BEHIND
THE NUMBERS
Quality of Earnings Analysis
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Jeff Middleswart
jmiddleswart@btnresearch.com

Bill Whiteside, CFA
bwhiteside@btnresearch.com

www.btnresearch.com

Behind the Numbers

Companies in this Issue

Broadcom Inc. (AVGO)
Earnings Quality Review

6- Exceptionally Strong
5- Strong
4- Acceptable
3- Minor Concern
2- Weak
1- Strong Concern
+ quality improving
- quality deteriorating

We are initiating earnings quality coverage of AVGO with a 4- (Acceptable) rating.

For an explanation of the EQ Review Rating scale, please refer to the end of this report.

Summary

AVGO has been a long-term growth-through-acquisition company. The Covid period stalled that source of growth and AVGO shows some of the same issues regarding inventory that we have seen with other tech names. Primarily, inventory went from being plentiful to short supply with strong demand, Chinese lockdowns, followed by a normalization of the channels. The company is now viewed as an AI (Artificial Intelligence) play with that source of growth accelerating. From the 2Q23 conference call:

Hock Tan, AVGO President:

> *"I know you all want to hear about how we are benefiting from this strong deployment of generative AI by our customers. Put this in perspective, our revenue today from this opportunity represents about 15% of our semiconductor business. Having said this, it was only 10% in fiscal '22. And we believe it could be over 25% of semiconductor revenue in fiscal '24. In fact, over the course of fiscal '23 that we're in, we are seeing a trajectory where our quarterly revenue entering the year doubles by the time we exceed '23. And in fiscal third quarter '23, we expect this revenue to exceed a $1 billion in the quarter."*

AI aside, we found several earnings quality issues that are worth following. Cash flow is solid and should be able to support the goal of paying 50% of prior year's free cash flow as a dividend even after the VMware acquisition. The goal will also be to pay down debt which is likely to disrupt share repurchases. Our concerns could hinder some growth going forward, but it does not appear critical enough to derail the full story:

- AVGO uses distributors for 56% of sales – up from 28% in 2017. AVGO charges credits against revenues for returns or pricing adjustments. The contra-account against revenues plummeted in recent years with shortages in the semiconductor market. With the supply chains correcting, we see a risk of this charge returning closer to 7% of sales vs. the 2.6% reported in 2022. **(See Below).**

- AVGO beat forecasts in 2021 by 29 cents and in 2022 by 95 cents. This credit allowance declining helped 2021 by 49 cents and in 2022 by 159 cents if it had been 6.9% of distributor sales. The ending allowance has also dropped and we estimate added about 35 cents to EPS. **(See Below).**

- Inventory levels are higher than pre-Covid at 66 days vs. the 30s. AVGO believes the total inventory in the channel is about 80 days. This looks like supply chain bottlenecks correcting to us and customers are destocking a bit causing inventory to back up on AVGO. This doesn't look that alarming to us, but could further push up the credit allowance. If this happens, it should hurt gross margin. That is already being seen in 2023. **(See Below).**

- Cash R&D adjusted for stock compensation is declining in dollar terms and has fallen about 300bp as a percentage of sales since pre-Covid. We have multiple issues with this. Most tech companies are saying wage growth for engineers is 6%-10%, so how is AVGO cutting this cost? The move to AI should also require more R&D in our view. Growing with acquisitions could help this – buying R&D knowledge and not expensing goodwill. However, AVGO's last large completed deal was in November 2019. We believe this could be a headwind for EPS going forward. In 2Q23, AVGO's $10.32 adjusted EPS beat forecasts by 18 cents. If cash R&D had risen by 6% y/y, it would have cost AVGO 21 cents. If the percentage of sales remained flat for R&D, AVGO would have lost 23 cents in EPS. **(See Below).**

- Growth through acquisition stalled for several years as AVGO has not completed a sizeable deal in nearly four years. We give AVGO high marks for consistently using a short amortization period for intangibles of 5-6 years so the spread between GAAP and non-GAAP earnings narrows quickly. We will be watching the VMware deal to see if AVGO stays with a short amortization life. **(See Below).**

- Growth through acquisition is also a negative for AVGO as it assigned 69% of over $60 billion in deals since 2016 to goodwill, which is not expensed under GAAP or non-GAAP earnings. We see this as a way to inflate income because knowledge and patents are added for no cost. Instead of expensing costs through income, they are financed on the cash flow statement and balance sheet. The VMware deal should lead to lower share repurchases as the company focuses on debt reduction, so it's obvious these purchases are not "free" like the income statement shows. **(See Below).**

- Depreciation is declining in dollar terms. AVGO has not changed its assumptions regarding asset lives. However, its net PP&E balance has been declining and so has capital spending. Only recently has spending perked back up. This could mean that a cutting-edge tech high-growth company is using older equipment.

	2Q23	**2Q22**	**1Q23**	**1Q22**	**2022**	**2021**	**2020**	**2019**	**2018**	**2017**
Depreciation	$129	$135	$127	$136	$529	$539	$570	$569	$515	$451
Cap-Exp.	$122	$103	$103	$83	$424	$443	$463	$432	$635	$1,069

Capital spending has not exceeded depreciation since 2018. Every $10 million drop in depreciation adds 2 cents to AVGO. That is not material. But we think investors should consider that in 2018, AVGO had sales of $20.8 billion and net PP&E was $2.635 billion. Now, sales are headed for over $35 billion but net PP&E is only $2.2 billion. This could represent a future cash flow headwind if capital spending needs to ramp up and in turn, depreciation could become a headwind rather than the tailwind seen since 2020.

- Stock compensation is added back to non-GAAP earnings at AVGO. We are not fans of this because it is a recurring cost and when the stock doesn't rise, employees tend to want more cash income. This policy is common and to AVGO's credit, it has seen this source of earnings decline in dollar terms and as a percentage of sales. It is worth watching this as it did tick up in 2Q23 by 110 bps. That was worth 19 cents in EPS in a quarter where AVGO beat by 18 cents.

A Normalized Supply-Chain May Restore Higher Distributor Credits

Revenues are reported net of credit allowances for distributors. This has the impact of lowering net sales and allows for distributors to adjust prices or even return some inventory when necessary. These numbers are only reported once a year in the 10-K. But we are seeing a trend that does not look sustainable for much longer.

- AVGO is using distributors for a larger percentage of sales
- Sales are rising also
- The amount charged to the allowance is falling in dollar terms and as a percentage of sales

	2022	2021	2020	2019	2018	2017
Sales	$33,203	$27,450	$23,888	$22,597	$20,848	$17,636
% to distributors	56%	53%	42%	46%	34%	28%
Distrib Sales	$18,594	$14,549	$10,033	$10,395	$7,088	$4,938
Credit Exp.	$484	$756	$696	$705	$882	$1,176
% of Dist. Sales	2.6%	5.2%	6.9%	6.8%	12.4%	23.8%
Ending Allowance	$125	$128	$149	$153	$151	$177
% of Dist. Sales	0.67%	0.88%	1.49%	1.47%	2.13%	3.58%
AVGO Adj. EPS	$37.64	$28.01	$22.16	$21.29	$20.82	$16.02
EPS of 100bp	$0.37	$0.29	$0.20	$0.21	$0.15	$0.10

We know what happened in the semiconductor markets of late. In 2020, demand vanished and then started to bounce back by late 2020 and into 2021. That was followed by demand rising quickly, but the supply chains were depleted of inventory. Plus, key areas such as China remained closed longer and the transportation logistics experienced chaos too. That led to customers and suppliers ordering more product than needed to rebuild inventory through the system during 2022. During 2021 and 2022, pricing was going up, demand was going up, double and triple-ordering was making their way into backlogs. What wasn't happening? Distributors were not dealing with inventory that couldn't sell and falling prices – thus the expense charged for distributor credit allowances plummeted from almost 7% to 2.6% as a percentage of sales at AVGO.

We won't argue with AVGO's low overall reserve too much. Historically, they have operated with a low reserve and almost seem to expense new credit allowances as they occur. Given the higher percentage of sales being done with distributors, an argument could be made that ending reserves should be at least the 1.5% of sales seen in 2019. That would require the reserve level to be about $300 million and AVGO would need to expense another $175 million – that is about 35 cents in lower EPS to boost the reserve.

The bigger issue is, "will the overall expense ratio need to return to a level of 5%-7% of sales on an annual basis?" Other semiconductor companies are reporting that the channel is cutting inventories – both distributors and customers. That's not true of every end-market but even

AVGO notes it has some markets that are flat to down. That would seem to be areas where the credit allowance would be rising again. The three things to keep in mind are:

- AVGO beat forecasts in 2021 by 29 cents and in 2022 by 95 cents. This credit allowance declining helped 2021 by 49 cents and in 2022 by 159 cents if it had been 6.9% of distributor sales.

- There is another 35 cents of potentially lost EPS if the ending reserve is held at 1.5% of distributor sales.

- This is a contra-account to sales. When the expense rises for credit allowances, it reduces sales and sales growth.

Inventory Levels Look High

Compared to pre-Covid, inventories at AVGO look higher. Management does not discuss this too much but we believe this reflects the supply chains normalizing and customers and distributors may be in a position to reduce inventory levels and potential sales in some divisions:

Inv. DSI's	Oct	July	April	Jan
2023			65.6	59.4
2022	58.3	60.1	57.0	52.1
2021	42.6	40.9	35.8	32.1
2020	33.6	39.3	34.0	33.1
2019	30.3	40.0		

This is not the level of other semiconductor companies. We know Texas Instruments is carrying 200 days of inventory. If we look at the January 2022 quarter, AVGO said lead times were extended for customers and suppliers. That was helping backlog grow and they thought the channel inventory was about one month. That was the same thought given for April 2022 and in July 2022, AVGO noted it was ramping up some inventory to deal with expected revenue growth. In the last quarter, AVGO said it believes total inventory is about 80 days including the channel and inventory on its books.

	2Q23	2Q22	1Q23	1Q22	2022	2021	2020	2019	2018	2017
Sales	$8,733	$8,103	$8,915	$7,706	$33,203	$27,450	$23,888	$22,597	$20,848	$17,636
Adj. Gross	$6,606	$6,186	$6,578	$5,821	$25,107	$20,443	$17,552	$16,055	$13,931	$11,137
Margin	75.6%	76.3%	73.8%	75.5%	75.6%	74.5%	73.5%	71.0%	66.8%	63.1%

As we noted above, we believe the higher inventory and normalization of supply chains could lead to higher credit allowances. Because we addressed the EPS impact above, we will avoid double counting it here. However, when higher credit expense lowers sales and the gross profit by the same amount – it results in lower gross margin. That is already being seen in 2023.

Adjusted R&D Spending Is Declining in Dollar Terms and Driving EPS

Another red flag in our view is AVGO is not growing R&D at any rate close to sales. R&D in dollar terms is declining y/y in 2023 so far after showing little growth from 2020-2022. We are going to look cash R&D as AVGO does pay engineers in stock, which it adjusts out for its non-GAAP EPS. The stock payment declined from 2020 to 2022 and is now rising again in 2023.

	2Q23	2Q22	1Q23	1Q22	2022	2021	2020	2019	2018	2017
Sales	$8,733	$8,103	$8,915	$7,706	$33,203	$27,450	$23,888	$22,597	$20,848	$17,636
R&D	$1,312	$1,261	$1,195	$1,206	$4,919	$4,854	$4,968	$4,686	$3,768	$3,292
Cash R&D	$958	$1,000	$928	$938	$3,871	$3,655	$3,549	$3,164	$2,913	$2,656
R&D %	15.0%	15.6%	13.4%	15.7%	14.8%	17.7%	20.8%	20.7%	18.1%	18.7%
Cash R&D %	11.0%	12.3%	10.4%	12.2%	11.7%	13.3%	14.9%	14.0%	14.0%	15.1%
y/y Sales Growth	7.8%	22.6%	15.7%	15.8%	21.0%	14.9%	5.7%	8.4%	18.2%	33.2%
y/y Cash R&D Growth	-4.2%	7.4%	-1.1%	6.2%	5.9%	3.0%	12.2%	8.6%	9.7%	18.4%

What we hear almost across the board from other tech companies is that they are experiencing wage growth of 6%-10%. And yet, we're not seeing this when we look at the AVGO R&D figures. We see two things in play here:

- AVGO is likely buying some its R&D via acquisitions – especially in years 2017-19. As we will discuss below, with much of the purchase price of deals not being expensed, AVGO can bring in new patents and knowledge and not report much of it on the income statement.

- Sales growth leverages the budgeted R&D and that allows margins and earnings to expand. We can understand 2022's sales growth rising as customers were scrambling to build their own inventories, being a special case too.

Our basic problem is recent cash spending on R&D is down in dollar terms. Wage inflation alone should be pushing up that cost by more than 6% in our view. Plus, sales growth is not as explosive as it was in 2022. That should make it tougher to leverage a largely fixed costs. Yet, AVGO picked up 180bp in 1Q23 and 130bp in 2Q23 for margins and pushed cash R&D to all-time lows.

Plus, while VMware is coming as an acquisition, the last major deal AVGO made was Symantec in November 2019. Thus, in the last 3+ years, the argument cannot be made that AVGO bought its R&D through the cash flow statement instead. And, it has seen growth and demand in the AI sector too. Shouldn't that alone be driving up R&D spending?

- In 1Q23, AVGO's $10.33 adjusted EPS beat forecasts by 17 cents. If cash R&D had risen by 6% y/y, it would have cost the company 14 cents in EPS. Had cash R&D remained flat as a percentage of sales, it would have cost AVGO 33 cents in EPS.

- In 2Q23, AVGO's $10.32 adjusted EPS beat forecasts by 18 cents. If cash R&D had risen by 6% y/y, it would have cost AVGO 21 cents. If the percentage of sales remained flat for R&D, AVGO would have lost 23 cents in EPS.

We expect this to become more of a headwind going forward.

Acquisitions Show Both Aggressive and Conservative Accounting

AVGO is currently working to close its VMware acquisition by year-end. We won't comment too much on the accounting there because the deal isn't finalized. We will note that AVGO is expected to boost debt by about $30 billion to fund that deal and will devote more of free cash flow toward debt repayment. It still expects to allocate about 50% of prior year's free cash flow to its dividend as well. We see good cushion here for AVGO to meet both these goals. Prior deals also led to some asset sales which could also drive some debt reduction:

	2Q23	1Q23		2022	2021
Wrk Cap chg	-$0.2	-$0.6		-$1.7	-$0.1
Cash Ops	$4.5	$4.0		$16.7	$13.8
Cap Ex	$0.1	$0.1		$0.4	$0.4
Free Cash	$4.4	$3.9		$16.3	$13.4
Dividend	$1.9	$1.9		$7.0	$6.2
stock Repo	$3.4	$1.5		$8.4	$7.5

Recent cash flow shows that even with higher working capital drains, free cash flow is over $16 billion with an $8 billion dividend. Even if AVGO needed to boost capital spending by a large amount, there is plenty of cash. The stock repurchase will likely decline for a few years as AVGO focuses on debt retirement. The company should be able to make meaningful progress on the debt front fairly quickly. The stock repurchases added 1.5% and 3.3% to adjusted EPS growth in 2Q23 and 1Q23. That may be lost in 2024 and 2025 and replaced with some EPS growth from falling interest expense.

Looking at past deals there are three overriding themes:

- A huge percentage of each deal's value is allocated to Goodwill, which is not expensed.
- The remaining part of the deal values is allocated to intangibles, which is expensed under GAAP earnings, but is removed from non-GAAP earnings – thus it has no expense on adjusted earnings either.

- The amortization periods are rather quick – so the spread between GAAP and non-GAAP earnings narrows quickly too. We will watch VMware for what life-span AVGO assigns to intangibles.

	Symantec	CA	Brocade	Broadcom
Date	Nov 19	Nov 18	Nov 17	Feb 16
Cost	$10.7	$16.1	$4.8	$28.8
Goodwill	$6.6	$9.8	$2.2	$23.0
Dev. Tech	$2.9	$5.0	$2.9	$9.0
amtiz period	5 yrs	6 yrs	10 yrs	6 yrs
Customer value	$2.4	$4.2	$0.3	$2.7
amtiz period	5 yrs	6 yrs	11 yrs	2 yrs
Misc intang.		$2.6		$2.0
GW % of deal	61.7%	60.9%	45.8%	79.9%
Intang % of deal	49.5%	73.3%	65.7%	47.6%

AVGO is not the only company doing this, but this is one of the more aggressive forms of accounting being used today by tech companies. These four deals cost $60.4 billion. But, according to GAAP – 69% of what was spent has zero cost to AVGO because it is called goodwill – which is simply a plug figure. We know AVGO added patents, engineers, and existing projects as part of these deals. That's why we say acquisitions result in companies effectively purchasing R&D on the balance sheet as debt and the investing section of the cash flow statement. The non-GAAP income statement and operating cash flows show zero outflows with any of this.

If AVGO built some of this in-house, it would have bought equipment, hired engineers, and leased space – all that would have had immediate expensing on the income statement as depreciation, wages, health insurance, and rent. It is unlikely there would have been a revenue stream tied to that work until it reached milestones. On top of that, GAAP allows this plug figure to have an indefinite life. If AVGO had paid $80 billion instead of $60 billion, GAAP would have simply said Goodwill is $20 billion higher. The only time Goodwill becomes an expense is if the company determines there is an impairment to the value because future cash flows are not looking as rosy as initially thought. However, that test is done annually and the forecasts aren't likely to change much early on. When a company assigns 69% of acquisitions to Goodwill, it can

keep other on-going expenses like R&D lower to boost earnings and neither GAAP nor non-GAAP EPS is impacted by the huge Goodwill figure.

On the other intangibles, we give Kudos to AVGO for expensing these rapidly under GAAP accounting. The game that can be played is suddenly using longer lives for larger deals. We'll be watching the VMware accounting for that – but so far we only see it in the Brocade deal which was small, going to a 10-year life.

On non-GAAP earnings, AVGO adds back this amortization and it's still a sizeable percentage of non-GAAP earnings.

	2Q23	1Q23	2022	2021	2020
NonGAAP Pretax Income	$5,131	$5,123	$18,779	$14,293	$11,356
Amortization Intangibles	$789	$883	$4,359	$5,403	$6,220
Restructuring	$102	$53	$177	$285	$634
% NonGAAP Pretax income	17.37%	18.27%	24.15%	39.80%	60.36%

- On the positive side – the fast amortization is causing this adjustment to decline rapidly in dollar terms and it is becoming a smaller part of non-GAAP earnings

- On the negative side – this is still a material amount of AVGO earnings and if the Goodwill was being amortized over 20-40 years, that would be another $1-$2 billion spread between GAAP and non-GAAP earnings.

Explanation of EQ Rating Scale

6- (Exceptionally Strong)- Indicates uncommonly conservative accounting policies to the point that revenue and earnings are essentially understated relative to the company's peers. Higher possibility of reporting positive earnings surprises

5 (Strong)- Indicates the company has no areas of concern with its reported results and we see very little risk of the company disappointing due to recent results being overstated from aggressive reporting in recent periods.

4 (Acceptable)- Indicates the company may have exhibited a minor “red flag”, but the severity of the issue is not yet a concern. Minimal risk of an earnings disappointment resulting from previous earnings or cash flow overstatement

3 (Minor Concern)- Indicates the company has exhibited either a larger number of or more serious warning signs than companies receiving a 4. The likelihood of an immediate earnings or cash flow disappointment is not considered to be high, but the signs mentioned deserve a higher degree of attention in the future.

2 (Weak) Indicates the company’s recently reported results have benefitted materially from aggressive accounting. Follow up work should be performed to determine the nature and extent of the problem. There is a possibility that upcoming results could disappoint as the impact of unsustainable benefits disappears.

1 (Strong Concern)- Indicates that the company’s recent results are significantly overstated and that we view a disappointment in upcoming quarters is highly likely

In addition to the numerical rating, the EQ Review Rating also include either a minus or plus sign. A minus sign indicates that our analysis shows the overall earnings quality of the company has worsened since the last review and there is a possibility the numerical rating will fall should the problem continue into upcoming quarters. Likewise, a positive sign indicates that the overall

earnings quality is improving, and the company may see an upgrade in its numerical rating should the trend continue.

Key Points to Understand About the EQ Score

The EQ Review Rating is much more than a blind, quantitative scoring method. While we utilize proprietary adjustments, ratios, and methods developed over decades of earnings quality analysis, the foundation of all of our analysis is reading recent SEC filings, press releases, conference call transcripts and in some cases, conversations with managements.

The EQ Review Rating is not comparable to a traditional buy/sell rating. The Rating is intended to specifically convey the extent to which reported earnings may be over/understated. Fundamental factors such as forecasts for future growth, increasing competition, and valuation are not reflected in the rating. Therefore, a high score does not in itself indicate a company is a buy but rather indicates that recent results are a good indication of the underlying earnings and cash generation capacity of the company. A low score (1-2) will likely result in us performing a more thorough review of fundamental factors to determine if the company warrants a full-blown sell recommendation.

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