4/29/2022

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| Performance Summary | | |
|---|---|---|
| | Sosin Partners, LP* | SPY** |
| **2012*** ** | **14.0%** | **-1.5%** |
| **2013** | **66.6%** | **32.3%** |
| **2014** | **6.3%** | **13.5%** |
| **2015** | **14.5%** | **1.3%** |
| **2016** | **22.0%** | **12.0%** |
| **2017** | **31.2%** | **21.7%** |
| **2018** | **29.8%** | **-4.6%** |
| **2019** | **64.5%** | **31.2%** |
| **2020** | **96.5%** | **18.3%** |
| **2021** | **3.9%** | **28.7%** |
| Q1 2022 | -26.7% | -4.6% |
| **YTD 2021** | **-26.7%** | **-4.6%** |
| | | |
| **Cumulative return since inception** | **1082.3%** | **271.1%** |
| **Annualized return since inception** | **29.8%** | **14.8%** |

*See disclaimer regarding comparison to indicies at the end of this letter.*
** Performance net of 2% management fee and 20% performance allocation.*
*** Includes dividends reinvested.*
**** Sosin Partners LP launched 10/9/2012; performance for both the fund and SPY shown from that date.*

To My Partners:

As shown in the performance summary, during the three months ended March 31, 2022, Sosin Partners, LP reported a loss on a mark to market basis net of all fees, expenses, and performance allocations of 26.7%. The broad market as represented by the SPY ETF including dividends was down 4.6% during the same period.

Since its inception on October 9, 2012, Sosin Partners, LP has reported gains on a mark to market basis net of all fees, expenses, and performance allocations of 1,082.3%; this represents a 29.8% compound annualized rate of return. The SPY ETF is up 271.1% including dividends during that period representing an 14.8% compound annualized rate of return.

The Balance Sheet

We ended the quarter with eight stock positions on the long side of the balance sheet, totaling 99.6% of equity capital. As of March 31, 2022, our largest holding, representing 25% of equity capital, was Carvana. Our second largest holding represented 24% of capital, and the remaining positions ranged from 4% to 17% of equity capital. No other positions are material individually or collectively. Changes between December 31 and March 31 in our relative holding sizes resulted predominantly from changes in market prices.

Since the end of March, we have continued to experience meaningful mark to market losses. As of this writing the portfolio is down approximately 43% year to date as compared to the market which is down only 10%.

Mark to Market Performance

In his 2016 essay The Agony of High Returns, Morgan Housel lays out the experience of owning the best performing stocks of the prior decades. His point, articulated elegantly and demonstrated compellingly, is that the owners of the best performing stocks invariably must endure many, often substantial drawdowns. The simple fact is stocks do not rise in straight lines.

We are in the midst of one of the more substantial drawdowns since the inception of the partnership. That these sorts of drawdowns are to be expected and are a normal part of investing over the long term does not make them fun.

While a number of our holdings are generally progressing well and the stocks appear to be down for no obvious identifiable business reasons, our largest holding, Carvana, is in the midst of a confluence of challenges that obscure what I believe to be its very bright future.

It is my observation from business history that few great businesses are built without mistakes, setbacks and challenges. In retrospect, these challenges appear obviously soluble taking the form of mere blips on the path of a company's inexorable rise. In the moment, however, they can appear insurmountable and terrifying.

Carvana's challenges, especially when coupled with the precipitous decline in its stock price, clearly seem terrifying, however as I will explain in this letter, I believe that in due time we will look back at them as bumps in road on the company's path to success.

I am not immune to mistakes, and I promise that when I eventually make a doozy I will put it here at the top of this letter. In this case, however, I do not believe I have.

This brings me to a question that I suspect is on many of your minds…

So What's Going on with Carvana?

In my prior letters, I've laid out our overall thesis for Carvana. Namely, why I think Carvana's consumer offering is radically superior to that of traditional dealerships, why the offering is extremely difficult to replicate, Carvana's compelling unit economics, and finally, the company's vast market opportunity/ profit potential. In my last letter, I also described how the Omicron wave of the COVID-19 pandemic was impacting the company's logistics system and thus its ability to serve its customers.

At the time I wrote my last letter, I had anticipated that as the Omicron wave subsided, the company would see a fairly rapid return to its original growth and profit trajectory. Alas, this clean and quick return to normal was not to happen.

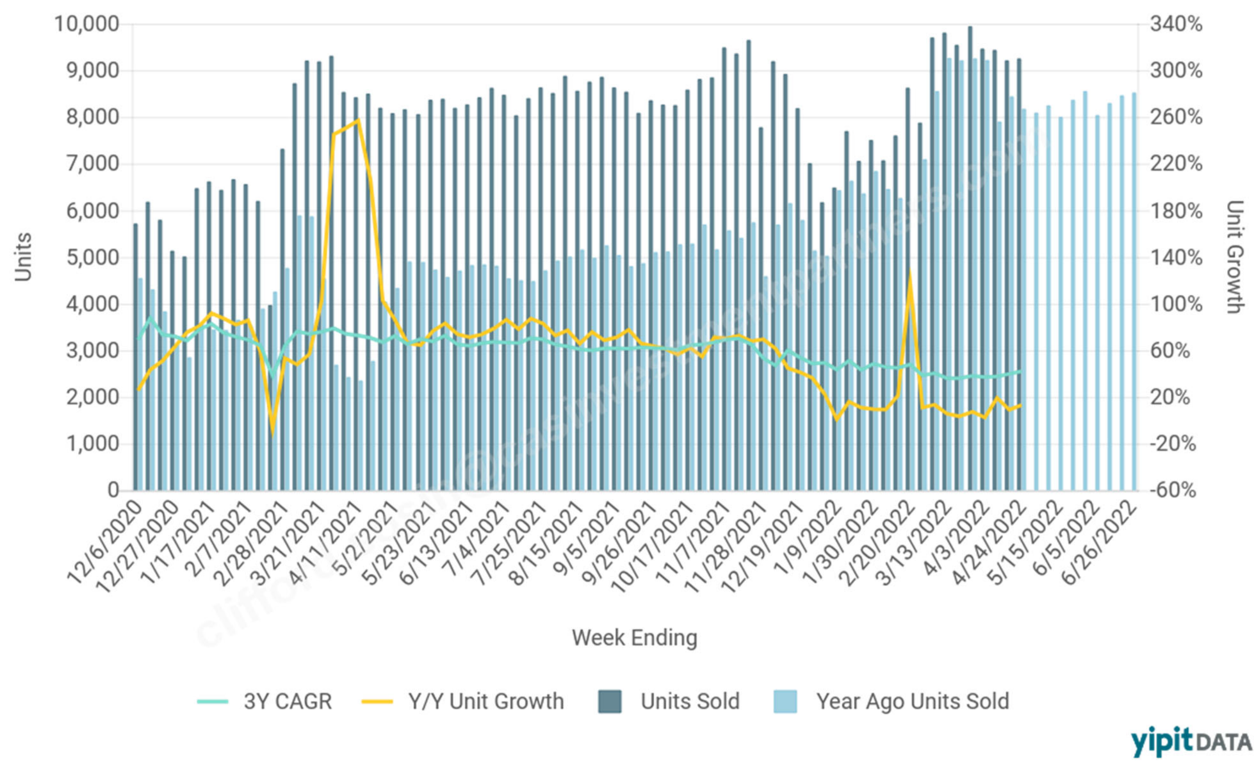
Since my last letter, the company has been impacted by two separate issues which continue to weigh on its performance:

First, the set of logistics challenges initially brought on by the Omicron wave and subsequently exacerbated by a number of other factors have proven more enduring than I had originally expected. Second, the used car retailing industry in aggregate has seen a significant slowdown in the volume of vehicles transacted. Taken together, these trends have impacted Carvana's growth.

As you can see in the graph below, while Carvana's weekly unit volume increased from the Omicron induced lows of January and February, the increase was small relative to the prior year, resulting in a significant slowdown in the company's year over year growth rate.

As the graph shows, over the past couple of months, Carvana's growth has been running at about 15% year over year. While a disappointing pace for Carvana, it should be noted that this is significantly better than the overall used market which is *declining* by approximately 15% year over year. A fact made more significant by the impact of Carvana's internal logistics issues on it is growth.

*Carvana Weekly Sales (Source: YipitData)*




Given the scope of its operations and its high pace of growth, Carvana hires roughly six to twelve months ahead of need. Consequently, this disappointing level of sales (as well as the impact of a spike in interest rates and Omicron related costs) left the company with far greater costs in Q1 than its revenue could support, resulting in a $364 million EBITDA loss in the quarter as compared to the near breakeven levels achieved in the prior year's Q1 and full year 2021. Additionally, since the logistics issues are expected to extend through Q2, the company also faces another meaningful EBITDA loss in Q2.

Further complicating matters, after years of consideration and negotiations, the company announced its acquisition of Adessa's physical auction business for $2.2 billion in February, just prior to these issues coming to the fore. The Adessa purchase was made primarily to gain ownership of their locations (very large, well located, appropriately zoned parking lots) as logistics sites and sites to build new inspection and reconditioning centers (IRCs). The auction business itself was not the reason for the acquisition. The company had initially planned to finance the acquisition and $1 billion cost of building these IRCs with $3.2 billion of secured and unsecured debt.

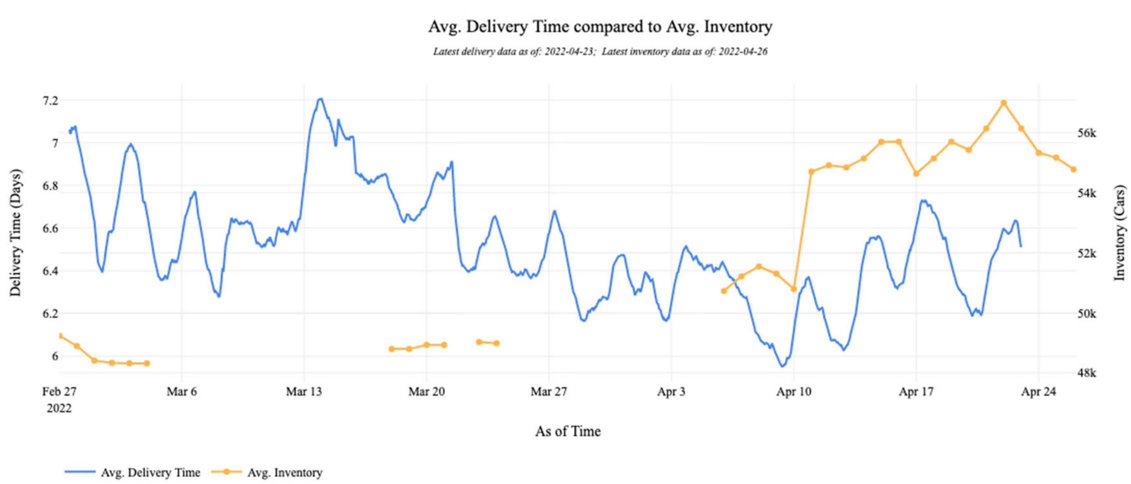
Given these unanticipated losses and the financing needs for the acquisition and related build out, the company issued $1.25 billion of stock at $80 per share and placed $3.25 billion of senior unsecured notes at the fairly high rate of 10.25%. We participated in the offering buying more than our pro rata share and thus somewhat increasing our position and our percentage ownership of the company.

Before we discuss how these events might impact our investment (spoiler alert: while I anticipate short to medium term impacts I don't believe it should matter too much in the long term), it is first worth reflecting on whether Carvana's logistics issues and the weak used vehicle market do indeed explain Carvana's weak sales. Could something else, something that would be disconfirming to my thesis, be causing the slowdown? I don't believe so.

First, Carvana's ongoing logistical issues are evident on the website for all to see. While I've been informally tracking inventory availability throughout our investment, in light of these issues, we set up more systematic tracking starting in early March.

As you can see in the graph below, in the forty markets we sampled, Carvana is only showing a fraction of its nearly ninety-thousand units of inventory to most consumers. Moreover, this limited selection of vehicles is available in six to seven days on average. When Carvana's system is operating normally, all inventory should be available to all consumers within seven days and often as soon as the next day, yielding average lead times in the four day neighborhood or less.

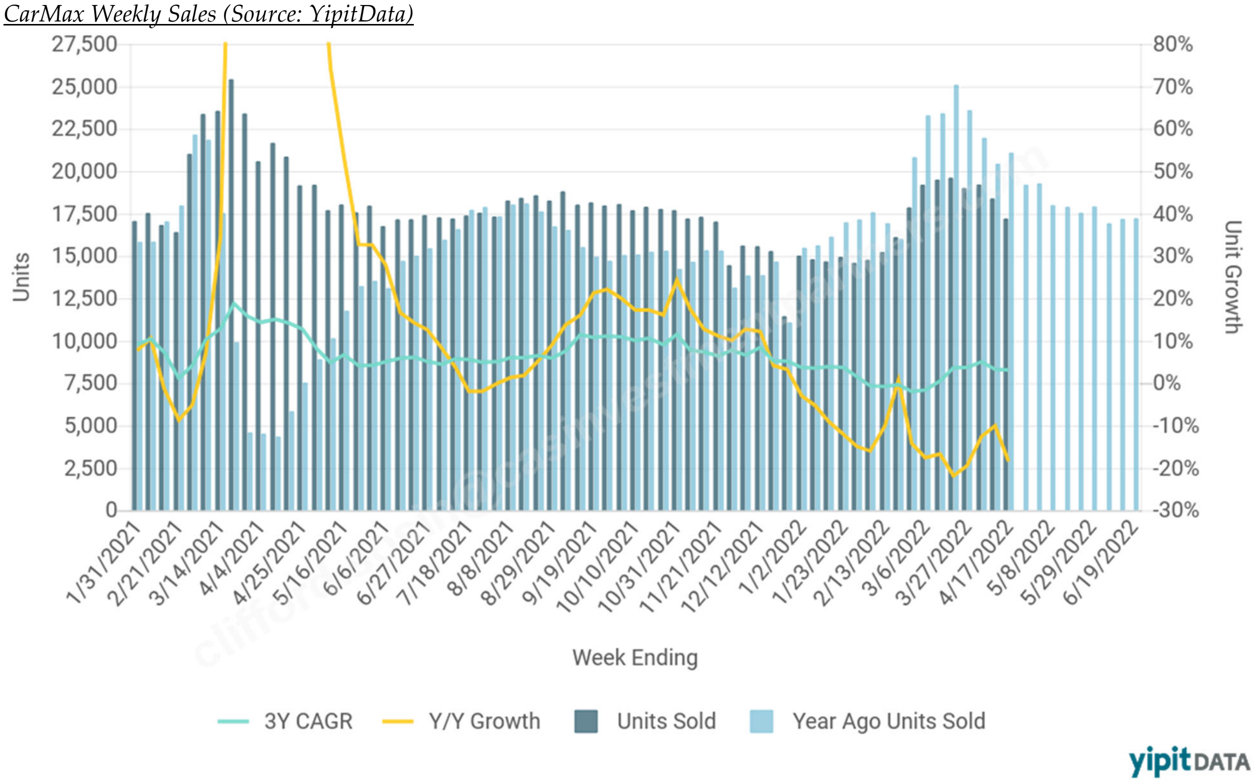
*Carvana Weekly Available Inventory & Delivery Lead Times (Source: CAS Analysis)*



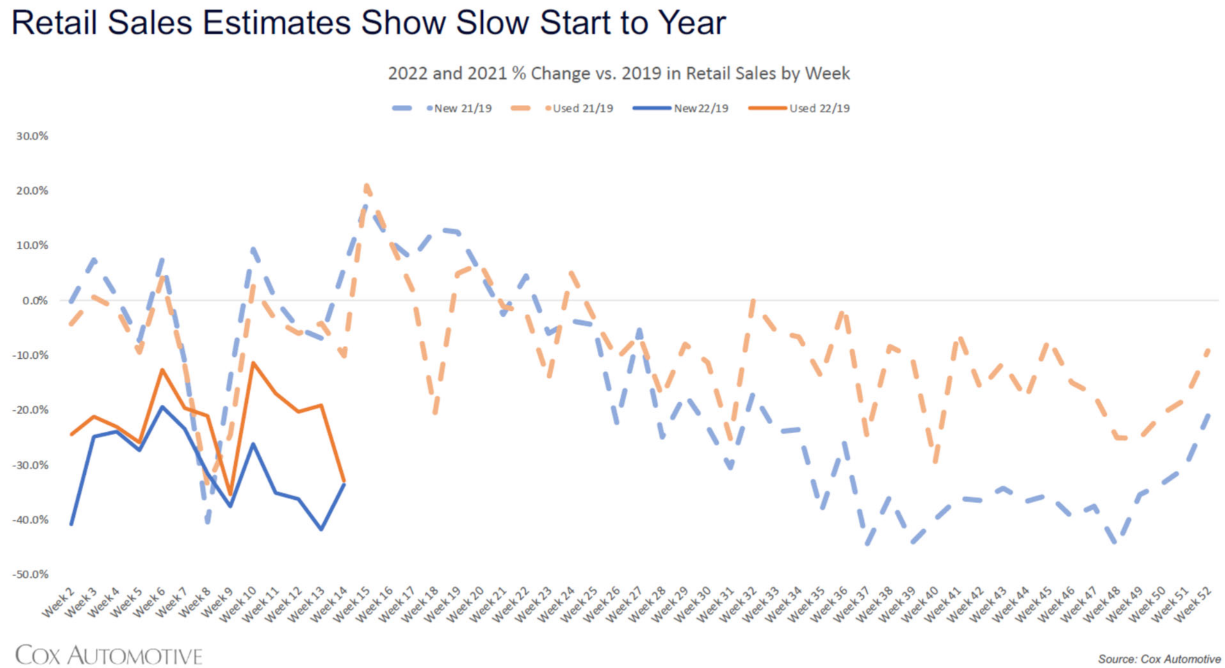
That selection and lead times is an extremely important driver of conversions is something that I have been aware of for years through conversations with both management and former employees. Indeed, the improved customer conversion rate that arises by offering a greater selection and shorter delivery lead times is one of Carvana's key economies of scale versus would be copycats. Thus it is unsurprising that limited selection and extended lead times would reduce sales.

Second, the overall decline in used car transactions has been broadly recognized in the industry. Below, I've included a chart from Cox Automotive that shows the significant industry decline. I've also included weekly sales for CarMax, which also show a roughly 15% decline versus last year. Simply put, the overall decline in the used vehicle industry is pronounced and well documented. Indeed, this decline is similar in magnitude to the decrease during the Great Recession, when CarMax's same store sales declined by 16%.

*CarMax Weekly Sales (Source: YipitData)*



*Used Vehicle Industry Trends (Source: Cox Automotive)*




Carvana also cited 50% Q1 year over year growth in its sales to customers with greater than 700 FICO scores as compared to 14% overall. As I'll discuss more below, it is widely believed that high car prices and to a lesser extent higher interest rates have are causing the overall decline in industry volume. As customers with a greater than 700 FICO are less impacted by industry affordability issues but are impacted by Carvana's logistics issues, we would expect to see a smaller slowdown in the pace of sales to higher FICO customers than to lower FICO customers. So this fact is consistent with that explanation.

Clearly there is direct evidence pointing to and supporting our explanation for Carvana's weak volume.

However, we should not just look for evidence related to our proposed explanations of Carvana's slowdown. We must also consider alternative hypotheses and see if they are consistent with the facts. Let's consider three: 1) that Carvana could be reaching saturation for its offering; 2) that Carvana's strong demand up until now was a result of the COVID-19 pandemic and that with the abatement of the pandemic their market opportunity is much smaller; and 3) that the used auto retailing competitive landscape has changed.

The table below shows Carvana's penetration by market and market growth rates in its top 25 markets by unit volume in Q4 (the most recent data available):

*Carvana Market Penetration and Growth (Source: YipitData, CAS Analysis)*

| | **Share** | **Growth** | **Units** |
|---|---|---|---|
| Phoenix AZ | 4.1% | 33% | 5,077 |
| Columbus OH | 3.9% | 29% | 2,123 |
| Atlanta GA | 3.4% | 53% | 5,340 |
| Austin TX | 2.9% | 73% | 1,568 |
| Nashville TN | 2.7% | 43% | 1,338 |
| Charlotte NC | 2.6% | 71% | 1,699 |
| Virginia Beach VA | 2.5% | 70% | 1,187 |
| Las Vegas NV | 2.3% | 149% | 1,340 |
| Orlando FL | 2.3% | 123% | 1,507 |
| Raleigh / Durham NC | 2.1% | 30% | 1,061 |
| San Antonio TX | 2.0% | 73% | 1,303 |
| Dallas TX | 2.0% | 97% | 3,872 |
| Pittsburgh PA | 1.9% | 38% | 1,228 |
| Newark NJ | 1.7% | 64% | 3,118 |
| Philadelphia PA | 1.6% | 48% | 2,723 |
| Tampa FL | 1.6% | 69% | 1,295 |
| Washington DC | 1.5% | 97% | 2,548 |
| St. Louis MO | 1.4% | 113% | 1,064 |
| Detroit MI | 1.3% | 20% | 1,583 |
| Chicago IL | 1.2% | 43% | 3,019 |
| Houston TX | 1.1% | 31% | 1,966 |
| Miami FL | 1.0% | 77% | 1,603 |
| Boston MA | 1.0% | 27% | 1,262 |
| Los Angeles / Riverside CA | 0.8% | 47% | 4,020 |
| New York City NY | 0.5% | -15% | 1,246 |

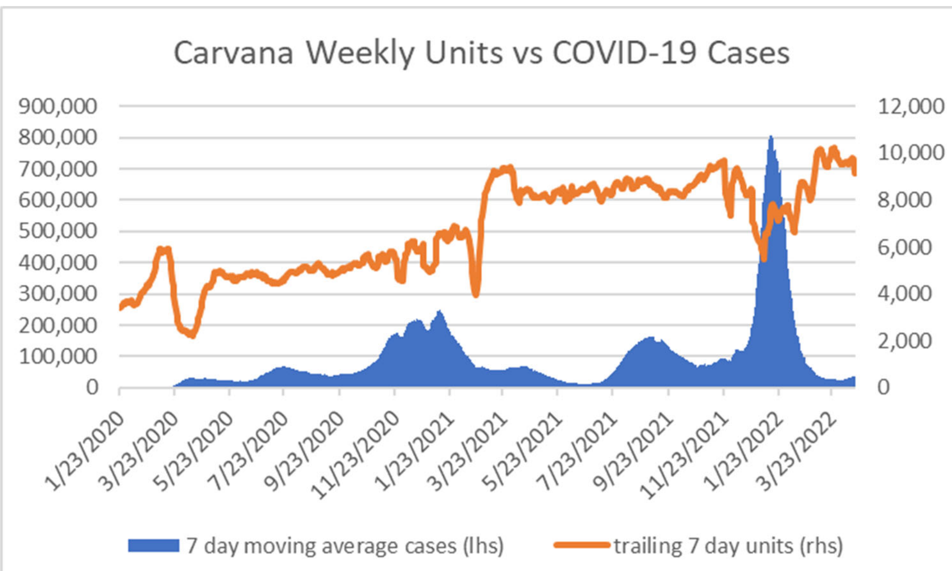
Were Carvana reaching saturation, you would expect slower growth in more mature markets. As you can see, in Q4, Carvana achieved very high levels of growth in its largest and most penetrated markets.

Carvana's overall penetration in Q4 2021 was a bit over 1%. If Carvana's growth slowdown were due to the offering reaching saturation, it is difficult to explain why growth in its most penetrated markets did not slow earlier or why growth in its least penetrated markets would slow now.

Recall also the fact that Carvana saw significantly higher growth in its sales to customers with a greater than 700 FICO. Were market saturation to blame for Carvana's weak volumes it is tough to see why this would so disproportionately impact consumers with higher FICOs versus those with lower FICOS.

Returning to the market share and growth rate table, notice that Carvana experienced some of its highest penetration and fastest growth rates in markets such as Phoenix, Columbus and Atlanta. These are not markets that had particularly stringent social distancing norms during the pandemic. Conversely, Carvana has relatively under-performed in markets such as Boston, New York and San Francisco, where COVID-19 impacted behavior more significantly. If Carvana's issues were due to the end of COVID, this fact pattern is hard to explain.

Further, comparing Carvana's weekly unit volumes with COVID-19 cases (shown below) would seem to show that COVID waves reduced Carvana's sales (due to the impact on Carvana's operations) instead of increasing them. Again, this is not consistent with the lapsing of a COVID bump.




Moreover, recall the divergent performance between above and below 700 FICO customers. Did COVID only impact low FICO consumers? How could one explain the seeming indifference to changes in COVID-19 by Carvana shoppers with better FICOs versus those with worse FICOs?

The argument that the competitive landscape has meaningfully changed is similarly unreasonable. The used car retailing industry is highly fragmented, and one needs only to spend a few minutes perusing a typical dealership's website to realize that they still offer essentially the same experience they did in 2019, let alone in late 2021.

But if competitors had evolved to improve their offering, why did they seem to so disproportionately affect Carvana's less than 700 FICO consumers? For that matter, if the changing competitive landscape were the explanation, how can it be that CarMax, which is arguably the industry's technology/ customer experience leader outside of Carvana, still transacts only 11% of its sales online? Or more importantly, why is CarMax facing such large year over year declines in unit volumes if Carvana's sales losses are their gains? Taking a broader view of the market, while there are other online initiatives by competitors and they are worthy of monitoring as long term potential competitive threats, they are simply far too small to explain Carvana's recent performance.

The simple reality is that it seems none of these (and other) alternative hypotheses make sense in light of all the facts, while the company's explanation, a mix of overall market declines and internal logistics issues does.

Having (presumably) correctly diagnosed the reason for Carvana's lower unit volume we now need to contemplate the impact on our investment.

Carvana's management team believes they will have their logistics issues resolved by roughly the end of Q2. As an outsider, I haven't found a way to verify this assertion. However, we know that 1) the team is very talented and aligned, 2) they have had this system running properly in the past, and 3) hub and spoke logistics systems like theirs are routinely operated by other companies (think Amazon, FedEx, etc.). So I don't see any reason to be particularly concerned that the system won't be restored to normal operations in a timeline consistent with their expectations. Resolving the logistics issues should meaningfully improve Carvana's units and profitability.

The timing of the resolution of the broader used car industry decline is far more uncertain and so are its impacts.

Most used car buyers transact in order to swap into a newer and nicer vehicle. Thus, for most used car buyers, the ~40% increase in the price of used vehicles and to a lesser extent the rise in interest rates has made trading up to a new vehicle less attractive or affordable.

For this reason, most industry observers, including me, believe that the primary cause of the weak used vehicle market is poor affordability, although undoubtedly other factors such as consumer confidence, gas prices, inflation, etc., must all also play a role.

Assuming affordability is a major culprit, then in order for the used car industry to return to a normal level of activity, used vehicle prices have to normalize. This normalization in turn requires an increase in the rate of new vehicle production, which has been disrupted by supply chain issues in the semiconductor industry.

My guess is as good as yours as to when new vehicle production will recover. Most industry observers expect some improvement in the back half of 2022 with bigger gains in 2023, but these prognostications are uncertain. It is possible, even likely, that the auto market deteriorates further before normalizing.

While industry volumes are weak, Carvana's volumes will be impacted. If the industry worsens, Carvana's volumes will worsen. However, when the industry normalizes Carvana's volumes should similarly accelerate. Through this uncertainty, the management team will need to adjust its largely fixed and highly scalable cost structure to match demand in order to marshal its liquidity resources as it continues to win share and awaits an eventual industry recovery. Fortunately, the company is in a strong position to achieve this.

During 2021 the company incurred a $5 million EBITDA loss on 425,237 units sold despite incurring substantial investments for growth. The company's recent weekly performance suggests that it is running at around 500k units on an annualized basis despite its ongoing logistics challenges.

I estimate that Carvana makes $2,700 of incremental profit on each unit it sells. This unit profitability across 500k units means that, excluding the cash flow from the Adessa physical auction business, the company has roughly $1.3 billion per year of contribution margin with which to cover its fixed costs, interest expense and growth investments. This $1.3 billion of contribution margin will increase as the company's unit volume increases with normalization of its logistics system and ongoing share gains. The company also should also generate $100 million of profitability annually from Adessa's physical auction business.

While the company's $600 million of annual interest expense is largely fixed, and a certain level of fixed/ overhead costs are necessary to run the company, the company's growth investments are under the management's control.

Simply put, Carvana has a great deal of latent margin potential. This potential should allow the company to pursue its growth ambitions, albeit at a slower pace of expansion, without meaningfully accessing the capital markets or counting on a significant used vehicle industry recovery.

In addition to its latent margin potential, Carvana also has ample resources for any planned or unplanned cash shortfalls. With its recent capital raise, the company has $2.663 billion of cash and another $1.916 billion of unpledged assets (mostly real estate) available to manage through to profitability.

Clearly, the assertion here that Carvana has ~$2,700 of incremental profit per unit is a critical assumption in assessing the latent profitability upon which this analysis relies. Because this topic is fairly involved and detailed, I've added an appendix on the topic at the end of this letter to which I would refer you.

Fortunately, a weak used vehicle retailing environment is not all bad news for Carvana.

Carvana competes in a highly fragmented market with tens of thousands of independent dealerships and around seventeen thousand franchise dealerships. Franchise dealerships are making record profits in this environment, on account of record new car margins and profits from off lease vehicle trade-ins. Independent dealerships, on the other hand are struggling due to a combination of low volume and thinner wholesale-retail margins.

Given their struggles, should the overall industry demand weakness persist (or worsen), many independent dealerships will fail. Collectively, independent dealerships account for ~60% of all used vehicle sales through dealerships and around ~40% of transactions in less than ten year old vehicles (where Carvana competes). Thus as independent dealerships fail, Carvana stands to win share (recall Carvana has only a bit over 1% market share). This observation implies that Carvana's pace of share gains should increase the longer this environment lasts. It also provides meaningful protection to Carvana in the event the used car demand environment worsens, as such worsening will accelerate the independents' exit from the market.

Carvana also competes on a limited basis with other companies who are attempting to copy its model, most notably Vroom. Vroom was in a very weak position going into this recent demand decline, and according to web scraping data has seen a very significant decline in its unit volumes recently. Should the demand environment remain weak or weaken further, it is difficult to see how Vroom survives. While Vroom's small size means that its demise would have no meaningful impact on Carvana today, the elimination of this potential long term competitor would be a positive.

Another positive byproduct of the weak demand environment could be to boost Carvana's marketplace program. By way of background Carvana allows certain dealerships to market their vehicles on the Carvana site in exchange for sharing in the economics and subject to a number of restrictions to ensure a great consumer experience. Carvana has been offering this marketplace model to dealerships over the past year and a half. To date, dealer feedback has been excellent but dealer uptake has been modest. Dealers simply didn't need help selling cars given their limited inventories and strong demand. The decline in demand and likely struggles at independent dealerships should increase dealer interest in the marketplace program.

Carvana also has opportunities to "self-help." For example, the company can allow co-signers on loans, increase its focus on older vehicles and/ or begin offering vehicles that have been in a flood or an accident (with appropriate descriptors for consumers). Each of these initiatives, and others, has been in the works for some time but has not been rolled out at scale due to the resource demands required of an over-stretched system.

Cost and process efficiency is another area where Carvana can focus managerial attention that was previously focused on managing rapid growth. Assuming they are realized, these improvements to the model should improve profitability in the near-term while also providing benefits to Carvana for years to come.

Eventually, of course, today's industry headwinds will become industry tailwinds as overall industry activity recovers to normal levels. The used car industry has existed for many decades and tended to have fairly consistent levels of activity over time. There is no reason to believe that in the long-term this will change.

Taken together, as you've probably figured out, the ultimate tally of costs and benefits from the internal and external issues facing Carvana is difficult to calculate. Certainly the approximately 9% dilution and higher coupon on the $3.25 billion of bond financing are both tangible costs. This year is shaping up to be something of a lost year in terms of growth, and the company's growth in the future will probably need to be at a more moderate pace that can be better managed and funded from internal cash generation. This all means a slower albeit longer and more cash generative growth ramp.

Conversely Carvana's competitive position and efficiency will likely benefit from this episode and the slack and learnings afforded by this experience will make the company stronger.

Most importantly, in my opinion, there likely isn't any change to Carvana's ultimate place as America's largest and most profitable car retailer. Provided that belief proves accurate, I don't think the long term outcome for owners should be particularly impacted by this episode. Indeed, from our perspective, given our increased ownership, our long term outcome might be better, but only time will tell.

Administrative

The Partnership's Amended and Restated Confidential Offering Memorandum (the "Offering Memorandum") requires that I disclose whether my investment in Sosin Partners, LP and parallel funds represents over 50% of my liquid net worth. I am pleased to say it does. In fact, it represents over 90% of my entire net worth. My family and I are invested right alongside you.

In addition, the Offering Memorandum requires that I disclose whether I have any other significant income generating activities. I do not. The management of the Partnership, the parallel funds and a single purpose vehicle establish for a co-investment opportunity in a single issuer is my sole occupation and source of income.

Conclusion

I am excited for the prospects of our Partnership. While I expect our short term results will be volatile, I believe that profits over time will be worth the volatility.

You'll recall that we endeavor to benefit from a virtuous cycle wherein:

1) our investors trust us and allow us the space necessary to focus on long term investment performance,
2) this long term focus allows us to make better investment decisions unclouded by short term considerations,
3) better long term investment decisions, in turn, (hopefully) allow us to produce better long term returns, thus earning our investors' trust and restarting the cycle.

Other than raising capital to replace any redemptions and approximately $30 million of capital additions per year, we will not be raising any incremental capital. Given this constraint and the number of people who have requested access, at present we cannot guarantee access before 2023.

That said, over time we do anticipate continuing to bring on additional partners to backfill any redemptions and are open to building those relationships well in advance of any potential subscription. Potential partners who understand and support our long term approach to investing should review the Amended and Restated Confidential Offering Memorandum for more information.

I appreciate your continued trust in me. As always, feel free to call or drop by the office if you'd like to chat.

Sincerely,

Clifford Sosin

CAS Investment Partners, LLC

**APPENDIX – Detailed Discussion of Carvana's Unit Economics and Latent Profit Potential.**

Like any business, Carvana has direct costs to serve its customers which tend to vary linearly with the size of the enterprise and overhead costs which tend to scale as the enterprise expands. Using this framework, I like to think about Carvana's profit potential as what it makes selling a vehicle (its contribution margin) multiplied by the number of vehicles it sells, less its fixed/ semifixed overhead. At smaller scale, Carvana's fixed costs will dwarf its contribution margins. As the business grows and these costs scale, the overall margins should ultimately converge towards the contribution margin.

Carvana's contribution margin consists of its gross profit per unit, less its customer acquisition costs and the cost of fulfillment. I will assess each competent and its subcomponents below.

Gross profit per unit in 2021 was $4,537 and consisted of $1,638 of used vehicle gross profit (the margin earned on the spread between buying and selling the vehicle itself), $466 of wholesale gross profit (the margin earned selling vehicles acquired from customers through wholesale channels) and $2,453 of other gross profit which consists of gains made originating and selling vehicle loans and to a lesser extent originating vehicle service contracts, gap insurance and other ancillary products.

| | 2020 | 2021 | Increase |
|---|---|---|---|
| Used vehicle gross profit | $ 1,472 | $ 1,638 | $ 166 |
| Wholesale vehicle gross profit | $ 138 | $ 446 | $ 308 |
| Other gross profit | $ 1,642 | $ 2,453 | $ 811 |
| Gross Profit Per Unit | $ 3,252 | $ 4,537 | $ 1,285 |

The table above shows a comparison of the components of gross profit per unit in 2021 vs 2020. As you can see, the big drivers of the year on year increase in overall GPU were other gross profit and wholesale vehicle gross profit while used vehicle gross profit was largely flat. Let's assess the sustainability of each line item.

Used vehicle gross profit was fairly stable as the effects of COVID-19 related costs, vehicle appreciation, vehicle sourcing mix, and wholesale-retail margins roughly offset. I'd note that in Q1, 2020, the last quarter before the COVID-19 pandemic, used vehicle gross profit was $1,581 or roughly in line with the 2021 level. Given that the company has meaningfully expanded its sourcing of vehicles from consumers which have higher margins since Q1 2020 it is arguable that the 2021 level understates the company's normalized potential. At a minimum the $1,638 per unit should be sustainable.

The increase in wholesale vehicle gross profit consisted of an increase in the number of wholesale vehicles sourced from the public per retail unit sold as well as an increase on the gain realized on each wholesale vehicle sold. These changes are laid out in the table below.

| | 2020 | 2021 | Increase |
|---|---|---|---|
| Wholesale units sold | 55,204 | 170,556 | 115,352 |
| Retail units sold | 244,111 | 425,237 | 181,126 |
| Wholesale units per retail unit | 0.23 | 0.40 | 0.17 |
| | | | |
| Wholesale gross profit per wholesale unit | $ 610 | $ 1,116 | $ 506 |

As you can see, roughly half of the increase in wholesale gross profit per unit relates to greater profit per unit sold while the other half of the gain relates to the growth of the wholesale business.

The increase in vehicles purchased from the public had been a result of the growth of the company's business of acquiring cars from consumer and is likely to endure and further improve. However, the increase in the profits made per vehicle purchased was largely driven by the unusual vehicle appreciation environment and will likely normalize. Such normalization will represent a roughly $150 per unit headwind to overall GPU.

The larger GPU gains came from the other gross profit line. The table below decomposes other gross profit between the gains made selling loans that the company originates and the gains made selling other ancillary products. As you can see, nearly all the increase came from improved profit selling loans.

| | 2020 | 2021 | Increase |
|---|---|---|---|
| - financing | $ 893 | $ 1,686 | $ 793 |
| - other ancilliary | $ 749 | $ 767 | $ 18 |
| Other gross profit | $ 1,642 | $ 2,453 | $ 811 |

The increase in profit from selling loans can be further decomposed between the increase in the amount of profit realized per dollar of loans sold and the dollars of loans originated per vehicle sold. This breakout is shown below.

| | 2020 | 2021 | Increase |
|---|---|---|---|
| Loan sales $s | $ 3,634 | $ 7,391 | $ 3,757 |
| Gain on sale $ | $ 218 | $ 717 | $ 499 |
| Gain on sale % | 6.0% | 9.7% | 3.7% |
| Loan sales per unit | $ 14,887 | $ 17,381 | $ 2,494 |

As you can see, Carvana's increase in loan sale profits were in part a result of 20% higher vehicle prices in 2021 as compared to 2020 which increased loan sales per retail unit. Assuming vehicle prices normalize to roughly 10% more than their 2020 average (reflecting a few years of inflation) this normalization will reduce gain on loan sales by approximately 10% or $150.

Unlike the impact of used car prices on wholesale profits which are tied to change in vehicle prices, this effect is tied to the level of vehicle prices and thus won't likely materialize while the overall industry is suffering from affordability issues.

The bigger driver of the increased financing income was the increase in the premium Carvana earned on its loans to 109.7% of principal in 2021, up from 106.0% of principal in 2020.

Carvana sells its loans to institutional buyers who price the loans based on the anticipated interest income in excess of charge offs, servicing costs and financing costs over the life of the loans. Since these purchases are made prospectively, it takes time to build the trust of loan buyers who must make assumptions regarding future performance of the loans.

Carvana's loan program has been maturing over the years. As recently as 2019, the company's primary channel to sell loans was its relationship with Ally. Since 2019, the company has built out a significant securitization program where the loans are sold to institutional buyers in tranches with different seniority.

The increase in profitability per dollar of loans originated that Carvana experienced between 2021 and 2020 thus has two drivers.

First, during the early and most uncertain days of the COVID-19 pandemic, Carvana committed to sell a large quantity of loans to Ally at less unfavorable terms for Carvana than is typical. While this sale reduced Carvana's profit per dollar of originations, it guaranteed them a channel to profitably distribute loans in the midst of a significant credit dislocation. The lapsing of this arrangement (which worked out exceptionally well for Ally) boosted Carvana's loan gain on sale premium.

Second, as Carvana's loan program has matured, the auto finance market has become increasingly familiar with the quality of its originations and increasingly willing to underwrite to the loan's profitability. This progress continues and represents a long term tailwind to Carvana's gain on sale margin..

Based on my conversations, neither participants in the auto finance space nor the company believe that the 109.7 price achieved in 2021 fully reflects the quality of the originated loans given the vintage's relative performance. Put another way, many loan buyers are willing to bid more (relative to the overall market) than they have previously.

Complicating this picture, however, is the fact that Carvana prices loans weeks if not months ahead of selling them. If interest rates, loss expectations or risk premiums in the securitization market move between when Carvana originates a loan and when it sells a loan, Carvana's gain is impacted. This dynamic is what played out in Q1 as a combination of sharply rising risk free rates and widening risk premiums led to Carvana realizing a relatively crummy Q1 gain on sale of 5.5%. Absent these rate and spread changes, the company estimates its gain on sale margin would have been 8.8%

During 2021, a much more gradual reverse effect of declining loss expectations and tightening credit spreads created a subtle tailwind to the gain on sale percentage and to some extent inflated the 9.7% result.

Based on these datapoints, while Carvana's loan gain on sales will be impacted by step function changes in interest rates or funding costs, my sense is that Carvana should continue to earn a roughly 9% gain on sale margin over time, roughly in line with its 2021 result and that this premium might even slightly improve as the program continues to mature.

Having assessed each of the subcomponents of gross profit we can now formulate an estimate of an achievable, sustainable level.

Starting with the $4,537 of gross profit and deducting the ~$150 of excess gross profits in the company's wholesale business and the ~$150 of excess gross profits in the company's financing business, I estimate Carvana's sustainable gross profit per unit at approximately $4,200 per unit.

This, is not, however the upper bound of Carvana's GPU. Carvana should be able to continue to increase GPU over time as the business matures. Retail margins, which were burdened by excess costs as the company builds capacity ahead of need should expand as growth slows and supply more closely matches demand. Wholesale margins should increase as the company commences insourcing its auctions and growing its sell-to-Carvana business. Other gross margin should increase as the company increases its sales of ancillary products such as auto insurance. These opportunities collectively could add to many hundreds of dollars of GPU, more than offsetting the ~$300 of headwinds I've identified above. But these gains will take time to be fully realized.

In addition to the above opportunities, Carvana likely could also increase its prices to consumers or institute additional fees. Most dealerships charge some sort of dealer or doc fee. Depending on state CarMax charges between $100 and $400 per vehicle. Vroom and Shift both implemented substantial fees in the 2018 and 2019 period and noticed little impact on volume. Any such fee would clearly add to GPU but potentially at the risk of harming the long term consumer value proposition.

Assuming the $4,200 per units of gross margin is the right sustainable level for the company in the near term, we can now turn our attention to customer acquisition costs and fulfillment costs which are included in selling general and administrative costs.

Carvana spent $479 million on advertising in 2021 to sell 425,237 units. This implies a customer acquisition cost of $1,126. Carvana's advertising spending consists of a mixture of brand advertising spending and performance advertising. Much of the brand advertising has relatively little impact on near term sales but is intended to help build consumer's understanding the Carvana brand over time.

Prior to 2020, Carvana shared its marketing spending and customer acquisition costs by market. As you can see in the table below, Carvana's customer acquisition costs generally fall as markets mature and Carvana was able to achieve customer acquisition costs in the ~$500 per unit range in its earliest market. Carvana should be able to continue to grow robustly even at lower levels of marketing spending. During period of 2016 – 2019 while marketing spending was around $500 per unit, Carvana's market share in Atlanta expanded from roughly 0.75% to north of 2.0%.

Table 3 **ANNUAL ADVERTISING EXPENSE PER RETAIL UNIT BY COHORT**

| | 2015 | 2016 | 2017 | 2018 | 2019 |
|---|---|---|---|---|---|
| 2013 Cohort | $875 | $568 | $543 | $462 | $564 |
| 2014 Cohort | $2,866 | $991 | $791 | $728 | $783 |
| 2015 Cohort | $5,731 | $2,363 | $1,154 | $771 | $904 |
| 2016 Cohort | | $5,093 | $2,204 | $1,114 | $1,086 |
| 2017 Cohort | | | $2,730 | $1,298 | $1,088 |
| 2018 Cohort | | | | $1,717 | $1,405 |
| 2019 Cohort | | | | | $1,276 |

1. CAC generally trends down as markets age
2. Older markets have lower CAC
3. Newer markets launch at lower CAC

Once a vehicle is sold, it needs to be transported to the hub nearest the customer and delivered to the customer. There are also costs of call center support, title and registration, warranty and other miscellany. Collectively, I've been referring to these costs as fulfilment costs.

Based on web scraping data and vehicle registration data, it is possible to work out that the average distance a vehicle travels to get to a consumer is approximately 500 miles. At $2.00 of cost per truck mile and assuming about 7/9ths occupancy of the trucks the cost per occupied mile should be approximately 30c. This yields trucking costs of approximately $150 per unit. (The cost of backhaul is included in cost of goods for inbound freight.)

Local customer advocates can pick up or drop off approximately three vehicles per day. Assuming advocates cost $230 per working day ($60k per year) and assuming they need to drive 100 miles round trip per event at a cost of $1.00 per mile for the single car hauler the delivery costs should work out to be around $175 per event. (Note that the pickup and transportation of cars purchased from the public is allocated into cost of goods sold along with all inbound freight.)

Based on conversations with former employees, I believe that each unit sold requires approximately ten hours of labor from inside customer advocates (call center employees). Assuming a fully loaded cost of $30 per hour for these employees this adds $300 per unit sold.

Carvana also incurs warranty costs on vehicles its sells of approximately $150 and other costs such as title and registration, customer service accommodations (Ubers, rental cars, etc.) which probably amount to a few hundred dollars per vehicle.

Taken together these items add up to approximately $1,000 per unit of fulfilment cost.

The table below puts the pieces together, showing how I arrive at an approximately $2,700 contribution profit per retail unit. I should be clear that this is an estimate and based on a lot of assumptions. The point is not to be super precise, per se, merely to observe that the company has a lot of contribution margins to work with.

| | | |
|---|---|---|
| Normalized Gross Profit Per Unit | $ | 4,200 |
| Estimated Customer Acquisition cost ex brand building | $ | (500) |
| Fulfilment Costs | $ | (1,000) |
| Estimated Contribution Margin | $ | 2,700 |

In 2021, the company's SG&A was $4,781 per unit. Excluding advertising costs, SG&A was $3,654 per unit. This raises the question of how we can reconcile my estimate that Carvana's variable fulfilment costs should be approximately $1,000 per unit with Carvana's much higher level of SG&A per unit of $3,654 per unit. The answer, according to the company, is that the difference is a mix of corporate costs, which should scale, and growth related costs, namely hiring ahead of need but also recruiting, training, mistakes by inexperienced people and so forth.

This answer while believable is somewhat unsatisfying since we cannot easily validate them from the outside…. Except we can.

In late March, 2020, in response significant decline in demand at the onset of the COVID-19 pandemic, the company froze the hiring of new corporate employees (but made no layoffs). The company also changed all of its hourly employees to part time and put them on reduced hours tied to customer demand. These steps effectively froze the company's central costs while making its customer facing costs entirely variable and staffed to demand (as opposed to ahead of demand). The company maintained this posture through the end of Q2, 2020.

As shared by Carvana in its Q2 2020 shareholder letter, the table below shows the company's units, and SG&A ex Advertising and D&A by month through Q2 2020.

| | Apr-20 | May-20 | Jun-20 |
|---|---|---|---|
| Units Sold | 13,548 | 20,923 | 20,627 |
| SG&A ex Advertising & D&A (millions) | $ 50.9 | $ 55.6 | $ 53.5 |
| SG&A ex Advertising & D&A per unit | $ 3,760 | $ 2,655 | $ 2,593 |
| | | | |
| Increase April to May in SG&A ex Adverting & D&A (in millions) | | | $ 4.61 |
| Increase April to May in units | | | 7,375 |
| Incremental SG&A ex Advertising & D&A per unit | | | $ 625.1 |

As you can see, the company sold 13,548 units in April 2020 and incurred $50.9 million of SG&A ex advertising and D&A or $3,760 per unit. In May 2020 demand significantly increased rising by 7,375 units to 20,923 units. However, despite this 54% increase in units, SG&A ex advertising and D&A increased by 9% equating to $4.6 million or $625 dollars per unit. This small increase in costs for such a large sequential increase in units is consistent with the view that the variable fulfillment margins of the business are modest when the business is more optimized for efficiency.

Note also the overall level of SG&A ex advertising and D&A. In May and June 2020, operating at an annualized scale of approximately 250k units, the company was able to sustain SG&A ex advertising and D&A of approximately $2,600 per unit. This compares very favorably with the company's actual result of SG&A ex advertising (D&A isn't so big) of $3,654 in 2021 despite the business operating at nearly twice the scale in 2021.

Moreover, this level of SG&A per unit ex advertising achieved in early 2020 was not the result of an austerity plan. The company was investing heavily in growing its corporate capabilities through Q1 2020 and elected to freeze this growth but not to cut these costs in an effort to continue making progress on the company's long term initiatives. If needed, the $2,600 of SG&A per unit ex advertising could have been much lower.

I believe that this Q2 2020 episode provides robust support for my view that the company's core unit economics are robust and that it can be effectively managed to profitability if needed.

Another way to look at the company's profit potential is to consider each of the elements of its overall profitability independently based on what the company has actually achieved for each line item if not at the same or for the business as a whole.

For this analysis, I assume:

- GPU of $4,200, my estimate of sustainable GPU based on the company's 2021 actual result.
- $500 of advertising cost per unit, based on the actual experience in Atlanta.
- $2,700 of SG&A ex advertising, based on the actual experience of the company during Q2 2020 with the addition of $100 to estimate the portion depreciation and amortization expense which runs through SG&A.

This arithmetic is shown below. As you can see, it shows that the company has demonstrated an ability to earn $1,000 of EBIT per unit at much lower scale and with less mature processes than it has currently.

| | |
|---|---|
| Estimated Normalized GPU | $ 4,200.0 |
| Atlanta Advertising Expense per Unit | $ (500.0) |
| May, June 2020 SG&A Ex Advertising & D&A per Unit | $ (2,600.0) |
| Estimated D&A not in COGs | $ (100.0) |
| **Estimate of demonstrated latent profit potential per unit** | **$ 1,000.0** |

At the current depressed run rate of 500k units per year, this already demonstrated $1,000 per unit of EBIT, when combined with the $100 million per year of profits from the Adessa auction business would be more than enough to cover the $600 million of interest while the company continues to grow.

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