

12 September 2012 | 23 pages

Semiconductors (Citi)
North America | United States

Semiconductors

Downgrading PC-Related Names: INTC, AMD, MRVL to Neutral

- **Action.** — This morning we are downgrading several semiconductor names in the PC supply chain, namely INTC (Neutral from Buy), AMD (Neutral from Buy), and MRVL (Neutral from Buy). While these names are down noticeably in recent days, prompted by a noticeably weak August and punctuated by Intel's recent pre-announcement (see: [Cutting Estimates Fearing a Pre-](#); [Negative Pre- As Expected](#)), our downgrade today reflects our checks in Asia (we are currently in Taiwan) that stoke our concerns that the intermediate term prospects for PC's do not look optimistic. Robbed of catalysts, we see limited likelihood PC-related shares will appreciate meaningfully in coming months, despite valuations. Our 2013 estimates are revised down to reflect a -1% PC unit growth rate and price targets are reduced accordingly (see below). Note we also reduce estimates for NVDA (Neutral-rated).
- **No Windows 8 Surge.** — At the start of 2012, we were hopeful for a boon to PC unit growth from Windows 8; it is increasingly evident to the supply chain that this is unlikely. To be sure, September PC production is up from a dismal August (20%+ m/m). And it is conceivable that demand will spike upon the Win8 launch. However, several factors are likely to limit Win8 PC success at launch: 1) according to checks, touch-based solutions will comprise less than 5% of production in 2H12, negating the benefits of the Metro UI; 2) ASP's of touch-enabled solutions are apt to remain high, adding \$50-\$100 to system costs; 3) high license fees for RT-based solutions (that must bundle Office) are apt to elevate ARM-based NB ASP's; 4) macro uncertainty is clouding demand and likely limits tolerance for high ASP devices; and 5) tablet cannibalization, particularly given coincident launches of Surface tablets (we estimate 2-3M units scheduled for production in 4Q12) and iPad Mini (we estimate 10M units scheduled for production in 4Q12). After an initial build recovery in September and October, we suspect PC-related builds will again soften from November onward.
- **Little Recovery in 2013.** — We lower our estimates for 2013 PC unit growth to -1% from +4%, reflecting our view that, in the absence of a Windows 8 surge, 1H13 PC units will show negative y/y growth. Indeed, simply applying seasonal sequential metrics, PC units would be negative 1H13/1H12—as charted below, this alone is historically negative for INTC shares. But when factoring in a tepid demand environment for PC's, high ASP's to fully benefit from the new O/S, and the likely 1H13 launch of an updated 10" iPad, we suspect below seasonal trends (mostly over the last two years) is likely. In light of this extended pattern of below seasonal growth, we must recognize the risk/likelihood that PC sales may be at a tipping point, more permanently suffering at the hands of new personal portable connected devices (PPCD: i.e. tablets, smartphones). While time will tell, we believe the threat of this is apt to limit appreciation in PC-oriented shares in the interim.
- **Valuation Appealing but Not Enough.** — We recognize (continued below...)

Glen Yeung

+1-415-951-1885

glen.yeung@citi.com

C. Adeline Lee

adeline.lee@citi.com

Delos Elder

delos.elder@citi.com

Company	Ticker	Rating		Target Price		Current Year Earnings Estimates	
		Old	New	Old	New	Old	New
Adv Micro Dev	AMD	1H	2H	US\$6.50	US\$4.25	US\$-0.65	US\$-0.72
Intel	INTC	1	2	US\$32.00	US\$25.75	US\$2.25	US\$2.07
Marvell Technology	MRVL	1	2	US\$14.00	US\$11.50	US\$0.66	US\$0.66
NVIDIA	NVDA	2H	2H	US\$16.50	US\$15.25	US\$0.92	US\$0.89

See Appendix A-1 for Analyst Certification, Important Disclosures and non-US research analyst disclosures.

Citi Research is a division of Citigroup Global Markets Inc. (the "Firm"), which does and seeks to do business with companies covered in its research reports. As a result, investors should be aware that the Firm may have a conflict of interest that could affect the objectivity of this report. Investors should consider this report as only a single factor in making their investment decision.

- **Valuation Appealing but Not Enough.** — (...continued from above) that valuation of PC-related chip names will prove appealing to value investors. As we tabulate in Figure 4, INTC/AMD/MRVL are trading at 11.4x/10.6x/10.4x consensus 2013 EPS, 12.0x/12.6x/10.6x our revised estimates, compared to 11.9x/11.0x/11.7x historical averages (5-year). Noting that we are below consensus in most instances, we expect consensus estimates to fall in coming months/quarters limiting the benefit of valuation. Our new price targets reflect the market multiple assigned to our new growth expectations, and yield insufficiently to warrant buy ratings—see valuation sections. We continue to view Broadcom as our top idea. Simplistically, their position in new non-PC product cycles (iPhone5) is apt to create some near-term momentum in estimates. Their core competency in integration focused on hand-held devices, while not immune to risk from captive competitors, generally positions them well for growth in PPCD's—our checks show share gain in China and continued momentum at Samsung. Meanwhile, we view growth in broadband as likely, given more targeted efforts in new under-penetrated geographies (e.g. India, S. America).

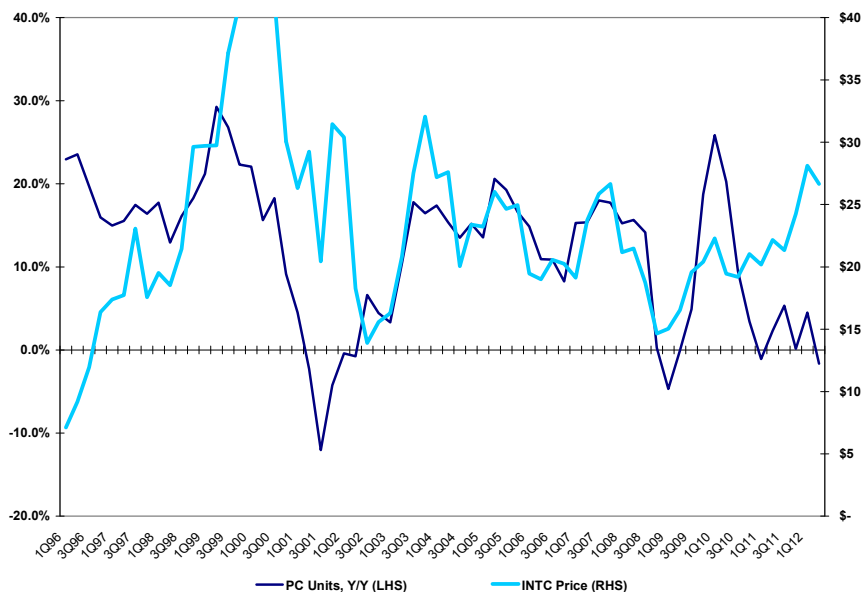
- **Where Can We Be Wrong?** — Most obviously, the negative PC environment may be aligned more with macro weakness than secular concerns. Should macro trends improve, PC trends could reverse course. At least one distributor we have met with has suggested China is showing signs of improvement, although PC does not look to be participating at this stage. On a more company specific basis we note:
 - **INTC:** Intel continues to make progress with its efforts in mobile devices. We suspect several Win8 tablets will sport Intel processors, noting that the success of ARM-based devices could be limited by price/performance characteristics (according to discussions with the supply chain). With the specifications of Haswell (20x better power consumption), we see room for Intel to further its progress in Win8 tablets and enhance its argument relative to ARM solutions. Of course, Intel's leading-edge manufacturing remains an advantage over all others that could prove enticing to new customers.
 - **AMD:** AMD is in the midst of a company re-transformation. Several new executives of high caliber have been added in recent weeks/months. The company is re-positioning to offer “semi-custom” solutions to better meet the needs of customers who would like a better-integrated CPU solution. We suspect first evidence of this will be in gaming systems in 1Q13. Meanwhile, AMD is embarking on an ambidextrous strategy, suggesting they are open to new architectures (i.e. ARM) should customer demand warrant.
 - **MRVL:** While competition is stiff, Marvell has made progress cost-reducing its TD-SCDMA solutions for smartphones. This may help limit share losses to less than market concerns. Meanwhile, Marvell is likely to add to HDD share (Enterprise and Mobile at STX, eventually Desktop at Toshiba) potentially making our HDD estimates for 2013 overly conservative.

Figure 1. Our Estimates Relative to Consensus

	4Q12		2012		1Q13		2Q13		2013	
	Citi	Street	Citi	Street	Citi	Street	Citi	Street	Citi	Street
INTC										
Sales	\$13,462	\$13,975	\$53,069	\$53,716	\$13,048	\$13,329	\$13,170	\$13,462	\$54,269	\$56,318
GM %	61.70	62.80	62.77	63.22	61.25	61.67	60.79	61.57	62.33	62.34
OpEx	\$4,643	\$4,689	\$18,500	\$18,527	\$4,690	\$4,635	\$4,691	\$4,681	\$19,128	\$19,151
EPS (GAAP)	\$0.51	\$0.57	\$2.07	\$2.16	\$0.47	\$0.49	\$0.48	\$0.50	\$2.14	\$2.25
AMD										
Sales	\$1,390	\$1,481	\$5,760	\$5,864	\$1,346	\$1,415	\$1,392	\$1,428	\$5,847	\$6,027
GM % (Non-GAAP)	44.70	44.75	45.09	43.93	45.16	44.85	46.03	45.28	46.24	45.61
OpEx	\$568	\$566	\$2,300	\$2,200	\$581	\$560	\$574	\$564	\$2,318	\$2,308
EPS (Non-GAAP)	\$0.03	\$0.17	\$0.21	\$0.28	-\$0.01	\$0.12	\$0.05	\$0.11	\$0.34	\$0.40
MRVL										
Sales	\$790	\$833	\$3,226	\$3,279	\$788	\$811	\$817	\$853	\$3,267	\$3,495
GM % (Non-GAAP)	54.00	53.72	53.89	53.82	54.50	53.95	55.00	54.25	55.13	54.37
OpEx	\$329	\$303	\$1,350	\$1,207	\$329	\$304	\$338	\$309	\$1,321	\$1,252
EPS (Non-GAAP)	\$0.24	\$0.25	\$0.95	\$0.97	\$0.24	\$0.22	\$0.26	\$0.26	\$1.08	\$1.11
NVDA										
Sales	\$1,207	\$1,227	\$4,376	\$4,393	\$1,108	\$1,149	\$1,113	\$1,174	\$4,571	\$4,805
GM % (Non-GAAP)	51.93	51.96	51.50	51.52	51.50	51.81	51.52	52.09	51.66	52.06
OpEx	\$390	\$397	\$1,572	\$1,576	\$390	\$405	\$386	\$415	\$1,560	\$1,664
EPS (Non-GAAP)	\$0.36	\$0.34	\$1.14	\$1.06	\$0.28	\$0.29	\$0.29	\$0.31	\$1.22	\$1.27

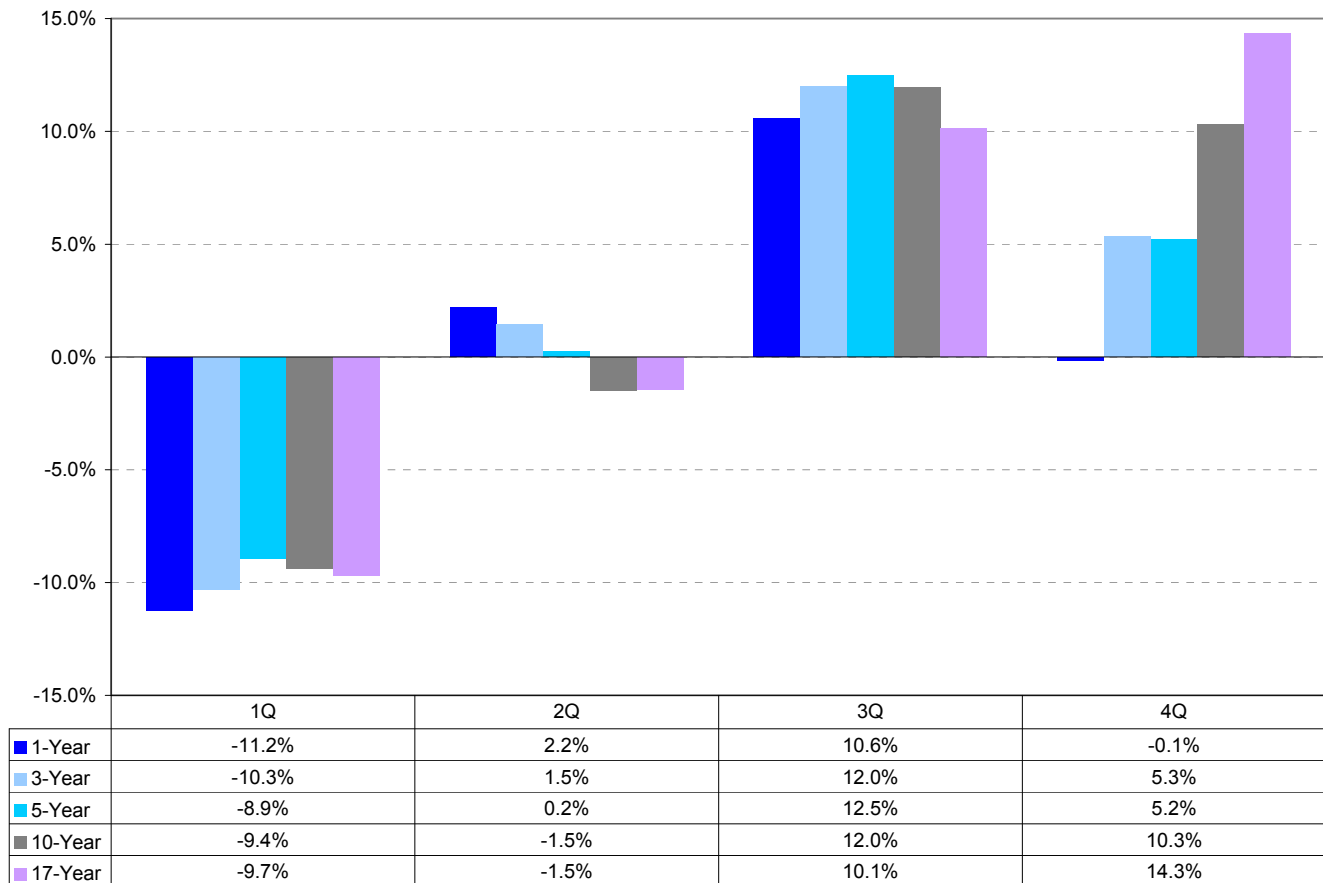
Source: Citi Research, ThomsonONE

Figure 2. Year-over-Year PC Unit Growth versus INTC



Source: Citi Research, FactSet

Figure 3. The Shift in PC Seasonality



Source: Citi Research, IDC

Figure 4. New Targets & Valuation

	Price Target	Citi*	Street*	5-Year Average
INTC	\$25.75	12.02x	11.44x	11.94x
AMD	\$4.25	12.63x	10.63x	10.98x
MRVL	\$11.50	10.62x	10.36x	11.71x
NVDA	\$15.25	12.46x	12.01x	15.31x

Source: Citi Research, ThomsonONE
*Based on 2013 Estimates

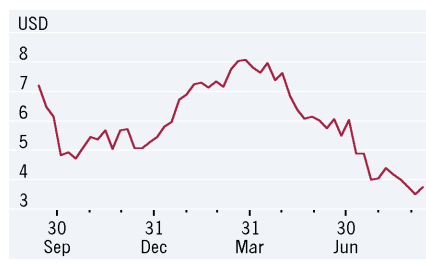
(BRCM.O; US\$35.59; 1)

Company Focus

- Company Update
- Rating Change
- Target Price Change
- Estimate Change

Neutral/High Risk	2H
<i>from Buy/High Risk</i>	
Price (11 Sep 12)	US\$3.75
Target price	US\$4.25
<i>from US\$6.50</i>	
Expected share price return	13.3%
Expected dividend yield	0.0%
Expected total return	13.3%
Market Cap	US\$2,653M

Price Performance (RIC: AMD.N, BB: AMD US)



Advanced Micro Devices (AMD) Downgrading to Neutral, Price Target to \$4.25

■ See body of note above for rationale. Estimate changes below:

Figure 5. Estimate Changes

(\$ in M, except per share amounts)		New	Old
Revenues	3Q 12	\$1,371	\$1,399
	4Q 12	\$1,390	\$1,481
	1Q 13	\$1,346	\$1,415
	2Q 13	\$1,392	\$1,461
	2012	\$5,760	\$5,877
	2013	\$5,847	\$6,110
Sequential Revenue Growth	3Q 12	-3.0%	-1.0%
	4Q 12	1.4%	5.9%
	1Q 13	-3.2%	-4.4%
	2Q 13	3.4%	3.2%
	2012	-12.3%	-10.5%
	2013	1.5%	4.0%
OPEX	3Q 12	\$560	\$560
	4Q 12	\$564	\$569
	1Q 13	\$577	\$578
	2Q 13	\$570	\$579
	2012	\$2,279	\$2,283
	2013	\$2,302	\$2,331
Non-GAAP Gross Margin	3Q 12	43.9%	44.0%
	4Q 12	44.7%	44.8%
	1Q 13	45.2%	45.2%
	2Q 13	46.0%	46.0%
	2012	45.1%	45.1%
	2013	46.2%	46.2%
Non-GAAP EPS (ex amortization of acquired intangibles, incl stock-comp)	3Q 12	\$ 0.00	\$ 0.02
	4Q 12	\$ 0.03	\$ 0.08
	1Q 13	\$ (0.01)	\$ 0.03
	2Q 13	\$ 0.05	\$ 0.08
	2012	\$ 0.21	\$ 0.28
	2013	\$ 0.34	\$ 0.46

Source: Citi Research

EPS	Q1	Q2	Q3	Q4	FY	FC Cons
2011A	0.67A	0.08A	0.13A	-0.24A	0.66A	0.50A
2012E	-0.80A	0.05A	0.00E	0.02E	-0.72E	0.28E
Previous	-0.80A	0.05A	0.01E	0.07E	-0.65E	na
2013E	-0.01E	0.04E	0.11E	0.18E	0.32E	0.40E
Previous	0.03E	0.07E	0.14E	0.20E	0.44E	na
2014E	0.09E	0.10E	0.13E	0.14E	0.47E	0.53E
Previous	0.12E	0.13E	0.17E	0.19E	0.61E	na

Source: Company Reports and dataCentral, Citi Research. FC Cons: First Call Consensus.

Company Focus

- Company Update
- Rating Change
- Target Price Change
- Estimate Change

Neutral	2
from Buy	
Price (11 Sep 12)	US\$23.20
Target price	US\$25.75
from US\$32.00	
Expected share price return	11.0%
Expected dividend yield	3.8%
Expected total return	14.8%
Market Cap	US\$116,070M

Price Performance (RIC: INTC.O, BB: INTC US)



Intel Corp (INTC) Downgrading to Neutral, Price Target to \$25.75

■ See body of note above for rationale. Estimate changes below:

Figure 6. Estimate Changes

(\$ in M, except per share data)		New	Old
Revenues	3Q 2012	\$ 13,200	\$ 13,776
	4Q 2012	\$ 13,462	\$ 14,193
	1Q 2013	\$ 13,048	\$ 13,520
	2Q 2013	\$ 13,170	\$ 13,646
	2012	\$ 53,069	\$ 54,376
	2013	\$ 54,269	\$ 57,121
Sequential Revenue Growth	3Q 2012	-2.2%	2.0%
	4Q 2012	2.0%	3.0%
	1Q 2013	-3.1%	-4.7%
	2Q 2013	0.9%	0.9%
	2012	-1.7%	0.7%
	2013	2.3%	5.0%
Gross Margin	3Q 2012	62.0%	62.7%
	4Q 2012	61.7%	64.2%
	1Q 2013	61.3%	61.6%
	2Q 2013	60.8%	61.8%
	2012	62.8%	63.6%
	2013	62.3%	63.3%
GAAP Operating Expenses	3Q 2012	4,680	4,680
	4Q 2012	4,643	4,643
	1Q 2013	4,690	4,715
	2Q 2013	4,691	4,716
	2012	18,500	18,500
	2013	19,128	19,421
GAAP EPS	3Q 2012	\$0.49	\$0.55
	4Q 2012	\$0.51	\$0.63
	1Q 2013	\$0.47	\$0.51
	2Q 2013	\$0.48	\$0.53
	2012	\$2.07	\$2.25
	2013	\$2.14	\$2.44

Source: Citi Research

EPS	Q1	Q2	Q3	Q4	FY	FC Cons
2011A	0.56A	0.54A	0.65A	0.64A	2.39A	2.39A
2012E	0.53A	0.54A	0.49E	0.51E	2.07E	2.15E
Previous	0.53A	0.54A	0.55E	0.63E	2.25E	na
2013E	0.47E	0.48E	0.57E	0.63E	2.14E	2.23E
Previous	0.51E	0.53E	0.67E	0.73E	2.44E	na
2014E	0.50E	0.52E	0.61E	0.67E	2.30E	2.48E
Previous	0.59E	0.60E	0.69E	0.76E	2.64E	na

Source: Company Reports and dataCentral, Citi Research. FC Cons: First Call Consensus.

Company Focus

- Company Update
- Rating Change
- Target Price Change
- Estimate Change

Neutral	2
<i>from Buy</i>	
Price (11 Sep 12)	US\$10.35
Target price	US\$11.50
<i>from US\$14.00</i>	
Expected share price return	11.1%
Expected dividend yield	2.3%
Expected total return	13.4%
Market Cap	US\$5,773M

Price Performance (RIC: MRVL.O, BB: MRVL US)



Marvell Technology Group Ltd. (MRVL) Downgrading to Neutral, Price Target to \$11.50

■ See body of note above for rationale. Estimate changes below:

Figure 7. Estimate Changes

(\$ in M, except per share data)		New	Old
Revenues	3Q 2013 (Oct)	\$ 823.82	\$ 823.82
	4Q 2013 (Jan)	\$ 789.83	\$ 793.48
	1Q 2014 (Apr)	\$ 788.21	\$ 803.32
	F2013 (CY12)	\$ 3,226.11	\$ 3,229.76
	F2014 (CY13)	\$ 3,267.39	\$ 3,377.39
Sequential Revenue Growth	3Q 2013 (Oct)	0.9%	0.9%
	4Q 2013 (Jan)	-4.1%	-3.7%
	1Q 2014 (Apr)	-0.2%	1.2%
	F2013 (CY12)	-4.9%	-4.8%
	F2014 (CY13)	1.3%	4.6%
Proforma Gross Margin	3Q 2013 (Oct)	53.5%	53.5%
	4Q 2013 (Jan)	54.0%	54.0%
	1Q 2014 (Apr)	54.5%	54.5%
	F2013 (CY12)	53.9%	53.9%
	F2014 (CY13)	55.1%	55.1%
Non-GAAP Opex	3Q 2013 (Oct)	300.2	300.2
	4Q 2013 (Jan)	289.6	290.7
	1Q 2014 (Apr)	290.8	296.1
	F2013 (CY12)	1,184.2	1,185.3
	F2014 (CY13)	1,171.3	1,206.6
Pro Forma EPS	3Q 2013 (Oct)	\$0.24	\$0.24
	4Q 2013 (Jan)	\$0.24	\$0.24
	1Q 2014 (Apr)	\$0.24	\$0.24
	F2013 (CY12)	\$0.95	\$0.95
	F2014 (CY13)	\$1.08	\$1.13

Source: Citi Research

EPS	Q1	Q2	Q3	Q4	FY	FC Cons
2012A	0.22A	0.31A	0.32A	0.13A	0.99A	1.27A
2013E	0.16A	0.16A	0.17E	0.17E	0.66E	0.97E
Previous	0.16A	0.16A	0.17E	0.17E	0.66E	na
2014E	0.17E	0.19E	0.24E	0.22E	0.82E	1.11E
Previous	0.17E	0.19E	0.26E	0.23E	0.86E	na
2015E	0.22E	0.25E	0.32E	0.29E	1.08E	1.38E
Previous	0.24E	0.27E	0.34E	0.31E	1.15E	na

Source: Company Reports and dataCentral, Citi Research. FC Cons: First Call Consensus.

Company Focus

- Company Update
- Target Price Change
- Estimate Change

Neutral/High Risk	2H
Price (11 Sep 12)	US\$13.44
Target price	US\$15.25
from US\$16.50	
Expected share price return	13.5%
Expected dividend yield	0.0%
Expected total return	13.5%
Market Cap	US\$8,326M

Price Performance (RIC: NVDA.O, BB: NVDA US)



NVIDIA Corp (NVDA) Lowering Estimates, Price Target to \$15.25

■ See body of note above for rationale. Estimate changes below:

Figure 8. Estimate Changes

		New	Old
Revenues	F3Q 13	\$1,200.0	\$1,200.0
	F4Q 13	\$1,206.5	\$1,240.8
	F1Q 14	\$1,108.5	\$1,133.9
	F 2013	\$4,375.7	\$4,409.9
	F 2014	\$4,571.4	\$4,698.1
Sequential Revenue Growth	F3Q 13	14.9%	14.9%
	F4Q 13	0.5%	3.4%
	F1Q 14	-8.1%	-8.6%
	F 2013	9.4%	10.3%
	F 2014	4.5%	6.5%
Gross Margin	F3Q 13	51.9%	51.9%
	F4Q 13	51.9%	52.1%
	F1Q 14	51.5%	51.6%
	F 2013	51.5%	51.5%
	F 2014	51.7%	51.8%
OpEx (R&D + SG&A)	F3Q 13	\$390.0	\$390.0
	F4Q 13	\$390.2	\$391.3
	F1Q 14	\$389.9	\$391.0
	F 2013	\$1,571.9	\$1,573.0
	F 2014	\$1,559.8	\$1,575.9
Pro Forma EPS	F3Q 13	\$0.35	\$0.35
	F4Q 13	\$0.36	\$0.38
	F1Q 14	\$0.28	\$0.30
	F 2013	\$1.14	\$1.16
	F 2014	\$1.22	\$1.29
	F 2015	\$1.25	\$1.35

Source: Citi Research

EPS	Q1	Q2	Q3	Q4	FY	FC Cons
2012A	0.22A	0.25A	0.29A	0.19A	0.94A	0.94A
2013E	0.10A	0.19A	0.30E	0.30E	0.89E	0.90E
Previous	0.10A	0.19A	0.30E	0.33E	0.92E	na
2014E	0.23E	0.24E	0.27E	0.28E	1.03E	1.10E
Previous	0.25E	0.25E	0.29E	0.31E	1.10E	na
2015E	0.23E	0.24E	0.29E	0.32E	1.08E	1.13E
Previous	0.25E	0.27E	0.32E	0.34E	1.18E	na

Source: Company Reports and dataCentral, Citi Research. FC Cons: First Call Consensus.

Advanced Micro Devices

Company description

Advanced Micro Devices Inc (AMD) is the world's second-largest producer of microprocessors, with ~20% global PC CPU market share. The company generates revenue from the PC end-market from sales of its microprocessors, graphics processors and PC chipsets. Advanced Micro is a fabless company utilizing Global Foundries and Taiwan Semiconductor Manufacturing Company to manufacture its chips.

Investment strategy

We rate the shares of Advanced Micro Devices as Neutral/High Risk (2H). AMD is in the midst of a company re-transformation. AMD was hit in 2011 by management changes and yield problems, which led to share losses in server and desktop. But AMD is now righting the ship: several new executives of high caliber have been added since late 2011. On a long-term basis, the company is re-positioning to offer "semi-custom" solutions to better meet the needs of customers who would like a better-integrated CPU solution. We suspect first evidence of this will be in gaming systems in 1Q13. Meanwhile, AMD is embarking on an ambidextrous strategy, suggesting they are open to new architectures (i.e. ARM) should customer demand warrant. Nearer-term, we see increasing risks from slowing PC demand given their PC client business accounts for a proportionally larger share of revenue relative to Intel.

Valuation

Our target price for AMD is \$4.25. Our target price is based on the implied multiple derived from a growth and value screen of the top 100 market cap stocks in the S&P 500, excluding energy and financials. We believe our methodology reflects the P/E multiple investors pay for growth and the P/BV multiple investors pay for return on equity. We have found the market is paying an FY2 earnings multiple of 0.888x (Sales Growth) + 8.894 with a 46% correlation and a price-to-book multiple of 0.205 x (ROE) - 0.410 with a correlation of 90%.

For AMD, our CY13 revenue growth estimate of 1.5% yields an implied P/FY2 earnings of 10.2x. We multiply our 2013 GAAP EPS estimate of \$0.32 by our implied P/FY2 of 10.2x for an implied share price of \$3.23. Our 2013 ROE estimate of 15.42% yields an implied P/BV of 2.8x. We multiply our average 2011-2013 tangible BV/share estimate of \$1.92 by 2.8x for an implied share price of \$5.28. We equally weigh our \$3.23 and \$5.28 implied targets to derive an initial target price of \$4.26, which we round to \$4.25.

Risks

We rate Advanced Micro Devices High Risk because AMD generates 90% of its revenue from the PC and server markets. Thus, an unexpected upturn or downturn in PC/server sales could impact revenue potential and earnings.

If AMD loses microprocessor market share to Intel due to issues such as product roadmap execution, delay in adoption of new products by OEMs, or yield issues at Global Foundries, it could impact revenue and profitability.

If Intel or Nvidia lower their MPU or GPU pricing materially, AMD may have to respond in kind to maintain market share, thereby pressuring its profitability.

AMD's ownership of Global Foundries on a fully converted to Global Foundries ordinary shares basis is ~10%, and AMD now accounts for Global Foundries under the cost method. Global Foundries remains a major foundry partner to AMD. Issues with technology migration, yield and manufacturing could impact AMD's revenues and profitability.

If any of these risk factors has a greater downside impact than we anticipate, the share price will likely have difficulty attaining our target price. Conversely, if the impact of any of these upside risks is greater than we anticipate, the stock could exceed our target price.

Intel Corp

Company description

Intel Corporation (INTC) is the largest semiconductor manufacturer in the world and supplies the world with most of the CPUs used in PCs, workstations, and servers. Intel derives most of its sales from client PCs (notebook and desktop) as well as servers. Intel has recently diversified its revenue sources with the purchase of McAfee (software) and Infineon's Wireless Communications unit, in addition to other services and silicon (NAND). Intel manufactures microprocessors, chipsets and other products at its fabs in Arizona, Oregon, Massachusetts, New Mexico, Ireland, and Israel.

Investment strategy

We rate the shares of Intel Corporation Neutral (2). PC sales may be at a tipping point as they suffer from the hands of new personal portable connected devices such as tablets and smartphones. This threat is apt to limit appreciation in PC-oriented shares such as INTC, despite valuation. Intel trades at a P/E & P/B discount to other large cap tech stocks and other chip stocks, and Intel's manufacturing strength positions it well in mobile and possibly foundry, but we see few catalysts on the horizon for PC market optimism. Weakness in the PC market is only partially offset by growth in Intel's data center group sales (server), and traction with volume customers in mobile remains elusive for the foreseeable future.

Valuation

Our target price for INTC is \$25.75. Our target price is based on the implied multiple derived from a growth and value screen of the top 100 market cap stocks in the S&P 500, excluding energy and financials. We believe our methodology reflects the P/E multiple investors pay for growth and the P/BV multiple investors pay for return on equity. We have found the market is paying an FY2 earnings multiple of 0.888x (Sales Growth) + 8.894 with a 46% correlation and a price-to-book multiple of 0.205x (ROE) - 0.410 with a correlation of 90%.

For Intel, our CY13 revenue growth estimate is 2.26%, yielding implied P/FY2 earnings of 10.9x. We multiply our 2013 GAAP EPS estimate of \$2.14 by our implied P/FY2 for an implied share price of \$23.35. Our 2013 ROE estimate of 22.16% yields an implied P/BV 4.13x. We multiply our 2013 tangible BV/share estimate of \$6.81 by the implied P/BV multiple for an implied share price of \$28.08.

We equally weigh our implied targets to derive an initial target of \$25.72, which we round to \$25.75.

Risks

The key risks to our investment thesis on Intel are:

- 1) As the world's largest PC microprocessor manufacturer, Intel is highly dependent upon the prospects of this increasingly mature end-market. If PC unit growth in the consumer and/or corporate segments is negatively impacted by macroeconomic conditions or PC component supply/demand imbalances, it could impact our revenue and profitability estimates. If ARM core-based tablet unit growth cannibalizes PC growth, it could impact our revenue and profitability estimates.
- 2) If Intel is successful in gaining design win traction in ultrabooks, tablets, smartphones and embedded products, Intel's revenue and profitability could be positively impacted.
- 3) If AMD or Nvidia's sell-through is stronger than we have anticipated, Intel's market share in MPU and graphics could be negatively impacted.
- 4) Intel's Data Center Group continues to grow, in part driven by the buildout of cloud infrastructure. Changes to Intel's market share in servers, storage and networking products could impact Intel's revenue and profitability.

If any of these risk factors has a greater downside impact than we anticipate, the share price will likely have difficulty attaining our target price. Conversely, if the impact of any of these upside risks is greater than we anticipate, the stock could exceed our target price.

Marvell Technology Group Ltd.

Company description

Marvell is a fabless semiconductor provider of high-performance application-specific standard products. Its core strength is the design and development of complex system-on-a-chip (SoC) solutions, leveraging its technology portfolio of intellectual property in the area of analog, mixed-signal, digital signal processing, and embedded ARM-based microprocessor integrated circuits. Nearly half of Marvell's revenues come from the storage market, where they maintain a leading share at top storage OEMs. Approximately a quarter of Marvell's sales comes from Networking (PON, Ethernet, Embedded), where Marvell participates in the data center market. Marvell's mobile and wireless segment (approx. a quarter of sales) came via their acquisition in 2006 of Intel's x-Scale processor division and was the primary driver of growth, namely benefiting from RIMM, who was a major customer of Marvell's communications processor business. Marvell is one of the largest fabless semiconductor companies in the world behind Qualcomm, Broadcom and Nvidia. Marvell has about 5,000 employees globally and is incorporated in Bermuda with a U.S. operating office in Santa Clara, California.

Investment strategy

We rate Marvell Neutral (2). The PC market is a key driver of Marvell's storage sales (nearly half of their total sales). With the PC market weak, Marvell has limited prospects for growth. As the HDD market has recovered, major HDD OEMs forecast a flat TAM, and seek to maintain share without creating excess supply. With the major HDD players consolidating share of the market, we expect Marvell's growth to be limited to the amount of share they can gain at their customers. And while the SSD market—still in its early stages—does offer potential for growth, we would

expect it to be offset, at least partially, by declines in HDD. In Mobile & Wireless (approximately a quarter of total sales), Marvell's success in China's TD cellular market is now under pressure from competitors. Marvell's Networking group (approximately 25% of total sales) should see single digit growth due to secular growth in PON, share gain in Ethernet switches at Cisco, and cloud computing platforms (Xcelerated), but longer term concerns such as SDN (software-defined networking) serve as an overhang.

Valuation

Our target price for Marvell is \$11.50. Our target price is based on the implied multiple derived from a growth and value screen of the top 100 market cap stocks in the S&P 500, excluding energy and financials. We believe our methodology reflects the P/E multiple investors pay for growth and the P/BV multiple investors pay for return on equity. We have found the market is paying an FY2 earnings multiple of $0.888x \text{ (Sales Growth)} + 8.894$ with a 46% correlation and a price-to-book multiple of $0.205x \text{ (ROE)} - 0.410$ with a correlation of 90%.

For Marvell, our F2014 sales growth estimate of 1.28% yields an implied P/FY2 earnings multiple of 10.03x. We multiply our F2014 non GAAP EPS estimate of \$1.08 by the implied growth multiple for an implied share price of \$10.86. Our average F2014 ROE estimate of 8.55% yields an implied P/BV 1.34x. We multiply our F2014 BV/share estimate of \$8.66 by the implied value multiple for an implied share price of \$11.60.

We equally weigh our implied targets to derive an initial target of \$11.23, which we round to \$11.50.

Risks

The key risks to our investment thesis on Marvell are:

- 1) Approximately half of Marvell's revenue comes from the storage market, mostly from system-on-a-chip (SoC) products designed for the hard disk drive market. Changes in PC demand, channel inventories, ASPs of hard disk drives, and customer wallet share could materially impact Marvell's storage revenue and profitability.
- 2) Marvell's Mobile and Wireless segment accounts for approximately a quarter of the company's revenue. Changes in demand for Marvell's customers' products, Marvell's wallet share at customers, and Marvell's ability to design competitive products, could materially impact Marvell's mobile and wireless revenue and profitability.
- 3) Marvell's Networking segment accounts for approximate a quarter of the company's revenue. The number of design wins at customers, level of supply chain inventories, and networking market demand could materially impact Marvell's networking revenue and profitability.
- 4) As a fabless semiconductor company, Marvell is dependent on third party foundries to manufacture its products. Marvell's ability to secure foundry capacity in adequate amounts and price could impact Marvell's revenue and profitability.
- 5) Many of Marvell's products are built using one or more ARM-based embedded processors licensed from ARM Holdings. The future generation of products from Marvell will rely on the advancement of ARM's roadmap.

If any of these risk factors has a greater upside impact than we anticipate, the share price may exceed our target price. Conversely, if the impact of any of these is to the downside more than we anticipate, the stock may not achieve our target price.

NVIDIA Corp

Company description

Nvidia Corp (NVDA) is a fabless semiconductor company and a leading vendor of graphics processors predominantly used in PCs (desktop/notebook/servers), but also increasingly deployed in handsets, tablets, and game consoles. Nvidia's strength is in stand-alone (or discrete) graphics processors, and has made notable inroads into the applications processor market with its Tegra processors. Revenues are segmented into graphics processors (GPU), professional solutions (PSB), and consumer products (which includes Nvidia's Tegra family). Nvidia is headquartered in Santa Clara, California.

Investment strategy

We rate the shares of Nvidia Neutral/High Risk (2H). Despite recent outperformance, we remain skeptical of Nvidia's LT positioning. The apps processor market is competitive, with dominance by Apple and Samsung being augmented with mass at Qualcomm and momentum at BRCM and INTC. We see little room for NVDA to have breakaway success long-term. Meanwhile, we envision slowing GPU growth as integrated graphics gain share, notably in regions of high GPU attach rates like China.

Valuation

Our target price for NVDA is \$15.25, based on the implied multiple derived from a growth and value screen of the top 100 market cap stocks in the S&P 500, excluding energy and financials. We believe our methodology reflects the P/E multiple investors pay for growth and the P/BV multiple investors pay for return on equity. We have found the market is paying an FY2 earnings multiple of 0.888x (Sales Growth) +8.894 with a 46% correlation and a price-to-book multiple of 0.205x (ROE) - 0.410 with a correlation of 90%. For Nvidia, our C2013 sales growth estimate (ex MCP) of 4.6% yields an implied P/FY2 earnings multiple of 12.9x. We multiply our C2013 non-GAAP EPS estimate of \$1.22 by the growth multiple for an implied share price of \$15.83. Our C2013 operating ROE estimate of 12.8% yields an implied P/BV 2.2x. We multiply our C2013 tangible BV/share estimate of \$6.70 by the value multiple for an implied share price of \$14.75. We equally weigh our growth and value implied targets to derive an initial target of \$15.29, which we round to \$15.25.

Risks

We rate Nvidia High Risk primarily due to the stock's historical volatility (beta 1.6). In addition, apart from financial volatility, we see risk to Nvidia's GPU business given the growing share of integrated graphics processors on CPUs. We also see risk in Nvidia's handset/tablet strategy vis-à-vis its Tegra processor family.

Risks to Nvidia stock include the trend by the two major CPU vendors Intel and AMD to integrate graphics cores onto their chips. If discrete graphics card attach rates decline, it could negatively impact Nvidia's revenue and profitability. Conversely attach rates in emerging markets such as China could prove to be

higher than expected, and Nvidia could sell high end discrete graphics cards resulting in better than expected revenue and profitability.

Nvidia's revenues are impacted by the company's execution on achieving design wins for hardware components designed by PC OEMs, ODMs, motherboard manufacturers, and handset/tablet OEMs. Loss of design wins to competitors could impact market share, revenues, and profitability.

Nvidia's Professional Solutions business accounts for 20-25% of revenue. If demand for Nvidia's Fermi generation of products in the enterprise markets or if growth of Quadro and/or Tesla products in developed and emerging markets is higher than expected, Nvidia's revenue and profitability could be positively impacted.

As a fabless company, Nvidia relies on its foundry partners (eg. TSMC) to manufacture its products. Lower than expected yields, such as its ramp of new products on 28nm could negatively impact gross margins and profitability. Conversely, better than expected yields on 28nm could result in better than expected gross margins and profitability.

Nvidia completed the acquisition of Icera in June 2011. Historically baseband modems have required relatively large R&D investments to progress on technology roadmaps. If operating expenses are higher than expected, it could negatively impact profitability.

If the impact on the company from any of these factors proves to be greater/less than we anticipate, we believe the stock will likely have difficulty achieving our target price or could outperform it.

Broadcom Corporation

Valuation

Our price target for Broadcom is \$42. Our target price is based on the implied multiple derived from a growth and value screen of the top 100 market cap stocks in the S&P 500, excluding energy and financials. We believe our methodology reflects the P/E multiple investors pay for growth and the P/BV multiple investors pay for return on equity. We have found the market is paying an FY2 earnings multiple of $0.211x (\text{Sales Growth}) + 11.654$ with a 32% correlation and a price-to-book multiple of $0.205x (\text{ROE}) - 0.410$ with a correlation of 90%.

We apply our C2013 revenue growth estimate of 11.1% for BRCM for an implied P/E of 14.00x. We multiply our implied P/E by our C2013 non-GAAP EPS estimate of \$3.09 to arrive at a growth-based target of \$43.32. We apply our C2013 ROE estimate of 21.07% for an implied P/BV of 3.90x. We multiply our implied P/BV by our C2013 tangible BV/share estimate of \$9.48 to arrive at a value-based target of \$36.99. We average our growth and value targets to arrive at a price target of \$40.16, which we adjust by Citi's US Strategist's S&P Target return to arrive at \$42.37, which we round to \$42.

Risks

The key risks to our investment thesis on BRCM are:

Macro Risk – Broadcom is exposed to end-markets such as broadband and consumer which are impacted by enterprise and consumer electronics discretionary spending, as well as communications infrastructure which is capital intensive. A slowdown in consumer or capital spending as a result of macroeconomic uncertainty could negatively impact Broadcom's revenues and margins.

Industry and customer concentration – In 2011, Broadband accounted for 28% of sales, with Mobile/Wireless and Enterprise Networking accounting for 47% and 22% of sales, respectively. A loss in market share in a particular segment could impact revenues and margins. Conversely, a gain in market share due to increased design wins could positively impact Broadcom's revenue and profitability.

Outsourcing – Broadcom is the 2nd largest fabless semiconductor company worldwide, and outsources its manufacturing to third party foundries. Currently, Broadcom outsources the majority of its manufacturing to Taiwan Semiconductor Manufacturing Company (TSMC), with the remaining manufacturing outsourced to other foundries primarily in Asia (Global Foundries (formerly Chartered Semi), SMIC, Silterra and UMC). Broadcom requires leading-edge process technologies, and could be negatively impacted by problems at its foundry partners. Broadcom also outsources its packaging, assembly and testing functions.

Acquisitions – Historically, Broadcom has made several acquisitions and has recently announced the acquisition of NetLogic Microsystems. The integration of newly acquired businesses or future acquisition offers could be costly and time consuming. In addition, goodwill and other intangible assets associated with the acquisitions may negatively impact GAAP earnings or result in impairment losses if they are deemed unrecoverable.

Litigation – While Broadcom settled and dismissed all outstanding litigation with Qualcomm on 4/26/09, Broadcom is currently involved in litigation with Emulex, SiRF, and Rambus, and litigation relating to the company's historical stock option granting practices. The pending proceedings are expected to require expenditure of significant funds and diversion of resources, which may impact Broadcom's profitability.

If any of these risk factors has a greater downside impact than we anticipate, the share price will likely have difficulty attaining our target price. Conversely, if the impact of any of these upside risks is greater than we anticipate, the stock could exceed our target price.

Appendix A-1

Analyst Certification

The research analyst(s) primarily responsible for the preparation and content of this research report are named in bold text in the author block at the front of the product except for those sections where an analyst's name appears in bold alongside content which is attributable to that analyst. Each of these analyst(s) certify, with respect to the section(s) of the report for which they are responsible, that the views expressed therein accurately reflect their personal views about each issuer and security referenced and were prepared in an independent manner, including with respect to Citigroup Global Markets Inc and its affiliates. No part of the research analyst's compensation was, is, or will be, directly or indirectly, related to the specific recommendation(s) or view(s) expressed by that research analyst in this report.

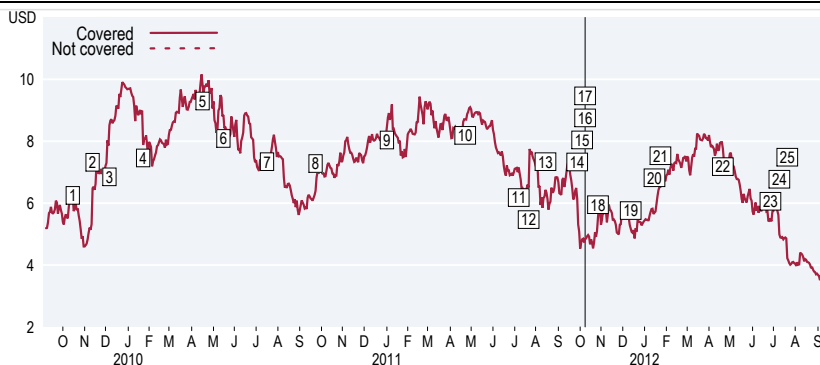
IMPORTANT DISCLOSURES

Advanced Micro Devices (AMD)

Ratings and Target Price History

Fundamental Research

Analyst: Glen Yeung



Date	Rating	Target Price	Closing Price
1 15-Oct-09	1S	*8.50	6.19
2 12-Nov-09	1S	*10.00	6.48
3 6-Dec-09	1S	*11.00	7.86
4 22-Jan-10	1S	*12.00	7.88
5 16-Apr-10	1S	*14.00	9.81
6 17-May-10	1S	*12.00	8.85
7 16-Jul-10	1S	*11.00	7.37
8 23-Sep-10	1S	*9.00	6.40
9 2-Jan-11	1S	*12.50	8.18

* Indicates change

Date	Rating	Target Price	Closing Price
10 22-Apr-11	1S	*12.00	8.71
11 7-Jul-11	1S	*11.00	7.15
12 21-Jul-11	1S	*10.00	6.50
13 14-Aug-11	1S	*9.00	6.21
14 28-Sep-11	1S	*8.00	6.15
15 5-Oct-11	1S	*7.00	4.83
16 8-Oct-11	Stock rating system changed		
17 8-Oct-11	*1H	7.00	4.73
18 27-Oct-11	1H	*8.00	5.54

Date	Rating	Target Price	Closing Price
19 13-Dec-11	1H	*7.00	5.18
20 16-Jan-12	1H	*8.00	5.65
21 24-Jan-12	1H	*9.00	6.53
22 20-Apr-12	1H	*12.00	7.76
23 27-Jun-12	1H	*10.50	5.50
24 10-Jul-12	1H	*8.00	4.99
25 20-Jul-12	1H	*6.50	4.22

Rating/target price changes above reflect Eastern Standard Time

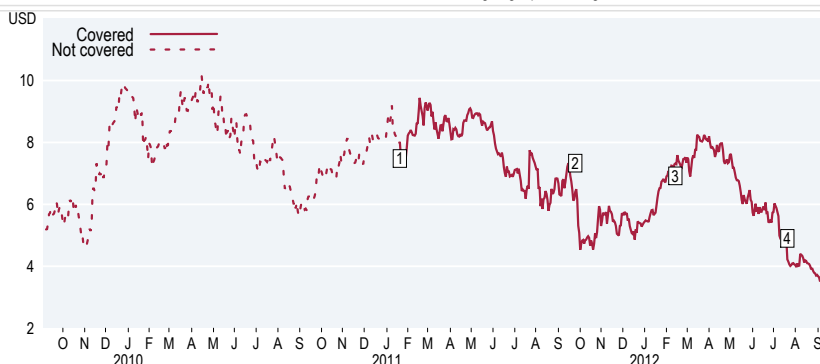
Advanced Micro Devices (AMD)

Ratings and Target Price History

Best Ideas Research

Relative Call (3 Month)

Analyst: Glen Yeung



Date	Rating	Target Price	Closing Price
1 20-Jan-11	*ADD MP	-	8.02
2 25-Sep-11	*REM MP	-	6.17

* Indicates change

Date	Rating	Target Price	Closing Price
3 14-Feb-12	*ADD MP	-	7.32
4 20-Jul-12	*REM MP	-	4.22

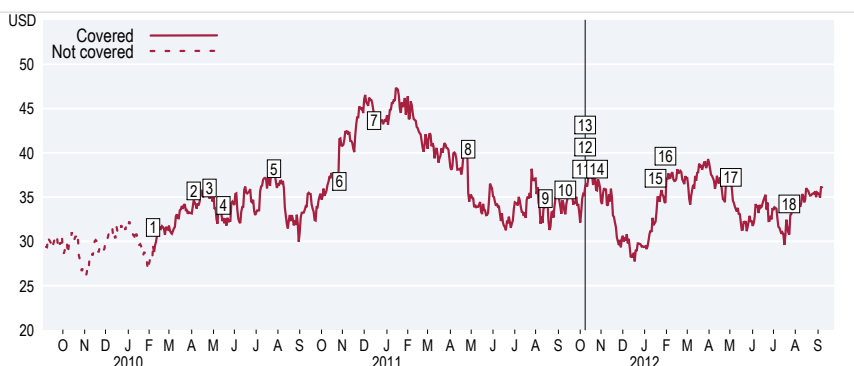
Rating/target price changes above reflect Eastern Standard Time

Broadcom Corporation (BRCM)

Ratings and Target Price History Fundamental Research

Analyst: Glen Yeung

Covered since February 6 2010



	Date	Rating	Target Price	Closing Price
1	5-Feb-10	1H	*35.00	29.39
2	5-Apr-10	1H	*40.00	34.63
3	27-Apr-10	1H	*42.00	34.82
4	17-May-10	1H	*40.00	32.64
5	27-Jul-10	1H	*45.00	37.53
6	27-Oct-10	1H	*48.00	41.56

* Indicates change

	Date	Rating	Target Price	Closing Price
7	15-Dec-10	1H	*54.00	44.29
8	27-Apr-11	1H	*45.00	35.45
9	14-Aug-11	1H	*42.00	33.84
10	12-Sep-11	1H	*43.00	33.06
11	6-Oct-11	1H	*42.00	35.35
12	8-Oct-11	Stock rating system changed		

	Date	Rating	Target Price	Closing Price
13	8-Oct-11	*1	42.00	35.27
14	26-Oct-11	1	*40.00	35.75
15	17-Jan-12	1	*37.00	32.22
16	31-Jan-12	1	*42.00	34.35
17	2-May-12	1	*45.00	36.89
18	24-Jul-12	1	*42.00	30.77

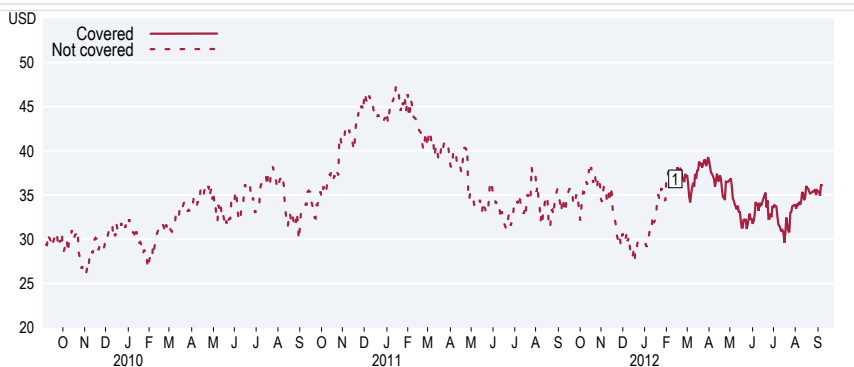
Rating/target price changes above reflect Eastern Standard Time

Broadcom Corporation (BRCM)

Ratings and Target Price History Best Ideas Research Relative Call (3 Month)

Analyst: Glen Yeung

Covered since February 6 2010



	Date	Rating	Target Price	Closing Price
1	14-Feb-12	*ADD MP	-	36.85

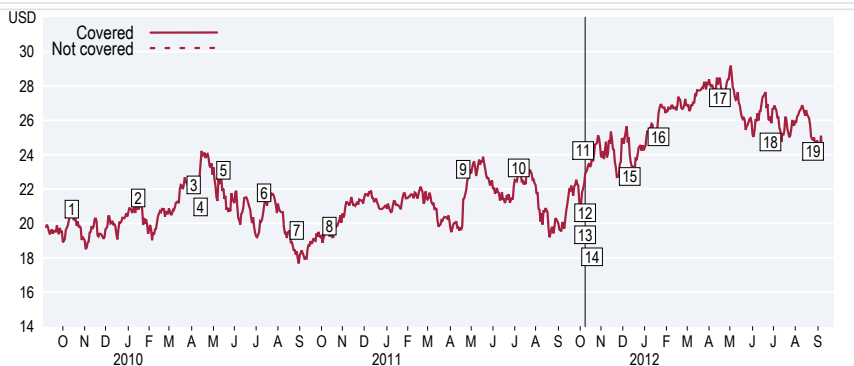
* Indicates change

Rating/target price changes above reflect Eastern Standard Time

Intel Corp (INTC)

Ratings and Target Price History Fundamental Research

Analyst: Glen Yeung



	Date	Rating	Target Price	Closing Price
1	14-Oct-09	1M	*26.00	20.83
2	15-Jan-10	1M	*29.00	20.80
3	5-Apr-10	1M	*30.00	22.59
4	14-Apr-10	1M	*31.00	23.52
5	17-May-10	1M	*30.00	22.02
6	13-Jul-10	1M	*32.00	21.01
7	27-Aug-10	1M	*29.00	18.37

* Indicates change

	Date	Rating	Target Price	Closing Price
8	13-Oct-10	1M	*25.00	19.24
9	20-Apr-11	1M	*27.00	21.41
10	7-Jul-11	1M	*26.00	23.23
11	6-Oct-11	1M	*25.00	22.03
12	8-Oct-11	Stock rating system changed		
13	8-Oct-11	*1	25.00	22.29
14	19-Oct-11	1	*27.50	24.24

	Date	Rating	Target Price	Closing Price
15	12-Dec-11	1	*27.00	24.00
16	20-Jan-12	1	*29.00	26.38
17	17-Apr-12	1	*35.00	28.47
18	27-Jun-12	1	*34.00	26.22
19	26-Aug-12	1	*32.00	24.91

Rating/target price changes above reflect Eastern Standard Time

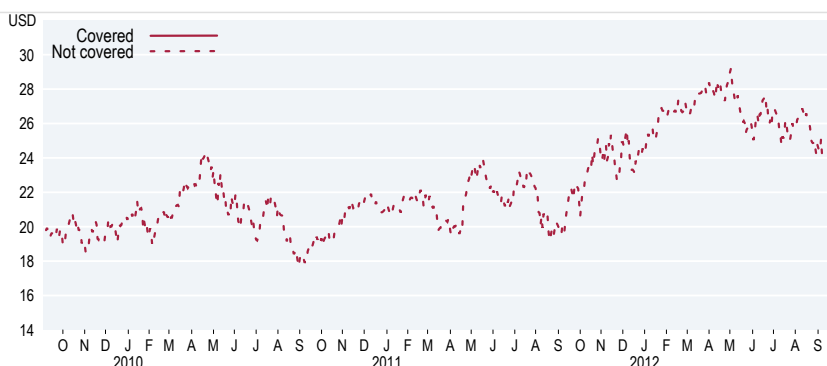
Intel Corp (INTC)

Ratings and Target Price History

Best Ideas Research

Relative Call (3 Month)

Analyst: Glen Yeung



* Indicates change

Rating/target price changes above reflect Eastern Standard Time

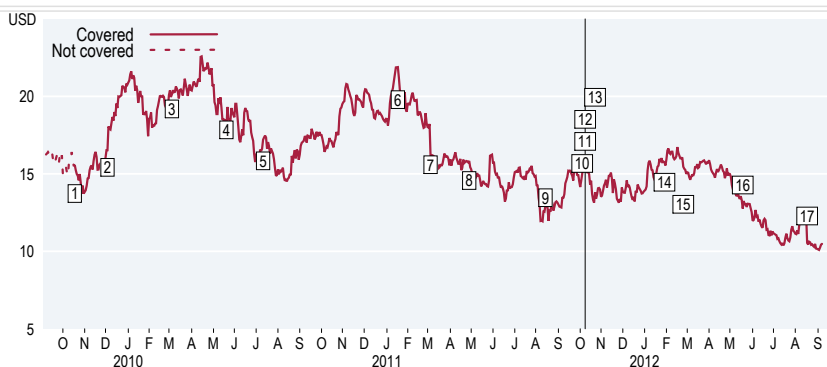
Marvell Technology Group Ltd. (MRVL)

Ratings and Target Price History

Fundamental Research

Analyst: Glen Yeung

Covered since October 18 2009



* Indicates change

Rating/target price changes above reflect Eastern Standard Time

Date	Rating	Target Price	Closing Price
1 18-Oct-09	1H	*21.00	15.50
2 3-Dec-09	1H	*24.00	16.53
3 4-Mar-10	1H	*25.00	20.13
4 20-May-10	1H	*24.00	17.84
5 12-Jul-10	1H	*23.00	17.20
6 18-Jan-11	1H	*29.00	21.89

Date	Rating	Target Price	Closing Price
7 4-Mar-11	1H	*24.00	16.13
8 28-Apr-11	1H	*20.00	15.83
9 14-Aug-11	1H	*17.00	12.58
10 5-Oct-11	1H	*18.00	15.00
11 8-Oct-11	Stock rating system changed		
12 8-Oct-11	*1	18.00	15.35

Date	Rating	Target Price	Closing Price
13 24-Oct-11	1	*17.50	13.80
14 29-Jan-12	1	*18.50	15.79
15 24-Feb-12	1	*19.00	15.46
16 18-May-12	1	*18.00	12.76
17 17-Aug-12	1	*14.00	10.54

Marvell Technology Group Ltd. (MRVL)

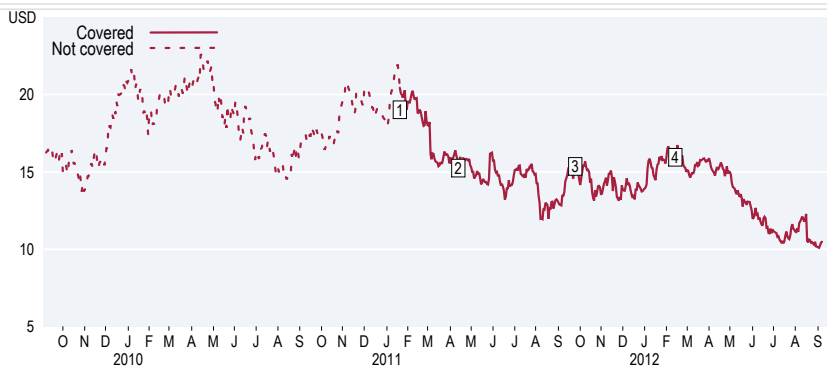
Ratings and Target Price History

Best Ideas Research

Relative Call (3 Month)

Analyst: Glen Yeung

Covered since October 18 2009



* Indicates change

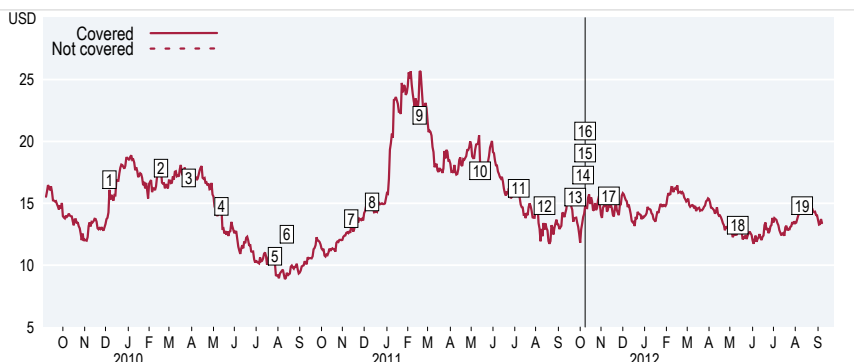
Rating/target price changes above reflect Eastern Standard Time

Date	Rating	Target Price	Closing Price
1 20-Jan-11	*ADD MP	-	20.43
2 13-Apr-11	*REM MP	-	15.65

Date	Rating	Target Price	Closing Price
3 25-Sep-11	*ADD MP	-	15.30
4 14-Feb-12	*REM MP	-	16.00

NVIDIA Corp (NVDA) **Ratings and Target Price History** **Fundamental Research**

Analyst: Glen Yeung



	Date	Rating	Target Price	Closing Price
1	7-Dec-09	1S	*21.00	16.09
2	17-Feb-10	1S	*23.00	17.84
3	29-Mar-10	1S	*24.00	17.56
4	13-May-10	1S	*20.00	14.65
5	28-Jul-10	1S	*14.00	10.13
6	13-Aug-10	1S	*12.50	9.39
7	12-Nov-10	1S	*17.00	13.26

* Indicates change

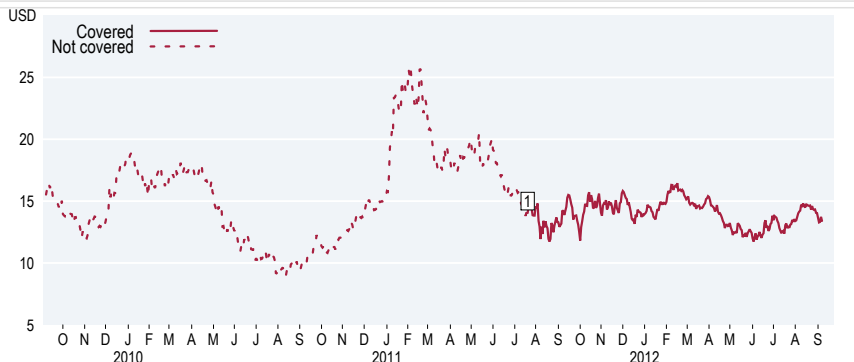
	Date	Rating	Target Price	Closing Price
8	13-Dec-10	1S	*20.00	14.57
9	17-Feb-11	*2S	*27.00	25.68
10	13-May-11	2S	*22.00	18.26
11	7-Jul-11	2S	*20.00	15.73
12	12-Aug-11	2S	*18.00	12.88
13	25-Sep-11	2S	*16.50	13.79
14	6-Oct-11	2S	*14.00	13.89

	Date	Rating	Target Price	Closing Price
15	8-Oct-11	Stock rating system changed		
16	8-Oct-11	*2H	14.00	14.15
17	11-Nov-11	2H	*17.00	14.98
18	11-May-12	2H	*16.00	13.21
19	10-Aug-12	2H	*16.50	14.62

Rating/target price changes above reflect Eastern Standard Time

NVIDIA Corp (NVDA) **Ratings and Target Price History** **Best Ideas Research** **Relative Call (3 Month)**

Analyst: Glen Yeung



	Date	Rating	Target Price	Closing Price
1	20-Jul-11	*ADD LP	-	14.04

* Indicates change

Rating/target price changes above reflect Eastern Standard Time

Within the past 12 months, Citigroup Global Markets Inc. or its affiliates has acted as manager or co-manager of an offering of securities of Broadcom Corporation, Intel Corp.

Citigroup Global Markets Inc. or its affiliates has received compensation for investment banking services provided within the past 12 months from Advanced Micro Devices, Broadcom Corporation, Intel Corp.

Citigroup Global Markets Inc. or an affiliate received compensation for products and services other than investment banking services from Advanced Micro Devices, Broadcom Corporation, Intel Corp, Marvell Technology Group Ltd., NVIDIA Corp in the past 12 months.

Citigroup Global Markets Inc. currently has, or had within the past 12 months, the following as investment banking client(s): Advanced Micro Devices, Broadcom Corporation, Intel Corp.

Citigroup Global Markets Inc. currently has, or had within the past 12 months, the following as clients, and the services provided were non-investment-banking, securities-related: Advanced Micro Devices, Broadcom Corporation, Intel Corp, Marvell Technology Group Ltd., NVIDIA Corp.

Citigroup Global Markets Inc. currently has, or had within the past 12 months, the following as clients, and the services provided were non-investment-banking, non-securities-related: Advanced Micro Devices, Broadcom Corporation, Intel Corp, Marvell Technology Group Ltd., NVIDIA Corp.

Citigroup Global Markets Inc. or an affiliate received compensation in the past 12 months from Advanced Micro Devices.

Analysts' compensation is determined based upon activities and services intended to benefit the investor clients of Citigroup Global Markets Inc. and its affiliates ("the Firm"). Like all Firm employees, analysts receive compensation that is impacted by overall firm profitability which includes investment banking revenues.

The Firm is a market maker in the publicly traded equity securities of Broadcom Corporation, Intel Corp, Marvell Technology Group Ltd., NVIDIA Corp.

For important disclosures (including copies of historical disclosures) regarding the companies that are the subject of this Citi Research product ("the Product"), please contact Citi Research, 388 Greenwich Street, 28th Floor, New York, NY, 10013, Attention: Legal/Compliance [E6WYB6412478]. In addition, the same important disclosures, with the exception of the Valuation and Risk assessments and historical disclosures, are contained on the Firm's

disclosure website at https://www.citivelocity.com/cvr/eppublic/citi_research_disclosures. Valuation and Risk assessments can be found in the text of the most recent research note/report regarding the subject company. Historical disclosures (for up to the past three years) will be provided upon request.

Citi Research Ratings Distribution

Data current as of 30 Jun 2012	12 Month Rating			Relative Rating		
	Buy	Hold	Sell	Buy	Hold	Sell
Citi Research Global Fundamental Coverage	53%	37%	10%	10%	80%	10%
% of companies in each rating category that are investment banking clients	44%	43%	40%	48%	43%	45%

Guide to Citi Research Fundamental Research Investment Ratings:

Citi Research stock recommendations include an investment rating and an optional risk rating to highlight high risk stocks.

Risk rating takes into account both price volatility and fundamental criteria. Stocks will either have no risk rating or a High risk rating assigned.

Investment Ratings: Citi Research investment ratings are Buy, Neutral and Sell. Our ratings are a function of analyst expectations of expected total return ("ETR") and risk. ETR is the sum of the forecast price appreciation (or depreciation) plus the dividend yield for a stock within the next 12 months. The Investment rating definitions are: Buy (1) ETR of 15% or more or 25% or more for High risk stocks; and Sell (3) for negative ETR. Any covered stock not assigned a Buy or a Sell is a Neutral (2). For stocks rated Neutral (2), if an analyst believes that there are insufficient valuation drivers and/or investment catalysts to derive a positive or negative investment view, they may elect with the approval of Citi Research management not to assign a target price and, thus, not derive an ETR. Analysts may place covered stocks "Under Review" in response to exceptional circumstances (e.g. lack of information critical to the analyst's thesis) affecting the company and / or trading in the company's securities (e.g. trading suspension). As soon as practically possible, the analyst will publish a note re-establishing a rating and investment thesis. To satisfy regulatory requirements, we correspond Under Review and Neutral to Hold in our ratings distribution table for our 12-month fundamental rating system. However, we reiterate that we do not consider Under Review to be a recommendation.

Relative three-month ratings: Citi Research may also assign a three-month relative call (or rating) to a stock to highlight expected out-performance (most preferred) or under-performance (least preferred) versus the geographic and industry sector over a 3 month period. The relative call may highlight a specific near-term catalyst or event impacting the company or the market that is anticipated to have a short-term price impact on the equity securities of the company. Absent any specific catalyst the analyst(s) will indicate the most and least preferred stocks in the universe of stocks under consideration, explaining the basis for this short-term view. This three-month view may be different from and does not affect a stock's fundamental equity rating, which reflects a longer-term total absolute return expectation. For purposes of NASD/NYSE ratings-distribution-disclosure rules, most preferred calls correspond to a buy recommendation and least preferred calls correspond to a sell recommendation. Any stock not assigned to a most preferred or least preferred call is considered non-relative-rated (NRR). For purposes of NASD/NYSE ratings-distribution-disclosure rules we correspond NRR to Hold in our ratings distribution table for our 3-month relative rating system. However, we reiterate that we do not consider NRR to be a recommendation.

Prior to October 8, 2011, the firm's stock recommendation system included a risk rating and an investment rating. **Risk ratings**, which took into account both price volatility and fundamental criteria, were: Low (L), Medium (M), High (H), and Speculative (S). **Investment Ratings** of Buy, Hold and Sell were a function of the Citi Research expectation of total return (forecast price appreciation and dividend yield within the next 12 months) and risk rating. Additionally, analysts could have placed covered stocks "Under Review" in response to exceptional circumstances (e.g. lack of information critical to the analyst's thesis) affecting the company and/or trading in the company's securities (e.g. trading suspension). Stocks placed "Under Review" were monitored daily by management and as practically possible, the analyst published a note re-establishing a rating and investment thesis. For securities in developed markets (US, UK, Europe, Japan, and Australia/New Zealand), investment ratings were: Buy (1) (expected total return of 10% or more for Low-Risk stocks, 15% or more for Medium-Risk stocks, 20% or more for High-Risk stocks, and 35% or more for Speculative stocks); Hold (2) (0%-10% for Low-Risk stocks, 0%-15% for Medium-Risk stocks, 0%-20% for High-Risk stocks, and 0%-35% for Speculative stocks); and Sell (3) (negative total return). For securities in emerging markets (Asia Pacific, Emerging Europe/Middle East/Africa, and Latin America), investment ratings were: Buy (1) (expected total return of 15% or more for Low-Risk stocks, 20% or more for Medium-Risk stocks, 30% or more for High-Risk stocks, and 40% or more for Speculative stocks); Hold (2) (5%-15% for Low-Risk stocks, 10%-20% for Medium-Risk stocks, 15%-30% for High-Risk stocks, and 20%-40% for Speculative stocks); and Sell (3) (5% or less for Low-Risk stocks, 10% or less for Medium-Risk stocks, 15% or less for High-Risk stocks, and 20% or less for Speculative stocks).

Investment ratings are determined by the ranges described above at the time of initiation of coverage, a change in investment and/or risk rating, or a change in target price (subject to limited management discretion). At other times, the expected total returns may fall outside of these ranges because of market price movements and/or other short-term volatility or trading patterns. Such interim deviations from specified ranges will be permitted but will become subject to review by Research Management. Your decision to buy or sell a security should be based upon your personal investment objectives and should be made only after evaluating the stock's expected performance and risk.

NON-US RESEARCH ANALYST DISCLOSURES

Non-US research analysts who have prepared this report (i.e., all research analysts listed below other than those identified as employed by Citigroup Global Markets Inc.) are not registered/qualified as research analysts with FINRA. Such research analysts may not be associated persons of the member organization and therefore may not be subject to the NYSE Rule 472 and NASD Rule 2711 restrictions on communications with a subject company, public appearances and trading securities held by a research analyst account. The legal entities employing the authors of this report are listed below:

Citigroup Global Markets Inc

Glen Yeung; C. Adeline Lee; Delos Elder

OTHER DISCLOSURES

The subject company's share price set out on the front page of this Product is quoted as at 11 September 2012 04:00 PM on the issuer's primary market.

Citigroup Global Markets Inc. and/or its affiliates has a significant financial interest in relation to Broadcom Corporation. (For an explanation of the determination of significant financial interest, please refer to the policy for managing conflicts of interest which can be found at www.citiVelocity.com.)

For securities recommended in the Product in which the Firm is not a market maker, the Firm is a liquidity provider in the issuers' financial instruments and may act as principal in connection with such transactions. The Firm is a regular issuer of traded financial instruments linked to securities that may have been recommended in the Product. The Firm regularly trades in the securities of the issuer(s) discussed in the Product. The Firm may engage in securities

transactions in a manner inconsistent with the Product and, with respect to securities covered by the Product, will buy or sell from customers on a principal basis.

Securities recommended, offered, or sold by the Firm: (i) are not insured by the Federal Deposit Insurance Corporation; (ii) are not deposits or other obligations of any insured depository institution (including Citibank); and (iii) are subject to investment risks, including the possible loss of the principal amount invested. Although information has been obtained from and is based upon sources that the Firm believes to be reliable, we do not guarantee its accuracy and it may be incomplete and condensed. Note, however, that the Firm has taken all reasonable steps to determine the accuracy and completeness of the disclosures made in the Important Disclosures section of the Product. The Firm's research department has received assistance from the subject company(ies) referred to in this Product including, but not limited to, discussions with management of the subject company(ies). Firm policy prohibits research analysts from sending draft research to subject companies. However, it should be presumed that the author of the Product has had discussions with the subject company to ensure factual accuracy prior to publication. All opinions, projections and estimates constitute the judgment of the author as of the date of the Product and these, plus any other information contained in the Product, are subject to change without notice. Prices and availability of financial instruments also are subject to change without notice. Notwithstanding other departments within the Firm advising the companies discussed in this Product, information obtained in such role is not used in the preparation of the Product. Although Citi Research does not set a predetermined frequency for publication, if the Product is a fundamental research report, it is the intention of Citi Research to provide research coverage of the/those issuer(s) mentioned therein, including in response to news affecting this issuer, subject to applicable quiet periods and capacity constraints. The Product is for informational purposes only and is not intended as an offer or solicitation for the purchase or sale of a security. Any decision to purchase securities mentioned in the Product must take into account existing public information on such security or any registered prospectus.

Investing in non-U.S. securities, including ADRs, may entail certain risks. The securities of non-U.S. issuers may not be registered with, nor be subject to the reporting requirements of the U.S. Securities and Exchange Commission. There may be limited information available on foreign securities. Foreign companies are generally not subject to uniform audit and reporting standards, practices and requirements comparable to those in the U.S. Securities of some foreign companies may be less liquid and their prices more volatile than securities of comparable U.S. companies. In addition, exchange rate movements may have an adverse effect on the value of an investment in a foreign stock and its corresponding dividend payment for U.S. investors. Net dividends to ADR investors are estimated, using withholding tax rates conventions, deemed accurate, but investors are urged to consult their tax advisor for exact dividend computations. Investors who have received the Product from the Firm may be prohibited in certain states or other jurisdictions from purchasing securities mentioned in the Product from the Firm. Please ask your Financial Consultant for additional details. Citigroup Global Markets Inc. takes responsibility for the Product in the United States. Any orders by US investors resulting from the information contained in the Product may be placed only through Citigroup Global Markets Inc.

Important Disclosures for Morgan Stanley Smith Barney LLC Customers: Morgan Stanley & Co. LLC (Morgan Stanley) research reports may be available about the companies that are the subject of this Citi Research research report. Ask your Financial Advisor or use smithbarney.com to view any available Morgan Stanley research reports in addition to Citi Research research reports.

Important disclosure regarding the relationship between the companies that are the subject of this Citi Research research report and Morgan Stanley Smith Barney LLC and its affiliates are available at the Morgan Stanley Smith Barney disclosure website at www.morganstanleysmithbarney.com/researchdisclosures.

For Morgan Stanley and Citigroup Global Markets, Inc. specific disclosures, you may refer to www.morganstanley.com/researchdisclosures and https://www.citivelocity.com/cvr/eppublic/citi_research_disclosures.

This Citi Research research report has been reviewed and approved on behalf of Morgan Stanley Smith Barney LLC. This review and approval was conducted by the same person who reviewed this research report on behalf of Citi Research. This could create a conflict of interest.

The Citigroup legal entity that takes responsibility for the production of the Product is the legal entity which the first named author is employed by. The Product is made available in **Australia** through Citi Global Markets Australia Pty Ltd. (ABN 64 003 114 832 and AFSL No. 240992), participant of the ASX Group and regulated by the Australian Securities & Investments Commission. Citigroup Centre, 2 Park Street, Sydney, NSW 2000. The Product is made available in Australia to Private Banking wholesale clients through Citigroup Pty Limited (ABN 88 004 325 080 and AFSL 238098). Citigroup Pty Limited provides all financial product advice to Australian Private Banking wholesale clients through bankers and relationship managers. If there is any doubt about the suitability of investments held in Citigroup Private Bank accounts, investors should contact the Citigroup Private Bank in Australia. Citigroup companies may compensate affiliates and their representatives for providing products and services to clients. The Product is made available in **Brazil** by Citigroup Global Markets Brasil - CCTVM SA, which is regulated by CVM - Comissão de Valores Mobiliários, BACEN - Brazilian Central Bank, APIMEC - Associação dos Analistas e Profissionais de Investimento do Mercado de Capitais and ANBID - Associação Nacional dos Bancos de Investimento. Av. Paulista, 1111 - 11º andar - CEP. 01311920 - São Paulo - SP. If the Product is being made available in certain provinces of **Canada** by Citigroup Global Markets (Canada) Inc. ("CGM Canada"), CGM Canada has approved the Product. Citigroup Place, 123 Front Street West, Suite 1100, Toronto, Ontario M5J 2M3. This product is available in **Chile** through Banchile Corredores de Bolsa S.A., an indirect subsidiary of Citigroup Inc., which is regulated by the Superintendencia de Valores y Seguros. Agustinas 975, piso 2, Santiago, Chile. The Product is made available in **France** by Citigroup Global Markets Limited, which is authorised and regulated by Financial Services Authority. 1-5 Rue Paul Cézanne, 8ème, Paris, France. The Product is distributed in **Germany** by Citigroup Global Markets Deutschland AG ("CGMD"), which is regulated by Bundesanstalt fuer Finanzdienstleistungsaufsicht (BaFin). CGMD, Reuterweg 16, 60323 Frankfurt am Main. Research which relates to "securities" (as defined in the Securities and Futures Ordinance (Cap. 571 of the Laws of Hong Kong)) is issued in **Hong Kong** by, or on behalf of, Citigroup Global Markets Asia Limited which takes full responsibility for its content. Citigroup Global Markets Asia Ltd. is regulated by Hong Kong Securities and Futures Commission. If the Research is made available through Citibank, N.A., Hong Kong Branch, for its clients in Citi Private Bank, it is made available by Citibank N.A., Citibank Tower, Citibank Plaza, 3 Garden Road, Hong Kong. Citibank N.A. is regulated by the Hong Kong Monetary Authority. Please contact your Private Banker in Citibank N.A., Hong Kong, Branch if you have any queries on or any matters arising from or in connection with this document. The Product is made available in **India** by Citigroup Global Markets India Private Limited, which is regulated by Securities and Exchange Board of India. Bakhtawar, Nariman Point, Mumbai 400-021. The Product is made available in **Indonesia** through PT Citigroup Securities Indonesia. 5/F, Citibank Tower, Bapindo Plaza, Jl. Jend. Sudirman Kav. 54-55, Jakarta 12190. Neither this Product nor any copy hereof may be distributed in Indonesia or to any Indonesian citizens wherever they are domiciled or to Indonesian residents except in compliance with applicable capital market laws and regulations. This Product is not an offer of securities in Indonesia. The securities referred to in this Product have not been registered with the Capital Market and Financial Institutions Supervisory Agency (BAPEPAM-LK) pursuant to relevant capital market laws and regulations,

and may not be offered or sold within the territory of the Republic of Indonesia or to Indonesian citizens through a public offering or in circumstances which constitute an offer within the meaning of the Indonesian capital market laws and regulations. The Product is made available in **Israel** through Citibank NA, regulated by the Bank of Israel and the Israeli Securities Authority. Citibank, N.A. Platinum Building, 21 Ha'arba'ah St, Tel Aviv, Israel. The Product is made available in **Italy** by Citigroup Global Markets Limited, which is authorised and regulated by Financial Services Authority. Via dei Mercanti, 12, Milan, 20121, Italy. The Product is made available in **Japan** by Citigroup Global Markets Japan Inc. ("CGMJ"), which is regulated by Financial Services Agency, Securities and Exchange Surveillance Commission, Japan Securities Dealers Association, Tokyo Stock Exchange and Osaka Securities Exchange. Shin-Marunouchi Building, 1-5-1 Marunouchi, Chiyoda-ku, Tokyo 100-6520 Japan. If the Product was distributed by SMBC Nikko Securities Inc. it is being so distributed under license. In the event that an error is found in an CGMJ research report, a revised version will be posted on the Firm's Citi Velocity website. If you have questions regarding Citi Velocity, please call (81 3) 6270-3019 for help. The Product is made available in **Korea** by Citigroup Global Markets Korea Securities Ltd., which is regulated by the Financial Services Commission, the Financial Supervisory Service and the Korea Financial Investment Association (KOFIA). Citibank Building, 39 Da-dong, Jung-gu, Seoul 100-180, Korea. KOFIA makes available registration information of research analysts on its website. Please visit the following website if you wish to find KOFIA registration information on research analysts of Citigroup Global Markets Korea Securities Ltd. <http://dis.kofia.or.kr/fs/dis2/fundMgr/DISFundMgrAnalystPop.jsp?companyCd2=A03030&pageDiv=02>. The Product is made available in Korea by Citibank Korea Inc., which is regulated by the Financial Services Commission and the Financial Supervisory Service. Address is Citibank Building, 39 Da-dong, Jung-gu, Seoul 100-180, Korea. The Product is made available in **Malaysia** by Citigroup Global Markets Malaysia Sdn Bhd (Company No. 460819-D) ("CGMM") to its clients and CGMM takes responsibility for its contents. CGMM is regulated by the Securities Commission of Malaysia. Please contact CGMM at Level 43 Menara Citibank, 165 Jalan Ampang, 50450 Kuala Lumpur, Malaysia in respect of any matters arising from, or in connection with, the Product. The Product is made available in **Mexico** by Acciones y Valores Banamex, S.A. De C. V., Casa de Bolsa, Integrante del Grupo Financiero Banamex ("Accival") which is a wholly owned subsidiary of Citigroup Inc. and is regulated by Comision Nacional Bancaria y de Valores. Reforma 398, Col. Juarez, 06600 Mexico, D.F. In **New Zealand** the Product is made available to 'wholesale clients' only as defined by s5C(1) of the Financial Advisers Act 2008 ("FAA") through Citigroup Global Markets Australia Pty Ltd (ABN 64 003 114 832 and AFSL No. 240992), an overseas financial adviser as defined by the FAA, participant of the ASX Group and regulated by the Australian Securities & Investments Commission. Citigroup Centre, 2 Park Street, Sydney, NSW 2000. The Product is made available in **Pakistan** by Citibank N.A. Pakistan branch, which is regulated by the State Bank of Pakistan and Securities Exchange Commission, Pakistan. AWT Plaza, 1.1. Chundrigar Road, P.O. Box 4889, Karachi-74200. The Product is made available in the **Philippines** through Citicorp Financial Services and Insurance Brokerage Philippines, Inc., which is regulated by the Philippines Securities and Exchange Commission. 20th Floor Citibank Square Bldg. The Product is made available in the Philippines through Citibank NA Philippines branch, Citibank Tower, 8741 Paseo De Roxas, Makati City, Manila. Citibank NA Philippines NA is regulated by The Bangko Sentral ng Pilipinas. The Product is made available in **Poland** by Dom Maklerski Banku Handlowego SA an indirect subsidiary of Citigroup Inc., which is regulated by Komisja Nadzoru Finansowego. Dom Maklerski Banku Handlowego S.A. ul.Senatorska 16, 00-923 Warszawa. The Product is made available in the **Russian Federation** through ZAO Citibank, which is licensed to carry out banking activities in the Russian Federation in accordance with the general banking license issued by the Central Bank of the Russian Federation and brokerage activities in accordance with the license issued by the Federal Service for Financial Markets. Neither the Product nor any information contained in the Product shall be considered as advertising the securities mentioned in this report within the territory of the Russian Federation or outside the Russian Federation. The Product does not constitute an appraisal within the meaning of the Federal Law of the Russian Federation of 29 July 1998 No. 135-FZ (as amended) On Appraisal Activities in the Russian Federation. 8-10 Gasheka Street, 125047 Moscow. The Product is made available in **Singapore** through Citigroup Global Markets Singapore Pte. Ltd. ("CGMSPL"), a capital markets services license holder, and regulated by Monetary Authority of Singapore. Please contact CGMSPL at 8 Marina View, 21st Floor Asia Square Tower 1, Singapore 018960, in respect of any matters arising from, or in connection with, the analysis of this document. This report is intended for recipients who are accredited, expert and institutional investors as defined under the Securities and Futures Act (Cap. 289). The Product is made available by The Citigroup Private Bank in Singapore through Citibank, N.A., Singapore Branch, a licensed bank in Singapore that is regulated by Monetary Authority of Singapore. Please contact your Private Banker in Citibank N.A., Singapore Branch if you have any queries on or any matters arising from or in connection with this document. This report is intended for recipients who are accredited, expert and institutional investors as defined under the Securities and Futures Act (Cap. 289). This report is distributed in Singapore by Citibank Singapore Ltd ("CSL") to selected Citigold/Citigold Private Clients. CSL provides no independent research or analysis of the substance or in preparation of this report. Please contact your Citigold/Citigold Private Client Relationship Manager in CSL if you have any queries on or any matters arising from or in connection with this report. This report is intended for recipients who are accredited investors as defined under the Securities and Futures Act (Cap. 289). Citigroup Global Markets (Pty) Ltd. is incorporated in the **Republic of South Africa** (company registration number 2000/025866/07) and its registered office is at 145 West Street, Sandton, 2196, Saxonwold. Citigroup Global Markets (Pty) Ltd. is regulated by JSE Securities Exchange South Africa, South African Reserve Bank and the Financial Services Board. The investments and services contained herein are not available to private customers in South Africa. The Product is made available in **Spain** by Citigroup Global Markets Limited, which is authorised and regulated by Financial Services Authority. 29 Jose Ortega Y Gasset, 4th Floor, Madrid, 28006, Spain. The Product is made available in the **Republic of China** through Citigroup Global Markets Taiwan Securities Company Ltd. ("CGMTS"), 14 and 15F, No. 1, Songzhi Road, Taipei 110, Taiwan and/or through Citibank Securities (Taiwan) Company Limited ("CSTL"), 14 and 15F, No. 1, Songzhi Road, Taipei 110, Taiwan, subject to the respective license scope of each entity and the applicable laws and regulations in the Republic of China. CGMTS and CSTL are both regulated by the Securities and Futures Bureau of the Financial Supervisory Commission of Taiwan, the Republic of China. No portion of the Product may be reproduced or quoted in the Republic of China by the press or any third parties [without the written authorization of CGMTS and CSTL]. If the Product covers securities which are not allowed to be offered or traded in the Republic of China, neither the Product nor any information contained in the Product shall be considered as advertising the securities or making recommendation of the securities in the Republic of China. The Product is for informational purposes only and is not intended as an offer or solicitation for the purchase or sale of a security or financial products. Any decision to purchase securities or financial products mentioned in the Product must take into account existing public information on such security or the financial products or any registered prospectus. The Product is made available in **Thailand** through Citicorp Securities (Thailand) Ltd., which is regulated by the Securities and Exchange Commission of Thailand. 18/F, 22/F and 29/F, 82 North Sathorn Road, Silom, Bangrak, Bangkok 10500, Thailand. The Product is made available in **Turkey** through Citibank AS which is regulated by Capital Markets Board. Tekfen Tower, Eski Buyukdere Caddesi # 209 Kat 2B, 23294 Levent, Istanbul, Turkey. In the **U.A.E.** these materials (the "Materials") are communicated by Citigroup Global Markets Limited, DIFC branch ("CGML"), an entity registered in the Dubai International Financial Center ("DIFC") and licensed and regulated by the Dubai Financial Services Authority ("DFSA") to Professional Clients and Market Counterparties only and should not be relied upon or distributed to Retail Clients. A distribution of the different Citi Research ratings distribution, in percentage terms for Investments in each sector covered is made available on

request. Financial products and/or services to which the Materials relate will only be made available to Professional Clients and Market Counterparties. The Product is made available in **United Kingdom** by Citigroup Global Markets Limited, which is authorised and regulated by Financial Services Authority. This material may relate to investments or services of a person outside of the UK or to other matters which are not regulated by the FSA and further details as to where this may be the case are available upon request in respect of this material. Citigroup Centre, Canada Square, Canary Wharf, London, E14 5LB. The Product is made available in **United States** by Citigroup Global Markets Inc, which is a member of FINRA and registered with the US Securities and Exchange Commission. 388 Greenwich Street, New York, NY 10013. Unless specified to the contrary, within EU Member States, the Product is made available by Citigroup Global Markets Limited, which is regulated by Financial Services Authority.

Pursuant to Comissão de Valores Mobiliários Rule 483, Citi is required to disclose whether a Citi related company or business has a commercial relationship with the subject company. Considering that Citi operates multiple businesses in more than 100 countries around the world, it is likely that Citi has a commercial relationship with the subject company.

Many European regulators require that a firm must establish, implement and make available a policy for managing conflicts of interest arising as a result of publication or distribution of investment research. The policy applicable to Citi Research's Products can be found at https://www.citivelocity.com/cvr/eppublic/citi_research_disclosures.

Compensation of equity research analysts is determined by equity research management and Citigroup's senior management and is not linked to specific transactions or recommendations.

The Product may have been distributed simultaneously, in multiple formats, to the Firm's worldwide institutional and retail customers. The Product is not to be construed as providing investment services in any jurisdiction where the provision of such services would not be permitted.

Subject to the nature and contents of the Product, the investments described therein are subject to fluctuations in price and/or value and investors may get back less than originally invested. Certain high-volatility investments can be subject to sudden and large falls in value that could equal or exceed the amount invested. Certain investments contained in the Product may have tax implications for private customers whereby levels and basis of taxation may be subject to change. If in doubt, investors should seek advice from a tax adviser. The Product does not purport to identify the nature of the specific market or other risks associated with a particular transaction. Advice in the Product is general and should not be construed as personal advice given it has been prepared without taking account of the objectives, financial situation or needs of any particular investor. Accordingly, investors should, before acting on the advice, consider the appropriateness of the advice, having regard to their objectives, financial situation and needs. Prior to acquiring any financial product, it is the client's responsibility to obtain the relevant offer document for the product and consider it before making a decision as to whether to purchase the product. With the exception of our product that is made available only to Qualified Institutional Buyers (QIBs) and other product that is made available through other distribution channels only to certain categories of clients to satisfy legal or regulatory requirements, Citi Research concurrently disseminates its research via proprietary and non-proprietary electronic distribution platforms. Periodically, individual Citi Research analysts may also opt to circulate research posted on such platforms to one or more clients by email. Such email distribution is discretionary and is done only after the research has been disseminated via the aforementioned distribution channels. Citi Research simultaneously distributes product that is limited to QIBs only through email distribution.

The level and types of services provided by Citi Research analysts to clients may vary depending on various factors such as the client's individual preferences as to the frequency and manner of receiving communications from analysts, the client's risk profile and investment focus and perspective (e.g. market-wide, sector specific, long term, short-term etc.), the size and scope of the overall client relationship with Citi and legal and regulatory constraints. Citi Research product may source data from dataCentral. dataCentral is a Citi Research proprietary database, which includes Citi estimates, data from company reports and feeds from Reuters and Datastream.

© 2012 Citigroup Global Markets Inc. Citi Research is a division of Citigroup Global Markets Inc. Citi and Citi with Arc Design are trademarks and service marks of Citigroup Inc. and its affiliates and are used and registered throughout the world. All rights reserved. Any unauthorized use, duplication, redistribution or disclosure of this report (the "Product"), including, but not limited to, redistribution of the Product by electronic mail, posting of the Product on a website or page, and/or providing to a third party a link to the Product, is prohibited by law and will result in prosecution. The information contained in the Product is intended solely for the recipient and may not be further distributed by the recipient to any third party. Where included in this report, MSCI sourced information is the exclusive property of Morgan Stanley Capital International Inc. (MSCI). Without prior written permission of MSCI, this information and any other MSCI intellectual property may not be reproduced, disseminated or used to create any financial products, including any indices. This information is provided on an "as is" basis. The user assumes the entire risk of any use made of this information. MSCI, its affiliates and any third party involved in, or related to, computing or compiling the information hereby expressly disclaim all warranties of originality, accuracy, completeness, merchantability or fitness for a particular purpose with respect to any of this information. Without limiting any of the foregoing, in no event shall MSCI, any of its affiliates or any third party involved in, or related to, computing or compiling the information have any liability for any damages of any kind. MSCI, Morgan Stanley Capital International and the MSCI indexes are services marks of MSCI and its affiliates. The Firm accepts no liability whatsoever for the actions of third parties. The Product may provide the addresses of, or contain hyperlinks to, websites. Except to the extent to which the Product refers to website material of the Firm, the Firm has not reviewed the linked site. Equally, except to the extent to which the Product refers to website material of the Firm, the Firm takes no responsibility for, and makes no representations or warranties whatsoever as to, the data and information contained therein. Such address or hyperlink (including addresses or hyperlinks to website material of the Firm) is provided solely for your convenience and information and the content of the linked site does not in anyway form part of this document. Accessing such website or following such link through the Product or the website of the Firm shall be at your own risk and the Firm shall have no liability arising out of, or in connection with, any such referenced website.

ADDITIONAL INFORMATION IS AVAILABLE UPON REQUEST
