

**Finance and Economics Discussion Series  
Divisions of Research & Statistics and Monetary Affairs  
Federal Reserve Board, Washington, D.C.**

**How Much Are Car Purchases Driven by Home Equity  
Withdrawal? Evidence from Household Surveys**

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**2015-106**

Please cite this paper as:

McCully, Brett, Karen M. Pence, and Daniel J. Vine (2015). "How Much Are Car Purchases Driven by Home Equity Withdrawal? Evidence from Household Surveys," Finance and Economics Discussion Series 2015-106. Washington: Board of Governors of the Federal Reserve System, <http://dx.doi.org/10.17016/FEDS.2015.106>.

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# **How Much Are Car Purchases Driven by Home Equity Withdrawal? Evidence from Household Surveys**

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November 9, 2015

## **Abstract**

We use data from three nationally representative surveys to document that very few households report purchasing cars with home equity lines of credit or the proceeds from a cash-out refinancing. Households that do report using these sources of funds to purchase cars tend to be affluent and appear to have ample access to credit. These findings suggest that an easing of home-equity borrowing constraints was not the major factor driving any relationship between home prices and car sales during the housing boom in the 2000s. We discuss other mechanisms that might underlie this relationship.

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<sup>1</sup> We are grateful to Aditya Aladangady, Neil Bhutta, Laura Feiveson, Ben Keys, Chris Kurz, Geng Li, and Norm Morin for helpful comments.

## Introduction

The value of the U.S. housing stock increased by about \$14 trillion, or 150 percent, from the beginning of the housing boom in 1998 until its peak in 2006. Households are estimated to have extracted about \$2.8 trillion of this wealth through home equity loans and cash-out refinancing (Greenspan and Kennedy, 2008).<sup>2</sup> This extraction was widespread: more than ten percent of homeowners extracted equity in each year during the 1999-2010 period (Bhutta and Keys, 2015). The popular perception is that homeowners used some of this extracted home equity to purchase cars (see, for example, Harney, 2015, and Singletary, 2009).<sup>3</sup> This perception is consistent with research that has shown a link between car sales and the rise and fall of house prices during the 2002 to 2009 period, particularly in zip codes where a large share of the residents had high debt burdens or low incomes (Mian, Rao, and Sufi, 2013; Mian and Sufi, 2014).

In this note, we use data from three nationally representative consumer surveys to explore the share and characteristics of households who report purchasing cars with home equity lines of credit or the proceeds from a cash-out refinancing. We document that very few households report purchasing cars by these means, and that this pattern is consistent across the three surveys. In addition, we find that the households that do report purchasing cars with home equity tend to be fairly affluent. We conclude this note by discussing mechanisms other than outright purchases with home equity that might explain the relationship between auto sales and house prices.

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<sup>2</sup> The increase in house values is from the Federal Reserve's "Financial Accounts of the United States," Available at <http://www.federalreserve.gov/releases/z1/>. Estimates of home equity extraction from Greenspan and Kennedy (2008) have been updated to reflect revised data provided by the authors.

<sup>3</sup> We use term "car" to refer to passenger cars and light trucks, which include vans, pickups, and utility vehicles.

## Home Equity Extraction and Car Purchases in Household Surveys

Our analysis is based on three household surveys: The Reuters/University of Michigan Survey of Consumers (Michigan Survey), the Federal Reserve's Survey of Consumer Finances (SCF), and the Bureau of Labor Statistics' Consumer Expenditure Survey (CE). All three surveys allow us to estimate the share of car purchases funded with home equity, although the underlying survey questions, as described below, differ considerably.

We consider a car purchase as directly funded with home equity if the survey respondent bought a new or used car and indicated that home equity was a source of funding. As we discuss in the conclusion, home equity extraction might still facilitate car purchases even if it is not identified as a direct source of funding. For example, equity extraction might ease other pressures on a household's balance sheet and make it easier for a household to come up with funds for a down payment. Our estimates will not consider such purchases as directly funded by home equity.

**Michigan Survey.** The Michigan survey data come from a special module that the Federal Reserve has sponsored three times per year since 2003. Survey respondents are asked if they purchased a car in the previous six months, and if so, whether they borrowed money to purchase the car or paid cash. If the answer is "cash," respondents are asked whether the source of the cash was savings or investments, a home equity loan, a mortgage refinancing, or "somewhere else."<sup>4</sup> Respondents can cite multiple sources of the cash, although this is rare. We define the car purchase as a home equity extraction if the respondent identifies a home equity

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<sup>4</sup> According to the Michigan survey staff, some respondents who purchase autos with home equity appear to consider these purchases as funded with "borrowed" money rather than "cash." If so, the survey instrument will miss some car purchases funded by home equity extraction. The survey staff catch many of these instances and recode the answers as cash/home equity. We do not think that this aspect of the question structure leads to a significant understatement of home-equity funded purchases because the Michigan results are in line with the results from the other two surveys, which have different question structures.

loan or mortgage refinancing as the source of the cash. We define the purchase as an auto loan if the respondent indicates that a car was purchased with borrowed money. We define all other purchases as cash/other. The data span the 2003 to 2014 period and include 2,388 purchases of new and used cars.

**CE.** In the CE, households are asked about the vehicles that they currently own. We focus on cars purchased in the survey year. For each car owned, households are asked whether any portion of the purchase price was financed.<sup>5</sup> If so, they are asked whether the source of credit was a home-equity loan. Households are not asked if the car was purchased with the proceeds from a cash-out refinancing, and so we will miss these purchases.

We define the purchase as a home equity extraction if the respondent identifies a home equity loan as a source of credit. We define the purchase as an auto loan if the respondent financed the purchase but does not indicate they used a home equity loan. We define all other purchases as cash/other. The data cover the 1997 to 2012 period and include 28,290 car purchases.

**SCF.** In the SCF, like in the CE, households are asked about the cars that they own at the date of the interview. We focus on cars that were likely purchased recently. For used cars, the date of purchase is known from a survey question, and we select cars purchased during the survey year. For new cars, we must deduce the date of purchase, because the survey asks only about the model year of the car. We define a new car as recently purchased if its model year corresponds to the survey year or the subsequent year. Most new car purchases covered by this definition will have occurred during the survey year, although some of these purchases will have

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<sup>5</sup> The CE asks households a separate set of questions about the vehicles they purchased during the reference period. Our analysis is based on the set of questions about vehicles owned (in the EOVB files) because these data include questions about how the purchases were financed.

occurred during the previous calendar year. The reason is that new models are introduced during the previous calendar year and are not fully phased out until the subsequent calendar year. For the same reason, our definition will miss the small volume of new cars still being sold from earlier model years.<sup>6</sup>

The definitions described above yield a sample of car purchases from the SCF that have occurred mostly within a year of the interview. Taking advantage of this relatively short look-back window, we match households' recent car purchases to the answers from separate questions asked about outstanding auto loan balances and recent activities with home mortgages. Unlike the CE, the SCF does not ask households whether their cars were purchased with home equity, and so we infer these purchases when an SCF respondent both appears to have purchased a car recently and reports having used the proceeds from a recently originated cash-out refinancing, second or third lien, or HELOC to buy a car.<sup>7</sup> If a household does not appear to have used home equity but does report having an auto loan outstanding, we assume the car was purchased with an auto loan. All other purchases are defined as cash/other.

One potentially important consequence of using the definitions described above is that households who buy the newest models early in the model year are likely over represented in our

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<sup>6</sup> In the 2013 SCF, for example, our definition would include new cars from the 2013 or 2014 model years, about 75 to 80 percent of which likely occurred in 2013 and 20 to 25 percent in 2012. Our definition misses new cars from the 2012 or earlier model years that were purchased in 2013, a volume that is likely only about 3 percent of the new-car sales in our sample. These estimates are based on monthly sales by model year from JD Power and Associates and are adjusted to reflect the fact that SCF interviews are conducted from April of the survey year to the following February. Dettling et al (2015) document that auto sales in the SCF line up well with the NIPA aggregates once the timing and model-year issues are taken into account.

<sup>7</sup> We consider the origination of a cash-out refinancing or second lien to be recent if it occurred in the survey year or in the year prior. We include the prior year because, as described earlier, our sample of recent vehicle purchases likely includes some cars purchased in the previous year, and because there may be a lag between the cash-out refinance and the purchase of the car. We assume that a HELOC funded a recent car purchase if the proceeds of the most recent draw were used for a car. The SCF does not ask when that draw took place; depending on the timing, our definition could either understate or overstate the share of vehicle purchases funded with HELOCs.

SCF sample of new-car purchases. And, as noted earlier, we also miss a few purchases of older car models. All told, these factors may bias upward some of the sample statistics on new-car buyers, such as average income and wealth, because new car prices decline over the course of the model year (Aizcorbe, Bridgman, and Nalewaik, 2009) and can drop when newer models are introduced.<sup>8</sup> These price dynamics suggest that households who buy new cars immediately upon the model release are likely more affluent than those who purchase later in the model year.

We use data from the 2004, 2007, 2010, and 2013 surveys, which include 3,929 purchases of new and used cars.

### **Frequencies of Car Purchases Funded with Home Equity in the Household Surveys**

As shown in Table 1, households rarely report using home equity to purchase cars. Results from the three surveys suggest that home equity extraction funds about 1 to 2 percent of both new- and used-car purchases. These estimates are quite similar across the three surveys, despite the different ways the questions are structured. If we run these tabulations on the SCF and CE using data for homeowners only, as renters cannot use home equity to purchase cars, the shares of car purchases funded with home equity are only about ½ percentage point higher, on average, than for the general population.<sup>9</sup> Instead, households typically fund new car purchases with auto loans, which finance around 70 percent of new-car purchases and a somewhat smaller share of used-car purchases—around 40 to 50 percent. Cash or some other source of funds are

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<sup>8</sup> The SCF and CE samples also miss vehicles purchased during the calendar year but sold (or scrapped) before the date of the survey. We assume, given our short look-back period, that this bias is small.

<sup>9</sup> In the CE: Home equity was used by 1.0 percent of homeowners who bought a new car and 1.3 percent who bought a used car. In the SCF: Home equity was used by 2.7 percent of homeowners who bought a new car and 2.5 percent who bought a used car.

used to finance the remaining 25 percent or so of new-car purchases and 50 to 60 percent of used-car purchases.<sup>10</sup>

**Table 1. Percent of Cars Purchased with Each Source of Funds**

Funded with:	New cars			Used cars		
	Michigan Survey	SCF	CE	Michigan Survey	SCF	CE
Home equity	1	2.3	0.9	2.6	1.6	0.6
Auto loan	72	69	75	53	40	44
Cash/other	27	28	24	44	58	56
<i>Memo:</i>						
N	830	1,864	14,385	1,062	2,118	36,718

Note: Table excludes leases. Estimates from the Michigan Survey are based on data from 2003 to 2014. Estimates from the SCF are based on data from 2004, 2007, 2010, and 2013. Estimates from the CE are based on data from 1997 to 2012. Figures in the table are calculated with sample weights provided by each survey.

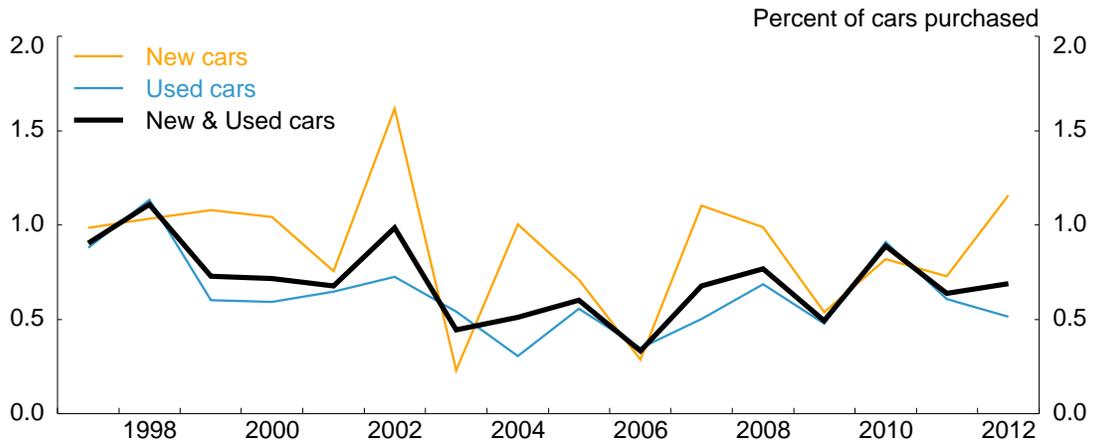
Although home equity appears to directly fund only a very small share of car purchases, its use might have picked up during the housing boom and then dropped off during the financial crisis. To assess this possibility, we calculated from the CE the share of car purchases funded by a home equity loan for each year between 1997 and 2012 (figure 1). The share of cars purchased with home equity does not appear to have changed much over this period; it averaged 0.7 percent both during the housing boom (1997 to 2006) and after it (2007 to 2012).<sup>11</sup>

Finally, we examine whether households who purchase cars with home equity tend to have levels of income, wealth, and education, and experiences with access to credit, that are

<sup>10</sup> The shares presented in table 1, which are based on transaction counts, change only slightly if they are instead based on dollars spent. SCF tabulations indicate that the average purchase price was around \$25,000 for cars funded with auto loans or home equity, and \$29,000 for cars purchased with cash; the median values were even closer at \$24,000 or \$25,000 for all three funding methods.

<sup>11</sup> The pattern does not appear to be substantively different for households identified in the CE as living in California, Arizona, Nevada, and Florida (states with particularly high rates of home-price appreciation during the housing boom). The share of cars purchased with home equity in these states averaged 0.4 percent from 1997 to 2006 and 0.8 percent from 2007 to 2012. These tabulations are based on smaller samples than the overall shares.

**Figure 1: Share of Cars Purchased with a Home Equity Loan**



Note: Authors' calculations based on data from the Consumer Expenditure Survey. Figure shows the percent of car purchases for which the respondent cites a home equity loan as a source of financing. Shares are calculated with sample weights.

different from households who purchase cars with auto loans or with cash or other means (table 2). We limit the sample to homeowners who purchase new cars so that our results do not simply reflect differences between homeowners and renters, or between new-car purchasers and used-car purchasers. Homeowners who purchase a new car with home equity have more net worth and more liquid assets (defined as checking, savings, money market, and call accounts at brokerages) than homeowners who use auto loans, but have less net worth and liquid assets than those who use cash. Households who use home equity are also more likely than those who use auto loans to be stockowners and are less likely to be credit constrained, as measured by whether the household indicated that it had not applied for credit because of a fear of being turned down. Car purchasers who use cash are significantly older than those who purchase cars with other means. Although the sample of homeowners who use home equity to purchase cars is quite small, all of these differences are statistically significant.

The comparisons in table 2 are inconsistent with the idea that increases in house prices boost auto spending by alleviating home-equity borrowing constraints (also known as the collateral channel, as houses are the main source of lending collateral for most families). Rather,

households who use home equity loans to purchase autos appear to be quite affluent and do not appear to lack access to credit. If increasing house prices do cause these households to purchase more cars, the wealth effects seem to be more important than the alleviation of borrowing constraints.

**Table 2: Summary Statistics for Homeowners who Buy New Cars**

Summary statistic:	Method of funding new car purchase		
	Home equity	Auto loans	Cash/other
Median family income (2013 dollars)	114,026	99,909	129,204
Median net worth (2013 dollars)	598,906	291,000 <sup>***</sup>	1,057,283 <sup>***</sup>
Median liquid assets (2013 dollars)	21,909	10,500 <sup>***</sup>	42,134 <sup>**</sup>
Own stock directly (Percent)	39	24 <sup>*</sup>	48
College graduate (Percent)	43	43	54
Avg. age of household head (Years)	50	48	60 <sup>***</sup>
Turned down for credit in past five years (Percent)	15	20	7
Did not apply b/c worried turned down for credit (Percent)	2	10 <sup>***</sup>	2
<i>Memo:</i>			
N	29	686	992

Note: Authors' calculations from Survey of Consumer Finances data (2004, 2007, 2010, and 2013). Figures are calculated with sample weights. Figures in 2013 dollars are calculated with the Consumer Price Index from the Bureau of Labor Statistics. Summary statistic is significantly different from that for those who purchase a car with home equity at the \*10 percent \*\*5 percent \*\*\*1 percent level. Statistical significance is based on standard errors bootstrapped with 999 replicates drawn in accordance with the SCF sample design and adjusted for imputation uncertainty.

That said, higher house prices can raise the creditworthiness of households and ease borrowing constraints in other ways, a point to which we return to in the conclusion. In addition, the collateral channel appears to be important for other types of borrowing and spending. (For evidence in support of the collateral narrative overall, see Mian and Sufi, 2014, and Bhutta and Keys, 2015.)

## **Conclusions**

Estimates from three nationally representative surveys indicate that very few households purchase cars directly with home equity. Further, the share of those who report doing so did not appear to vary with the housing cycle. In addition, homeowners who buy new cars with home equity typically have more wealth and liquid assets than those who take out an auto loan. Homeowners who purchase new cars with home equity also report fewer concerns about access to credit than homeowners who use auto loans.

These findings are not too surprising for a few reasons. First, personal finance professionals often advise against using a home equity loan to purchase a car, as these loans extend maturities beyond the lengths typically recommended for cars and thus may increase the total interest paid by consumers (Singletary, 2008; Wall Street Journal). Second, the transaction costs of extracting home equity with a second lien or mortgage refinancing generally exceed those of originating an auto loan; doing so only makes sense if the homeowner plans to extract a lot of equity at once and use much of it for another purpose. Third, the primary advantage to using home equity rather than an auto loan to finance a car purchase—the tax-deductibility of the interest—is not available for the approximately one-third of homeowners who take the standard deduction (Poterba and Sinai, 2008). Finally, auto loans were an attractive financing choice during much of the housing boom period: Auto credit appears to have been widely available, and

interest rates on new car loans were generally low and often heavily discounted by the manufacturers, especially for households with low credit risk.

Our findings are inconsistent with some stories from the housing boom era, which connected strong auto sales to a large number of households using home equity to alleviate credit constraints, but they do not imply that housing wealth is irrelevant for car purchases. Three other (not mutually exclusive) channels likely do connect some auto purchases to increases in home equity. First, households are wealthier when their homes increase in value, and their demand for cars should increase. Households with more housing wealth may not necessarily purchase more cars directly with home equity, but different types of wealth are, to some extent, interchangeable, and so they may use cash or auto loans.

Second, households may use the proceeds of home equity extraction to clean up their balance sheets and thereby free up funds for car purchases. A household that replaces high-interest credit card debt with lower-interest mortgage debt, for example, would reduce debt service payments and leave more income available for a car purchase. According to Bhutta and Keys (2015), the share of home equity extraction used for this type of balance-sheet repair between 1999 and 2010 does not appear to have been large overall, but it may have played a bigger role for individuals with lower credit scores.<sup>12</sup>

Finally, auto lenders may have become more willing to extend credit to households in neighborhoods with rising house prices, even though home equity is not directly considered in the underwriting of auto loans. This may happen because lenders take local economic conditions into account more generally, which can be correlated with house prices, or because lenders may

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<sup>12</sup> Bhutta and Keys (2015) find that credit card debt decreased only slightly (by \$2,000 to \$3,000, on average) after a \$40,000 home equity extraction and that auto debt did not decrease at all. However, the decrease in credit card debt were larger and more persistent for individuals with lower credit scores.

have an easier time raising capital in buoyant and profitable markets. Households in these markets may also be more likely to retain their good credit standing when their income is disrupted because they can more easily refinance their mortgages or sell their homes. Ramcharan and Crowe (2013) show that peer-to-peer lenders were less willing to extend unsecured credit to homeowners in areas with declining house prices; a similar dynamic seems likely in the auto credit market, although we are not aware of any research on this topic.

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