Kerrisdale Capital

February 2024

Carvana Co. (CVNA)

Time to Hit the Brakes

We are short shares of Carvana (CVNA), a poorly capitalized, growth-challenged auto retailer now valued at an absurd *$19 billion (42x EV/2024E EBITDA)* following last Friday's 30%+ pop in share price. Prior to this move, Carvana's valuation was already stretched – now, its share price is so ridiculous that it doesn't just trade at levels unheard of for an auto dealer, it trades at a premium to leading tech companies. Carvana does not have a brighter path to profitable growth than CarMax, let alone Microsoft. While tech peers drive an exciting revolution in AI, Carvana shareholders are at risk of being run over to help pay down billions in high yield debt with 14% PIK interest.

Throughout 2023 Carvana management focused on improving profitability to stave off a looming balance sheet crisis. Shares have long since transitioned from trading as a distressed equity to pricing in a return to meaningful growth (at $50 prior to earnings, Carvana had a $10bn market cap). This renders market exuberance over Carvana's fundamentally mixed 4Q23 results all the more inexplicable. Carvana reported a *miss* across major metrics in 4Q and called for only "slight" unit growth in 1Q24. This was all excused by the market in favor of 1Q24 guidance for better-than-expected EBITDA – a move we find problematic as by our estimation, Carvana's stock discounts not just improving profitability, but a *substantial* acceleration in unit volume. We estimate that not only does EBITDA per unit need to double, but vehicle sales and revenue must grow at an unrealistic *18% CAGR for 7 years* just to arrive at the current stock price. Contrary to the stark re-rating in Carvana's shares, consensus revenue estimates coming out of the print actually *fell* post earnings.

In addition to the disappointing growth outlook, there are signs that further improvement in unit economics is nearing an end. Having reached levels consistent with CarMax, gross profit per retail unit has plateaued over the last 3 quarters. This is a noteworthy development not only because gains in this metric have served as a key catalyst for shares, but because it highlights how unremarkable Carvana's unit economics are when compared to true industry leaders. Carvana has had to work tirelessly over the past two years to simply match the same levels CarMax has consistently achieved *for years.*

With growth forestalled and unit economics no longer a source of meaningful upside, investors should finally awaken to the glaring fact that Carvana is not a disruptive technology company. As told to us by former Carvana executives, the company is "just a dealership." Consequently, if Carvana wants to grow without sacrificing its hard-earned improvement in profitability, it must grow responsibly like any other dealership, particularly given its exposure to subprime consumers and the need to manage a still severely over-levered balance sheet.

As profitability strides inevitably lose their appeal and the constraints on Carvana's business are laid bare, so too will the vulnerability of Carvana's current valuation. At present levels, Carvana's enterprise value is a staggering *40% greater than CarMax's* despite selling half the number of retail units and having no demonstrable advantage in terms of margins, market share, or capital allocation. We believe Carvana shares should at the very least converge to trade at multiples in line with CarMax. Applying a 12x multiple to our estimated 2026E EBITDA yields a price target of $16 (-77%).

Investment Summary

Capitalization and Financial Summary

$ Millions except per share data	
CVNA share price	$70.00
Class A common shares	116
Class B common shares	86
Total shares outstanding	202
Market capitalization	**$14,133**
Total asset-based financing	1,713
Senior secured notes (PIK toggle)	4,193
Accrued PIK interest	185
Senior unsecured notes	205
Total debt	**6,296**
Less: unrestricted cash	(530)
Less: fin. receivables facilities	(848)
Adj. net debt	**4,918**
Adj. enterprise value	**$19,051**
Net leverage: [2]	
LTM	14.5x
2024E	11.2x

Financial Summary ($ mm)	2022A	2023A	2024E	2025E	2026E
Retail units	412,296	312,847	333,149	359,801	388,585
change	*-3%*	*-24%*	*6%*	*8%*	*8%*
Wholesale units	193,260	156,545	164,147	175,316	187,097
change	*14%*	*-19%*	*5%*	*7%*	*7%*
Total revenue	13,604	10,771	11,037	11,651	12,677
change	*6%*	*-21%*	*2%*	*6%*	*9%*
Gross profit (GAAP)	1,246	1,724	1,889	2,060	2,234
margin	*9%*	*16%*	*17%*	*18%*	*18%*
Adj. EBITDA (company defined)	(1,041)	339	453	553	687
margin	*NM*	*3.1%*	*4.1%*	*4.7%*	*5.4%*
Less: cash interest expense [1]	(423)	(538)	(98)	(98)	(525)
Less: cash taxes	(3)	(28)	(20)	(20)	(20)
Less: total capex	(512)	(87)	(100)	(120)	(120)
Free cash flow	(1,979)	(314)	235	315	22
PIK interest [1]		185	553	626	-
Valuation					
EV / Sales	1.4x	1.8x	1.7x	1.6x	1.5x
EV / Gross Profit	15.3x	11.1x	10.1x	9.2x	8.5x
EV / EBITDA	NA	NA	42.1x	34.5x	27.7x

Source: Kerrisdale analysis and estimates, Carvana SEC filings.

1. *2024E and 2025E cash and payment-in-kind (PIK) interest assumes 9% cash / 12% PIK senior secured notes due 2028, 11% cash / 13% PIK senior secured notes due 2030, and 9% cash / 14% PIK senior secured noted due 2031 are fully PIK interest for first two years at their respective rates. 2026E assumes full cash interest.*
2. *Includes roll-forward of PIK interest on debt balances and free cash flow in 2024E net leverage.*

Mixed 4Q23 Results and Disappointing Unit Guide

Shares have soared +32% on 4Q23 results we view as mixed, at best. 4Q units, revenue, and EBITDA all missed consensus expectations. These negatives were overlooked in favor of 1Q24 EBITDA guidance to be “significantly above” $100m (versus estimates of ~$73m heading into the print) and for the first time in two years, a return to “slight” retail unit growth in 1Q24 on a y/y basis. Note, this unit outlook was below where street expectations were set (we believe street estimates have slid to mid-single-digits unit growth from high-single-digits), meaning in a somewhat unusual twist for a stock positioned as a growth story, shares have risen sharply despite a ~3% *downward* revision to consensus revenue estimates post print (see Appendix I).

What Carvana needs and its stock price implicitly discounts, is not only profitability enhancements which we believe are running out of steam, but acceleration of volume far in excess of “slight” unit growth.

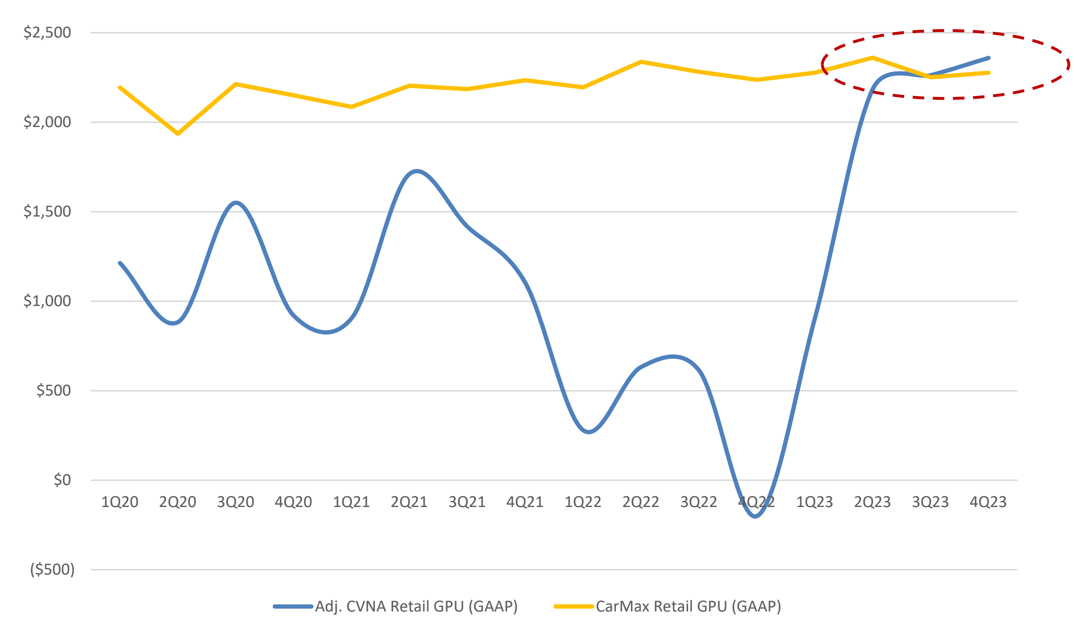
Retail GPU Improvements Are Running out of Steam

After two years focused on improving efficiency, there are signs that gains in retail per unit economics – a key driver of overall profitability – are slowing. As management noted on the call, retail GPU has plateaued in the "$2,800 plus area" for the last three quarters and 1Q is expected to land in a similar spot.

In addition, though it failed to garner any mention on the analyst call, the 4Q23 shareholder letter included an interesting section (p.7) comparing definitional differences in Carvana's reported retail GPU versus industry peers. The note begins by highlighting Carvana's use of non-GAAP retail GPU (which excludes non-cash expenses such as stock-based compensation and depreciation) versus peers which use GAAP. It then mentions how Carvana includes limited warranty expenses and outbound logistics in SG&A, versus peers which more intuitively record these items in cost of sales. In total, these disparities account for over ~$500 in reported retail GPU versus peers (we estimate closer to ~$600) – a material difference.

The note does not name any industry peer specifically, but CarMax is Carvana's clearest and closest competitor. In CarMax's latest reported fiscal quarter (ending November 2023), the company reported $2,277 in GAAP retail GPU. If one adjusts Carvana's ~$2,900 non-GAAP retail GPU reported in 2H23 to account for these definitional differences, we estimate the comparable metric would be ~$2,300, remarkably similar to CarMax, as shown below.

Carvana Retail GPU (GAAP) versus CarMax [1]



Source: Carvana quarterly shareholder letters, CarMax SEC earnings press releases, Kerrisdale Analysis.

1. *Adj. CVNA Retail GPU (GAAP) is Carvana's reported GAAP retail GPU adjusted for Kerrisdale estimated differences in accounting for outbound logistics and limited warranty expense as detailed in the company's 4Q23 shareholder letter.*

We think this comparison to CarMax is important for several reasons:

1) It places Carvana's celebrated profitability improvement in proper context. Carvana's unit economics are *not* remarkable when compared to industry peers. Carvana has worked tirelessly over the past two years to survive self-inflicted balance sheet woes and succeeded in raising horrendous unit economics not to "historically unprecedented" levels as described in the letter, but to merely the *same* levels CarMax has achieved with metronomic reliability *for years.*
2) It strongly suggests further retail GPU upside will be limited given that unit margins are now tracking in-line with CarMax. As we later describe, this similar level of achievement is not a coincidence. Carvana's operations manager ranks are littered with former CarMax employees (a representative sample of dozens found on LinkedIn). According to a former ADESA executive we spoke with, teams from CarMax effectively photocopied CarMax's operations playbook in order to install proper reconditioning and logistics operations for Carvana (more later on this in the report).
3) The analysis underscores the advice of multiple former Carvana executives we have interviewed to *not* confuse the company as anything other than "just a dealership" subject to the same (if not worse) constraints on growth as others within the industry now that it's being held accountable for profitability.

Returning to (Modest) Growth

Returning to growth without undoing the hard-earned gains on profitability is not as easy as pushing an ignition start button. On the last analyst call, Carvana CFO Mark Jenkins acknowledged incremental costs (staffing, outsourcing of select reconditioning services) would be necessary upon a return to unit volume growth. While Jenkins downplayed the magnitude of these costs, in a February 16 call hosted by expert network Guidepoint, a former Carvana Director of Operations outlined a range of challenges to reaccelerating growth that should give bulls pause.

Optimizing operations for profit in the used car business boils down to flipping cars as quickly as possible. Carvana has achieved improved sales cycles by focusing on selling cheaper, higher mileage cars, sourced directly from consumers (85% of retail units are purchased from consumers as opposed to auctions) and sold to buyers located within the same regional market as the vehicle's reconditioning site (and/or implementing fees for longer distance delivery). Based on data from a 3rd party analytics provider, Carvana's average online days to sale is now less than 40, down substantially from ~70 days in mid-2020 and the disastrous spike above 100 in 2H22 when Carvana aggressively built inventory right before the used car market collapsed. (See: Appendix II for charts from the 3rd party data provider which capture changes in Carvana's inventory management, average selling price, and average delivery and inventory miles.)

Re-accelerating growth while maintaining core aspects of this profit maximizing strategy will not be easy. First, while sourcing cars directly from the public is more cost effective than buying from auctions, you pay for what you get. Cars purchased directly from consumers can often be older, dirtier, and have more mechanical damage. Significantly higher volumes of these harder-to-recondition vehicles risks bottlenecks in production or needing to hire more expensive third parties to recondition the vehicles. According to the former Carvana director, finding additional skilled labor to recondition interiors, repair chrome, perform body work, etc. at inspection centers typically located away from city centers is "extremely difficult" in the presently tight job market. While the efficiencies and physical capacity which Carvana has installed in recent years *theoretically* can manage much higher volumes internally, the former director stated "actually, on the ground performing [to] that level of volume is extremely difficult." Second, lower priced used vehicles are the most supply-constrained segment of an overall used vehicle market which continues to feel supply constraints stemming from lower new-vehicle sales in 2021 and 2022. There is a limited supply of inexpensive, high mileage, yet still reasonable-to-recondition cars which fit Carvana's specific profit maximizing algorithm in the current environment. And even if more cheap cars were available, if a buyer requires financing, the average auto loan rate for a used vehicle now stands at a prohibitive 14.25%.

All of the preceding is to emphasize the comprehensive manner in which Carvana has pivoted to favoring profit across every facet of its business – from customer acquisition to purchasing strategy to reconditioning standards. Having "succeeded" (these changes resulted in retail units collapsing -24% in 2023, compared with CarMax at -5%), Carvana cannot simply flip a switch or tweak an algorithm to roll more cars through its assembly lines. Pivoting to accelerated growth in the present environment means increasing advertising, dropping fees / increasing discounting, pre-investing in expanded inventory, or some combination of these actions which would sacrifice unit economics. As the former Director of Operations explained:

> *"I think that if Carvana has the ability to control the volume at which they're ramping,* ***they're much more likely to succeed than if they are putting themselves in a position where they want to ramp to the volume that the market requires or the market wants****…if [Carvana] can take their time and grow as they please based on the systems they have in place, there will be challenges, but it's doable.* ***If they have to ramp beyond what they're comfortable with, the only levers you can pull is to spend money****." [emphasis added]*

The days when Carvana can recklessly chase growth without regard for the bottom line are gone. Carvana now faces the same trade-offs that constrain all used car dealerships. Carvana can grow modestly in line with the industry while preserving unit economics, or aggressively ramp unit growth and destroy its recent profitability achievements. It cannot do both.

What's Priced in at $70?

Below we walk though an analysis of what we believe are a host of unrealistic long-term growth assumptions that one must make to justify the current stock price. In sharp contrast to the inherent challenges to growth as described above, we estimate the market is ascribing unit growth CAGRs of *18% over 7 years* to reach one million retail units by around 2030E. This would represent ~2.5% market penetration of an estimated ~40m used vehicles, or *2.5x* the market share Carvana presently holds. Note, based on 3rd party dynamic market share data (see: Appendix II), this would require Carvana to not just reverse eroded market share but raise penetration of all markets to levels *above* that of its longest tenured markets, all in 7 years. After *10 years*, 2013 launched markets are still only ~2% penetrated.

Layered onto this wildly optimistic unit growth forecast, we apply pandemic level average selling prices nearing $25k per vehicle and EBITDA per retail unit of $2,700 (~2x what Carvana and CarMax are generating currently after a prolonged period focused on profitability) to produce total EBITDA of $2.7bn, an 8% EBITDA margin (inline with the lower boundary of Carvana's long-term margin target, p.8). Even with these generous assumptions, a 16x EBITDA growth tech multiple, discounted at 12%, is required to return Carvana's current $70 price.

While admittedly assumption laden, the lynchpin of this analysis is the unit and revenue growth CAGR of 18%, a figure that is 3x that of CarMax and far exceeds consensus revenue growth expectations for dominant, capital light, pristine balance sheet tech companies such as Meta, Microsoft, Uber, Alphabet, and Netflix (see: Appendix III).

What's Embedded in Carvana's Share Price?

		Comment
Used vehicle SAAR (mm)	40	Consistent with pre-pandemic used vehicle SAAR [1]
Market share	2.50%	2.5x current market share
2030E Retail Units	1,000,000	
2023A retail units	312,847	
CAGR	18%	Unrealistic, 3x higher than KMX, above even leading growth tech companies….
Years	7	…and over a very long time for a highly levered subprime exposed cylical business
Retail ASP	$24,870	Inline with 2022 pandemic level ASPs
Retail revenue	24,870	
Total revenue	35,028	
EBITDA per retail unit	$2,700	2x current EBITDA per retail unit
Total EBITDA ($mm)	$2,700	
Margin	8%	Inline with lower end of long-term EBITDA margin target
Assumed multiple	16x	Inline with EV / '26E EBITDA multiples for mid-teens rev growth tech companies.
Target EV	42,120	
Discount rate	12%	
NPV of Target EV	$19,053	
Implied market cap	$14,135	
Implied stock price	$70	

Source: Kerrisdale analysis.
(1) Autonews.com

Copying the CarMax Playbook

> *You were copying CarMax's playbook when it came to reconditioning for Carvana? [Kerrisdale]*
>
> *"Absolutely. Literally, I had to laugh because I had documents in my possession where if you took the logo off, it was the exact same verbiage, the exact same formatting on a page – it was kind of scary."*
>
> — Former ADESA Director and Operations Manager at CarMax, 20+ years auto industry operations experience

During our research, we interviewed a former executive at both ADESA and CarMax, who was flabbergasted at the level of inefficiency and unsophistication he found in Carvana's reconditioning centers following the company's purchase of ADESA in May 2022. He explained how he was initially quite excited to see how "the big boys" approached reconditioning, only to realize shortly afterward that the "big boys" were great at maximizing volume (and dis-regarding costs) but did not have any idea how to properly run a complex reconditioning and logistics business. To his great dismay, the Silicon Valley of the used car business was actually "light years behind us."

According to the ADESA executive, with Carvana's internal resources lacking, the company resorted to poaching industry veterans from CarMax who effectively copied many of the industry-best processes and procedures CarMax developed. The aping of CarMax extends to the very manner in which Carvana has converged its business model to having decentralized, brick-and-mortar infrastructure – just like any other large dealership group.

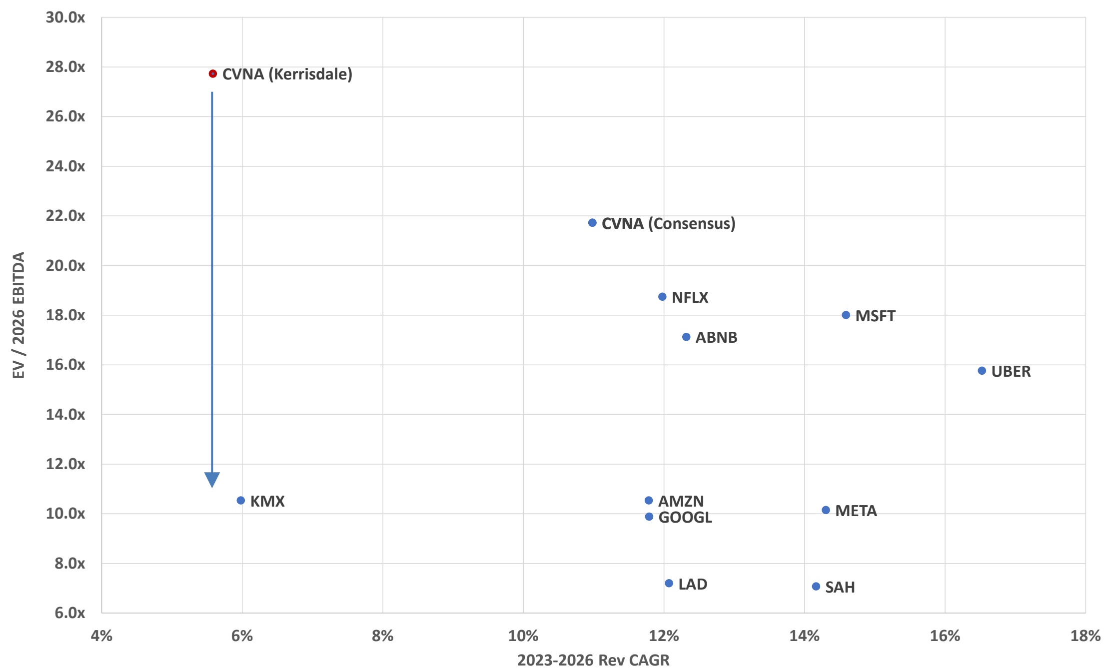
When CEO Ernest Garcia on the most recent quarterly call described how Carvana's customer offering is "stronger than ever" he referenced how the increased number of facilities has enabled moving cars to and from inspection centers with 20%-30% fewer miles than a year ago. Later in the call, Jenkins referenced 1Q EBITDA per unit guidance of significantly more than $1,200 as proof Carvana's vertically integrated online nationwide sales model worked. The key to a better customer offering and unit economics cited by management, however, is precisely because Carvana abandoned its original infrastructure light, centralized hub and spoke logistics model after realizing it *did not* scale effectively. Carvana has only now posted acceptable unit economics because it has increased physical infrastructure, shifted inventory to be less available nationwide, and reduced the distance to customers. In effect, it has become more like CarMax which has 248 locations nationwide.

Once again, as was the case with retail GPU, Carvana's guidance for over $1,200 in adjusted EBITDA per unit is only remarkable from the perspective of how deeply negative this figure once was. We estimate for its fiscal 2024 CarMax will also post over $1,200 in adjusted EBITDA per retail unit, much as it has every year for the last five.

Valuation

Understanding the similarities in business practices, unit economics, and longer-term growth between Carvana and auto industry peers is important given the vast disparity in trading levels (see Appendix III for auto dealership comps). Carvana not only trades at nosebleed levels relative to its closest peers, even on consensus revenue growth expectations we regard as too high, Carvana now trades at a premium to leading tech players, all of whom enjoy better margins and generate free cash flow. At present levels, Carvana's enterprise value is 40% higher than CarMax's despite selling half the number of retail units and carrying a mountain of debt. While Carvana shareholders endure the risk of equity dilution to help address a mountain of debt PIK-ing at 11%-14%, CarMax is buying back stock.

2023-2026 Revenue CAGR vs. EV / '26E EBITDA



Source: Bloomberg consensus estimates, Kerrisdale analysis.

Using 12x our 2026E EBITDA estimate returns $16, -77% from current levels.

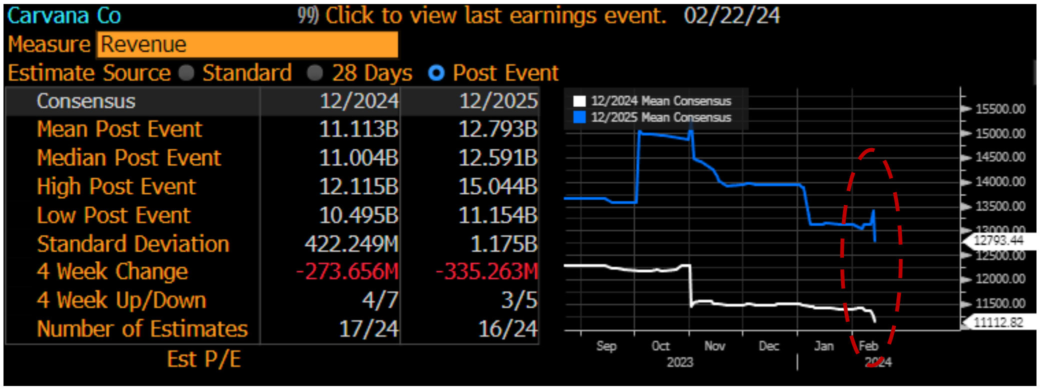
Price Target Methodology

2026E EBITDA	$687
Target multiple	12.0x
Implied enterprise value	$8,244
Less: adj. net debt (2024E)	(5,051)
Equity value	$3,193
Implied shr price	$16
Discount to current	-77%

Source: Bloomberg consensus estimates, Kerrisdale analysis.

Appendix I: Consensus Revenue Estimate Change

Consensus Revenue Estimate Change Post 4Q23 Results


Carvana Co 99) Click to view last earnings event. 02/22/24
Measure Revenue
Estimate Source Standard 28 Days Post Event

Consensus	12/2024	12/2025
Mean Post Event	11.113B	12.793B
Median Post Event	11.004B	12.591B
High Post Event	12.115B	15.044B
Low Post Event	10.495B	11.154B
Standard Deviation	422.249M	1.175B
4 Week Change	-273.656M	-335.263M
4 Week Up/Down	4/7	3/5
Number of Estimates	17/24	16/24
Est P/E		

Source: Bloomberg

Appendix II: 3rd Party Data Provider Charts

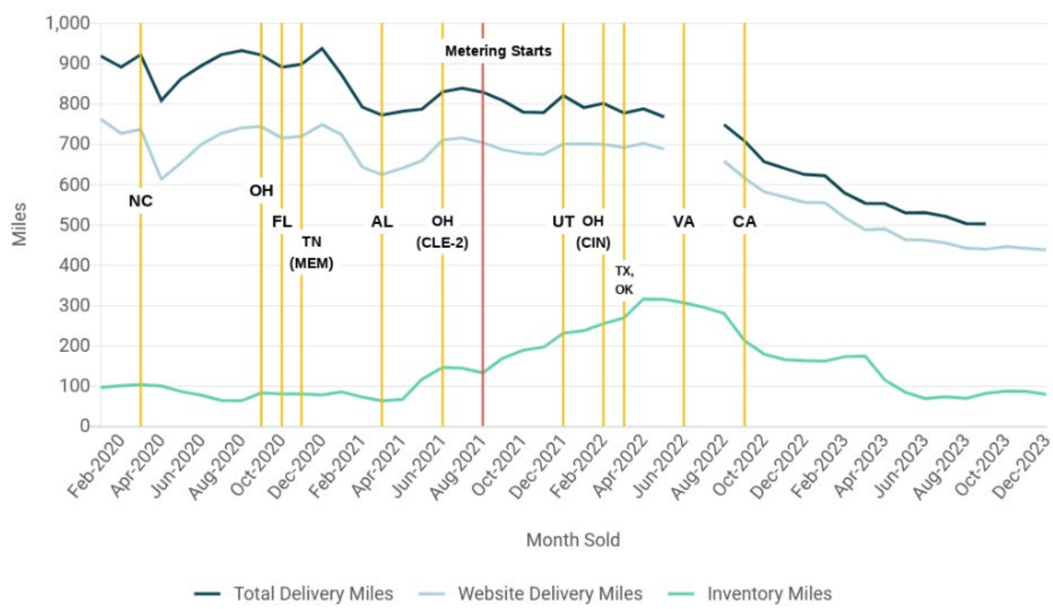
Average Online Days to Sale

Source: 3rd party data analytics provider.

Retail Average Selling Price

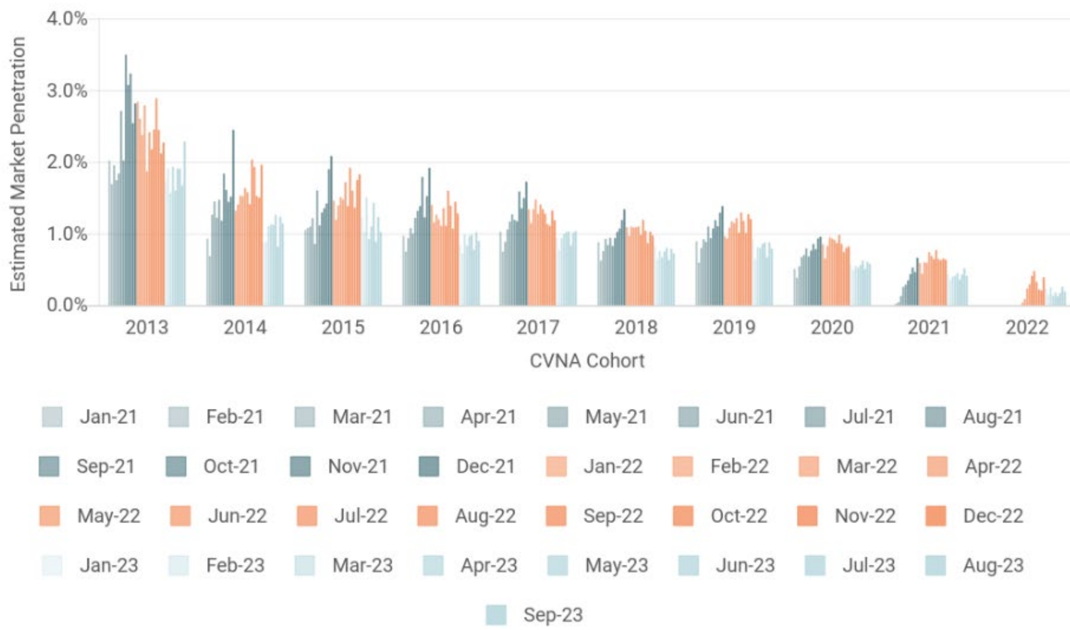
Source: 3rd party data analytics provider.

Average Delivery Miles and Inventory Miles



Source: 3rd party data analytics provider. The yellow bars in the chart denote IRC launches.

Dynamic Market Share of Market Cohort by Month



Source: 3rd party data analytics provider. According to the data provider, "Dynamic market share" utilizes U.S. used vehicle registrations to account for changing market conditions and provides a better representation of market share trends than Carvana's reported "static" market share based on industry sales by market.

Appendix III: Auto Dealer Trading Comparables and Tech Revenue CAGRs

Dynamic Market Share of Market Cohort by Month

			EV / Sales		EV / EBITDA		P / E		
	Mkt. Cap.	TEV	2024E	2025E	2024E	2025E	2024E	2025E	Div. Yield
Penske	$10,115	$14,101	0.5x	0.5x	9.9x	10.2x	10.2x	10.2x	2.3%
Asbury	$4,416	$9,363	0.5x	0.5x	8.3x	8.7x	6.8x	6.6x	N.A.
Sonic	$1,761	$5,595	0.4x	0.4x	9.8x	9.5x	8.1x	7.2x	2.3%
Lithia Motors	$7,943	$17,792	0.5x	0.4x	9.5x	9.0x	8.1x	7.1x	0.7%
AutoNation	$5,871	$10,606	0.4x	0.4x	6.7x	6.5x	7.3x	7.1x	N.A.
CarMax (1)	$11,580	$13,681	0.5x	0.5x	12.5x	10.5x	21.0x	17.0x	N.A.
		Mean	0.5x	0.4x	9.4x	9.1x	10.2x	9.2x	1.8%
		Median	0.5x	0.4x	9.6x	9.3x	8.1x	7.2x	2.3%
Carvana	$14,133	$19,051	1.7x	1.6x	42.1x	34.5x	NM	NM	N.A.

Source: Bloomberg consensus estimates, Kerrisdale analysis.
1. 2024E and 2025E for CarMax reflects fiscal year end February 2025 and February 2026.

Revenue Growth CAGRs for Select Tech. Companies

	Revenue 2023A	Revenue 2030E	7 yr. CAGR
Meta Platforms Inc.	$133,917	$256,226	10%
Microsoft Corp	$211,197	$525,468	14%
Alphabet Inc.	$254,951	$491,868	10%
Uber Technologies	$37,099	$89,810	13%
Airbnb Inc.	$9,857	$21,184	12%
Netflix	$33,594	$60,758	9%
Tesla	$97,444	$279,498	16%
Mean			12%
Median			12%
CarMax	$26,773	$39,062	6%
Carvana share price implied			**18%**

Source: Bloomberg consensus estimates, Kerrisdale analysis.

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