



Rating
Buy

Asia
China

Energy
Chemicals

Company
Wanhua Chemical

Reuters 600309.SS Bloomberg 600309 CH Exchange SHH Ticker 600309

Date
19 October 2017

Forecast Change

Price at 17 Oct 2017 (CNY)	38.89
Price target - 12mth (CNY)	47.50
52-week range (CNY)	43.45 - 20.05
Shanghai Composite	3,373

Volatile near-term MDI prices provide good entry opportunity; reiterate Buy

Buy on share price weakness after strong 3Q results; raising TP to RMB47.5

WHC posted strong 3Q17 results with EPS of RMB1.08, +30% QoQ/+145% YoY; meanwhile, 9M17 recorded EPS of RMB2.87, +212% YoY. We believe the strong set of results was driven by: 1) robust MDI spread surge due to tight supply situation created by Hurricane Harvey, which took out capacity in Texas; and 2) healthy performances from petrochemical and functional materials. The results beat expectations. Following the strong 3Q17 results, we lift our 2017E/18E EPS by 14.8%/14.0% and our target price by 14% to RM47.5, factoring in higher MDI spreads in 2017/18E (RMB17.5k /17.0k per ton); we reiterate our Buy rating.

Bumpy near-term MDI prices while long-term prospects bright

Our channel check suggests that China MDI prices for Oct 12 fell by RMB1.5k-2k/ton (-4-5.5%), and the upcoming batch may sell at RMB33k/ton (a further RMB1.5k/ton drop). Given the tight supply-demand dynamics and high entry barriers, we remain positive on the MDI cycle and believe near-term pressure on MDI prices in China could provide better entry point for Wanhua (WHC).

Beat expectations: 3Q results backed by 46% QoQ rise in MDI spreads

MDI-Benzene spread picked up by 46% and averaged US\$3,565 in 3Q17 (MDI-Benzene spread rose 71% to US\$4,467/ton as of Sep 30 from Jun 30). The strong MDI spreads performance was boosted by the tight supply situation as a result of: 1) overseas capacity going into force majeure maintenance due to Hurricane Harvey hitting Texas; and 2) China domestic environmental scrutiny. Also, strong downstream demand in China continues, from both white appliances and construction materials, which has led to a short-term supply shortage in China with WHC twice changing its indicated selling prices, in Aug and Sep.

Valuation and risks

We base our RMB47.5 target price on 8.0x EV/EBITDA by using Gordon Growth Model which is at an 16% discount to its historical average of 9.5x. Our target price implies 5.0x 2017-18E P/B; we believe the premium to global peers is justified as its ROE averages 42.4% in 2017-18E, which is at a c.160% premium over the MDI peers. At the current price, the share trades at 6.4x 12-month forward EV/EBITDA, 3.8x 12-month forward P/B and 11x 12-month forward P/E. The 6.4x forward EV/EBITDA represents a 33% discount to its historical average. Key risks: 1) unplanned maintenance turnaround; 2) fluctuations in

Valuation & Risks

Vitus Leung

Research Analyst
+852-2203 6158

Johnson Wan

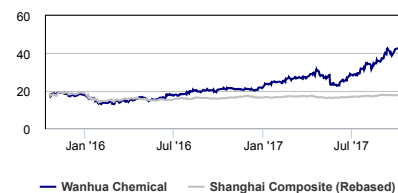
Research Analyst
+852-2203 6163

Key changes

TP	42.00 to 47.50	↑	13.1%
Sales (FYE)	41,398 to 43,051	↑	4.0%
Op prof margin (FYE)	30.2 to 33.0	↑	9.4%
Net profit (FYE)	7,609.7 to 8,737.2	↑	14.8%

Source: Deutsche Bank

Price/price relative



Performance (%)	1m	3m	12m
Absolute	-6.4	33.3	89.0
Shanghai Composite	0.6	6.2	10.9

Source: Deutsche Bank

Key indicators (FY1)

ROE (%)	46.2
Net debt/equity (%)	44.1
Book value/share (CNY)	8.43
Price/book (x)	4.6
Net interest cover (x)	17.2
Operating profit margin (%)	33.0

Source: Deutsche Bank

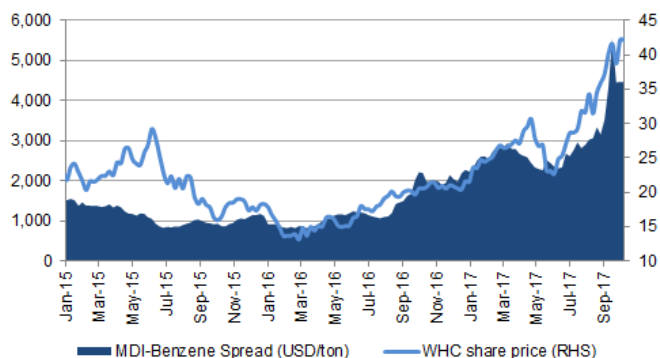
Deutsche Bank AG/Hong Kong

Deutsche Bank does and seeks to do business with companies covered in its resDistributed on: 19/10/2017 02:57:40 GMT 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. DISCLOSURES AND ANALYST CERTIFICATIONS ARE LOCATED IN APPENDIX 1. MCI (P) 083/04/2017. THE CONTENT MAY NOT BE DISTRIBUTED IN THE PEOPLE ' S REPUBLIC OF CHINA ("THE PRC") (EXCEPT IN COMPLIANCE WITH THE APPLICABLE LAWS AND REGULATIONS OF PRC), EXCLUDING SPECIAL ADMINISTRATIVE REGIONS OF HONG KONG AND MACAU.



oil and chemical product prices; 3) lower-than-expected GDP growth; and 4) unexpected corporate actions with demanding valuations.

Figure 1: MDI - Benzene spread vs. WHC share price



Source: Bloomberg Finance LP, WIND, Deutsche Bank

Figure 2: WHC target price: sensitivity to MDI / benzene prices

TP sensitivity RMB/sh		MDI Price						
		-15%	-10%	-5%	0%	5%	10%	15%
Benzene price	15%	30.4	34.6	38.7	42.8	46.9	51.0	55.1
	10%	32.0	36.1	40.2	44.3	48.5	52.6	56.7
	5%	33.6	37.7	41.8	45.9	50.0	54.1	58.2
	0%	35.2	39.3	43.4	47.5	51.6	55.7	59.8
	-5%	36.7	40.9	45.0	49.1	53.2	57.3	61.4
	-10%	38.3	42.4	46.5	50.7	54.8	58.9	63.0
	-15%	39.9	44.0	48.1	52.2	56.3	60.4	64.6

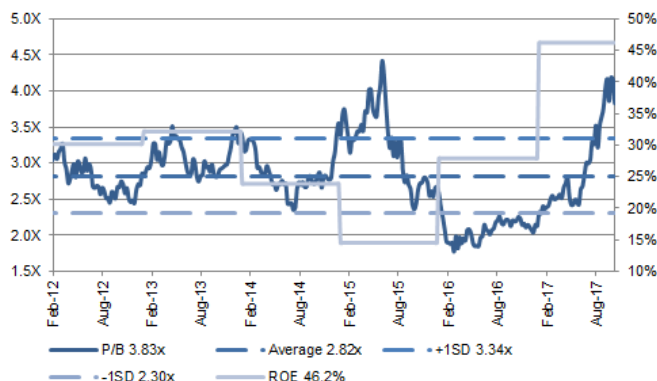
Source: Deutsche Bank estimates

Figure 3: 12-month forward EV/EBITDA



Source: Company data, Bloomberg Finance LP, Deutsche Bank estimates

Figure 4: 12-month forward P/B vs. ROE



Source: Company data, Bloomberg Finance LP, Deutsche Bank estimates

Forecasts and ratios

Year End Dec 31	2015A	2016A	2017E	2018E	2019E
Sales (CNYm)	19,492.4	30,099.9	43,051.2	47,474.6	53,041.4
EBITDA (CNYm)	4,636.7	8,108.0	17,554.5	19,676.0	21,232.9
Reported NPAT (CNYm)	1,609.7	3,679.4	8,737.2	10,063.5	11,021.7
Reported EPS FD(CNY)	0.62	1.42	3.20	3.68	4.03
DB EPS FD(CNY)	0.62	1.42	3.20	3.68	4.03
DB EPS growth (%)	-	128.6	125.9	14.9	9.5
Price/Book (x)	4.0	3.8	4.6	3.7	3.0
PER (x)	34.2	12.5	12.1	10.6	9.6
EV/EBITDA (x)	17.6	8.7	7.1	6.1	5.4
DPS (net) (CNY)	0.17	0.44	1.12	1.47	1.61
Yield (net) (%)	0.8	2.5	2.9	3.8	4.1

Source: Deutsche Bank estimates, company data



Figure 5: Key changes

RMB mn	New		Old		Changes	
	2017E	2018E	2017E	2018E	2017E	2018E
Revenue	43,051	47,475	41,398	46,413	4%	2%
GPM (%)	42.5%	43.3%	39.6%	40.0%	2.9% pt	3.4% pt
EBITDA	16,990	19,423	15,263	17,496	11.3%	11.0%
Net income	8,737	10,064	7,610	8,805	14.8%	14.3%
EPS (Rmb/sh)	3.2	3.7	2.8	3.2	14.8%	14.3%
ROIC (%)	26.0%	25.8%	23.4%	23.7%	2.6% pt	2.1% pt

Source: Company data, Deutsche Bank

Figure 6: WHC quarterly P&L

RMB mn	1Q16	2Q16	3Q16	4Q16	1Q17	2Q17	3Q17	QoQ	YoY
Revenue	5,299.6	7,176.2	8,456.4	9,167.7	11,007.0	13,423.0	14,533.4	8%	72%
Cost of Goods Sold	-3,869.0	-4,983.0	-5,776.8	-6,116.1	-6,688.9	-8,257.3	-8,816.2	7%	53%
Gross Profit	1,430.6	2,193.2	2,679.6	3,051.6	4,318.1	5,165.8	5,717.3	11%	113%
GPM%	27%	31%	32%	33%	39%	38%	39%	1%	8%
Operating expenses									
Tax other than income tax	-12.4	-34.2	-24.8	-132.4	-65.7	-102.4	-136.4	33%	450%
Sales/Marketing/Advertising Expenses	-244.1	-273.8	-286.1	-362.0	-304.2	-367.3	-365.1	-1%	28%
General and Administrative Expenses	-274.1	-353.0	-444.4	-351.8	-393.7	-417.8	-602.2	44%	36%
EBIT	900.1	1,532.2	1,924.4	2,205.3	3,554.6	4,278.2	4,613.6	8%	140%
EBIT margin	17%	21%	23%	24%	32%	32%	32%		
Total Financial Costs	-216.3	-211.4	-230.4	-231.8	-207.3	-243.1	-267.0	10%	16%
Write-Down/Impairment Of Fixed Assets	-28.3	-28.1	-0.3	-17.6	-72.0	-88.5	-48.3	-45%	16506%
Investment Income	-1.4	31.9	6.0	16.2	22.8	32.8	23.9	-27%	296%
Profits from operations (reported)	654.1	1,324.7	1,699.7	1,972.1	3,298.1	3,979.4	4,322.3	9%	154%
Other Non-Operating Income	22.4	28.7	17.5	21.1	55.2	-38.1	2.2	-106%	-87%
Other Non-Operating Expenses	-5.4	-2.6	-38.1	-41.1	-2.0	-6.8	-54.5	697%	43%
Profit before tax	671.0	1,350.8	1,679.1	1,952.2	3,351.4	3,934.4	4,269.9		
Income Tax Expense	-126.3	-262.1	-338.8	-377.8	-763.6	-817.1	-846.8	4%	150%
Effective tax rate (%)	19%	19%	20%	19%	23%	21%	20%	-5%	-2%
Profit after tax	544.8	1,088.7	1,340.2	1,574.4	2,587.8	3,117.3	3,423.2	10%	155%
Minority incmoe	101.1	164.3	207.9	395.2	392.8	555.8	503.2	-9%	142%
MI as %	19%	15%	16%	25%	15%	18%	15%	-18%	-5%
Net income	443.6	924.3	1,132.3	1,179.2	2,195.1	2,561.6	2,919.9	14%	158%
NI Margin %	8%	13%	13%	13%	20%	19%	20%	1%	7%
EPS (RMB/share) - Basic	0.21	0.32	0.44	0.73	0.96	0.83	1.08	30%	145%
EPS (RMB/share) - Diluted	0.21	0.32	0.44	0.73	0.96	0.83	1.08	30%	145%

Source: Company data, Deutsche Bank



Figure 7: Target price valuation

Target price valuation		2017E	2018E	2017-18E
EBITDA	RMB mn	16,990	19,423	18,206
Target EV/EBITDA		8.3	7.7	8.0
Enterprise value	RMB mn	141,806	149,501	146,049
Net Debt/ (Cash)	RMB mn	12,599	6,247	9,423
MI	RMB mn	5,575	7,951	6,763
Equity value	RMB mn	123,632	135,303	129,863
No. of Existing Shares	mn	2,734	2,734	2,734
Target Price	RMB/sh			47.5

Source: Deutsche Bank estimates

Figure 8: Target price implied valuation

TP Implied Valuation	2017E	2018E	2019E
P/E	14.83x	12.90x	11.78x
P/B	5.63x	4.47x	3.64x
EV/EBITDA	8.6x	7.5x	7.0x
EV/Sales	3.39x	3.08x	2.75x
ROIC	26.0%	25.8%	24.3%
ROE	46.2%	38.7%	34.1%
EPS (RMB/shr)	3.20	3.68	4.03
DPS (RMB/shr)	1.12	1.47	1.61

Source: Deutsche Bank estimates

Comps

Figure 9: Comps

Name	Ticker	Trading Curr	DB Rating	18-Oct Shr price	Mkt Cap (USD mn)	P/E (x)		P/B (x)		ROE (%)		Dvd yield (%)		EV/EBITDA (x)	
						FY17E	FY18E	FY17E	FY18E	FY17E	FY18E	FY17E	FY18E	FY17E	FY18E
Wanhua Chemical	600309.SS	CNY	Buy	38.89	16,064	12.1	10.6	4.6	3.7	46.2	38.7	2.9	3.8	7.1	6.1
China - A Share Listed															
SPC - A	600688.SS	CNY	Sell	6.18	9,022	11.6	10.0	2.4	2.1	21.9	22.5	3.9	4.5	5.6	4.6
Oriental Energy	002221.SZ	CNY	NR	10.66	2,656	13.4	10.2	2.2	1.8	16.9	18.4	1.2	1.3	NA	NA
Cangzhou Dahua	600230.SS	CNY	NR	53.11	2,360	12.5	11.8	5.7	3.8	53.4	38.3	NA	NA	NA	NA
Satellite Petrochemical	002648.SZ	CNY	NR	15.85	2,547	16.8	14.2	2.3	2.0	16.8	17.2	1.8	2.1	12.9	11.3
Luxi Chemical	000830.SZ	CNY	NR	10.92	2,416	13.9	10.0	1.7	1.5	12.9	15.1	5.5	7.4	8.7	7.5
Befar	601678.SS	CNY	NR	8.88	1,593	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Jiangshan Chemical	002061.SZ	CNY	NR	11.92	1,191	17.0	15.3	2.1	1.8	16.4	15.9	1.5	1.8	2.2	2.0
Skshu Paint	603737.SS	CNY	NR	72.01	1,088	37.9	26.3	6.0	5.3	16.8	20.5	0.5	0.8	26.7	20.0
Haiyue	600387.SS	CNY	NR	11.63	678	89.5	68.4	NA	NA	NA	NA	NA	NA	NA	NA
Hongbaoli	002165.SZ	CNY	NR	6.65	605	47.5	18.0	NA	NA	13.0	NA	NA	NA	NA	NA
Honghui New Materials	002802.SZ	CNY	NR	37.87	620	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Weighted average						14.5	11.7	3.3	2.7	30.1	26.6	2.6	3.2	6.1	5.2
Wanhua Chemical vs China - A Peers						-16%	-10%	41%	38%	53%	46%	12%	18%	16%	18%
Overseas Listed															
BASF	BASFn.DE	EUR	Buy	89.31	96,840	15.5	14.2	2.4	2.2	15.9	16.1	3.7	4.0	8.6	8.1
Covestro	1COV.DE	EUR	Buy	71.84	17,174	9.3	10.0	2.8	2.4	33.1	25.6	3.5	3.7	5.3	5.5
Solvay	SOLB.BR	EUR	Sell	124.60	15,184	15.5	18.1	1.3	1.2	8.4	6.9	2.9	3.0	9.3	8.0
Arkema	AKE.PA	EUR	Buy	103.10	9,216	15.8	13.4	1.7	1.6	11.3	12.4	2.4	2.7	7.4	6.6
Lanxess	LXSG.DE	EUR	Buy	66.14	7,146	38.2	15.3	2.3	2.1	6.1	14.2	1.2	1.7	9.0	8.5
Synthomer	SYNTS.L	GBP	Buy	480.70	2,169	19.2	16.1	4.4	3.8	24.4	25.4	2.5	2.7	12.6	11.1
Weighted average						15.9	14.1	2.3	2.1	16.5	16.0	3.4	3.6	8.3	7.7
Wanhua Chemical vs Overseas Peers						-24%	-25%	102%	74%	180%	141%	-15%	4%	-15%	-21%
HK Listed															
PetroChina	0857.HK	HKD	Hold	5.05	211,577	36.0	19.1	0.6	0.6	1.8	3.4	2.9	2.4	5.9	5.5
Sinopec	0386.HK	HKD	Buy	5.82	103,324	11.6	9.5	0.8	0.8	7.1	8.3	4.5	5.8	3.6	3.1
CNOOC Ltd	0883.HK	HKD	Buy	10.20	58,334	12.2	10.8	1.0	0.9	8.1	8.8	4.9	5.6	4.6	4.3
SPC - H	0338.HK	HKD	Buy	4.84	9,022	7.7	6.6	1.6	1.4	21.9	22.5	5.9	6.8	5.6	4.6
Weighted average						25.1	15.0	0.8	0.7	4.7	6.0	3.7	3.9	5.1	4.6
Wanhua Chemical vs HK Listed Peers						-52%	-29%	504%	395%	891%	546%	-22%	-2%	40%	31%

Source: Bloomberg Finance LP, Deutsche Bank estimates; Note: Bloomberg consensus estimates for non-rated (NR) companies



Model updated: 18 October 2017

Running the numbers

Asia

China

Chemicals

Wanhua Chemical

Reuters: 600309.SS Bloomberg: 600309 CH

Buy

Price (17 Oct 17) CNY 38.89

Target Price CNY 47.50

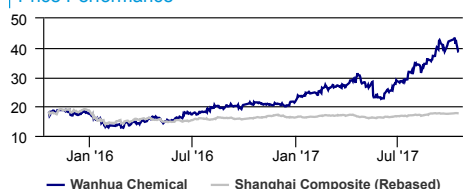
52 Week range CNY 20.05 - 43.45

Market cap (m) CNYm 106,326
USDm 16,074

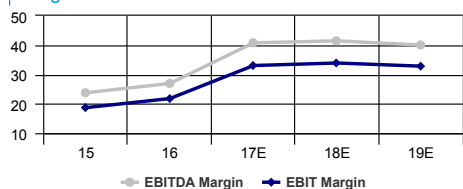
Company Profile

Wanhua Chemical Group Co. Ltd (WHC) was founded in 1998. The company engages in the production, sales, R&D of downstream chemical products such as isocyanate, polyol, and polyurethane. WHC is the largest MDI producer in the world with more than 24% market shares globally as of 2016. Moreover, the company started six new business segments, including intermediate chemicals products, polycarbonate (PC), TPU,

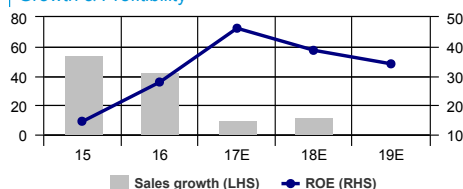
Price Performance



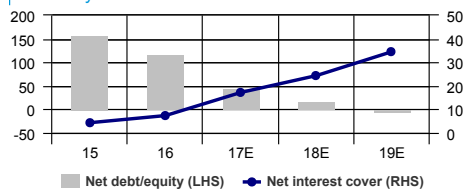
Margin Trends



Growth & Profitability



Solvency



Vitus Leung

+852 2203 6158

vitus.leung@db.com

Fiscal year end 31-Dec

Financial Summary

	2015	2016	2017E	2018E	2019E
DB EPS (CNY)	0.62	1.42	3.20	3.68	4.03
Reported EPS (CNY)	0.62	1.42	3.20	3.68	4.03
DPS (CNY)	0.17	0.44	1.12	1.47	1.61
BVPS (CNY)	4.5	5.7	8.4	10.6	13.0
Weighted average shares (m)	2,595	2,595	2,728	2,734	2,734
Average market cap (CNYm)	54,994	45,932	106,326	106,326	106,326
Enterprise value (CNYm)	81,640	70,766	124,137	120,160	114,821

Valuation Metrics

P/E (DB) (x)	34.2	12.5	12.1	10.6	9.6
P/E (Reported) (x)	34.2	12.5	12.1	10.6	9.6
P/BV (x)	3.96	3.77	4.61	3.66	2.98
FCF Yield (%)	nm	nm	9.9	10.4	12.1
Dividend Yield (%)	0.8	2.5	2.9	3.8	4.1
EV/Sales (x)	4.2	2.4	2.9	2.5	2.2
EV/EBITDA (x)	17.6	8.7	7.1	6.1	5.4
EV/EBIT (x)	22.4	10.8	8.7	7.5	6.6

Income Statement (CNYm)

Sales revenue	19,492	30,100	43,051	47,475	53,041
Gross profit	5,872	9,355	18,291	20,576	22,418
EBITDA	4,637	8,108	17,554	19,676	21,233
Depreciation	934	1,473	3,153	3,390	3,616
Amortisation	55	73	174	190	205
EBIT	3,648	6,562	14,228	16,096	17,412
Net interest income/(expense)	-841	-890	-826	-660	-504
Associates/affiliates	0	0	0	0	0
Exceptionals/extraordinary	5	-74	0	0	0
Other pre-tax income/(expense)	143	55	22	25	25
Profit before tax	2,954	5,653	13,424	15,462	16,934
Income tax expense	675	1,105	2,624	3,022	3,310
Minorities	670	869	2,063	2,376	2,602
Other post-tax income/(expense)	0	0	0	0	0
Net profit	1,610	3,679	8,737	10,064	11,022
DB adjustments (including dilution)	0	0	0	0	0
DB Net profit	1,610	3,679	8,737	10,064	11,022

Cash Flow (CNYm)

Cash flow from operations	4,021	4,602	13,769	14,637	16,453
Net Capex	-9,050	-5,097	-3,300	-3,600	-3,600
Free cash flow	-5,029	-495	10,469	11,037	12,853
Equity raised/(bought back)	0	0	2,500	0	0
Dividends paid	-2,851	-1,866	-3,884	-4,685	-4,912
Net inc/(dec) in borrowings	7,706	3,607	-4,893	-2,652	-2,214
Other investing/financing cash flows	180	-179	0	0	0
Net cash flow	6	1,068	4,193	3,700	5,727
Change in working capital	-1,079	-69	-1,183	-2,042	-1,495

Balance Sheet (CNYm)

Cash and other liquid assets	2,066	1,987	6,179	9,880	15,607
Tangible fixed assets	20,046	28,468	28,902	28,879	28,518
Goodwill/intangible assets	2,530	2,889	3,135	3,402	3,654
Associates/investments	186	363	363	363	363
Other assets	22,976	17,058	19,486	22,710	24,874
Total assets	47,804	50,765	58,065	65,234	73,016
Interest bearing debt	25,646	23,672	18,779	16,127	13,913
Other liabilities	7,335	8,759	10,710	12,117	12,898
Total liabilities	32,981	32,431	29,489	28,244	26,811
Shareholders' equity	11,571	14,822	23,001	29,039	35,652
Minorities	3,252	3,512	5,575	7,951	10,553
Total shareholders' equity	14,823	18,334	28,576	36,990	46,205
Net debt	23,580	21,685	12,599	6,247	-1,694

Key Company Metrics

Sales growth (%)	nm	54.4	43.0	10.3	11.7
DB EPS growth (%)	na	128.6	125.9	14.9	9.5
EBITDA Margin (%)	23.8	26.9	40.8	41.4	40.0
EBIT Margin (%)	18.7	21.8	33.0	33.9	32.8
Payout ratio (%)	26.9	31.0	35.0	40.0	40.0
ROE (%)	14.5	27.9	46.2	38.7	34.1
Capex/sales (%)	46.4	17.1	7.7	7.6	6.8
Capex/depreciation (x)	9.2	3.3	1.0	1.0	0.9
Net debt/equity (%)	159.1	118.3	44.1	16.9	-3.7
Net interest cover (x)	4.3	7.4	17.2	24.4	34.6

Source: Company data, Deutsche Securities estimates



Appendix 1

Important Disclosures

*Other information available upon request

Disclosure checklist			
Company	Ticker	Recent price*	Disclosure
Wanhua Chemical	600309.SS	37.70 (CNY) 18 Oct 2017	NA

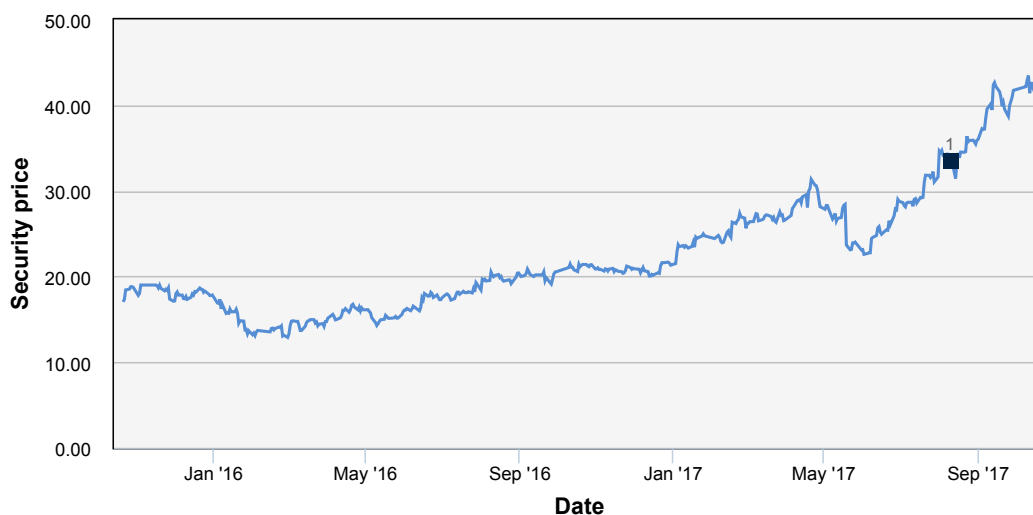
*Prices are current as of the end of the previous trading session unless otherwise indicated and are sourced from local exchanges via Reuters, Bloomberg, and other vendors. Other information is sourced from Deutsche Bank, subject companies, and other sources. For disclosures pertaining to recommendations or estimates made on securities other than the primary subject of this research, please see the most recently published company report or visit our global disclosure look-up page on our website at <http://gm.db.com/ger/disclosure/DisclosureDirectory.egsr>. Aside from within this report, important conflict disclosures can also be found at <https://gm/db.com/equities> under the "Disclosures Lookup" and "Legal" tabs. Investors are strongly encouraged to review this information before investing.

Analyst Certification

The views expressed in this report accurately reflect the personal views of the undersigned lead analyst(s) about the subject issuer and the securities of the issuer. In addition, the undersigned lead analyst(s) has not and will not receive any compensation for providing a specific recommendation or view in this report. Vitus Leung

Historical recommendations and target price. Wanhua Chemical (600309.SS)

(as of 10/17/2017)



Current Recommendations

- Buy
- Hold
- Sell
- Not Rated
- Suspended Rating

** Analyst is no longer at Deutsche Bank

1. 08/11/2017 Buy, Target Price Change CNY 42,00 Vitus Leung



Equity Rating Key

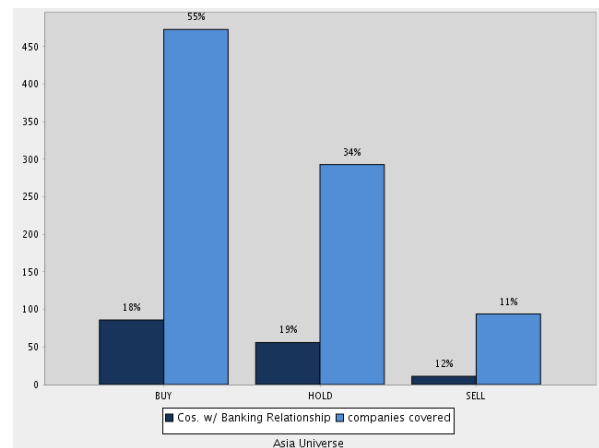
Buy: Based on a current 12- month view of total share-holder return (TSR = percentage change in share price from current price to projected target price plus pro-jected dividend yield) , we recommend that investors buy the stock.

Sell: Based on a current 12-month view of total share-holder return, we recommend that investors sell the stock.

Hold: We take a neutral view on the stock 12-months out and, based on this time horizon, do not recommend either a Buy or Sell.

Newly issued research recommendations and target prices supersede previously published research.

Equity rating dispersion and banking relationships





Additional Information

The information and opinions in this report were prepared by Deutsche Bank AG or one of its affiliates (collectively "Deutsche Bank"). Though the information herein is believed to be reliable and has been obtained from public sources believed to be reliable, Deutsche Bank makes no representation as to its accuracy or completeness. Hyperlinks to third-party websites in this report are provided for reader convenience only. Deutsche Bank neither endorses the content nor is responsible for the accuracy or security controls of these websites.

If you use the services of Deutsche Bank in connection with a purchase or sale of a security that is discussed in this report, or is included or discussed in another communication (oral or written) from a Deutsche Bank analyst, Deutsche Bank may act as principal for its own account or as agent for another person.

Deutsche Bank may consider this report in deciding to trade as principal. It may also engage in transactions, for its own account or with customers, in a manner inconsistent with the views taken in this research report. Others within Deutsche Bank, including strategists, sales staff and other analysts, may take views that are inconsistent with those taken in this research report. Deutsche Bank issues a variety of research products, including fundamental analysis, equity-linked analysis, quantitative analysis and trade ideas. Recommendations contained in one type of communication may differ from recommendations contained in others, whether as a result of differing time horizons, methodologies or otherwise. Deutsche Bank and/or its affiliates may also be holding debt or equity securities of the issuers it writes on. Analysts are paid in part based on the profitability of Deutsche Bank AG and its affiliates, which includes investment banking, trading and principal trading revenues.

Opinions, estimates and projections constitute the current judgment of the author as of the date of this report. They do not necessarily reflect the opinions of Deutsche Bank and are subject to change without notice. Deutsche Bank provides liquidity for buyers and sellers of securities issued by the companies it covers. Deutsche Bank research analysts sometimes have shorter-term trade ideas that are consistent or inconsistent with Deutsche Bank's existing longer term ratings. Trade ideas for equities can be found at the SOLAR link at <http://gm.db.com>. A SOLAR idea represents a high conviction belief by an analyst that a stock will outperform or underperform the market and/or sector delineated over a time frame of no less than two weeks. In addition to SOLAR ideas, the analysts named in this report may from time to time discuss with our clients, Deutsche Bank salespersons and Deutsche Bank traders, trading strategies or ideas that reference catalysts or events that may have a near-term or medium-term impact on the market price of the securities discussed in this report, which impact may be directionally counter to the analysts' current 12-month view of total return or investment return as described herein. Deutsche Bank has no obligation to update, modify or amend this report or to otherwise notify a recipient thereof if any opinion, forecast or estimate contained herein changes or subsequently becomes inaccurate. Coverage and the frequency of changes in market conditions and in both general and company specific economic prospects make it difficult to update research at defined intervals. Updates are at the sole discretion of the coverage analyst concerned or of the Research Department Management and as such the majority of reports are published at irregular intervals. This report is provided for informational purposes only and does not take into account the particular investment objectives, financial situations, or needs of individual clients. It is not an offer or a solicitation of an offer to buy or sell any financial instruments or to participate in any particular trading strategy. Target prices are inherently imprecise and a product of the analyst's judgment. The financial instruments discussed in this report may not be suitable for all investors and investors must make their own informed investment decisions. Prices and availability of financial instruments are subject to change without notice and investment transactions can lead to losses as a result of price fluctuations and other factors. If a financial instrument is denominated in a currency other than an investor's currency, a change in exchange rates may adversely affect the investment. Past performance is not necessarily indicative of future results. Unless otherwise indicated, prices are current as of the end of the previous trading session, and are sourced from local exchanges via Reuters, Bloomberg and other vendors. Data is sourced from Deutsche Bank, subject companies, and in some cases, other parties.

The Deutsche Bank Research Department is independent of other business areas divisions of the Bank. Details regarding our organizational arrangements and information barriers we have to prevent and avoid conflicts of interest with respect to our research is available on our website under Disclaimer found on the Legal tab.



Macroeconomic fluctuations often account for most of the risks associated with exposures to instruments that promise to pay fixed or variable interest rates. For an investor who is long fixed rate instruments (thus receiving these cash flows), increases in interest rates naturally lift the discount factors applied to the expected cash flows and thus cause a loss. The longer the maturity of a certain cash flow and the higher the move in the discount factor, the higher will be the loss. Upside surprises in inflation, fiscal funding needs, and FX depreciation rates are among the most common adverse macroeconomic shocks to receivers. But counterparty exposure, issuer creditworthiness, client segmentation, regulation (including changes in assets holding limits for different types of investors), changes in tax policies, currency convertibility (which may constrain currency conversion, repatriation of profits and/or the liquidation of positions), and settlement issues related to local clearing houses are also important risk factors to be considered. The sensitivity of fixed income instruments to macroeconomic shocks may be mitigated by indexing the contracted cash flows to inflation, to FX depreciation, or to specified interest rates – these are common in emerging markets. It is important to note that the index fixings may – by construction – lag or mis-measure the actual move in the underlying variables they are intended to track. The choice of the proper fixing (or metric) is particularly important in swaps markets, where floating coupon rates (i.e., coupons indexed to a typically short-dated interest rate reference index) are exchanged for fixed coupons. It is also important to acknowledge that funding in a currency that differs from the currency in which coupons are denominated carries FX risk. Naturally, options on swaps (swaptions) also bear the risks typical to options in addition to the risks related to rates movements.

Derivative transactions involve numerous risks including, among others, market, counterparty default and illiquidity risk. The appropriateness or otherwise of these products for use by investors is dependent on the investors' own circumstances including their tax position, their regulatory environment and the nature of their other assets and liabilities, and as such, investors should take expert legal and financial advice before entering into any transaction similar to or inspired by the contents of this publication. The risk of loss in futures trading and options, foreign or domestic, can be substantial. As a result of the high degree of leverage obtainable in futures and options trading, losses may be incurred that are greater than the amount of funds initially deposited. Trading in options involves risk and is not suitable for all investors. Prior to buying or selling an option investors must review the "Characteristics and Risks of Standardized Options", at <http://www.optionsclearing.com/about/publications/character-risks.jsp>. If you are unable to access the website please contact your Deutsche Bank representative for a copy of this important document.

Participants in foreign exchange transactions may incur risks arising from several factors, including the following: (i) exchange rates can be volatile and are subject to large fluctuations; (ii) the value of currencies may be affected by numerous market factors, including world and national economic, political and regulatory events, events in equity and debt markets and changes in interest rates; and (iii) currencies may be subject to devaluation or government imposed exchange controls which could affect the value of the currency. Investors in securities such as ADRs, whose values are affected by the currency of an underlying security, effectively assume currency risk.

Unless governing law provides otherwise, all transactions should be executed through the Deutsche Bank entity in the investor's home jurisdiction. Aside from within this report, important conflict disclosures can also be found at <https://gm.db.com/equities> under the "Disclosures Lookup" and "Legal" tabs. Investors are strongly encouraged to review this information before investing.

Deutsche Bank (which includes Deutsche Bank AG, its branches and all affiliated companies) is not acting as a financial adviser, consultant or fiduciary to you, any of your agents (collectively, "You" or "Your") with respect to any information provided in the materials attached hereto. Deutsche Bank does not provide investment, legal, tax or accounting advice, Deutsche Bank is not acting as Your impartial adviser, and does not express any opinion or recommendation whatsoever as to any strategies, products or any other information presented in the materials. Information contained herein is being provided solely on the basis that the recipient will make an independent assessment of the merits of any investment decision, and it does not constitute a recommendation of, or express an opinion on, any product or service or any trading strategy.

The information presented is general in nature and is not directed to retirement accounts or any specific person or account type, and is therefore provided to You on the express basis that it is not advice, and You may not rely upon it in making Your decision. The information we provide is being directed only to persons we believe to be financially sophisticated, who are capable of evaluating investment risks independently, both in general and with regard to particular transactions and investment strategies, and who understand that Deutsche Bank has financial interests in the offering of its products



and services. If this is not the case, or if You are an IRA or other retail investor receiving this directly from us, we ask that you inform us immediately.

United States: Approved and/or distributed by Deutsche Bank Securities Incorporated, a member of FINRA, NFA and SIPC. Analysts located outside of the United States are employed by non-US affiliates that are not subject to FINRA regulations.

Germany: Approved and/or distributed by Deutsche Bank AG, a joint stock corporation with limited liability incorporated in the Federal Republic of Germany with its principal office in Frankfurt am Main. Deutsche Bank AG is authorized under German Banking Law and is subject to supervision by the European Central Bank and by BaFin, Germany's Federal Financial Supervisory Authority.

United Kingdom: Approved and/or distributed by Deutsche Bank AG acting through its London Branch at Winchester House, 1 Great Winchester Street, London EC2N 2DB. Deutsche Bank AG in the United Kingdom is authorised by the Prudential Regulation Authority and is subject to limited regulation by the Prudential Regulation Authority and Financial Conduct Authority. Details about the extent of our authorisation and regulation are available on request.

Hong Kong: Distributed by Deutsche Bank AG, Hong Kong Branch or Deutsche Securities Asia Limited.

India: Prepared by Deutsche Equities India Pvt Ltd, which is registered by the Securities and Exchange Board of India (SEBI) as a stock broker. Research Analyst SEBI Registration Number is INH000001741. DEIPL may have received administrative warnings from the SEBI for breaches of Indian regulations.

Japan: Approved and/or distributed by Deutsche Securities Inc.(DSI). Registration number - Registered as a financial instruments dealer by the Head of the Kanto Local Finance Bureau (Kinsho) No. 117. Member of associations: JSDA, Type II Financial Instruments Firms Association and The Financial Futures Association of Japan. Commissions and risks involved in stock transactions - for stock transactions, we charge stock commissions and consumption tax by multiplying the transaction amount by the commission rate agreed with each customer. Stock transactions can lead to losses as a result of share price fluctuations and other factors. Transactions in foreign stocks can lead to additional losses stemming from foreign exchange fluctuations. We may also charge commissions and fees for certain categories of investment advice, products and services. Recommended investment strategies, products and services carry the risk of losses to principal and other losses as a result of changes in market and/or economic trends, and/or fluctuations in market value. Before deciding on the purchase of financial products and/or services, customers should carefully read the relevant disclosures, prospectuses and other documentation. "Moody's", "Standard & Poor's", and "Fitch" mentioned in this report are not registered credit rating agencies in Japan unless Japan or "Nippon" is specifically designated in the name of the entity. Reports on Japanese listed companies not written by analysts of DSI are written by Deutsche Bank Group's analysts with the coverage companies specified by DSI. Some of the foreign securities stated on this report are not disclosed according to the Financial Instruments and Exchange Law of Japan. Target prices set by Deutsche Bank's equity analysts are based on a 12-month forecast period.

Korea: Distributed by Deutsche Securities Korea Co.

South Africa: Deutsche Bank AG Johannesburg is incorporated in the Federal Republic of Germany (Branch Register Number in South Africa: 1998/003298/10).

Singapore: by Deutsche Bank AG, Singapore Branch or Deutsche Securities Asia Limited, Singapore Branch (One Raffles Quay #18-00 South Tower Singapore 048583, +65 6423 8001), which may be contacted in respect of any matters arising from, or in connection with, this report. Where this report is issued or promulgated in Singapore to a person who is not an accredited investor, expert investor or institutional investor (as defined in the applicable Singapore laws and regulations), they accept legal responsibility to such person for its contents.

Taiwan: Information on securities/investments that trade in Taiwan is for your reference only. Readers should independently evaluate investment risks and are solely responsible for their investment decisions. Deutsche Bank research may not be distributed to the Taiwan public media or quoted or used by the Taiwan public media without written consent. Information on securities/instruments that do not trade in Taiwan is for informational purposes only and is not to be



construed as a recommendation to trade in such securities/instruments. Deutsche Securities Asia Limited, Taipei Branch may not execute transactions for clients in these securities/instruments.

Qatar: Deutsche Bank AG in the Qatar Financial Centre (registered no. 00032) is regulated by the Qatar Financial Centre Regulatory Authority. Deutsche Bank AG - QFC Branch may only undertake the financial services activities that fall within the scope of its existing QFCRA license. Principal place of business in the QFC: Qatar Financial Centre, Tower, West Bay, Level 5, PO Box 14928, Doha, Qatar. This information has been distributed by Deutsche Bank AG. Related financial products or services are only available to Business Customers, as defined by the Qatar Financial Centre Regulatory Authority.

Russia: This information, interpretation and opinions submitted herein are not in the context of, and do not constitute, any appraisal or evaluation activity requiring a license in the Russian Federation.

Kingdom of Saudi Arabia: Deutsche Securities Saudi Arabia LLC Company, (registered no. 07073-37) is regulated by the Capital Market Authority. Deutsche Securities Saudi Arabia may only undertake the financial services activities that fall within the scope of its existing CMA license. Principal place of business in Saudi Arabia: King Fahad Road, Al Olaya District, P.O. Box 301809, Faisaliah Tower - 17th Floor, 11372 Riyadh, Saudi Arabia.

United Arab Emirates: Deutsche Bank AG in the Dubai International Financial Centre (registered no. 00045) is regulated by the Dubai Financial Services Authority. Deutsche Bank AG - DIFC Branch may only undertake the financial services activities that fall within the scope of its existing DFSA license. Principal place of business in the DIFC: Dubai International Financial Centre, The Gate Village, Building 5, PO Box 504902, Dubai, U.A.E. This information has been distributed by Deutsche Bank AG. Related financial products or services are only available to Professional Clients, as defined by the Dubai Financial Services Authority.

Australia: Retail clients should obtain a copy of a Product Disclosure Statement (PDS) relating to any financial product referred to in this report and consider the PDS before making any decision about whether to acquire the product. Please refer to Australian specific research disclosures and related information at <https://australia.db.com/australia/content/research-information.html>

Australia and New Zealand: This research is intended only for "wholesale clients" within the meaning of the Australian Corporations Act and New Zealand Financial Advisors Act respectively.

Additional information relative to securities, other financial products or issuers discussed in this report is available upon request. This report may not be reproduced, distributed or published without Deutsche Bank's prior written consent. Copyright © 2017 Deutsche Bank AG



David Folkerts-Landau

Group Chief Economist and Global Head of Research

Raj Hindocha
Global Chief Operating Officer
Research

Michael Spencer
Head of APAC Research
Global Head of Economics

Steve Pollard
Head of Americas Research
Global Head of Equity Research

Anthony Klarman
Global Head of
Debt Research

Paul Reynolds
Head of EMEA
Equity Research

Dave Clark
Head of APAC
Equity Research

Pam Finelli
Global Head of
Equity Derivatives Research

Andreas Neubauer
Head of Research - Germany

Spyros Mesomeris
Global Head of Quantitative
and QIS Research

International locations

Deutsche Bank AG

Deutsche Bank Place
Level 16
Corner of Hunter & Phillip Streets
Sydney, NSW 2000
Australia
Tel: (61) 2 8258 1234

Deutsche Bank AG

Mainzer Landstrasse 11-17
60329 Frankfurt am Main
Germany
Tel: (49) 69 910 00

Deutsche Bank AG

Filiale Hongkong
International Commerce Centre,
1 Austin Road West, Kowloon,
Hong Kong
Tel: (852) 2203 8888

Deutsche Securities Inc.

2-11-1 Nagatacho
Sanno Park Tower
Chiyoda-ku, Tokyo 100-6171
Japan
Tel: (81) 3 5156 6770

Deutsche Bank AG London

1 Great Winchester Street
London EC2N 2EQ
United Kingdom
Tel: (44) 20 7545 8000

Deutsche Bank Securities Inc.

60 Wall Street
New York, NY 10005
United States of America
Tel: (1) 212 250 2500
