

A Few Things We Learned

2023

October - November - December

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for the world's internet-scale businesses.



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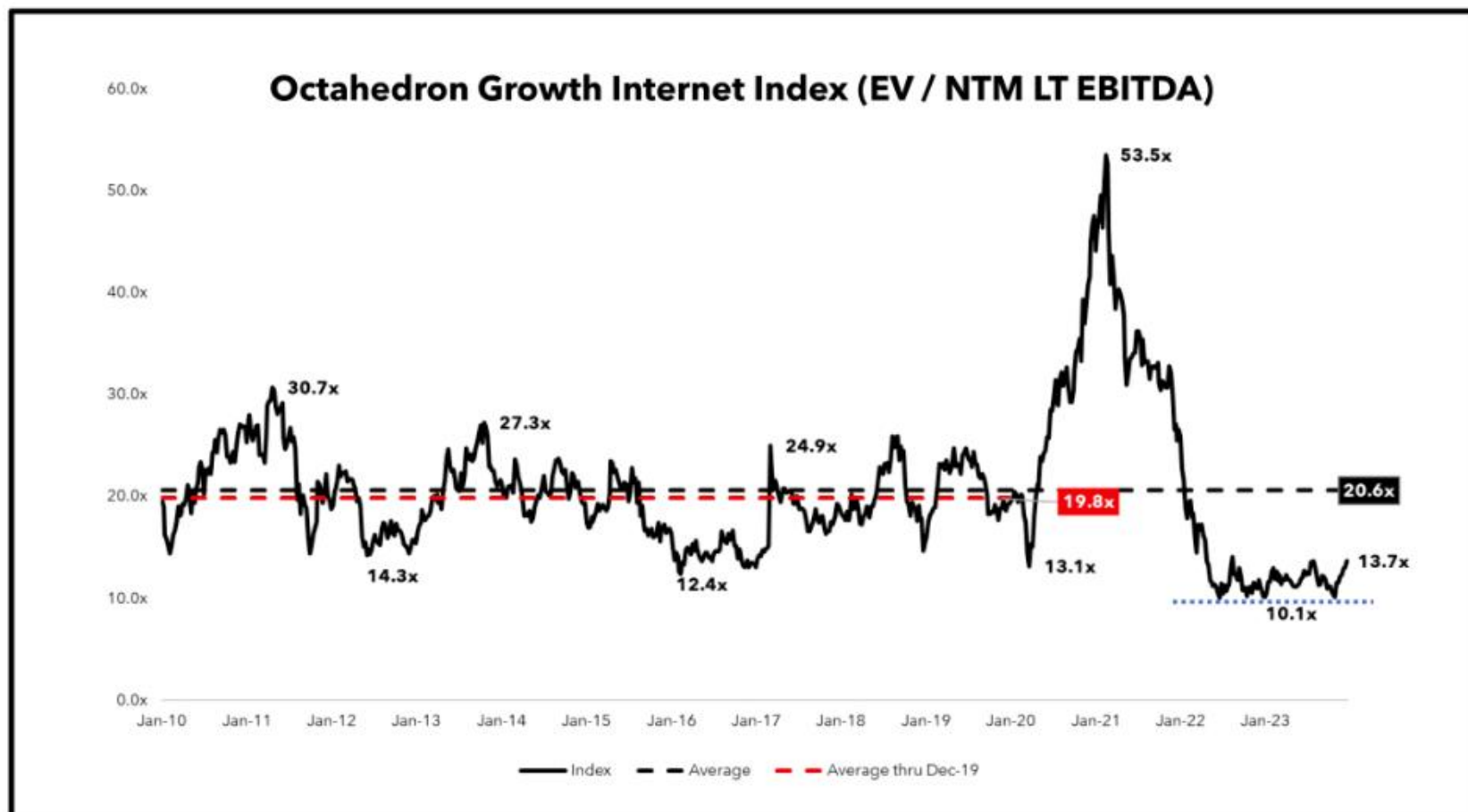
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Valuations : Internet

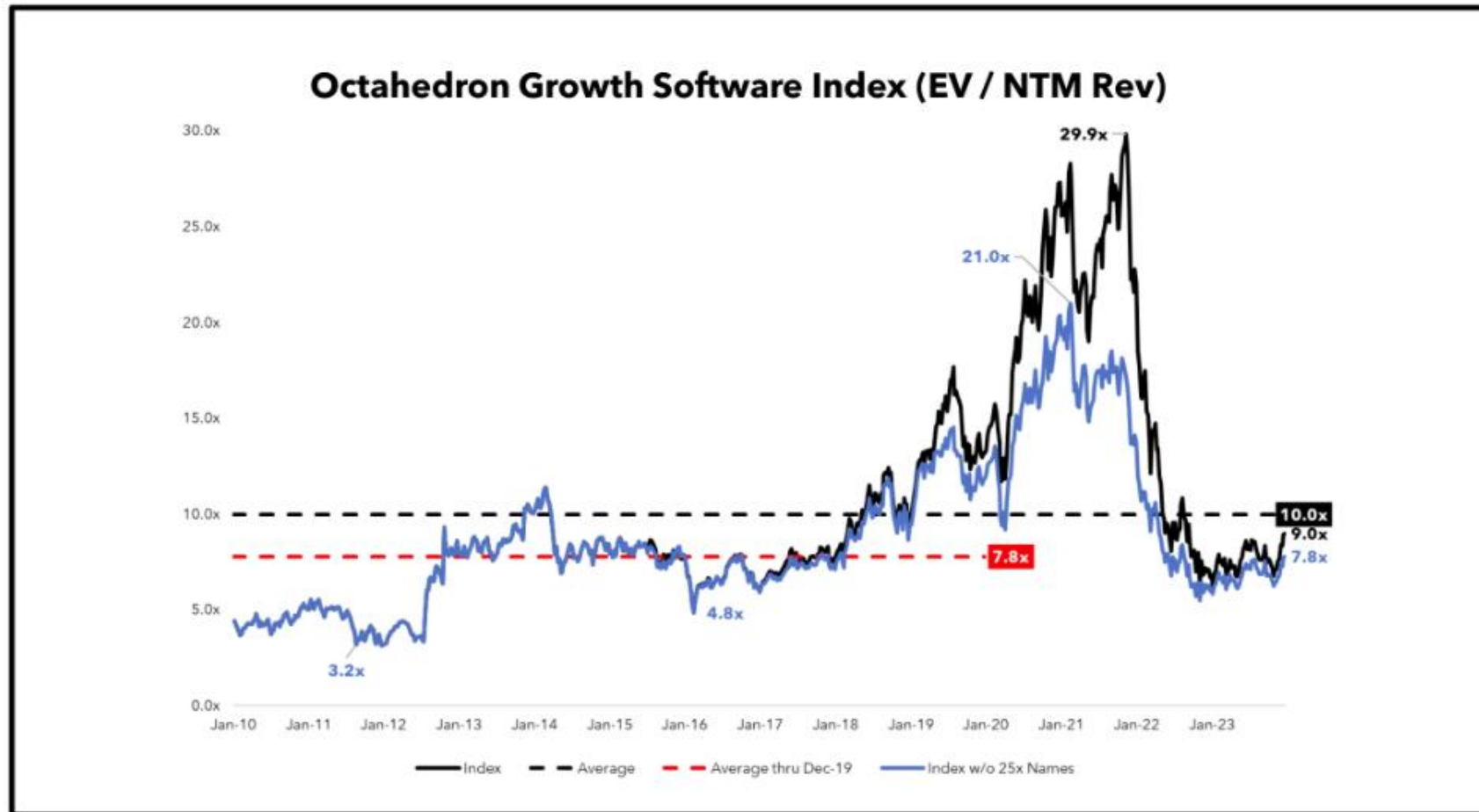
Growth Internet valuations bounced off the "10x LT-EBITDA bottom" in this recent rally, but are still below long-term averages...



Source: Bloomberg as of 22-Dec-23, Octahedron estimates

Valuations : Software

...but software multiples are close to historical averages, implying fair valuations



Source: Bloomberg as of 22-Dec-23, Octahedron estimates

Quote(s) of the quarter

Immaculate disinflation anyone?

J.P.Morgan

"I do think we are a little bit more optimistic than we were. But obviously markets have been bumpy, both equity markets and rate markets have been very whippy recently. **We don't want to get too carried away with optimism.** We are coming on and off a very low-base....expectation that we are on the path to normalization and improvement and of course, **the overall economic picture at least currently looks solid, sort of immaculate disinflation.** Trade is actually happening. So those are all reasons to be a little bit optimistic in the near-term, but it's tempered with quite a bit of caution."

Source: C3Q'23 earnings

Quote(s) of the quarter

"I Love You All" ; "OpenAI is nothing without its people"



Source: Tweets by OpenAI execs. and team

Macro Musings : *US Consumer*

Somewhat healthy, but risks are rising in the US...(1/3)

J.P.Morgan

“Currently, U.S. consumers and businesses generally remain healthy, although, consumers are spending down their excess cash buffers.

However, persistently tight labor markets as well as extremely high government debt levels with the largest peacetime fiscal deficits ever are increasing the risks that inflation remains elevated and that interest rates rise further from here. Additionally, we still do not know the longer-term consequences of quantitative tightening, which reduces liquidity in the system at a time when market-making capabilities are increasingly limited by regulations. Furthermore, the war in Ukraine **compounded by last week’s attacks on Israel may have far-reaching impacts on energy and food markets, global trade, and geopolitical relationships. This may be the most dangerous time the world has seen in decades”**

Source: C3Q'23 earnings

Macro Musings : *US Consumer*

Somewhat healthy, but risks are rising in the US...(2/3)

Goldman
Sachs

"The U.S. economy has been more resilient. The fiscal stimulus has helped mute the material tightening of monetary conditions that's occurred. I'm still of the belief that there's been a lag with this tightening **and across a broad swath of the economy, we will see more sluggishness.**

But we, again, in the past quarter, materially tightened economic conditions, and I just think there's a lag in most sectors of the economy, not all, but most sectors of the economy. **And I do think over the next two to four quarters, the impact of that tightening will be more evident and will create slowdowns in some areas.** I am hearing, as I interact with CEOs, particularly around consumer businesses some softness, **particularly in the last eight weeks in certain consumer behaviors.** I don't want to over amplify that because I think the economy and the consumer has been more resilient."

Source: C3Q'23 earnings

Macro Musings : US Consumer

Somewhat healthy, but risks are rising in the US...(3/3)



2023 YTD Consumer Payment Spend of \$3.1T is up 4% YoY

Payment Spend¹ (\$ Volume) and YoY % Growth

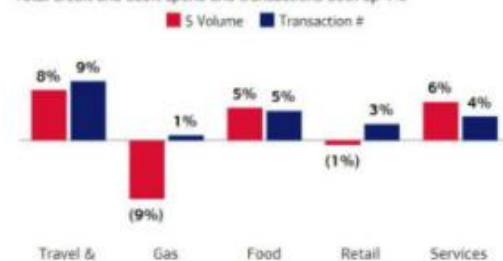


Payment Spend¹ (\$ and Transaction Volume) Quarterly YoY % Growth



2023 YTD Credit and Debit^{2,3} YoY % Growth

Total credit and debit spend and transactions both up 4%



2023 YTD YoY Change in Payment Transaction Volume



We see that in our customer data, **our 37 million checking customers, we see their spending slowing down.**



¹ Total payments represent payments made from Bank of America accounts using credit card, debit card, ACH, wires, billpay, person-to-person, cash and checks.
² Includes consumer and small business credit card portfolios in Consumer Banking and DBM.
³ Excludes credit and debit money transfers, charitable donations, and miscellaneous categories with immaterial volume.
⁴ P2P stands for person-to-person. P2B stands for person-to-business.

Source: C3Q'23 earnings



Macro Musings : *Global Consumer*

Europe weak, but China likely at a cyclical bottom



"The global macro backdrop remains the story of desynchronization. In the **U.S., recent data implies a soft landing, but history would suggest otherwise, and we are seeing some cracks in the lower FICO consumers.**

In the **euro area and the U.K., the picture has turned distinctly more negative. The summer weakness in industrial economies is spreading south** and the weight of structurally higher labor and energy costs suggests a more enduring competitiveness challenge for that region.

China's economy may have reached a cyclical bottom, supported by the government's modest stimulus efforts, but it still has to work through weak sentiment, youth unemployment and the pain in its property market.

I'm struck how consistently CEOs are less optimistic about 2024 than a few months ago.

Source: C3Q'23 earnings

Macro Musings : *Price Sensitivity*

Consumers are getting more price conscious...(1/2)



"We are seeing indications of more cautious consumer behavior around the world in an uneven macroenvironment."

"Total retail sales across the marketplace fell short of our expectations with softer demand outside of the key consumer moments. While NIKE's store traffic continued to grow, **we saw softness in digital traffic and higher levels of promotional activity across the marketplace.** As a result, we are adjusting our channel growth plans for the remainder of the year."

"Given the promotional environment and the cautious consumer behavior that we're seeing, we are stepping up our plans to reduce marketplace supply of our key franchises."

Source: C3Q'23 earnings

Macro Musings : *Price Sensitivity*

Consumers are getting more price conscious...(2/2)



"Outside of Prime Day, we've continued to see strong demand across everyday essentials, including categories like beauty and health and personal care. **From a customer behavior standpoint, we still see customers remaining cautious about price, trading down where they can and seeking out deals, coupled with lower spending on discretionary items.**"

Source: C3Q'23 earnings

Macro Musings : *Price Sensitivity*

...with caution inflecting downwards starting 4Q'23...



“Recently, we've experienced a higher degree of variability and weekly performance in between holiday events in the US, including seeing a softening in the back half of October, it was off-trend to the rest of the quarter. Sales during November have turned higher as unseasonal weather abated and we kicked off holiday events. **So sales have been somewhat uneven and this gives us reason to think slightly more cautiously about the consumer versus 90 days ago.** We still expect sales growth to moderate in Q4 versus prior quarters as grocery inflation further normalizes towards historic levels.”

Source: C3Q'23 earnings

Macro Musings : *Price Sensitivity*

...which results in consumers unsurprisingly trading down to value

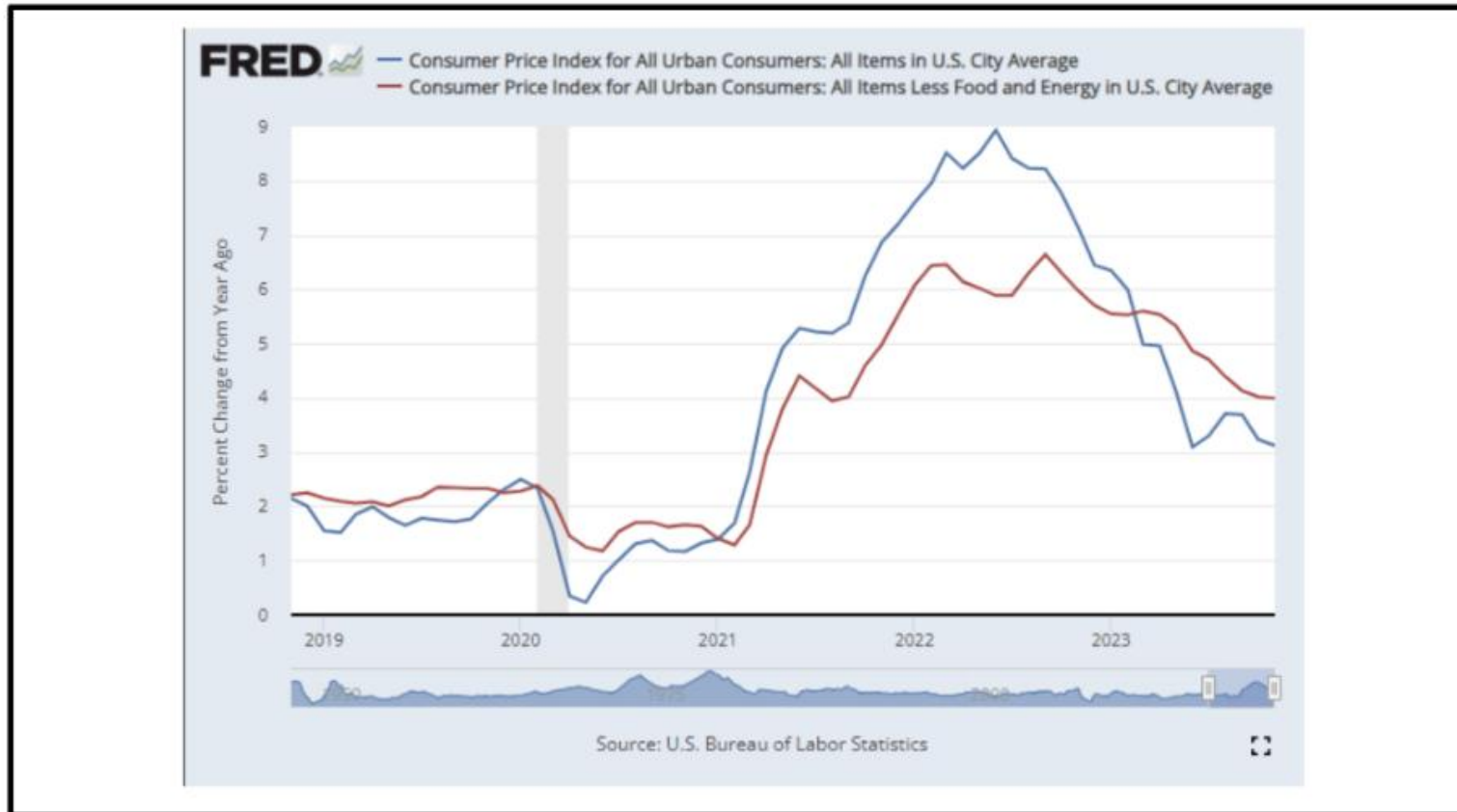


“Consumer expectations are shifting, especially around price and convenience. We've seen **4x deals queries during the holidays** versus other periods. 75% of users say, they'll shop with those offering free shipping. Retailers are capitalizing on these trends with our differentiated merchant offerings like merchant promotions and fulfillment options. And we're making improvements to significantly boost the number of deals shown to shoppers in Search this holiday season.”

Source: C3Q'23 earnings

Macro Musings : *Inflation Trends*

Inflation trending down from mid-2022 highs...



Source: US Bureau of Labor Statistics

Macro Musings : *Inflation Trends*

...as pockets of essential spend (fresh produce) are starting to deflate,...



"If you look at overall, inflation is definitely stabilizing overall. From a customer standpoint, they appreciate the stabilization, but they also know the fact that if you look at over the last two years they've had to endure a lot of inflation. **And if you look at some of the fresh departments some of that is actually returned back to normal,** but if you look at on the process side you wouldn't see that. So if you look at like eggs, for an example, eggs are significantly deflationary. And we'll all be happy when we get to the point where we're cycling that early next year."

Source: C3Q'23 earnings

Macro Musings : *Inflation Trends*

...and input costs have stabilized, leading to general merch deflation...

DOLLAR GENERAL

"We've seen some deflationary pieces starting to show up, especially in our non-consumable discretionary type areas. Nothing that alarms us at this point as we move into 2024. How we're looking at it is, **we see some real opportunity to reduce initial costs, especially in our import-related goods, not only from the factory, but also for the transportation side.** So ocean freight, fuel costs, bunker fuel costs, and such have moderated greatly over the last year. **So there's some opportunity to pull costs out. Some of that we will definitely pass on to the consumer as we continue to watch,** especially in those commodity areas of the import side of the business, because there's always some good, even in our nonconsumable areas, there's some good commodity type items in there."

Source: C3Q'23 earnings

Macro Musings : *Inflation Trends*

...and potential deflation is also possible in dry grocery



"But it does start to have an impact on dollars when the units don't go up enough to offset the deflationary impact as it relates to GM. **The dry grocery and consumables question feels like the key question Will it come down? Will those categories come down? We hope they will. On a two-year stack in Walmart US, John, I think we're still mid-double digits, slightly up versus a year ago. But we think we may see dry grocery and consumables start to deflate in the coming weeks and months.** And so as we look ahead to next year, we could find ourselves in Walmart US with a deflationary environment. And John David mentioned earlier, that causes us to think about what are we doing with expenses. Are we ready for that? It's too early to call how dramatic it'll be."

Source: C3Q'23 earnings

Macro Musings : *Spending Trends*

This may lead consumers to start spending discretionary \$s on goods...



“More specifically, in both Food & Beverage and Beauty & Essentials, the benefit from average pricing decelerated by about 3 percentage points between the second and third quarters, as we move beyond the period of peak inflation from a year ago. **As we've said, a lower inflation rate is welcome news, as it will reduce pressure on consumer budgets, making room for them to expand back into Discretionary categories over time.**”

Source: C3Q'23 earnings

Macro Musings : *Spending Trends*

...and travel

Booking.com

"Given current trends, we expect customers and consumers will continue to prioritize travel over other discretionary spend in 2024."

Expedia

"Travel demand otherwise remain solid with broad trends consistent over the last few months. North America and Europe demand remains stable with more pronounced growth in APAC and Latin America."

airbnb

"Q3 marked another quarter of strong results for Airbnb. **Nights and Experiences Booked exceeded 113 million, growing 14% year-over-year and accelerating from Q2 2023.**"

Source: C3Q'23 earnings

Macro Musings : *Spending Trends*

Beauty, health and wellness were standout categories, despite a shrinking wallet...

NORDSTROM

"The majority of our categories improved sequentially from the second quarter in terms of year-over-year trends, with Active, Beauty and Accessories leading."

KOHL'S

"I am pleased with our positive year-to-date stores performance, driven by strong growth in Sephora, and more recently, our home and gifting initiatives."

Walmart 

"But we're still seeing an ongoing category mix pressure as health and wellness and grocery sales outperformed general merchandise."

Source: C3Q'23 earnings

Macro Musings : *Spending Trends*

...but higher income consumers continue to spend without trading down



"Demand for Starbucks remains strong around the world. Here in the US, our largest market, we saw momentum sustained throughout the quarter. Revenue for the quarter was up a record 12%, underpinned by 8% comps."



"So in terms of guest metrics, we're still seeing growth in both spend from new and existing guests. So still really pleased, I would say, overall. And just looking out over Q4 again two-thirds of the quarter in front of us, so planning the business prudently. But I would say overall, really pleased with what we're seeing in terms of guest behavior."

Source: C3Q'23 earnings

Macro Musings : *Spending Trends*

Low-income consumers continue to see the most pressure...



"I'm sure part of that, and anytime I talk to a politician, I always remind them, **if you look at customers on a budget, they're under a lot of strain and they're doing a lot of behavior changes.** If you look at customers that are not as focused on price because inflation hasn't affected them as much, that customers behavior is still very strong and they're still continuing to buy big packs, continuing to buy nicer wines, Murray's cheese, Starbucks, things like that."

Source: C3Q'23 earnings

Macro Musings : *Spending Trends*

...resulting in a more promotional environment for some discount retailers

DOLLAR GENERAL

"Our promotional activity, while I still believe I would call it semi-rational across the spectrum, we have seen an uptick in recent weeks on promotional activity. We're watching that carefully. Is that because we're moving into the holidays or is that something that we'll sustain as we move into '24. So we're watching that carefully."



"I would say for the most part, there's a lot going on in the external environment, whether it's macro economy, we expect it to be a very promotional retail environment, and now you have geopolitics into the mix, and it is our toughest compare for the year. So, given everything going on externally, we think it's prudent to remain very conservative in running the business in the fourth quarter."

Source: C3Q'23 earnings

Macro Musings : *Freight*

Freight costs continue to benefit retailer margins...



"This increase reflected the continued benefit of lower freight costs, disciplined inventory management by our team, favorable category and channel mix and the continued benefit of our work to enhance efficiency, which offset multiple pressures throughout our business."

KOHL'S

"Gross margin in Q3 was 38.9%, an increase of 158 basis points to last year. The year-over-year increase was driven by lower freight costs, reduced digital-related cost of shipping, and further progress against simplifying our value strategies. This was partially offset by product cost inflation. Although shrink remains elevated, it was in line with our expectations during the quarter."

Source: C3Q'23 earnings

Macro Musings : *Freight*

...although freight rates are likely to see upwards pressure in 2024



"On the truckload side, the announcements of failures and rumors of more seem to be increasing by the week as of late. It's taken a lot to get to this point, so deep along the bottom of this current cycle. But the market is beginning to show signs of sensitivity to when supply leaves suddenly or provider cannot perform with freight lanes that were awarded by offering the cheapest price and a shipper may find themselves quickly seeking a quality provider at a higher price than the original award. **However, we are not seeing enough of that kind of activity or enough supply leave and/or enough strength in volumes to move rates to a meaningful inflection position right now. But it does appear that the stage has been set for positive rate pressure in the next bid season.**"

Source: C3Q'23 earnings

Macro Musings : *Tidbits*

Retailers saw some weakness in late October (blamed on “the weather”)...

KOHL'S

"Taking a closer look at the quarter, we had a solid back-to-school season, and through the first eight weeks, sales were tracking above our expectations. **However, warmer weather during the latter part of September and into October had a clear impact on demand for our fall seasonal goods, especially, in store.**"

TJX

"So, you know, the cadence of the quarter, August and September, you know, were strong. **The October when the warmer weather did set in, and I'll add in there, you know, the geopolitical events that are also taking place. You know, we did see our trend, you know, a little bit of a drop from our August-September trend.** But when we saw the weather cool down towards the end of October, we saw our sales trends return."

Source: C3Q'23 earnings

Macro Musings : *Tidbits*

...while the war in the middle east created a ripple in travel

Booking.com

"Globally, we saw a slowdown starting the second week of October due to cancellations and a drop in new bookings after the start of the war in the Middle East. The cancellations we saw that started in the second week of October were concentrated in Israel, but we also saw some impact on travel trends outside of the country as people absorbed the news. **We were pleased to see room night growth recover towards the end of the month."**

 Expedia

"We're also keeping a close eye on the escalating violence in the Middle East, which appeared to have some impact on global travel in early October."

 airbnb

"Q3 was a record-breaking summer travel season for our business. We are seeing greater volatility early in Q4, and are closely monitoring macroeconomic trends and geopolitical conflicts that may impact travel demand."

Source: C3Q'23 earnings

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3. On-Demand & E-Commerce
4. Software & Services
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Digital Advertising & Content



Digital Advertising : *Ad Market*

Advertisers are directing dollars to the platforms with the highest ROAS...



“With respect to Google Services, first within advertising. **After a period of historic volatility, we were pleased with the year-on-year revenue growth of Search and YouTube advertising in the third quarter.** Second, within Other revenues, **in our YouTube subscription products, the substantial growth in revenues primarily reflects subscriber growth.** Looking ahead, a full quarter of NFL Sunday Ticket revenues as well as associated content acquisition costs, will be reflected in Q4 results, compared to only a few weeks in the third quarter.”

Source: C3Q'23 earnings

Digital Advertising : *Ad Market*

...resulting in weakness for the rest of the ads market



WARNER BROS.
DISCOVERY

"On the challenging side, it is becoming increasingly clear now that much like 2023, 2024 will have its share of complexity, particularly as it relates to the possibility of continued sluggish advertising trends. To that point, while streaming advertising remains robust, the state of the overall linear ad market during the second half of this year has been disappointing. **And looking ahead, while it is early, the timing of an ad recovery is currently difficult for any of us to predict with any conviction.**"

Source: C3Q'23 earnings

Digital Advertising : Ad Market

Macro and geopolitical issues are creating more volatility...



"I should say that coming into Q4, we've been seeing continued strong advertiser demand in key segments, including online commerce and gaming. But we are also seeing more volatility at the start of the quarter. ...

While we don't have material direct revenue exposure to Israel and the Middle East, we have observed softer ad spend in the beginning of the fourth quarter, correlating with the start of the conflict, which is captured in our Q4 revenue outlook. It's hard for us to attribute demand softness directly to any specific geopolitical event. Historically, we have seen **broader demand softness follow other regional conflicts in the past, such as in the Ukraine war.** We've reflected the latest trends and advertiser reaction that we've seen into our Q4 outlook, which, again, **we think reflects the greater uncertainty and volatility in the landscape ahead."**

Source: C3Q'23 earnings

Digital Advertising : *Ad Market*

...offset by idiosyncratic progress in ML and AI at the largest platforms



"Beyond that, there is also a different set of sophisticated recommendation AI systems that powers our feeds, Reels, ads, and integrity systems. And this technology has less hype right now than generative AI, but it is also very important and improving very quickly. AI-driven feed recommendations continue to grow their impact on incremental engagement. **This year alone, we've seen a 7% increase in time spent on Facebook and a 6% increase on Instagram as a result of recommendation improvements. Our AI tools for advertisers** are also driving results with **Advantage+ Shopping Campaigns reaching a \$10 billion run rate..."**

Source: C3Q'23 earnings

Digital Advertising : *GenAI*

Advances in GenAI is likely the next wind in the sails for search...(1/2)



“Our work with the Search Generative Experience, which is our experiment to bring generative AI capabilities into Search. We have learned a lot from people trying it and we have added new capabilities like incorporating videos and images into responses and generating imagery. We have also made it easier to understand and debug generated code. **Direct user feedback has been positive with strong growth and adoption.** In August, we opened up availability to India and Japan with more countries and languages to come. As we add features and expand into new markets, we are engaging with the broader ecosystem and **will continue to prioritize approaches that add value for our users**, send valuable traffic to publishers, and support a healthy open Internet.”

Source: C3Q'23 earnings

Digital Advertising : *GenAI*

Advances in GenAI is likely the next wind in the sails for search...(2/2)



“With generative AI applied to Search, **we can serve a wider range of information needs and answer new types of questions**, including those that benefit from multiple perspectives. We are surfacing more links with SGE and linking to a wider range of sources on the results page, creating new opportunities for content to be discovered. **Of course, ads will continue to play an important role in this new Search experience.** People are finding ads helpful here, as they provide useful options to take action and connect with businesses. **We'll experiment with new formats native to SGE that use generative AI to create relevant, high-quality ads** customized to every step of the Search journey.”

Source: C3Q'23 earnings

Digital Advertising : *GenAI*

...while GenAI is making its way through all of Meta's surfaces...(1/2)



"The experiences that we started rolling out at Connect are going to transform the way that people use all our services: feeds, messaging, hardware, advertising, business messaging, interacting with creators and more. But it's going to take time to tune all of these experiences before hundreds of millions or billions of people are going to use them. **And I expect that dialing in these products and the vision that we articulated at Connect is going to be our theme for much of the next year. And I think that it's going to be a very exciting 2024."**

Source: C3Q'23 earnings

Digital Advertising : GenAI

...while GenAI is making its way through all of Meta's surfaces...(2/2)



"We started rolling out Meta AI, our new assistant that you can access across all our messaging experiences and smart glasses to answer questions, get access to real-time information, and generate photorealistic images. We started launching our AI Studio platform that enables people to create and interact with lots of different AIs for help getting things done and just having fun. We rolled out Emu, our image creation model that produces high-quality images and stickers fast. We launched an early alpha of business AIs so that eventually every business can have an AI to interface with customers to do sales and support. And we laid out the plan to launch creator AIs next year, so every creator can have an AI that their fans can engage with to help them build out their community."

Source: C3Q'23 earnings

Content : *Tidbits*

Netflix grew their ads membership 70% q/q...

NETFLIX

"Our immediate priority is building our ad membership so that Netflix becomes an essential buy for advertisers, which is key for advertising to become material to our business. **In Q3'23, our ads membership increased nearly 70% quarter-over-quarter and now accounts for ~30% of all new sign-ups in our 12 ads countries.**"

Source: C3Q'23 earnings

Content : *Tidbits*

...and de-risked 2024 by giving an early guide of continued margin expansion

NETFLIX

"In terms of profitability, we're updating our FY23 operating margin guidance forecast to 20%, the high end of our prior 18% to 20% forecast (based on F/X rates as of 1/1/23). This would mean that our operating margin would increase approximately two percentage points from our 18% operating margin in FY22. Assuming no material swing in F/X rates, **we currently expect an operating margin in FY24 of 22% to 23%."**

Source: C3Q'23 earnings

Content : *Tidbits*

Disney buys the remainder of Hulu from Comcast...



"And speaking of Hulu, **we were pleased to announce last week that we will acquire the remaining stake in Hulu held by Comcast, which will further Disney streaming objectives.** We remain on track to rollout a more unified one-app experience domestically, making extensive general entertainment content available to bundle subscribers via Disney+."

Source: C3Q'23 earnings

Content : *Tidbits*

...while disclosing ESPN financials for the first time



ESPN	FYE Oct 2022				FYE Oct 2023		
	FQ1	FQ2	FQ3	FQ4	FQ1	FQ2	FQ3
Revenue	\$4,678	\$4,215	\$4,477	\$3,900	\$4,640	\$4,226	\$4,335
% YoY					(0.8%)	0.3%	(3.2%)
EBIT	(\$313)	\$1,211	\$949	\$863	(\$164)	\$794	\$854
% Margin - TTM				15.7%	16.6%	14.2%	13.7%

Source: Company filing dated 18-Oct-23

Content : *Tidbits*

Spotify added audiobook access to their Premium subscription



"Audiobook lovers across the U.S., rejoice! **As of today, Spotify Premium users in the U.S. join those in the U.K. and Australia as we make over 200,000 audiobooks available as part of Spotify Premium subscriptions.**

How's that for a sequel?

To start, we're offering each Premium individual, as well as plan managers for Family and Duo accounts, 15 hours of listening per month.

There's no need for you to do anything: Starting today, you'll simply start seeing audiobooks marked as "Included in Premium" that you can hit play on right away. **Fifteen hours should get you around two average audiobooks per month**, but if you do hit the limit, you can purchase a 10-hour top-up."

Source: Company blog dated 8-Nov-23

Content : *Tidbits*

Peloton expects to have 75k rental subscribers by June 2024



"Peloton Bike Rental subscriptions, which we sometimes refer to as Fitness-As-A-Service (FAAS), is the largest of these initiatives so far and is also the first new growth initiative we launched in 2022. **We ended 1QFY24 with 54 thousand rental subscribers in the US and Canada. We expect to finish the fiscal year with ~75 thousand subscribers** and to grow our Bike rental subscription revenues for FY24 by ~90%+ Y/Y. As in previous periods, rentals continue to be highly incremental, with 60%+ of survey respondents saying they wouldn't have joined Peloton if it weren't for the flexibility our rental program offers."

Source: C3Q'23 earnings

Payments & Fintech

Payments & Fintech : *Spending Trends*

The strong labor market is driving consumer spend, but is normalizing to pre-pandemic levels...

VISA

"...we saw Payments volume growth **tick-up from July to September**, primarily driven by sequential improvement in ticket size growth that was mostly led by fuel with higher gas prices and easier Y-o-Y comparison..."

"Consumer spend **across all segments from high to low spend has remained stable** since March.

Our data **did not indicate any behavior change across consumer segments."**



"...the labor market remained strong, which is a key driver of consumer spending... "

"Consumer spending patterns continue to normalize post-pandemic..."

...our base case scenario **continues to assume consumer spending remains resilient, buoyed by strong labor markets, and reflects recent spending dynamics."**

Source: C3Q'23 earnings

Payments & Fintech : *Spending Trends*

...reflecting a low inflation, low growth economy...



"Consumer spend growth has now reverted to pre-pandemic trends with nominal spend per customer stable and relatively flat year-on-year.



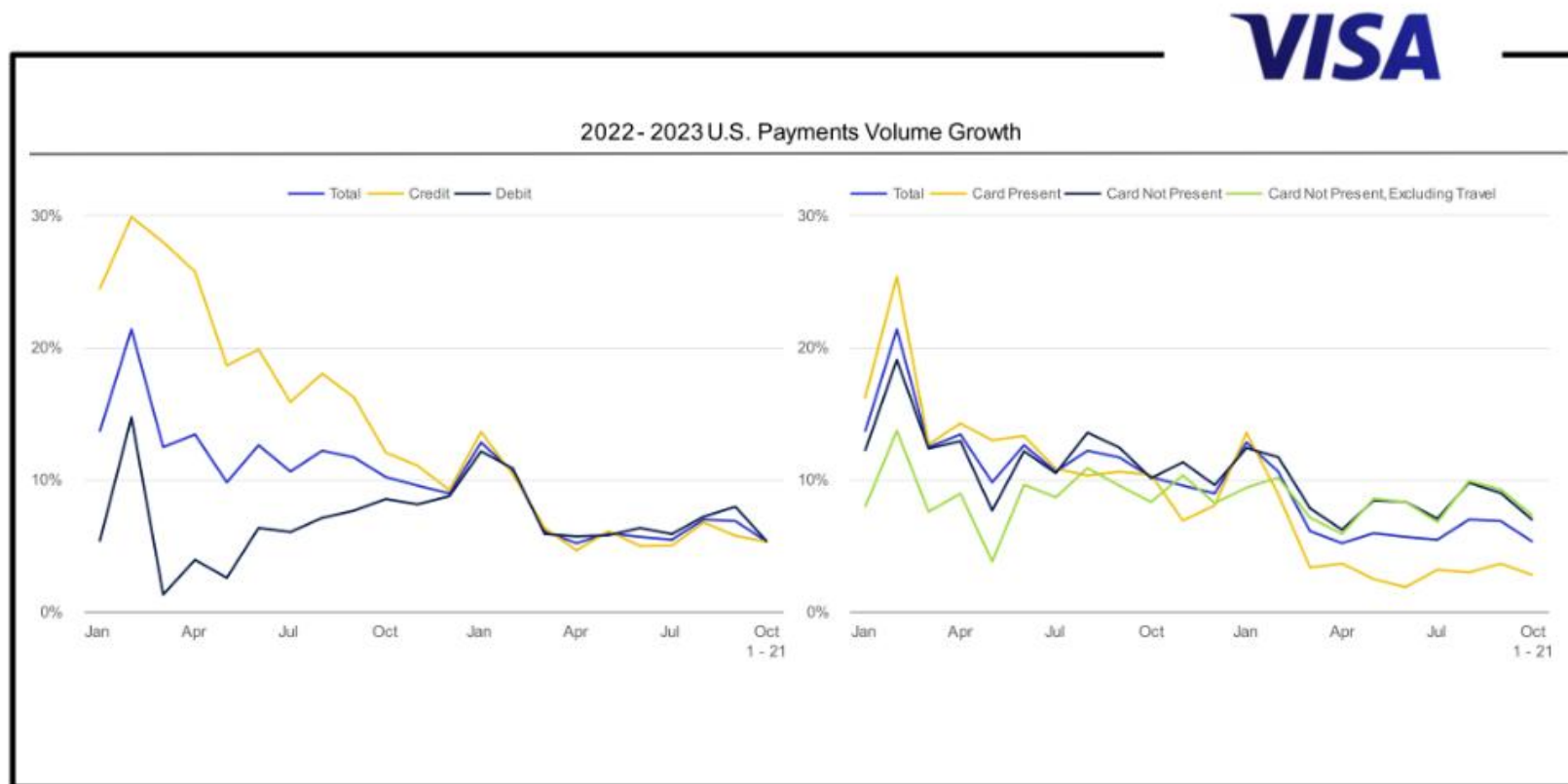
"...in the big aggregate numbers, it can keep bumping along at that level, which is consistent with **low inflation, low growth economy**, and **effectively shows the consumer has been brought more in line with the scenario of the Fed reaching their target.** That's what we see"

"...the retail sales number seems to be stronger today, but that all shakes through."

Source: C3Q'23 earnings

Payments & Fintech : Spending Trends

Visa's showed normalizing US payments volumes...



Source: C3Q'23 earnings

Payments & Fintech : *Spending Trends*

...with continuing strength in cross-border e-commerce & travel...

VISA

"...cross-border e-commerce spending grew year-over-year in the low-double-digits..."

"Cross-border travel-related spend grew 26% year-over-year."

"Cross-border travel volume excluding intra-Europe year-over-year growth **will moderate to the low 20s... driven primarily by improving AP cross-border travel volume, mostly from China** and to a lesser extent improving U.S. inbound travel volume"



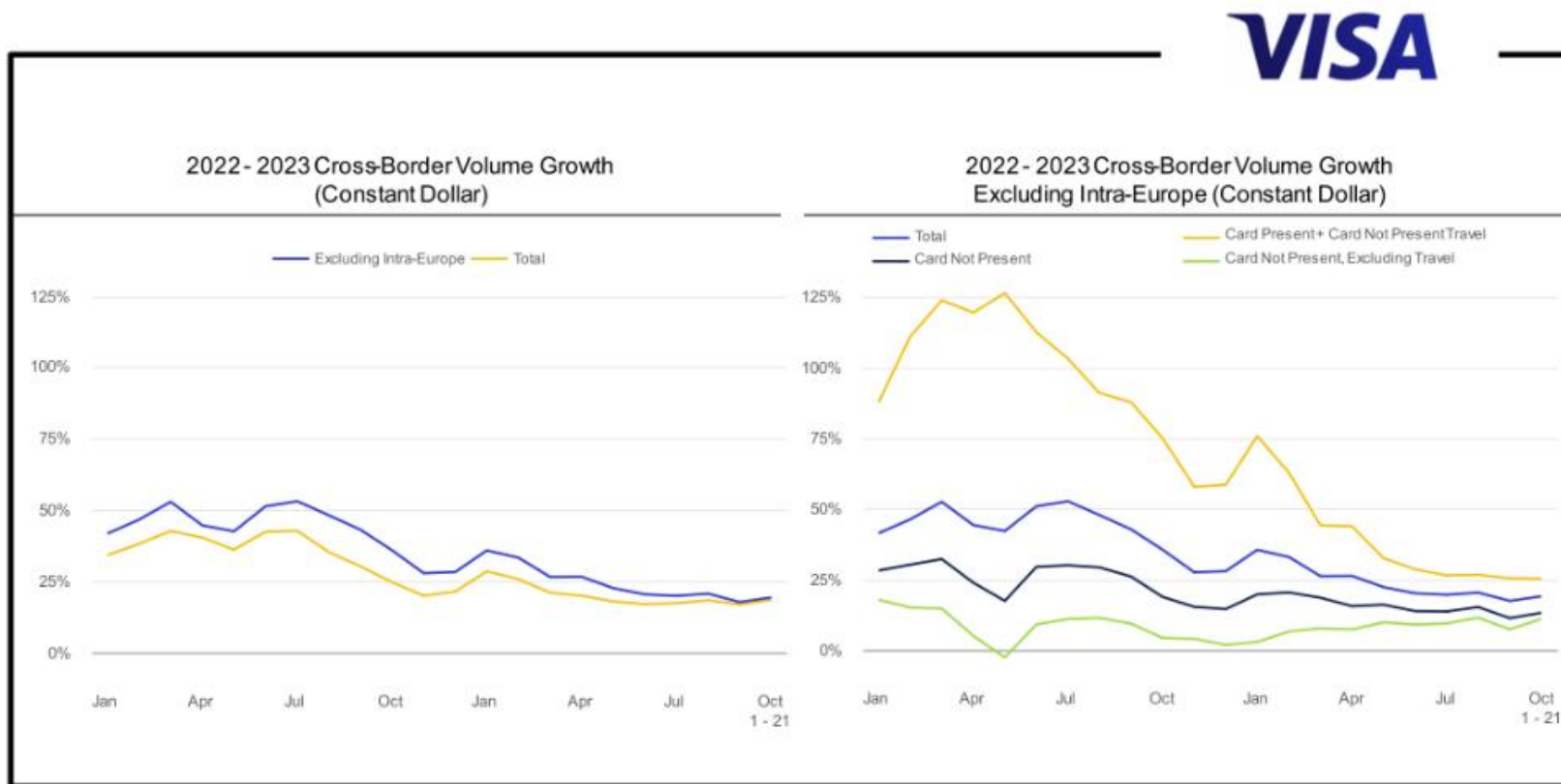
"Overall, cross-border volume increased 21% globally for the quarter... reflecting **strong growth in both travel and non-travel-related cross-border spending"**

Consumer spending patterns continue to normalize post-pandemic, while pockets of opportunity remain for further recovery of cross-border travel, notably into and out of China.

Source: C3Q'23 earnings

Payments & Fintech : *Spending Trends*


...as seen from Visa's cross-border, CP and CNP volumes, incl and ex-travel...



Source: C3Q'23 earnings

Payments & Fintech : Spending Trends

...with similar trends at Mastercard



mastercard.

Business Update Through October 21st

	Year-over-year growth %						Current period as a percentage of 2019 ^{1,2}					
	2023						2023					
	Q2	Jul	Aug	Sep	Q3	Oct 21 MTD	Q2	Jul	Aug	Sep	Q3	Oct 21 MTD
Switched volume³	15%	13%	14%	14%	14%	11%	178%	179%	176%	178%	178%	177%
United States	7%	6%	7%	7%	7%	5%	155%	157%	152%	155%	155%	153%
Worldwide less U.S.	22%	19%	19%	19%	19%	16%	200%	199%	199%	199%	199%	199%
Switched transactions	17%	15%	15%	15%	15%	12%	166%	166%	162%	163%	164%	162%
Cross-border volume³	24%	22%	21%	20%	21%	20%	172%	172%	172%	170%	171%	174%
Intra-Europe	19%	19%	18%	18%	19%	18%	184%	183%	184%	177%	182%	181%
Other Cross-border	29%	25%	25%	22%	24%	22%	161%	161%	160%	162%	161%	167%
XB CNP ex travel	16%	19%	20%	17%	19%	18%	210%	209%	211%	206%	209%	212%
XB Travel (CP + CNP travel)	29%	24%	22%	22%	23%	22%	154%	157%	156%	152%	155%	154%

Source: C3Q'23 earnings

Payments & Fintech : *On Alert*

Fintechs are on alert for geopolitics, monetary policy and consumer balance sheets risk



"However, we continue to **monitor aspects such as credit availability and savings behaviors.** Second, **although inflation levels have moderated, they remain elevated.**

As central banks continue to actively manage monetary policy, we expect the **impacts to vary across countries and sectors. Also, geopolitical uncertainty remains a concern..."**



"**Cash buffers continue to normalize to pre-pandemic levels** with lower-income groups normalizing faster."



"...**consumer balances are going to find a floor at some point.** They, again, are in the **late innings of returning to** sort of more **normal pre-pandemic balances** per account."

Source: C3Q'23 earnings

Payments & Fintech : *On Alert*

...but do not see dark clouds on the horizon as inflation cools and limited evidence of softness in credit...

CHASE 

"...where am I seeing softness in credit?"

And I think the answer to that is **actually nowhere roughly or certainly nowhere that's not expected, meaning we continue to see the normalization story play out in consumer more or less exactly as expected"**

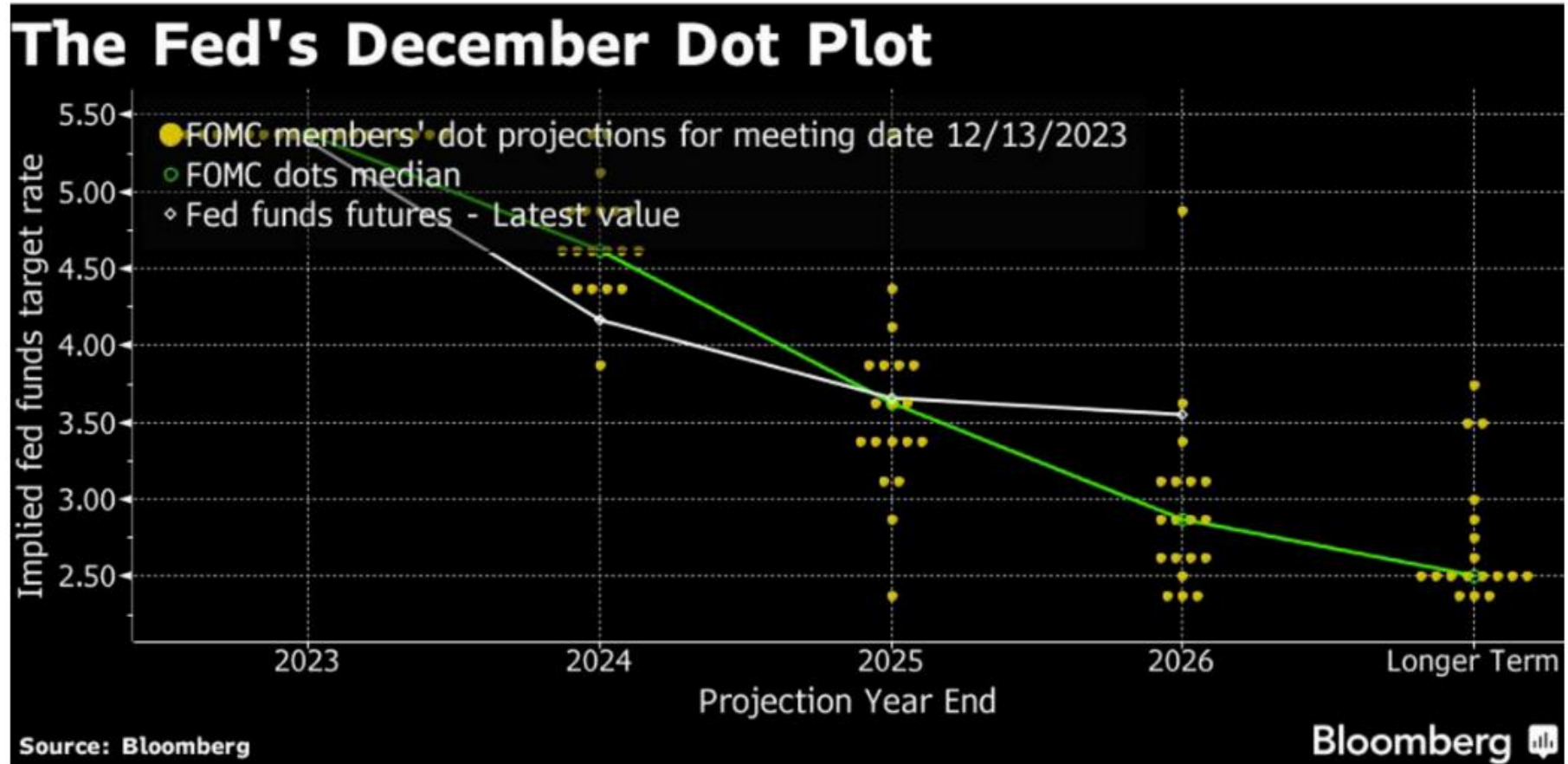


"And on consumer, we'd just note that we continue to see the asset quality metrics come off the bottom, and for the most part, they **remain below historical averages, 30 and 90-day consumer delinquencies still remain below Q4 2019** as an example."

Source: C3Q'23 earnings

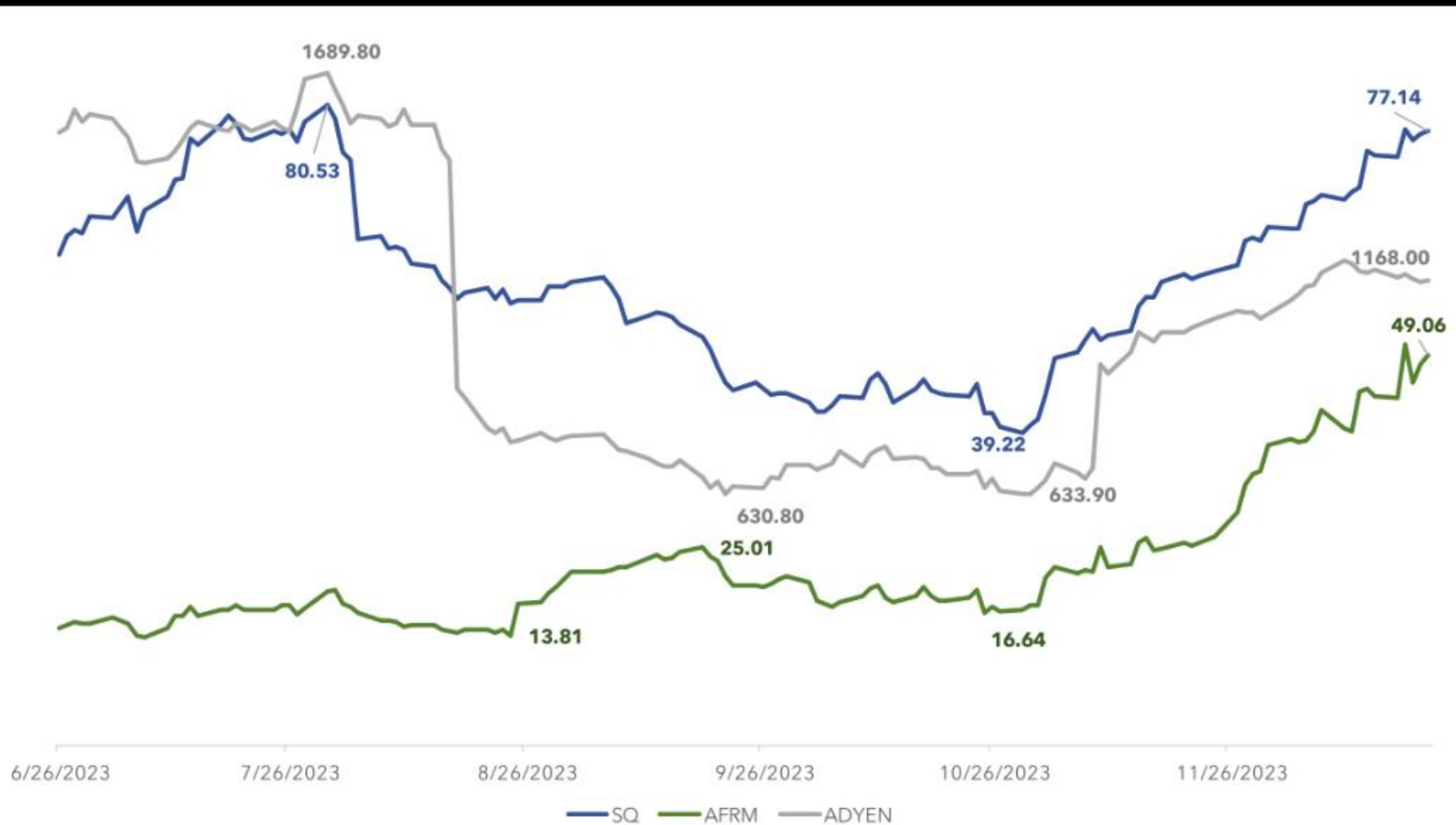
Payments & Fintech : FOMC

...clearly validated by the recent FOMC discussion and dot-plot earlier this month...



Payments & Fintech : *Stock Performance*

A few best-in-class fintechs roared back in recent weeks...



Payments & Fintech : *Stock Performance*

...some by (re)focusing and going back to what made them great in the first place...



"As a company, we remain **focused on balancing growth and profitability**. As we look longer-term, we're bringing a **renewed focus to efficiency, exercising discipline with our expenses, and thinking critically about how we operate to drive leverage**.

"In balance with our growth priorities, what you're hearing from us today is a **significant commitment to profitability and efficiency across three key initiatives...**"

...we are implementing an **absolute cap on the number of people** we have at our company... Our cap of 12,000 people compares to our current size of just over 13,000 people. We believe constraining team size will enable us to be more effective in how we drive performance and service of our customers and accountability on our business strategies.

We expect to reach this cap by the end of 2024 through a combination of performance management, centralizing teams and functions to reduce duplication, and strict prioritization of our scope aligned with the priorities... Second, we are also in the midst of a broad-based effort to reduce our spend across corporate overhead areas. We've identified a number of areas where we expect to find savings, such as real estate, process improvements using automation, discretionary spend areas like T&E, and certain vendor relationships across software, data, cloud, consultants, and contractors.

Source: C3Q'23 earnings

Payments & Fintech : *Stock Performance*

...while recognizing that profitable growth is necessary (in this environment)...



"Yes, I think there's **even more room for innovation and invention and growth**. To be very frank, I believe **we're getting in our own way throughout the company**. As I've dug in through both the lens of Square and also our investment framework, I **just found a lot of silos, a lot of redundancy, a lot of kind of a lack of desire for teams to work together**. And then number two is around just our structure. We **had unclear decision-making throughout the company, which led to a lot of slowness**, especially on the Square side."

"...we're looking to **really focus on our customer** and retaining our customers as well so that it **will always be a checkpoint on all the moves that we make**. And ultimately, **how we think about shipping and iterating and experimenting much more**"

"...my first two weeks with Square, again, running Square was focused on like **what are we working on and why**, and **doing a significant stack rank so that we -- as an organization, we know what's most important, why it's most important, and how it's going to impact**"

Source: C3Q'23 earnings

Payments & Fintech : *Stock Performance*

...others, by staying focused on their core strengths, but adapting to the environment...



We believe the important takeaway from this quarter is that having done the hard work of adapting to interest rate changes over the course of last year, **we are prepared to grow our business at pace while managing credit in the higher-for-longer interest rate environment.**

Our goal for this quarter was... **to grow responsibly, maintain excellent unit economics, and ship new software for our merchants and consumers. We delivered on all three.**

Still, we continue to keep a very keen eye on credit, **as it remains job #0 at Affirm at all times.** We shipped several new risk model improvements, **balancing the twin goals** of finding new opportunities to approve credit applicants without overextending them and to deliver strong yields to our capital partners.

We continue to invest in our areas of strength for the long term: risk management, technology and product development, and building deep, mutually-beneficial partnerships with great institutions.

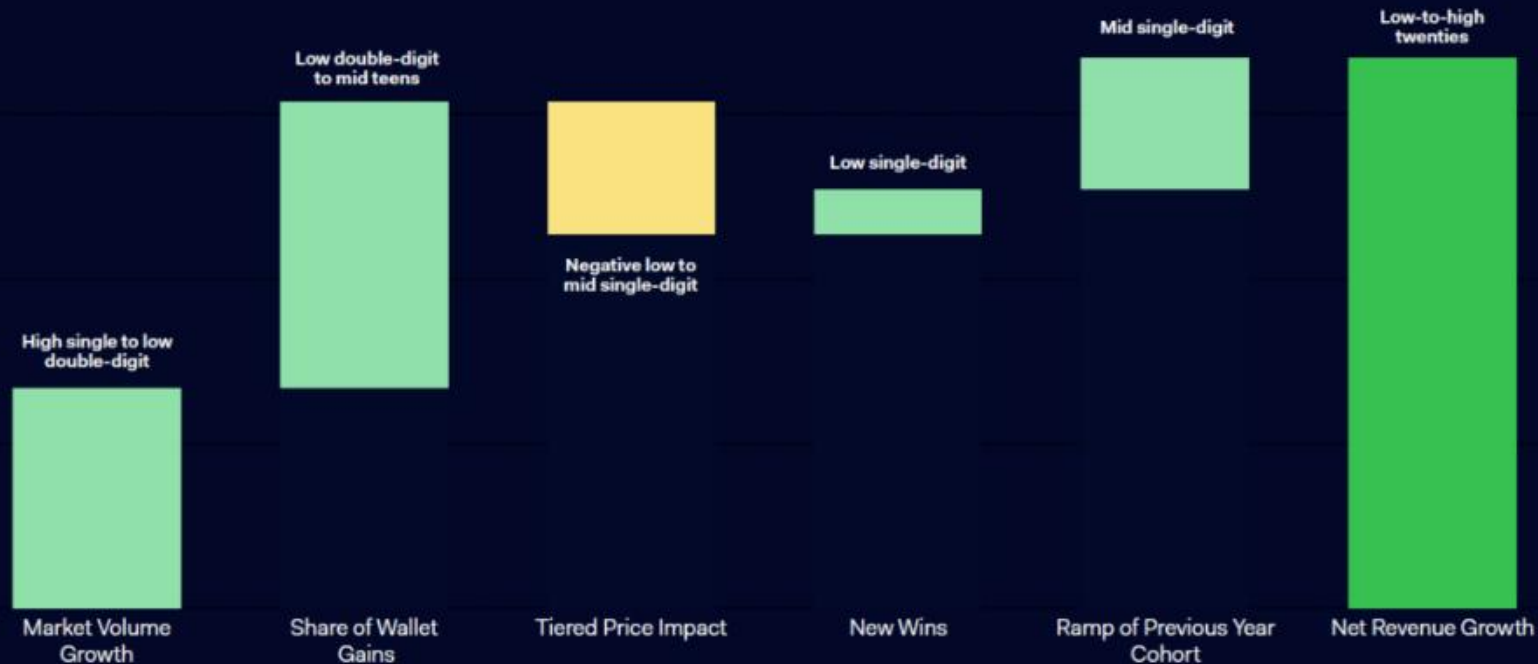
Source: C3Q'23 earnings

Payments & Fintech : *Stock Performance*

...or simply providing transparency and allaying fears

adyen

Putting this together, we continue to expect strong net revenue growth in the medium term



Source: Adyen Investor Day

Payments & Fintech : *Challenged businesses*

Those focused on mid-to-long-term lending...



"We continue to operate in a challenging and fluid macro environment.

Real consumption continues to hover at levels which we believe **to be unsustainable**. **Incomes continue to lag consumption growth** despite the positive trend in labor participation as the ongoing decline in government transfers still receding from stimulus era highs offsets any wage gains from the return to work.

The residual savings rates in the economy have consequently **continued to languish** at historically low levels.

This consumer reality continues to be reflected in **elevated borrower default trends...**

Our ability to approve borrowers in this environment has remained the constraint on platform growth for most of the past quarter. **On the funding side** of our business, **the banks continue to manage balance sheet conservatively..."**

"...instance where a loan is approved and an offer is made and what percentage of those are accepted by the borrower, and those are currently at the 30% level. They definitely trended down. I think they probably used to be in the 60s a couple of years ago before the environment sort of became very challenging"

Source: C3Q'23 earnings

Payments & Fintech : *Challenged businesses*

...or large organizations with complexity



“Simply put, our cost base remains too high, it is actually slowing us down.

As such, I'm in the process of evaluating our most profitable growth priorities and aligning our resources to those priorities. **We will become leaner, more efficient, and more effective, driving greater velocity, innovation and impact for customers.”**

“But we must focus and execute. **The weight of the organization** will be squarely **behind, one, reinventing our consumer experience** to drive a clear and durable value proposition with checkout at the center;
two, improving and scaling PayPal Complete Payments for small businesses globally; and
three, driving margin expansion in Braintree and other products for large enterprises.

Additionally, we will invest in our company-wide platform, driving efficiency and acceleration of innovation, while rightsizing our expenses.”

Source: C3Q'23 earnings

Payments & Fintech : *Winners*

While some suffer, best-of-breed transactional payment businesses continue to win...



H1 FY24 Summary Financials

7.2m

Active customers

+32%

£57bn

Volume

+12%

£12.3bn

Customer balances¹

+33%

£656m

Income

+58%

£241m

Adj. EBITDA

+163%

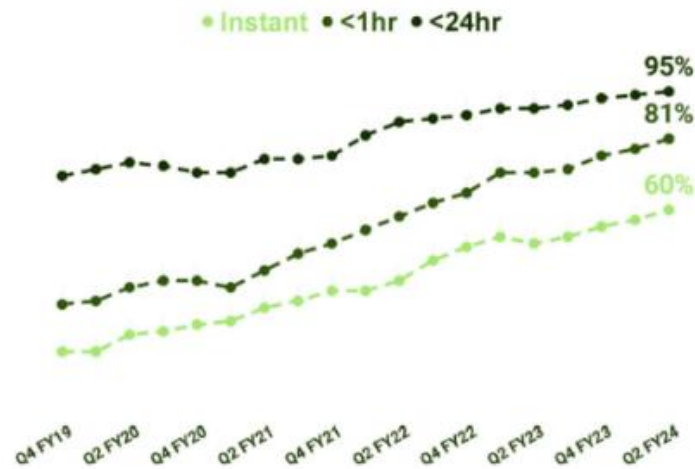
Source: C3Q'23 earnings

Payments & Fintech : *Winners*

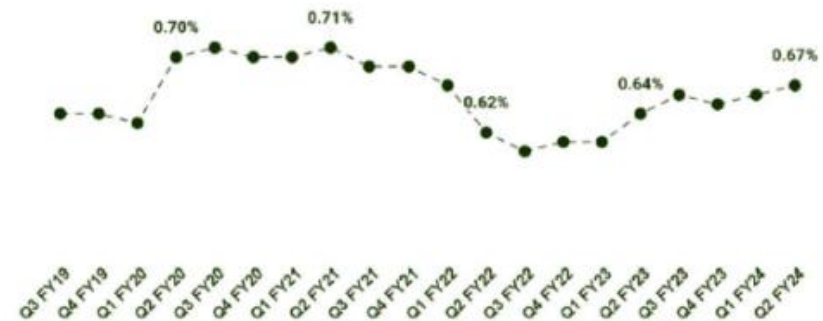
...driven by low cost, high-quality products



Significantly faster payment speeds



Low cost and cheaper than banks



Source: C3Q'23 earnings



Payments & Fintech : *Winners*

Financial platforms that are spinning the growth flywheel...



"...our pace of customer growth exceeded our expectations, culminating in **over 89 million customers** at the end of the quarter. Once again, we witnessed robust customer acquisition in Brazil, Mexico, and Colombia with slightly **more than 1.5 million new customers per month.**"

"...**robust growth of our customer base, driven by the growing cross-selling and upselling** opportunities facilitated by our highly engaged platform resulted in a **more than four-fold increase in quarterly revenues in just two years** on an FX neutral basis. This translates to a **triple digit revenue annual compounded growth rate** over this period"

"This scale also allows us to **reduce our operational costs, efficiency,** which we then decide to pass to our customers via lower prices, **helping us to provide better products and services at competitive rates** and, thus, starting the virtuous cycle again.

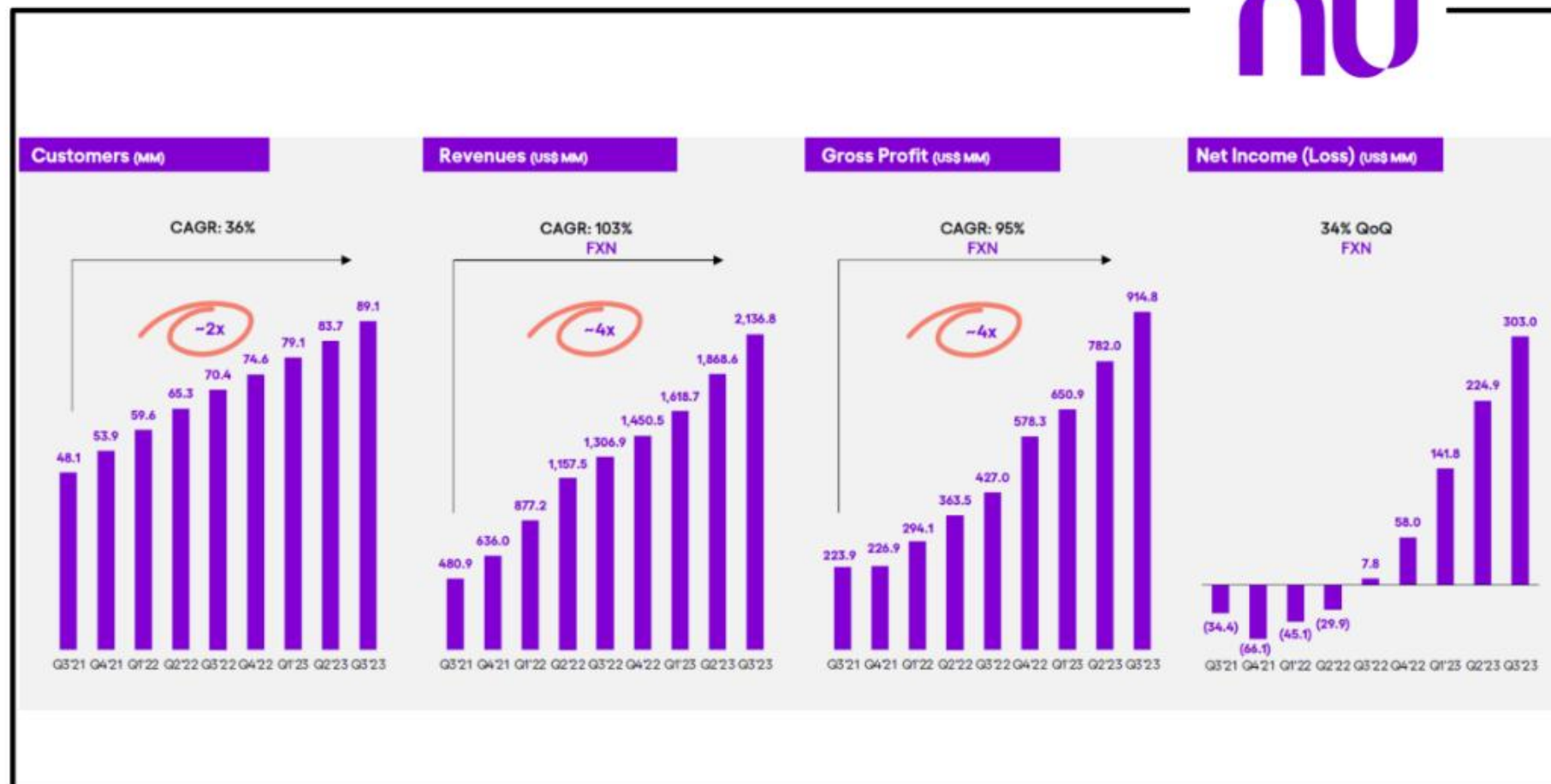
The momentum we're seeing **over the past 12 months is a direct result** of this **flywheel accelerating.**

In the third quarter, Nu Holdings achieved an impressive adjusted net income of \$356 million **reflecting an adjusted annualized return on equity of 25%**

Source: C3Q'23 earnings

Payments & Fintech : *Winners*

...thereby compounding growth and profitability (1/2)



Source: C3Q'23 earnings

Payments & Fintech : *Winners*

...compounding growth and profitability (2/2)



"We added a record number of **717,000 new members in Q3 '23, bringing total members to nearly 7 million**, up 47% year-over-year."

"Our highest quarter ever of new products in Q3 of 1 million brought total products to 10.4 million, up 45% year-over-year."

"...continues to fuel high quality deposits that increased by a record of \$2.9 billion sequentially, and we ended the quarter with nearly \$15.7 billion in total deposits. Importantly, more than **90% of our consumer deposits are from sticky direct deposit customers...**
...As of the end of Q3, **over 65% of our loans were funded by deposits**"

"Importantly, all three segments recorded record revenue, and we continue to diversify the revenue composition. Adjusted EBITDA of \$98 million **represented a 48% incremental margin** and a record 18% consolidated margin."

Source: C3Q'23 earnings

Payments & Fintech : *Winners*

Captive consumer base = fast adoption of new products = higher ARPAC & stickiness



Active Customers

73.8MM

+29% YoY



Active Credit Card Customers

38.9MM

+23% YoY



NuInvest Active Customers

12.4MM

+100% YoY



NuCoin Active Customers

10.5MM

Launched in March 2023



Active NuAccounts

64.7MM

+32% YoY



Active Personal Loan Customers

7.3MM

+52% YoY

Eligible Customers
18.1MM
+19% YoY



Active SME Accounts

2.0MM

+54% YoY



Active Insurance Policies

1.2MM

+50% YoY

Source: C3Q'23 earnings

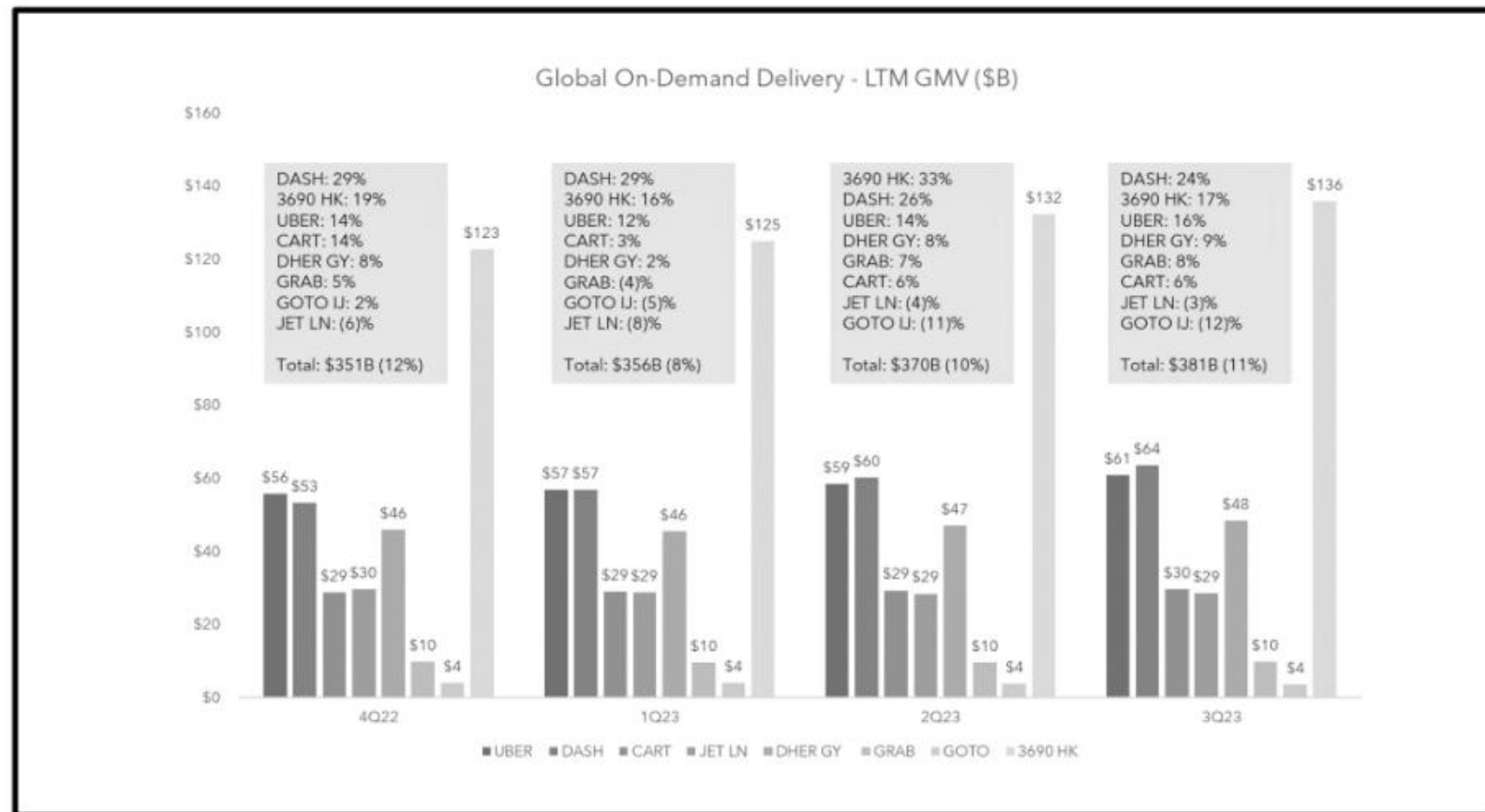


On-Demand & E-Commerce



On-Demand : *On-demand delivery*

Doordash continues to maintain it's growth leadership...



Source: C3Q'23 earnings; all growth rates in constant currency terms where reported; Meituan based on Octahedron estimates

On-Demand : *On-demand delivery*

...as Uber's Delivery business continued to accelerate, with frequency reaching ATHs

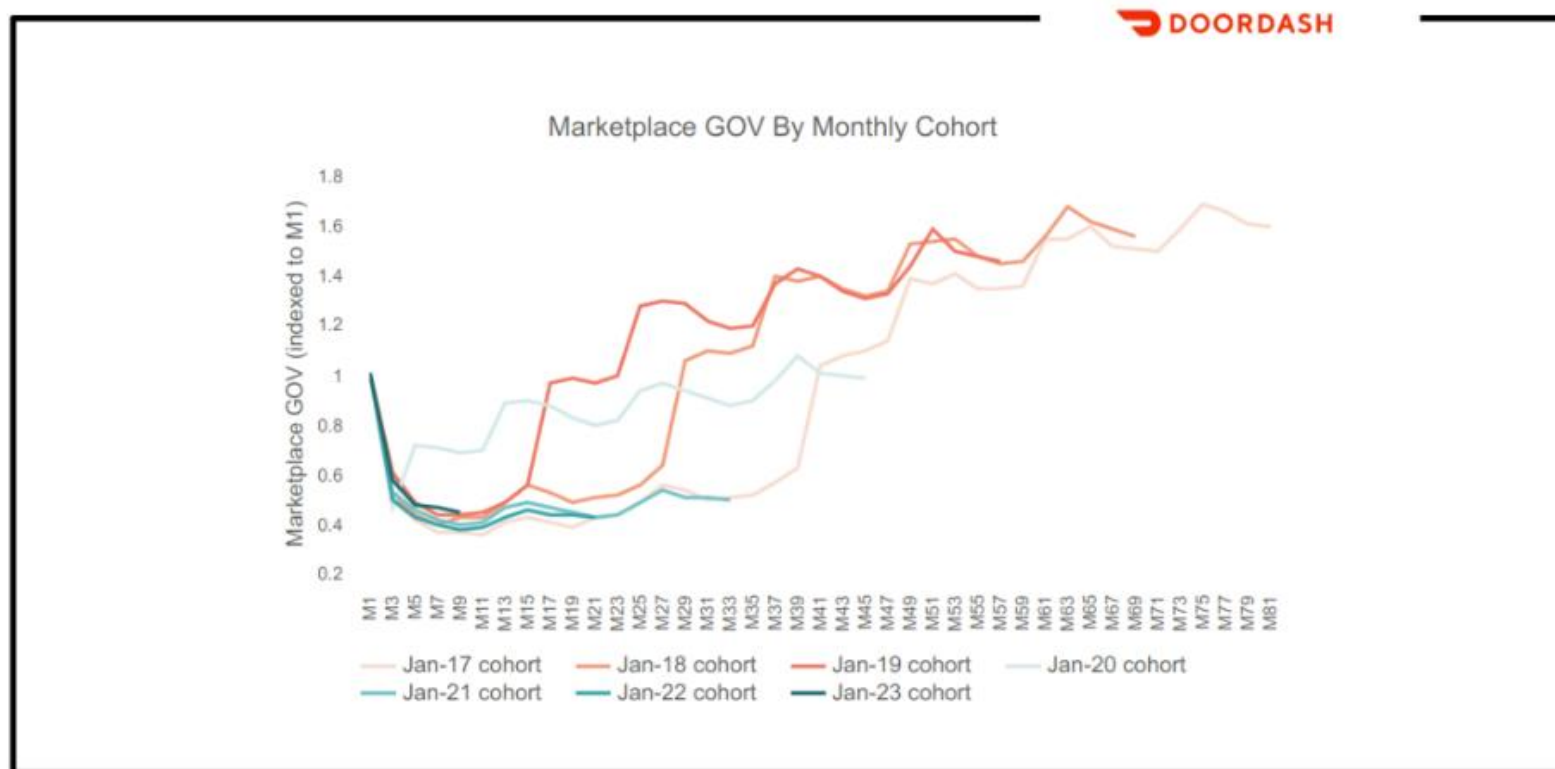


"Delivery Gross Bookings grew 16% YoY on a constant-currency basis, with the highest trip growth in nearly two years and frequency reaching another all-time high. Trip growth accelerated across every region, with particular strength in the US & Canada and LatAm."

Source: C3Q'23 earnings

On-Demand : *On-demand delivery*

DoorDash sees newer cohorts continuing to retain GOV faster (and at a higher levels) than older cohorts



Source: C3Q'23 earnings

On-Demand : *Batching*

Just Eat Takeaway still sees batching as not yet reaching its full potential...



"Technology improvements is around topics such as **pooling for example, which contributes obviously to the bottom-line and then creates efficiencies but, we haven't yet deployed the full force of the pooling capabilities.** In some countries, we're still running and rolling out multi-partner pooling. And, we now also have a better understanding of the impact on the experience for a consumer, which in the end remains our top priority."

Source: C3Q'23 earnings

On-Demand : *Batching*

...while Grab already sees batching account for a third of orders



"For example, batched orders, which now account for over a third of deliveries orders, provided average delivery fees for users that were 8% lower than unbatched orders and resulted in 5% higher driver earnings per transit hour compared to unbatched orders."

Source: C3Q'23 earnings

On-Demand : *Affordability*

Grab and GoTo continue to expand affordability programs for Deliveries...



"We will continue to expand our suite of affordability features at different price points to appeal to more consumer segments, all without compromising on our service quality and reliability. Saver Delivery is now available in all six of our core markets and in over 130 cities. **In Malaysia and Singapore, where the services were first launched, the penetration of Saver has now reached over one-third of deliveries MTUs."**



"Our On-demand affordability offerings are both spurring user growth and boosting driver productivity. For instance, in Q3, drivers who took Food Hemat orders on top of regular orders more than doubled their orders per hour, while GoCar Hemat has increased drivers' hourly orders by over 35%. This uplift in productivity will enable us to provide Hemat in a sustainable manner in more areas while keeping driver income stable. **This will allow us to broaden our ODS consumer base by 50% to 60% in the medium-term as per our original business."**

Source: C3Q'23 earnings

On-Demand : *Affordability*

...while Meituan saw increased demand from consumers for affordable meals



"We also witnessed strong growth in late-night snacks leveraging our marketing and subsidy strategies during the summer. **In addition, "Pin Hao Fan" ("拼好饭") onboarded more high-quality supply at affordable price to better satisfy consumer demand for low price meals."**

Source: C3Q'23 earnings

On-Demand : *Platform effects*

Coupage suggested that their discounting on Eats is positively WOW memberships (and core commerce spend)...



“Engagement on Eats helps drive higher levels of member acquisition and retention on WOW membership. As we've noted before, WOW members purchase with significantly higher frequency and across more categories and offerings than non WOW members.

WOW members who purchase Eats spend considerably more on Product Commerce. And in the regions where we've launched the program, we've observed that they spend twice as much overall as WOW members who don't purchase Eats.”

Source: C3Q'23 earnings

On-Demand : *Platform effects*

...Although Delivery Hero (naturally) doesn't expect Coupang to be able to sustain discounting



"So effectively, even if we are multiple times larger, we only had to spend or spending -- expect to spend like EUR41 million. And we can keep the market share stable. So I think that is, of course, super strong. **I also think that the whole halo effect from the discount promotion is over.** I don't think any customer now is like, of course, now realizing that you can get discounts. **There is no news. There is no talking point. There is no one cares. You can get vouchers here, you can get vouchers there.** So either people took a decision of doing some orders on Coupang and that's why they had some easy growth. **But I think that it's very hard to keep that kind of growth, like low value growth up.** So I think, yeah, we don't expect -- we expect to trail where we are right now, more or less. And I think overall, category share is back to where it was two years ago. **So easy come, easy go. I don't know, they did a lot of vouchers two years ago. They guided the share up and eventually, I would expect the opposite now."**

Source: C3Q'23 earnings

On-Demand : *New modalities*

Meituan's Instashopping platform continued to accelerate, reaching 7.6m daily average orders...



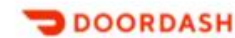
“Turning to Meituan Instashopping, order volume grew robustly, with daily average order volume reaching 7.6 million this quarter. Importantly, the year-over-year growth rate of order volume continued to accelerate from the second quarter, even against last year's high base.”

“Users' transaction frequency has further accelerated, particularly among users aged 18 to 25. **Young people have emerged as the primary consumer force of Meituan Instashopping. Moreover, people have started to use Meituan Instashopping in a wider variety of timeframes and consumption scenarios.**”

Source: C3Q'23 earnings

On-Demand : *New modalities*

...while DoorDash Grocery GOV 2x'd y/y with unit economics seeing a strong improvement...



"What we're seeing in the business today is a couple of things, right. One is more number of users are ordering from both restaurants, as well as new verticals, and that's driving two things. **We are seeing our new verticals business overall accelerate from the prior quarter, as well as when you look at the grocery business itself on the GOV to the specific question you asked, our GOVs have doubled year-on year.**

If you look at that paired with the efficiency that we've seen in the business, we have driven a ton of efficiency across the business. **In fact, when I look at the unit economics, there's been a dramatic improvement in unit economics."**

Source: C3Q'23 earnings

On-Demand : *New modalities*

...and Uber's Delivery New Vertical GBV accelerated to 46% y/y growth



"We also continue to invest in New Verticals like grocery, convenience, and alcohol, with New Verticals Gross Bookings growth accelerating to 46% YoY on a constant-currency basis in Q3, as we continue to make progress on selection and launch key capabilities for consumers, couriers, and merchants."

"As we improve our New Verticals product, we are cross-promoting more effectively, with 14% of Delivery users now ordering New Verticals."

Source: C3Q'23 earnings

On-Demand : Ads

Delivery Hero's Dmart business is leaning into advertising to drive profitability...



"And the second one is on the **Dmart, where we see basically that the AdTech could be a driver for the profitability as more and more FMCGs want to replace the product on the platform.**"

"Despite the further optimization of operations, we saw our footprint reduced by 22% year-on-year to now 935 Dmarts in Q3. We continue to make our headway to our -- in our Dmart operations, as we further develop the product assortment and availability, increasing the relevance for the customers, and addressing additional shopping needs. **Our efforts have led Dmarts to achieve a positive gross profit after store-related expenses in Q3, with profitability trending up every single month during the quarter.**"

Source: C3Q'23 earnings

On-Demand : *New IPOs*

Instacart saw the decline of mature cohorts *improve* sequentially...



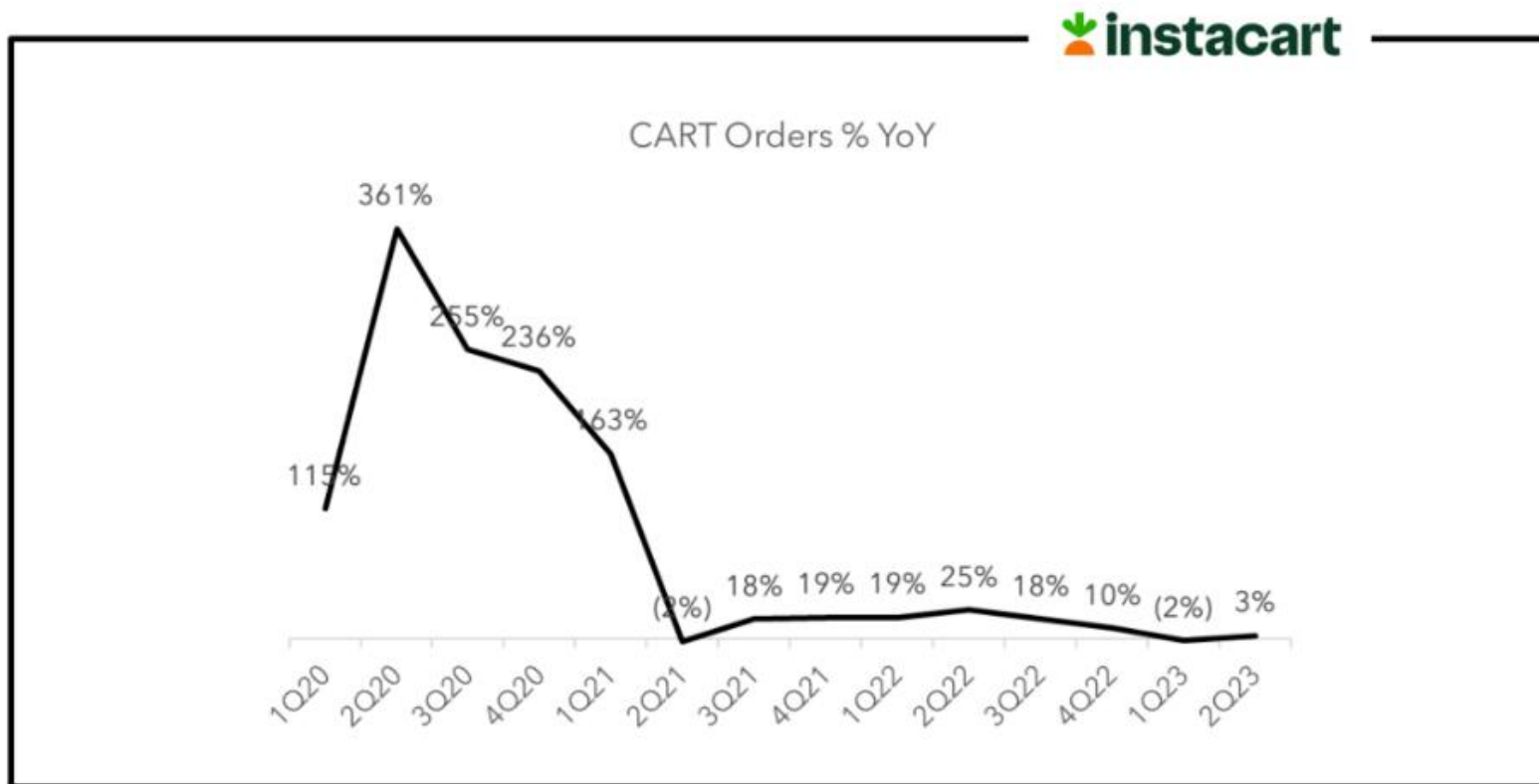
"GTV was \$7,494 million, up 6% year-over-year, driven by orders of 66.2 million, which grew 4% year-over-year, and AOV of \$113, up 2% year-over-year. **During the quarter, GTV performance from our mature cohorts (2021 and prior) collectively declined year-over-year, but the rate of the decline improved in Q3 compared to Q2 (and Q2 also improved compared to Q1).**

This decline continued to be more than offset by new customer activations. We also delivered a higher-quality mix of GTV growth. **Orders drove the majority of our GTV increase, and AOV growth tempered as we lapped the onset of higher inflation last year.** For two out of the last three quarters, we also started to see the average price per item in an order decline sequentially, and average items per order increase in the same periods."

Source: C3Q'23 earnings

On-Demand : *New IPOs*

...although slowing unit growth likely to be key investor debate going forward



Source: Company filings

On-Demand : *Small is beautiful*

Walmart sees 80% of customer orders able to be fulfilled by 6-8k SKU MFCs



"But we're not just automating our distribution centers and fulfillment centers. We're also automating our stores as well. **So, one of the things that we have and we're earlier on into this, but something that we call a Market Fulfillment Center or MFC.** And this is, think of this as the same automated and the storage and retrieval, but appended to the end of one of our stores.

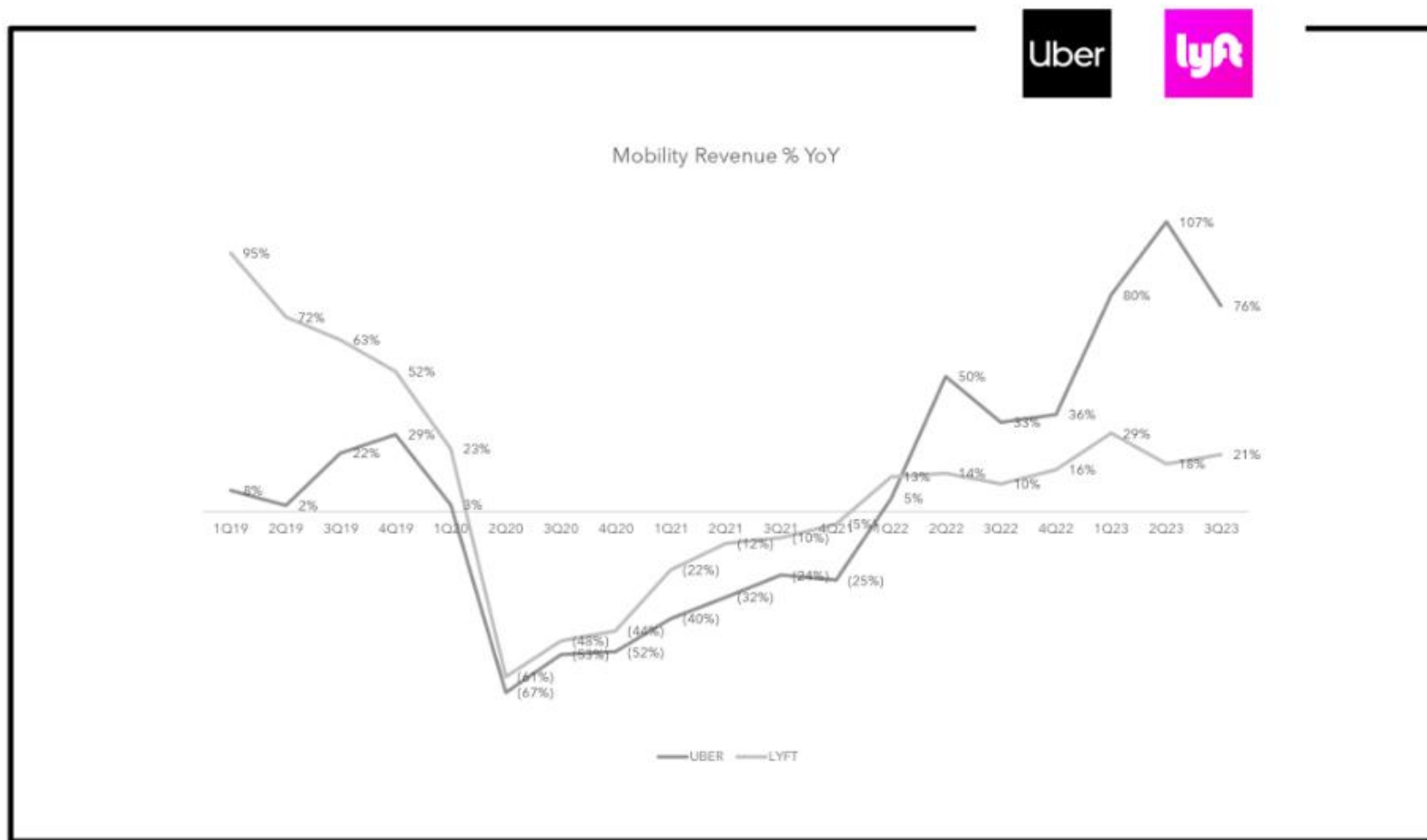
And **what's exciting about this is that, if you think of a like a typical Walmart Supercenter may have 130,000 SKUs in it. These automated storage and retrieval MFCs have about 6,000 to 8,000 SKUs in them.** So we don't put everything in there. There are certain things that don't lend themselves that bulky paper towels is an example or fresh meat.

But the important point is that roughly 80% of customer orders can be fulfilled with those 6,000 to 8,000 SKUs that are in the MFCs. It gives us a great opportunity to be much more efficient versus one of our associates going through the store, getting in the way of other customers, trying to manually pick these baskets."

Source: Morgan Stanley Global Consumer & Retail Conference dated 6-Dec-23

On-Demand : *Ride Sharing* scale effects

Uber continues to outpace Lyft in Mobility growth...



Source: C3Q'23 earnings; Note: starting comparing vs. 2019 in 2021

On-Demand : *Ride Sharing scale effects*

...as driver supply remained robust...



"Big headline this quarter is that more drivers are choosing Lyft and are driving more often. **In Q3, this resulted in an almost 45% year over year increase in the number of hours drivers spent using Lyft** with not incentivize driver hours gone even faster."



"**In Q3, active drivers were up 32% YoY and driver engagement (or monthly supply hours per active driver) was up 5% YoY.** Our early investments in operational improvements and product innovation in the Uber Driver app are compounding over time, contributing to strong competitive positions."

Source: C3Q'23 earnings

On-Demand : *Ride Sharing scale effects*

...and while consumer usage continues to accelerate



"Ride growth has accelerated each quarter this year, up 10% year on year in Q1, 17% in Q2, 20% in Q3. With better balance in our marketplace, Primetime is at the lowest level, it's been in years and drivers pickup times have gotten faster across our regions."



"Mobility trips grew 29% YoY, accelerating from 26% YoY in Q2, as marketplace balance continued to improve and drove down average fares sequentially. Trip growth was led by APAC and LatAm on strong summer travel and back-to-school trends, coupled with growth in our non-UberX portfolio."

Source: C3Q'23 earnings

On-Demand : *Ride Sharing New Modalities*

Uber's suite of mobility products are all growing > 20% y/y, including UberX

Uber

"Our suite of non-UberX products like Reserve, hailables, Uber for Business, and Shared Rides continued to grow more than 80% YoY in Q3, generating \$9 billion in annualized bookings (or 13% of Mobility Gross Bookings). In other words, these products contributed one quarter of YoY absolute Mobility Gross Bookings growth, while **UberX grew over 20% YoY."**

Source: C3Q'23 earnings

On Demand : *Autonomous Driving*

Waymo is ramping consumers for its commercial offering in San Francisco...



"Waymo is onboarding more riders to its commercial ride-hailing service as it **gradually adds over 100,000 people from its San Francisco waitlist.** **Austin will follow as its next ride-hail city.**"

Source: C3Q'23 earnings

On Demand : *Autonomous Driving*

...while Cruise had a high-profile step back in its commercialization efforts

cruise

“The General Motors-owned tech startup Cruise said Thursday it was pausing all driverless operations across the U.S. The announcement came two days after the California DMV revoked Cruise’s permits to operate its fleet of autonomous vehicles following a crash in San Francisco where one of its cars dragged a pedestrian for 20 feet while she was pinned underneath the vehicle.

Cruise said it was pausing nationwide to try to “rebuild public trust” after the California Department of Motor Vehicles also accused the company of failing to disclose the full details of the Oct. 2 collision. ”

Source: <https://www.nbcnews.com/tech/cruise-self-driving-crash-freeze-pause-stop-call-rcna122462>

On-Demand : *Tidbits*

Lyft saw COVID impacts on insurance starting to lessen



"You know rising auto insurance costs are a reality of our industry overall. The rate increases we saw in this most recent round were lower rate increases than in the previous year. **So certainly some signs that I think some of the COVID impact on these rates is abating."**

Source: C3Q'23 earnings

On-Demand : *Tidbits*

Grab's mobility business continues to improve back to pre-COVID levels



“Overall, mobility GMV is now at 91% of pre-COVID levels. When we compare mobility MTUs between third quarter 2023 and the same period in 2019, the majority of our core markets have surpassed those levels already.”

“Domestic demand continues to pick up across our markets while international travel demand also continues to recover. **Airport rides grew 9% year-on-year to reach 84% of pre-COVID levels.**”

Source: C3Q'23 earnings

E-Commerce : *Tidbits*

Booking.com continues to build their Connected Trip offering

Booking.com

"In the third quarter, we saw an increase in the percentage of transactions which we count as Connected Trip, meaning two or more travel components within a trip. So still a small percentage of our total transactions today, it is encouraging to see an increasing number of our travelers booking more elements of their travel with us.

Outside of accommodations, one of the most important elements of travel is flights. **And we continue to focus on further developing our flight offering on Booking.com. In the third quarter, air tickets booked increased 57% year-over-year**, driven by the growth of Booking.com flight offer. To provide some context on how this has developed over the last few years, the 9 million tickets booked on our platforms during the third quarter were more than 5 times the number of air tickets booked through us in Q3, 2019."

Source: C3Q'23 earnings

E-Commerce : *Tidbits*

Expedia saw loyalty programs drive higher app bookings and lower marketing expense



"One Key along with our ongoing efforts to more generally attract higher lifetime value customers is accelerating our mix of loyalty members, app users, and app members, and **the percentage of bookings coming through our apps continues to grow, and was up approximately 300 basis points sequentially in the third quarter**, which ultimately contributed to our year-over-year marketing leverage in our B2C business for the third quarter."

Source: C3Q'23 earnings

E-Commerce : *Tidbits*

AirBnB is getting ready to re-expand beyond its core again



“To your point, Eric, **I think we are now getting ready to re-expand Airbnb beyond its core. It was always our intention to do much more than just short-term housing for travelers, which is our intention to do more of that.** So we're working on making Airbnb more of an extensible platform.

And **I think, ultimately, there are actually quite literally dozens of services, guests and hosts that we could build on top of the Airbnb system.** I think a lot of it comes down to making the platform extensible so we can offer these services. I think at the end of the day, what we're really thinking about are a couple big ideas.”

Source: C3Q'23 earnings

E-Commerce : *Platforms*

Coupage saw continued user growth re-acceleration...

coupang

"Second, our flywheel is accelerating. Our selection advantage is a critical component of that accelerating flywheel. In Q3, we expanded selection across both first and third party. **Both active customer and revenue grew even faster than last quarter. Active customers grew 14% year-over-year, faster than the rate of any quarter since the pandemic levels of 2021.**"

Source: C3Q'23 earnings

E-Commerce : *Platforms*

...while seeing multiple investment areas grow at multiples of the core

coupang

"We have observed that increasing selection on Rocket leads generally to increasing customer spend on Coupang. **In Q3 even established categories like consumables experienced double-digit year-over-year growth** that was a high multiple of the rate of the market. **Newer categories like Fresh grew more than twice as fast as the overall business** and also at a high multiple of the market growth rate. **We're also seeing strong third-party volume growth which is outpacing the rest of the business.** That is important due to fulfillment and logistics by Coupang or **FLC growing more than three times faster than the overall business.**"

Source: C3Q'23 earnings

E-Commerce : *Vehicles*

Carvana has seen their average car profile change materially thru the pandemic...



"Pre-pandemic, the average car that we sold was approximately a three-year-old car and that car was for sale for approximately \$19,500 more recently, the average car we've sold has been 5.7 years old and it's been sold for \$25,000. That's a dramatically different situation and I think there's many, many reasons for that."

Source: C3Q'23 earnings

E-Commerce : *Vehicles*

...but still sees their business as a share taker as the market normalizes



"I think there is nothing that will lead to the normalization of the market more quickly than car prices are coming back into line with where they historically were or even close to where they historically were. And so, I think we very much look forward to that. But as those stores to wide, I think the more likely scenario or at least our belief and that can make up their mind is that we're back in the world that we were for eight years before.

And in that world, we have an offering customers love we have a highly differentiated model. We have a ton of infrastructure that we can grow into. We have a business that gets better as it gets bigger. We have a team that is hustling fast and it's always helpful bet and has changed the direction of that half full of last 18 months but is ready to change it back and we're going to hit our goals.

So, I think when we look forward, we don't know exactly what the growth rates are going to be. We're not ready yet to provide that. I think it's going to depend on all sorts of factors macro factors industry factors, our own execution. **But we do expect it to be considerable and our expectations for the future are absolutely unchanged versus what they were before."**

Source: C3Q'23 earnings

E-Commerce : *Furniture*

Wayfair sees a return to growth driven by interest rate cuts and a return to more discretionary spend...



“I think the one overhang could be moves in housing is slower. And so that is one of the things that bolster the categories you say, well, hey, what's the time frame where the categories back to 4% growth? That could take a little longer, right? **So I think a few are saying, hey, anyone who gets super bullish on interest rates diving quickly and demand taking off quickly, I think that you could -- you want to be careful there.”**

Source: Morgan Stanley Global Consumer & Retail Conference dated 5-Dec-23

E-Commerce : *Furniture*

...and sees healthy demand elasticity as AOV inflation has reversed



“Well, I mean, certainly, orders have been up, while AOV has been down, right? So if that's what you're referring to, we've obviously -- **we've long spoken about, even before it started happening, that when AOV started to normalize and get back and pull back out the inflation that we would see an uptick in orders. And you saw that last quarter and the quarter before. So that dynamic is continuing to hold.**”

Source: Morgan Stanley Global Consumer & Retail Conference dated 5-Dec-23

E-Commerce : *Home goods*

Etsy continuing to feel the impact of weaker macro and Temu competition...

Etsy

"As you all know, there's been significant pressure on consumer discretionary product spending, as high inflation, elevated interest and mortgage rates, splurges on Yolo experiences, and declining savings balances have meant that there's little left over for many consumers after paying for food, gas, rent, and child care.

These issues are magnified for lower-income buyers, and we feel the impact on the Etsy marketplace. We're also experiencing an increasingly competitive retail environment with a very heavy emphasis on deep discounting and in some cases competitors investing at potentially unsustainable levels in marketing and promotions."

Source: C3Q'23 earnings

E-Commerce : *Pets*

Chewy.com has seen weakness from 2Q persist, mainly impacting discretionary categories



"As it relates to guidance, the softness that we called out last quarter, right, that we started seeing in the July-August timeframe has persisted.

We're seeing the impact of this softness most materially in the non-Autoship portion of our business, right? And so, the 25% of the business that doesn't go through Autoship.

And primarily across highly discretionary components, some consumable components, this is related and coupled with the impact of the newer customer cohorts that we talked about last time, where loyalty is still continuing to be earned, right? These customers are early tenure and we're taking steps to engage with them and making forecasting a little bit difficult across the macro that is keeping discretionary soft and overall spending patterns a little bit opportunistic."

Source: C3Q'23 earnings

E-Commerce : *Platform adjacencies*

MercadoLibre sees fast shipping and their payments and financing ecosystems as key moats vs. Temu



"We're obviously monitoring that closely, but our data suggests that there is a bigger overlap between their business and with other cross border platforms. Our business in the meantime continues to perform really well as shown by the acceleration of items sold to 38%. Unit growth has been strong across-the-board, including categories where some of those players are focusing on and all ASP ranges. **And our competitive advantages remain untouched, I would say, particularly logistics, which enables us to deliver fast shipping and payments, which allow us to provide attractive financing to our users.**"

Source: C3Q'23 earnings

E-Commerce : *Increased competition*

TikTok bought a majority share in Tokopedia, ramping up their competition w/ Shopee in Indonesia...



"We are pleased to announce a groundbreaking strategic partnership with TikTok that will accelerate our e-commerce business, ultimately making it an e-commerce leader, while driving growth for Indonesia's MSMEs and the country's digital economy as a whole.

As part of the agreement, Tokopedia and TikTok Shop Indonesia's businesses will be combined under the existing PT Tokopedia entity in which TikTok will take a 75.01% controlling stake. TikTok has committed to invest over \$1.5bn in the enlarged entity over time, to provide future funding required by the business, without any additional dilution to GoTo's 24.99% stake. The shopping features within the TikTok app in Indonesia will be operated and maintained by the enlarged entity."

Source: Press release dated 11-Dec-23

E-Commerce : *Increased competition*

...while Shopee sees live streaming as a core investment area already at meaningful scale



“In Southeast Asia, our average daily orders from live-streaming already reached more than 10% of the total order volume for October. For our investments in live-streaming, we have a targeted focus on key categories such as fashion and health and beauty. These categories tend to benefit more from this format of user engagement and to enjoy higher margins. This further strengthened our overall market leadership in these key marketplace categories. Moreover, we have been focused on investment efficiency and driven fast improvement in unit economics. **This is well in-line with our long-term view. The live streaming e-commerce can be both meaningful part of our platform and profitable.”**

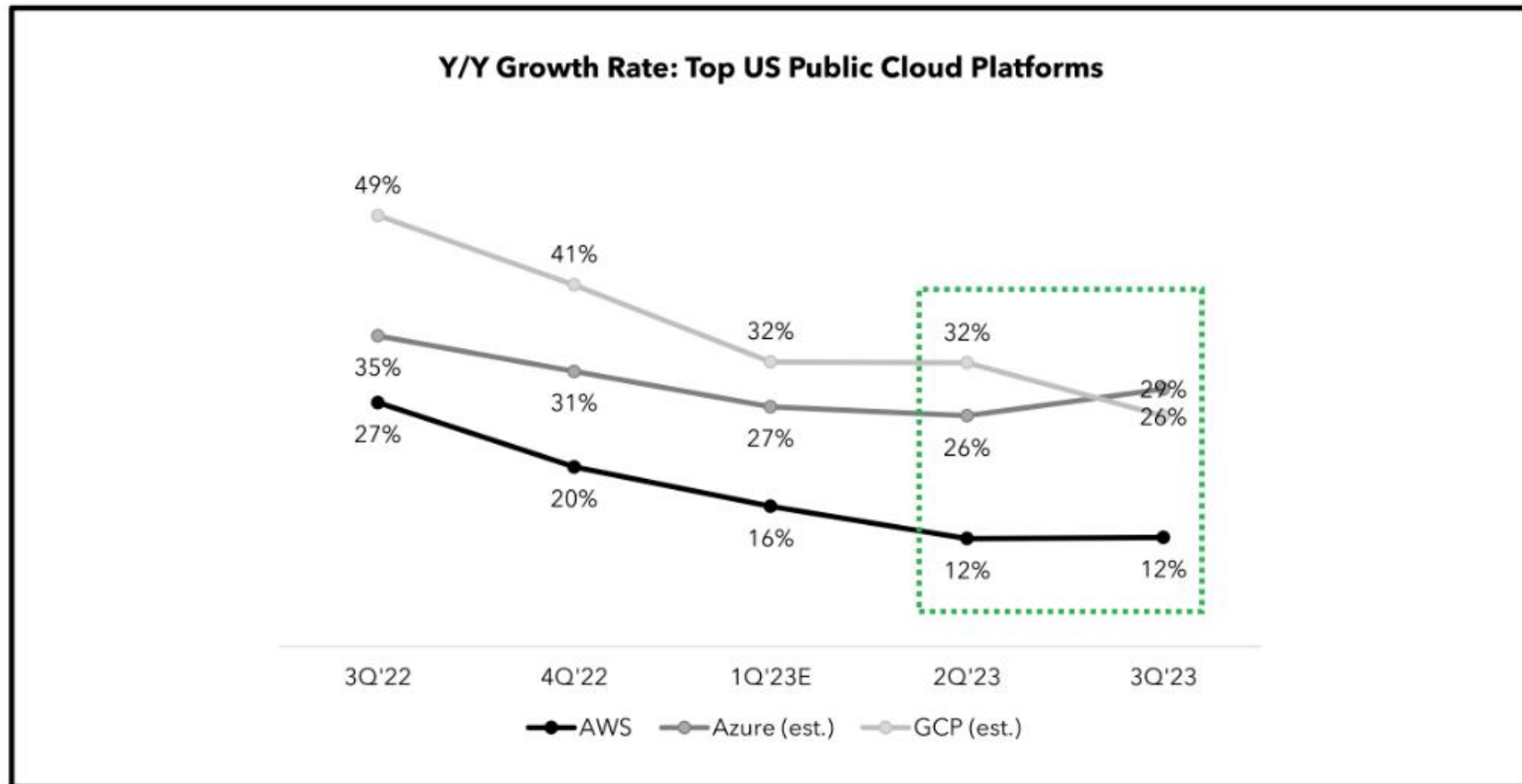
Source: C3Q'23 earnings

Software
+
AI



Software + AI : Stabilization

Public cloud stabilized w/ slowing cost optimizations...



Source: Company filings, Octahedron estimates

Software + AI : *Stabilization*

...as deal volumes picked up in 4Q...



AWS's year-over-year growth rate continued to stabilize in Q3 and while we still saw **elevated cost optimization relative to a year ago, this continued to attenuate as more companies transition to deploying net new workloads**. Companies have moved more slowly in an uncertain economy in 2023 to complete deals, but we're seeing the **pace and volume of closed deals pick up** and we're encouraged by the strong last couple of months of new deals signed. We signed **several new deals in September with an effective date in October that won't show up in any GAAP reported number for Q3, but the collection of which is higher than our total reported deal volume for all of Q3**. Deal signings are always lumpy and the revenue happens over several years, but we like the recent deal momentum we're seeing.

Source: C3Q'23 earnings

Software + AI : *Stabilization*

...due to genAI tailwinds, growing usage, and bigger optimizations complete...



"Secondly, people have really driven themselves through these processes and rationalized themselves and are now in a good place to move forward. **You can only optimize and rationalize so much. At some point, it's diminishing returns.** People get tired of it and they're moving on to things that are now new and interesting, namely preparing for enabling AI and ML technologies."



"The second thing, of course, is the workloads start, then workloads get optimized, and then new workloads start, and that cycle continues. **We'll lap some of those optimization cycles that were fairly extreme perhaps in [1H CY'24]. And the third thing is, for us, that's unique and different is new workload starts around AI.** Given our leadership position, we are seeing complete new projects start, which are AI projects. And as you know, **AI projects are not just about AI meters, they have lots of other cloud meters as well.**"

Source: C3Q'23 earnings

Software + AI : *Stabilization*

...and moderation on the breadth and intensity of cost optimizations



"We are seeing signs that the cloud optimization activity from some of our customers may be moderating. ...we continue to see impact from optimization in our business. But we believe that **the intensity and breadth of optimization we've experienced in recent quarters is moderating.**"

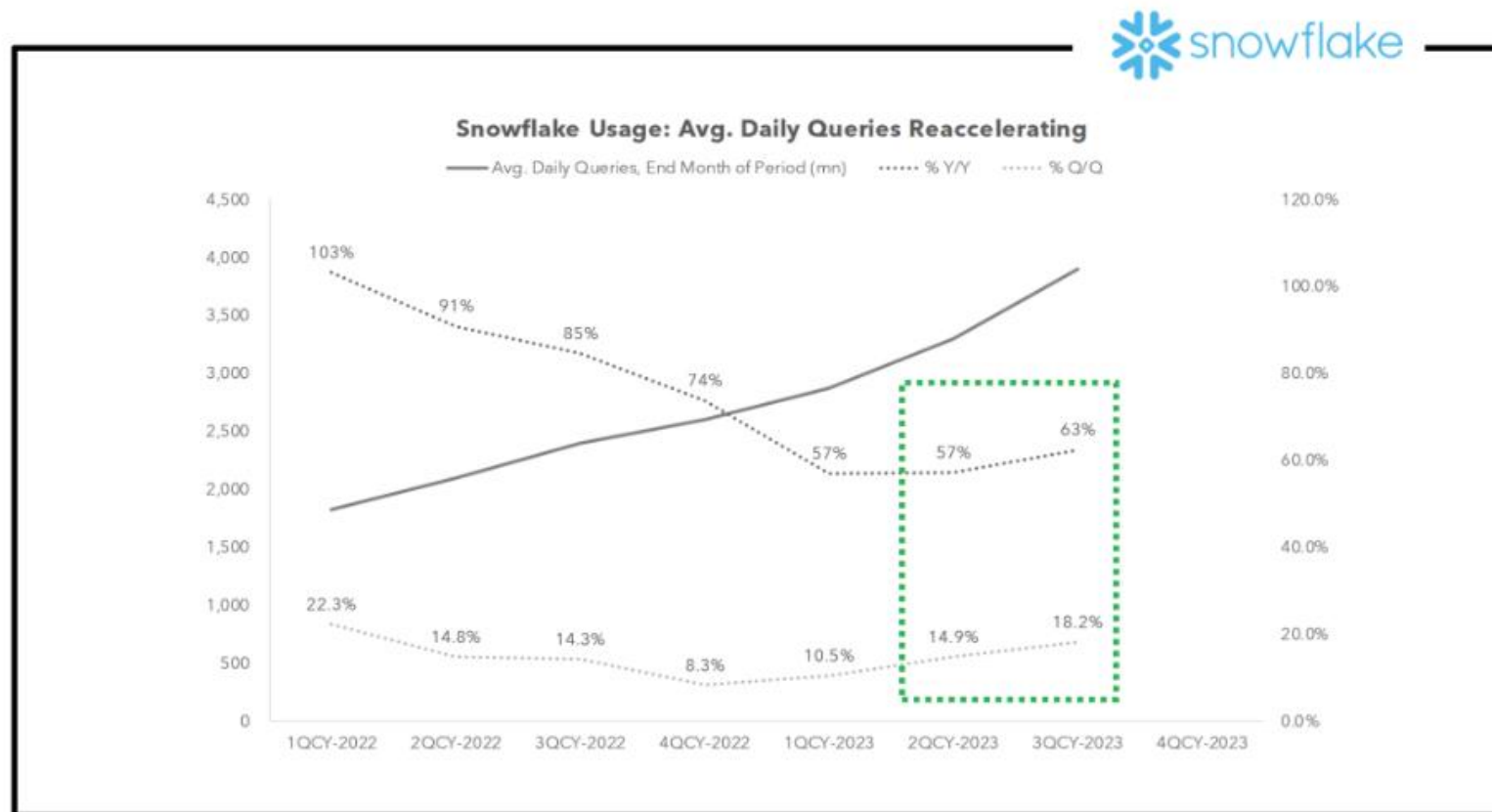
"We had a very healthy start to Q4 in October...the trends we see in early Q4 are stronger than they've been for the past year. ...we **continue to see larger spending customers grow at a slower rate than smaller spending customers**, but usage growth improved for all customer sizes in Q3 relative to Q2.

While we expect cost management to continue, we believe we are seeing that moderation is still present but is less intense and less widespread than we experienced in recent quarters."

Source: C3Q'23 earnings

Software + AI : *Re-acceleration*

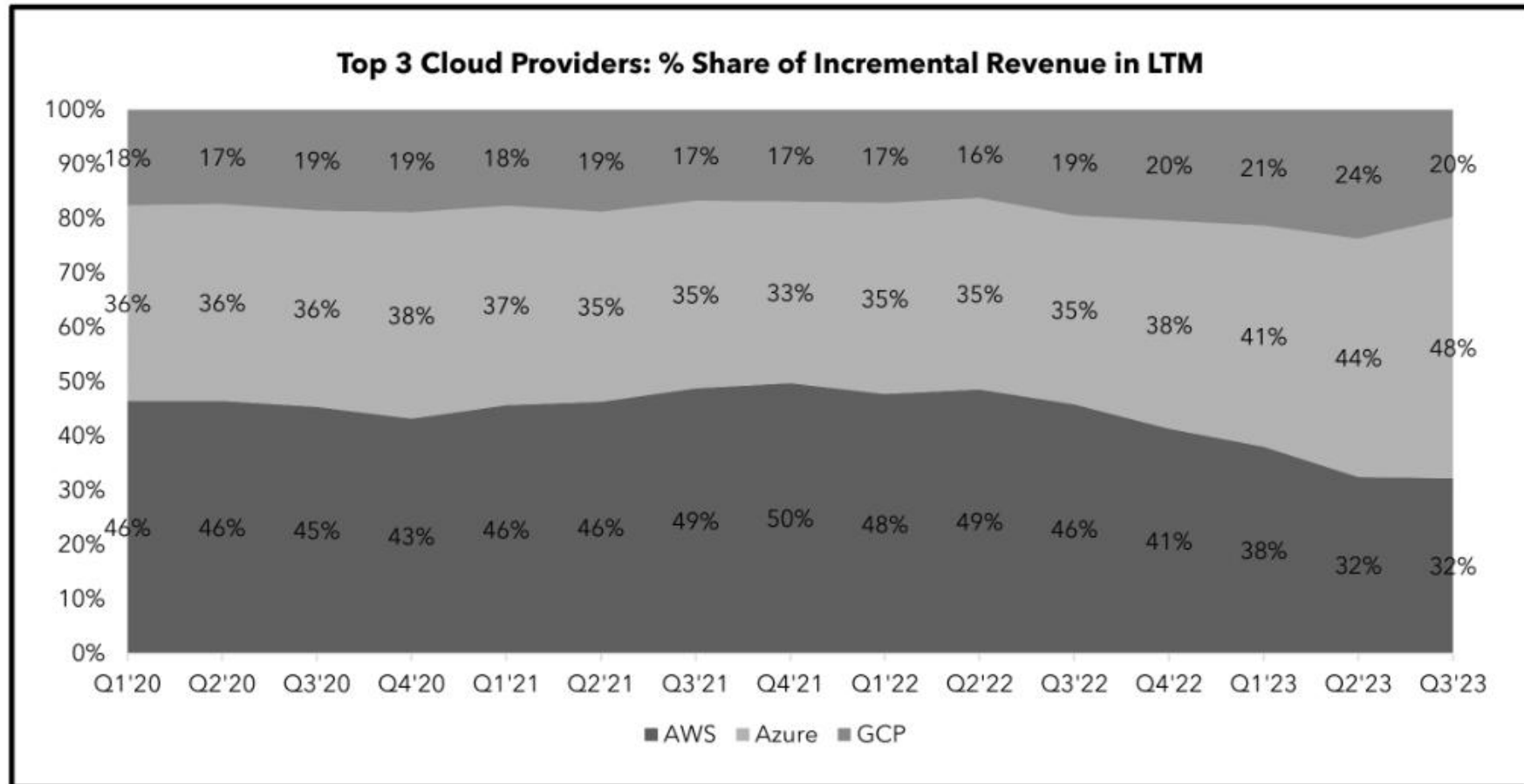
SNOW's core usage (queries) saw early reacceleration too, as query costs come down



Source: SNOW Investor Days and earnings

Software + AI : Market Share

Azure is winning 40%+ of incremental public cloud market share in the LLM era



Source: Company filings, Octahedron estimates

Software + AI : LLMs

Observability is set to become even more important in the LLM AI-assisted dev. era



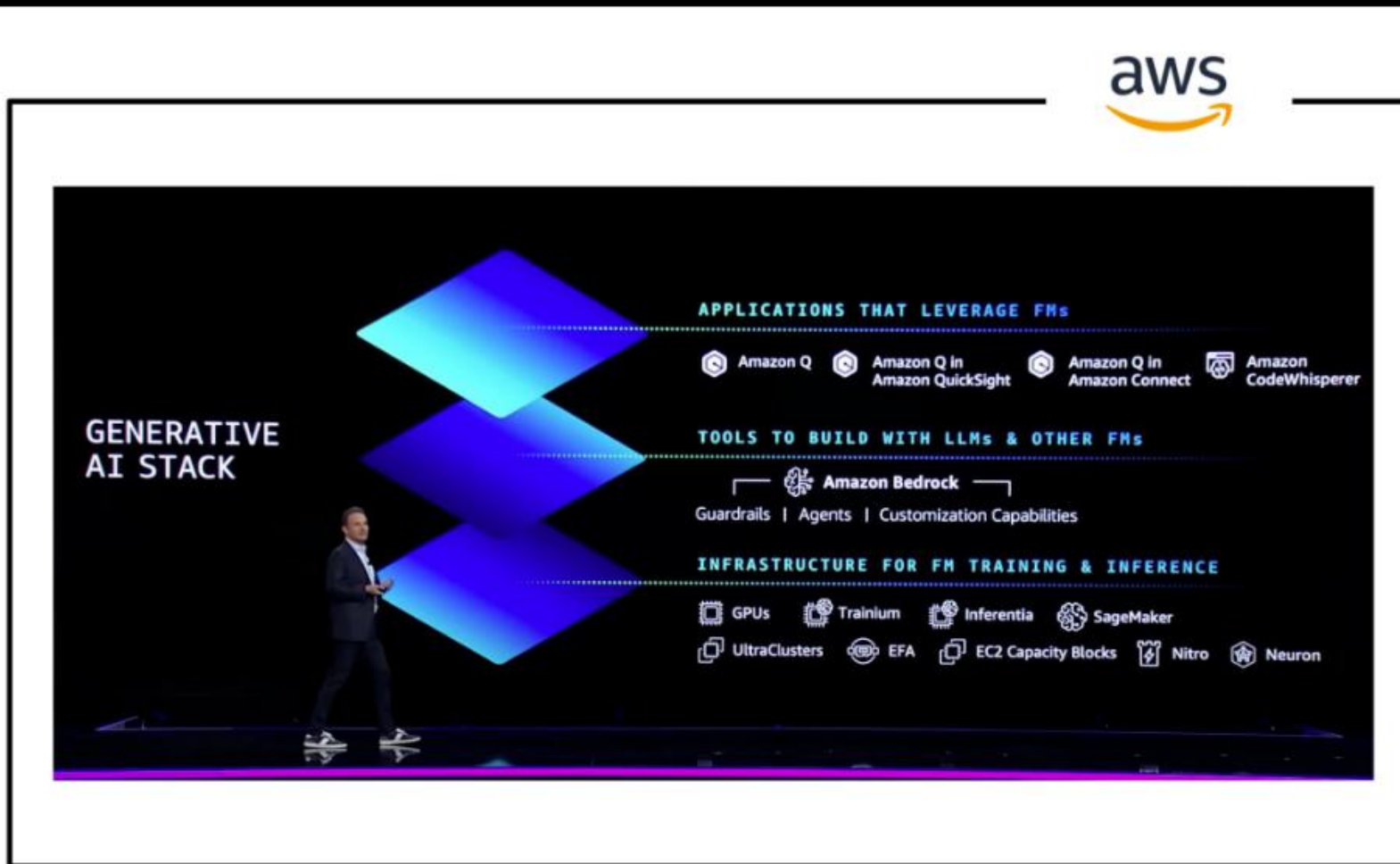
"Datadog's unified platform...generates a large amount of deep and precise observability data. We believe combining AI capabilities with this broad data set will allow us to deliver differentiated value to customers. And we are working to productize this differentiated value through recently announced capabilities such as our Bits AI assistant, AI-generated synthetic tests and AI-led error analysis and resolution..."

"In general, the more complexity there is, the more useful observability is; the more you see the value from writing code to actually understanding it and observing it. ...if, thanks to all the major advances of technology and all of the various open source and AI [offerings now available], you can just very quickly generate thousands of lines of code, ship them and start operating them, you actually have no idea how these work and what they do. And you need a lot of observability to actually understand that and keep driving that and secure it and do everything you need to do with it over time. **So we think that overall, these increases in productivity are going to favor observability.** In terms of the future growth of AI...it looks like it's going to be pretty transformative, if you judge from just internally, how much of that technology we are adopting a how much productivity impact it seems to be having."

Source: C3Q'23 earnings

Software + AI : *GenAI innovation*

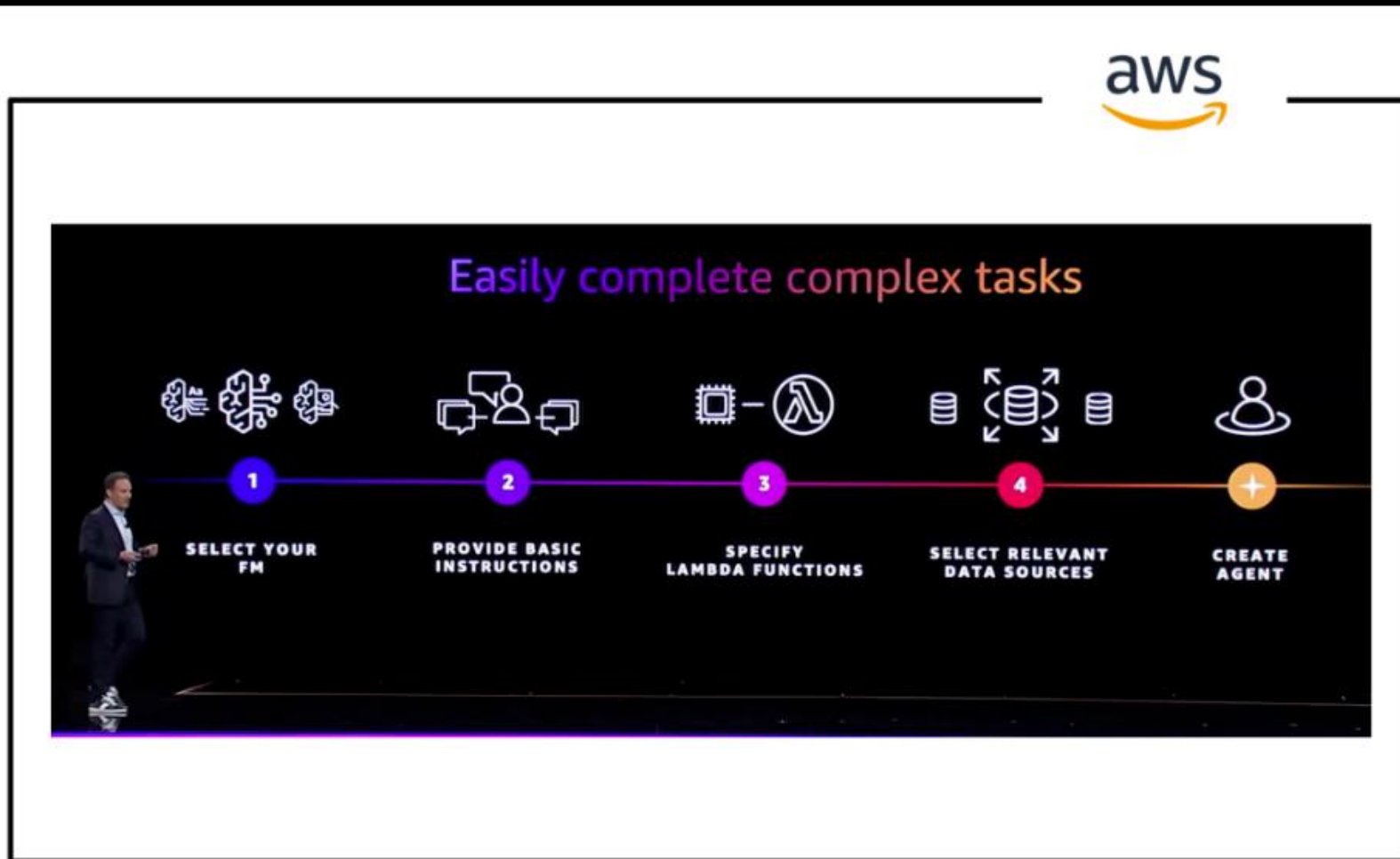
AWS further built out its genAI stack, from silicon to new Amazon Q chat assistants...



Source: AWS re:Invent 2023 keynote and AWS ML Blog product announcements

Software + AI : *GenAI innovation*



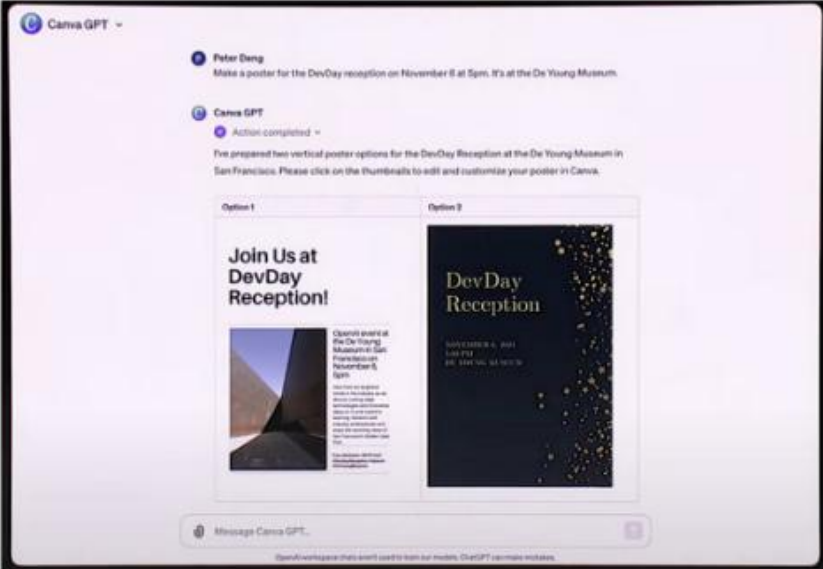
...including Amazon Bedrock Agents, for developing customizable LLM agents



Source: AWS re:Invent 2023 keynote and AWS ML Blog product announcements

Software + AI : *GenAI innovation*

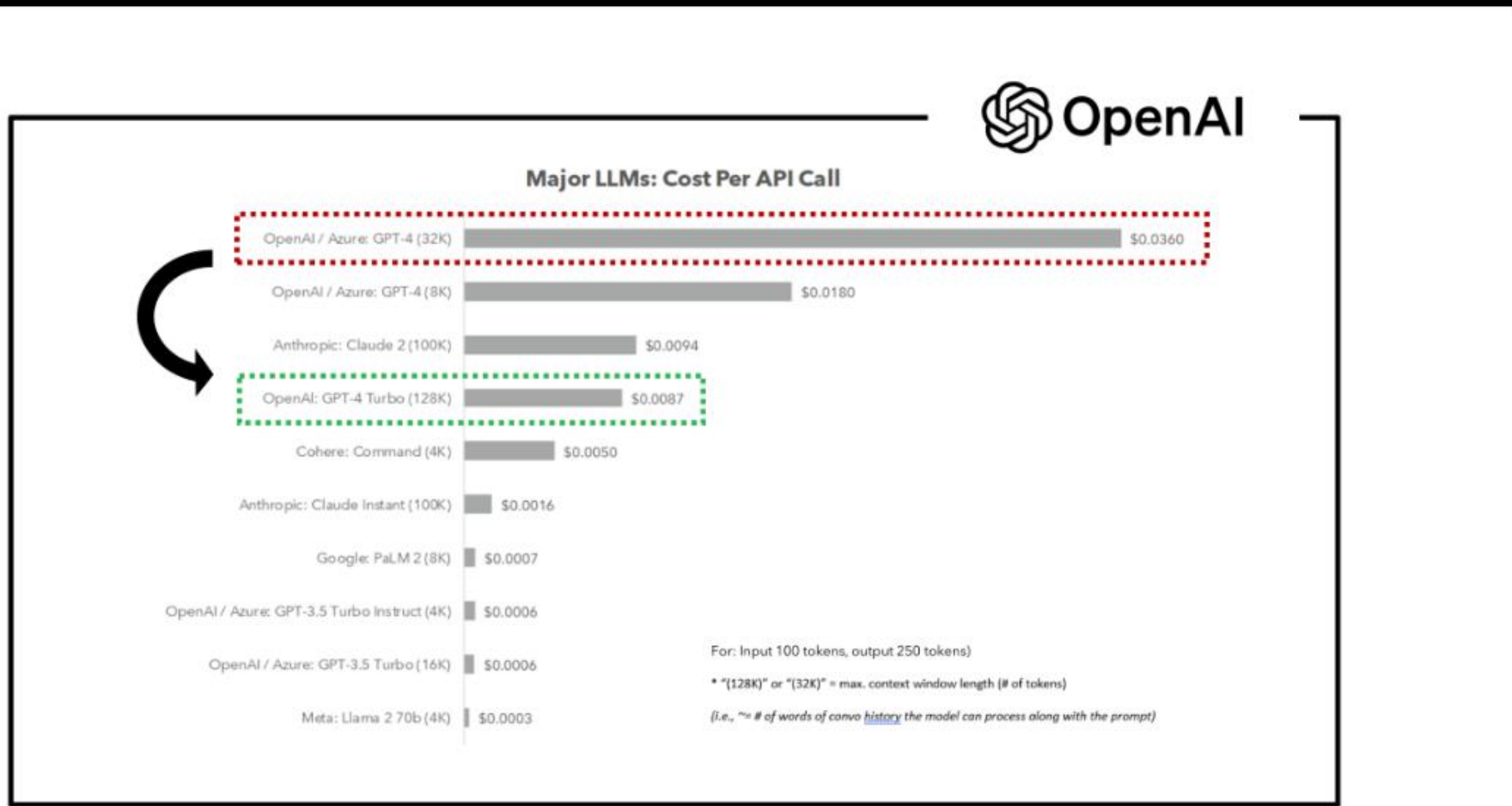
We'll "see" your AI agent maker for developers (Assistants API)...and raise you a custom AI agent maker for regular users too (GPTs in ChatGPT)

Source: OpenAI DevDay 2023

Software + AI : Costs

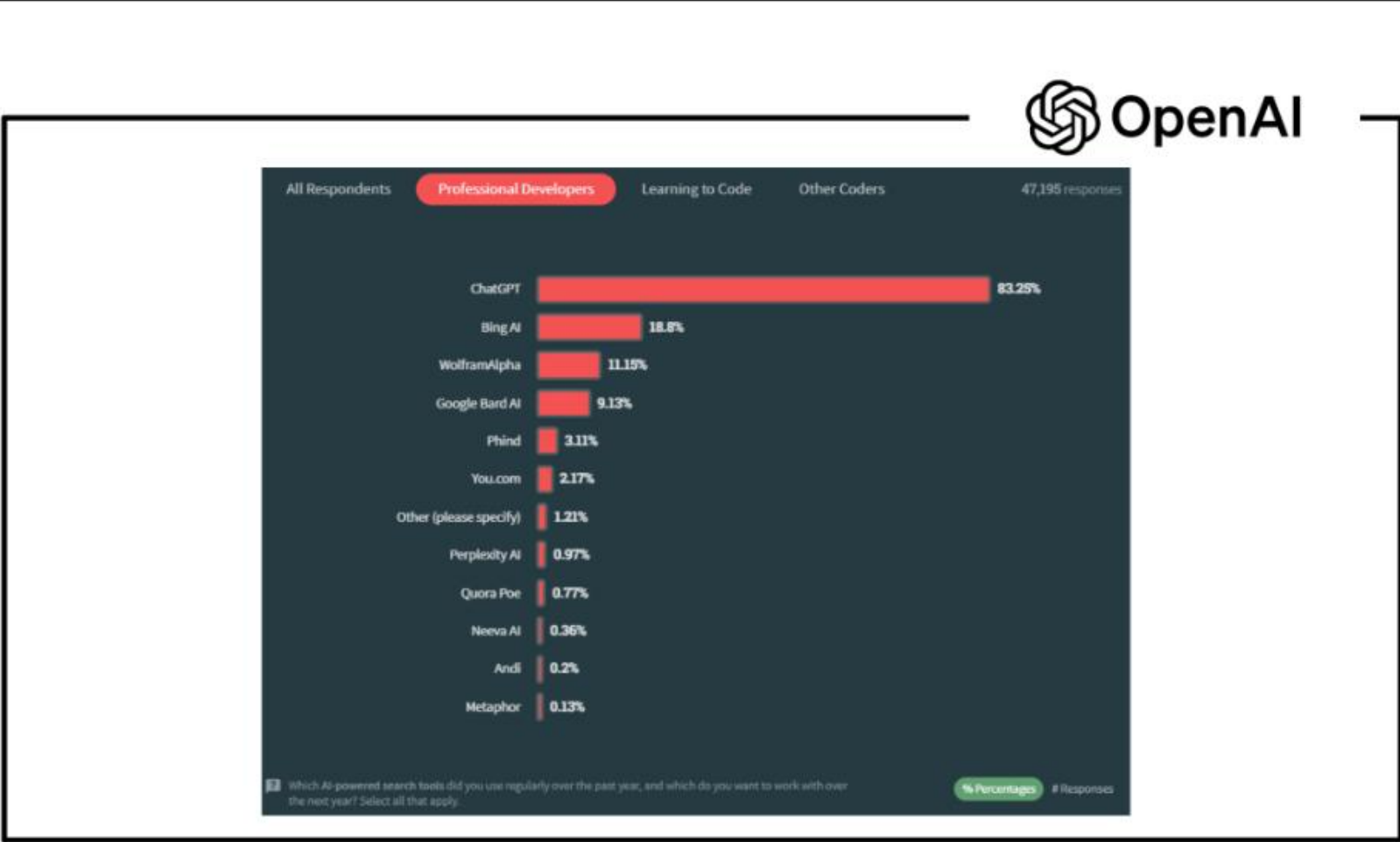
Inference costs down 2-4x/token with GPT-4 Turbo, making possible whole new types of GPT-4-powered applications



Source: OpenAI DevDay; OpenAI API pricing; DocsBot.ai LLM APIs pricing tracker

Software + AI : *Developer mind share*

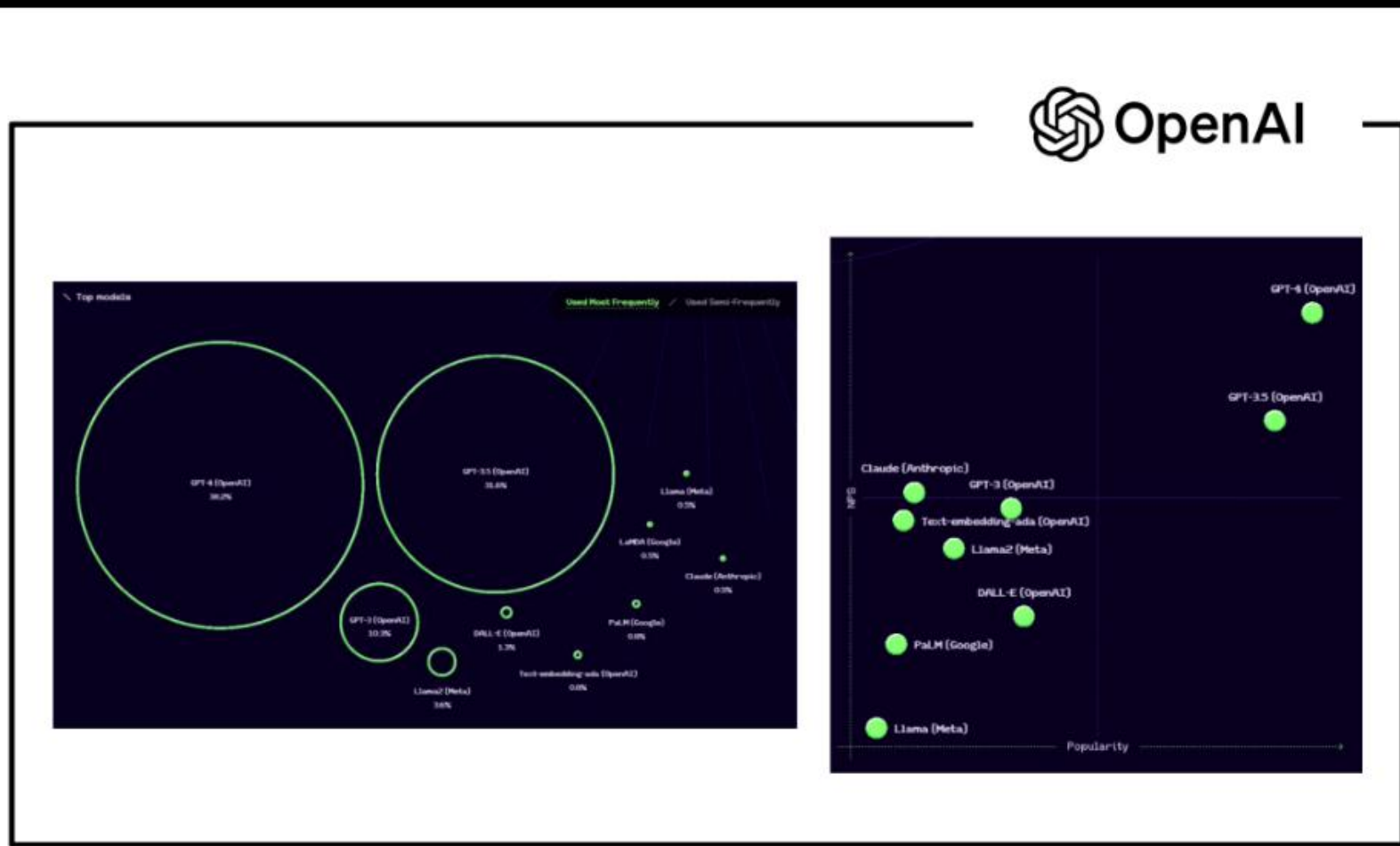
OpenAI leads...(1/2)



Source: [Stack Overflow Survey 2023](#) (n=47k developers), June 2023

Software + AI : *Developer mind share*

OpenAI leads...(2/2)



Source: [Retool State of AI Report 2023](#) survey of developers (n=1578), Nov. 2023

Software + AI : *Challenges*

Macro, Israel conflict, & customer-specific



"RPO growth was **impacted by a decline in both average deal sizes and average contract duration, a continuation of the trends** we had called out last quarter."

"The lower cloud revenue this quarter impacts to guidance for Q4 is primarily driven by two factors:

- First, the impact from two large digital native customers...their company-specific events and accounts for roughly 50% of the expected consumption shortfall for Q4.
- Second, the continuing macro pressure, including the ongoing conflict in the Middle East, where Israel is a top 10 country for us, and the possible U.S. government shutdown, both of which add uncertainty and disruption in particular segments. Specifically, we've seen slower organic consumption resulting from a slower rate of new use case additions in some part of our customer base."

Source: C3Q'23 earnings

Software + AI : Challenges

Macro increasing customers' resistance to subscription model upfront commitments...



“Macro has increased the misalignment between our subscription-based GTM and the new buying behavior of customers, impacting consumption growth.” “In the current macro environment, we believe customers have less appetite for larger upfront commitments and prefer consumption against smaller commits...”

...It is also necessary that we do this now. As we've seen across the industry this last year, economic pressure combined with the changing norm in cloud, means **customers are increasingly reluctant to make large multi-year commitments ahead of their usage.**

This means over the course of this year, the misalignment between our subscription based go-to-market and the natural buying behavior of customers has increased, creating a drag in our cloud growth. This has shown up in the dislocation between RPO and cloud revenue, but ultimately affects both, as our interaction with customers are directed in a way that is out of sync with the customers' natural buying behavior.”

Source: C3Q'23 earnings

Software + AI : Challenges

...as these traditional subscription models are misaligned with customers' needs



"In the traditional world of on-premise software, customers would make big upfront commitments. ...oriented around bookings...There was some misalignment between customer and vendor, because customer might end up over-purchasing...

...Cloud has a utility-like model, where services are metered as they are used. However, in the early days, the go-to-market engine for cloud infrastructure software largely remained as it was previously, selling customer commitments or credits...the vendor still had incentive to maximally scope customer commitments.

Over the last couple of years, businesses like MongoDB, Snowflake, Datadog, and Hyperscalers have all **transitioned their go-to-market to a fully consumption based model. In this model, the customer and the go-to-market organization are both oriented around the actual service usage, not the upfront commitment. This fully aligns the customer value realization with the vendors' revenue."**

Source: C3Q'23 earnings

Software + AI : *Challenges*

HashiCorp is seeing similar deal scrutiny and macro-related pressure on spending



"The team performed well under difficult circumstances, with continued new large customer wins despite sustained deal scrutiny that's a result of the broader macroeconomic environment."

"...it's no secret that market conditions remain difficult. While there are many things we cannot control, there are many others we can. So, we've taken steps to help us with both near-term performance and meeting the long-term opportunity ahead of us.

First, we are focused on simplifying our go-to-market messaging and strategy. ...we introduced new messaging centered on lifecycle management, which we apply to both our infrastructure and security offerings.

...Second, these go-to-market efforts are also crucial to our ongoing focus on building a wholly-integrated offering around the HashiCorp Cloud Platform. ...We are already seeing positive responses to the **new cloud pricing frameworks we introduced** earlier this year."

Source: C3Q'23 earnings

Software + AI : Challenges

...and is similarly adjusting its pricing, GTM and open-source licensing to adapt



On moving Terraform from an open source license (NPL) to Business Source License (BSL):

"We've used NPL, as you said, for 10-plus years. So the NPL...is effectively totally unencumbered. You can do whatever you want with NPL, right?"

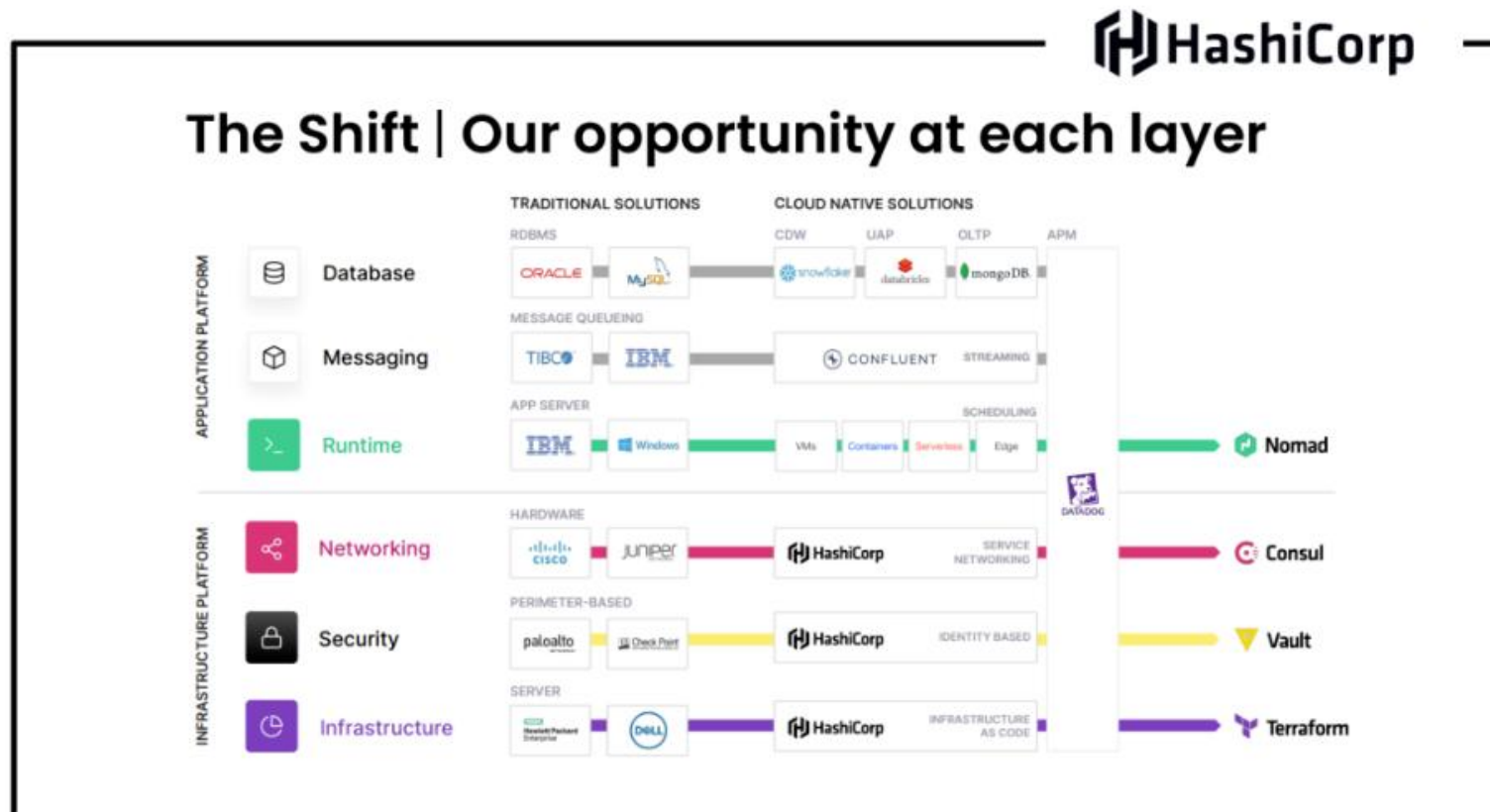
So the challenge is we've spent 10 years creating a large market around infrastructure as code, secret management, network automation. And effectively with NPL, there's no barrier to entry. Anyone can come in, take Vault, put a sticker over it. It's my Vault. Now you go sell it for \$0.10 on the dollar, right? ...And I think what we saw over the last few years was the emergence of a set of clone vendors that did exactly that, right, where they would literally go in their pitch to HashiCorp customers...

...option 3 is you say, "Okay, well, I'm going to go from a totally unencumbered license to a slightly encumbered license that says, 'You can't do that,'" right? And so that felt like the most logical path to us when we looked at our peers like Mongo and Confluent and everybody else, who effectively, they've all put a slight level of commercial control on their license that says, okay, you can't take Mongo and sell it against me, right? You can't take, in our case, a Vault and sell it against me or Terraform and sell it against me. But effectively, you can do everything else, right? So if you're using it for internal purposes and an organization, great, it's unencumbered...So it's actually a relatively narrow restriction."

Source: HashiCorp Investor Day @ HashiConf 2023

Software + AI : Stack

HashiCorp reiterated its opportunities across critical layers of the software stack



Source: C3Q'23 earnings

Software + AI : *Product velocity*

Snowflake kicking off a new product cycle, with promising adoption



"Snowflake continues to win new workloads outside of its traditional scope. **Snowpark consumption grew 47% Q/Q, [and] consumption in October was up over 500% since last year.** Over 30% of customers use Snowflake to process unstructured data in October. Consumption of unstructured data was up 17x year-over-year. Our newest streaming capability, Dynamic Tables, entered public preview earlier this year.

We have a number of **major new capabilities becoming broadly available in Q4. Our native apps framework will go GA; Unistore for transactional processing, Snowpark Container Services and Apache Iceberg Tables will all enter public preview.** These products unlock substantial new workload expansion opportunities."

"We've **introduced Snowflake Cortex to leverage AI and machine learning on Snowflake. Cortex is a managed service for inferencing large language models.** This opens up direct access to models and specialized operations like translation, sentiment, and vector functions. ...we introduced Snowpark Container Services, which also serves as the second pillar of our AI enablement strategy. Developers can access any language, any library, and flexible hardware inside the governance boundary of Snowflake."

Source: C3Q'23 earnings

Software + AI : *Product velocity*

...as MongoDB launched its vector search / vector DB offering to everyone...



"AI is in nearly every conversation with customers of all sizes. ...And with the recent advances in Gen AI, building AI applications is no longer the sole domain of AI or ML experts. Increasingly, software developers are being asked to build powerful AI functionality directly into their applications.

...We saw **exceptional interest in our Vector Search public preview and we announced general availability yesterday.** Customers are building a range of AI use cases, from semantic search to retrieval augmented generation or RAG where organizations can leverage the use of their private data, to increase the accuracy of LLMs.

...Moreover, developers can combine Vector Search with any other query capabilities available on MongoDB...For example, you can run complex AI-enriched queries such as find pants, shirts, shoes in my size that look like the outfit in this image within the particular price range and have free shipping, or find real-estate listings with houses that look like this image that were built in the last five years and/or in that area within seven miles west of Downtown Chicago with top-rated schools."

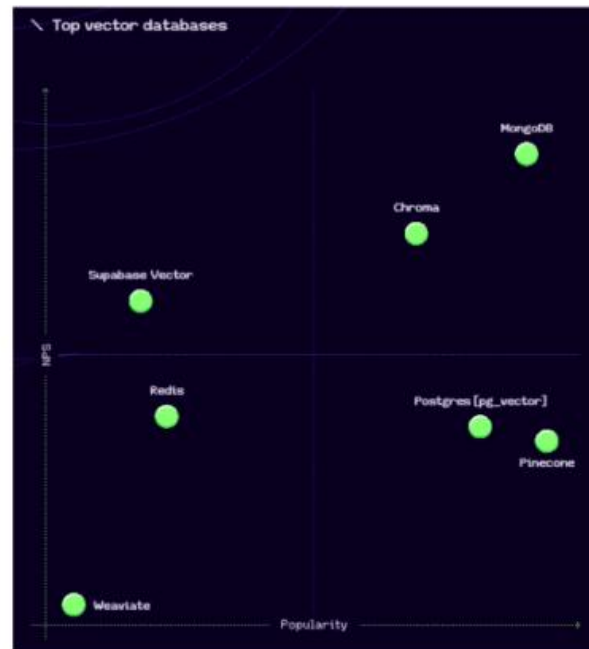
Source: C3Q'23 earnings

Software + AI : *Product velocity*

...that's getting great developer feedback



"In a recent State of AI Survey report by Retool, **Atlas Vector Search** received by far the **highest net promoter score from developers** compared to all other vector databases available in the market."



Source: [Retool State of AI Report 2023](#) survey of developers (n=1578)

Semis & Hardware



Semis & Hardware : *AI tailwinds*

NVIDIA continues to execute as accelerated computing and generative AI drive demand for GPUs...

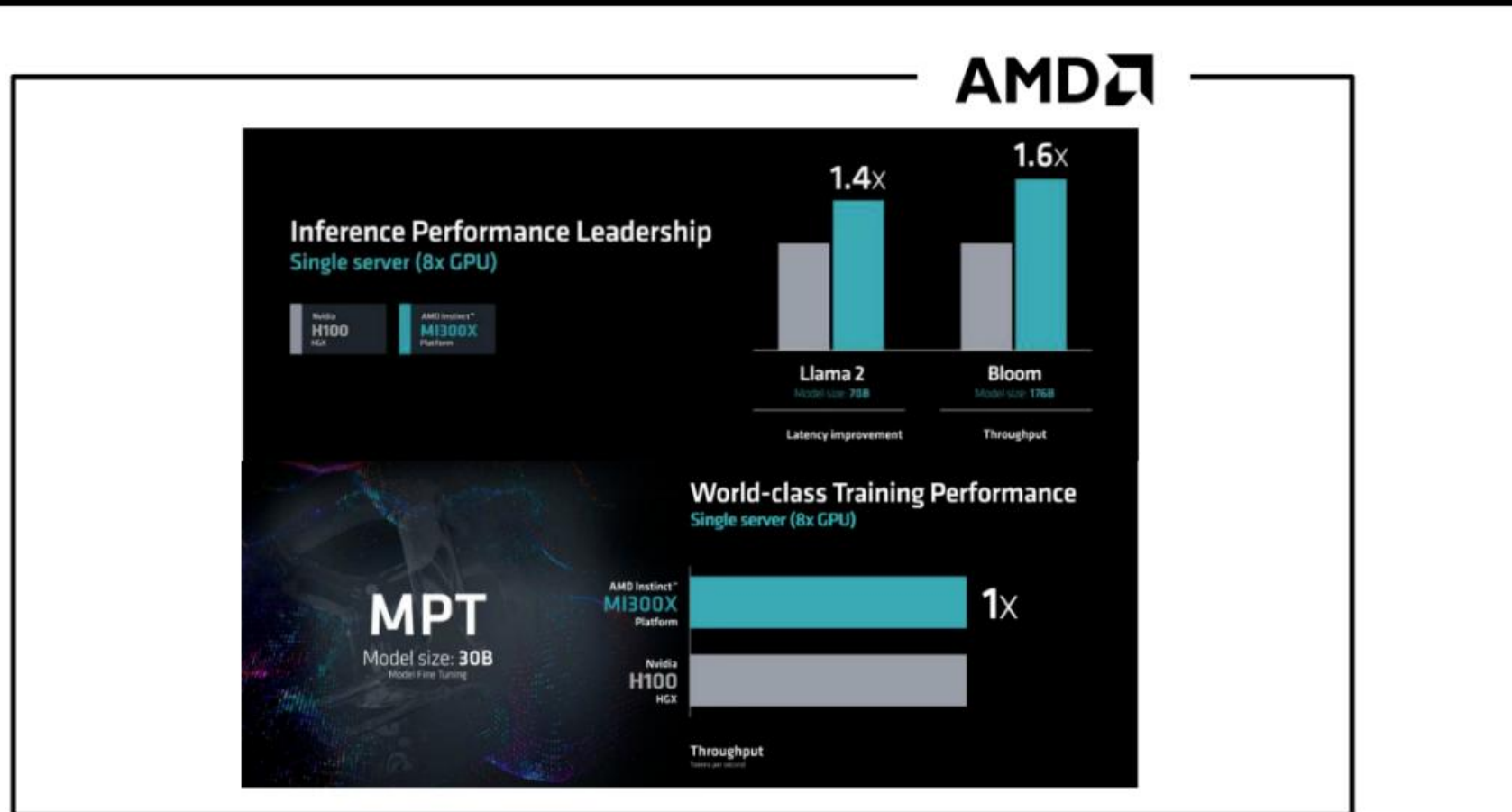


"Our data center compute revenue quadrupled from last year and networking revenue nearly tripled. Investment in infrastructure for training and inferencing large language models, deep learning recommender systems and generative AI applications is fueling strong broad-based demand for NVIDIA accelerated computing. Inferencing is now a major workload for NVIDIA AI computing. **NVIDIA networking now exceeds a \$10 billion annualized revenue run rate.** InfiniBand grew fivefold year-over-year and is positioned for excellent growth ahead as the networking of AI factories. "

Source: C3Q'23 earnings

Semis & Hardware : AI tailwinds

...while AMD released the MI300X accelerators to challenge NVIDIA's market dominance...



Source: AMD Advancing AI Event

Semis & Hardware : *AI tailwinds*

...and made enthusiastic projections on AI hardware demand



" We're now expecting that the **data center accelerator TAM will grow more than 70% annually over the next 4 years to over 400 billion in 2027**. So does that sound exciting for us as an industry. I have to say for someone like me who's been in the industry for a while, this pace of innovation is faster than anything I've ever seen before.

Based on the rapid progress we are making with our AI road map execution and purchase commitments from cloud customers, **we now expect Data Center GPU revenue to be approximately \$400 million in the fourth quarter and exceed \$2 billion in 2024 as revenue ramps throughout the year**. This growth would make MI300 the fastest product to ramp to \$1 billion in sales in AMD history."

Source: C3Q'23 earnings, AMD Advancing AI Event

Semis & Hardware : *AI tailwinds*

Broadcom continues to benefit from AI investments in networking infrastructure and custom silicon...



"Revenue from generative AI in fiscal '23 reached 15% of semiconductor revenue in line with our expectation. And moving on to fiscal '24, we forecast Semiconductor Solutions revenue to be up mid- to high single-digit percent year-on-year. **We expect revenue from generative AI to represent more than 25% of the semiconductor revenue** consistent with prior guidance, which more than offset the lack of growth from non-AI semiconductor revenue.

In fiscal 2024, **we expect networking revenue to grow 30% year-on-year, driven by accelerating deployment of networking connectivity and expansion of AI accelerators in hyperscalers."**

Source: C3Q'23 earnings

Semis & Hardware : AI tailwinds

...as Hyperscalers continue to seek out in-house chip solutions



" We are announcing **Azure Maia 100, an AI Accelerator chip designed to run cloud-based training and inferencing for AI workloads** such as OpenAI models, Bing, GitHub Copilot and ChatGPT. This chip is manufactured on a 5-nanometer process and has 105 billion transistors, making it one of the largest chips that can be made with current technology"

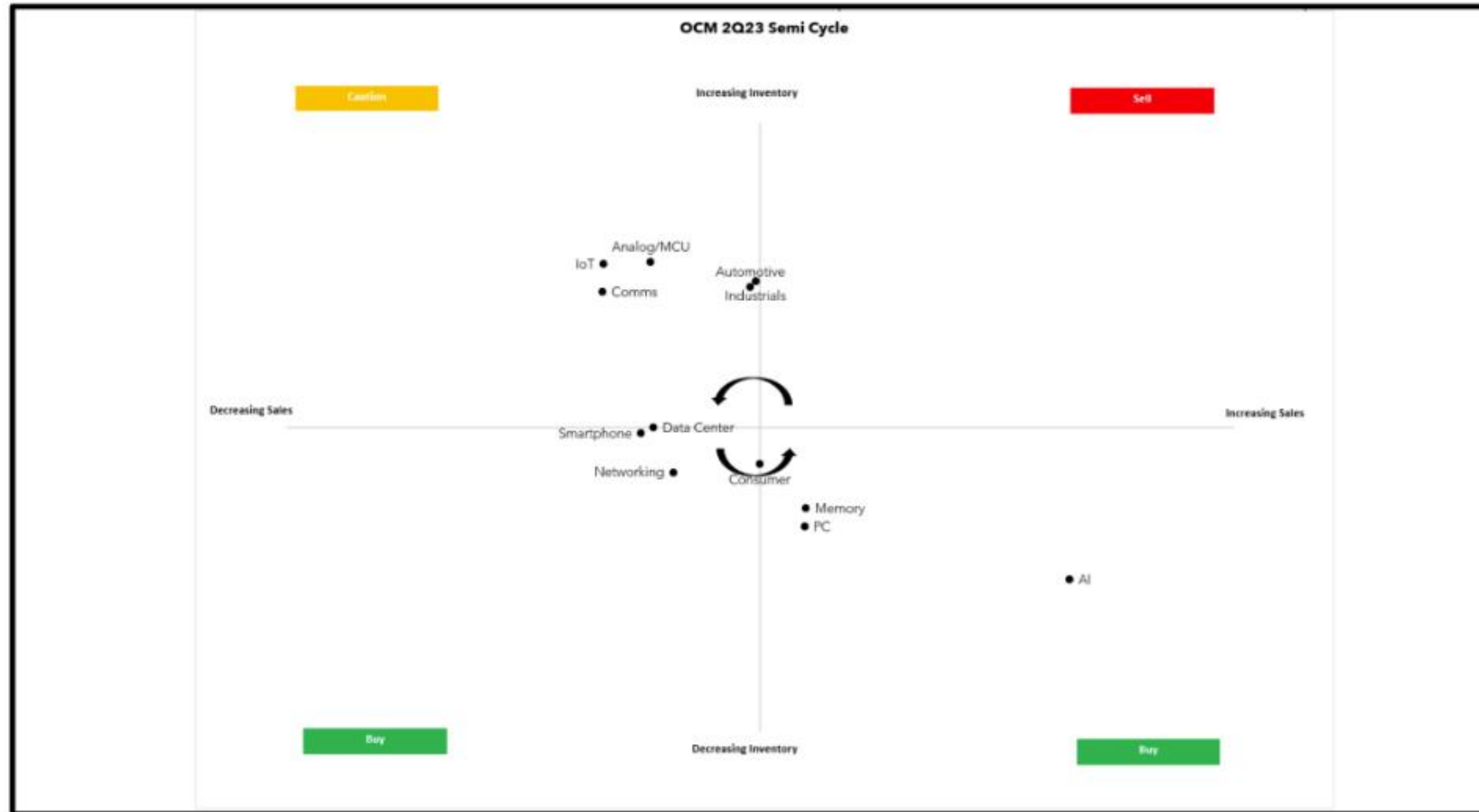


"AWS is announcing **Trainium2, which will power the highest performance compute on AWS for training foundation models.** Trainium2 is designed to deliver up to 4x faster training than first generation Trainium chips and will be able to be deployed in EC2 UltraClusters of up to 100,000 chips, making it possible to train foundation models (FMs) and large language models (LLMs) in a fraction of the time, while improving energy efficiency up to 2x"

Source: Microsoft Ignite 2023, AWS re:Invent 2023

Semis & Hardware : Cycle

The semiconductor industry broadly bottomed in Q2...



Source: Octahedron Estimates, Cycle framework by @FabricatedKnowledge

Semis & Hardware : Cycle

...with most consumer facing end markets entering an upcycle in Q3



Source: Octahedron Estimates, Cycle framework by @FabricatedKnowledge

Semis & Hardware : *End Markets*

Smartphone demand stabilized

Qualcomm

"We are seeing **early signs of stabilization in demand for global 3G, 4G, 5G handsets**. We now estimate that calendar '23 handsets will be down mid- to high single-digit percentage relative to calendar '22 and improvement from our prior expectations."

QORVO

In addition, **channel inventories of Qorvo components across the Android ecosystem continue to be consumed with OEMs indicating inventory levels are approaching historical norms**. General inventory digestion is allowing Qorvo to shift more closely to end-market demand even as pockets of channel inventory remain in markets such as base station. **Looking at days of inventory, this represents a decrease from 210 days to 138 days.**

Source: C3Q'23 earnings

Semis & Hardware : *End Markets*

PC components are seeing stronger sell through



" As we expected, **customers completed their inventory burn in the first half of the year, driving solid sequential growth, which we expect will continue into Q4.** In the near term, we expect Windows 10 end-of-service to be a tailwind, and **we remain positive on the long-term outlook for PC TAM returning to plus or minus 300 million units.**"



"Turning to our Client segment. Revenue increased 42% year-over-year and 46% sequentially to \$1.5 billion. Sales of our Ryzen 7000 processors featuring our industry-leading Ryzen AI on-chip accelerator, grew significantly in the quarter as **inventory levels in the PC market normalized and demand began returning to seasonal patterns.**"

Source: C3Q'23 earnings

Semis & Hardware : *End Markets*

Traditional data center demand remains mixed, although customers are starting to spend selectively...



"DCAI revenue was \$3.8 billion, ahead of our internal forecast. **Despite continued unit TAM softness, the Xeon business was up sequentially, with MNC customers showing a better than seasonal recovery in the quarter.** We expect moderate sequential growth from DCAI, with Xeon's strength more than offsetting a decline in PSG and continued recovery in edge markets roughly offsetting persistent network weakness."



"In cloud, **while the demand environment remained mixed in the quarter, EPYC CPU revenue grew by a strong double-digit percentage sequentially as hyperscalers expanded deployments** of EPYC processors to power their internal workloads and public instances while optimizing their infrastructure spend. "

Source: C3Q'23 earnings

Semis & Hardware : *End Markets*

...prioritizing general compute and networking over storage



" In cloud, revenue from both AI and standard cloud infrastructure grew sequentially with AI growing significantly faster. **Growth was broad-based, led by our PAM4 optical products, Teralynx Ethernet switches as well as our data center Interconnect or DCI products. Demand for data center storage also remains depressed** and industry expectations for recovery have continued to push out."



" **Now if you ask me [about inventory], maybe server storage, that could be a little excessive**, but non-broadband and **certainly not in networking**. So overall, on our products, we still feel rather good about it and the best indication is the level of our own inventory on our own books. If only I know. I mean I'll be speculating to say second half of '24, things will start looking better compared to the first half of '24."

Source: C3Q'23 earnings

Semis & Hardware : *End Markets*

Industrial players are seeing a broad downturn in the market...



"Turning on to the industrial... revenue declined 5% sequentially and was up 28% year-over-year. While we're very pleased with the year-over-year growth, we did experience sequential softness in this market, consistent with broader industry trends, and we expect this market softness to continue into the current quarter."



"Industrial, which had been more resilient, but we've been seeing signs of that come through as we were leading in Q3 and going into Q4, the weakness in that space."



"If you compare that to the industrial market, we had seen that, let's say, let's call it, about half of the sectors begin to weaken a couple of quarters ago, it was really this quarter that we saw that, that weakness is broadening."

Source: C3Q'23 earnings

Semis & Hardware : *End Markets*

...with weakness partially driven by telecom and China



" That's softness around telecom infrastructure...for the Comms and Computing segment, we expect as we go into Q4 the segment to be flat to sequentially, with 5G telecom infrastructure being down...I would say that it was really localized to the Asia geography. And we expect that softness that we started to see at the end of Q3 extend into the current quarter, Q4."



"Clearly, the macro environment remains weak, including subdued demand in China, geopolitical challenges and elevated inflation, which is constraining demand...Finally, we do believe the weak demand in Communication Infrastructure likely continues..."



"So I think if we're having this call a year ago or so, as China came out of COVID I think most of us would have expected there to be a more significant rebound, which just hasn't materialized... and next, communications equipment was down upper teens."

Source: C3Q'23 earnings

Semis & Hardware : *End Markets*

Macro outlook on automotive is mixed, but semis suppliers remain upbeat on secular drivers



" Regarding Automotive, I'm not sure, by the way. The automotive -- the assumption you're making is that there could be a double-digit drop in Automotive. I'm not sure about that because we know that cars are consuming about 10% more silicon per year. And in fact, we continue to grow in share and ASP in the car. So my own sense is that against what could be a very challenging macro backdrop during 2024, that of all the elements of our portfolio, automotive, we expect will fare best of them all."



"The difficult geopolitical and macroeconomic environment means that for the foreseeable future, there will be a volatile market development. Our target markets will continue to follow very different demand patterns. It is very positive for Infineon that the structural demand for the majority of our automotive semiconductors continues unabated. The increasing semiconductor value per vehicle continues to be a growth driver as I've already explained. We continue to see strong demand in these fields."

Source: C3Q'23 earnings

Semis & Hardware : *Value Chain*

Strong demand for leading-edge chips flows through to TSMC's top line...



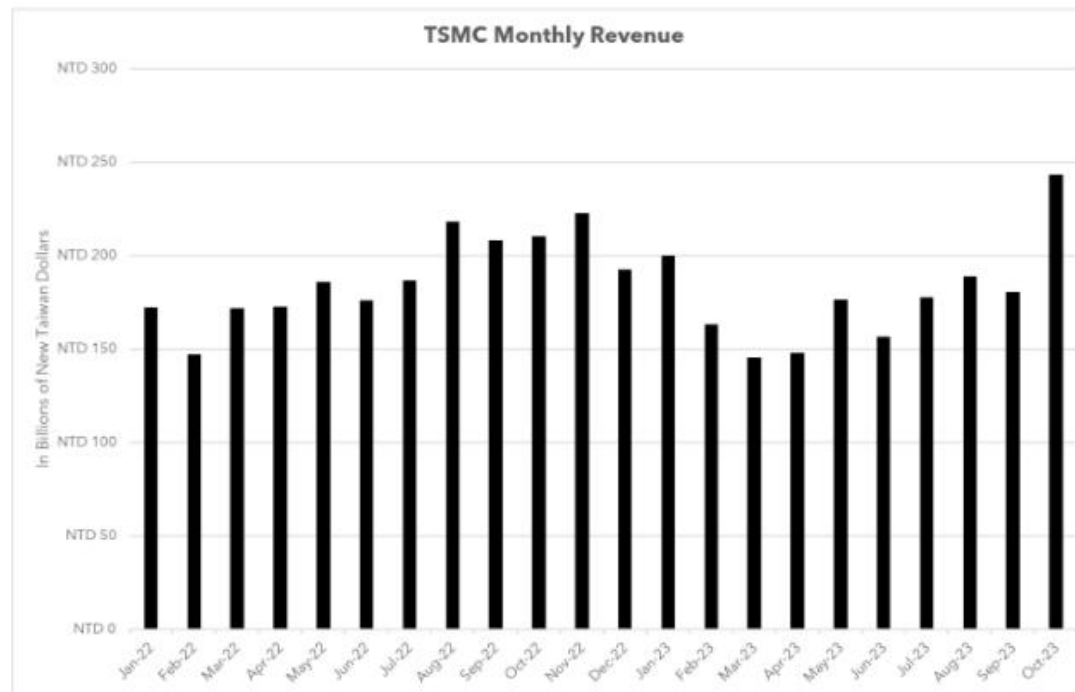
"Moving on to revenue contribution by platform. **HPC [High Performance Computing] increased 6% quarter-over-quarter to account for 42% of our third quarter revenue. Smartphone increased 33% to account for 39%.** IoT increased 24% to account for 9%. Automotive decreased 24% to account for 5%. And DCE decreased 1% to account for 2%...

...Having said that, **we are observing some early sign of demand stabilization in the PC and smartphone end market. Together with such level of inventory control, we forecast the fabless semiconductor inventory to further reduce and exit 4Q '23 at a healthier level."**

Source: C3Q'23 earnings

Semis & Hardware : *Value Chain*

...driving October revenues to hit an all-time high for a single month



Source: Company filings

Semis & Hardware : *Value Chain*

GlobalFoundries calls out continued weakness for trailing-edge chips...



"Specific end markets that we serve, such as smart mobile devices, communications infrastructure, data center and the **lower end of the consumer and home electronics segment continue to grapple with increased inventory compounded by decreased year-over-year demand.**

To manage elevated inventory, some customers have requested shipment adjustments and alterations to their long-term agreements. We are collaborating closely with these customers to support their short-term inventory reductions and avoid prolonging the duration of the inventory correction.

In smart mobile devices, **we continue to remix our business towards the premium-tier handset market, where we have seen greater resilience in demand and opportunities to build upon our feature-rich solutions."**

Source: C3Q'23 earnings

Semis & Hardware : *Value Chain*

...suggesting that end-demand recovery is not uniform



"Moving into fourth quarter 2023. While AI-related demand continues to be strong, **it is not enough to offset the overall cyclicity of our business.** We expect our business in the fourth quarter to be supported by the continued strong ramp of our 3-nanometer technology, partially offset by customers' continued inventory adjustment."



"Look, we started this year, we'll just take a step back, as an industry, that we were going to be down in the first half and come roaring back in the second half. **So in the first half, customers were saying, let's build some of that inventory because we have to get ready for the second half, and clearly, that didn't happen.** And we're just starting to see now is exactly what these long-term agreements were meant to, was to provide a balanced framework by which we as partners with all our customers go through these cycles together."

Source: C3Q'23 earnings

Semis & Hardware : *Value Chain*

Semicap players are taking a more conservative view for CY24...

ASML

"Although there's an opportunity for some demand to be pulled back into the back half of 2024, **we currently prefer to take a more conservative view for the full year 2024, especially considering the inherent nature of the macroeconomic uncertainties.** Therefore, based on our current view, **we expect revenue next year to be similar to 2023.**"

 **Lam**
RESEARCH

"**The first is that we're currently experiencing favorable customer mix that may not continue at the same level going into next year. This may create near-term headwinds for gross margin. Second...2024 may be an R&D spending growth year to take advantage of these future opportunities that we see. As a result, it's possible that historic leverage we've delivered takes a temporary pause.** We will obviously continue to aggressively drive the operational efficiencies that we always have, and our longer-term profitability objectives remain unchanged."

Source: C3Q'23 earnings

Semis & Hardware : *Value Chain*

...in preparation for significant growth in 2025

ASML

"As such, we see '24 as a transition year, but also as an important year to prepare for the significant growth that we expect in '25...Based on discussions with our customers, we currently expect '25 to be a strong year the industry expects to be in the middle of a cyclical upturn in '25, starting in '24. "

Lam
RESEARCH

"So if we were to think and I believe that the general feeling is that '25 is probably -- I mean, a lot of fabs opening, a lot of a demand out in that time frame."

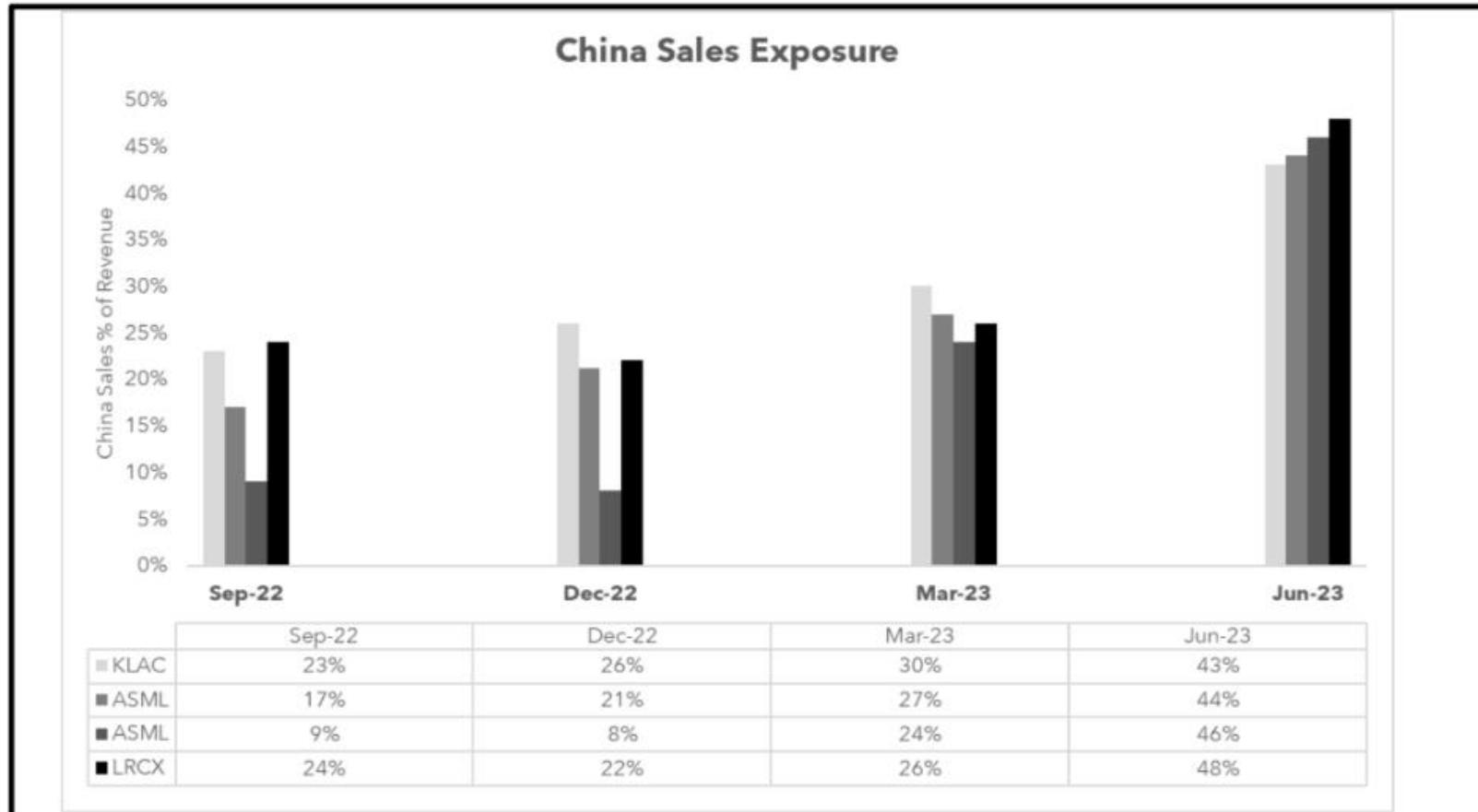
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MATERIALS

"We do get anecdotally from our customers that they're expecting a stronger year in '25 from a leading-edge logic perspective."

Source: C3Q'23 earnings

Semis & Hardware : *Value Chain*

In the near term, China fab buildouts is the main driver of the semicap business



Source: Company filings, Octahedron estimates

Semis & Hardware : *Value Chain*

Memory recovery in 2024 both a function of both pricing,...



"Yes. **We have said that for a while that 2025, we believe will be a record year for the industry and 2024 will be the year of recovery.** I think it's really, important that the focus on supply management is maintained. Micron is extremely focused on its CapEx management, OpEx management, supply management, even though pricing has increased and has good outlook, we want to make sure that the supply is controlled because industry, as you can see, is still far from the normal kind of profitability levels. So the discipline and focus is critically important, and this will be our mantra as we drive the business moving forward as well."



"Therefore, we believe memory industry is finally passing through the severe downturn and is now entering the stage of full recovery. **While next year's demand conditions may still be under the influence of the macroeconomic environment, we expect such shipment growth in all applications after 2 consecutive years of correction.**"

Source: C3Q'23 earnings, UBS Global Technology Conference 2023

Semis & Hardware : *Value Chain*

..., constraining ramp-up of new capacity,...



"As part of CapEx management, what we have focused on, of course, as part of supply management that **we have been running underutilization in the fabs. We have talked about underutilization approaching 30% for DRAM and NAND in our fabs today.** And we have said that we have taken that underutilized equipment **and diverted it towards ramp-up of the new technology nodes, such as 1-beta in DRAM as well as 232-layer NAND.**"



"Now for the company, this year, we are executing CapEx within the given scope while adjusted to product-specific priorities but the current investment and production volume are not likely to be sufficient to allow us to fully respond to the growing demand while maintaining technological competitiveness. As such, in 2024, the company will continue to operate with CapEx efficiency by **focusing more on tech migration rather than on capacity ramp-up.**"

Source: C3Q'23 earnings, UBS Global Technology Conference 2023

Semis & Hardware : *Value Chain*

...and High Bandwidth Memory (HBM) serving as secular tailwinds



"HBM is in a high-growth mode, **HBM requires more wafers because HBM dye is more than 2x bigger than a standard dye** and the packaging stack is much more complex. So the combination of the 2 requires you to produce more than 2x wafers to produce the same number of bits at the same -- number of bits in the same technology node. **This is a factor that will affect the industry demand supply dynamics as well. And of course, AI servers that require significantly more memory, 6x to 8x DRAM content and 2x to 3x more NAND content.** "



"For HBM, the current projection is an average of 60% to 80% growth for the next 5 years, so the **CAGR of 60% to 80% for the next 5 years.** Having said that, again, we are seeing signs that **there could be potentially even faster growth in this market.** "

Source: C3Q'23 earnings

Questions?

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