

October 10, 2018

CarMax Inc.

Thesis: CarMax operates the largest used vehicle dealership chain in the United States. Our forecast indicates CarMax can sustain high growth rates well into 2030 by scaling operations to 7% domestic market penetration. Competition from franchise dealers, Carvana, and online price aggregators such as Cars.com and Cargurus.com may induce margin or market share compression in coming years. The company hopes to address rising competition by releasing new e-commerce capabilities such as online appraisal, finance pre-approval, in-home-delivery, and expedited pickup. In the long-run, CarMax may face disruption from autonomous and electric vehicles that would reduce car ownership across the country.

Key points:

1. CarMax is a leader in the used car space, controlling 4.7% market share in established regions. The used car market is highly fragmented with 18,000+ franchised dealers competing for customers. Local dealers will continue to struggle to compete against CarMax's scale and proprietary vehicle data.
2. CarMax built out an estimated 9.5% market share in its oldest markets in Virginia. Based on our unit sales model, the company can sustain current growth rates well into 2030. CarMax would sell 1.7M used and 0.8M wholesale vehicles annually in the 25.5M market for 0-10-year-old vehicles by 2030.
3. Record off-lease car penetration (35%) continues to increase used vehicle supply. Off-lease cars should supply CarMax with 5 million vehicles until 2020. In addition, new vehicle price growth has been outpacing used pricing. This makes used offerings more attractive.
4. Autonomous vehicle technology, ride-sharing, and electric vehicles may be a disrupter in the car industry. Ride sharing cost/mile is predicted to drop below ownership cost/mile in the next decade for metropolitan areas. Technologies such as these could pose a material threat to CarMax's current business model.
5. Carvana aims to disrupt the used car market by offering an online car-buying experience. While Carvana lacks sustainable competitive advantage, we think they can still exert competitive pressure on CarMax. CarMax announced plans to address rising online competition by rolling out a comprehensive omni-channel offering in the coming quarters – including home-delivery, online finance pre-approvals, online appraisal, and expedited pickup.

Recommendation: HOLD

Ticker: KMX

Price: \$ 70.02

Fair Value: \$81

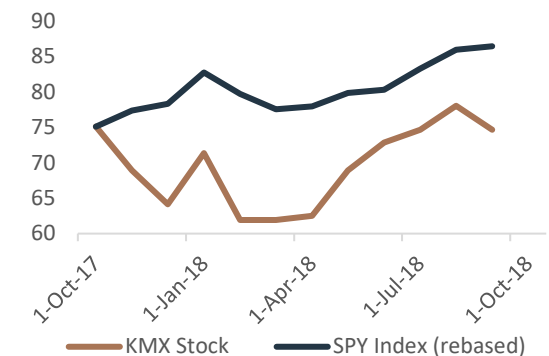
Scenario Analysis

Downside Scenario	Current Price	Price Target	Upside Scenario
NA	70.02	81 ↑15.7%	NA

Key Statistics

Shares O/S (MM)	182	P/E (T12M)	21.19
Mkt Cap (MM)	14,114	P/E (F12M)	17.30
Div Yield (%)	NA	PEG	1.82

Price Performance



Taylor Hoffman Estimates

	2018A	2019P	2020P	2021P
Vehicle Revenue (MM)	17,120	18,331	19,749	20,948
Used Vehicle Units	721,512	775,625	837,675	904,689
Used Price, Adj for CPI	\$19,757	\$19,777	\$19,777	\$19,480
Avg. Financing %	7.8	8.0	7.8	7.6
EPS, Adj	3.64	4.63	5.09	5.76

Company Description

CarMax sells, finances, and services used and new cars through a chain of nearly 200 retail stores. It was formed in 1993 as a unit of Circuit City and was spun off into an independent company in late 2002. Used-vehicle sales account for over 84% of revenue, wholesale about 13%, and the remaining portion is composed of extended service plans, and repair. In fiscal 2018, the company retailed and wholesaled 721,512 and 408,509 used vehicles, respectively.

Peer Group

LAD, PAG, CVNA, ABG, AN



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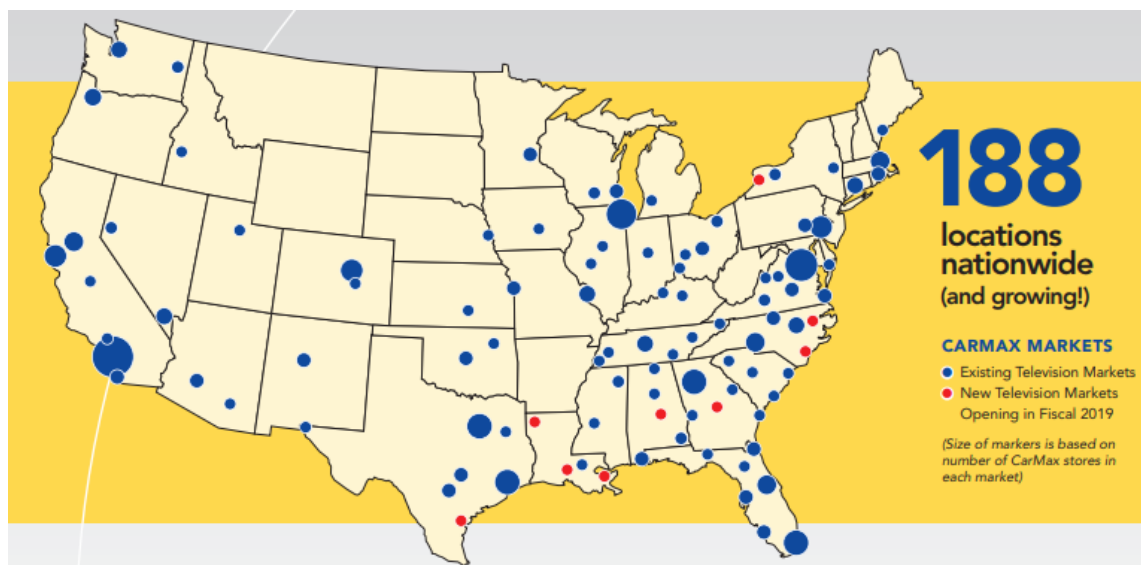
Section I – Business Overview

Quote from CEO, Bill Nash: *Over the last couple years we placed a great deal of focus on the development and testing of new customer experiences such as finance pre-approval, home delivery, online appraisals, and the new expedited pick up test. Our next step is to combine all these pieces into a comprehensive e-commerce experience that is comparable to our in-store experience. In the next few quarters we plan to take this comprehensive experience to new markets and learn how to best operationalize it in a scalable way.*

Corporate Strategy:

CarMax operates the largest pure-play used vehicle dealership network in the United States. The company was founded in 1993 with a mission to drive integrity in the automotive industry by being honest and transparent. The mission manifested in a business model that makes car-buying easy and fair, a refreshing departure from the “buyers beware” mentality experienced at countless dealerships today. CarMax operates via the following Value Chain:

- **Acquire/Appraise:** CarMax acquires used vehicles in the open market from wholesalers and individuals. Every purchased car undergoes quality check and reconditioning. More than half of cars fail the tests and are transferred to wholesale auctions. The rest of the cars are distributed to one of 188 retail stores.
- **Recommend/Sell:** CarMax doesn’t hire salespeople from the auto industry. Customer representatives receive flat commission on car sales and offer haggle-free pricing on all cars. Hassle-free car transfers between locations and on-demand test drives make purchasing a vehicle fast and easy.
- **Finance:** CarMax Auto Finance processes roughly 1.2M financing applications annually and provides an on-premise financing option for CarMax customers.



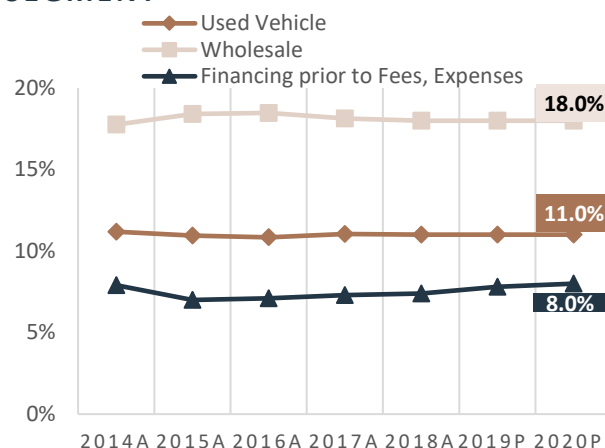
Source: CarMax 2018 Annual Report

Segments Breakdown:

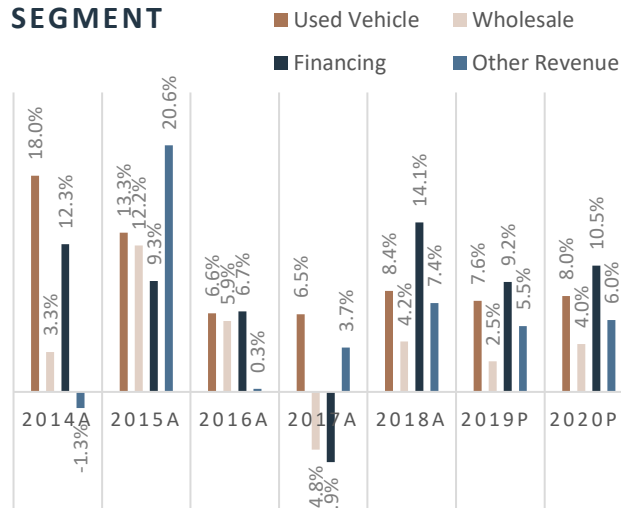
CarMax is organized into four segments – Used Vehicles, Wholesale Vehicles, Financing, Other Services.

- **Used Vehicles** represent 83% of car sales. CarMax benefits from steady Gross Profit per Unit (GPU) around \$2,100-\$2,200 or 11%. Penske is the only competitor that comes close to CarMax with a 10.2% gross margin on used units (not adjusted for reconditioning profit). CarMax's market leading used car sales are aided by first-mover advantage, decades of proprietary vehicle data, and streamlined business strategy. Intense competition and rising pricing pressure from online price aggregators might limit margin expansion.
- **Wholesale Vehicles** represent 12% of car sales. Recent supply spur in used vehicles allowed the wholesale unit to become a significant segment of CarMax. The unit is currently the third largest vehicle auction company in the country. CarMax manages to sell 95% of the vehicles it brings to auction, compared to 60% at competitors. The unit also delivers attractive gross margins of 18% compared to 11% for the used car segment.
- **Financing** represents 2.5% of total sales. The CarMax Financing arm originates and services loans internally which provides an edge over competitors that rely on third-party providers. The unit takes on a form of credit risk on 51% of managed receivables, that come from Tier 2 and Tier 3 credit customers.
- **Other Services** represent 5% of vehicle sales.

GROSS PROFIT MARGIN BY SEGMENT



REVENUE GROWTH BY SEGMENT



Source: Company Filings, TH projections

LOAN PERFORMANCE	2014A	2015A	2016A	2017A	2018A
Total ending managed receivables	7,148	8,436	9,537	10,596	11,536
Allowance for loan losses	59.6	81.7	94.9	123.6	128.6
as % of Managed receivables	0.83%	0.97%	1.00%	1.17%	1.11%
Past due accounts % of Managed receivables	2.6%	2.6%	2.7%	3.1%	3.4%
Average recovery rate	55.2%	54.2%	51.2%	47.4%	46.1%
CAF income % of Receivables	4.70%	4.35%	4.11%	3.48%	3.65%
LOAN COMPONENT	2014A	2015A	2016A	2017A	2018A
A - highest repayment	48.8%	48.9%	48.6%	48.9%	49.3%
B - medium repayment	37.0%	36.1%	35.4%	35.0%	35.6%
C - lowest repayment	14.2%	15.0%	15.9%	16.1%	15.1%

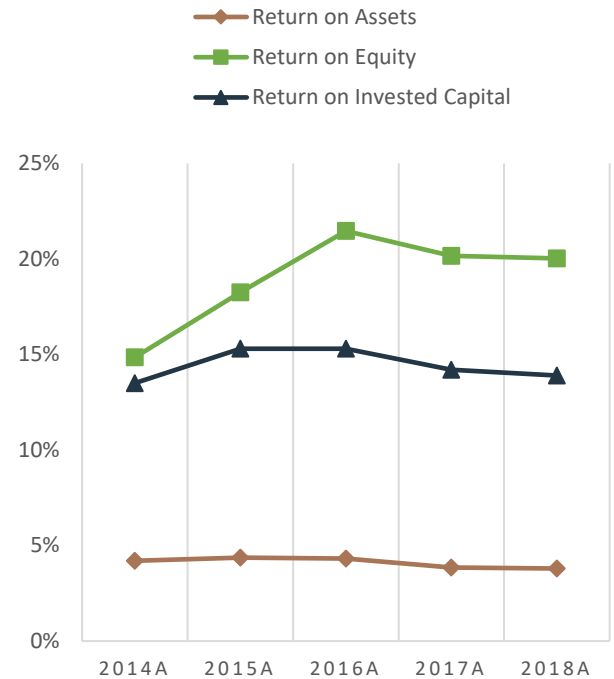
CAF loans remain well balanced among the three credit levels, but default risk has increased in recent years. Both type A and B loan amounts increased relative to loan C in the last year. Average recovery rate on delinquent loans dropped from 55.2% in 2014 to 46.1% in 2018 (historically this rate ranged between 60%-44%). This represents the average percentage of the outstanding principal balance CarMax receives when a vehicle is repossessed and liquidated. Past due accounts (measuring delinquent loans) as a % of managed receivables reached 3.4% in 2018 up from 2.3% in 2012.

Source: Company Filing

Performance Snapshot:

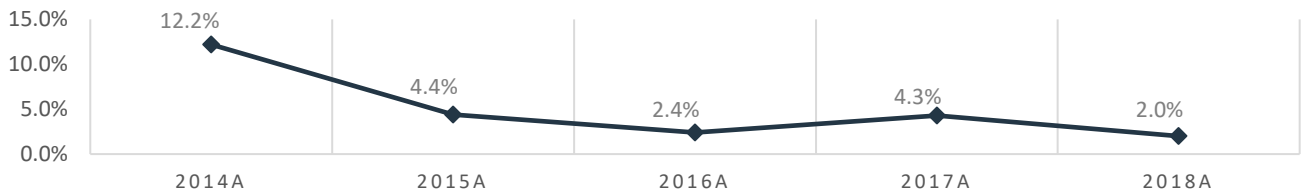
- CarMax executes well on capital allocation. Steady and strategic store rollouts helped maintain ROIC in the 14% to 15% range while ROE increased from 15% to 20% in the last four years aided by an aggressive stock repurchase plan. CarMax bought back \$579.9M worth of stock in fiscal 2018. As of August 31, 2018, the company had \$638.3M remaining under the current repurchase authorization plan.
- CarMax drives sales growth from store openings and comparable store sale increases. We estimate CarMax will be able to boost sales from new store openings well into 2030. Comparable store sales have been in the 2% to 4.5% range since 2015. We expect that number to moderate below 2%, given the overall low growth characteristics of the used vehicle market.
- CarMax increased used vehicle unit sales ~8% in the last four years. Used vehicle prices have been under pressure from peaking off-lease vehicle supply. CarMax's ability to target a \$ amount for GPU instead of a % helped keep GPU around \$2,150 in the past four years.
- CarMax's P/E ratio is 17.6 which remains in line with historical multiples.

CAPITAL ALLOCATION

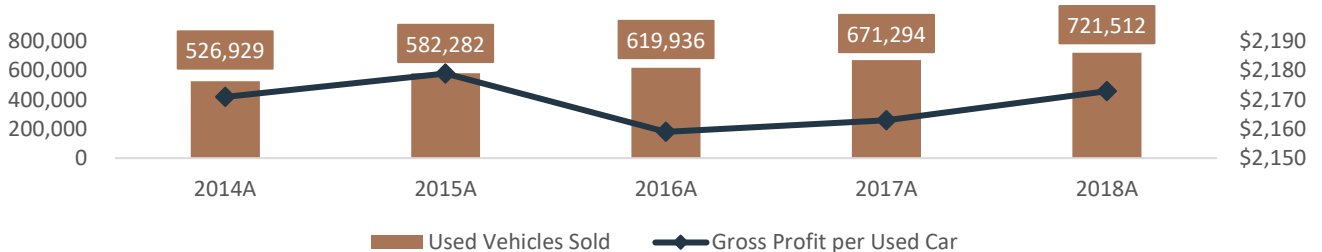


Source: Company Filings

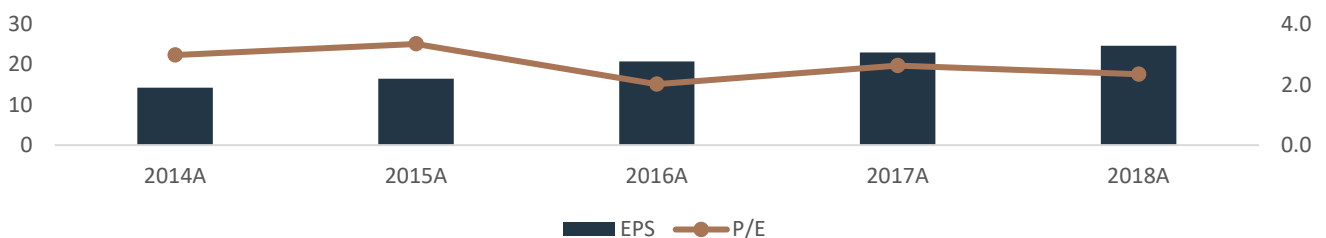
COMPARABLE STORE USED UNIT SALES



Used Car Unit Performance



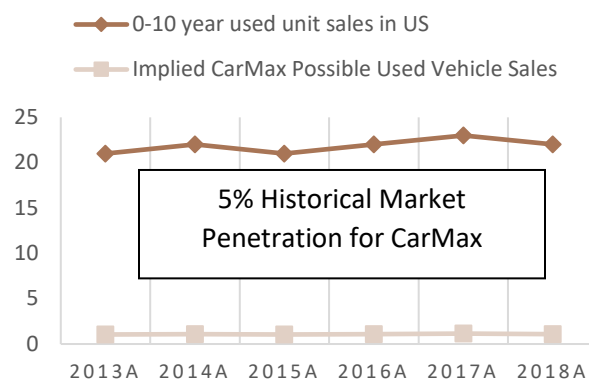
Valuation



Moat:

- CarMax pioneered the haggle free used car buying experience in 1993. The company now has 188 locations across the United States. It holds 4.7% market share in established markets and ~3% in the United States. According to company representatives, “CarMax’s share in its oldest markets is roughly twice the level of comparable market average”. This implies a ~9.5% market penetration in their oldest markets (25 years). We believe CarMax drives competitive advantage because of the following factors:
 - Proprietary vehicle acquisition data, going back to 1993, allowed CarMax to develop a national pricing algorithm which helps purchase and market vehicles at the best price. No other competitor has access to a data library that CarMax has accumulated since 1993. This advantage is reflected in CarMax’s high gross profit (~\$2,200).
 - The company developed its own dealer management software tailored to the used car business. Third-party software lacks the focus and customization of CarMax, but offerings are improving.
 - 188 physical locations, that would require ~\$4.5 billion to replicate (land, building, maintenance), provide unparalleled scale. Online competitors such as Carvana plan to grow without physical locations, but surveys show that consumers continue to prefer the “physical store experience”. Shifting consumer preferences and technological advancements pose a threat to CarMax’s brick-and-mortar strategy. Yet recent efforts by the company to create an omnichannel buying experience show that the company is well equipped to keep up with change.
 - The used car business remains a highly fragmented market with dealerships competing to sell close to identical cars. We view branding as a key differentiating factor. CarMax has done a great job at creating a brand that customers know and trust. CarMax spent \$450M on advertisement vs Carvana’s \$100M in the last three years. CarMax only spent ~\$218/car on advertisement, while Carvana just hit \$440/car in its oldest market and averages \$1,000/car in other markets. This shows that CarMax can leverage its brand to generate more profit per used car than any other competitor.

CARMAX MARKETSHARE



Company	Used unit sales	GP/car	GM %
CarMax	170,572	2147	10.7%
Penske	73,228	2038	10.3%
AutoNation	62,210	1565	7.4%
Lithia	36,114	1498	5.9%
Sonic	33,739	1318	6.6%
Group 1	27,310	1226	5.9%
Asbury	20,570	1090	5.2%
Carvana	18,464	902	5.0%

* The above numbers are quoted in articles, but they don’t provide an apples-to-apples comparison due to accounting differences between the firms. CarMax includes the profit on both the sale of the vehicle and the profit on reconditioning. Competitors roll up reconditioning profits in the Parts & Services segment of their business. This difference makes it impossible to truly compare GPU numbers, but it is certain that CarMax doesn’t benefit from a \$600 GPU premium as indicated.

Source: Autonews.com – CarMax leads all publics in used sales, profits



Section III – Industry Trends

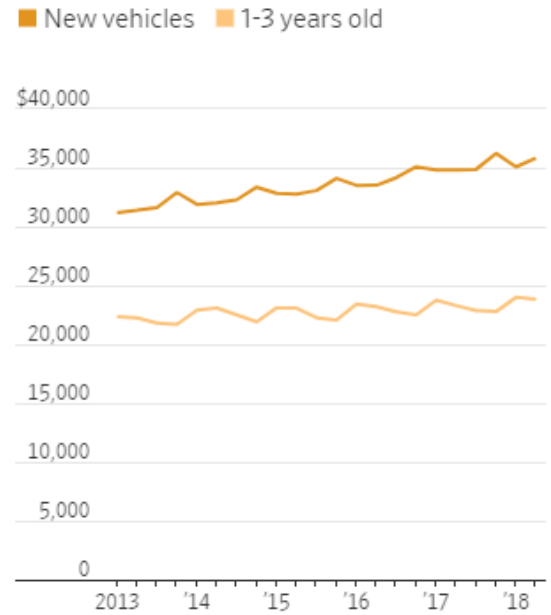
The United States car market has experienced steady recovery since the bottom of 2009, when only 10.4M new vehicles were sold. Edmunds estimates that 2018 will be another strong year for new vehicles sales (16.8M units); still off from the 2016 high of 17.5M units. Trade tensions and tariffs are starting to show up in new vehicles prices. While used vehicle pricing remained in the \$22,000-\$24,000 range, new vehicle prices topped \$35,000 for the first time ever. This trend bodes well for used car dealerships such as CarMax. Supply growth and elevated prices have started putting pressure on dealerships and manufacturers to move inventory. OEMs’ incentive spending hit record levels (\$3,500/car) to combat the increasing Days-to-Turn ratio. Aggressive pricing by manufacturers and dealers can put pressure on CarMax’s margins.

According to Edmunds, average lease penetration per year remains elevated at 31% in 2018. This translates to an estimated 3.9 million off-lease cars that CarMax can have access to. So far, the elevated supply of used cars hasn’t compressed CarMax’s margins, but we wonder how long before competitors will take advantage of the supply glut and pressure CarMax on margins.

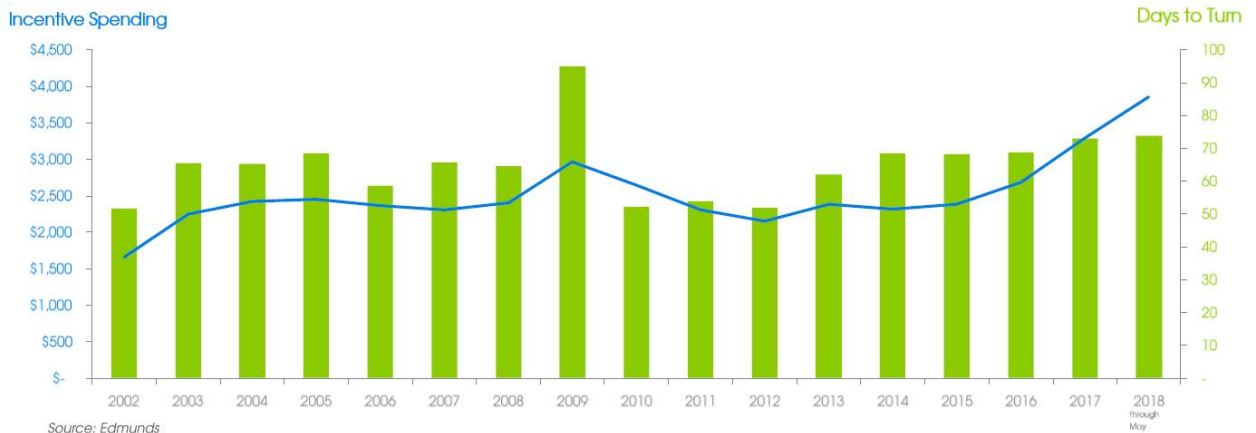
Second-hand Shift

Used vehicles are becoming more attractive as new vehicle prices continue to rise.

Average transaction price

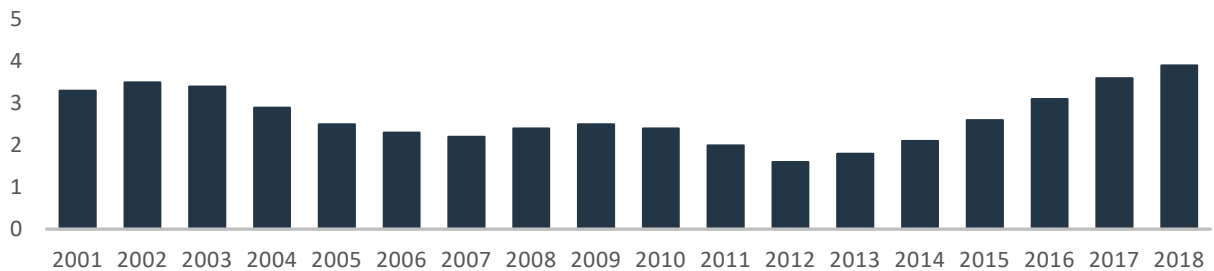


Source: Edmunds.com



Source: Edmunds

Off-lease vehicle volume returning to the U.S. auto market



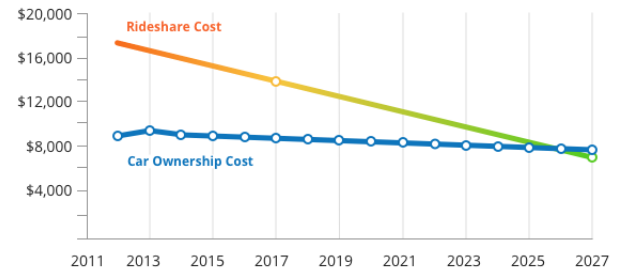
Source: Statista: Off-lease vehicle volume

Section III – Industry Trends: Ride Sharing and Homogenization

Quote from Uber Founder, Travis Kalanick: *Our intention is to make Uber so efficient, cars so highly utilized that for most people it is cheaper than owning a car.*

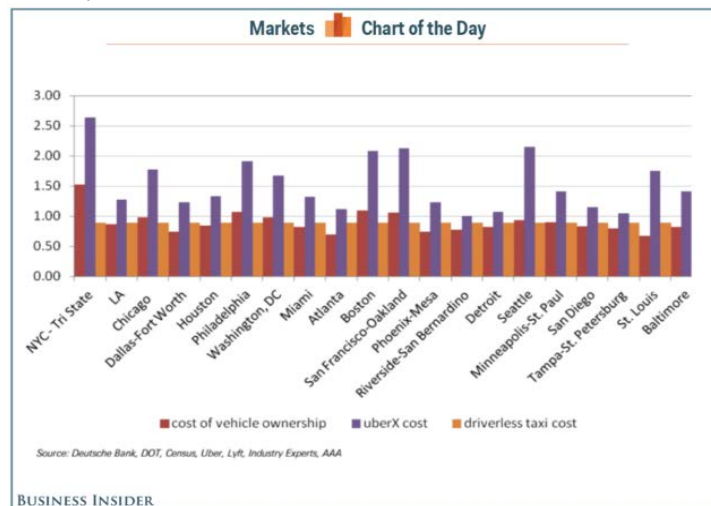
Ride sharing and autonomous vehicles are shifting the landscape of the transportation industry. A 2017 study performed by Lyft found that 250,000 of their ride sharing passengers have sold their personal car or abandoned replacing their current car due to the availability of ridesharing services. This translates to ~1.7% of average annual car sales, but ride-sharing is still a fast-growing industry. Deutsche Bank estimates that in the top 20 metropolitan areas car ownership costs \$0.90/mile, while ride sharing costs \$1.54/mile. Pool options offer a 20%-50% discount, dropping ride sharing costs to around \$1/mile. In our view, the real threat comes from the introduction of autonomous ride-sharing technology that, according to estimates, could drop transportation costs to \$0.90 - \$0.30/mile in metropolitan areas. This decreased rate means ride sharing would become more financially feasible for people in metropolitan areas.

This graph shows the trajectory of the cost of rideshare versus owning a car:



Source: Quotewizard.com, Self-driving cars will make owning a car unnecessary by Lee Prindle

In a paper released by Moody's Analytics, Dr. Tony Hughes argued that Automated Vehicle ('AV') introduction will create homogenization in the auto industry. Homogenization refers to the standardization of cars and the focus on durability over technological upgrades. Currently, car manufacturers focus on serving the needs of customers that are looking to own a car. This puts the focus on technological and design upgrades that improve end user experience. In a world dominated by AV ride-sharing services, car manufacturers would need to focus on serving the needs of ride-sharing companies that demand durability, price and fuel efficiency. In that world, used car dealerships would face an uphill battle since their business model is based on fulfilling the varying needs of individual buyers.



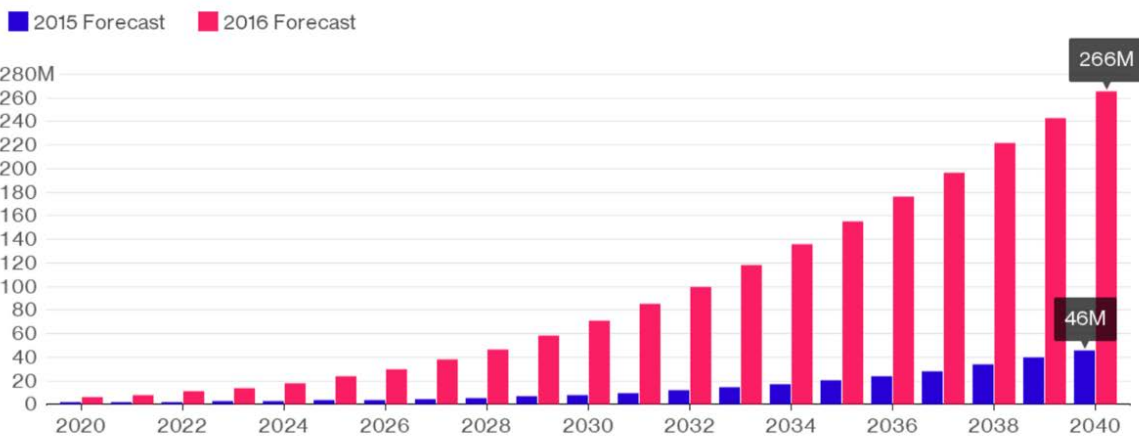
Section III – Industry Trends: EVs

Electric vehicles (EV) pose a threat to the used dealership business. CarMax built its business model around making used car buying transparent and easy. Internal Combustion Engines (ICE) vehicles on average contain 2,000+ moving parts. All these moving parts create a need for a company like CarMax to be the proven and trusted steward of selling quality/problem free used vehicles. EVs only contain 18 moving parts – 100 times fewer than ICEs. This doesn't eliminate the need for CarMax, but it does lower the value that the company can add to a used vehicle. Fewer parts also mean less replacing and higher use factors. According to the NTSB the average ICE will last around 150,000 miles while the same EV will drive at least 500,000 miles.

EVs are still undergoing rapid transformation, but adoption rate forecasts continue to adjust upward. OPEC increased their EV unit forecast 500% from 46M to 266M by 2040. Volvo announced that after 2019 they won't sell any pure ICE vehicles. France and England both indicated their intentions to ban ICEs by 2040. Tony Seba, award winning thought leader, even claims that autonomous electric vehicles will result in a 70% drop in passenger cars and trucks, resulting in the total disruption of the car value chain, with car dealers, maintenance, and insurance companies suffering almost complete destruction. While these claims are more subjective forecasts, they do provide an indication to the disruption that awaits the car industry. CarMax has been able to innovate and adjust to the changing competitive landscape since 1993, but it will face its biggest test in the coming decades.

Growing Expectations

OPEC's electric vehicle forecast grew by almost 500% last year



Source: Bloomberg New Energy Finance

Bloomberg 

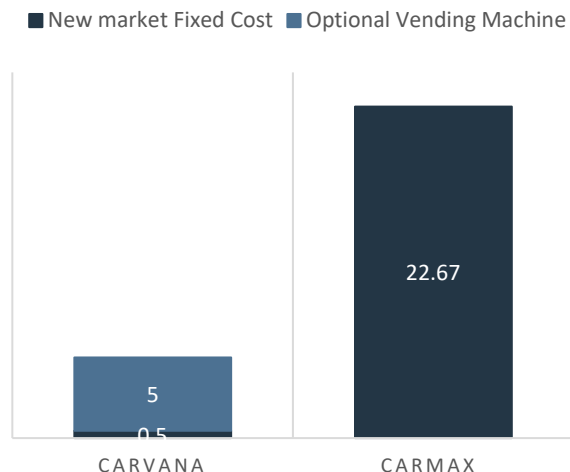
Section III – Industry Trends: Carvana

On a recent earnings call, management refrained from addressing analyst questions on the rising competition from online pure plays such as Carvana. While we agree that Carvana remains a tiny competitor, the ambitious expansion model of the company can pose a threat to CarMax in the long run. Carvana has achieved 87% revenue CAGR since its inception in 2016. The company is valued at \$8.05 billion with \$0.85 billion in sales, compared to CarMax which is valued at \$12.92 billion with \$17.10 billion in sales. Based on our assessment of the Carvana.com shopping experience, we agree that the company offers a modern, intuitive, and fast used car buying experience that is tailored toward the Millennial generation. However, CarMax’s online platform offers similar ease of use and tools, which makes us question Carvana’s sustainable competitive advantage.

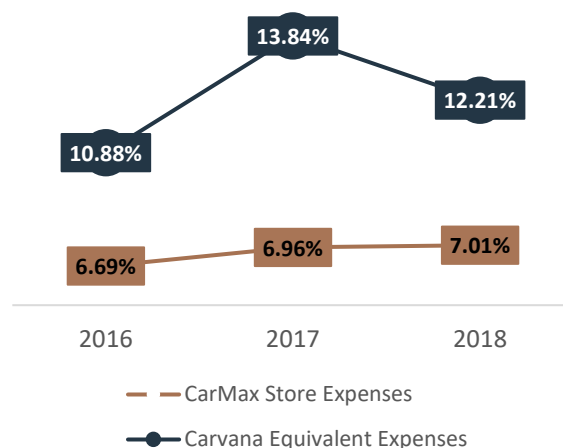
Carvana has attempted to incorporate CarMax’s business model into a pure play online strategy. According to the company’s annual report, new market expansion costs only \$0.50 million with the option of installing a vending machine for \$5 million. CarMax spends ~22.67 million in CapEx per store per year, which covers land acquisition, store building, store overhaul, and other expenses. Low fixed costs enable Carvana to expand rapidly and potentially grab market share from CarMax. This comes at the expense of higher variable costs. Based on our model, Carvana’s operational costs (compensation, logistics, store occupancy costs) were 12.21% (excluding an additional 8% in advertisement expenditure) vs. CarMax’s 7.01% (compensation, store occupancy costs). Carvana should be able to reduce these costs with scale, but we remain cautious regarding the company’s ability to address the high delivery costs of its pure play online strategy. CarMax also plans on moving into the home delivery business, but it has the infrastructure and logistics (188 stores) to handle deliveries at a lower variable cost.

Even though Carvana is called the “Amazon of the used car industry”, CarMax still dominates online. In August, CarMax.com had 14 million visitors compared to Carvana.com’s 3 million. Further, CarMax’s efforts to roll out finance pre-approvals, home delivery, online appraisal, and expedited pick up make us believe the company is on very strong footing to address rising competition from Carvana.

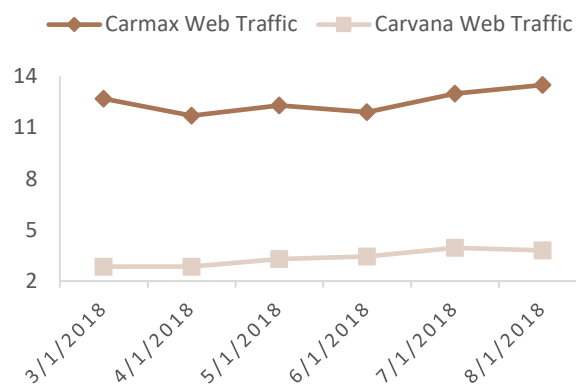
EXPANSION STRATEGY



GENERAL EXPENSES (EXCL. ADVERTISING)



CARMAX VS. CARVANA WEB TRAFFIC



Source Similarweb.com data for CarMax.com and Carvana.com

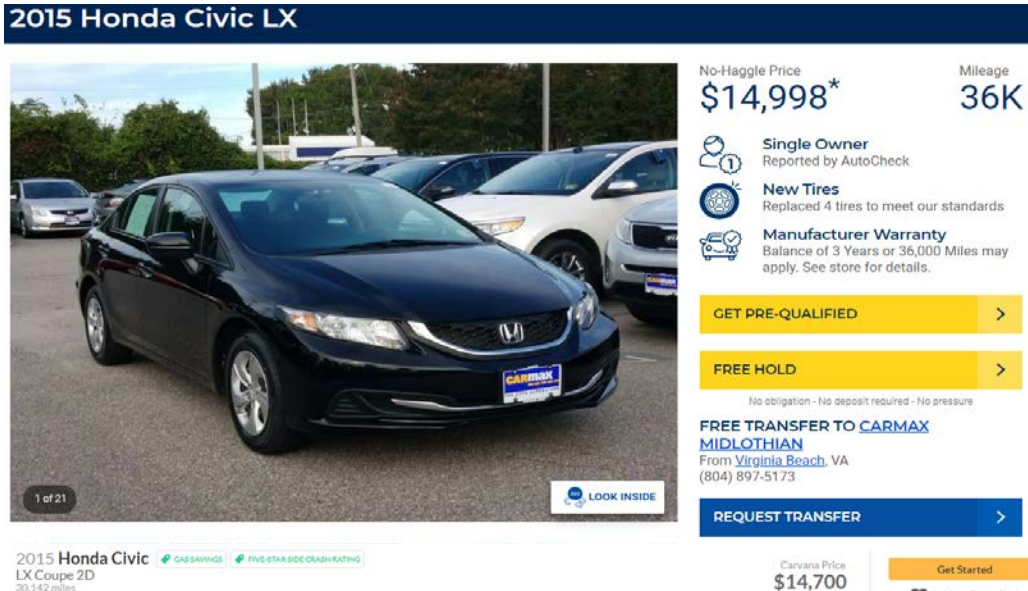
Section III – Industry Trends: Price Comparison

We have investigated purchasing all kinds of vehicles across CarMax.com, Carvana.com, and Certified Dealers, the latter of which had the best pricing and extended factory warranty offerings. CarMax.com and Carvana.com had very similar pricing for comparable vehicles. While Carvana.com had the best user interface, CarMax.com offered a more competitive solution. The major drawback of using Carvana.com was the inability to test drive the vehicle without purchasing it. Carvana starts a 3-5-day refund process after pick up from your location, which may take additional time. This could create a logistical nightmare if the test drive ends in a return.

Example of comparison shopping for a 2015 Honda Civic LX:

- **CarMax:** No haggle price at \$14,988 + fees with 36k mileage. The customer must go to a physical location to purchase the vehicle. There is possibility for a transfer fee and wait time of 3 days to make the vehicle available in desired location.
- **Carvana:** No haggle price at \$14,700 + fees with 31k mileage. Only available purchase option is free home delivery within 3 days. Customer can test drive the vehicle for 7 days.
- **Williamsburg Honda Certified Honda Dealer:** No haggle price of \$14,500 + fees with 35k mileage. As a certified pre-owned vehicle, Honda guarantees 1 year limited and 84 months powertrain warranty which is included in the price. The online experience was underwhelming compared to CarMax.com and Carvana.com, but the additional factory warranty and attractive price make for a competitive offer.

CarMax.com



2015 Honda Civic LX

No-Haggle Price **\$14,998*** Mileage **36K**

- Single Owner**
Reported by AutoCheck
- New Tires**
Replaced 4 tires to meet our standards
- Manufacturer Warranty**
Balance of 3 Years or 36,000 Miles may apply. See store for details.

GET PRE-QUALIFIED >

FREE HOLD >

No obligation - No deposit required - No pressure

FREE TRANSFER TO CARMAX MIDLOTHIAN
From [Virginia Beach, VA](#)
(804) 897-5173

REQUEST TRANSFER >

2015 Honda Civic LX Coupe 2D
30,142 miles

Carvana Price **\$14,700**

Get Started
Add to Favorites

Carvana.com



Order within **1hrs 14mins 47secs** Get it delivered as soon as **Thursday**

NO STOCK PHOTOS HERE
TAKE THE TOUR TO SEE EVERYTHING YOU NEED TO KNOW

CLICK & DRAG
TO EXPLORE 360 DEGREES

OPEN THE DOORS

FLY INTO THE INTERIOR



Section IV – Catalyst

CarMax is the largest used vehicle dealer in the United States, yet only has 4.7% market share across its markets. The used car market remains highly fragmented with roughly 18,000 franchised dealers competing against CarMax. CarMax’s scale, brand, and proprietary vehicle data all contribute to a ~\$2,150 gross profit margin/car compared to the peer average of \$1,473 + undisclosed reconditioning profit. While dealerships tend to undercut CarMax on pricing, our market research indicates that CarMax offers competitive deals for most vehicle models. CarMax’s gross profit continues to drive competitive advantage, but we remain concerned about the long-term sustainability of these figures. Increasing competition from Carvana, Penske, AutoNation, and online price aggregators such as Cars.com and Cargurus.com should continue to aid price discovery and comparison. This can pressure CarMax to lower GPU, cutting into the intrinsic value of the business.

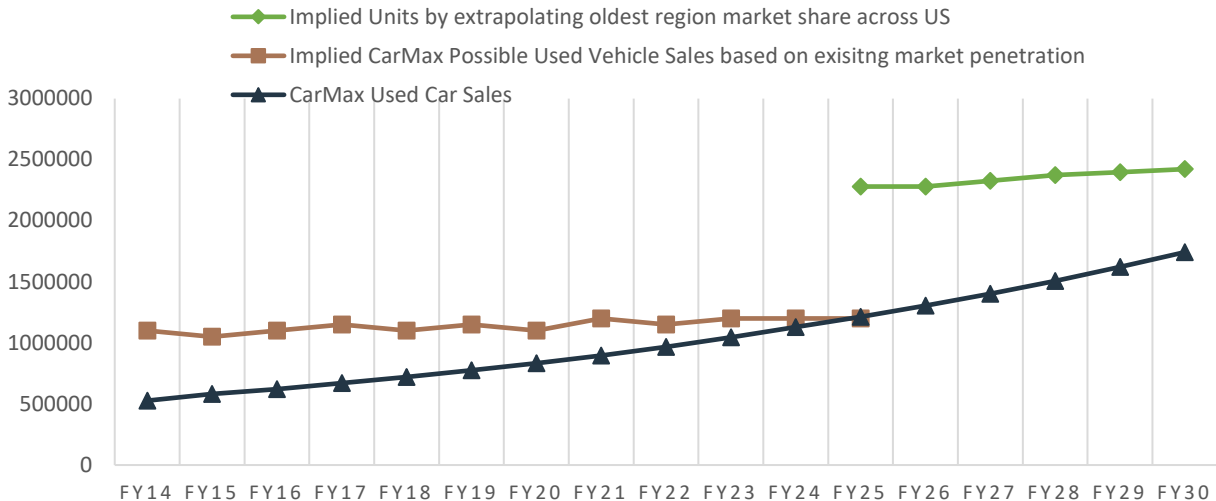
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Sonic	33,739	1318	6.6%
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Asbury	20,570	1090	5.2%
Carvana	18,464	902	5.0%

Source: AutoneWS.com – CarMax leads all publics in used sales, profits

Based on our model, CarMax can achieve long-term growth well into 2030. CarMax could sell 1.75 million used and 0.83 million wholesale vehicles by 2030. This implies a 7% market penetration for CarMax across the United States, given the 0-10-year-old used vehicle market continues to grow ~1% annually to 25.5 million units. According to company representatives, “CarMax’s share in its oldest markets is roughly twice the level of comparable market average”. This would imply ~9.5% market penetration in the 25-year-old Virginia market. This growth assumption doesn’t account for potential disruption from autonomous and electric vehicles, which could materially impact growth projections in the long-run.

CarMax is in the works of releasing an omni-channel sales bundle in the next couple of quarters. This offering will incorporate finance pre-approval, home delivery, online appraisal, and expedited pickup to the existing offerings. These new offerings can help elevate CarMax’s customer experience to a new level.

USED VEHICLE UNIT SALE MODEL





Investment Thesis, Valuation, and Scenario Analysis

CarMax, Inc. (Price Target: \$81)

Investment Thesis

CarMax operates the largest used vehicle dealership chain in the United States. It operates with a steady \$2,100-\$2,200 GPU by leveraging its scale, decades of proprietary vehicle data, in-house software systems, and significant brand recognition. Our forecast indicates that CarMax can sustain high growth rates well into 2030 by scaling its operations to 7% domestic market penetration. Competition from franchise dealers, Carvana, and online price aggregators such as Cars.com and Cargurus.com may induce margin or market share compression in the coming years. The company hopes to address rising competition by releasing new e-commerce capabilities such as online appraisal, finance pre-approval, in-home-delivery, and expedited pickup. In the long-run, CarMax might face disruption from autonomous and electric vehicles that would reduce car ownership across the country.

Valuation

Our October 2018 price target of \$81 is based on a DCF assuming a 7% market penetration by 2030 in the 0-10-year-old used car market, a terminal growth rate of 1.5, 9% WACC, and a 7.9x implied EV/EBITDA exit multiple.

Fair value per share		
	Perpetuity	EBITDA
Enterprise value	16,198	16,305
Less: Net debt	(1,451)	(1,451)
Equity value	14,747	14,853
Diluted shares	182.660	182.660
Equity value per share	\$80.73	\$81.32
<i>Market premium / (discount) to fair val</i>	(10.4%)	(11.1%)

\$81.32	7.0x	7.5x	8.0x	8.5x	9.0x
10.0%	68.88	71.70	74.51	77.33	80.14
9.5%	71.90	74.86	77.83	80.79	83.76
9.0%	75.07	78.19	81.32	84.44	87.57
8.5%	78.41	81.70	85.00	88.29	91.58
8.0%	81.93	85.40	88.87	92.35	95.82

\$80.73	0.5%	1.0%	1.5%	2.0%	2.5%
10.0%	64.43	66.55	68.93	71.60	74.63
9.5%	69.16	71.65	74.44	77.61	81.23
9.0%	74.49	77.42	80.73	84.52	88.90
8.5%	80.53	84.00	87.97	92.55	97.89
8.0%	87.43	91.59	96.38	101.97	108.58



INCOME STATEMENT (\$ in millions, except per share data)												
Fiscal year	2014A	2015A	2016A	2017A	2018A	2019P	2020P	2021P	2022P	2023P	2024P	2025P
Fiscal year end date	2/28/14	2/28/15	2/28/16	2/28/17	2/28/18	2/28/19	2/29/20	2/28/21	2/28/22	2/28/23	2/29/24	2/28/25
Revenue	12,574	14,269	15,150	15,875	17,120	18,331	19,749	20,948	22,278	23,474	24,870	26,635
Cost of sales	(10,926)	(12,381)	(13,131)	(13,692)	(14,791)	(15,811)	(17,051)	(18,051)	(19,198)	(20,223)	(21,431)	(22,963)
Gross Profit	1,649	1,888	2,019	2,183	2,329	2,521	2,698	2,897	3,080	3,251	3,439	3,672
CarMax Auto Finance Income	336	367	392	369	421	441	488	520	595	642	682	734
Selling, general & administrative	(1,155)	(1,279)	(1,352)	(1,489)	(1,617)	(1,760)	(1,896)	(1,990)	(2,116)	(2,230)	(2,363)	(2,530)
Operating profit (EBIT)	830	976	1,059	1,064	1,133	1,202	1,290	1,427	1,558	1,663	1,758	1,876
Interest income	0	0	0	0	0	1	1	1	1	1	1	1
Interest expense	(31)	(24)	(36)	(56)	(71)	(80)	(82)	(85)	(87)	(90)	(92)	(95)
Other expense	(1)	(3)	(13)	(1)	1	1	1	1	1	1	1	1
Pretax profit	797	948	1,010	1,006	1,064	1,124	1,210	1,344	1,473	1,576	1,668	1,783
Taxes	(305)	(372)	(387)	(379)	(399)	(284)	(302)	(336)	(368)	(394)	(417)	(446)
Net income	493	576	623	627	664	840	907	1,008	1,105	1,182	1,251	1,337
Basic shares outstanding	224	216	203	190	183	181	178	175	173	172	171	170
Impact of dilutive securities	4	3	2	2	2	2	2	2	2	2	2	2
Diluted shares outstanding	228	219	206	192	184	183	180	177	175	174	173	171
Basic EPS	\$2.20	\$2.67	\$3.07	\$3.29	\$3.64	\$4.63	\$5.09	\$5.76	\$6.39	\$6.88	\$7.33	\$7.88
Diluted EPS	\$2.16	\$2.64	\$3.03	\$3.26	\$3.60	\$4.59	\$5.04	\$5.70	\$6.32	\$6.81	\$7.25	\$7.80
Growth rates & margins												
Implied Rev growth from model	14.7%	13.5%	6.2%	4.8%	7.8%	7.1%	7.7%	6.1%	6.3%	5.4%	5.9%	7.1%
Implied CAF margin % of rev	2.7%	2.6%	2.6%	2.3%	2.5%	2.4%	2.5%	2.5%	2.7%	2.7%	2.7%	2.8%
Implied growth in Autofinance	12.3%	9.3%	6.7%	(5.9%)	14.1%	4.8%	10.5%	6.6%	14.4%	8.0%	6.3%	7.5%
Gross profit as % of sales	13.1%	13.2%	13.3%	13.8%	13.6%	13.8%	13.7%	13.8%	13.8%	13.9%	13.8%	13.8%
Operating margin	6.6%	6.8%	7.0%	6.7%	6.6%	6.6%	6.5%	6.8%	7.0%	7.1%	7.1%	7.0%
SG&A margin	9.2%	9.0%	8.9%	9.4%	9.4%	9.6%	9.6%	9.5%	9.5%	9.5%	9.5%	9.5%
Tax rate	38.2%	39.2%	38.3%	37.7%	37.6%	25.3%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%

Revenue Driver Model												
Fiscal Year	2014A	2015A	2016A	2017A	2018A	2019P	2020P	2021P	2022P	2023P	2024P	2025P
Used Vehicle Units	526,929	582,282	619,936	671,294	721,512	775,625	833,797	896,332	968,039	1,045,482	1,129,120	1,213,804
Average Used Selling Price	\$19,408	\$19,897	\$19,917	\$19,586	\$19,757	\$19,559	\$19,364	\$19,267	\$19,267	\$19,363	\$19,557	\$19,557
Used Vehicle Revenue	\$10,227	\$11,586	\$12,347	\$13,148	\$14,255	\$15,171	\$16,146	\$17,270	\$18,651	\$20,244	\$22,082	\$23,738
Wholesale Vehicle Units	342,576	376,186	394,437	391,686	408,509	433,020	461,166	491,142	523,066	554,450	587,717	622,980
Average Wholesale Price	\$5,160	\$5,273	\$5,327	\$5,106	\$5,102	\$5,051	\$5,000	\$4,975	\$4,975	\$5,000	\$5,050	\$5,050
Wholesale Vehicle Revenue	\$1,768	\$1,984	\$2,101	\$2,000	\$2,084	\$2,187	\$2,306	\$2,444	\$2,602	\$2,772	\$2,968	\$3,146
Total Car Sale Revenue	\$11,994	\$13,569	\$14,448	\$15,148	\$16,339	\$17,358	\$18,452	\$19,713	\$21,254	\$23,016	\$25,050	\$26,885
Other Revenue	\$580	\$699	\$701	\$727	\$781	\$824	\$869	\$917	\$972	\$1,031	\$1,092	\$1,152
TOTAL REVENUE	\$12,574	\$14,269	\$15,150	\$15,875	\$17,120	\$18,182	\$19,321	\$20,630	\$22,226	\$24,047	\$26,143	\$28,037
implied rev growth	14.70%	13.48%	6.17%	4.79%	7.84%	6.20%	6.26%	6.78%	7.73%	8.19%	8.72%	7.25%

CAF Unit	2014A	2015A	2016A	2017A	2018A	2019P	2020P	2021P	2022P	2023P	2024P	2025P
Used Vehicle Sales	526,929	582,282	619,936	671,294	721,512	775,625	837,675	904,689	977,065	1,045,459	1,118,641	1,196,946
Vehicle units financed	218,706	243,264	265,426	297,043	310,739	341,275	376,954	398,063	420,138	449,547	481,016	514,687
Net penetration	40.9%	41.8%	42.8%	44.2%	43.1%	44.0%	45.0%	44.0%	43.0%	43.0%	43.0%	43.0%
Loan To Value		94%	95%	95%	95%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%
Used Average Selling Price	19,408	19,897	19,917	19,586	19,757	19,777	19,777	19,480	19,246	19,015	18,882	18,977
Net Loans Originated	4,184	4,728	5,171	5,643	5,962	6,412	7,082	7,367	7,682	8,121	8,629	9,279
Avg. Contract Rate	7.0%	7.1%	7.3%	7.4%	7.8%	8.0%	7.8%	7.6%	7.5%	7.5%	7.5%	7.5%
Credit Score		701	702	706	707	706	705	705	705	705	705	705
Avg Term Months	65.4	65.8	65.9	65.4	65.8	65.5	65.5	65.5	65.5	65.5	65.5	65.5
Avg. Term Years	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Interest and fee income	548	604.9	682.9	762	856.6	992.5	1068.8	1083.2	1114.7	1178.4	1252.1	1346.4
Interest expense	-90	-96.6	-127.7	-171.4	-215	-322.5	-328.9	-299.3	-252.7	-251.4	-267.1	-287.2
Net Income	458	508.3	555.2	590.6	641.6	669.9	739.9	783.9	862.0	927.0	985.0	1059.2
Provision for losses	-72.2	-82.3	-101.2	-150.6	-137.6	-138.3	-152.8	-158.9	-165.7	-175.2	-186.1	-200.1
Expenses	-49.6	-58.7	-62	-71	-82.8	-90.3	-99.4	-105.1	-101.4	-109.6	-116.4	-125.2
CarMax Auto Finance Income	336.2	367.3	392	369	421.2	441.3	487.8	519.9	594.9	642.3	682.4	733.8

Source: Company Reports, Bloomberg

October 10, 2018

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BALANCE SHEET												
Fiscal year	2014A	2015A	2016A	2017A	2018A	2019P	2020P	2021P	2022P	2023P	2024P	2025P
Fiscal year end date	2/28/14	2/28/15	2/28/16	2/28/17	2/28/18	2/28/19	2/29/20	2/28/21	2/28/22	2/28/23	2/29/24	2/28/25
Cash & equivalents ST & LT market. securities	628	28	37	38	45	235	783	1,105	2,005	2,617	3,434	4,450
Restricted Cash From Auto Loans	259	294	344	380	399	429	459	489	519	549	579	609
Accounts Receivables	80	138	132	152	133	156	168	178	156	188	199	213
Inventory	1,641	2,087	1,932	2,261	2,391	2,593	2,762	2,888	3,110	3,296	3,515	3,789
Current Assets	2,609	2,546	2,445	2,832	2,968	3,413	4,172	4,661	5,790	6,651	7,727	9,062
Auto Loan Receivables	7,148	8,436	9,537	10,596	11,536	12,406	13,703	14,253	14,863	15,712	16,695	17,952
Property, plant & equipment	1,653	1,863	2,162	2,518	2,667	2,810	2,949	3,096	3,295	3,504	3,715	3,934
Deferred income taxes	160	176	162	151	63	93	123	98	73	73	73	73
Other Assets (C & L)	138	178	154	182	252	282	262	272	282	292	302	312
Total assets	11,707	13,198	14,460	16,279	17,486	19,004	21,209	22,380	24,303	26,233	28,512	31,333
Accounts payable	427	455	442	495	530	660	711	754	802	845	895	959
Accrued expenses and other current liabilities	203	250	246	266	279	294	309	324	339	354	369	384
Accrued income taxes	2	2	2	1	0	-	-	-	-	-	-	-
TOTAL CURRENT LIABILITIES	633	707	690	763	809	954	1,020	1,078	1,141	1,199	1,264	1,343
LT Debt (include current portion)	335	639	1,129	1,449	1,496	1,596	1,646	1,696	1,746	1,796	1,846	1,896
Non-recourse notes payable (including current portion)	7,248	8,471	9,507	10,721	11,622	12,282	13,703	14,110	14,863	15,555	16,528	17,952
Other liabilities	174	225	229	239	243	243	243	243	243	243	243	243
TOTAL LIABILITIES	8,390	10,041	11,555	13,171	14,169	15,074	16,611	17,127	17,992	18,793	19,880	21,434
Common stock / additional paid in capital	1,149	1,228	1,228	1,282	1,324	1,464	1,619	1,790	1,966	2,149	2,337	2,535
Treasury stock	0	0	0	0	0	(367)	(762)	(1,285)	(1,508)	(1,743)	(1,992)	(2,258)
Retained earnings / accumulated deficit	2,214	1,994	1,747	1,883	2,047	2,887	3,794	4,803	5,907	7,089	8,340	9,677
Other comprehensive income / (loss)	(46)	(65)	(70)	(57)	(54)	(54)	(54)	(54)	(54)	(54)	(54)	(54)
Total equity	3,317	3,157	2,905	3,109	3,317	3,930	4,598	5,253	6,311	7,440	8,631	9,900
<i>Balance check</i>	0	0	0	0	0	0	0	0	0	0	0	0
Ratios												
Net debt	(293)	611	1,092	1,410	1,451	1,361	863	591	(259)	(821)	(1,588)	(2,554)
Auto Loan Receivables Days	207 days	216 days	230 days	244 days	246 days	247 days	253 days	248 days	244 days	244 days	245 days	246 days
Asset turnover (Revenue / Total assets)	1.07x	1.08x	1.05x	0.98x	0.98x	0.96x	0.93x	0.94x	0.92x	0.89x	0.87x	0.85x
Net profit margin	3.9%	4.0%	4.1%	3.9%	3.9%	4.6%	4.6%	4.8%	5.0%	5.0%	5.0%	5.0%
Return on Assets	4.2%	4.4%	4.3%	3.9%	3.8%	4.4%	4.3%	4.5%	4.5%	4.5%	4.4%	4.3%
Return on Equity	14.9%	18.3%	21.5%	20.2%	20.0%	21.4%	19.7%	19.2%	17.5%	15.9%	14.5%	13.5%
Return on Invested Capital	13.5%	15.3%	15.3%	14.2%	13.9%							
Debt/Equity	10.1%	20.2%	38.9%	46.6%	45.1%	40.6%	35.8%	32.3%	27.7%	24.1%	21.4%	19.2%
Inv/CA	63%	82%	79%	80%	81%	76%	66%	62%	54%	50%	45%	42%
Inventory	2014A	2015A	2016A	2017A	2018A	2019P	2020P	2021P	2022P	2023P	2024P	2025P
Beginning of period	1,518	1,641	2,087	1,932	2,261	2,391	2,593	2,762	2,888	3,110	3,296	3,515
Increases / (decreases)	124	445	(155)	329	130	202	169	126	222	186	218	274
End of period	1,641	2,087	1,932	2,261	2,391	2,593	2,762	2,888	3,110	3,296	3,515	3,789
Inventory as % of COGS	15.0%	16.9%	14.7%	16.5%	16.2%	16.4%	16.2%	16.0%	16.2%	16.3%	16.4%	16.5%
Inventory turnover	6.7x	5.9x	6.8x	6.1x	6.2x	6.1x	6.2x	6.3x	6.2x	6.1x	6.1x	6.1x
Inventory Days	54.8x	61.5x	53.7x	60.3x	59.0x	59.9x	59.1x	58.4x	59.1x	59.5x	59.9x	60.2x
Inv % of Rev	13.1%	14.6%	12.8%	14.2%	14.0%	14.1%	14.0%	13.8%	14.0%	14.0%	14.1%	14.2%
PROPERTY, PLANT & EQUIPMENT	2014A	2015A	2016A	2017A	2018A	2019P	2020P	2021P	2022P	2023P	2024P	2025P
Beginning of period						2,667	2,810	2,949	3,096	3,295	3,504	3,715
Plus: Capital expenditures						341	346	377	423	446	448	466
Less: Depreciation						(198)	(207)	(230)	(224)	(236)	(237)	(247)
End of period	1,653	1,863	2,162	2,518	2,667	2,810	2,949	3,096	3,295	3,504	3,715	3,934
Capex (enter as +)	305	304	314	417	297	341	346	377	423	446	448	466
Capital expenditures as % of revenue	2.4%	2.1%	2.1%	2.6%	1.7%	1.9%	1.8%	1.8%	1.9%	1.9%	1.8%	1.8%
Depreciation (enter as -)	(90)	(106)	(127)	(141)	(159)	(198)	(207)	(230)	(224)	(236)	(237)	(247)
Depreciation as a % of capital expenditures	29.6%	34.8%	40.4%	33.7%	53.5%	58.0%	60.0%	61.0%	53.0%	53.0%	53.0%	53.0%

Source: Company 10-K

Free cash flow buildup										
Fiscal year	2016A	2017A	2018A	2019P	2020P	2021P	2022P	2023P	2024P	2025P
Fiscal year end date	2/29/12	2/28/17	2/28/18	2/28/19	2/29/20	2/28/21	2/28/22	2/28/23	2/29/24	2/28/25
EBITDA	831	1,324	1,375	1,470	1,583	1,757	1,889	2,012	2,115	2,250
EBIT	700	1,064	1,133	1,202	1,290	1,427	1,558	1,663	1,758	1,876
tax rate	38.0%	37.7%	37.6%	25.3%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
EBIAT (NOPAT)	434	663	707	898	968	1,070	1,169	1,248	1,319	1,407
Depreciation and amortization				198	207	230	224	236	237	247
Stock based compensation				70	85	100	107	112	119	127
Restricted Cash From Auto Loans				(30)	(30)	(30)	(30)	(30)	(30)	(30)
Accounts Receivables				(22)	(12)	(10)	22	(32)	(11)	(14)
Inventory				(202)	(169)	(126)	(222)	(186)	(218)	(274)
Auto Loan Receivables				(870)	(1,297)	(550)	(610)	(850)	(982)	(1,258)
Deferred income taxes				(30)	(30)	25	25	0	0	0
<u>Other Assets (C & L)</u>				(30)	20	(10)	(10)	(10)	(10)	(10)
Accounts payable				130	51	43	48	43	50	64
Accrued expenses and other current liabilities				15	15	15	15	15	15	15
Accrued income taxes				0	0	0	0	0	0	0
Non-recourse notes payable (including current portion)				659	1,421	408	752	692	972	1,425
Other liabilities				0	0	0	0	0	0	0
Unlevered CFO				786	1,229	1,165	1,490	1,239	1,461	1,698
Less: Capital expenditures				(341)	(346)	(377)	(423)	(446)	(448)	(466)
Less: Purchases of intangible assets				0	0	0	0	0	0	0
Unlevered FCF				445	883	788	1,067	793	1,013	1,232

Perpetuity approach

Normalized FCF in last forecast period (t)	1,716
Normalized FCF ^{t+1}	1,741
Long term growth rate (g)	1.5%
Terminal value	24,241
Present value of terminal value	9,026
Present value of stage 1 cash flows	7,172
Enterprise value	16,198
<i>Implied TV exit EBITDA multiple</i>	<i>7.907x</i>

Exit EBITDA multiple approach

Terminal year EBITDA	3,066
Terminal value EBITDA multiple	8.0x
Terminal value	24,528
Present value of terminal value	9,133
Present value of stage 1 cash flows	7,172
Enterprise value	16,305
<i>Implied TV perpetual growth rate</i>	<i>1.582%</i>

Fair value per share

	Perpetuity	EBITDA
Enterprise value	16,198	16,305
Less: Net debt	(1,451)	(1,451)
Equity value	14,747	14,853
Diluted shares	182.660	182.660
Equity value per share	\$80.73	\$81.32
<i>Market premium / (discount) to fair val</i>	<i>(10.4%)</i>	<i>(11.1%)</i>



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