

## ANALYSIS

# Alternatives to Long-Term Car Loans?

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### Introduction

The auto finance sector seems to be generally in great shape at present. Total delinquencies on auto loans and leases, as measured using data from Equifax credit files, are running close to 3% of outstanding balances, down from around 6.5% at the height of the Great Recession. Growth in lending volume has been proceeding at a double-digit pace, enabling new-car sales numbers to finally claw their way back to prerecession levels. Annualized vehicle sales have remained close to the 18-month level for six straight months now. This figure is consistent with solid growth in a well-functioning industry.

# Alternatives to Long-Term Car Loans?

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For the subprime sector—borrowers with credit scores lower than 620—growth has been modestly faster than that for the overall industry (12% annualized versus 11%). Credit quality, meanwhile, seems to be holding in this sector, with total delinquency rates remaining in the 9% to 10% range of balances over the past year. These rates have been gradually improving in line with the trajectory of the labor market and overall U.S. economy.

Despite the apparent general health of the auto finance sector, talk of a looming subprime auto bubble can still be heard. Much of the recent growth in new-vehicle sales has been driven by efforts to find ways to lower monthly payments on vehicles and thus attract more buyers. On the one hand, leasing has been rapidly growing to the point where around one-third of all new-vehicle sales are to lessees. According to Experian, around 15% of all outstanding auto-related financial arrangements in 2015 involved lease contracts.

The second feature relates to longer loan terms for borrowers. They can reduce monthly repayments substantially by stretching principal payments out over a much wider window. These arrangements, however, come with substantial costs to both the borrower and the lender. For borrowers, a longer-term loan will saddle them with a much

greater total interest burden while reducing their ability to generate trade-in value when they decide to update the vehicle. For the lender, meanwhile, the glacial pace of equity growth means that recoveries will likely be scant if and when defaults begin to rise.

In this article, we explore some of the effects of these two developments. When looking at the growth in leasing, our focus will be on finding ways to potentially tackle lease-term or model-year concentration risk. By this, we mean the phenomenon where lessors face the prospect of bulk vehicle returns 24 or 36 months after signing lots of lease deals. The second problem relates to the subprime or near-prime sector and industry efforts to find affordable finance for such folks. Stretching the loan term seems like a very blunt and risky way to sell in this sector. Perhaps there are other ways to structure the deal to provide more value to car buyers while reducing the overall risk level for financiers.

## Used-vehicle leasing

Only around 4% of lease deals are for used cars. Given that the industry seems keen to offer alternatives with lower monthly repayment obligations and that there is clearly strong demand for leases generally, we view it as odd that the industry has not more vigorously explored such used-vehicle

leasing options. Part of the rationale for longer-term vehicle loans is that modern cars are more durable and thus more likely to hold some value even as mileage reaches the stratosphere. One could easily apply the same rationale to the extension of lease agreements to more used cars.

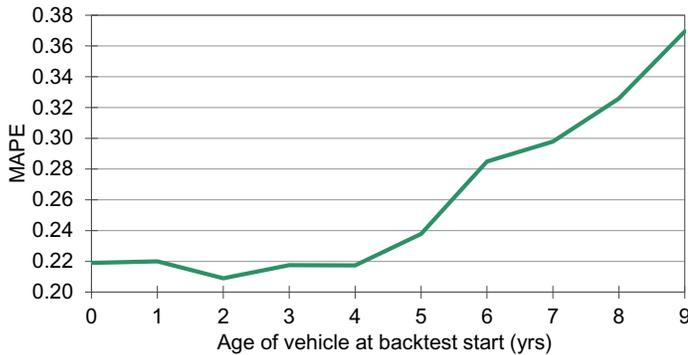
There is also an odd divide in the academic literature on leasing. Many articles point out the theoretical and empirically observable advantages of leases—for example, that leased cars are normally more valuable in the secondary market than equivalent owned cars. Such research always fails to address the obvious follow-up: Would this trend not hold for 6-year-old cars exiting a three-year lease originated when the vehicle was 3 years old?

The conventional wisdom, however, suggests that leases on used cars are very dangerous for buyers and sellers. We can break these objections down into two broad classes: supposed difficulty or noise in predicting values of older cars relative to newer cars and concerns about the “lemon” problem with used cars. This second issue relates to the information asymmetries regarding exactly what is being sold when a used car trades.

In terms of the first stumbling block, is it true that older-car prices are more difficult to forecast? This is an empirical question

### Chart 1: Forecasting Harder for 5-Year-Old Cars

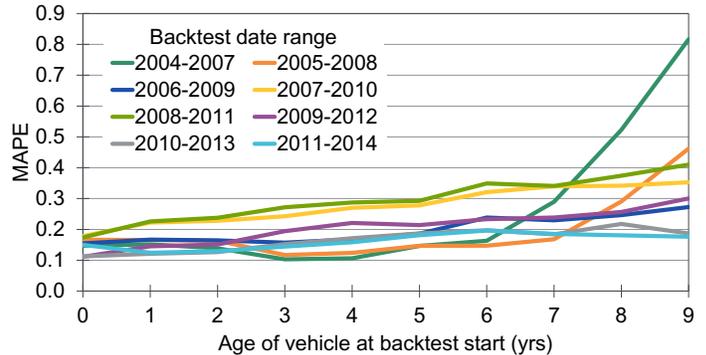
3-yr backtests ended in Dec 2007 to Dec 2014



Sources: National Automobile Dealers Association, Moody's Analytics

### Chart 2: Old Cars Hard to Predict in Recession

3-yr backtests



Sources: National Automobile Dealers Association, Moody's Analytics

for which data are readily available. Using the Moody's Analytics AutoCycle model, built using data from the National Auto Dealers Association, we can construct forecasts for a wide range of vehicles and then assess the relative quality of the forecasts across different vehicle ages. We base our assessments on mean absolute percentage error because the absolute forecast errors on lower-value older cars are likely to be smaller than those for higher-price newer vehicles. A financier with a high volume business should therefore be most interested in the percentage errors being committed.

Chart 1 shows forecasts made with a three-year horizon to mimic the typical term of leases. In cases where the number on the x-axis is 2, for example, we are considering forecasts of prices of cars sold when they are 5 years old. In other words, we assume that residuals are being set for leases on cars that are 2 years old at the outset of the lease. Such cars will then be 5 years old when they are (potentially) returned to the lessor. We initially consider forecasts for all vehicles in our database over the past nine years.

The data show that the forecast error rates are ostensibly flat over the first four years of the vehicles' lives. In aggregate, forecasting the future price of a 3-year-old car is just as difficult as predicting prices of new vehicles. The error rates then rise quite dramatically as even older vehicles are considered. These results suggest that the conventional wisdom is correct, but it kicks in

far later than most in the industry probably realize. Offering leases on 2- or 3-year-old cars is as risky as leasing brand-new vehicles.

Digging deeper, we can consider how these forecast error rates change through the business cycle. Chart 2 has the same setup as Chart 1, but we have broken out the data by year of sale. Note that much of the sharp rise in the forecast error rate in very old vehicles is driven by sales made around the time of the Great Recession. It turns out that it was very hard to forecast prices of old cars during that period.

Older-car prices held up remarkably well during the recession. This may have been due to the effects of cash for clunkers, or it may be a more cyclical phenomenon where consumers switch from newer to older cars during difficult economic times. Ironically, the forecast errors made for these older cars over this period ultimately would have favored the lessor.

The second stumbling block—the lemon problem—may explain why used-car leases are not popular on the demand side. It is true that if I lease a car that immediately breaks down, I will feel aggrieved that I chose that option. Of course, I would feel basically the same way if I bought a car with similar mechanical issues. Whether my fear of the lemon is affected by the manner in which the vehicle is financed is difficult to analyze, and it is unclear whether a leased lemon is necessarily worse for any party to the transaction. I would, however, have a specified end date on the lease, or can pay an early termination fee, at which point

I can make the lemon some other sucker's problem.

The other thing that should be borne out is that cars are getting more reliable over time. This is one of the assumed bases for the explosive growth in long-term vehicle loans. This should mean that the likelihood of lemon-type problems should be declining for 2- to 3-year-old vehicles.

Given that new-car leasing has been so strong of late, the clear problem is that there is likely to be a glut of returned 3-year-old vehicles in secondary markets. Overall, we expect this to flatten the age profile of used-car prices. Although 5-year-old cars will always be cheaper, they will sell at a smaller discount as the glut of vehicles hits the market.

For lessors, this represents a problem. One way to address it may be to "re-lease" the vehicles to a different set of clientele. We have shown that much of the danger associated with used-car leases is misplaced, so long as we are not talking about genuine clunkers. Since only 4% of leases involve used cars, there seems to be plenty of room to expand in this underserved marketplace.

#### Vehicle equity lines of credit

For cash-strapped subprime borrowers, longer-term car loans represent a way to upgrade their ride without breaking the bank. These folks may not be able to afford the monthly payments on a traditional five-year loan but could cover a seven- or eight-year commitment. As we pointed out in a recent paper (<http://www.autoremarketing.com/>

subprime/let%E2%80%99s-consider-vehicle-equity-long-term-loans), however, such longer-term loans build razor-thin levels of vehicle equity that can evaporate quickly when recession hits.

Here, we briefly propose a solution that will allow budget-constrained borrowers to buy a vehicle, build equity therein, improve their credit standing, and still cover potential emergencies.

If I buy a new Toyota Camry with a minimal down payment, I will hold about a \$12,000 asset after my five-year loan has expired. With an eight-year loan, by contrast, I will have about \$1,000 in equity at the same point in the life of the vehicle. In terms of monthly principal payments, the five-year loan is about \$150 extra per month at the outset of the period, assuming a 12% annual percentage rate on each loan. Interest payments are lower for the shorter-term loan.

In comparing these loan structures, bear in mind that in one case, the borrower is being forced to save in the form of illiquid vehicle equity. In the other, the borrower pockets cash that can either be saved for a rainy day or spent on other forms of consumption.

We propose a middle ground between the long-term loan and the traditional five-year financial structure. Suppose that a line of credit proportional to the amount of equity held in the vehicle is offered to the borrower at the outset of the loan. The line is initially zero, since we assume that the vehicle is financed at full economic cost. As loan payments consistent with a five-year term are made, and as equity in the car slowly builds, the size of the available credit line also increases. If the proposed structure uses a 50% multiplier, after one year a \$500 secured credit line will be available to the borrower. After two years, \$1,500 will be available to the client to cover potential emergencies or spending requirements. At the end of five years, the borrower will have clear title to a \$12,000 car and a \$6,000 credit line.

There is no doubt that longer-term loans have expanded access to vehicle credit for poorer buyers. The risks with such loans, however, are manifest. The industry should be looking at other, potentially safer ways to make vehicle finance accessible by subprime borrowers. The combination of a tougher five-year repayment schedule and access to a secured credit line may be a useful addition

to the financial arsenal that might increase the welfare of borrowers and lenders alike.

## Conclusion

Although the auto sector is performing well, some elevated risks for financiers are apparent. New-vehicle leasing has increased so rapidly that lessors are exposed to remarketing risks as they sell a glut of vehicles of a particular age. Such risks may be diversifiable through the issuance of lease contracts for a broader range of vehicle vintages. Long-term car loans, no doubt a useful addition at the subprime end of the spectrum, also pose risks because vehicle equity buildup is so elusive.

In both cases, the need for high-quality analytics is paramount. It might not be immediately obvious to industry insiders that residuals for 2-year-old cars are as easy to set as those for brand-new vehicles. High-quality data can, however, tell us that this is indeed the case. Lines of credit associated with vehicle equity require accurate predictions of vehicle value.

In the era of big data, as statistical methods improve, we should be willing to use more analytical methods to provide value to all our customers.

## About the Authors

Tony Hughes is a Managing Director of research at Moody's Analytics. He serves as head of a small group of high caliber modelers, charged with identifying new business opportunities for the company. Prior to this appointment, he led the Consumer Credit Analytics team for eight years from its inception in 2007. His first role after joining the company in 2003 was as lead economist and head of the Sydney office of Moody's Economy.com.

Dr. Hughes helped develop a number of Moody's Analytics products. He proposed the methodology behind CreditCycle and CreditForecast 4.0, developed the pilot version of the Stressed EDF module for CreditEdge, and initiated the construction of the Portfolio Analyzer (ABS) product that provides forecasts and stress scenarios of collateral performance for structured securities worldwide. More recently, he championed and oversaw the development of AutoCycle, a tool that provides forecasts and stress scenarios for used car prices at the make/model/year level. He has a current development project related to quantifying counterparty network risks that can be applied to the assessment of systemic risk in the financial system.

In the credit field, Dr. Hughes' research has covered all forms of retail lending, large corporate loans, commercial real estate, peer-to-peer, structured finance and the full range of pre-provision net revenue elements. He has conducted innovative research in deposit modeling and in the construction of macroeconomic scenarios for use in stress-testing.

Dr. Hughes has managed a wide variety of large projects for major banks and other lending institutions. In addition, he has published widely, both in industry publications such as American Banker, Nikkei, GARP and the Journal of Structured Finance as well as several papers in peer reviewed academic journals. He obtained his PhD in econometrics from Monash University in Australia in 1997.

Michael Vogan is an economist in the Credit Analytics department at Moody's Analytics. Before joining Moody's Analytics, Michael was a research analyst at the Federal Reserve Bank of Philadelphia. He holds a master's degree in applied economics and econometrics from the University of Delaware and a bachelor's degree in economics from Bloomsburg University.

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