Introducing the Cox Automotive/Moody's Analytics Vehicle Affordability Index

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Jump Start

Cox Automotive and Moody's Analytics have come together to develop the Vehicle Affordability Index. The index quantifies price movements in the new-vehicle market in relation to the spending power of the U.S. consumer. Moreover, the index provides the number of weeks of median household income needed to purchase an average new vehicle. The new index will be updated monthly using the latest data from multiple government and industry sources.

The need for an affordability index has increased in recent years as new-vehicle prices continue to reach record heights. Price increases in 2018 and 2019 for an average new vehicle caused many industry experts to predict a drastic move away from new-vehicle sales and toward the used-vehicle market. The shift that occurred was not drastic, but rather a marginal movement toward used vehicles. Such a miscalculation can be partially attributed to a lack of visibility into consumer spending power from income and interest rate changes relative to the movement of new-vehicle prices.

The Cox Automotive/Moody's Analytics Vehicle Affordability Index accounts for movements in transaction prices, income and interest rates to provide an easy to use and track metric on the affordability of new vehicles. The sections that follow will provide a look under the hood into the data sources, methodology, and reasoning as to why each decision was made.

Under the Hood

The Cox Automotive/Moody's Vehicle Affordability Index is driven by the consumer's vehicle transaction prices, the income of the consumer, the amount financed by the consumer, and the interest rate provided by the lender. Let's look at each of these inputs more closely.

First, the consumer's vehicle transaction price is determined by the new vehicle's price, how much the dealer loses in gross margin through negotiations, and price decreases from factory/dealer incentives. This information is sourced from Kelley Blue Book and Motor Intelligence to derive the weighted average of actual consumer transaction prices.

The decision to use the average consumer transaction price on all vehicles sold rather than the average price of cars, but not trucks or SUVs, was made to increase the representativeness of the index. An argument can be made that affordability should only consider cars because smaller vehicles are the first place a marginal buyer will look. However, this thought is out-of-tune with the purchasing habits of the average American. Moreover, the average vehicle purchased today, and for the foreseeable future, is a light truck or specifically an SUV, and the ability of a consumer to afford this purchase is exactly what the index is intended to measure. According to Kelley Blue Book data in Q3 2020, 65% of new-vehicle shoppers were looking at SUVs.

The second major input to the index is the income of the consumer. Consumer income is measured as the median household income provided by the Census Bureau. Due to income inequality skewing the average incomes in the U.S., the median income rather than average income measure has become a better gauge of consumer spending power.

A harder decision comes from whether to use median family income or median household income. Median family income only includes individuals that are related through marriage or birth, and a household includes everyone living in the home. Our index uses household income rather than median family income.

The average household owns more than one vehicle. Therefore, the typical household tends to purchase multiple vehicles. If nonfamily members are living together, the purchase of multiple vehicles will likely increase. This goes against traditional home affordability indexes that use family income as a measure because it is more likely for a single-family unit to be the buyer of a home. Qualitatively speaking, if there is someone outside a family unit living in the household (owner's siblings, friends), they likely will have or want to have their own vehicle. Given this, the median income by household is more representative for the average car buyer than family income.

The third major input is the interest rate paid by the consumer. Our preferred value for this input would be the average interest rate of a 72-month fixed-rate new-vehicle loan. However, this rate is not readily available for a longer time series. Instead, we are using the interest rate for new vehicles on a 60-month loan from finance companies and credit unions and the shorter time series of the 72-month loans. Using these series, we were able to estimate the risk spread from an extra year on the books. This risk spread is added to the movements of the 60-month rate to inform our interest rate assumptions. These rates were checked against anonymized industry sources for accuracy to further our confidence in this value.

Two final input decisions were required to round out the equation. First, what percentage of the original transaction price is financed. For this, we assume a 10% down payment. This decision was made after reviewing several years of recent vehicle sales and finance detail from Dealertrack, a Cox Automotive company that provides a credit application platform for thousands of dealers in the U.S. as well as title, econtract, and dealer management system services. This platform provides a very large sample of actual finance details of new-vehicle transactions.

Our review of auto loans revealed that down payment percentages are inversely correlated by loan term, with longer loans seeing much less money put down at purchase and shorter terms having much higher down payments. The analysis conducted by Cox Automotive revealed that a typical down payment on a 72-month loan has averaged approximately 9% for the most recent years. As a result, the team concluded that a 10% down payment rate is a likely conservative estimate for a 72-month loan, and using a flat 10% down payment assumption would fairly represent the most typical new-vehicle transaction.

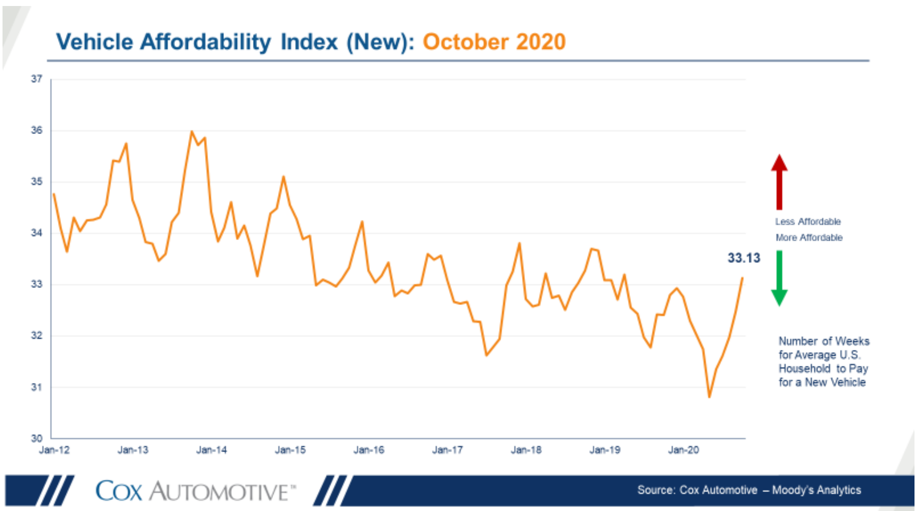
As for term length, it was initially thought we could use the average term for new vehicles from finance companies provided by the Federal Reserve. However, the average term length in this value is biased lower by older loans on the books. A more appropriate measure would be loans that are being originated right now. Given the limited availability of this information, the next best solution is the most popular loan term length, which was made available through Cox Automotive based on the Dealertrack platform.

The term analysis revealed that 72-month terms are the most popular new vehicle loans. A separate analysis using Equifax data confirmed that terms of 72 months or longer represent the majority of the most recent auto loan originations. Using 72-month loans as with the 10% downpayment assumption ensures that the affordability index is tracking the most typical current new-vehicle purchase.

Horse Power

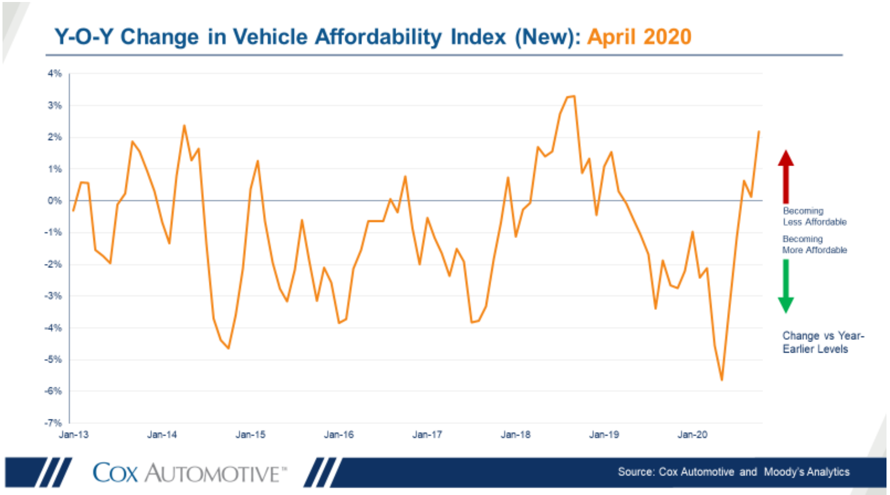
With the index at our disposal, see Chart 1, some initial insights can be drawn. Surprisingly, despite all-time highs for average transaction prices, the index dropped from November 2018 through the first half of 2020, which means vehicles were becoming more affordable in that timeframe.

CHART #1



The annual drop was a significant turn-around from the steady year-over-year growth experienced from mid-2017 to late-2018 shown in Chart 2. An important note when interpreting the charts is that affordability decreases as the number of weeks needed to pay off the loan increases—more weeks = more money. That is, as the line lowers, the consumer's share of income needed to buy a new car drops, which means new vehicles are becoming more affordable.

Chart #2



In 2019 dealers and manufacturers increased incentives to move inventory as the retail market slowed after several record years. At the same time wage growth continued and interest rates dropped. However, without all these the additional inputs being considered, the rise in new-vehicle prices and continuing strength in new-vehicle sales would seem at odds. But in fact, despite a rise in prices, vehicles in 2019 were becoming more affordable—perhaps the reason strong sales continued despite rising prices.

The index was able to pick up this recent increase and then decrease in new-vehicle affordability, and it also informs that unaffordability has not risen to the levels reached at the end of 2013. In fact, the consumer was able to pay off the new-vehicle purchase 4.8% faster at the highest point of last year than they were in December 2013, a time when wage growth kept consumers' ability to pay low. Accounting for recent index movements in context with previous periods make the index ever-more valuable.

Finish Line

Using the number of weeks needed for a median-income household to pay off a new vehicle gives a straight forward unit that captures the affordability of new vehicles. The calculation eliminates the need to incorporate rules on how much should be spent or how long a payment should last. By using the number of weeks, the index does not need to be anchored to a year to be understood. Instead, the index looks across time to determine past and present trends.

Going forward the Cox Automotive/Moody's Analytics Vehicle Affordability Index will inform industry experts as well as consumers if the prices being paid for vehicles are getting out of reach or becoming more affordable. The guessing and prognosis based on disparate indicators can be put to rest.