority of the furnishings category's increase in share, and the gain in the communication group was due to big increases in phone purchases.

An interesting finding is that the GDP share of spending on the category of housing, utilities, and fuel declined during the period. The largest component of this category is owned housing (homeownership). Measuring spending on homeownership has long been a difficult task because of the owned home's dual role as consumption and investment. That is, a household's spending on a home provides consumption services but also has the potential to develop as an investment with changes in the home's value. The Bureau of Economic Analysis measure is an approximation of the consumption portion and is calculated as the imputed rental value of the home—in other words, what the members of the household would have paid in rent to live in their home.[17] The finding that the GDP share of owned housing did not increase during the asset boom suggests that households did not increase their consumption of owned housing services relative to other categories during the period. Rather, any added attention to owned housing was for the investment component. Households also reduced their GDP share of rental housing.

The *relative* changes in the GDP shares of consumption from 1997 to 2007 for the categories shown in chart

Chart 2. Percentage-point change in share of real GDP, major consumption groups, 1997–2007



SOURCE: U.S. Department of Commerce.

2 are given in chart 3. The results are largely consistent with those shown in chart 2, but with some differences. From chart 2, the five categories with the largest percentage-point changes are seen to be recreation, "other spending," health care, furnishings, and communication.[18] In chart 3, the five categories with the largest percentage changes are communication, recreation, "other spending," furnishings, and clothing. Clothing purchases in the relative change replaces health care in the absolute change. Also, the increase in communication spending is much more important on a relative basis than on an absolute basis.

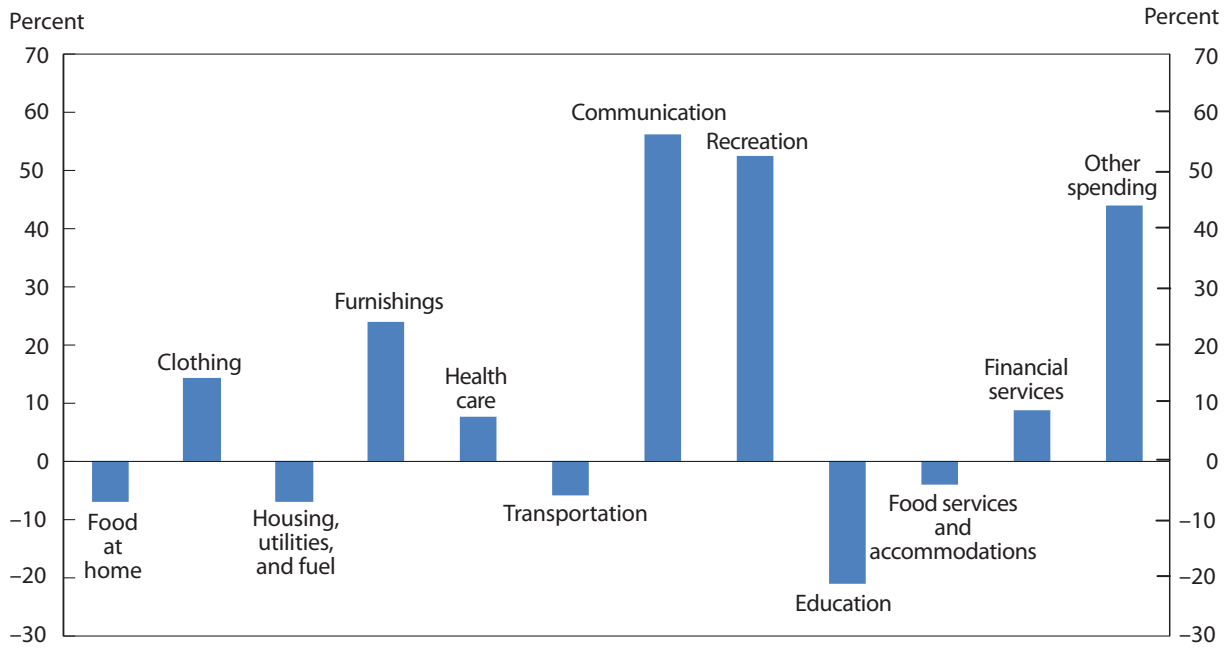
Are these findings consistent with the change in spending shares that the theoretical literature would predict to occur during an asset boom? They are if households consider a considerable part of the wealth gains to be temporary and therefore allocate the gains to durable products (investments), which provide services over many years. Purchases in the categories of communication (phones), recreation (video and audio equipment), furnishings, and some clothing can all be considered investments in durable goods. Even health care can be considered an investment in human capital that yields continuing returns in future years. The one category that does not fit this interpretation is "other spending." The two largest members of this broad grouping are personal care and legal, accounting, and business services. Households may consider spending in these subcategories to be long-run investments—for example, if personal care expenditures are made to improve employment prospects and if legal, accounting, and business services are purchased to improve financial management returns and investment returns.

While instructive, the findings in this section may be artifacts of spurious correlation. Although the asset boom was the prominent economic feature of the period 1997–2007, other economic factors also were changing. Hence, in using a one-dimensional view, other determinants of change may be missed. In addition, better calibration of the impact of asset value changes on consumption can be achieved by studying periods when asset values are changing at different rates. Both of these concerns are addressed in the next section.

The impact of wealth changes on consumption

This section reports the results of analyzing the impact of household asset value changes on consumption for more

Chart 3. Percent change in share of real GDP, major consumption groups, 1997–2007



SOURCE: U.S. Department of Commerce.

than 80 consumer products and services. Importantly, the analysis controls for the influence of other factors, such as age, price, income, and interest rates. Two sets of results are offered: one for an 81-year period of analysis (1929–2009) and the other for the post-World War II period (1946–2009). The major difference in the two periods is the measure of wealth values that was available.

Given this article's focus on individual consumer products and services, it is preferable to have quantities of product or service purchases as the dependent variable, with the matching product or service price as an independent variable along with other relevant control variables, such as income and asset values. Fortunately, data for 2011 from the Bureau of Economic Analysis provide such matching quantities and prices.[19] The quantities and prices are derived from that agency's work in decomposing consumer spending into its two components: quantity consumed and price per unit (i.e., spending equals quantity, or number of units, multiplied by price per unit). Both quantity and price are expressed as index numbers, and prices are in real (inflation-adjusted) terms.[20]

The quantities and prices identified for the 84 spending categories allow quantity to be treated as the dependent variable and price to be one of the independent variables. Of course, this is the standard economic approach to demand theory and is therefore preferred to using spending (quantity x price) as the dependent variable. The approach also allows price to be directly controlled, eliminating the possibility that changes in price are included in the effects of other independent variables.

Among these other independent, or right-hand-side, variables are real per-capita disposable personal income, age, population, and interest rates. The link between consumption and personal income dates to Engel,[21] and disposable personal income measures the income available to households after subtracting tax payments.[22] Age[23] is included in accordance with Ando and Modigliani's work, and population[24] is necessary to account for the likelihood that total quantities consumed of most products and services increase with gains in population. A measure of the level of interest rates is important to include with time series data because the interest rate affects the household's tradeoff between present and future consumption.[25] Higher real interest rates, all else equal, make current consumption more expensive relative to future consumption, and the opposite is the case for lower real interest rates.[26] The AAA corporate interest rate, adjusted for inflation as measured by the Consumer Price Index, is used as the interest rate.[27]

The focus of this study is the impact of wealth on consumption. Both Friedman and the duo Ando and Modigliani recommended wealth (also called net worth) as the conceptual measure affecting consumption. Wealth is the difference between asset values and the value of outstanding liabilities. The Federal Reserve's Flow of Funds Accounts have annual measures of household assets and liabilities.[28] From these accounts, two wealth variables were formed: real estate wealth and financial wealth. Real estate wealth is measured as the value of real estate assets minus the value of real estate loans (mortgages). Financial wealth is measured as the value of all other (non–real estate) wealth minus the value of all other liabilities.

One issue with the Federal Reserve's Flow of Funds data is its limited availability. The data are available only from 1946, whereas the BEA consumption data are available annually from 1929. As a result, two analyses were performed. The first examines the wealth effects on individual consumption items for the period 1946–2009. In this analysis, the real estate and financial wealth measures are those mentioned in the previous paragraph. The second analysis makes use of the complete consumption dataset spanning 1929–2009. Because wealth measures are not available for the entire period, real (inflation-adjusted) prices of the premier assets of the two wealth categories—home prices and stock prices—are used as proxies for wealth, as has been done in previous research.[29] The national Case-Shiller Home Price Index is used for real estate prices,[30] and Standard and Poor's 500 Stock Index[31] is applied for financial prices. Both price series are adjusted for inflation, so they are in real terms.

The multivariate analysis is accomplished with a regression technique. All of the variables are measured in logarithmic terms, so the coefficients of the independent variables are elasticities (percent change in the dependent variable divided by percent change in the independent variable). Because the imposition of price controls during World War II (1942–1946), the Korean War (1951–1952), and late in the Vietnam War era (1971–1974) could have affected purchasing behavior, a dummy variable (PRICE CONTROL) is included as an independent variable to account for those years when price changes were restricted. Also, because purchasing decisions by consumers are likely interrelated, a "seemingly unrelated" regression (SUR) technique is used to derive the parameter estimates. Two SUR analyses are run for each period, one using the aggregate classifications from charts 2 and 3 and the other using the 84 individual spending items.

Tables 1 and 2 present the results obtained by using the aggregate categories from charts 2 and 3. Looking first at table 1 for the period 1946–2009 reveals that the model

Table 1. Estimated elasticities, by major consumption group and using wealth values, 1946–2009

Group	Price	Income	Population	Age	Interest rate	Real estate wealth	Financial wealth	Price control
Total spending	[1]–0.18	[1]0.64	[1]1.33	[1]0.21	–0.01	[1]0.06	0.04	–0.01
At-home food	[1]–.18	[1].26	[1]1.04	–.47	–.01	.03	–.02	–.01
Clothing and footwear	[1]–.49	[1].96	[1]–.54	[1].48	.01	–.03	[1].21	–.01
Housing, utilities, and fuel	[1]–.55	[1].27	[1]2.56	[1]–.61	.01	[1].08	[1]–.09	–.02
Household furnishings and equipment	[1]–1.39	.16	.15	[1]–1.43	–.01	[1].20	[1].23	[1]–.06
Health care	[1]–.17	[1]1.29	[1]2.32	[1]–.88	[1].02	.05	[1]–.26	–.01
Transportation	[1]–1.30	–.35	[1]2.47	[1]–1.15	.03	[1].49	–.11	–.07
Communication	[1]–.76	[1].54	[1]2.59	–.28	[1]–.02	.04	.11	.01
Recreation	[1]–.64	[1]1.07	[1]1.15	[1].60	–.01	–.01	[1].22	–.02
Education	[1]–.88	[1]1.14	[1]2.15	[1]–1.63	–.01	[1]–.15	[1].21	.01
Food service and accommodations	–.10	[1]1.41	–.32	[1].37	–.01	[1]–.08	–.03	–.01
Financial services	–.14	[1].63	[1]2.04	[1].64	[1].03	[1].13	–.08	[1]–.05
Other goods and services	–.06	[1].74	[1].86	[1]–.37	–.01	.03	[1].11	[1]–.03

[1] Statistically significant at the .05 level or better (one-tailed *t*-test).
NOTE: System R^2 = .99.

SOURCE: Author's calculations based on data from U.S. Department of Commerce, Board of Governors of the Federal Reserve System, and .Standard and Poor's.

Table 2. Estimated elasticities, by major consumption group and using asset prices, 1929–2009

Group	Price	Income	Population	Age	Interest rate	Real estate price	Financial price	Price control
Total spending	[1]–0.62	[1]0.76	[1]1.28	[1]–0.13	0.01	[1]0.09	[1]0.02	[1]–0.02
At-home food	[1].21	[1].34	[1]1.07	[1]–.40	–.02	[1].18	–.01	–.01
Clothing and footwear	[1]–.49	[1]1.05	[1]–.26	[1].56	.01	–.01	[1].04	–.01
Housing, utilities, and fuel	[1]–.47	[1].29	[1]2.59	[1]–.77	[1].02	.03	[1]–.03	[1]–.03
Household furnishings and equipment	[1]–.48	[1].87	[1].51	[1]–.67	.01	[1].43	[1].08	[1]–.08
Health care	–.02	[1].80	[1]2.70	[1]–.91	[1].02	–.03	[1]–.09	–.02
Transportation	[1]–.53	[1].87	[1]1.72	[1]–1.98	.02	[1].52	.01	[1]–.17
Communication	[1]-.72	[1].63	[1]2.84	[1]–.33	.01	[1].14	.02	.04
Recreation	[1]-1.00	[1]1.20	[1]1.04	[1]–.34	.02	–.02	[1].07	–.04
Education	[1]–.21	[1].75	[1]2.43	[1]–2.36	.01	[1]–.23	–.03	.01
Food service and accommodations	.38	[1].79	[1].76	[1].59	[1]–.06	.14	[1]–.09	.07
Financial services	–.11	[1].53	[1]2.15	[1].85	[1].06	[1]–.20	.02	[1]–.10
Other goods and services	[1]–.13	[1].83	[1].99	[1]–.33	–.01	–.01	[1].03	[1]–.03

[1] Statistically significant at the .05 level or better (one-tailed *t*-test).
NOTE: System R^2 = .99.

SOURCE: Author's calculations based on data from U.S. Department of Commerce, Board of Governors of the Federal Reserve System, and Standard and Poor's.

yields the expected results for the price elasticities (how spending changes when price changes) and income elasticities (how spending changes when income changes). First, all the price elasticities are negative, with 10 of the 13 coefficients statistically significant. Second, all but one of the income elasticities are positive, and 11 of the 12 positive coefficients are statistically significant. Third, 10 of the 13 population coefficients are positive and statistically significant, and only 1 coefficient (of clothing and footwear) is negative and statistically significant. The effects of the age variable on consumption are mixed: for total spending, consumption increases modestly with age; for clothing and footwear, recreation, food service and accommodations, and financial services, consumption increases with age; and for housing, household furnishings, health care, transportation, education, and the catchall category "other goods and services," consumption decreases with age. The age findings reflect observed shifts in consumption patterns as older households with shorter remaining lifespans downsize spending on housing, transportation, and education and increase spending on products and services that provide immediate utility (clothing and food service) and benefits related to their financial affairs. Also, although at first glance the inverse relationship between the consumption of health care services and age may seem odd, note that the health care services are those purchased by the *household*, and elderly households have a high percentage of health care services purchased for them by third parties, including government and private insurance. Finally, most of the effects of the interest rate and the price control variable are not statistically significant.

Because the focus of this article is on the effects of real estate and financial wealth on consumption, the coefficients of these two variables are examined in more detail. For total consumption, the only wealth effect is from real estate wealth. The coefficient 0.06 suggests an inelastic effect and is within the range of a number of previous findings.[32]

Looking at the real estate wealth effects for the individual aggregate categories brings to light some noteworthy findings. First, the categories of housing, household furnishings, transportation, and financial services each have positive and statistically significant elasticities, with the coefficients of transportation and household furnishings being the largest. Next, education, as well as food service and accommodations, has a modest negative and statistically significant wealth effect. Finally, at-home food, clothing and footwear, health, communication, recreation, and "other goods and services" exhibit no wealth effects at all. These results for real estate wealth seem broadly to support Friedman. The transitory income from real estate wealth will be saved through increases in spending on durable goods (e.g., vehicles and furnishings) or services supporting financial assets. However, all the effects are inelastic, meaning that the percent increase in consumption for the category is less than the percent increase in wealth.

The individual wealth effects from financial assets are somewhat different. The largest positive elasticity is for a durable good—household furnishings—which had the second-highest positive elasticity from real estate wealth. However, unlike the situation with real estate wealth, the transportation elasticity is now not statistically significant. The categories of clothing and footwear, recreation, and education have positive and statistically significant elasticities that are similar in size to the elasticity for furnishings. Finally, health care and housing exhibit significant negative elasticities.

Table 2 shows the empirical results for the longer period (1929–2009) for the aggregate categories, using asset prices instead of asset net worth for the two wealth categories. These results are similar to those for price, income, and population when net worth values are used. (See table 1.) Most of the price elasticities are negative and statistically significant, all of the income elasticities are positive and statistically significant, and all but one of the population elasticities (again, clothing and footwear) are positive and statistically significant. Age has a negative effect on total consumption (in contrast to the positive effect shown in table 1), and nine of the individual aggregate categories are inversely related to consumption, compared with six in table 1. Only four of the interest rate coefficients are statistically significant, with three being positive. The price control variable now has a statistically negative effect for total consumption, and it also has statistically negative elasticities for five of the individual aggregate categories. Very likely, the longer period allows better estimation for the price control variable.

Addressing the real estate price effects reveals that the estimated elasticity for total consumption is positive and statistically significant and is larger than that for the shorter period. The largest elasticities for individual aggregate categories are those for transportation and household furnishings and equipment, just as they were for the shorter period covered by table 1. Other similarities for the real estate results between tables 1 and 2 are the statistically insignificant elasticity estimates for clothing and footwear, health care, and recreation and the statistically negative elasticity for education.

Whereas financial wealth had no impact on total consumption in table 1, the financial price elasticity in table 2 is now positive and statistically significant, although smaller than the elasticity for real estate price. The finding of a larger wealth effect from real estate than from financial assets is

again consistent with some earlier findings.[33] However, a large degree of similarity exists between tables 1 and 2 as regards the results from the individual aggregate categories: the estimated elasticities are the same in both statistical significance and sign for 8 of the 12 aggregate categories.

Thus, the conclusion to draw from the aggregate analysis is that transportation and household furnishings and equipment have the largest positive elasticities from real estate wealth in both periods. Because these groups are composed largely of durable products, the findings obtained from them support Friedman. With regard to financial wealth, the categories of clothing and footwear, household furnishings and equipment, and recreation have the largest positive elasticities in both periods.

Though sufficient for broad generalizations, the results for the aggregate categories listed in tables 1 and 2 may mask important differences in estimated elasticities between specific products and services. Consequently, tables 3 and 4 give the results for the individual consumption items in each aggregate category, thereby allowing a more detailed examination of the impacts of the price, demographic, and wealth variables on consumption.

In table 3, which uses the wealth measures for the 1946–2009 period, the results for the price, income, population, age, interest rate, and price control variables follow the same pattern as that for the aggregate categories: most of the price elasticities are negative and statistically significant, most of the income and population elasticities are positive and statistically significant, the age elasticities are mixed, and most of the interest rate and price control elasticities are not statistically significant.

Again, the emphasis here will be on the results for the two wealth measures: real estate wealth and financial wealth. Scanning the results for real estate wealth shows that the consumption group with the highest positive elasticity is new vehicles, with an elasticity of 1.69. The group with the next-highest positive elasticity is appliances, at 0.86. Following are vehicle insurance (0.50), vehicle fluids and airplane travel (0.42 each), and medical lab services (0.41). All the other groups with statistically significant positive elasticities have elasticities that are less than 0.40. The dominant effects of real estate wealth are therefore on consumer durables and related services (new vehicles, appliances, vehicle insurance, and vehicle fluids). The largest negative elasticities are for foreign mail, tours, and labor organization dues.

The results are more varied for financial wealth. The groups with the highest positive elasticites are water vehicle travel (1.51), financial services with a fee (1.24), laundry and drycleaning (0.79), "other vehicle services" (0.67), clothing alterations and repair (0.61), U.S. mail and labor organization dues (0.60 each), and carpets, drapes, and linens (0.59). Compared with real estate wealth, financial wealth presents a mixed group dominated by nondurable goods and services. New vehicles and photography have the largest negative elasticities.

In table 4, which uses asset prices for the 1929–2009 period, the results for the price, income, population, age, and interest rate variables are once again similar to those for the shorter period covered in table 3. The price control variable is now negative and statistically significant in about one-third of the individual categories. For real estate wealth (housing price), the estimates are almost identical to those listed in table 2. The groups with the largest positive elasticities are new vehicles, appliances, disability insurance, and vehicle fluids, all having an elasticity above 0.70. For new vehicles and appliances, the results are elastic (elasticity greater than 1), meaning that the percent change in consumption is greater than the percent change in the housing price. Except for disability insurance, these groups also had statistically significant effects in the shorter period covered in table 3. Water vehicle travel (–2.15), tours (–1.99), and foreign mail (–1.95) had the largest negative elasticities in the longer period covered in table 4.

The estimated elasticity values for the stock price in table 4 are noticeably smaller than their counterparts in table 3. The groups with the largest positive statistically significant stock price elasticities are clothing alterations and repairs (0.41); financial services with a fee (.40); laundry and drycleaning, and group housing (0.33 each); and used vehicles (0.31). The groups with the largest negative elasticities are airplane travel (–.55), telephone equipment (–.38), and photography (–.31).

THE ASSET BOOM IN THE U.S. ECONOMY OCCURRED together with good stock market returns in the 1980s and 1990s, and accelerated the housing boom of 1997–2007. At the time, economists maintained that such a boom would increase consumer spending via the "wealth effect." Indeed, that very thing happened, with consumption rising 4 percentage points, to a level of more than 70 percent as a percentage of GDP from 1997 to 2007.

This article has added to the long literature on consumption and wealth effects in three ways. First, it has extended the analysis of the relationship between wealth and consumption to include the turbulent decade of the 2000s, a decade that saw both substantial gains and substantial losses in household wealth. Second, controlling for the effects of price, income, demographic, and other important variables, the article has used a direct measure of consumption

Table 3. Estimated elasticities, by detailed consumption group and using wealth values, 1946–2009

Group	Price	Income	Population	Age	Interest rate	Real estate wealth	Financial wealth	Price control
Total spending	[1]–0.18	[1]0.64	[1]1.33	[1]0.21	–0.01	[1]0.06	0.04	–0.01
At-home food	[1]–.18	[1].26	[1]1.04	[1]–.47	–.01	.03	–.02	–.01
Food	–.26	–.03	[1]1.51	[1]–.67	–.01	.05	–.01	–.01
Alcohol	[1]–.53	[1]1.85	[1]–1.00	–.36	–.01	–.04	–.16	.05
Farm food	.02	–.46	–1.28	[1]–1.02	–.03	–.07	[1]–.66	–.01
Clothing and footwear	[1]–.49	[1].96	[1]–.54	[1].48	.01	–.03	[1].21	–.01
Women's clothing[3]	[1]–.22	[1]1.12	.69	[1]1.97	[1].06	[1].12	–.02	[1]–.07
Men's clothing[3]	.01	[1].77	[1].99	[1]1.52	–.02	–.01	.07	–.02
Children's clothing[3]	[1].12	[1]2.02	[1]2.50	[1]–2.02	[1].05	[1].23	[1]–.45	.01
Other clothing materials	[1]–1.86	[1]2.11	[1]–5.20	[1]–2.79	[1]–.07	[1]–.23	–.26	[1].13
Laundry and drycleaning[3]	[1]–1.10	.22	1.17	[1]1.53	–.01	[1]–.33	[1].79	–.05
Clothing alterations and repair[3]	[1]–.21	[1]1.79	[1]–6.15	[1]2.84	–.03	–..25	[1].61	–.03
Footwear	[1]–.42	[1].70	[1]–.58	[1].64	.01	–.02	[1].32	–.02
Housing, utilities, and fuel	[1]–.55	[1].27	[1]2.56	[1]–.61	.01	[1].08	[1]–.09	–.02
Rental nonfarm housing	[1]–.53	[1]1.04	[1]1.14	[1]–.97	[1].05	–.08	–.07	–.01
Owned nonfarm housing	[1]–.41	–.09	[1]3.71	[1]–.54	.01	[1].17	[1]–.13	–.01
Rental farm housing	[1].59	.03	–.31	[1]1.37	–.02	[1].41	–.15	–.07
Group housing	–.90	[1]–1.80	[1]2.76	[1]–2.69	[1]–.21	–.15	.34	.08
Water	[1]–.06	[1]1.25	.26	[1]–.35	[1].06	–.02	.05	.01
Electricity	[1]–.27	[1].61	[1]3.43	[1]–1.69	[1].05	[1].25	[1]–.49	–.06
Natural gas	[1]–.38	[1]–.61	[1]4.52	[1]–3.54	.02	[1].25	[1]–.31	–.04
Fuel oil and others	[1]–.46	–.35	.48	[1]–2.11	[1]–.11	.04	–.08	–.06
Household furnishings and equipment	[1]–1.39	.16	.15	[1]–1.43	–.01	[1].20	[1].23	[1]–.06
Furniture and flooring	[1]–1.17	.01	.10	[1]–1.53	[1]–.04	[1].29	[1].39	–.05
Carpet, drapes, and linens	[1]–.93	.46	[1]–1.30	.25	.01	–.02	[1].59	–.08
Appliances	.61	[1]–2.23	[1]7.80	.74	–.01	[1].86	–.32	–.01
Eating utensils	[1]–1.43	[1]1.58	[1]–1.13	[1]–1.09	–.01	[1].17	–.09	[1]–.10
Home tools and equipment	[1]–2.43	.71	[1]–1.22	[1]–4.54	.01	.10	[1].28	[1]–.12
Other furnishings and equipment	[1]–.91	[1].21	[1]1.00	[1]–1.06	–.01	–.01	[1].27	[1]–.06
Health care	[1]–.17	[1]1.29	[1]2.32	[1]–.88	[1].02	.05	[1]–.26	–.01
Pharmaceuticals[3]	[1]–.46	–.42	[1]6.15	[1]1.41	.01	[1].29	.01	.05
Other medical products[3]	[1]–.30	[1]1.46	1.14	[1]3.28	–.07	.12	[1]–.59	.07
Health equipment	[1].85	[1]1.91	.67	[1]2.08	[1].06	.10	[1]–.23	–.04
Physician services	[1]–.30	[1].40	[1]2.71	.16	.01	[1].14	[1]–.17	–.02
Dental services	[1]–.59	[1].98	[1]1.72	[1]–.63	–.01	[1].11	[1]–.17	–.03
Home health care[4]	–.62	[1]–6.73	[1]12.94	5.07	–.09	.05	.06	–
Medical lab services[4]	–1.67	1.09	[1]8.55	–1.46	.11	[1].41	–.18	–
Other medical services[4]	.54	[1]–1.97	[1]8.13	–1.01	–.05	.14	–.09	–
Hospital services	–.14	[1]2.07	[1]1.88	[1]–2.34	.03	.11	[1]–.62	–.01
Nursing home services	[1]–2.92	[1]3.51	[1]5.41	[1]–8.32	[1].08	–.29	.31	.03

See notes at end of table.

Table 3. Continued—Estimated elasticities, by detailed consumption group and using wealth values, 1946–2009

Group	Price	Income	Population	Age	Interest rate	Real estate wealth	Financial wealth	Price control
Transportation	[1]–1.30	–.35	[1]2.47	[1]–1.15	.03	[1].49	–.11	–.07
New vehicles	[1]3.91	.21	[1]8.34	2.15	.14	[1]1.69	[1]–1.68	–.21
Used vehicles	.04	[1]–2.07	[1]3.54	[1]3.71	–.03	[1].31	.32	.02
Vehicle parts	[1]–1.69	[1]1.38	.95	[1]–4.23	.01	.08	[1]–.45	.08
Vehicle fluids	[1]–.31	[1]–.73	[1]4.38	[1]–1.32	–.01	[1].42	[1]–.42	–.01
Vehicle maintenance and repair	[1]–1.61	.23	[1]2.61	[1]–1.49	.04	[1].35	–.06	–.03
Other vehicle services	.05	–.63	[1]4.08	[1]3.01	.04	–.01	[1].67	.09
Buses and trains	[1]–2.01	[1].61	–.44	.37	[1]–.06	[1]–.16	[1].27	[1].12
Airplane travel	–.26	[1]1.66	[1]4.08	[1]–5.17	.05	[1].42	–.21	–.05
Water vehicle travel	–.19	[1]6.19	[1]–8.59	[1]8.44	[1].23	.03	[1]1.51	–.07
Communication	[1]–.76	[1].54	[1]2.59	–.28	[1]–.02	.04	.11	.01
Telephone equipment	[1]–.72	[1]4.55	–1.31	[1]8.59	[1].36	.30	[1]–1.14	–.22
U.S. mail[3]	[1].43	[1]2.09	[1]–6.30	[1]–1.84	[1].13	–.15	[1].60	–.04
Foreign mail[3]	[1]–2.69	[1]13.56	[1]–14.28	[1]15.31	.15	[1]–1.02	–.13	.16
Telecommunications services	[1]–.49	[1].92	[1]2.55	–.21	–.01	.06	.03	–.01
Internet access[4]	–.96	–3.56	-4.38	[1]73.53	[1].83	1.63	–.57	–
Recreation	[1]–.64	[1]1.07	[1]1.15	[1].60	–.01	–.01	[1].22	–.02
Video and audio equipment[3]	[1]–.83	[1]3.87	–1.30	[1]1.18	[1].05	–.02	.06	[1]–.14
Video and audio services[3]	[1].62	[1]4.24	[1]–4.62	1.27	[1].13	–.11	–.27	–.10
Recreational vehicles[3]	–.12	[1]5.00	–3.15	[1]–3.01	[1]–.13	–.02	–.01	.12
Other recreational products[3]	[1]–.41	[1]1.26	[1]2.79	[1]1.81	[1]–.03	–.01	.04	[1]–.13
Recreation equipment maintenance and repair[3]	[1]–.49	[1]4.99	[1]-4.68	[1]3.04	[1].10	.16	.12	–.02
Club memberships	[1]–.74	[1]1.50	[1]–.76	[1].90	.03	[1]–.22	[1].26	–.03
Books, magazines, and newspapers	[1]–.55	[1].84	.42	–.04	.01	–.06	[1].14	–.01
Gambling	[1]–1.66	[1].72	[1]3.01	[1]1.81	[1].04	.01	[1].18	–.01
Pets	[1]–.91	[1]2.19	[1]1.08	[1]–1.73	.01	[1]–.19	.07	–.02
Photography	[1].16	[1]3.76	[1]2.29	.31	[1]–2.81	.16	[1]–.95	–.05
Tours	[1]–1.85	[1]7.52	[1]–7.76	.62	.08	[1]–.73	.37	.01
Education	[1]–.88	[1]1.14	[1]2.15	[1]–1.63	–.01	[1]–.15	[1].21	.01
Educational books	[1]-1.33	[1]1.45	–.74	.53	[1].08	–.04	[1].46	.01
Higher education	[1]–.39	[1]1.33	[1]2.07	[1]–2.85	[1].03	–.06	–.01	.03
K–12 schools	[1]–.81	[1].64	[1]3.05	[1]–2.95	–.02	[1]–.13	.08	–.01
Commercial and vocational schools	[1]–1.12	[1]1.24	[1]1.39	–.27	–.08	–.08	.22	[1]–.11
Food service and accommodations	–.10	[1]1.41	–.32	[1].37	–.01	[1]–.08	–.03	–.01
Restaurants	.04	[1]1.13	.07	[1].52	–.01	–.02	–.06	–.01
Employee meals	[1].30	[1]1.33	–1.42	–.39	[1]–.11	[1]–.31	.05	–.07
Accommodations	[1]–.47	[1]2.06	.24	[1]–.76	.03	–.05	–.01	–.05
Financial services	–.14	[1].63	[1]2.04	[1].64	[1].03	[1].13	–.08	[1]–.05
Financial services, no fee	–.01	[1]2.55	.02	[1].81	[1].11	.01	[1]–.48	–.03
Financial services with fee	[1]–1.03	–.13	[1]1.68	.41	[1].06	–.06	[1]1.24	–.10

See notes at end of table.

Table 3. Continued—Estimated elasticities, by detailed consumption group and using wealth values, 1946–2009

Group	Price	Income	Population	Age	Interest rate	Real estate wealth	Financial wealth	Price control
Life insurance	[1]–2.00	.27	[1]2.46	[1]–1.22	–.03	–.05	[1].38	–.10
Home insurance	–.89	[1]1.06	[1]2.33	[1]–1.34	–.02	.13	[1]–.34	–.01
Medical insurance[3]	–.02	[1].87	[1]2.06	[1].66	[1].03	[1].21	[1]–.40	[1]–.07
Disability insurance[3]	[1]–.52	–.01	[1]5.32	[1]–3.42	[1]–.23	.31	[1]–.61	.10
Workers' compensation[3]	[1]–.89	[1]3.49	–.18	[1]2.38	[1].12	.24	[1]–.51	[1]–.20
Vehicle insurance	[1].08	[1]–.91	[1]4.59	[1]–1.58	.04	[1].50	[1]–.50	.01
Other goods and services	–.06	[1].74	[1].86	–.37	–.01	.03	[1].11	[1]–.03
Personal care	[1].59	[1].35	[1]1.96	–.01	[1]–.04	–.05	[1].37	–.03
Personal items	[1]–.53	[1]2.17	[1]–1.17	[1]–.77	[1]–.03	.07	.06	[1]–.07
Social and religious activities	[1]–2.05	[1]1.34	[1]1.69	[1].37	–.01	–.01	.12	–.02
Legal services[3]	[1].43	.35	–.76	[1]–2.00	[1]–.07	–.08	[1].24	–.01
Accounting services[3]	–.15	[1]2.05	.75	–1.00	[1]–.11	[1]–.21	[1].24	.01
Labor organization dues[3]	[1]1.29	[1]2.62	[1]–7.79	[1]–1.93	–.01	[1]–.68	[1].60	.02
Professional association dues[3]	[1].63	[1]3.06	–1.62	[1]–6.60	–.05	–.12	–.15	–.08
Funeral services[3]	[1]–.38	[1].89	–.52	.81	.01	.05	.08	–.02
Tobacco products	[1]–.66	.01	[1].84	[1]–1.24	.02	.01	.07	.01
Foreign travel	[1]–1.77	–.18	[1]3.60	[1]–1.72	–.01	.18	.15	–.05

[1] Statistically significant at the .05 level or better (one-tailed *t*-test).
[2] Data from 1933.
[3] Data from 1959.
[4] Data from 1986.

NOTE: System R^2 = .99. Dash indicates price control variable does not apply.
SOURCE: Author's calculations based on data from U.S. Department of Commerce, Board of Governors of the Federal Reserve System, and Standard and Poor's.

instead of data on spending that have been used in most previous work. Finally, the article has estimated the wealth effects from both real estate assets and financial assets for more than 80 consumer products and services.

A wealth effect on consumption from real estate is supported for both periods of analysis (1946–2009 and 1929–2009), with respective elasticities of 0.06 and 0.09 for aggregate consumption. The consumption of durable products and associated services—including vehicles, appliances, vehicle insurance, and vehicle fluids—had the most significant positive responses to increases in real estate wealth or housing prices. These findings conform to Friedman's hypothesis that wealth gains viewed as transitory by the household will be invested rather than consumed. Purchases of consumer durable products, such as vehicles and appliances, are considered investments. The numerical findings for vehicles and appliances are also similar for the two periods. Purchases of new vehicles are highly elastic (1.69 in the shorter period, 1.95 in the longer), and purchases of appliances are near unitary elastic (0.86, 1.13). Exhibit 1 summarizes these findings.

The analysis also indicates some reallocation of consumption from the real estate wealth effect. In both periods, households significantly reduced their consumption of foreign mail, travel tours, and labor organization memberships when real estate wealth rose, although total spending on these categories was relatively small in either period.

The results obtained from financial wealth were less consistent. For total consumption, the financial wealth effect was statistically significant only in the longer period (1929–2009), and here the elasticity was relatively small (0.02). The consumption categories with consistently positive and statistically significant elasticities in both periods were financial services with a fee, laundry and drycleaning, clothing repair and alteration, and "other vehicle services." Like durable products, these categories represent services that can be easily begun and terminated. It is logical that households will increase their consumption of financial services that require a fee when they increase their financial wealth. The other three categories—laundry and drycleaning, clothing repair and alterations, and "other vehicle services"—have in common their contribution to the maintenance and enhancement of two important household durable or

Table 4. Estimated elasticities, by detailed consumption group and using asset prices, 1929–2009

Group	Price	Income	Population	Age	Interest rate	Housing price	Stock price	Price control
Total spending	[1]–0.62	[1]0.76	[1]1.28	[1]–0.13	0.01	[1]0.09	[1]0.02	[1]–0.02
At-home food	[1].21	[1].34	[1]1.07	[1]–.40	–.02	[1].18	–.01	–.01
Food	[1].44	[1].23	[1]1.16	[1]–.55	[1].02	[1].18	[1].03	–.01
Alcohol[2]	[1]–1.54	[1]3.88	[1]–6.38	[1]–2.53	–.11	.20	[1].24	–.14
Farm food	[1].99	[1]–1.31	–.53	–.06	–.01	.34	–.10	–.05
Clothing and footwear	[1]–.49	[1]1.05	[1]–.26	[1].56	.01	–.01	[1].04	–.01
Women's clothing[3]	[1]–.16	[1]1.23	.55	[1]2.01	[1].07	[1].18	–.02	[1]–.07
Men's clothing[3]	–.02	[1].77	[1]1.17	[1]1.62	–.02	–.01	–.01	–.02
Children's clothing[3]	–.02	[1]2.40	1.08	–.85	.04	.06	[1]–.21	.01
Other clothing materials	[1].04	[1]1.81	[1]–2.13	[1]1.55	–.04	[1].54	–.09	[1].26
Laundry and drycleaning[3]	[1]–.77	–.19	[1]2.53	–.08	–.04	[1]–.23	[1].33	–.03
Clothing alterations and repair[3]	[1].58	[1]1.06	[1]–5.76	–.57	[1]–.10	–.22	[1].41	.01
Footwear	[1]–.59	[1].67	.14	[1].26	.01	–.06	[1].06	–.01
Housing, utilities, and fuel	[1]–.47	[1].29	[1]2.59	[1]–.77	[1].02	.03	[1]–.03	[1]–.03
Rental nonfarm housing	[1]–.17	[1].44	[1]2.10	[1]–.54	.01	[1]–.31	[1]–.06	–.02
Owned nonfarm housing	[1]–.66	[1].27	[1]3.19	[1]–1.11	[1].04	[1].21	.01	–.03
Rental farm housing	[1].19	–.01	.09	[1].69	[1].03	[1].48	–.01	–.02
Group housing	[1]–2.65	.38	.06	[1]–4.43	[1]–.11	[1]1.01	[1].33	.16
Water	[1].09	[1].46	[1]1.78	.21	.01	[1]–.26	[1]–.05	.01
Electricity	[1]–1.10	.14	[1]3.72	[1]–1.06	–.02	–.08	[1]–.27	[1]–.10
Natural gas	[1]–.79	.01	[1]3.62	[1]–3.42	–.01	[1].34	[1]–.17	[1]–.09
Fuel oil and others	[1]–.75	.26	–.13	[1]–2.75	[1]–.12	[1].66	[1]–.13	–.07
Household furnishings and equipment	[1]–.48	[1].87	[1].51	[1]–.67	.01	[1].43	[1].08	[1]–.08
Furniture and flooring	[1]–.53	[1]1.27	–.15	[1]–1.00	.02	[1].54	[1].11	[1]–.10
Carpet, drapes, and linens	[1]–.34	[1].78	–.04	[1]1.19	.01	[1].47	[1].16	.01
Appliances	[1].34	–.23	[1]4.99	[1]–1.98	.04	[1]1.13	.03	[1]–.36
Eating utensils	[1]–1.15	[1].82	.61	–.38	–.02	[1].27	[1]–.07	–.07
Home tools and equipment	[1]–.67	[1]1.80	.19	–.02	–.01	–.01	[1]–.07	–.08
Other furnishings and equipment	[1]–.49	[1].72	[1].48	[1]–.85	.01	.03	[1].12	[1]–.06
Health care	–.02	[1].80	[1]2.70	[1]–.91	[1].02	–.03	[1]–.09	–.02
Pharmaceuticals[3]	[1]–.51	[1].65	[1]4.49	[1]1.67	[1].06	[1].38	.01	.02
Other medical products[3]	–.15	.91	.92	[1]2.51	–.05	[1].39	[1]–.19	.09
Health equipment	[1]–.43	[1]1.17	[1]1.10	[1]1.81	–.01	–.05	–.01	–.01
Physician services	[1]–.17	[1].57	[1]2.17	[1]–.33	[1].04	[1].30	[1]–.04	[1]–.05
Dental services	[1]–.19	[1].90	[1]1.47	[1]–1.06	[1].03	–.03	[1]–.07	[1]–.08
Home health care[4]	–.52	[1]–6.63	[1]9.49	11.37	–.04	.29	–.08	–
Medical lab services[4]	–.33	1.19	7.06	–5.19	.01	.05	.02	–
Other medical services[4]	.38	–1.49	5.97	1.23	–.05	.12	–.03	–
Hospital services	[1]–.35	[1].63	[1]3.91	[1]–1.59	.01	[1]–.20	[1]–.23	–.01
Nursing home services	[1]–2.42	[1].85	[1]9.81	[1]–5.73	–.01	[1]–.96	–.09	.09

See notes at end of table.

Table 4. Continued—Estimated elasticities, by detailed consumption group and using asset prices, 1929–2009

Group	Price	Income	Population	Age	Interest rate	Housing price	Stock price	Price control
Transportation	[1]–.53	[1].87	[1]1.72	[1]–1.98	.02	[1].52	.01	[1]–.17
New vehicles	.02	–.30	[1]4.97	[1]–5.66	[1].30	[1]1.95	.04	[1]–1.06
Used vehicles	[1].13	[1].95	–.76	[1]1.86	.02	[1].49	[1].31	[1]–.20
Vehicle parts	[1]–.96	[1]1.09	[1]1.90	[1]–3.28	–.01	–.11	[1]–.10	–.06
Vehicle fluids	[1]–.57	–.20	[1]3.67	[1]–2.41	–.01	[1].77	[1]–.15	[1]–.15
Vehicle maintennce and repair	[1]–2.69	[1]1.02	[1]2.60	[1]–2.86	.04	.24	–.01	[1]–.15
Other vehicle services	[1]–.18	.25	[1]4.06	[1]2.37	.02	[1]–.37	[1].29	–.01
Buses and trains	[1]–1.62	[1].60	[1]–.92	[1].90	–.01	.05	[1].09	[1].17
Airplane travel	[1]–3.80	[1]2.18	[1]5.24	[1]–10.18	–.17	–.38	[1]–.55	–.01
Water vehicle travel	[1].35	2.65	–1.25	[1]15.06	[1].49	[1]–2.15	.48	–.25
Communication	[1]–.72	[1].63	[1]2.84	[1]–.33	.01	[1].14	.02	.04
Telephone equipment	[1]–1.46	[1]2.94	.16	[1]9.72	[1].27	[1]–1.87	[1]–.38	[1]–.41
U.S. mail[3]	[1].13	[1]2.68	[1]–5.21	–.76	[1].09	[1]–.61	[1].11	–.06
Foreign mail[3]	[1]–1.04	[1]9.92	[1]–13.82	[1]11.00	–.08	[1]–1.95	.23	.29
Telecommunications services	[1]–.53	[1].80	[1]3.06	[1]–.35	.01	–.03	–.01	.01
Internet access[4]	–.47	–3.17	19.93	24.30	.20	–.47	1.25	–
Recreation	[1]–1.00	[1]1.20	[1]1.04	[1]–.34	.02	–.02	[1].07	–.04
Video and audio equipment[3]	[1]–.83	[1]3.84	–1.14	[1]1.18	[1].05	–.01	.01	[1]–.14
Video and audio services[3]	[1] 1.25	[1]3.58	[1]–4.81	–.21	.03	[1]–.48	[1]–.14	–.03
Recreational vehicles[3]	[1]–.31	[1]5.24	[1]–3.37	[1]–2.24	[1]–.15	–.28	–.02	.12
Other recreational products[3]	[1]–.35	[1]1.14	[1]3.08	[1]1.58	[1]–.03	[1].09	.02	[1]–.12
Recreation equipment maintenance and repair[3]	[1]–.35	[1]5.35	[1]–5.11	[1]2.77	[1].10	.18	.06	–.02
Club memberships	[1]–.17	[1].95	–.12	[1]2.34	[1].04	[1]–.49	.02	–.06
Books, magazines, and newspapers	[1]–.21	[1].90	[1].53	–.09	–.01	[1].20	.01	.01
Gambling	[1].13	[1]1.49	[1]1.79	[1]3.33	[1]–.04	[1]–.48	[1].08	–.02
Pets	[1]–1.70	[1]1.24	[1]2.22	[1]–1.70	–.02	[1]–.25	.04	.02
Photography	[1].13	[1]2.01	[1]2.29	[1]–2.58	.01	[1]–.37	[1]–.31	[1]–.13
Tours	[1]2.39	[1]2.81	1.25	[1]4.17	[1].22	[1]–1.99	–.04	[1]–.36
Education	[1]–.21	[1].75	[1]2.43	[1]–2.36	.01	[1]–.23	–.03	.01
Educational books	[1]–1.16	[1]1.46	.31	[1].52	[1].06	[1]–.31	[1].09	–.01
Higher education	[1]–.15	[1].42	[1]3.48	[1]–2.75	.01	[1]–.18	[1]–.09	.03
K–12 schools	[1]–.96	[1].34	[1]3.57	[1]–2.23	–.01	–.08	.01	.04
Commercial and vocational schools	[1]–.04	[1]1.19	1.05	.38	.05	[1]–.67	[1].11	–.10
Food service and accommodations	.38	[1].79	[1].76	[1].59	[1]–.06	.14	[1]–.09	.07
Restaurants	[1]1.21	[1].36	[1]1.05	[1]1.31	–.04	.16	[1]–.07	.05
Employee meals	[1]2.07	–.09	.64	–.48	[1]–.11	.40	.02	.02
Accommodations	.01	[1]1.10	[1]1.87	[1]–.44	–.02	[1]–.26	[1]–.08	–.04

See notes at end of table.

Table 4. Continued—Estimated elasticities, by detailed consumption groups and using asset prices, 1929–2009

Group	Price	Income	Population	Age	Interest rate	Housing price	Stock price	Price control
Financial services	–.11	[1].53	[1]2.15	[1].85	[1].06	[1]–.20	.02	[1]–.10
Financial services, no fee	[1]–.81	[1]1.44	[1]1.91	–.34	[1].10	[1]–.56	–.06	[1]–.17
Financial services with fee	[1]–1.42	.65	[1]2.36	.69	[1].17	[1]–.75	[1].40	–.15
Life insurance	[1]–.39	–.14	[1]2.75	–.25	–.03	[1]–.59	[1]–.10	[1]–.12
Home insurance	[1]–1.02	[1].70	[1]2.73	[1]–1.41	–.01	[1].45	[1]–.14	.05
Medical insurance[3]	[1]–.05	[1].97	[1]1.36	[1]1.19	.03	[1].14	[1]–.15	–.05
Disability insurance[3]	[1]–.61	.74	2.81	[1]–3.56	[1]–.14	[1].83	[1]–.26	.08
Workers' compensation[3]	[1]–.83	[1]3.23	.79	[1]3.72	.01	[1].32	[1]–.24	[1]–.14
Vehicle insurance	[1]–1.91	[1]–1.50	[1]7.14	[1]–1.26	–.04	[1].64	.15	.11
Other goods and services	[1]–.13	[1].83	[1].99	[1]–.33	–.01	–.01	.03	[1]–.03
Personal care	[1]–.43	[1].80	[1]1.47	[1]–.66	–.01	–.07	[1].14	–.02
Personal iems	[1]–.53	[1]2.20	[1]–.83	[1]–1.04	.01	.14	–.01	–.05
Social and religious activities	[1]-4.28	.31	[1]3.82	[1].67	–.01	–.05	.04	–.02
Legal services[3]	[1].51	.19	–.28	[1]–2.49	[1]–.07	–.04	[1].08	–.02
Accounting services[3]	[1]–.19	[1]1.78	1.65	–.90	[1]–.14	[1]–.33	[1].09	.01
Labor organization dues[3]	[1].59	[1]1.84	[1]–3.96	.22	–.05	[1]–.96	–.04	–.01
Professional association dues[3]	–.02	[1]3.67	–1.06	[1]–2.88	[1]–.07	[1]–.65	[1]–.17	–.06
Funeral services[3]	[1]–.35	[1]1.15	–.84	[1]1.10	–.03	[1]–.24	.03	–.02
Tobacco products	[1]–1.26	.05	[1]1.39	–.42	–.03	.14	[1].10	[1].09
Foreign travel	[1]–1.59	.52	[1]2.67	[1]–2.20	[1].13	.05	[1].18	[1]–.23

[1] Statistically significant at the .05 level or better (one-tailed *t*-test).
[2] Data from 1933.
[3] Data from 1959.
[4] Data from 1986.

NOTE: System $R^2 = .99$. Dash indicates price control variable does not apply.
SOURCE: Author's calculations based on data from U.S. Department of Commerce, Board of Governors of the Federal Reserve System, and Standard and Poor's.

semidurable goods: vehicles and clothing. Therefore, perhaps these findings suggest a slight modification, or reinterpretation, of Friedman's hypothesis concerning the use of transitory income from wealth: the wealth will be invested in consumer durable products or in services that maintain or enhance those products.

The results presented suggest that the negative wealth effect produced by the 2007–2009 recession had two major casualties: vehicle sales and appliance sales. From 2006 to 2009, U.S. vehicle sales declined 38 percent.[34] Household appliance sales were down almost 10 percent over the same period.[35] As household wealth made a modest rebound in 2010,[36] vehicle sales regained approximately 10 percent[37] and appliance sales recovered 3 percent.[38] These events suggest strong conformance to the empirical results' implications.

Thus, this article has largely reconfirmed the pathbreaking insights of Ando and Modigliani and of Friedman about the impact of wealth on consumption. In support of previous work, wealth—especially real estate wealth—was found to be an important determinant of consumption. This finding at least partially explains the jump in relative consumption (consumption as a percentage of GDP) that took place during the 1997–2007 period, a time that included the real estate boom. Now that the boom is over, the article's conclusions also may aid an understanding of the behavior consumers are exhibiting in the "new normal" of the post-crash world. □

Exhibit 1. Consumption groups with the 10 largest wealth elasticities (in absolute value) from the two analysis periods presented

For real estate wealth

1946–2009	*1929–2009*
New vehicles (1.69)	Water vehicle travel (–2.15)
Non-U.S. mail (–1.02)	**Tours (–1.99)**
Appliances (.86)	**New vehicles (1.95)**
Tours (–.73)	**Non-U.S. mail (–1.95)**
Labor organization dues (–.68)	Telephone equipment (–1.87)
Vehicle insurance (.50)	**Appliances (1.13)**
Airplane travel (.42)	Group housing (1.01)
Vehicle fluids (.42)	**Labor organization dues (–.96)**
Rental farm housing (.41)	Disability insurance (.83)
Medical lab services (.41)	**Vehicle fluids (.77)**

For financial wealth

1946–2009	*1929–2009*
New vehicles (–1.68)	Airplane travel (–.55)
Water vehicle travel (1.51)	**Clothing alterations and repairs (.41)**
Fee-paid financial services (1.24)	**Fee-paid financial services (.40)**
Photography (–.95)	Telephone equipment (–.38)
Laundry and drycleaning (.79)	**Laundry and drycleaning (.33)**
Other vehicle services (.67)	Group housing (.33)
Farm food (–.66)	Used vehicles (.31)
Hospital services (–.62)	**Photography (–.31)**
Cleaning alterations and repairs (.61)	**Other vehicle services (.29)**
Disability insurance (–.61)	Electricity (–.27)

NOTE: Boldface indicates that the group was among those with the 10 largest elasticities in both periods.

SOURCE: Tables 3 and 4.

Notes

[1] "U.S. economic accounts," Table 1.1.6, National Income Accounts, real personal consumption expenditures (U.S. Bureau of Economic Analysis, 2011), **http://www.bea.gov/iTable/iTable.cfm?ReqID=9&step=1&reqid=9&step=3&isuri=1&903=6**.

[2] See Orazio P. Attanasio, Laura Blow, Robert Hamilton, and Andrew Leicester, "Booms and busts: consumption, house prices and expectations, *Economica,* February 2009, pp. 20–50; John D. Benjamin, Peter Chinloy, and G. Donald Jud, "Real estate versus financial wealth in consumption," *Journal of Real Estate Finance and Economics,* vol. 29, no. 3, 2004, pp. 341–354; Raphael Bostic, Stuart A. Gabriel, and Gary Painter, "Housing wealth, financial wealth, and consumption: new evidence from micro data," *Regional Science and Urban Economics,* vol. 39, no. 1, 2009, pp. 79–89; John Y. Campbell and João F. Cocco, "How do house prices affect consumption? Evidence from micro data," *Journal of Monetary Economics*, vol. 54, no. 3, 2007, pp. 591–621; Christopher D. Carroll, Misuzu Otsuka, and Jirka Slacalek, "How large are housing and financial wealth effects? A new approach," *Journal of Money, Credit, and Banking*, vol. 43, no. 1, 2011, pp. 55–79; Karl E. Case, John M. Quigley, and Robert J. Shiller, "Comparing wealth effects: The stock market vs. the housing market," *Advances in Macroeconomics*, vol. 5, no. 1, 2005, pp. 1–34; and F. Thomas Juster, Joseph P. Lupton, James P. Smith, and Frank Stafford, "The decline in household saving and the wealth effect," *Review of Economics and Statistics*, February 2006, pp. 20–27.

[3] See Reuven Glick and Kevin Lansing, "U.S. household deleveraging and future consumption growth," *Federal Reserve Bank of San Francisco Economic Letter*, no. 2009–16, May 15, 2009; and David B. Gross and Nicholas S. Souleles, "An empirical analysis of personal bankruptcy and delinquency," *Review of Financial Studies*, spring 2002, pp. 319–347.

[4] Scott Fay, Erik Hurst, and Michelle J. White, "The household bankruptcy decision," *American Economic Review*, June 2002, pp. 706–718.

[5] Jeffrey R. Campbell and Zvi Hercowitz, "Welfare implications of the transition to high household debt," *Journal of Monetary Economics*, vol. 56, no. 1, 2009, pp. 1–16.

[6] See, for example, Mark Aguiar and Erik Hurst, "Consumption versus expenditure," *Journal of Political Economy*, October 2005, pp. 919–948; Orazio P. Attanasio and Hamish Low, "Estimating Euler equations," *Review of Economic Dynamics*, April 2004, pp. 405–435; Tamim Bayoumi and Hali Edison, *Is wealth increasingly driving consumption*? DNB Staff Report 100 (Amsterdam, De Nederlandsche Bank, 2003); Martin Browning and Thomas F. Crossley, "Shocks, stocks, and socks: smoothing consumption over a temporary income loss," *Journal of the European Economic Association*, December 2009, pp. 1169–1192; and Alexander Ludwig and Torsten Sløk, *The impact of changes in stock prices and house prices on consumption in OECD countries*, Working Paper 2002–1 (Washington, DC, International Monetary Fund, 2002).

[7] See, for example, Bayoumi and Edison, *Is wealth increasingly driving consumption*? Benjamin, Chinloy, and Jud, "Real estate versus financial wealth"; Bostic, Gabriel, and Painter, "Housing wealth"; Campbell and Cocco, "How do house prices affect consumption?" and Case, Quigley, and Shiller, "Comparing wealth effects."

[8] See, for example, Mian Atif and Amir Sufi, *Household leverage and the recession of 2007 to 2009*, Working Paper 15896 (Cambridge, MA, National Bureau of Economic Research, 2010); Glick and Lansing, "U.S. household deleveraging"; and Jaewoo Lee, Pau Rabanal, and Damiano Sandri, *U.S. consumption after the 2008 crisis*, Staff Position Note 10/01 (Washington, DC, International Monetary Fund, 2010).

[9] See, for example, Milton Friedman, *A theory of the consumption function* (Princeton, NJ, Princeton University Press, 1957); and Albert Ando and Franco Modigliani, "The 'life cycle' hypothesis of saving: aggregate implications and tests," *American Economic Review*, March 1963, pp. 55–84.

[10] John Maynard Keynes, *The general theory of employment, interest, and money* (London, Macmillan, 1936).

[11] Ando and Modigliani, "The 'life cycle' hypothesis of saving."

[12] See Eric Belsky and Joel Prakken, *Housing wealth effects: housing's impact on wealth accumulation, wealth distribution and consumer spending*, Working Paper 04–13 (Cambridge, MA, Harvard University Joint Center for Urban Studies, December 2004); Dean M. Maki and Michael G. Palumbo, *Disentangling the wealth effect: A cohort analysis of household saving in the 1990s*, Working Paper 2001–2 (Washington, DC, Board of Governors of the Federal Reserve System, 2001); and *Economic report of the President, 2010* (President's Council of Economic Advisers, 2010).

[13] See Yasserand Abdih and Evan Tanner, *Frugality: are we fretting too much? Household savings and assets in the U.S.*, Working Paper 09–197 (Washington, DC, International Monetary Fund, 2009); Charles Calomiris, Stanley Longhofer, and William Miles, *The (mythical?) housing wealth effect*, Working Paper 15075 (Cambridge, MA, National Bureau of Economic Research, 2009); and John Muellbauer, "Housing credit and Consumer expenditure," in *Housing, Finance, and Monetary Policy* (Federal Reserve Bank of Kansas City, 2007), pp. 267–334.

[14] See, for example, Benjamin, Chinloy, and Jud, "Real estate versus financial wealth"; Case, Quigley, and Shiller, "Comparing wealth effects"; Bayoumi and Edison, *Is wealth increasingly driving consumption?*; Campbell and Cocco, "How do house prices affect consumption?" Natalie Girouard and Sveinbjorn Blondal, *House prices and economic activity*, Working Paper 279 (Paris, Organisation for Economic Co-operation and Development, 2001); and Neale Kennedy and Palle Andersen, *Household saving and real house prices: an international perspective*, Working Paper 20 (Basel, Bank for International Settlements, 1994).

[15] Bostic, Gabriel, and Painter, "Housing wealth."

[16] Table 2.5.6, National Income Accounts, real personal consumption expenditures.

[17] Thesia Garner and Randal Verbrugge, *Reconciling user costs and rental equivalence: evidence from the U.S. Consumer Expenditure Survey*, Working Paper 427 (U.S. Bureau of Labor Statistics, 2009).

[18] Financial services are mainly brokerage, financial planning, and insurance services, while "other spending" includes legal and accounting services.

[19] Tables 2.5.3 and 2.5.4, National Income Accounts, real personal consumption expenditures.

[20] Jack E. Triplett, "Economic theory and BEA's alternative quantity and price indexes," *Survey of Current Business*, April 1992, pp. 49–52.

[21] Louis Phlips, *Applied consumption analysis* (Amsterdam, North Holland, 1974).

[22] Disposable personal income data are from Table 2.1, National Income Accounts, real personal consumption expenditures.

[23] Age data are from Table 7, *Statistical abstract* (U.S. Census Bureau, annual issues).

[24] Population data are from Table 34, *Economic report of the President, 2010*.

[25] W. Keith Bryant and Cathleen D. Zick, *The economic organization of the household*, 2nd ed. (New York, Cambridge University Press, 2006).

[26] Friedman, *A theory of the consumption function*, pp. 8–14.

[27] Interest rate data are from Tables B60 and B73, *Economic report of the President, 2010*.

[28] *Flow of Funds Accounts of the United States* (serial online) (Board of Governors of the Federal Reserve System, 2011), **http://www.federalreserve.gov/releases/z1/default.htm**.

[29] Ludwig and Sløk, *The impact of changes*.

[30] S&P/Case-Shiller Home Price Indices, **http://www.standardandpoors.com/indices/sp-case-shiller-home-price-indices/en/us/?indexId=spusa-cashpidff—p-us----.**

[31] Table B95, *Economic report of the President, 2010*.

[32] See, for example, Benjamin, Chinloy, and Jud, "Real estate versus financial wealth"; Bostic, Gabriel, and Painter, "Housing wealth"; Carroll, Otsuka, and Slacalek, "How large are housing and financial wealth effects?"; and Case, Quigley, and Shiller, "Comparing wealth effects."

[33] Ibid.

[34] WardsAuto: Data Center, 2010, **http://www.wardsauto.com/data-center**.

[35] Table 2.4.5, National Income Accounts, real personal consumption expenditures.

[36] *Flow of Funds Accounts*.

[37] WardsAuto.

[38] *Monthly sales for retail and food services*, report no. CB10–180 (U.S. Census Bureau, 2011).