

UPDATE

Nvidia Corporation

FY 2018 To See Pullback in Crypto Mining Trend

WHAT'S CHANGED

In just 24 hours, over US\$100 billion was wiped off the global cryptocurrency market on 1st January 2018. Numerous cryptocurrency issues are being placed in the spotlight over the past few months, highlighting major issues of security concerns, such as the Coincheck cryptocurrency exchange hack which siphoned US\$530 million worth of cryptocurrency NEM and is still untraceable till date. Investors are also feeling the squeeze from increasingly tighter regulations, alongside suspicions of Bitcoin price manipulation on major exchange Bitfinex colluding with Tether, a cryptocurrency company.

Despite the strengthening of the cryptocurrency market in November and December 2017, it is not surprising that the already depressed incomes Nvidia receives from crypto-mining suffer another hit in 4Q FY2018, after having observed a decline of more than 50% to US\$70 million in revenues in 3Q FY2018.

IMPLICATIONS

Although the market outlook for cryptocurrencies remains bleak, there has been an increase in sales of GPUs to customers for crypto-mining purposes over the past quarter. This has led to graphics card shortages as gamers vie for the scarce amounts of GPUs left on the market, causing mid-range and high-end GPU prices to skyrocket. In view of the strong growth prospects in the datacenter and gaming end-market segments as mentioned in the initial coverage, the negative impact from the cryptocurrency-related revenues should be curbed. Given the above, our recommendation for NVDA remains as a solid Buy.

VALUATION

We suggest a Hold recommendation with our 12-month price target to be \$234.74, based on our base case DCF assuming an industry WACC of 12.3% and a terminal EV/EBITDA multiple of 27.5x. NVDA continues to exhibit strong growth ahead of semiconductor and HPC peers, thus we estimate the long-term growth rate of Nvidia to outperform at +8.90%.

KEY RISKS

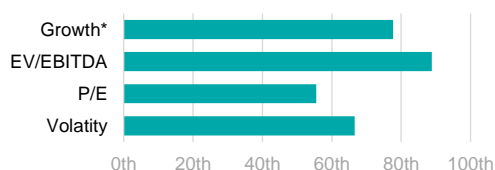
- (1) Failure to meet evolving needs of market, or successfully compete in target markets;
- (2) Failure of products to achieve expected manufacturing yields;
- (3) System security and data protection breaches;
- (4) Significant expenses incurred to remediate faulty products;
- (5) Failure to replace Intel licensing revenue stream.

KEY DATA

NVDA US, NVDA.O

Recommendation	Hold
12-month price target (USD)	234.74
Upside/downside (%)	4.06
Price as of January 31 (USD)	225.58
Market cap (\$ mn.)	137,757.03
Enterprise value (\$ mn.)	139,017.50

INVESTMENT PROFILE



Percentile rank within the industrial peer group.

*Calculated as 12-month EPS estimate over current EPS

FINANCIALS

\$ MN.	2017A	2018P	2019P	2020P
Revenue	6,910	8,985	10,693	12,725
% Growth	0.38	0.30	0.19	0.19
EPS (USD)	2.57	3.63	4.18	5.02
% Growth	2.38	1.42	1.15	1.20
EBIT	1,934	2,866	3,518	4,186
% Margin	0.28	0.32	0.33	0.33
EV/EBITDA (x)	27.50	27.50	27.50	27.50
P/E (x)	43.50	43.50	43.50	43.50
CROCI (%)	0.80	1.65	2.43	2.96
CROCI/WACC	6.50	13.41	19.73	24.07

PRICE CHART



PRICE PERFORMANCE

%	3M	6M	12M
Absolute	8.09	35.50	92.29
Relative to S&P 500 Index	4.00	26.41	78.45

Sources: NASDAQ, Thomson One Banker

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Valuation Outlook

We forecast our 2018E base case price target to be \$239.77

PRICE TARGET



UPSIDE CASE \$313.67 (-28.1%)

2018E EV/EBITDA multiple of 30.2x and EPS of \$4.18

Our upside case assumes consistent growth across all business segments in NVDA. This case purports a reversal of weakness in cryptocurrencies. With a sustained increase in market share gain by NVDA against AMD in the crypto-mining field, NVDA may poise to continually grow its revenue from this end-market sector. In addition, the upside case assumes rapid incorporation of Tesla and Tensor RT product lines by cloud service providers and data centers. Moreover, the potential adoption of Tegra by Automotives and/or Virtual Reality following increasing interest and development in these two industries extends NVDA's growth into other business segments.

BASE CASE \$234.74 (-3.9%)

2018E EV/EBITDA multiple of 27.50x and EPS of \$3.63

Our base case is founded on minimal growth in crypto revenues in view of recent pullbacks in the cryptocurrency market, expected to be offset by increasing revenues from GeForce GPU sales. The premium on these GPUs driven by competing demands from both the gaming and growing crypto-mining customer base provides a temporary boost to product prices at least for the near term. As mentioned in the initial coverage, rising Datacenter ramp-up of Tesla V100 platforms and NVDA gaining traction with Tensor RT3 inference acceleration platforms by cloud service providers builds upon Q3 FY2018 Datacenter revenues increases of +20% Q/Q (+109% Y/Y), suggesting much room for growth ahead.

CONSERVATIVE CASE \$162.33 (+39.0%)

2018E EV/EBITDA multiple of 24.18x and EPS of \$3.12

Our conservative case purports that cryptocurrency mining-related GPU sales continue to decline in 1H CY2018 (FY2019) as mining of cryptocurrencies such as Ethereum is replaced by Application-Specific Integrated Circuits (ASIC). Since NVDA's GPUs are not specialised for cryptocurrency mining, NVDA may also begin losing market share against AMD should the shortage of GPU be cleared, with customers returning to AMD's specialty mining cards. Slower adoption of GPUs by in data centers coupled with slow growth in the automotive industry may further depress revenues and operating profits.

INVESTMENT THESIS

■ Nvidia currently holds the largest GPU market share in the world. Unlike its main GPU competitor, AMD, Nvidia has established itself as a niche GPU supplier for the largest entertainment industry in the world – the Gaming industry. Moreover, growth in HPC sector from data centers is likely to accelerate in 2018, coupled with the diversification into automotive infotainment and self-driving technologies paving the long-term horizon for Nvidia's growth. Finally, considering the near-term growth potential from the cryptocurrency end-market segment, we believe Nvidia to be a solid buy.

POTENTIAL CATALYSTS

- / Success of NVIDIA Drive Xavier's sampling in Q1 FY2019
- / Increased incorporation of new Nvidia products for HPC and Datacenters
- / Strengthening of cryptocurrency markets amidst recent pullbacks.

POTENTIAL RISKS

- / Failure to replace revenues from Intel licensing revenue stream due to expire in FY2019
- / Heavy reliance on limited customer pool (gaming end-market segment and datacenters) for significant proportions of revenue.
- / Failure to obtain consumer or market acceptance for innovative products newer markets (e.g. Automotive market)
- / GPU shortage situation reverses, returning market share to AMD specialty cryptocurrency mining cards

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Model

Base case: 27.5x terminal EV/EBITDA multiple

\$ MN. EXCEPT PER SHARE	ACTUAL				PROJECTED (BASE CASE)					DCF
	2015A	2016A	2017A	2018P	2019P	2020P	2021P	2022P	TERMINAL YEAR	
FISCAL YEAR ENDING	31/1/2015	31/1/2016	31/1/2017	31/1/2018	31/1/2019	31/1/2020	31/1/2021	31/1/2022	27.5X EV/EBITDA	
Revenue	4,682	5,010	6,910	8,985	10,693	12,725	15,143	18,020	18,020	
% Growth	n/a	7.0%	37.9%	30.0%	19.0%	19.0%	19.0%	19.0%	19.0%	
EBITDA	1,137	1,148	2,368	3,483	4,248	5,042	5,988	7,119	7,119	
% Growth	n/a	1.0%	106.3%	47.1%	22.0%	18.7%	18.8%	18.9%	18.9%	
EBIT	759	747	1,934	2,866	3,518	4,186	4,982	5,929	5,929	
% Margin	16.2%	14.9%	28.0%	31.9%	32.9%	32.9%	32.9%	32.9%	32.9%	
Effective Tax Rate	16.5%	17.4%	12.5%	11.3%	17.5%	17.5%	17.5%	17.5%	17.5%	
EBIAT (NOPAT)	634	617	1,691	2,542	2,902	3,454	4,110	4,891		
Depreciation and amortisation				225	258	292	336	392		
Stock-based compensation				392	472	564	671	798		
Accounts receivable				-90	-195	-211	-251	-299		
Inventory				-18	-159	-184	-220	-261		
Accounts payable				63	108	125	148	176		
Accrued expenses & def revenues				-39	-10	87	104	123		
Other current assets (inc. non-trade receivables)				-17	0	0	0	0		
Deferred tax assets (DTAs)				0	0	0	0	0		
Capital lease obligations, long-term				-5	0	0	0	0		
Other assets				-8	0	0	0	0		
Other non-current liabilities				193	0	0	0	0		
Unlevered CFO				3,238	3,377	4,125	4,897	5,821		
Less: Capital expenditures				-559	-204	-243	-289	-344		
Less: Purchases of intangible assets				-13	-26	0	0	0		
Unlevered FCF				2,666	3,146	3,882	4,608	5,476	195,764	
% growth					18.0%	23.4%	18.7%	18.8%		
Discount factor				0%	100%	200%	300%	400%	400%	
Midperiod adjustment factor				0.00	1.00	1.00	1.00	1.00		
Present value of Unlevered FCF				2,666	2,969	3,262	3,447	3,647	123,027	

VALUATION

Enterprise value	139,018
Less: Net debt	4,335
Less: Trapped cash	0
Equity value	143,353
Equity value per share	\$234.74
Market premium / (discount)	(3.9%)
Implied TV perpetual growth rate	8.88%

ASSUMPTIONS

Terminal year exit EBITDA multiple	27.50x
Weighted average cost of capital	12.3%
Risk-free rate	2.5%
Beta	1.19
Effective tax rate	17.5%

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Model

Upside case: 30.212x terminal EV/EBITDA multiple

\$ MN. EXCEPT PER SHARE	ACTUAL				PROJECTED (UPSIDE CASE)				DCF
	2015A 31/1/2015	2016A 31/1/2016	2017A 31/1/2017	2018P 31/1/2018	2019P 31/1/2019	2020P 31/1/2020	2021P 31/1/2021	2022P 31/1/2022	TERMINAL YEAR 30.212X EV/EBITDA
Revenue	4,682	5,010	6,910	9,430	11,579	14,218	17,460	21,439	21,439
% Growth	n/a	7.0%	37.9%	36.5%	22.8%	22.8%	22.8%	22.8%	
EBITDA	1,137	1,148	2,368	3,917	4,814	5,898	7,230	8,870	8,870
% Growth	n/a	1.0%	106.3%	65.4%	22.9%	22.5%	22.6%	22.7%	
EBIT	759	747	1,934	3,291	4,041	4,962	6,094	7,482	
% Margin	16.2%	14.9%	28.0%	34.9%	34.9%	34.9%	34.9%	34.9%	
Effective Tax Rate	16.5%	17.4%	12.5%	11.3%	17.5%	17.5%	17.5%	17.5%	
EBIAT (NOPAT)	634	617	1,691	2,919	3,334	4,094	5,027	6,173	
Depreciation and amortisation				234	277	325	386	466	
Stock-based compensation				393	496	611	750	921	
Accounts receivable				-136	-241	-274	-337	-413	
Inventory				-37	-205	-236	-290	-356	
Accounts payable				76	139	159	196	240	
Accrued expenses & def revenues				-16	4	113	139	170	
Other current assets (inc. non-trade receivables)				-17	0	0	0	0	
Deferred tax assets (DTAs)				0	0	0	0	0	
Capital lease obligations, long-term				-5	0	0	0	0	
Other assets				-8	0	0	0	0	
Other non-current liabilities				193	0	0	0	0	
Unlevered CFO				3,596	3,804	4,791	5,871	7,202	
Less: Capital expenditures				-587	-221	-272	-333	-409	
Less: Purchases of intangible assets				-13	-26	0	0	0	
Unlevered FCF				2,996	3,557	4,520	5,538	6,792	267,966
% growth					18.7%	27.1%	22.5%	22.7%	
Discount factor				0%	100%	200%	300%	400%	400%
Midperiod adjustment factor				0.00	1.00	1.00	1.00	1.00	
Present value of Unlevered FCF				2,996	3,357	3,797	4,142	4,524	168,401

VALUATION

Enterprise value	187,217
Less: Net debt	4,335
Less: Trapped cash	0
Equity value	191,552
Equity value per share	\$313.67
Market premium / (discount)	(28.1%)
Implied TV perpetual growth rate	9.20%

ASSUMPTIONS

Terminal year exit EBITDA multiple	30.21x
Weighted average cost of capital	12.3%
Risk-free rate	2.5%
Beta	1.19
Effective tax rate	17.5%

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Model

Conservative case: 24.184x terminal EV/EBITDA multiple

\$ MN. EXCEPT PER SHARE	ACTUAL				PROJECTED (CONSERVATIVE CASE)				DCF	
	2015A	2016A	2017A	2018P	2019P	2020P	2021P	2022P	TERMINAL YEAR	
FISCAL YEAR ENDING	31/1/2015	31/1/2016	31/1/2017	31/1/2018	31/1/2019	31/1/2020	31/1/2021	31/1/2022		24.184X EV/EBITDA
Revenue	4,682	5,010	6,910	8,523	9,826	11,329	13,062	15,060		15,060
% Growth	n/a	7.0%	37.9%	23.3%	15.3%	15.3%	15.3%	15.3%		
EBITDA	1,137	1,148	2,368	3,067	3,538	4,067	4,678	5,387		5,387
% Growth	n/a	1.0%	106.3%	29.5%	15.4%	14.9%	15.0%	15.1%		
EBIT	759	747	1,934	2,463	2,840	3,274	3,775	4,352		
% Margin	16.2%	14.9%	28.0%	28.9%	28.9%	28.9%	28.9%	28.9%		
Effective Tax Rate	16.5%	17.4%	12.5%	11.3%	17.5%	17.5%	17.5%	17.5%		
EBIAT (NOPAT)	634	617	1,691	2,185	2,343	2,701	3,114	3,591		
Depreciation and amortisation				216	239	262	290	328		
Stock-based compensation				388	460	532	613	707		
Accounts receivable				-43	-152	-156	-180	-208		
Inventory				5	-134	-141	-163	-188		
Accounts payable				47	91	95	110	127		
Accrued expenses & def revenues				-63	-24	64	74	86		
Other current assets (inc. non-trade receivables)				-17	0	0	0	0		
Deferred tax assets (DTAs)				0	0	0	0	0		
Capital lease obligations, long-term				-5	0	0	0	0		
Other assets				-8	0	0	0	0		
Other non-current liabilities				193	0	0	0	0		
Unlevered CFO				2,898	2,824	3,357	3,859	4,442		
Less: Capital expenditures				-530	-188	-216	-249	-288		
Less: Purchases of intangible assets				-13	-26	0	0	0		
Unlevered FCF				2,355	2,610	3,140	3,610	4,155		130,280
% growth					10.8%	20.3%	14.9%	15.1%		
Discount factor				0%	100%	200%	300%	400%		400%
Midperiod adjustment factor				0.00	1.00	1.00	1.00	1.00		
Present value of Unlevered FCF				2,355	2,463	2,638	2,700	2,767		81,873

VALUATION

Enterprise value	94,797
Less: Net debt	4,335
Less: Trapped cash	0
Equity value	99,132
Equity value per share	\$162.33
Market premium / (discount)	39.0%
Implied TV perpetual growth rate	8.40%

ASSUMPTIONS

Terminal year exit EBITDA multiple	24.18x
Weighted average cost of capital	12.3%
Risk-free rate	2.5%
Beta	1.19
Effective tax rate	17.5%

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In-depth Analysis

Our NVDA investment thesis core driver assumptions in five figures

TRIPLING OF ETHEREUM PRICING IN 4Q NVDA FY2018

Within a span of three months from November 2017 to January 2018, Ethereum has seen its value spike from around US\$300 per Ethereum to over US\$1300 per Ethereum as shown in Figure 1. This rally occurred in coincidence with a general cryptocurrency rally beginning in November 2017.

FIGURE 1: ETHEREUM PRICING (USD)

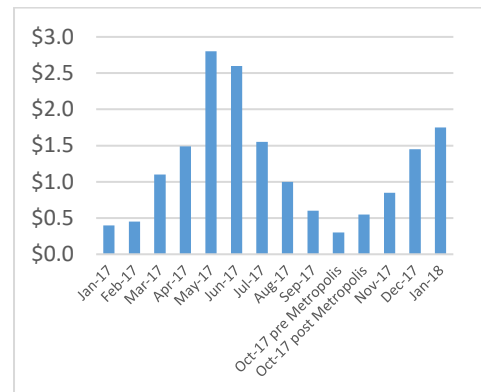


Source: Etherscan.io (2018)

UPTICK IN ETHEREUM MINING PROFITABILITY

In turn, the high value of Ethereum has raised the profitability of mining it across the same period. In Figure 2, Ethereum mining profit/day per GPU assumes a 70 cents per day power cost for each GPU unit employed. The inflation of Ethereum's value has approximately doubled the profitability per day per GPU to an approximate US\$1.76 per day

FIGURE 2: ETHEREUM MINING PROFIT PER DAY PER GPU (USD)

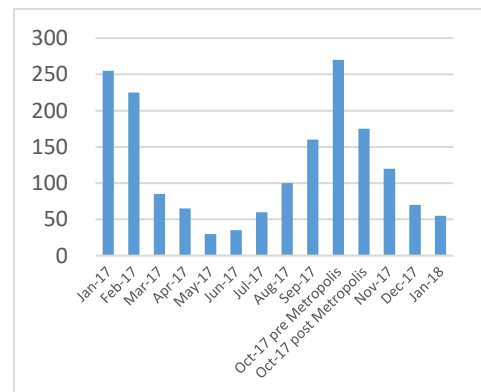


Source: Etherscan.io (2018), Morgan Stanley Research (2018)

RESULTING REDUCTION PAYBACK PERIOD NEARLY BACK TO PAST YEAR-LOWS

Following the increase in Ethereum mining profitability, this led to a significant fall in payback period in the last 3 months to approximately 57 days as shown in Figure 3.

FIGURE 3: PAYBACK PERIOD (IN DAYS)



Source: Etherscan.io (2018) , Morgan Stanley Research (2018)

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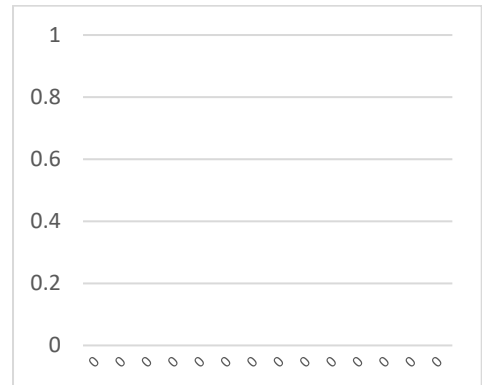
In-depth Analysis

Our NVDA investment thesis core driver assumptions in ten graphs

SKYROCKETTING DEMANDS FOR GPU CARDS CREATING A SHORTAGE OF GPUS

Figure 4 demonstrates that with Ethereum mining returning back into favour, GPU cards employed in mining Ethereum from December 2017 to January 2018 have surged by approximately 2.6 million GPU cards. This demand spike has squeezed the supply of GPUs on the market. While AMD manufactures GPUs that cater specifically to cryptocurrency mining purposes, the lack of supply of GPUs from AMD has compelled miners to purchase GPU cards from Nvidia instead despite Nvidia's GPUs being more tailored to gaming uses.

FIGURE 4: GPU CARDS USED FOR ETHEREUM MINING (MN)



Source: Etherscan.io (2018), Morgan Stanley Research (2018)

FAVOURABLE PREMIUM ON GPU SALES AT LEAST IN THE SHORT-RUN

Overwhelming demand for GPU cards in the face of market shortages have driven prices up to a hefty premium. As listed in Figure 5, the median GPU price has risen by 65% compared to their original launch prices. While the entry-level GPUs noted a far smaller percentage price increases ranging between 7% to 29%, the mid-range and high-end GPUs generally observed far higher percentage price increases of 46% and higher. Most notably would be the comparison between AMD and Nvidia GPUs of the mid-tier range, with AMD's RX 580 4GB and RX 570 4GB graphics cards attaining 151% and 190% increase in price respectively leaving Nvidia lagging far behind. This supports the preference of miners for AMD's specialised GPUs over Nvidia's graphics cards. While overall GPU prices benefits both AMD and Nvidia, should AMD regain its market share in the crypto-mining sector, Nvidia may face potential falls in revenues captured in this sector.

FIGURE 5: CHANGE IN GPU CARD PRICES AS OF 16 JAN 2018

GPU	Price at Launch (US\$)	Current Price (\$)	%Change
Nvidia			
GTX 1080 Ti 11GB	699	1200	72%
GTX 1080 8GB	499	800	60%
GTX 1070 Ti	449	765	70%
GTX 1060 6GB	239	450	88%
GTX 1060 3GB	199	290	46%
GTX 1050 Ti	139	180	29%
GTX 1050 2GB	109	130	19%
GT 1030	70	75	7%
AMD			
RX Vega 64	499	900	80%
RX Vega 56	399	900	126%
RX 580 4GB	199	500	151%
RX 570 4GB	169	490	190%
RX 560	119	139	17%
RX 550	79	100	27%
Median GPU Price Increase			65%

Source: PCGamer article (Walton, 2018)