24 February 2021
Equity Research
Americas | United States

CREDIT SUISSE

NVIDIA Corporation

NVDA

F4Q/F1Q Upside – Re-Hashing the Past Would Be a Mistake

Target price (12M, US$)
620.00
Outperform[V]

Semiconductor Devices | Forecast Change

Price (24 Feb 21, US$)	579.96
52-week price range	613.21 - 196.40
Enterprise value (US$ m)	354,589

[V] = Stock Considered Volatile (see Disclosure Appendix)

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Bottom Line. NVDA reported F4Q/F1Q WELL ABOVE on strong Gaming (50% of Rev) albeit more inline DCG (38% of Rev). While, lack of DCG upside, Crypto uncertainty and ARM overhang will continue to be headwinds on the stock (NVDA +12% in past 90-days vs. SOX of 22%), NVDA still represents the best secular growth in Semis with an almost open-ended AI TAM protected by increasingly wider, deeper moats in software and silicon. Specifically on DCG, while core y/y deceleration from +77% to +45% to +25% is not ideal, we estimate 14-to-13 week F1Q implies PF core-DCG +5-7% q/q and we see re-acceleration in 2H as enterprise re-opens and new workloads including NLP, conversional AI, Edge/Industry 4.0 proliferate. On Crypto – we estimate $100-$300m Rev in F4Q/F1Q each – but unlike F3Q18-F3Q19 – the Crypto market is becoming more institutionalized, only Ethereum uses GPUs, NVDA is halving hash rates RTX and introducing a purposed built CMP in F1Q ($50m in Rev) – likely minimizing excess.

By-the-Numbers F4Q/F1Q. F4Q (JanQ) Rev/EPS of $5.0bn/$3.10 was ABOVE CS/Street ~$4.8bn/$2.80 and above high-end of guide $4.70-4.90bn/~$2.66-2.92. By segment: (1) Gaming $2.5bn (50% of Rev) was +10% q/q, (2) Datacenter $1.9bn (38% of Rev) was ~flat q/q – embedding core-NVDA +9% q/q offsetting expected MLNX decline, (3) Pro Vis $307m (+30% q/q) and (4) Auto $145bn (+16% q/q). F1Q (AprQ) Rev/EPS was guided to ~$5.3bn/$3.21 WELL ABOVE CS/Street $4.5bn/$2.53 and $4.5bn/$2.51. F1Q Rev +6% q/q (+14% PF q/q) will be driven primarily by Gaming, though all other segments should grow q/q. We model core DCG Rev +2% q/q +5-7% PF for extra week in F4Q.

Valuation and Price Target. We raise our FY22/23 EPS to $13.35/$15.85 from $11.45/$13.50 vs. Street of $11.61/$13.28. NVDA trades at 50x NTM P/E a 97% premium to the SOX, below the 5-yr median premium of 120-140%. Our TP of $620 is based on ~40x CY25 EPS of >$20 discounted back – still mostly INLINE w/ top-quartile multiples but below top decile. Though the timing/magnitude of DCG re-acceleration is unclear, we'd note: (1) NVDA is an enabler of AI, (2) AI is transformative/disruptive to every industry, and (3) as the cost of Data Analytics declines, elasticity of application explosion underpins Compute TAM CAGR accelerating from 3-5% to 10-15% w/ NVDA's DCG CAGR of 2x TAM.

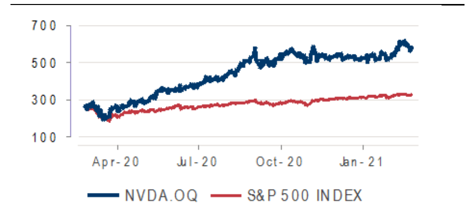
Financial and valuation metrics

Year	12/20A	12/21E	12/22E	12/23E
EPS (Excl. ESO) (US$)	7.06	12.10	15.58	18.09
EPS (CS adj.,)	5.80	10.01	13.35	15.85
Prev. EPS (CS adj., US$)	-	9.69	11.45	13.50
P/E (CS adj.) (x)	100.1	57.9	43.4	36.6
P/E rel. (CS adj., %)	349.0	251.4	217.5	203.5
Revenue (US$ m)	10,918.0	16,675.0	21,925.0	24,740.0
Net Debt (US$ m)	-12,623	-4,406	-10,440	-18,198
OCFPS (US$)	7.77	8.12	11.92	15.17
P/OCF (x)	74.7	71.5	48.6	38.2

Number of shares (m)	619.00	Price/Sales (x)	30.30
BV/share (Next Qtr., US$)	21.1	P/BVPS (x)	22.4
Net debt (Next Qtr., US$ m)	-9,395.0	Dividend (current, US$)	-
Dividend yield (%)	-		

Source: Company data, Refinitiv, Credit Suisse estimates

Share price performance



On 24-Feb-2021 the S&P 500 INDEX closed at 3925.43Daily Feb26, 2020 - Feb24, 2021, 02/26/20 = US$267.65

Quarterly EPS	Q1	Q2	Q3	Q4
2020A	0.88	1.24	1.78	1.89
2021E	1.80	2.18	2.91	3.10
2022E	3.21	3.32	3.39	3.43

NVIDIA Corporation (NVDA)

Analyst: **John Pitzer**

Price (24 Feb 2021): **US$579.96** Target Price: **620.00**

Rating: **Outperform [V]**

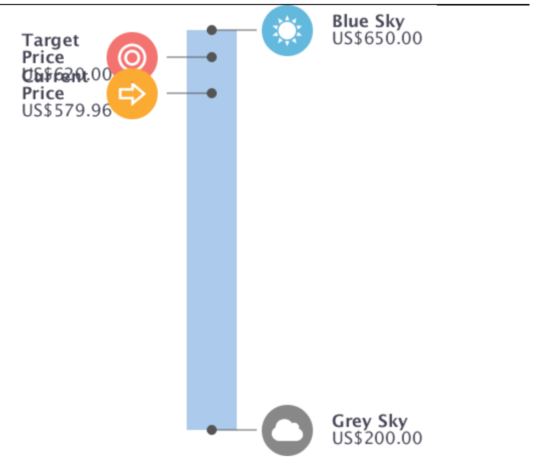
Income Statement	12/20A	12/21E	12/22E	12/23E
Revenue (US$ m)	**10,918.0**	**16,675.0**	**21,925.0**	**24,740.0**
EBITDA	**3,971.0**	**7,175.9**	**9,986.2**	**11,951.5**
Operating profit	**3,706.0**	**6,804.0**	**9,396.5**	**11,162.1**
Recurring profit	**3,860.0**	**6,684.0**	**9,191.5**	**10,942.1**
Cash Flow	**12/20A**	**12/21E**	**12/22E**	**12/23E**
Cash flow from operations	**4,798**	**5,091**	**7,510**	**9,559**
CAPEX	(488)	(1,128)	(1,142)	(1,293)
Free cashflow to the firm	**4,310**	**3,963**	**6,368**	**8,266**
Cash flow from investments	**2,780**	**(12,750)**	**(1,142)**	**(1,293)**
Net share issue(/repurchase)	0	(96)	(320)	(320)
Dividends paid	(391)	(395)	(396)	(404)
Issuance (retirement) of debt	-	-	-	-
Other	(767)	4,103	0	0
Cashflow from financing activities	(1,158)	3,612	(716)	(724)
Effect of exchange rates	-	-	-	-
Changes in Net Cash/Debt	**6,417**	**(8,218)**	**6,034**	**7,758**
Net debt at end	(12,623)	(4,406)	(10,440)	(18,198)
Balance Sheet ($US)	**12/20A**	**12/21E**	**12/22E**	**12/23E**
Assets				
Other current assets	157	239	239	239
Total current assets	**17,407**	**15,863**	**22,274**	**30,390**
Total assets	**21,032**	**28,599**	**30,741**	**39,727**
Liabilities				
Short-term debt	0	999	0	0
Total current liabilities	1,784	3,925	2,839	2,845
Long-term debt	1,991	5,964	6,581	6,365
Total liabilities	5,111	11,898	11,430	11,220
Shareholder equity	15,921	16,701	19,312	28,508
Total liabilities and equity	**21,032**	**28,599**	**30,741**	**39,727**
Net debt	(12,623)	(4,406)	(10,440)	(18,198)
Per share	**12/20A**	**12/21E**	**12/22E**	**12/23E**
No. of shares (wtd avg)	618	627	630	630
CS adj. EPS	5.80	10.01	13.35	15.85
Prev. EPS (US$)	-	9.69	11.45	42.77
Dividend (US$)	0.00	0.00	0.00	0.00
Free cash flow per share	6.98	6.32	10.11	13.12
Earnings	**12/20A**	**12/21E**	**12/22E**	**12/23E**
Sales growth (%)	(6.8)	52.7	31.5	12.8
Net profit growth (%)	(15.0)	75.4	34.0	18.7
EPS growth (%)	(14.2)	72.7	33.4	18.7
EBIT margin (%)	33.9	40.8	42.9	45.1
Valuation	**12/20A**	**12/21E**	**12/22E**	**12/23E**
EV/Sales (x)	31.72	21.26	15.90	13.78
EV/EBIT (x)	93.5	52.1	37.1	30.5
P/E (x)	100.1	57.9	43.4	36.6
Quarterly EPS	**Q1**	**Q2**	**Q3**	**Q4**
2020A	0.88	1.24	1.78	1.89
2021E	1.80	2.18	2.91	3.10
2022E	3.21	3.32	3.39	3.43

Source: Company data, Refinitiv, Credit Suisse estimates

Company Background

Nvidia Corporation focuses on PC graphics, graphics processing unit (GPUs) and artificial intelligence (AI). The Company's processor has created platforms that address four markets: Gaming, Professional Visualization, Datacenter, and Automotive.

Blue/Grey Sky Scenario



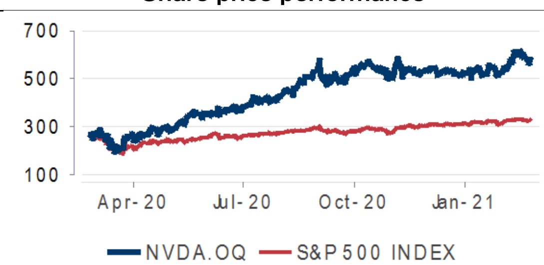
Our Blue Sky Scenario (US$) **650.00**

In the blue sky scenario, NVDA sees a full materialization of its forecasted Datacenter and Autonomous vehicle TAMs of $50bn and $60bn, respectively, and NVDA maintains positions of leadership of in both. Moreover, in this scenario, NVDA sees a successful launch of its Turing gaming chips, and sees continued positive secular trends in the Gaming industry. This will drive EPS of ~$19 in FY2023, and the stock can be worth in $650 at a 34x P/E.

Our Grey Sky Scenario (US$) **200.00**

In the grey sky scenario, NVDA sees increased competition from companies like INTC and AMD in the datacenter space, while internally-developed ASICs take market share as well. Also in this scenario, the proliferation of AV is delayed, as a result of increased regulation and other factors. Finally, AMD regains significant market share of the PC Gaming industry. This will drive EPS of ~$6 in FY2023, and the stock can be worth $200 at a 33x P/E.

Share price performance



On 24-Feb-2021 the S&P 500 INDEX closed at 3925.43
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Figure 1: Summary of Results and Expectations

US$ in millions, unless otherwise stated

NVDA-US	Oct-20	Jan-21				Apr-21E				FY2022E			FY2023E		
	Actual	Actual	CS	Cons	Guidance	New CS	CS	Cons	Guidance	New CS	CS	Cons	New CS	CS	Cons
Revenue	$4,726	$5,003	$4,800	$4,813	$4.70-4.90bn	$5,300	$4,500	$4,465	$5.19bn-$5.41bn	$21,925	$19,300	$19,703	$24,740	$22,000	$22,344
% q/q	*22.2%*	*5.9%*	*1.6%*	*1.8%*	*-0.5% to +3.6%*	*5.9%*	*-6.3%*	*-7.2%*	*+3.8% to +8.1%*						
Seasonal q/q %	*5.0%*	*3.9%*	*3.9%*			*5.2%*	*5.2%*								
% y/y	*56.8%*	*61.1%*	*54.6%*	*118.3%*		*72.1%*	*46.1%*	*48.1%*		*31.5%*	*17.2%*	*19.6%*	*12.8%*	*14.0%*	*13.4%*
Gross Margin	65.5%	65.5%	65.5%	*65.4%*	65.5% +/- 0.5%	66.0%	66.0%	*65.1%*	66.0% +/- 0.5%	66.3%	66.3%	*65.9%*	66.5%	66.5%	*66.5%*
OpEx	$1,101	$1,187	$1,180	$1,176	~1,180m	$1,200	$1,180	$1,123	~$1,120m	$5,130	$4,725	$4,833	$5,290	$5,090	$5,362
Operating Margin	42.2%	41.8%	40.9%	*40.9%*	~41%	43.4%	39.8%	*39.9%*	~43%	42.9%	41.8%	*41.4%*	45.1%	43.4%	*42.5%*
Net Income	$1,835	$1,957	$1,756			$2,023	$1,596			$8,411	$7,216		$9,983	$8,502	
Net Margin	38.8%	39.1%	36.6%			38.2%	35.5%			38.4%	37.4%		40.4%	38.6%	
EPS (Non-GAAP w/SBC)	$2.30	$2.44	$2.20			$2.60	$1.95			$10.92	$9.11		$13.39	$11.14	
EPS (Non-GAAP ex-SBC)	$2.91	$3.10	$2.79	$2.80	Implied $2.66-$2.92	$3.21	$2.53	$2.51	Implied $3.07-$3.34	$13.35	$11.45	$11.61	$15.85	$13.50	$13.28
Fully diluted shares	630	631	630			630	630			630	630		630	630	

Source: Company data, Credit Suisse estimates, FactSet

NVDA reported F4Q21 Rev/EPS ABOVE CS/Street

- **Revenue:** $5.0bn (+5.9% q/q) was ABOVE CS Preview ~$4.9bn (+3.7% q/q), CS print/Street $4.8bn (+1.6% q/q) - and ABOVE high-end guidance range of $4.70bn-$4.90bn.
  - **Gaming:** $2.5bn (+10% q/q) INLINE with CS Preview ~$2.50bn and ABOVE CS print/Street of $2.41bn/$2.36bn – driven by strong RTX30 series launch and Ampere GPU. The entire 30 series lineup has been hard to keep in stock and NVDA exited F4Q with channel inventories even lower than beginning of Q - despite increasing supply, channel inventories will likely remain low throughout F1Q. Note, only ~15% of installed base has upgraded to RTX-30.
    - **Crypto**: NVDA has created a new GPU for Ethereum mining launching in March i.e. Cryto Mining Processors (CMPs) – crypto added $100-300m to Gaming Rev in F4Q and should contributed $50m to F1Q – NVDA will quantify separately going forward.
  - **Datacenter:** $1.9bn (+97% y/y, ~flat q/q) slightly ABOVE CS/Street of $1.87bn/$1.84bn. Core-NVDA compute was up +45% y/y more than offsetting decline in MLNX. Rev lead by vertical industries (>50% of Datacenter Rev) – A100 based Servers and DGX systems both did well and drove stronger than expected core-NVDA compute q/q growth.
    - **MLNX:** +30% y/y with growth in the quarter led by Hyperscale and large consumer internet customers which grew >60% y/y with several contributing record revenues – MLNX should return to q/q growth in Q1 from high speed networking products
  - **Pro Vis:** $307m (+30% q/q) ABOVE CS/Street of $240m/$265m – ahead of expectations. Strong q/q growth driven by recovery in DT workstations as some workers returned and enterprises resumed modest buying.
  - **Auto:** $145bn (+16% q/q) ABOVE CS/Street of $135m/$139m. Sequential growth driven by recovery in Auto unit volumes and increased cockpit Rev.
  - **OEM & IP:** $153m (-21% q/q) ABOVE CS/Street $140m/$170m.
- **GM:** 65.5% (~flat q/q) was INLINE with CS of 65.5% and slightly ABOVE Street of 65.4%. This was INLINE with expectations – noting, higher margins for Gaming GPUs and lower IP related costs, partially offset by lower margin mix in Datacenter portfolio.
- **OpEx:** $1.19bn was slightly ABOVE CS/Street of $1.18bn

- **OpM:** 41.8% (-40 bps q/q) was ABOVE CS/Street of 40.9% (-130 bps).
- **Other Expenses/Income Net**: $45m expense was BELOW CS of $55m – 1 cent accretive to EPS
- **Taxes:** $87m was BELOW CS of $153m – 10 cent accretive to EPS
- **EPS:** $3.10 was ABOVE CS Preview $2.92, CS print of $2.79 and Street of $2.80 and ABOVE implied guidance range of $2.66-2.92 – 20 cent operational EPS upside to CS print
- **Inventory:** $1.83bn +22% q/q; days of 90 up 13 days q/q from 77 in F3Q.
- **ARM Update:** Previously, at deal announcement in September NVDA outlined 18-months timeline to secure approvals and this remains unchanged ("process moving forward as expected") – specifically from CFO remarks: *"we are in constructive dialogue with the relevant authorities and are confident that regulators will see the benefits to the entire tech eco-system"*

NVDA Guided F1Q22 Rev/EPS WELL ABOVE CS/Street

- **Revenue**: $5.3bn +/- 2% (+6.0% q/q) is WELL ABOVE CS Preview ~$4.80bn, CS print of $4.50bn (-6.3% q/q) and Street $4.47bn (-7.2% q/q).
  - **Segment Commentary:** Most of q/q growth driven by Gaming (~$50m from Crypto), with MLNX returning to q/q growth, Datacenter growing q/q – and all segments being able to grow sequentially. NVDA emphasized it has enough supply to address elevated demand – could supply even greater than guided outlook.
  - **Datacenter:** Core-NVDA compute grew double-digits in F4Q and offset MLNX, F1Q should be good for MLNX (Ethernet, Infiniband, switches…) and well as Compute. Future growth in core-Compute should be driven by Cloud/virtualization, further natural language processing integration (BERT/MSFT Word), and expansion deep-learning recommenders (conversational AI, DL). Additionally, Industrial/Edge/5G are all opportunities for Datacenter growth into AI for new applications – transportation, agriculture, factory automation, etc...
- **GM:** 66.0% +/- 0.5% is INLINE with CS of 66.0% and ABOVE Street of 65.1%
- **Implied OpM:** ~43% is ABOVE CS of 39.8% and Street at 39.9%
- **Other Expenses/Income Net:** $50m is slightly BELOW CS of $55m expense – 1 cent accretive to EPS
- **Taxes:** ~$225m is ABOVE CS of $139m – 13 cent headwind to EPS
- **Implied EPS:** ~$3.21 is ABOVE CS Preview $2.82, CS print of $2.53 and Street of $2.51 – 80 cent operational upside to CS print.
- **FY22 Opex:** Expected to grow mid 20% y/y
- **Capex:** $300-325m

Figure 2: NVDA Revenue Model

US$ in millions, unless otherwise stated

	Apr-20 F1Q21	Jul-20 F2Q21	Oct-20 F3Q21	Jan-21 F4Q21	Apr-21 F1Q22E	Jul-21 F2Q22E	Oct-21 F3Q22E	Jan-22 F4Q22E	FY2019 CY2018	FY2020 CY2019	FY2021 CY2020	FY2022E CY2021E	FY2023E CY2022E
Gaming	$1,339.0	$1,654.0	$2,271.0	$2,495.0	$2,725.0	$2,725.0	$2,750.0	$2,750.0	$6,246.0	$5,518.0	$7,759.0	$10,950.0	$11,150.0
Datacenter	$1,141.0	$1,752.0	$1,900.0	$1,903.0	$1,970.0	$2,090.0	$2,185.0	$2,300.0	$2,932.0	$2,983.0	$6,696.0	$8,545.0	$10,755.0
Professional Visualization	$307.0	$203.0	$236.0	$307.0	$310.0	$310.0	$310.0	$310.0	$1,130.0	$1,212.0	$1,053.0	$1,240.0	$1,465.0
Automotive	$155.0	$111.0	$125.0	$145.0	$145.0	$145.0	$150.0	$150.0	$641.0	$700.0	$536.0	$590.0	$750.0
OEM and IP	$138.0	$146.0	$194.0	$153.0	$150.0	$150.0	$150.0	$150.0	$767.0	$505.0	$631.0	$600.0	$620.0
Total	$3,080	$3,866	$4,726	$5,003	$5,300	$5,420	$5,545	$5,660	$11,716	$10,918	$16,675	$21,925	$24,740

% of Total	Apr-20	Jul-20	Oct-20	Jan-21	Apr-21	Jul-21	Oct-21	Jan-22	FY2019	FY2020	FY2021	FY2022E	FY2023E
Gaming	43.5%	42.8%	48.1%	49.9%	51.4%	50.3%	49.6%	48.6%	53.3%	50.5%	46.5%	49.9%	45.1%
Datacenter	37.0%	45.3%	40.2%	38.0%	37.2%	38.6%	39.4%	40.6%	25.0%	27.3%	40.2%	39.0%	43.5%
Professional Visualization	10.0%	5.3%	5.0%	6.1%	5.8%	5.7%	5.6%	5.5%	9.6%	11.1%	6.3%	5.7%	5.9%
Automotive	5.0%	2.9%	2.6%	2.9%	2.7%	2.7%	2.7%	2.7%	5.5%	6.4%	3.2%	2.7%	3.0%
OEM and IP	4.5%	3.8%	4.1%	3.1%	2.8%	2.8%	2.7%	2.7%	6.5%	4.6%	3.8%	2.7%	2.5%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Q/Q	Apr-20	Jul-20	Oct-20	Jan-21	Apr-21	Jul-21	Oct-21	Jan-22
Gaming	-10.2%	23.5%	37.3%	9.9%	9.2%	0.0%	0.9%	0.0%
Datacenter	17.9%	53.5%	8.4%	0.2%	3.5%	6.1%	4.5%	5.3%
Professional Visualization	-7.3%	-33.9%	16.3%	30.1%	1.0%	0.0%	0.0%	0.0%
Automotive	-4.9%	-28.4%	12.6%	16.0%	3.0%	8.0%	11.0%	4.2%
OEM and IP	-9.2%	5.8%	32.9%	-21.1%	-1.0%	1.0%	7.0%	0.0%
Total	-0.8%	25.5%	22.2%	5.9%	5.9%	2.3%	2.3%	2.1%

Y/Y	Apr-20	Jul-20	Oct-20	Jan-21	Apr-21	Jul-21	Oct-21	Jan-22	FY2019	FY2020	FY2021	FY2022E	FY2023E
Gaming	26.9%	26.0%	36.9%	67.3%	103.5%	64.8%	21.1%	10.2%	13.3%	-11.7%	40.6%	41.1%	1.8%
Datacenter	80.0%	167.5%	161.7%	96.6%	72.7%	19.3%	15.0%	20.9%	51.8%	1.7%	124.5%	27.6%	25.9%
Professional Visualization	15.4%	-30.2%	-27.2%	-7.3%	1.0%	52.7%	31.4%	1.0%	21.1%	7.3%	-13.1%	17.8%	18.1%
Automotive	-6.6%	-46.9%	-22.8%	-11.0%	-6.5%	30.6%	20.0%	3.4%	14.9%	9.2%	-23.4%	10.1%	27.1%
OEM and IP	39.4%	31.5%	35.7%	0.7%	8.7%	2.7%	-22.7%	-2.0%	-1.4%	-34.2%	25.0%	-4.9%	3.3%
Total	38.7%	49.9%	56.8%	61.1%	72.1%	40.2%	17.3%	13.1%	20.6%	-6.8%	52.7%	31.5%	12.8%

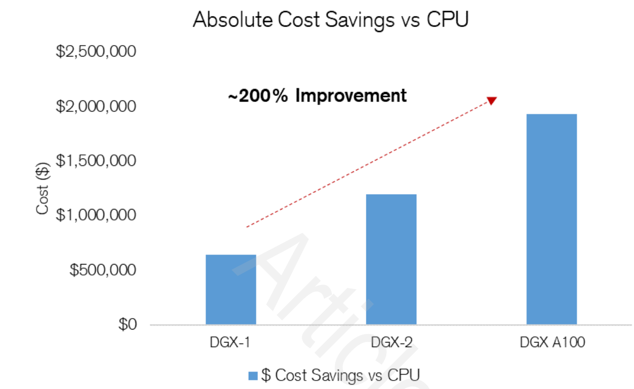
Source: Company data, Credit Suisse estimates

ARM Transaction Update: Recently, on 2/12 Bloomberg reported GOOG, MSFT, and QCOM are among the companies protesting US Anti-Trust regulators on the deal. However, the Cambridge A-1 Super-Computer (announced at GTC 2020) clearly would serve the dual purpose of appeasing UK regulators and supporting AI Clara Drug Discovery business. When asked of ARM transaction's value to NVDA's AI offerings – Jensen replied "*we can achieve extraordinary success and all the successes we've talked about with you guys without ARM. However with ARM there are some really exciting things we can do...as we turn the CPU core into CPU platform we will deliver lots of value to ARM…as we create all of that value to ARM platform it would be great to own it first…we would love to own it as we create the value around it.*". We'd remind investor – as we outlined in our note NVDA For ARM – Nothing Ventured, Nothing Gained – we remain to be convinced what ARM brings to NVDA that it cannot already do as a standalone Company.

DGX A100 Expands/Captures NVDA's TAM: Officially launched on 5/14 at GTC, NVDA's 7nm DGX A100 delivers the largest generational leap in both peak power and performance vs. predecessors DGX-1/DGX-2 – and delivers multiple technological improvements integrating newly acquired MLNX networking I/O - expanding DCG TAM from $50bn to $60bn+ by enabling solutions across the full processing/networking/storage stack. The DGX A100 is the most powerful AI processor to-date w/ 20x peak performance, requiring 50% fewer switches while still delivering AI Training/Inference 6x/7x faster than DGX-2. In terms of cost/power, DGX A100 has 3.0x/1.6x better cost savings than the DGX-1/2 and is in full-production with Rev in AprQ and traction at BABA, AMZN, MSFT, GOOG, and HP. The DGX A100 underscores CEO Huang's motto "the more you buy the more your save" as well as our view that AI is the first technology which will systematically lower the cost of Data Analytics (akin to Moore's, Butter's, Kryder's Laws for Data Creation, Storage and Transmission) – compared to

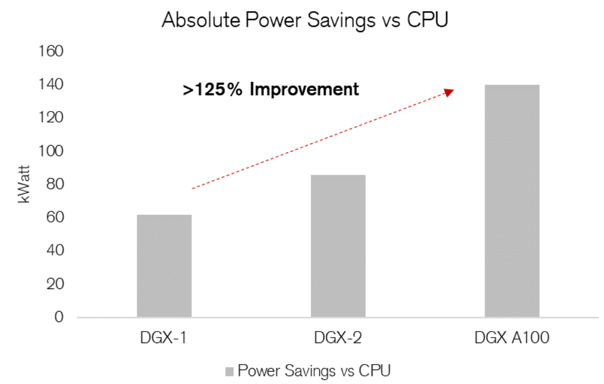
CPU-based datacenters processing the same amount of data on A100 is 1/10th the cost, 1/20th the power, and in 1/25th the space.

Figure 3: DGX A100 Cost Savings vs. Standard CPUs



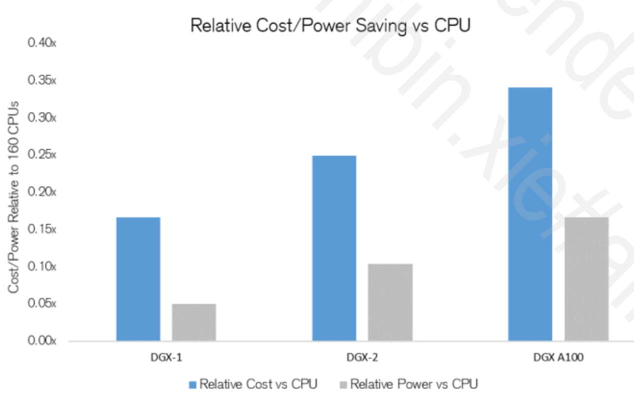
Source: Company data, Credit Suisse estimates

Figure 4: DGX A100 Power Savings vs. Standard CPUs



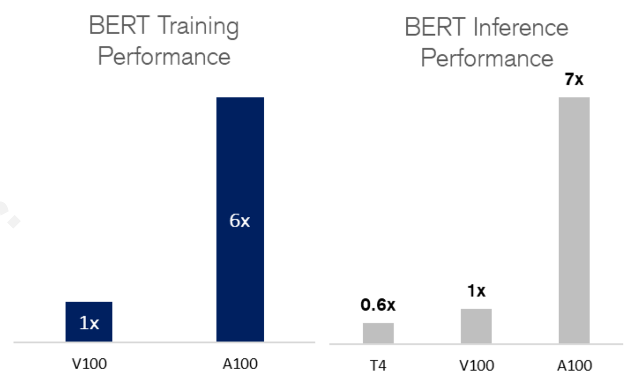
Source: Company data, Credit Suisse estimates

Figure 5: DGX A100 Relative Cost/Power Savings



Source: Company data, Credit Suisse estimates

Figure 6: DGX A100 Inference/Training Performance



Source: Company data, Credit Suisse estimates

GTC Fall 2020 Product Launches/Updates:

1. **NVDA AI Gaining Momentum in Accelerated Inference**: The need for AI inference has accelerated – i.e. # of days to train model on 1 PF Computer has increased 30,000x in less than 5 year, doubling every 2 months. In fact, the aggregate compute throughput has increased ~10x every 2 years and in CY20 >166 ExaOps of inference compute were run on CSPs, more than 6x that of CY19 – by end of year aggregate NVDA GPU inference cloud compute will exceed that of all cloud GPUs, in 2-3 years NVDA GPUs will represent ~90% of total cloud inference compute. Notably, NVDA's NGC is now on available on/for the cloud ("a marketplace within a marketplace"), to-date has ~1m downloads and is growing 400% y/y – and more CSPs are integrating (i.e. MSFT Azure, AWS and GCP).
2. **NVDA Powers Enterprise Computing**: Includes VMWare and Cloudera collaboration/partnerships– VMWare being the OS platform for 70% world's enterprises, implying BlueField-2/DOCA will run 30-40m DC enterprise servers.
   - **Datacenter Infrastructure on a Chip Architecture (DOCA):** NVDA announced Data Centre infrastructure-on-a-Chip Architecture (DOCA) SDK that provides developers with a comprehensive, open platform for building SW-defined, HW-accelerated networking, storage, security and

management applications running on the BlueField family of Data Processing Units (DPUs). Similar to what CUDA has done for AI Inference/GPU accelerated applications, this enables developers to build applications on DPU-accelerated data center infrastructure services.

- **Data-Processing Unit (DPU):** A new kind of processor, known as Data Processing Units or DPUs was launched in the form of the BlueField-2 – a programmable processor with 6.9b transistors, 8 64-bit Arm CPU cores, and acceleration capabilities for faster processing for networking, storage and security. Approx. ~30% of CPU cores are consumed running DC infra and BF-2 delivers the same DC services as ~125 CPU cores. This is supported by DOCA that enables cohesive ecosystem consistent throughout every generation of Bluefield; Bluefield-2 is sampling, the Bluefield-2X w/ Ampere GPU is also sampling, BF-3 is finishing, and BF-4 in high gear (and comes w/ CUDA support, NVDA AI, an integrated GPU).

3. **EGX Edge AI Platform**: EGX Edge AI platform is expanding to combine the NVDA A100 GPU and BlueField-2 DPU on a single PCIe card to use AI to enable IoT for industrial, retail, logistic, medical, etc. This will provide the enterprises with a common platform to build secure/accelerated datacenters. Already optimized AI software stacks for multiple industry verticals are available on NVIDIA's NGC, their SW catalogue offering a range of industry-specific AI toolkits and pre-trained models to make it easier to build and deploy AI applications on NVIDIA systems. Recent announced partnerships include: KION, Canonical, Cloudera, Red Hat, SUSE and VMware.

   - **Edge – Fleet Command**: This new EGX service called NVIDIA Fleet Command makes it easier for enterprises to deploy and manage updates across IoT devices, combining the real-time processing capabilities of edge computing w/ the ability to manage all devices from the cloud.

   - **Edge – Jetson Nano**: Expansion of Jetson AI at the Edge platform – an Arm-based SoC, designed for robotics – latest addition is the Jetson Nano 2GB at only ~$59 and supported by the NVIDIA JetPack SDK. Using the Isaac SIM platform enterprises can training autonomous systems virtually and DRIVE to test AV driving on the Omniverse.

4. **RTX Omniverse (A6000 and A40):** NVDA launched Ampere based RTX A6000 and A40 Video Card for Pro-Viz. The A6000 is the first Pro-Viz card on Ampere architecture w/ >2x performance to prev. gen Quadro RTX 8000 and available mid-December. The A40 is similar to A6000 but designed for "passive cooling".

5. **Clara Discovery, AI for Drug Discovery** – The Cambridge-1 AI supercomputer – expected to be the fastest in UK, Top 30 in the World, w/ collaborations with Academia/Pharma (AstraZenca, GSK, NHS) – will run CLARA discovery a suite of products (Parabricks, Clara Imaging, BioMegatron, BioBERT, RAPIDS for Data Science) to advance drug discovery using AI. Run on the DGX SuperPod (A100) it can use simulations to model, generate, and design new leads from existing chemical/drugs and NLP to study past publications.

   - **GSK Collaboration** – World's first in-house AI drug discovery lab. GSK has accumulated more data in C1Q this year than entire 300 year history combined and thus will use a DGX Superpod – 20 to 140 DGX system – to run its AI models. NVDA has created a SuperPOD blueprint for enterprises to replicate – i.e. the more you buy the more you save.

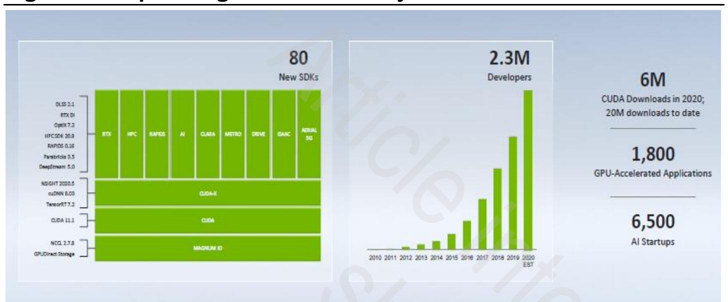
6. **Broadening Ecosystem & Customer Adoption of Vertical SW**: With over 2.3m develops, hundreds of ISVs, 1000+ enterprises, and tangible use cases by FB, Tencent, etc.

   - **Merlin Recommender in Open Beta** – using RAPIDS democratizing large scale deep learning recommenders (i.e. Tencent search) using NVDA

RAPIDS. When running 30 DB on 1TB Dataset, a 16 DGX cluster ran 20x than fastest CPU server; 1/7th the cost 1/3rd the power.

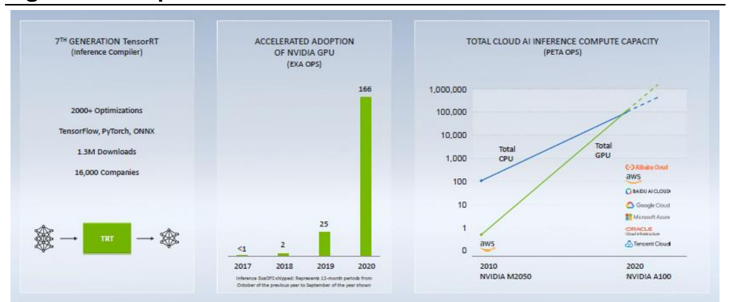
- **Jarvis in Open Beta** – SW system run on Ampere for conversational AI and is ½ the latency (<300ms response vs 600ms on CPUs), 1/3rd the cost, and 7x throughput.
- **Maxine for Video-Conferencing**: Cloud native streaming video AI service for video calls – reduces bandwidth 10x, AI system for tracking eye contact, removing background light, and supporting real-time translation.

Figure 7: Expanding NVDA AI Ecosystem



Source: Company data, Credit Suisse estimates

Figure 8: Adoption of NVDA AI Inference



Source: Company data, Credit Suisse estimates

Driving Towards a Recurring Revenue Stream: On 6/23 NVDA and Mercedes-Benz announced a partnership to launch a fleet of AVs by 2024 using a vertically integrated solution with NVDA Silicon, Hardware and importantly SW based on DRIVE, NVDA's AV software stack. We see the agreement as providing a tangible "traditional" Rev stream of Silicon/Hardware with optionality around a yet proven albeit interesting "non-traditional" SW-based recurring Rev stream (split 50/50 with Mercedes) which over the life of the vehicle could generate MORE Rev than the initial Silicon/Hardware sale. The partnership is non-exclusive and NVDA owns/controls all the IP implying additional OEMs over time. While Auto currently represents ~5% of NVDA's Rev, the Mercedes agreement represents a potential "traditional" TAM of >$1.0-2.0bn/yr ($0.80-$1.60 of EPS vs. CS CY21 EPS of ~$10.00) – assuming (1) units of ~2.3m/yr , (2) Silicon/Hardware content of ~$500-1k per vehicle, (3) Incr OpM of 55% and (4) 10% TR. Additional upside could be generated by SW updates and AV "skills" (e.g. parking, valet, racing, etc.) – not unlike the App Store in the iOS ecosystem. Assuming ~10 year avg. life generates an installed base of 23m units; at $200/year of additional SW add-ons Rev would drive another >$2bn/year of highly visible, highly profitable (>$2 EPS) and highly valued Rev from Mercedes alone. While the traditional Rev stream is tangible/high probability, we still have questions about the non-traditional recurring Rev while acknowledging optionality – it is unclear to us in a fully autonomous world which features will be standard and which optional – if only to ensure a high level of safety for all. NVDA has outlined a >$30bn Auto TAM by 2025 excluding recurring SW: (1) $25bn from L2/L3 AV and robotaxis (2) $3bn from AI Training/Development and (3) $2bn from simulation/validation applications – with >$60bn TAM by 2035 as AV adoption increases.

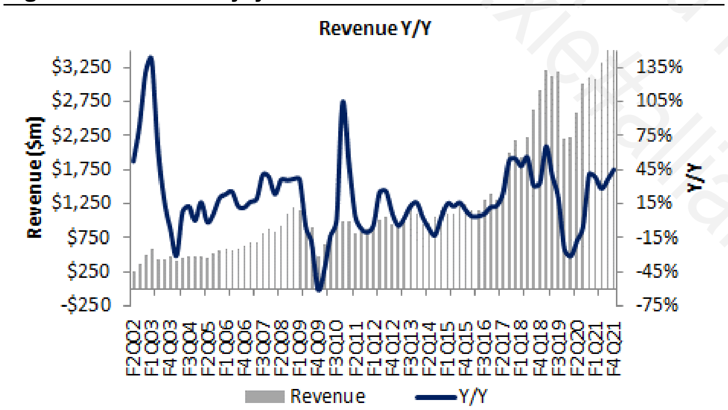
Figure 9: AV Semi Strategy Highlights

Company	Autonomous Plans / Key Actions
Intel/Mobileye	• Mobileye develops REM crowd-sourced map platform, exploits proliferation of ADAS cameras to maintain in near-real-time accurate map • Vision based solution provides functionality from basic Level 2 ADAS through Level 4/5 autonomous, with capabilities in all core pillars of AV development (sensing, mapping, driver policy, compute) • Announced plan in Oct'18 to collaborate with VW to commence self-driving taxi service in Israel in 2019, targeting scale in 2022 (few hundred vehicles); Mobileye to provide self-driving technology to pilot • Announced collaboration in Jan'19 with Beijing Public Transport Corp and Beijing Betai to develop autonomous commercial public transportation services in China, to be deployed in 2022 • Alliance with BMW (subsequently added FCA, MGA, APTV, Conti) for development of L3/L4 autonomous vehicles with 2021 launch • Announced partnership with Aptiv in Aug'16 for CSLP platform (central sensing localization and planning) - turnkey solution for L4 vehicles • Acquired by Intel in 2017 for $15bn; Mobileye was originially a mapping service, in the same year pursuing its own AV development jointly with Magna • Announced acquistion of Moovit (Mobility-as-a-Service Company) for ~$900m (May-2020) to accelerate Mobileye offering
Nvidia	• DRIVE Platform (including AutoPilot, Xavier & AGX Pegasus) capable of supporting Level 2+ to Level 5 autonomous driving solutions, offered to hundreds of companies including: Veoneer, Volvo, Continental, Daimler, Bosch, etc. • Providing its Jetson AGX Xavier platform to power the next generation of autonomous delivery robots; JD.com and Meituan are a few of the many companies that use the platform • Announced partnership with Mercedes Benz (June 20') to create an in-vehicle computing system and AI computing infrastructure. This will be achieved by leveraging the NVIDIA DRIVE platform and will become the standard for next-generation fleets to enable autonomous driving functionalities.

Source: Company data, Credit Suisse estimates

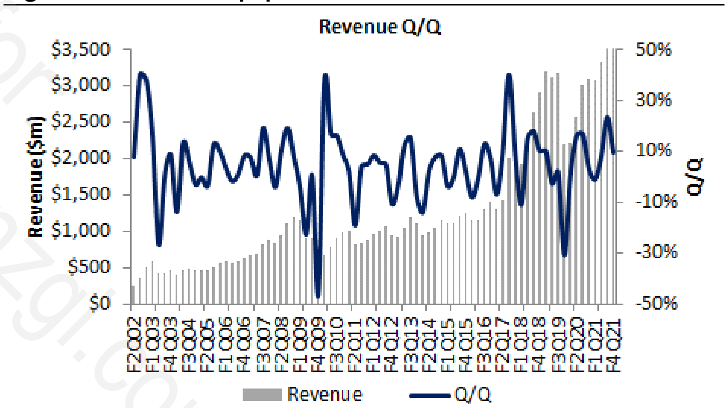
Key Charts and Historical Trends

Figure 10: Revenue y/y trends



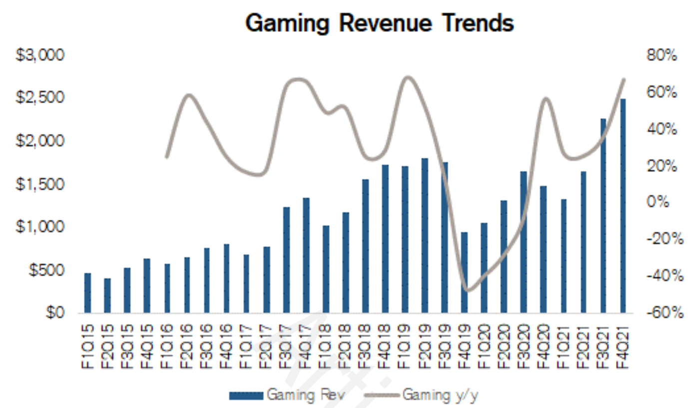
Source: Company data, Credit Suisse estimates

Figure 11: Revenue q/q trends



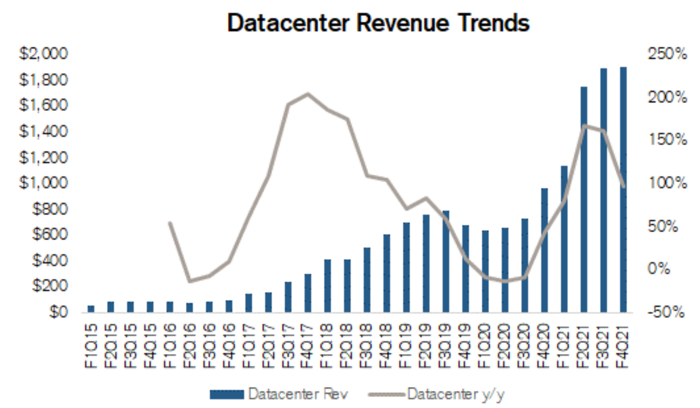
Source: Company data, Credit Suisse estimates

Figure 12: Gaming trends



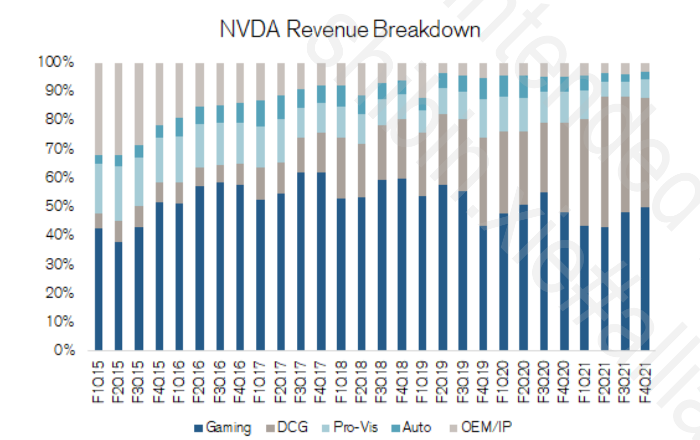
Source: Company data, Credit Suisse estimates

Figure 13: Datacenter trends



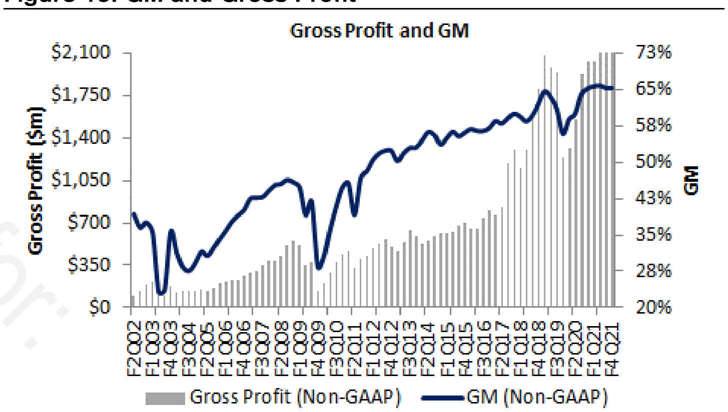
Source: Company data, Credit Suisse estimates

Figure 14: Revenue Breakdown



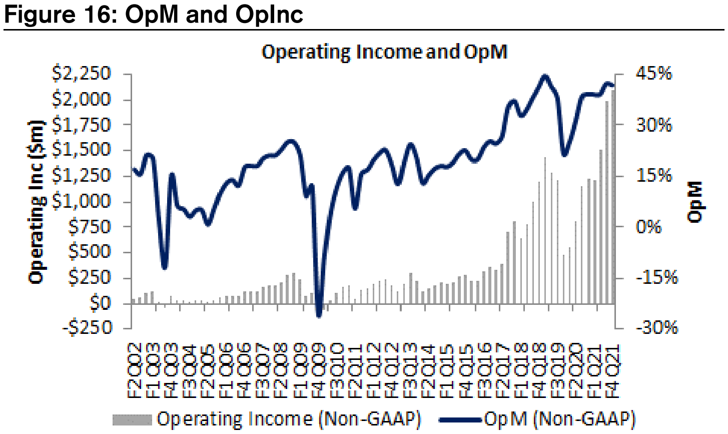
Source: Company data, Credit Suisse estimates

Figure 15: GM and Gross Profit



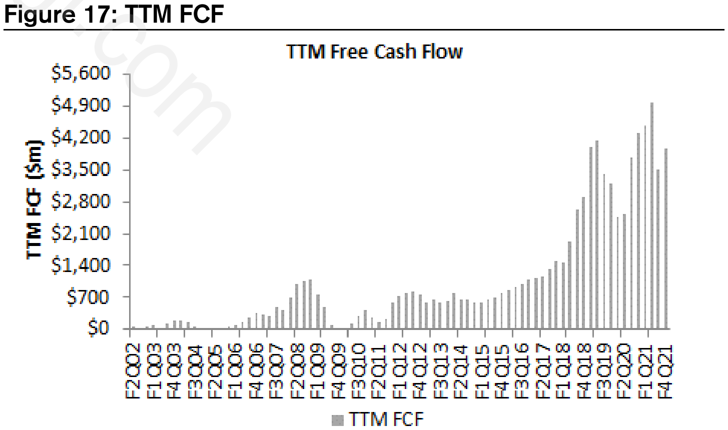
Source: Company data, Credit Suisse estimates

Figure 16: OpM and OpInc



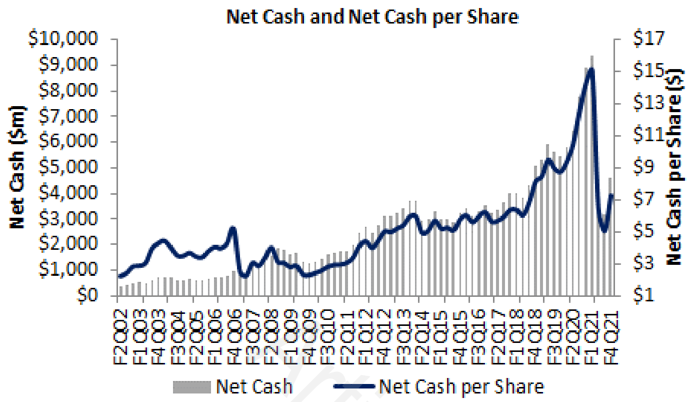
Source: Company data, Credit Suisse estimates

Figure 17: TTM FCF



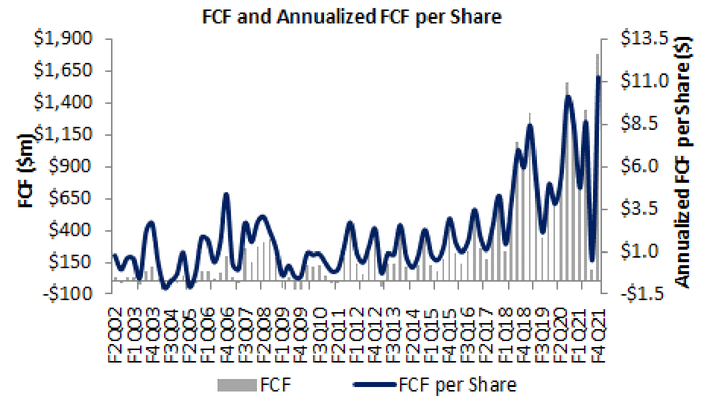
Source: Company data, Credit Suisse estimates

Figure 18: Net Cash/sh



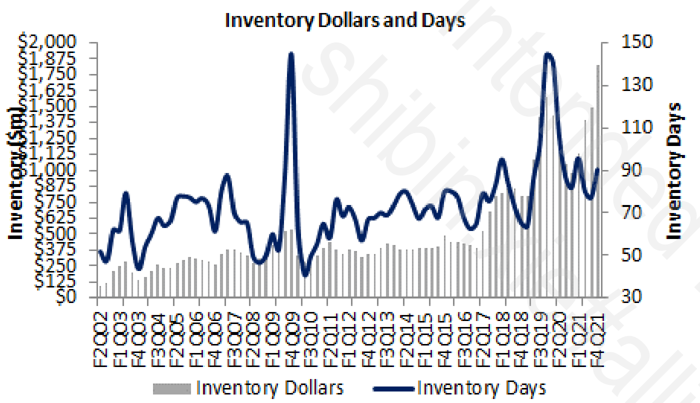
Source: Company data, Credit Suisse estimates

Figure 19: FCF/sh



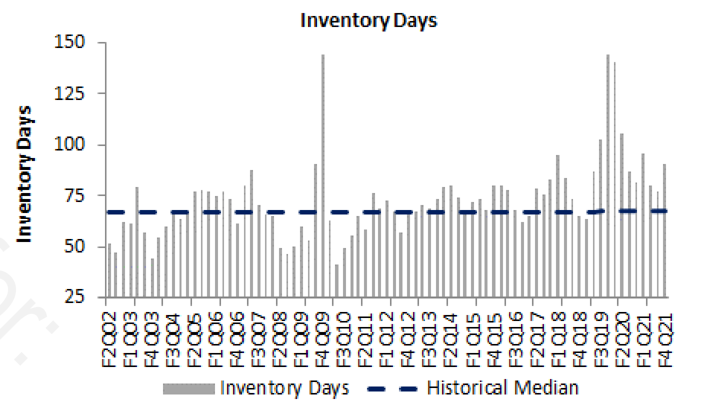
Source: Company data, Credit Suisse estimates

Figure 20: Inventory $s and Days



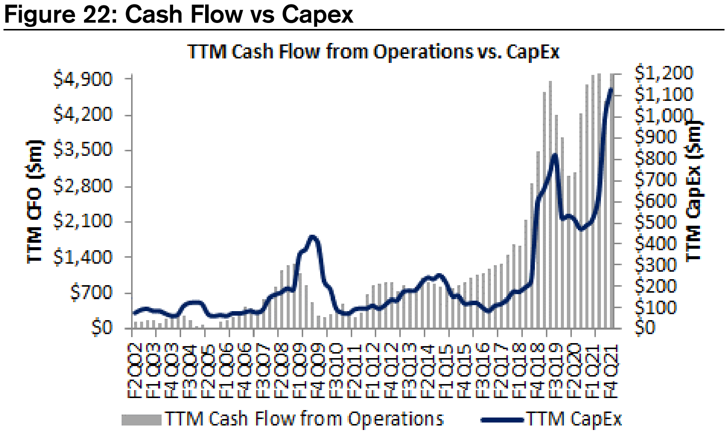
Source: Company data, Credit Suisse estimates

Figure 21: Historical Inventory Levels



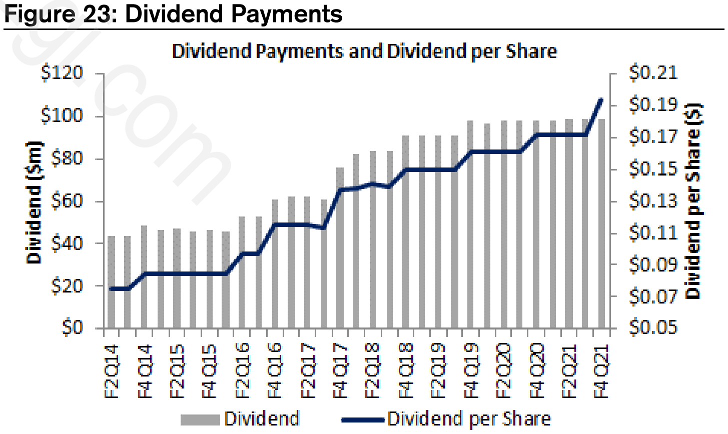
Source: Company data, Credit Suisse estimates

Figure 22: Cash Flow vs Capex



Source: Company data, Credit Suisse estimates

Figure 23: Dividend Payments



Source: Company data, Credit Suisse estimates

Key Issues

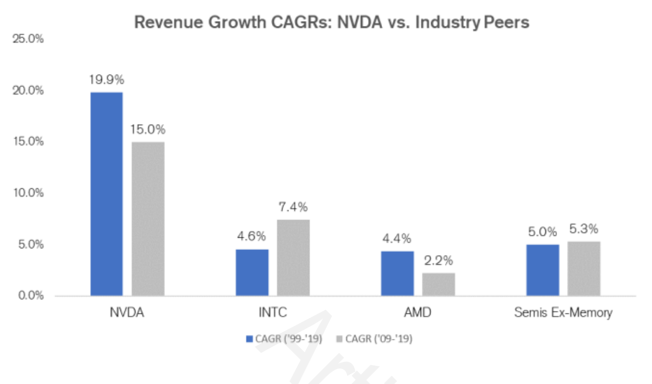
The Data-Driven Economy Underpins Semi Value Capture, NVDA Most Levered. We continue to argue that the Compute TAM is poised to accelerate as the world transitions from mostly creating data, to actually analyzing data – the latter is significantly more compute intensive. Specifically our Data Thesis consists of 4 buckets – Data Creation, Data Storage, Data Transmission and Data Analytics – of which Analytics is perhaps the most important bucket because it provides the foundation for data monetization without which Data becomes inherently less valuable/interesting. It is our contention that Creation, Storage and Transmission have all benefited from non-linear cost declines over the last 40+ years – Moore's Law, Butter's Law and Kryder's Law. As cost/function has decreased use cases have accelerated, expanding market potential well beyond what anyone thought possible at inception. To date, the cost of Analytics has mostly increased as most of the world's data is unstructured and prior to AI needed to be structured (a very costly process) in order to be analyzed. We see AI/ML as the first technology able to draw conclusions from unstructured data - greatly reducing the cost of analytics, which in turn should increase used cases and ultimate market size.

- **Compute TAM Accelerating, Rising Tide…** NVDA estimates a Data Center TAM of $50bn, against FY20 Rev of $2.98b, and an AV TAM of $60b against FY20 Rev of $700m. Importantly, our analysis suggests the Company could be significantly UNDERESTIMATING the market opportunity. We estimate the Compute TAM growing from ~$90bn to $230bn by 2025 (~15% CAGR). While the AI tech space should become increasingly crowded as competitors see the size of the opportunity, NVDA should benefit from capturing even a small % of Server TAM. Note, though NVDA has built sustainable moats in the Datacenter with CUDA and DGX/Volta – we conservatively modeled NVDA share declining from 90% to 50% in Server Accelerators and the Company can still maintain DC Rev at a +30% 3-yr CAGR (growing to ~44% of Rev from ~27% in FY20).

- **Recent Completed Acquisition of MLNX:** On 3/26, NVDA closed its deal to acquire MLNX for $125/sh in cash, or an EV of ~$6.9b, NVDA expects the deal to be immediately accretive to Non-GAAP GM, EPS, and FCF, without embedding any Rev or cost synergies as NVDA focuses on accelerating innovation and R&D spend. The acquisition increases NVDA's Datacenter TAM to $60b+ from $50b and enables NVDA to augment its core computing IP with MLNX's high-performance interconnect IP (InfiniBand/ Ethernet), strengthening NVDA's position by enabling them to provide solutions across the full computing stack – processing, networking, and storage. MLNX had CY19 Rev of $1.3bb (+22% y/y) and will increase NVDA's exposure to Datacenter to 36% from ~30%. NVDA and MLNX have worked together in the past, including on the DGX-2 Deep Learning server; the management teams believe the two companies' cultures are complementary. NVDA believes acquiring MLNX will grow its $50b computing TAM to $60b+ by adding $11b in high-speed networking. MLNX is a leader in high-speed interconnect and networking, and the mgmt. teams believe they share performance-driven cultures focused on innovation and collaboration.

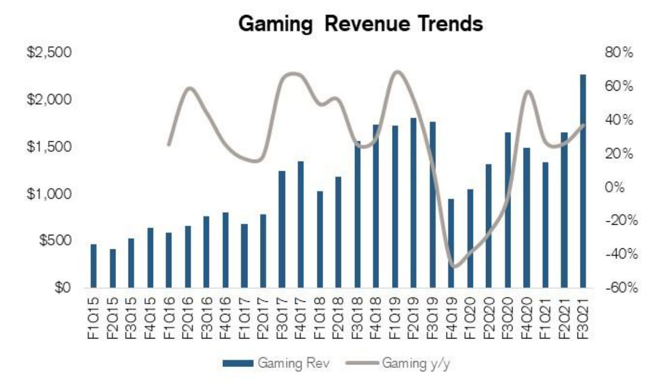
- **Gaming Driving a Continued Revenue Stream:** We believe that following the F4Q19 trough, there is still room for recovery and growth in the Gaming segment (which is already +56% y/y from reset), which has maintained an impressive ~22% five-year CAGR, as consumers continue to adopt mainstream midrange Pascal and now high-end Turing. The ~30+% y/y growth that this segment has seen in the past will not endure in the long term (we model 41%/14%/-4% growth in the out-years following a CY19 reset), but we do view Gaming as a sustainable growth driver in some capacity in both the near and medium term. We model Gaming growing at a 3/5-year CAGR of ~9/16% in CY22, with both unit growth and ASP growth as customers continuing to buy higher up the stack. Notably, Pascal and Turing will coexist in the marketplace, with Turing pricing reflecting the significant performance improvement. Since launch in February 2019, Turing sell through has outpaced Pascal by ~46% in Rev, and with ~50% of installed base using compatible architecture there is room for significant growth – Turing penetration only at ~4%. Turing brings Ray Tracing to the gaming segment; and more games are making use of the capability (i.e. wildly popular Fortnite), we view the progressively wide-spread adoption in 2020 as helping sustain revenue and ASP growth. Importantly, we believe the Gaming segment provides a solid base with strong free cash flow (FCF) generation for the continued R&D investment to support the scale out of growth businesses (Datacenter and Auto). Secular growth drivers, namely increasing graphics requirements for leading-edge PC games, eSports penetration, the rise of social gaming, and strong APAC demand support continued growth.

Figure 24: NVDA Rev Growth to Date vs. Peers



Source: SIA, Company data, Credit Suisse estimates.

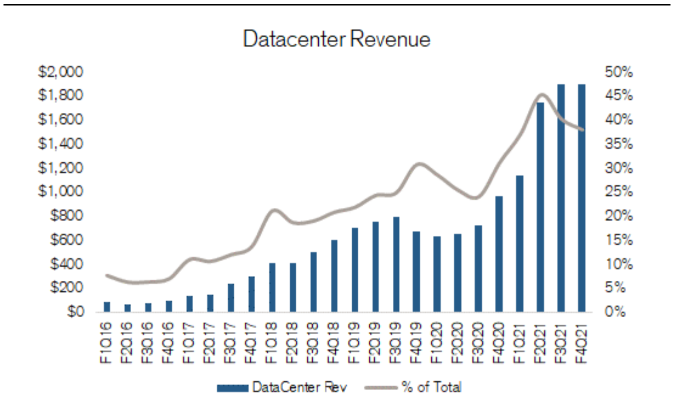
Figure 25: NVDA Gaming Rev over Time



Source: Company data, Credit Suisse estimates.

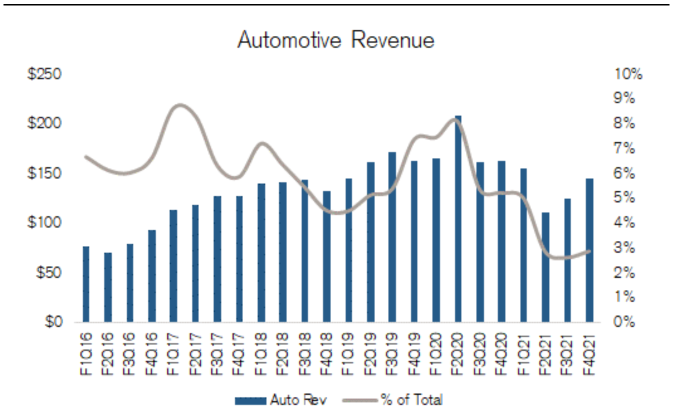
- **Future Growth Driven by Datacenter:** NVDA, at its analyst day in March, outlined a $50bn datacenter TAM in 2023, as the New Data Economy rests heavily on AI's ability to analyze the data that is being created at the edge and in the cloud in its unstructured form. NVDA currently has significant share in HPC/AI applications, but other entrants are vying for share in the space (INTC and XLNX with FPGAs, AMD with GPUs, and potentially others down the line). It is unclear what position NVDA will maintain in these markets; however, we believe a rising tide lifts all boats in AI. Even if NVDA's share of accelerated compute declines to 60% (from the current significant majority) of the Acceleration segment (assuming 20% of $89M Server TAM in 2022), its implied acceleration revenues would be ~$8.9B, suggesting a revenue CAGR north of our 30% through 2022 even with conservative share assumptions. Thereafter, the company would see continued expansion as analytics demand increases, as more value can be derived from data growth.
- **Autonomous Driving Provides Longer-Term Revenue Opportunities:** NVDA had pointed to a $60bn AV TAM in 2035, but currently, Automotive is sub-10% of revenues, with the bulk of revenues coming from the Infotainment end market. In the longer term, NVDA is heavily focused on gaining traction in the Autonomous Driving space. It has established a strong presence here, having built out an impressive platform (e.g., DRIVE Constellation, DGX, SIM) and established 400+ partnerships, many of which are high profile (e.g., Tesla, Mercedes, Toyota). We model ~4%+ 5-yr CAGR for the space through 2022 as revenue growth begins to gain traction – though real acceleration is contingent on AV market which we see realistically becoming more accretive beyond CY22 – and here, as in Datacenter, we believe that a growing TAM is good for all market participants.

Figure 26: Datacenter Rev Has Grown to ~35% of Total Rev…



Source: Company Data, Credit Suisse Estimates.

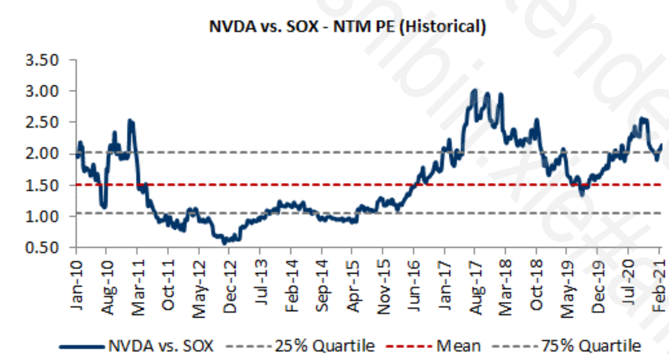
Figure 27: …While Automotive Rev Remains <10% of Total Rev



Source: Company Data, Credit Suisse Estimates.

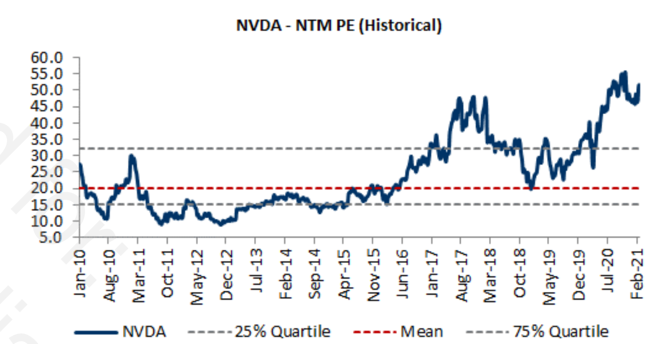
- **Other Segments Declining as a % of Revenues:** NVDA's remaining business segments, Professional Visualization (Pro Vis) and OEM/IP, are expected to continue to make up a decreasing proportion of Total Rev. We forecast that the Pro Vis segment will make up ~8-9% of Total Rev in FY2023 (vs. ~10% Total Rev in FY 2020). Here, we see upside potential to our estimates (6-7% 3-yr CAGR through 2022), given NVDA's Turing-based Pro Vis cards enable ray tracing applications and drive value to professional users in a number of enterprise applications (including medicine, architecture, product design, retailing, etc.) alongside gamer adoption, potentially contributing to higher units and ASPs. Pro-Vis also has multiple NVDA's OEM market is declining, both as a % of revenue and in absolute value. The OEM market is characterized by lower ASPs with a "good enough" performance, and NVDA has undergone a significant mix-shift away from the segment (~23% of Rev in FY2015 to less than 5% in FY2020). Although in 2018 the company saw a significant contribution to OEM revs. from Crypto, peaking at $289m in the April Q, this will not be a meaningful driver LT for NVDA's revenue growth. Finally, although NVDA has exhibited the ability to monetize IP with its patent license agreement with INTC, which concluded in Q1 FY2018, we do not forecast any additional royalty revenue in our model. We expect OEM/IP to shrink to ~3% of Rev by FY22, conservatively decreasing at a ~7% 5-year CAGR thru 2022.

Figure 28: NVDA NTM P/E vs. SOX



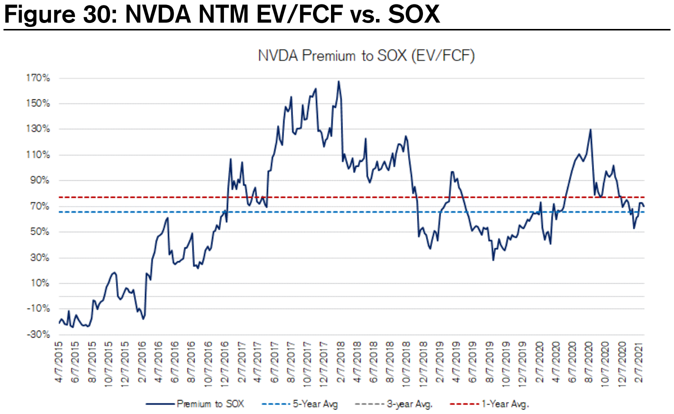
Source: FactSet, Company data, Credit Suisse estimates.

Figure 29: NVDA NTM PE (Historical)



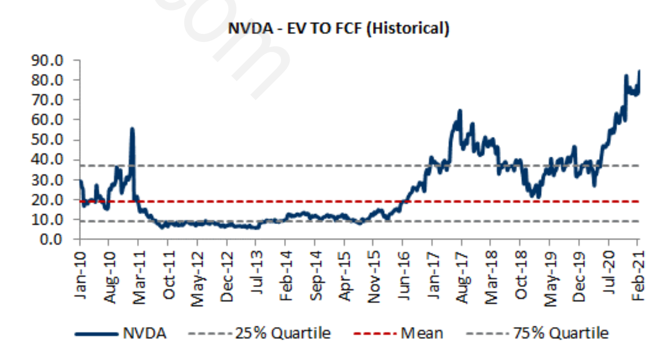
Source: FactSet, Company data, Credit Suisse estimates.

Figure 30: NVDA NTM EV/FCF vs. SOX



Source: FactSet, Company data, Credit Suisse estimates.

Figure 31: NVDA EV/FCF Historical



Source: FactSet, Company data, Credit Suisse estimates.

Valuation, Methodology and Risks

Target Price and Rating
Valuation Methodology and Risks: (12 months) for NVIDIA Corporation (NVDA.OQ)

Method: Our $620 target price and Outperform rating for NVDA are based on 52x FY23 P/E - still in-line with average premium to the SOX. We rate NVDA the stock Outperform as we expect it to appreciate more than its peers.

Risk: Risks to our $620 target price and Outperform rating are (1) a shift in consumer preferences in the gaming industry; (2) volatile demand in NVDA's key growth segments; and (3) competition in the Gaming, AV, and AI markets.

Companies Mentioned *(Price as of 24-Feb-2021)*
Alphabet (GOOGL.OQ, $2083.81)
Amazon com Inc. (AMZN.OQ, $3159.53)
Microsoft (MSFT.OQ, $234.55)
NVIDIA Corporation (NVDA.OQ, $579.96, OUTPERFORM[V], TP $620.0)

Disclosure Appendix

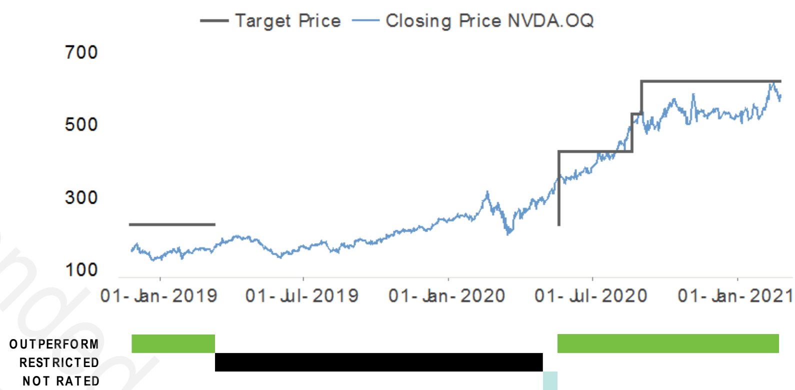
Analyst Certification

John W. Pitzer, Dalya Hahn and Jerome Darling each certify, with respect to the companies or securities that the individual analyzes, that (1) the views expressed in this report accurately reflect his or her personal views about all of the subject companies and securities and (2) no part of his or her compensation was, is or will be directly or indirectly related to the specific recommendations or views expressed in this report.

3-Year Price and Rating History for NVIDIA Corporation (NVDA.OQ)

NVDA.OQ Date	Closing Price (US$)	Target Price (US$)	Rating
25-Nov-18	145.00	225.00	O *
11-Mar-19	161.14		R
01-May-20	282.78		NR
20-May-20	358.80	425.00	O
20-Aug-20	485.64	530.00	
01-Sep-20	552.84	620.00	

** Asterisk signifies initiation or assumption of coverage.*



As of December 10, 2012 Analysts' stock rating are defined as follows:
Outperform (O) : The stock's total return is expected to outperform the relevant benchmark* over the next 12 months.
Neutral (N) : The stock's total return is expected to be in line with the relevant benchmark* over the next 12 months.
Underperform (U) : The stock's total return is expected to underperform the relevant benchmark* over the next 12 months.
**Relevant benchmark by region: As of 10th December 2012, Japanese ratings are based on a stock's total return relative to the analyst's coverage universe which consists of all companies covered by the analyst within the relevant sector, with Outperforms representing the most attractive, Neutrals the less attractive, and Underperforms the least attractive investment opportunities. As of 2nd October 2012, U.S. and Canadian as well as European (excluding Turkey) ratings are based on a stock's total return relative to the analyst's coverage universe which consists of all companies covered by the analyst within the relevant sector, with Outperforms representing the most attractive, Neutrals the less attractive, and Underperforms the least attractive investment opportunities. For Latin America, Turkey and Asia (excluding Japan and Australia), stock ratings are based on a stock's total return relative to the average total return of the relevant country or regional benchmark (India - S&P BSE Sensex Index); prior to 2nd October 2012 U.S. and Canadian ratings were based on (1) a stock's absolute total return potential to its current share price and (2) the relative attractiveness of a stock's total return potential within an analyst's coverage universe. For Australian and New Zealand stocks, the expected total return (ETR) calculation includes 12-month rolling dividend yield. An Outperform rating is assigned where an ETR is greater than or equal to 7.5%; Underperform where an ETR less than or equal to 5%. A Neutral may be assigned where the ETR is between -5% and 15%. The overlapping rating range allows analysts to assign a rating that puts ETR in the context of associated risks. Prior to 18 May 2015, ETR ranges for Outperform and Underperform ratings did not overlap with Neutral thresholds between 15% and 7.5%, which was in operation from 7 July 2011.*
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Not Covered (NC) : Credit Suisse Equity Research does not provide ongoing coverage of the company or offer an investment rating or investment view on the equity security of the company or related products.

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Analysts' sector weightings are distinct from analysts' stock ratings and are based on the analyst's expectations for the fundamentals and/or valuation of the sector* relative to the group's historic fundamentals and/or valuation:
Overweight : The analyst's expectation for the sector's fundamentals and/or valuation is favorable over the next 12 months.
Market Weight : The analyst's expectation for the sector's fundamentals and/or valuation is neutral over the next 12 months.
Underweight : The analyst's expectation for the sector's fundamentals and/or valuation is cautious over the next 12 months.
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Underperform/Sell*	11%	(22% banking clients)
Restricted	2%	

Please click here to view the MAR quarterly recommendations and investment services report for fundamental research recommendations.

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Credit Suisse Securities (USA) LLC..John W. Pitzer ; Dalya Hahn ; Jerome Darling

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