Has Durable Goods Spending Become Less Sensitive to Interest Rates?

By Willem Van Zandweghe and John Carter Braxton

Despite an unprecedented degree of monetary policy accommodation, including record-low interest rates, the pace of the current economic recovery has been only moderate. This moderate pace was unexpected by many forecasters and prompted extensive research into the roles of credit frictions, uncertainty, and other factors. One way these factors may have weakened the recovery is by reducing the stimulative effect that a decline in interest rates usually has on spending by consumers and businesses.

This article focuses on consumer spending on durable goods. It finds that the effect of interest rates on this category of spending has weakened in the current recovery. Durable goods purchases, which include residential investment as well as spending on vehicles, recreational goods, and household goods, are a particularly interest-sensitive component of consumer spending. In the first four years of previous recoveries, a decline in interest rates elicited a significant increase in durable goods spending. In contrast, in the first four years of the current recovery, declines in interest rates have had little impact on durable goods purchases.

Reduced growth of spending on durable goods, due to the diminished sensitivity of this spending to consumer and mortgage interest rates, is one factor that helps explain the moderate pace of the current recovery. If the interest-rate sensitivity had remained at the higher level

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that prevailed during typical recoveries in the past, declining real interest rates in the current recovery could have provided a stronger boost to durable goods spending. This spending, in turn, could have contributed more strongly to real GDP growth a few years into the recovery, when interest rates declined rapidly. In particular, from the beginning of 2012 to midway through 2013, real GDP grew at an average annual rate of 1.8 percent, with durable goods spending contributing 0.80 percentage point to that growth rate. Absent the weakened sensitivity of durable goods spending to lowered interest rates, both annualized GDP growth and the contribution to it from durable goods spending would each have been, on average, an estimated 0.45 percentage point higher.

This reduced sensitivity of durable goods spending to interest rates may be an important consideration for policymakers. The Federal Reserve's monetary policy affects real economic activity primarily through its influence over interest rates for consumers and businesses. The weakened impact of lowered interest rates on consumer spending has thus reduced the effectiveness of monetary policy in the current recovery.

However, the beneficial impact on the economy of the Federal Reserve's accommodative monetary policy stance could be greater than the direct impact of lower interest rates on aggregate spending. The policy stance could, over time, also provide substantial support to the economy indirectly, by mitigating the likely driving forces behind the diminished interest-rate sensitivity of durable goods spending. Such forces may include tight credit conditions, reduced appetite for credit, reduced value of collateral, and heightened uncertainty. To the extent these driving forces are related to the economic downturn, rather than being structural in nature, the accommodative monetary policy can help mitigate them.

Section I documents the moderate pace of the recovery in general and of durable goods spending in particular. Section II presents and estimates an empirical model that relates durable goods spending during the first four years of recoveries to interest rates and other determinants. Section III uses a counterfactual exercise to assess the extent to which the reduced interest-sensitivity of durable goods spending has restrained GDP growth and considers the implications for monetary policy.
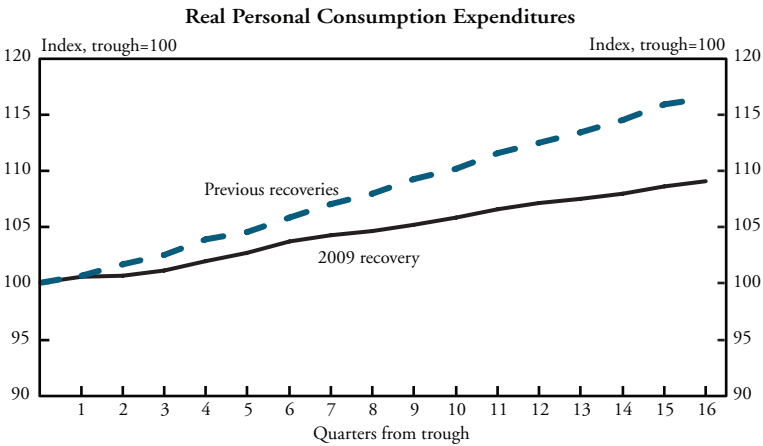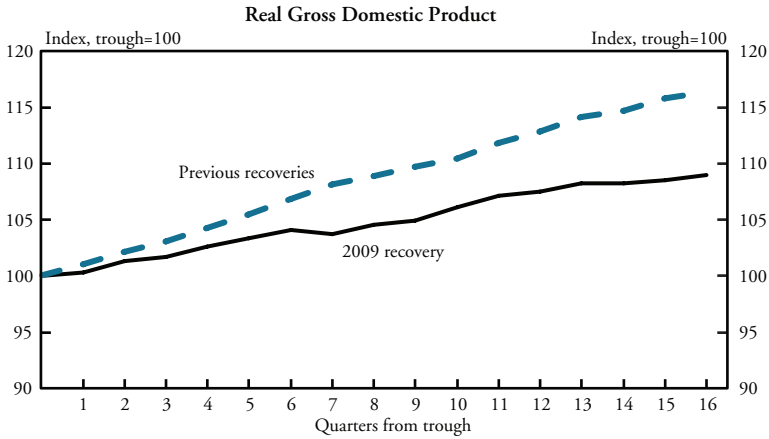
I.   THE MODERATE RECOVERY

The current recovery has been notably slower than previous recoveries on average, both in the aggregate and in the dynamics of spending on specific durable goods.

In the first four years of the current recovery, real GDP has increased only a little more than half as much as predicted by the average of previous recoveries. As shown by the black line in the top panel of Chart 1, over the 16-quarter period following the most recent business cycle trough (which occurred in mid-2009), real GDP rose steadily but gradually to a level only 9 percent higher by the end of the period (in mid-2013). In contrast, the blue dashed line in the chart shows real GDP rose 16.4 percent, on average, in the first four years of the previous recoveries.[1] The moderate pace of the recovery was unexpected by professional forecasters, who were repeatedly forced to revise their predictions downward for real GDP, in 2010, 2011, and 2012 (Dominguez and Shapiro). Similarly, the recovery of real personal consumption expenditures (PCE), which accounts for more than two-thirds of GDP, has been substantially slower in the current recovery than in previous recoveries (bottom panel of Chart 1).

The slow growth in consumer durable goods spending, a small but volatile component of GDP, has likely contributed to the moderate pace of the recovery. A broad measure of consumer durables spending includes four categories of spending, as shown in Chart 2: residential investment, PCE on motor vehicles and parts, PCE on recreational goods and vehicles, and PCE on furnishings and durable household equipment.[2] Combined spending on these goods was 9 percent of GDP in 2012. Despite being a relatively small share of GDP, durables expenditures contribute sizably to the business cycle because they are a volatile component of GDP. For example, since 1950 the standard deviations of the quarterly growth rate of durables PCE and residential investment are 4.1 and 4.9 times larger, respectively, than the standard deviation of real GDP growth.

Consumer durables expenditures are more sensitive to interest rates than other consumer spending (Bernanke and Gertler; Erceg and Levin; Monacelli). This is expected because most consumers use debt

Chart 1
REAL GDP AND REAL PCE
First Four Years of Economic Recoveries

Real Gross Domestic Product

Index, trough=100

Index, trough=100

Previous recoveries

2009 recovery

Quarters from trough

Real Personal Consumption Expenditures

Index, trough=100

Index, trough=100

Previous recoveries

2009 recovery

Quarters from trough

Notes: The line labeled "Previous recoveries" is the average of the recoveries from the recessions of 1981-82, 1990-91, and 2001. The trough of the current business cycle occurred in the second quarter of 2009.
Source: Bureau of Economic Analysis.
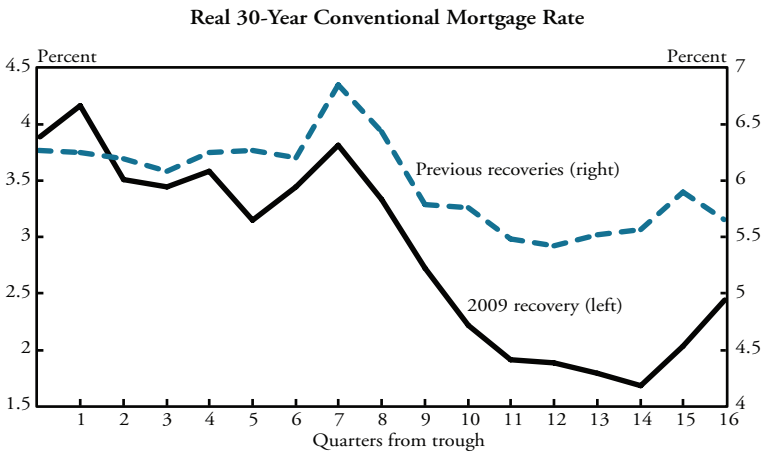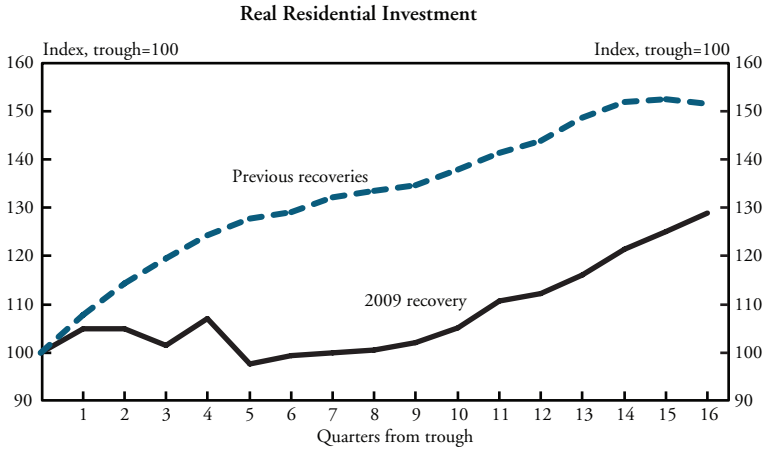
Chart 2
DURABLE GOODS SPENDING IN 2012
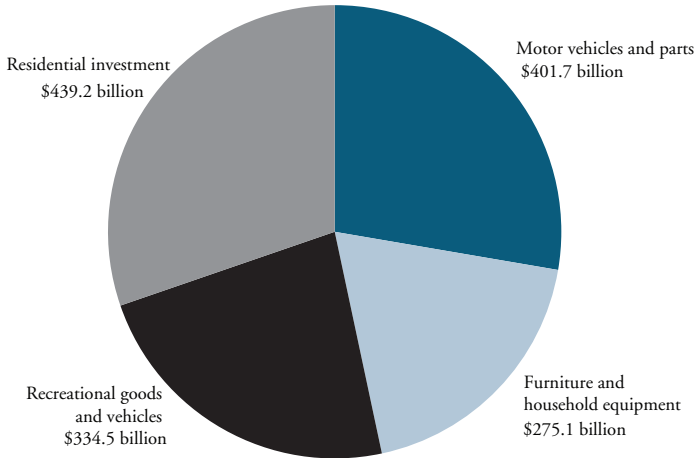
Source: Bureau of Economic Analysis.

to finance the purchase of big-ticket items. In 2010, the National Association of Realtors reported 91 percent of recent buyers of primary residences financed their home.[3] For consumers who bought new cars, only 22.5 percent had no lender on the title in the fourth quarter of 2012 (Zabritski). Interest rates, therefore, affect the cost of most durables purchases. Moreover, because durable goods are long-lived, consumers may time purchases to take advantage of low interest rates. For these reasons, interest rates are likely to affect purchase decisions. It is through this sensitivity to interest rates that durable goods purchases may affect cyclical fluctuations in real GDP.

The growth of residential investment has been slower in the current recovery than in the average of previous recoveries (top panel of Chart 3). Historically, residential investment rebounded vigorously at the onset of a recovery, leading to an average increase of 52 percent over the first four years in the recoveries from the recessions of 1981-82, 1990-91, and 2001. The current recovery, occurring after the housing bubble burst in the mid-2000s, has been markedly slower. Residential investment remained flat for the first two years after the business cycle trough in the second quarter of 2009 before rising 29 percent above the trough. In the first four years of the current recovery, residential

Chart 3
REAL RESIDENTIAL INVESTMENT
First Four Years of Economic Recoveries

Real Residential Investment

Index, trough=100   Index, trough=100

Previous recoveries

2009 recovery

Quarters from trough

Real 30-Year Conventional Mortgage Rate

Percent   Percent

Previous recoveries (right)

2009 recovery (left)

Quarters from trough

Notes: The line labeled "Previous recoveries" is the average of the recoveries from the recessions of 1981-82, 1990-91, and 2001. The trough of the current business cycle occurred in the second quarter of 2009.
Sources: Bureau of Economic Analysis, Federal Reserve Board.

investment grew just over half as much as in the past three recoveries. This slow pace of residential investment has occurred despite a faster than usual decline in real mortgage rates, which started falling notably two years into the current recovery (bottom panel of Chart 3).

Spending on motor vehicles and parts has also lagged the typical trajectory of past recoveries (top panel of Chart 4). Spending on vehicles remained almost flat a year after the economy bottomed, whereas it rose about 8 percent on average in the first year of previous recoveries.[4] However, motor vehicle spending subsequently expanded at a robust pace, and four years after the business cycle trough the rebound caught up with the average level of previous recoveries. This slight relative weakness in motor vehicle spending occurred despite a larger decline in the auto loan rate (bottom panel of Chart 4). The real auto loan rate in the first two-and-a-half years of the recovery declined at roughly the same pace as during previous recoveries, but fell more sharply in the next two quarters.
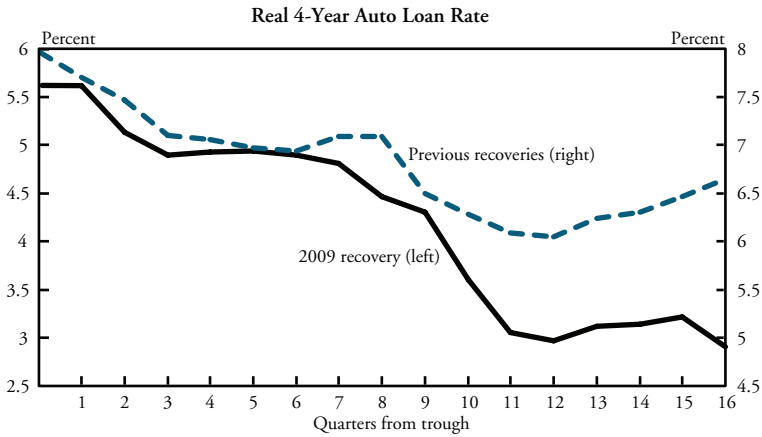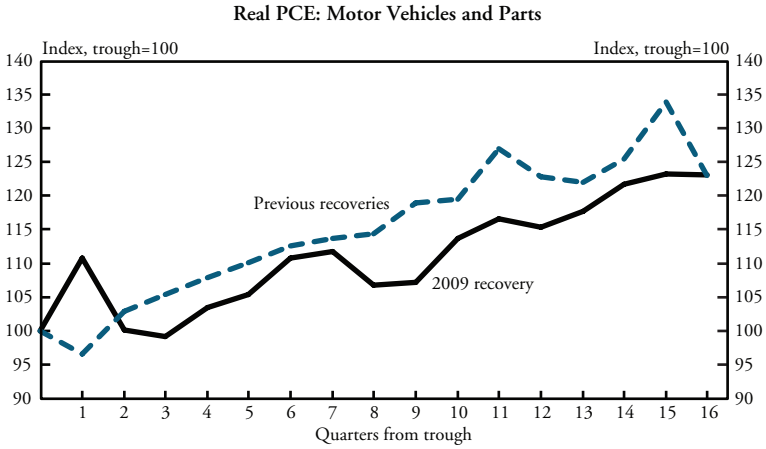
Not all categories of consumer durables have witnessed historically slow spending growth in the current recovery, although the interest-rate sensitivity of spending on such goods may still have declined. Recreational goods and vehicles as well as furniture and household equipment, categories that comprise a wide range of durables, made gains similar to those in previous recoveries (top panels of Charts 5 and 6). Recreational goods and vehicles include consumer electronics, musical instruments, motorcycles, bicycles and other sporting equipment. Household equipment includes both household appliances and tools and equipment for house and garden. Since purchases of such goods are often financed with short-term unsecured loans, the interest rate on credit cards is likely the most relevant interest rate. The real interest rate on credit cards fell faster in the current recovery than in previous ones, led by a sharp decline two years into the recovery (bottom panels of Charts 5 and 6). That spending did not grow faster despite a bigger decline in real interest rates suggests a reduced sensitivity of spending on these goods to interest rates.

II.   THE REDUCED INTEREST-RATE SENSITIVITY OF DURABLE GOODS SPENDING

The weak rebound in spending on consumer durables after the recession of 2007-09 can be partly attributed to a diminished sensitivity

Chart 4
REAL SPENDING ON MOTOR VEHICLES AND PARTS
First Four Years of Economic Recoveries

Real PCE: Motor Vehicles and Parts

Index, trough=100   Index, trough=100

Previous recoveries

2009 recovery

Quarters from trough

Real 4-Year Auto Loan Rate

Percent   Percent

Previous recoveries (right)
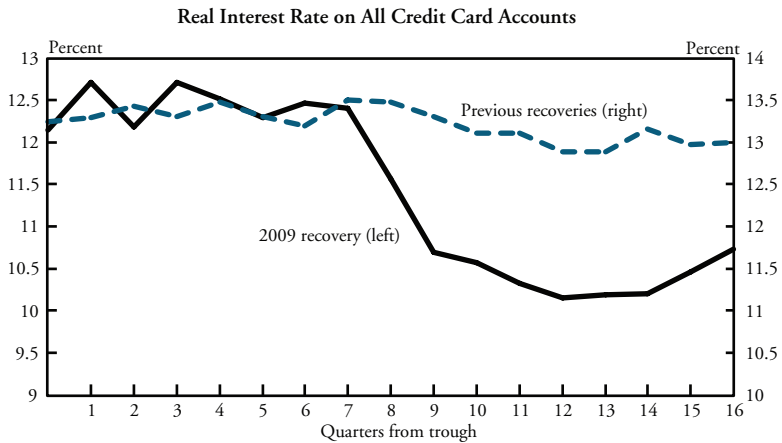
2009 recovery (left)

Quarters from trough

Notes: The line labeled "Previous recoveries" is the average of the recoveries from the recessions of 1981-82, 1990-91, and 2001. The trough of the current business cycle occurred in the second quarter of 2009.
Sources: Bureau of Economic Analysis, Federal Reserve Board.

Chart 5

REAL SPENDING ON RECREATIONAL GOODS AND VEHICLES

First Four Years of Economic Recoveries

Real PCE: Recreational Goods and Vehicles

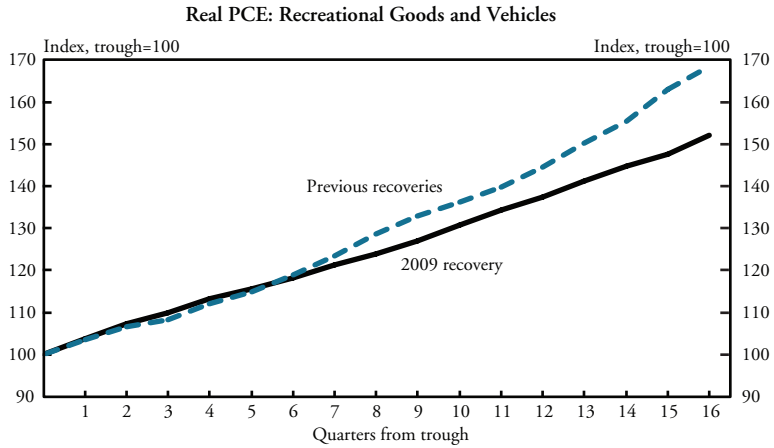

Real Interest Rate on All Credit Card Accounts

Notes: The line labeled "Previous recoveries" is the average of the recoveries from the recessions of 1981-82, 1990-91, and 2001. The trough of the current business cycle occurred in the second quarter of 2009.
Sources: Bureau of Economic Analysis, Federal Reserve Board.

Chart 6

REAL SPENDING ON FURNISHINGS AND DURABLE HOUSEHOLD EQUIPMENT

First Four Years of Economic Recoveries

Real PCE: Furnishings and Durable Household Equipment

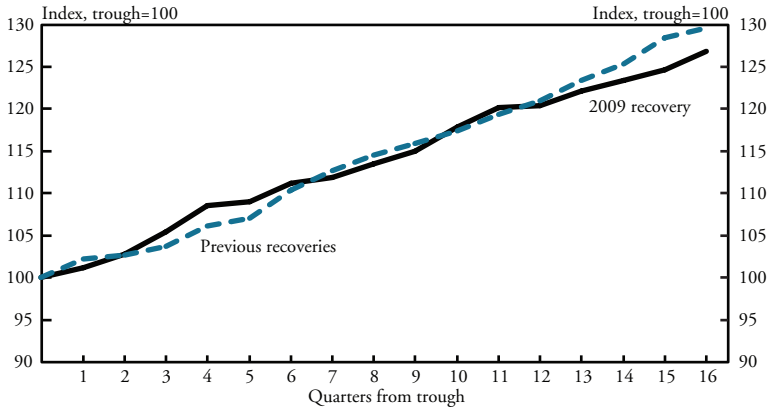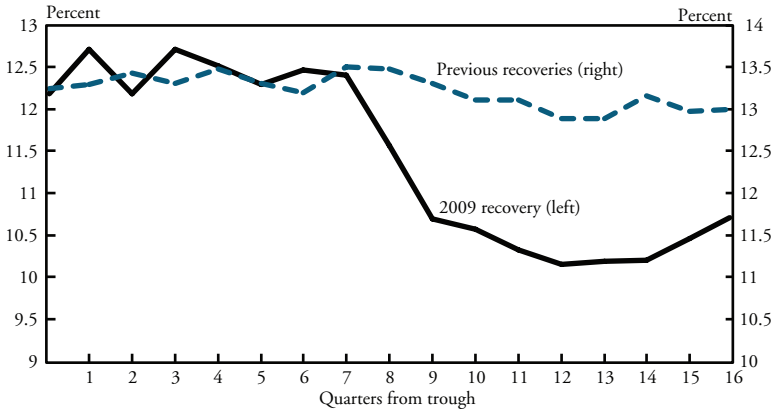**Real Interest Rate on All Credit Card Accounts**

Notes: The line labeled "Previous recoveries" is the average of the recoveries from the recessions of 1981-82, 1990-91, and 2001. The trough of the current business cycle occurred in the second quarter of 2009.
Sources: Bureau of Economic Analysis, Federal Reserve Board.

of such spending to interest rates. This section introduces a statistical model of the relationship between durables spending and interest rates and offers an estimate of the magnitude of the attenuation.[5]

A statistical model of durable goods spending

The statistical model relates real durables spending to three key factors: interest rates, lending standards, and income. Interest rates used in the model are those relevant to each type of durable good adjusted for inflation. Specifically, residential investment is related to the real 30-year conventional mortgage rate, motor vehicle spending is related to the real 48-month auto loan rate, and recreational goods and household goods are related to the real interest rate on credit cards for all accounts.[6] Because tightening lending standards may restrain durable goods spending even when interest rates are unchanged, the model also includes a measure of credit conditions. Finally, the model includes real disposable income, which is a key driver of aggregate spending. The model may be represented as:

$$\Delta C_{i,t} = \sum_{j=1}^{k} \beta_{1,j} \Delta R_{i,t-j} + \sum_{j=1}^{k} \beta_{2,j} \left(\Delta R_{i,t-j} D_t^e \right) + \sum_{j=1}^{k} \beta_{3,j} \left(\Delta R_{i,t-j} D_t^{ce} \right)$$

$$+ \sum_{j=1}^{k} \gamma_{1,j} \Delta S_{t-j} + \sum_{j=1}^{k} \gamma_{2,j} \Delta Y_{t-j} + \alpha_i + e_{i,t}$$

The variable $\Delta C_{i,t}$ represents the percentage change in real spending on durable good i (residential investment, motor vehicles PCE, recreational goods PCE, or household goods PCE) in quarter t. The variable $\Delta R_{i,t}$ is the quarterly change in the associated interest rate, which is adjusted by the four-quarter percent change in the core PCE price index. The interest-rate sensitivity of durable goods spending can be measured by the total impact of a change in real interest rates on durable goods spending. Because durable goods spending is affected by lagged interest rates in the model, the total impact is obtained as the sum of the coefficients of all the lagged interest rates. The sum is denoted by dropping the lag index on the coefficient; for instance, β_1 denotes the sum of the coefficients $\beta_{1,j}$ over the j lags of the interest rates. The index k is the lag length and takes the value of three quarters.[7] Because a change in the real interest rate is associated with a one-time change in the growth in durable goods spending, it has a lasting effect on the level of spending.

The interest-rate sensitivity of durable goods spending may differ in recessions and recoveries. To allow for this possibility, the recovery dummy variable D_t^e takes the value one in recoveries and zero in recessions. The interest-rate sensitivity of durable goods spending can then be different in recessions (β_1) than in recoveries ($\beta_1+\beta_2$), consistent with existing evidence that the responsiveness of durable goods spending is dampened in recessions (Berger and Vavra). In both cases, however, the coefficients (β_1 and $\beta_1+\beta_2$) are expected to be negative, reflecting the inverse relationship between durables spending and interest rates.

One of the main objectives of estimating the statistical model is to test the hypothesis that the interest-rate sensitivity of durables spending has declined during the recovery from the 2007-09 recession. This hypothesis is tested by introducing a current-recovery dummy variable (D_t^{ce}), which takes the value one from the third quarter of 2009 onward and is otherwise zero. A weakening in the sensitivity to interest rates of durable goods spending is reflected in a positive estimate of the coefficient β_3.

A number of explanatory variables are added to the model to control for variations in other key factors. The variable ΔS_t is the net percentage of banks that eased lending standards as reported in the Federal Reserve's Senior Loan Officer Opinion Survey (SLOOS).[8] The variable ΔY_t is the percentage change in real disposable personal income. The coefficients α_i capture durable good-specific fixed effects, which can reduce omitted variable bias. Any unexplained variation in durable goods spending is captured by the error term $e_{i,t}$. The model is estimated on the data from the first quarter of 1983 to the second quarter of 2013 to obtain magnitudes for the coefficient β_3—the decline in the interest-rate sensitivity of durables spending—and to draw inference about its statistical significance.

A possible drawback of this model is that it compares the interest elasticity during past recoveries in their entirety with only the first 16 quarters of the current recovery, despite the expectation of most forecasters that the current recovery will continue.[9] A comparison with the interest-rate sensitivity in the first 16 quarters of previous recoveries could be more relevant for two reasons.

First, as pent-up demand is satisfied during the earlier stages of a recovery, additional declines in interest rates may stimulate less

additional spending. Hence, comparing the experience of the first four years of the current recovery with the previous, longer recoveries could lead erroneously to the conclusion that special factors—such as tight credit conditions, a reduced appetite for credit, a reduced value of collateral, and heightened uncertainty—have not diminished the interest elasticity of spending in the current recovery.

Second, in the later stage of recoveries, real interest rates typically start to rise, restraining the growth in durable goods spending. But the special factors that may have reduced the interest-rate sensitivity of durable goods spending in the current recovery would no longer be expected to diminish the interest-rate sensitivity of durable goods spending once interest rates start rising.

For these reasons the interest-rate sensitivity in the current recovery is also compared with the first 16 quarters of past recoveries. Implementing this comparison requires inclusion of an additional recovery dummy variable, so that there is one for the first 16 quarters (D_t^{e1}) and one for the remainder of the recovery (D_t^{e2}). The benchmark model can then be written as:

$$\Delta C_{i,t} = \sum_{j=1}^{k} \beta_{1,j} \Delta R_{i,t-j} + \sum_{j=1}^{k} \beta_{2,j} \left(\Delta R_{i,t-j} D_t^{e1} \right) + \sum_{j=1}^{k} \beta_{3,j} \left(\Delta R_{i,t-j} D_t^{ce} \right) + \sum_{j=1}^{k} \beta_{4,j} \left(\Delta R_{i,t-j} D_t^{e2} \right)$$

$$+ \sum_{j=1}^{k} \gamma_{1,j} \Delta S_{t-j} + \sum_{j=1}^{k} \gamma_{2,j} \Delta Y_{t-j} + \alpha_i + e_{i,t}$$

As before, the estimated coefficient $\beta_1 + \beta_2$ measures the relevant interest-rate sensitivity of durable goods spending in recoveries and β_3 captures any attenuation in the current recovery.

Estimation results

The estimation results show evidence of an attenuation of the interest-rate sensitivity of durables spending in the current recovery (Table 1). The estimated coefficient β_1 can be interpreted as the interest-rate semielasticity of durables spending in recessions (that is, the percent increase in durable goods spending associated with a 1-percentage-point change in the real interest rate). The elasticity is slightly negative but not statistically significant, pointing to a weak association between interest rates and durable goods spending in

Table 1
ESTIMATION RESULTS

Economic recoveries	Interest sensitivity in recessions (β_1)	Interest sensitivity in recoveries ($\beta_1 + \beta_2$)	Change in current recovery (β_3)	Credit conditions (γ_1)	Disposable personal income (γ_2)	Adjusted R^2
Full recoveries	-1.44	-12.45***	15.95**	0.24***	0.62*	0.199
First four years	-1.80	-18.69***	20.66***	0.25***	0.70**	0.204

* Significant at 10 percent level
** Significant at 5 percent level
*** Significant at 1 percent level
Note: The coefficients β_m, γ_m denote, respectively, the sum of the coefficients $\beta_{m,j}$, $\gamma_{m,j}$ for $j = 1, \ldots, k$.

recessions. The sum of the estimated coefficients $\beta_1 + \beta_2$ measures the interest-rate semielasticity of durables spending in recoveries and is negative and statistically significant, confirming as expected that, during economic recoveries, consumption spending is stimulated by lower interest rates.[10] The elasticity of -18.69 in the second row means that in the first four years of past recoveries, a 1-percentage-point decline in the real interest rate on average boosted the annual growth in real durables spending by 18.69 percent across the different types of durable goods.[11]

In the current recovery, however, the interest-rate sensitivity of durables spending has diminished. The estimated coefficient β_3 is positive and statistically significant, indicating that the interest-rate sensitivity of durable goods spending has weakened in the current recovery.[12] As a result of this attenuation, the estimated interest elasticity in the current recovery is no longer statistically significant and the point estimate is slightly positive ($\beta_1 + \beta_2 + \beta_3$) rather than negative as would be expected.[13]

The regression results provide a measure of the extent to which the attenuation of the interest-rate sensitivity of durables spending has restrained durable goods spending in the current recovery. In the four years since the second quarter of 2009—a period spanning 16 quarters—the average real interest rate across the different durable goods categories has declined about 1.5 percentage points, or about 0.1 percentage point per quarter. With an interest elasticity of almost zero, however, the decline in interest rates has had little or no effect on durables spending. The estimated elasticity for the previous recoveries indicates that a 0.1-percentage-point decline in real interest

rates per quarter provided a boost of almost 1.9 percentage points (one-tenth of 18.69) to the average annualized quarterly growth rate of durable goods.

This potential 1.9-percentage-point boost per quarter in the growth of durables spending would have constituted a considerable increase. The average quarterly growth rate of durables spending over the four-year period starting in the second quarter of 2009 was 7.9 percent.[14] A 1.9-percentage-point boost would thus have raised that growth rate to 9.8 percent.

In addition to interest rates, looser credit conditions or an increase in real disposable personal income also boost durable goods spending. The estimated effects of these factors are positive and statistically significant. The coefficient γ_1 indicates that, on average, a 1-percentage-point rise in the net percentage of banks willing to make loans to consumers, compared with three months earlier, increases annualized durable goods spending by 0.25 percentage point.[15] The estimated elasticity of personal disposable income (γ_2) indicates that, on average, a one percent increase in personal disposable income increases durable goods consumption by 0.70 percent.

III. IMPLICATIONS FOR THE ECONOMIC RECOVERY AND MONETARY POLICY

A diminished interest-rate sensitivity of durable goods spending to a reduction in interest rates has likely restrained the current economic recovery, as declining interest rates provided less stimulus to spending than in previous recoveries. A counterfactual exercise indicates that the impact on GDP growth has been limited overall, but has been increasing throughout the first four years after the recession ended.

Effect of the reduced interest-rate sensitivity on the economic recovery

Just as interest rates affect consumer spending on durable goods, they can affect the pace of the economic recovery. In previous recoveries, a decline in real interest rates spurred durable goods expenditures, as the statistical model in Section II implies. Real interest rates fell substantially during the current recovery, but the effect on durable goods spending was limited due to the diminished sensitivity of this spending to changes in interest rates.

A two-step counterfactual exercise can assess the extent to which GDP growth has been restrained, as a result of this diminished sensitivity of durable goods spending to interest rates. The first step calculates the growth rate of durables spending and its contribution to GDP growth in the current recovery.[16] In the second step, the estimated attenuation of the interest-rate sensitivity in the current recovery is set counterfactually at zero ($\beta_3=0$). The (benchmark) model with β_3 set at 0 is then used to generate counterfactual growth rates of the spending on each type of durable good based on the observed changes in interest rates. These growth rates imply a counterfactual growth rate of total durables spending and a counterfactual contribution of durables spending to GDP growth that would have prevailed if the interest-rate sensitivity of durables spending had remained unchanged from previous recoveries.

The counterfactual exercise implies that, when accounting for the moderate pace of the current recovery, the lower path of durable goods expenditures that has resulted from the diminished interest-rate sensitivity is of limited size. Quarterly real GDP growth averaged 2.2 percent at an annualized rate from the third quarter of 2009 to the second quarter of 2013. During this period, growth in spending on residential investment and the three types of durables PCE—motor vehicles, recreational goods, and household goods—contributed a 0.62 annualized percentage point to quarterly real GDP growth.[17] If the interest-rate elasticity had remained unchanged at its magnitude of previous recoveries, the annualized contribution to quarterly real GDP growth could have been 0.76 percentage point on average, adding 0.14 percentage point to quarterly real GDP growth.

The counterfactual growth contribution, although of limited magnitude overall, would have increased progressively during the first four years of the current recovery. Interest rates in fact showed a significant, rapid decline in the second and third years of the recovery (Charts 3-6). The accelerating decline in the interest rates, combined with the lagged estimated impact of such a decline on durable goods spending, implies that the contribution to GDP growth would have increased as the recovery progressed. Chart 7 shows by how much the counterfactual contribution of durable goods spending to real GDP growth would

Chart 7

DIFFERENCE BETWEEN THE COUNTERFACTUAL AND ACTUAL CONTRIBUTION OF DURABLE GOODS SPENDING TO REAL GDP GROWTH
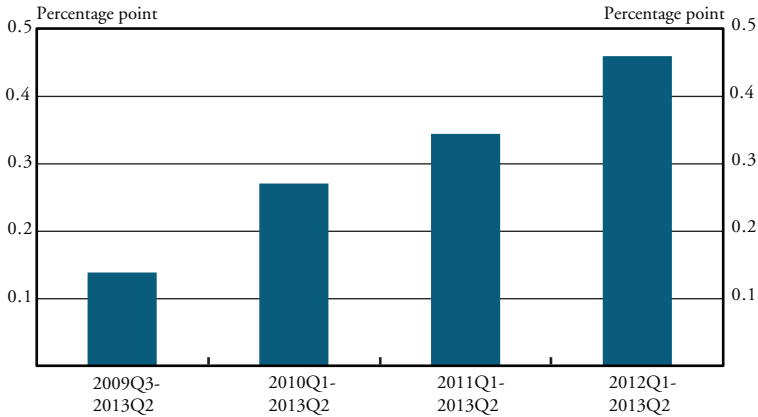
Note: The counterfactual growth contribution is obtained by assuming no attenuation of the interest-rate sensitivity of durable goods spending.

have exceeded the actual contribution in different periods of the current recovery.

The counterfactual contribution across the four years of the recovery, overall, would have been higher than the actual contribution and the difference between the two would have increased in the latter part of the period. For the period from the first quarter of 2012 to the second quarter of 2013, real GDP growth slowed to an annualized average of 1.8 percent, but the growth contribution of durable goods spending increased to 0.80 percentage point. In this period, the difference between the counterfactual and the actual growth contribution was 0.45 percentage point per quarter. That is, from the first quarter of 2012 to the second quarter of 2013, the contribution of durable goods spending to quarterly real GDP growth would have been an estimated 1.25 percentage points, 0.45 percentage point higher than the actual contribution, in the absence of the weakening in the interest-rate sensitivity of durable goods spending.

Although this counterfactual exercise estimates the direct effects of the attenuation of interest-rate sensitivity on the growth in durable goods and real GDP, it does not capture possible indirect effects. These include multiplier effects, by which a stronger path of durables

spending generates more jobs and income in the economy and, in turn, stimulates other spending. Moreover, it does not take into account that realized interest rates might have followed a different path, for instance because monetary policy could have been less accommodative. The indirect effects of the attenuation of the interest-rate sensitivity of durables spending also include substitution toward or away from non-durable consumption goods. The total effect of the attenuation may, therefore, have been larger or smaller than the direct estimate suggests. Nonetheless, the counterfactual exercise could provide a first-order approximation of the total effect, especially if the indirect adjustments build up over a longer time than the direct effects.

Possible implications for monetary policy

The finding of diminished interest-rate sensitivity in the current recovery indicates that the transmission of monetary policy has been impaired. In considering the implications of the diminished interest-rate sensitivity for monetary policy, a key question is whether the factors behind the decline are related to the cyclical economic downturn or are more structural.[18]

One way to stimulate spending despite the impaired transmission of monetary policy is to reduce interest rates below the level that would otherwise be desirable. The Federal Reserve reduced its main interest rate instrument, the federal funds rate target, effectively to zero by the end of 2008 to combat the recession. As the pace of the subsequent recovery has remained disappointing, the Federal Reserve has turned increasingly to unconventional monetary policy tools to put additional downward pressure on interest rates and to more broadly foster improved financial conditions. Despite this unprecedented degree of monetary policy accommodation, the pace of the recovery has been slower than expected by professional forecasters.

However, the beneficial impact of the accommodative monetary policy stance on the economy could be greater than the direct impact of lower interest rates on aggregate spending. The policy stance could, over time, also provide substantial indirect support to the economy by mitigating the likely driving forces behind the diminished interest-rate sensitivity of durable goods spending. The likelihood of this scenario

depends on whether the driving factors are related to the cyclical economic downturn or are more structural.

If the interest-rate sensitivity has declined only temporarily due to the severe economic downturn, then policy actions aimed at strengthening the recovery are likely to help restore interest-rate sensitivity, in turn making such actions more effective at spurring spending. For instance, household spending may have become less responsive to low interest rates in recent years because households' access to credit was limited during and after the financial crisis. Banks tightened lending conditions during the crisis, while the unprecedented decline in home values reduced the value of collateral. Subsequently, heightened uncertainty about the economic outlook may have prevented a quick easing of credit conditions after the crisis. Uncertainty typically rises during recessions but has remained particularly high during the recent recovery (Baker and others). Moreover, households may have become more risk averse and less willing to borrow following the surge in unemployment and sharp wealth losses during the recession. Heightened uncertainty about future incomes may have led to reluctance to spend on big-ticket items. Combined, these factors may have temporarily reduced the sensitivity of durables spending to interest rates. If so, interest-rate sensitivity may rise again as the economic recovery progresses, and the accommodative monetary policy stance can contribute more to the growth in spending.

The decline in the interest-rate sensitivity of durable goods spending could turn out to be persistent, however, lasting well beyond the current business cycle for a variety of reasons. Financial sector reform could lead to the adoption of high credit standards. The increased reluctance by households to hold debt, after having gone through a difficult process of deleveraging in recent years, may persist; it could represent a permanent shift in attitudes. Uncertainty, while typically higher during economic downturns, may also linger due to the prospect of a drawn-out process of entitlement reform and other major regulatory changes. In that case, any additional downward pressure on interest rates would likely provide only limited stimulus for durable goods expenditures.

IV.   CONCLUSION

The diminished sensitivity of durable goods spending to falling interest rates may help explain why the pace of the current recovery has been only moderate. Durable goods spending has been significantly less responsive to interest rates in the current recovery than in previous recoveries. As the current recovery has progressed, the decline in interest-rate sensitivity has likely shaved an increasingly large portion from real GDP growth.

Although this decline has likely reduced the effectiveness of the Federal Reserve's monetary policy, the accommodative monetary policy stance still could provide substantial support to the economic recovery over time depending on the driving factors behind the diminished sensitivity of durable goods spending to interest rates. If the driving factors—such as households' reduced access to credit or their heightened uncertainty about future income—are tied to the cyclical economic downturn, then accommodative monetary policy over time could help mitigate them. However, if the driving factors stem from structural changes in the economy that could persist long into the future, then accommodative monetary policy is unlikely to affect them, and the effectiveness of policy accommodation could likely remain reduced.

ENDNOTES

[1]The three previous recoveries are from the recessions of 1981-82, 1990-91, and 2001. If the recovery of the 1980s was excluded the lines in Chart 1 would be closer together. Recoveries before the 1980s are excluded for consistency with the econometric analysis in Section II. Although a complete data set is available beginning with the recovery from the recession of 1973-75, the analysis excludes that recovery because, unlike the subsequent recoveries, it was characterized by rising real interest rates. The analysis also excludes the brief, one-year recovery after the recession of 1980, which can be viewed as part of a long downturn that spans the recessions of 1980 and 1981-82.

[2]Other durable goods distinguished in the national accounts, such as luggage, jewelry and watches, are omitted in the analysis because such purchases typically are not financed and, therefore, less sensitive to interest rates.

[3]See *http://economistsoutlook.blogs.realtor.org/2011/06/21/percent-of-home-financed-by-type-of-home-purchased/.*

[4]The spike in the first quarter after the trough is associated with the federal government's "cash for clunkers" program in the third quarter of 2009.

[5]Kahn studies the interest-rate sensitivity of the U.S. economy in previous decades and presents evidence of a decline in interest-rate sensitivity in the 1980s compared with the prior quarter-century.

[6]Data on conventional 30-year mortgages rates come from the Federal Reserve Board's H.15 release. Data on interest rates for 48-month new car loans and all credit card accounts come from the Federal Reserve Board's G.19 release. All interest rates are converted to real rates by subtracting the four-quarter percent change in the PCE price index excluding food and energy (core PCE).

[7]The lag length is determined by the Akaike information criterion.

[8]Data from the SLOOS are provided by Haver Analytics (series FWILL). They are available from the third quarter of 1966 and measure the percent change in banks' willingness to lend to consumers. It is calculated as the number of banks more willing to make loans relative to three months earlier less the number of banks less willing to lend, divided by the total number of banks in the survey. An alternative measure of broader financial conditions is the Federal Reserve Bank of Chicago's adjusted National Financial Conditions Index, a weighted average of many variables that does not include the interest rates discussed above. The Chicago Fed index is highly correlated with the SLOOS index and yields very similar regression results.

[9]The Blue Chip consensus in August 2013 called for Q4/Q4 GDP growth of 1.9 percent in 2013 and 2.8 percent in 2014. The recoveries following the recession of 1981-82 have lasted 32 quarters on average.

[10]Moreover, the estimated coefficient β_2 is significant at the 5-percent level in the benchmark model with a dummy variable for the first four years of a recovery, confirming that durable goods spending is more interest-rate sensitive during recoveries than during recessions.

[11]Estimated over complete recoveries (spanning the entire period of each recovery, rather than just the first four years in each case), the elasticity is smaller but still significant (-12.45), indicating that interest-rate changes have a smaller impact on spending in the later stages of a recovery than in the first four years.

[12]The weakness of residential investment in the aftermath of the housing bubble does not drive the result of an attenuation of the interest-rate sensitivity of durables in the current recovery. Even if residential investment is excluded from the data, the attenuation coefficient in the benchmark model is significant at the 5-percent level.

[13]Average real GDP growth in the first four years following the recession of 1981-82 was substantially higher than in any of the subsequent recoveries. Thus it is possible that the exceptional strength of the recovery of the 1980s, rather than the exceptional weakness of the current recovery, accounts for the change in the interest-rate sensitivity of durable goods spending. However, this hypothesis is not supported by the data. Even when the data set is restricted to begin in the third quarter of 1991, an attenuation of the interest-rate sensitivity of durable goods spending occurs in the current recovery (the attenuation is statistically significant at the 5-percent level in the benchmark model and the alternative model).

[14]This approximate growth rate was obtained by weighting the quarterly growth in real spending for each durable good by its nominal share in total durable goods spending in the previous quarter.

[15]The estimated coefficient on the measure of credit standards captures the impact of a change in credit standards on spending at a given level of interest rates. Likewise, the estimated coefficient on interest rates captures the interest rate semielasticity of spending at a given level of credit standards. Thus, even after controlling for changes in credit standards the interest rate semielasticity may decline when the level of credit standards is high.

[16]The growth rate of total durables spending is approximated by adding the individual growth rates, weighted by their lagged nominal share of spending in total durables spending. The contribution of durables spending to real GDP growth is approximately the growth rate of durables spending, weighted by the lagged nominal share of durables spending in GDP.

[17]The growth contribution of durable goods spending averaged 1.01 percentage points during the 16 quarters that followed each of the business cycle troughs of 1982, 1991, and 2001.

[18]Drawing rigorous implications for monetary policy would require analyzing a structural economic model and is beyond the scope of this article.

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