

The logo for BBVA Research, featuring the word "BBVA" in a bold, white, sans-serif font, followed by a vertical line and the word "Research" in a smaller, white, sans-serif font.

BBVA | Research

Auto sales

A look under the hood

Filip Blazheski / Nathaniel Karp

Houston, 19 May 2017

Auto sales: a look under the hood

Both secular and cyclical factors are behind the current slowdown in auto sales

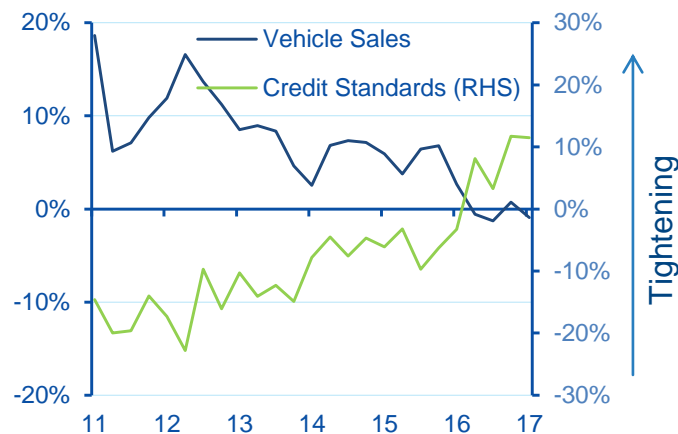
We expect auto sales to fall below 17 million units in 2017

The decline in demand could prompt a significant adjustment in the auto industry

The growth of sales of cars and light trucks stalled at the end of the first quarter of 2016. Since March 2016, sales have averaged -1% year-over-year (YoY), a sharp decline from 8.7% YoY during 2011-2015. If short-lived, this slowdown would not result in a persistent drag on the economy. However, if it proves long-lasting the slowdown could impact the economy significantly, considering that motor vehicle output represents almost 3% of gross domestic product.

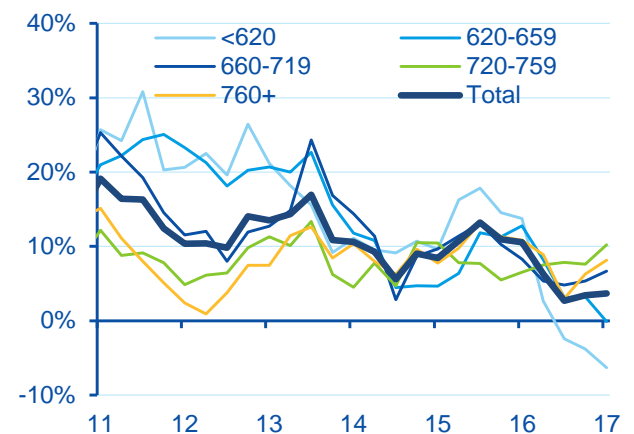
Given that banks started reporting tighter credit standards for auto loans since the beginning of 2016 (Figure 1), and that the correlation between credit standards and auto sales is significant and negative, some analysts believe that the slowdown in auto sales is the result of tighter access to credit. However, a closer look at the data reveals that the only group that has experienced a sustained decline in auto loan originations is subprime borrowers (Figure 2), which represents a relatively small share of the new auto market¹, while total auto loan originations have continued to increase at an average of close to 4% YoY. Therefore, the willingness of banks to rein in the subprime segment cannot fully account for the severity of the slowdown.

Figure 1. Auto sales and credit standard tightening YoY% and net % respondents



Source: BBVA Research, BEA and FRB

Figure 2. Auto loan originations by credit score YoY% 4QMA



Source: BBVA Research and NY Fed

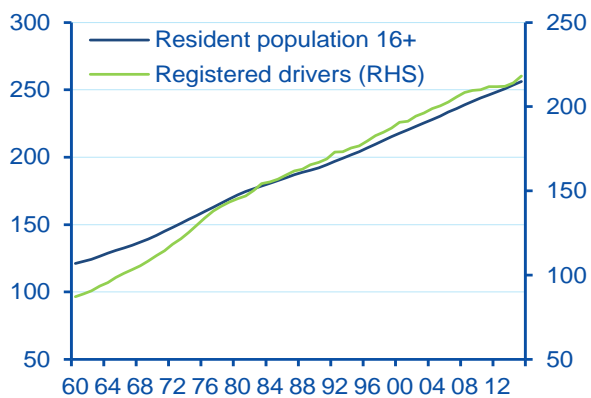
¹ Borrowers with a credit rating of 300-600 represented only 10.47% and 8.32% of the new auto loan and new auto lease market in 4Q15, and 10.16% and 7.41% in 4Q16 respectively (Experian <https://goo.gl/1z98lc>)

In other words, if tighter credit standards are a symptom of other underlying developments and not a root cause, there have to be other factors that better explain the magnitude and the persistence of the slowdown. In this brief we analyze the structural and cyclical factors that might be the root of the problem and present alternative explanations. Our results suggest that both long-term and cyclical forces are at play. Finally, based on our econometric analysis we present the likely trajectory of auto sales in the next four years and its implications for the overall economy and the auto industry in particular.

Structural trends

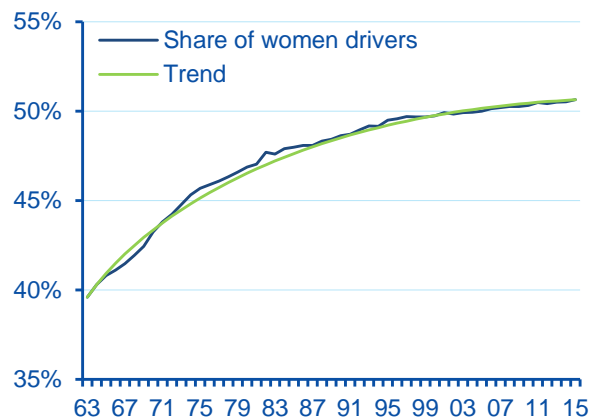
The underlying long-term trend in auto sales is determined by the number of drivers, the number of autos per driver, and the scrappage rate of the auto-stock. The first factor, number of drivers, has increased at a fairly steady pace supported by the growth in adult population (Figure 3). However, the dividend from the increase in the share of women in total registered drivers (Figure 4) seems to come to an end as this ratio reaches 50%.

Figure 3. Adult population and registered drivers
Million



Source: BBVA Research, Census and Federal Highway Administration

Figure 4. Share of women in total number of drivers
%

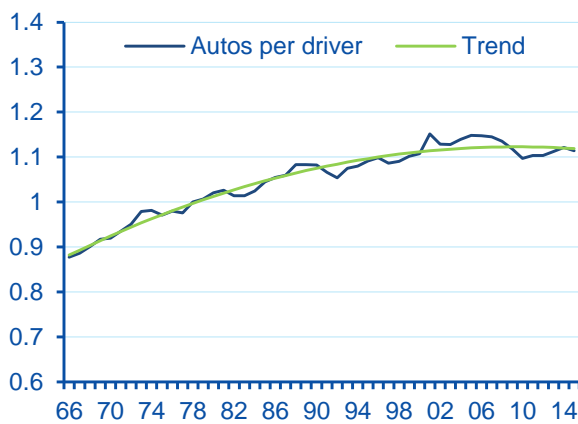


Source: BBVA Research and Federal Highway Administration

The second factor, number of autos per driver, has basically remained flat since the early 2000s (Figure 5). While the Great Recession may have been a contributing factor for the dip in the data during 2008-2011, it seems that other factors were already in play before the crisis and these and new elements continued long after the recovery. For example, population aging, which increases the number of people out of the labor force, would lower the amount of miles driven and the demand for autos. In addition, a gradual shift of preferences toward the sharing economy results in a more efficient use of the auto stock. Meanwhile, a continued trend toward urbanization favors a more intensive use of public transit or services such as Car2Go, Uber and Lyft, resulting in lower auto sales per person.

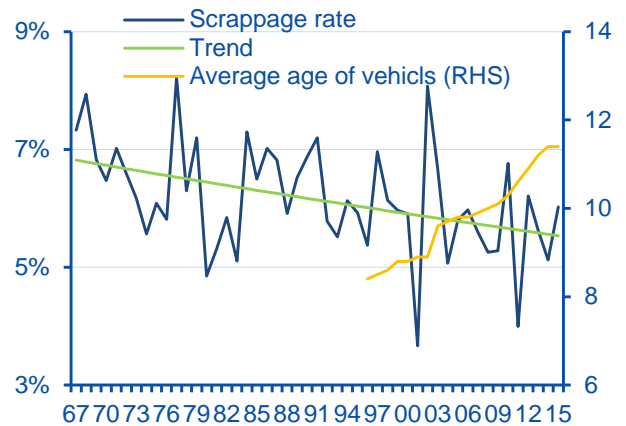
The third factor, scrappage rate, has been gradually declining over time (Figure 6), as the reliability and quality of vehicles has improved and autos are staying in operation for longer periods of time, as indicated by the increasing average vehicle age. As a result, it is easy to see that demographic trends, shifts in consumer preferences and technological advancements suggest a flatter long-term trend in auto sales (Figure 7).

Figure 5. Autos per registered driver
Units



Source: BBVA Research and Federal Highway Administration

Figure 6. Estimated scrappage rate and average age of vehicles, %



Source: BBVA Research and Federal Highway Administration

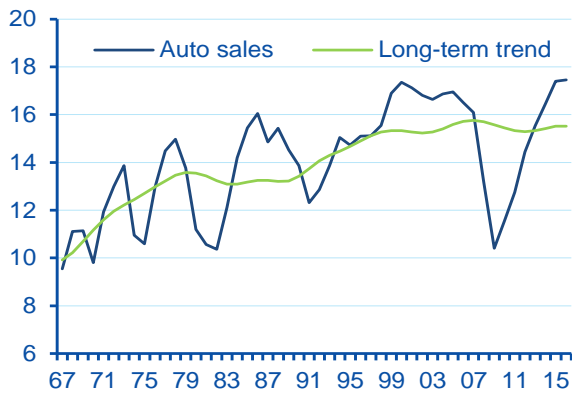
Cyclical factors

To understand the short-term dynamics we estimate the cyclical component of auto sales. This correlates fairly well with standard cycle indicators (Figure 8). We model the cyclical component using a combination of indicators related to the labor market, borrowing costs, credit availability and household wealth, among others. The regression results are presented in Table 1 and the fitted estimate in Figure 9. As expected, the results imply that lower unemployment, higher personal income, higher household wealth, low short-term interest rates and an upward sloping yield curve, which reflects a positive economic outlook, push auto sales above their long-term trend. For example, according to the model, auto sales would be at their underlying long-term trend in an environment characterized by a 0.5 percentage point decline in unemployment, 2% growth in real disposable personal income, 2% home price appreciation – a proxy for household wealth and borrowing capacity – and around 100 basis points yield curve slope.

This means that the strong car sales figures in the 2013-2016 period were supported by the large declines in unemployment (0.8 percentage points per year on average), a strong wealth effect from appreciating home prices (6.9% per year on average), solid gains in real personal income (2.1% YoY on average), a positive economic outlook implied by

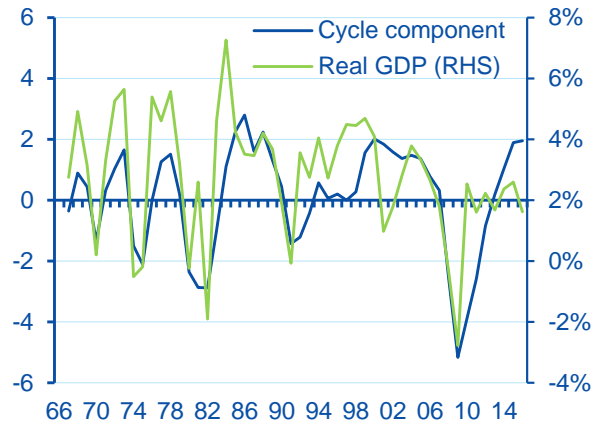
the positive yield curve slope (110 basis points average difference between the 5 and 1 year treasuries), and historically low borrowing costs.

Figure 7. Auto sales and underlying long-term trend
Million units



Source: BBVA Research and Census Bureau

Figure 8. Cyclical component of auto sales and real GDP, Million units and YoY%



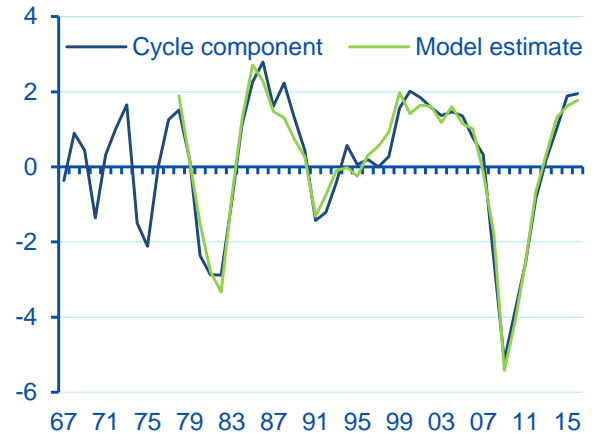
Source: BBVA Research and BEA

Table 1. Model results. Dependent variable: auto sales cyclical component in million vehicles

| Independent variable | Coefficient | P-value |
|--|-------------|---------|
| Change in unemployment rate (p.p.) | -0.6459 | 0.000 |
| L1. | -0.0371 | 0.748 |
| L2. | -0.4537 | 0.000 |
| Change in real disposable personal income (%) | 28.56 | 0.000 |
| L1. | 45.63 | 0.000 |
| L2. | 22.55 | 0.001 |
| 5 year treasury yield | 0.82 | 0.000 |
| 1 year treasury yield | -0.93 | 0.000 |
| Change in CoreLogic home price index, L1. (%) | 13.38 | 0.000 |
| Constant | -3.40 | 0.000 |

Source: BBVA Research

Figure 9. Auto sales cyclical component and estimate
Million units



Source: BBVA Research

The model findings are in line with the pent-up demand factor, which influences auto sales directly. As was the case during the Great Recession, pent-up demand builds up when unemployment increases and income stagnates and consumers delay the purchases of new vehicles, which in turn results in below trend sales. When the economy regains its footing and starts to recover, pent up demand then contributes to above trend sales, as consumers make the purchases that they have delayed in the past. This is exactly what happened during the economic recovery and expansion in the past few years.

Forecasts

Finally, we use the model to forecast auto sales based on our baseline macroeconomic scenario (Table 2). The results indicate that the underlying long-term trend declines from 15.5 million in 2015 and 2016 to 15.1 million in 2021, mainly due to slower growth of the adult population. This also assumes that consumer preferences remain relatively stable. The forecast also suggests that the cyclical component is likely to decline from 1.8 million in 2016 to 0.9 million in 2021, due to smaller declines in the unemployment rate – already close to full employment –, more modest home price appreciation, higher short-term interest rates and a flatter yield curve – assuming short-term rates rise faster than long-term rates. In contrast, strong growth in real income helps demand to keep growing. One of the mechanisms how the fundamentals will result in a decline in sales is the increase in the supply of second hand vehicles, especially off-lease, which are still generally in excellent condition and are priced competitively (used auto prices have been declining since March 2016) and thus represent a substitute for new vehicles for some consumers.

Table 2. Auto sales forecast and assumptions

| Year | Unemployment Rate, % | Real Personal Income, % YoY | 1-year treasury yield, % | 5-year treasury yield, % | CoreLogic HPI, % YoY | Underlying trend forecast (Million units) | Cyclical component forecast (Million units) | Total auto sales forecast (Million units) |
|------|----------------------|-----------------------------|--------------------------|--------------------------|----------------------|---|---|---|
| 2017 | 4.5 | 2.7 | 1.3 | 2.1 | 6.6 | 15.4 | 1.3 | 16.7 |
| 2018 | 4.2 | 4.1 | 2.0 | 2.5 | 6.3 | 15.3 | 1.0 | 16.3 |
| 2019 | 4.3 | 3.9 | 2.4 | 2.9 | 6.1 | 15.2 | 1.2 | 16.4 |
| 2020 | 4.3 | 4.0 | 2.8 | 3.1 | 5.2 | 15.1 | 1.2 | 16.3 |
| 2021 | 4.4 | 4.0 | 2.8 | 3.1 | 4.4 | 15.1 | 0.9 | 16.0 |

Source: BBVA Research

Implications

The main implication from our forecasts – a persistent slowdown in auto sales – is that real personal consumption expenditures will grow at a slower pace, as new autos represent 2.2% of personal consumption, but have been contributing to its growth at a solid pace until now. The magnitude of this impact will depend on how much consumers offset the lower number of new vehicle purchases by spending more per vehicle in inflation adjusted terms. During 1997-

2003 for example, this development was sustained over multiple years, thereby limiting the impact on consumption and thus on GDP.

In regards to the auto industry, the implications are that any pressures from idle capacity today are going to become more serious going forward. However, if demand for autos shifts to domestic vehicles and/or domestic producers can export more units, the pressures will be less severe. For example, if imported vehicles face disadvantages from changes to foreign trade policy or less competitive foreign exchange rates, domestic producers would be able to gain market share. Likewise, if auto manufacturers in the U.S. can shift production from vehicles tailored to U.S. consumers to foreign buyers, they will be able to use idle capacity for exports. In contrast, if demographic trends and consumer preferences continue shifting toward fewer miles driven, the impact for U.S. auto manufacturers could be more severe.

Finally, it is worth considering that incumbents could see significant pressures if new technologies translate into greater demand for more energy-efficient vehicles, such as electric vehicles. In fact, this trend is already in motion and auto sales could even experience a sharp increase if drivers replace their vehicles for more efficient ones at a faster pace than would have been the case with traditional vehicles. In this case, the technology under the hood could prove to be the ultimate winning factor.

DISCLAIMER

This document was prepared by Banco Bilbao Vizcaya Argentaria's (BBVA) BBVA Research U.S. on behalf of itself and its affiliated companies (each BBVA Group Company) for distribution in the United States and the rest of the world and is provided for information purposes only. Within the US, BBVA operates primarily through its subsidiary Compass Bank. The information, opinions, estimates and forecasts contained herein refer to the specific date and are subject to changes without notice due to market fluctuations. The information, opinions, estimates and forecasts contained in this document have been gathered or obtained from public sources, believed to be correct by the Company concerning their accuracy, completeness, and/or correctness. This document is not an offer to sell or a solicitation to acquire or dispose of an interest in securities.