Quantitative Monographs

How to pick stocks in China's domestic market – from a quant perspective

Equities

Global
Quantitative

Shanle Wu, PhD
Analyst
shanle.wu@ubs.com
+852-2971 7513

Paul Winter
Analyst
paul-j.winter@ubs.com
+61-2-9324 2080

Oliver Antrobus, CFA
Analyst
oliver.antrobus@ubs.com
+61-3-9242 6467

Luke Brown, CFA
Analyst
luke.brown@ubs.com
+61-2-9324 3620

Pieter Stoltz
Analyst
pieter.stoltz@ubs.com
+61-2-9324 3779

David Jessop
Analyst
david.jessop@ubs.com
+44-20-7567 9882

Nick Baltas, PhD
Analyst
nick.baltas@ubs.com
+44-20-7568 3072

Josh Holcroft
Analyst
josh.holcroft@ubs.com
+852-2971 7705

Ting Gao
Strategist
S1460515090002
ting.gao@ubssecurities.com
+86-213-866 8856

Our first quant alpha model for China's domestic market
We introduce a static six-factor model, attempting to mimic a typical selection process for an investor seeking stocks with attractive valuation, quality and earning profiles. The six factors we use are Earnings Yield, Book to Price, ROE, Three-month Return Volatility, Three-month Earnings Momentum and Earnings certainty. We believe the model is simple and transparent and back-testing suggests strong performance over the past decade.

A defensive model to weather storms and turbulence
Back-testing shows the model would have delivered much stronger performance in down markets. A Top 10 basket would have outperformed the market by 32% (pre-cost per annum) during down markets compared with 8% (pre-cost per annum) in up markets. The model benefits from the stronger diversification effect among the six factors during down markets; and the stocks selected by the model naturally tilt towards large-cap and low-volatility names.

Issues in the real world
We look beyond the paper portfolio and incorporate some of the major issues we would face in reality, including transaction costs, suspensions, and price limits. After taking into account the impact of all three in our back-testing, the model would have still delivered strong returns. After costs, a Top 10 basket would have outperformed the benchmark by 13.5% per annum.

Monthly screen
The portfolio is rebalanced on a monthly basis and we will publish a model update and screen at the beginning of each month.

Figure 1: What does the model say at the moment (as of end December 2016)

Ticker	Company Name	Industry	P/BV	PE	ROE (%)
601166	INDUSTRIAL BANK CO LTD -A	Financials	0.8	5.6	15.1
600177	YOUNGOR GROUP CO-A	Real Estate	1.4	8.3	16.9
600066	ZHENGZHOU YUTONG BUS CO -A	Industrials	2.5	9.8	27.5
601939	CHINA CONSTRUCTION BANK-A	Financials	0.8	5.8	13.7
600060	HISENSE ELECTRIC CO LTD-A	Consumer Discretionary	1.5	10.9	13.7
600036	CHINA MERCHANTS BANK-A	Financials	1.0	6.7	15.3
601398	IND & COMM BK OF CHINA-A	Financials	0.7	5.7	13.7
600064	NANJING GAOKE CO LTD-A	Real Estate	1.2	9.3	17.1
601988	BANK OF CHINA LTD-A	Financials	0.7	5.8	11.7
601818	CHINA EVERBRIGHT BANK CO-A	Financials	0.7	5.8	12.9

Source: Wind, MSCI, UBS Quantitative Research

Contents

Shanle Wu, PhD
Analyst
shanle.wu@ubs.com
+852-2971 7513

Paul Winter
Analyst
paul-j.winter@ubs.com
+61-2-9324 2080

Oliver Antrobus, CFA
Analyst
oliver.antrobus@ubs.com
+61-3-9242 6467

Luke Brown, CFA
Analyst
luke.brown@ubs.com
+61-2-9324 3620

Pieter Stoltz
Analyst
pieter.stoltz@ubs.com
+61-2-9324 3779

David Jessop
Analyst
david.jessop@ubs.com
+44-20-7567 9882

Nick Baltas, PhD
Analyst
nick.baltas@ubs.com
+44-20-7568 3072

Josh Holcroft
Analyst
josh.holcroft@ubs.com
+852-2971 7705

Ting Gao
Strategist
S1460515090002
ting.gao@ubssecurities.com
+86-213-866 8856

Summary

Since we launched our coverage of China A-shares, one of the most-asked questions has been how to pick stocks. In this report, we introduce a six-factor stock scoring model, seeking stocks with an attractive valuation, quality, and earning profiles. The six factors we use are shown in Figure 2.

A static six-factor model mimicking a typical stock selection process

Figure 2: Six-factor model

Value	Quality	Earnings
• Earnings Yield • Book to Price	• ROE • Three-month Return Volatility	• Three-month Earnings Momentum • Earnings Certainty

Source: UBS Quantitative Research

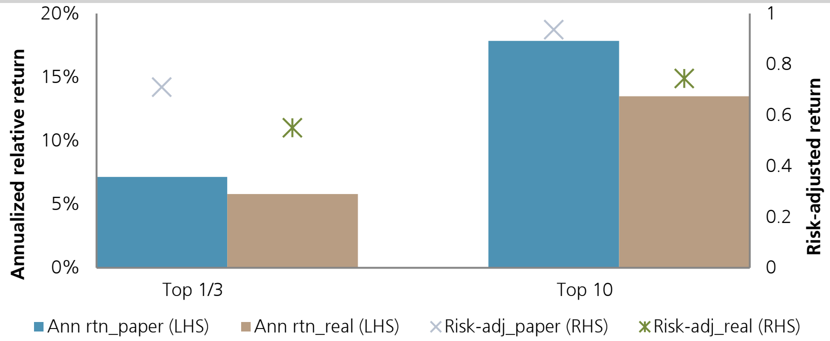
We take a balanced stance between the two factors in each category and among the three categories by assigning equal weights to each factor pair and assigning equal weights to the composite scores of the three categories.

Back-testing shows the model would have produced strong performance over the past decade, especially during down markets. It tends to pick stocks with larger market capitalizations and lower return volatilities.

A defensive model with strong performance even after considering the impact of transaction costs, suspensions, and price limits in our back-testing

Besides the paper portfolio, we also took a step further and considered the impact of transaction costs, suspensions, and price limits in our back-testing. The 'real' portfolio after taking into account these effects would have still generated strong returns.

Figure 3: Back-testing the model's relative performance the past decade



Note: The back-test is run on MSCI China A universe and the relative performance is calculated against this benchmark. The 'real' portfolio refers to the portfolios that take into account transaction costs, suspensions, and price limits; the 'paper' portfolio refers to the portfolios that do not. For the Top 10 real portfolio, we apply a buffer of 20 stocks. See on page 10 for details.

Source: Wind, MSCI, UBS Quantitative Research

Static multifactor alpha model – a transparent box

Since we launched our coverage of China A-shares, one of the most-asked questions has been how to pick stocks. The common top-down approach in practice is to screen stocks based on various criteria, aiming to capture stocks with desired characteristics.

In this report, we introduce a multi-factor stock-scoring model. The model attempts to mimic a typical selection process for an investor seeking stocks with attractive valuations, quality, and earning profiles.

A simple six-factor static model

Balance between intuition, performance, and practicality

In developing the model, we sought to balance intuition, performance, and practicality. We start with a static model. A complicated dynamic model may produce higher returns, but it is less transparent and may also induce high turnover, which in turn would dampen performance in practice. We try to select the factors that fit investors' investment intuition, instead of simply picking the factors that have performed the best in the past. Our model is based on a combination of six factors, belonging to the value, quality, and earnings categories:

- Value: Earnings Yield, Book to Price
- Quality: ROE, Three-month Return Volatility
- Earnings: Three-month Earnings Momentum, Earnings Certainty

Why not small cap and price reversal?

We do not include the size and price-reversal factors in our model even though they have been two of the best-performing factor categories over the past decade[1]. As different investors may have different investment mandates and size restrictions, we do not want to build a small-cap tilt into our model.

The price-reversal effect is strong and is unique to the China domestic market. This is at least partially driven by the investor structure and behavior in the market. Retail investors, who have dominated the market, usually have very short holding periods. As the market further develops, the investor structure may change and investors may also become more sophisticated. Whether this reversal effect will last forever is questionable. And, last but not least, the high turnover in a price-reversal strategy leads to high trading costs. The performance may look good on paper, but in practice it is not.

By combining the six factors mentioned above, we aim to look for stocks with transparent and improving earnings, good profitability, stable price performance, and reasonable valuation.

The model grades stocks according to these six factors and provides an aggregate score of a stock's attractiveness compared with that of other stocks in the market (see the Appendix for details on the calculation of scores).

[1] For single-factor performance, please see our 24 October 2016 report: China domestic market—alpha opportunity for quantitative investors

Is there a diversification effect?

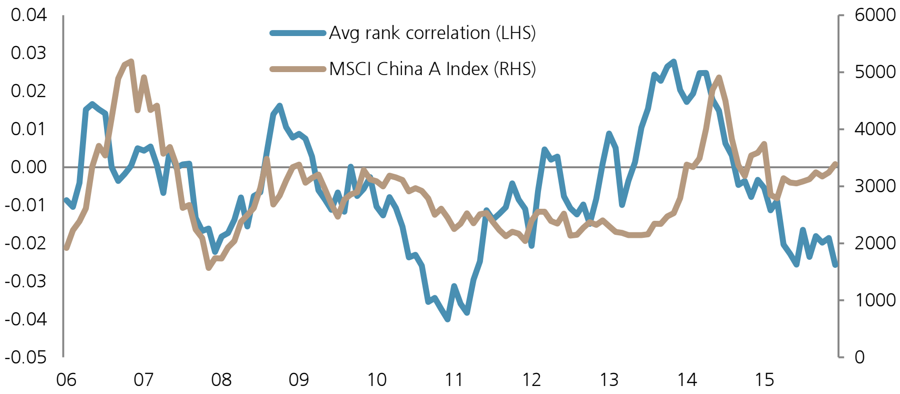
One of the benefits of using a multi-factor model is diversification. The average rank coefficients between the factor blocks are very close to zero and slightly negative (see Figure 4). It suggests that each of the factor blocks does pick up different information on the stocks.

Figure 4: Rank correlation between factor blocks

	Quality	Earnings
Value	-0.005	-0.009
Quality		-0.007

Source: Wind, MSCI, UBS Quantitative Research

Figure 5: Average rank correlation between factor blocks[2]



Source: Wind, MSCI, UBS Quantitative Research

Diversification effect is strong during a down market

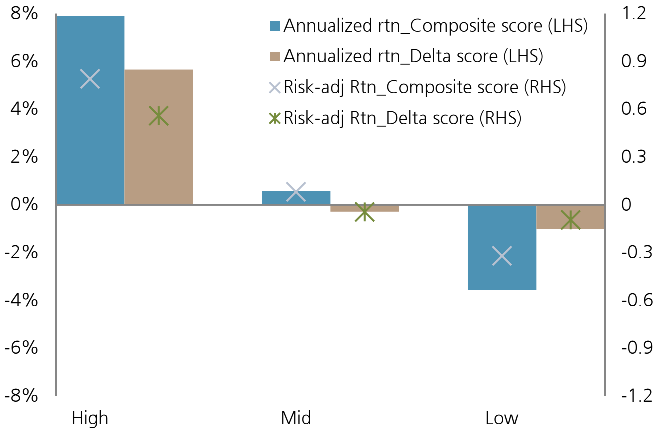
Looking through time, one major period when the rank correlation stayed positive was from end of 2013 until mid-2015. During this period, the rank correlation among all three pairs (i.e., the value-quality pair, the value-earnings pair, and the quality-earnings pair) was mostly positive, and as a result the diversification effect was not as good (see Figure 5). What is more, we found a general positive correlation between the rank correlation and market performance. In other words, the diversification effect is strong when the market performance is bad, and vice versa.

Back-testing the model's performance

We back-tested two models in the MSCI China A index universe, one with a composite score, one with a delta score, (i.e., the month-over-month changes of the composite score). We rebalanced the portfolios on a monthly basis and the calculated performance using market-cap-weight. We found both models would have delivered reasonably good performance during the back-test period. For the delta score especially, performance improved significantly for the past five years.

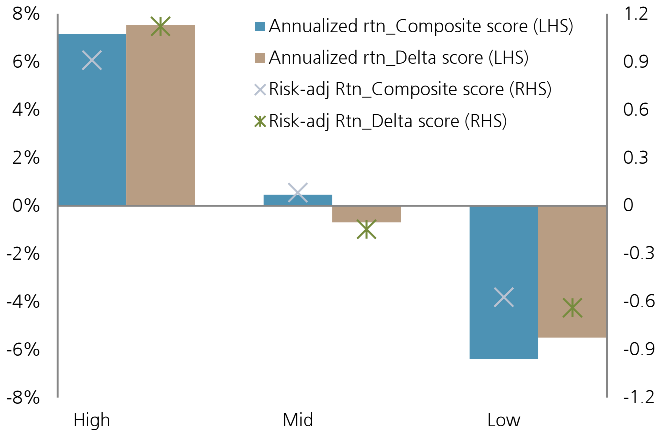
[2] Average rank correlation between factor blocks is the average of rank correlation between Value-Quality, Value-Earnings, and Quality-Earnings pairs. We report the 12-month moving average on the monthly time series.

Figure 6: Back-testing relative performance since 2006



Source: MSCI, Wind, UBS Quantitative Research

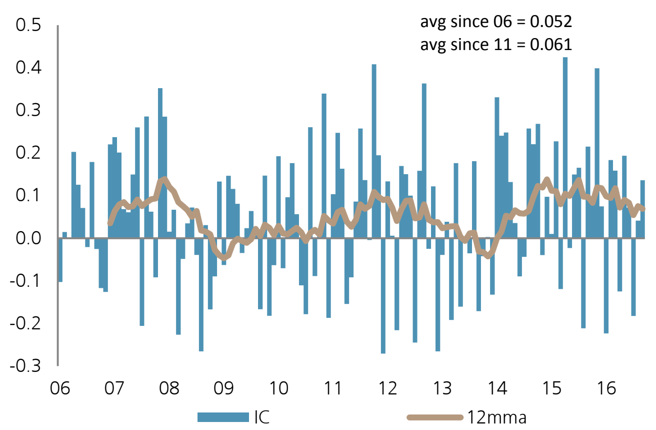
Figure 7: Back-testing relative performance since 2011



Source: MSCI, Wind, UBS Quantitative Research

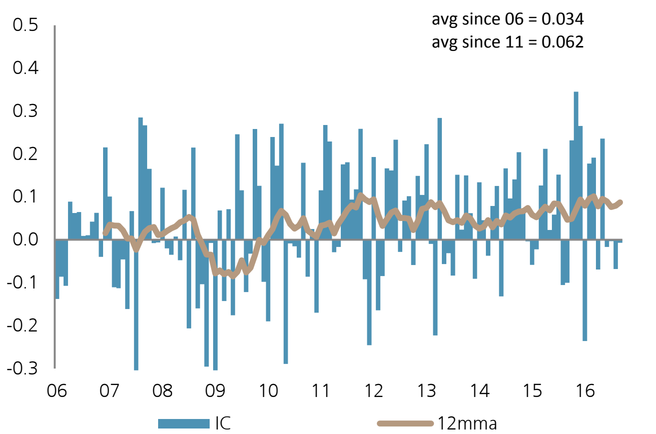
The information coefficient (IC) between the scores and the subsequent month's returns has been generally above zero. For both models, the IC improved for the past five years.

Figure 8: IC for Composite scores



Source: MSCI, Wind, UBS Quantitative Research

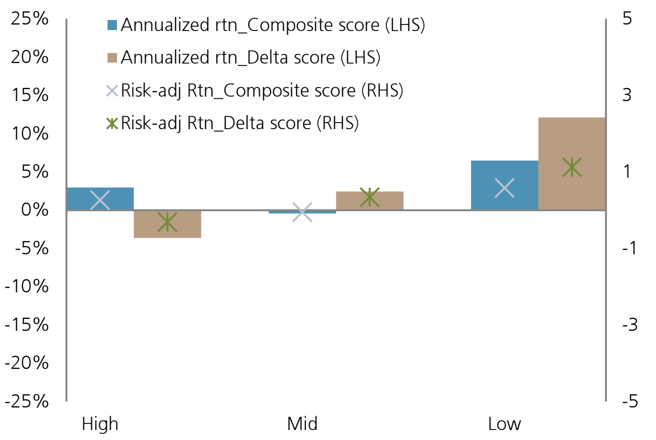
Figure 9: IC for Delta scores



Source: MSCI, Wind, UBS Quantitative Research

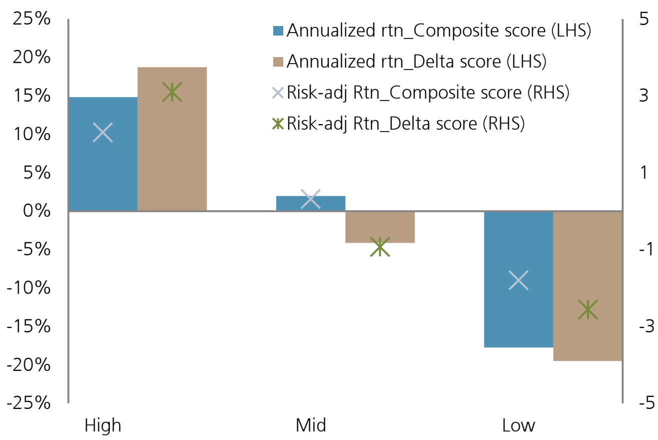
We then back-tested the models' performances under different market conditions. We found that both models would have generated strong excess returns during down markets (defined as the months when index returns are negative). During up markets (defined as the months when index returns are positive) the stocks with low scores also outperformed, but with a smaller return. The weak performance in up markets is due mainly to the dislocation during late 2008 to mid-2009, when most of the quant models underperformed.

Figure 10: Up market



Source: MSCI, Wind, UBS Quantitative Research

Figure 11: Down market

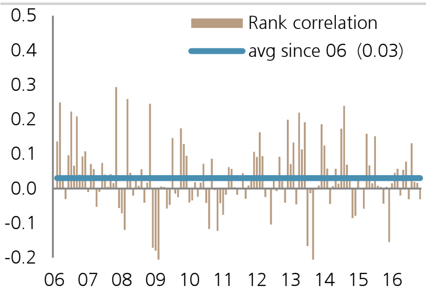


Source: MSCI, Wind, UBS Quantitative Research

Are the composite score and the delta score the same?

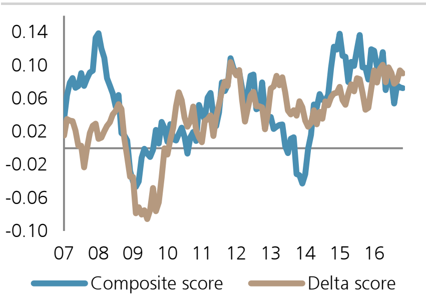
To answer this question, we first look at the rank correlation between these two scores. As expected, we see generally positive, but low, rank correlations (see Figure 12). We then compare the predictability of these two scores by comparing the IC of the scores and subsequent one-month returns (see Figure 13). The IC of these two scores deviated from each other from period to period. Back-testing during 2007 and 2008, the composite score had much better IC, while back-testing during 2012 and 2013 the delta score predicted the subsequent returns better. Lastly, we back-tested the performance of intersections of these two models (see Figure 14). The returns within the intersection analysis are generally monotonic with intersections improving the returns.

Figure 12: Rank correlation between composite score and delta score



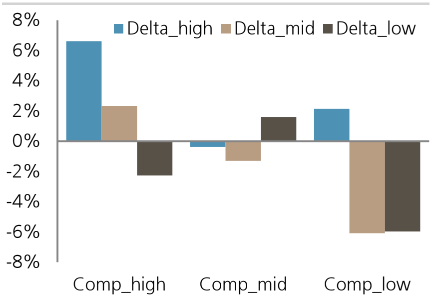
Source: MSCI, Wind, UBS Quantitative Research

Figure 13: IC (12mma) between scores and subsequent one-month return



Source: MSCI, Wind, UBS Quantitative Research

Figure 14: Relative performance for intersections



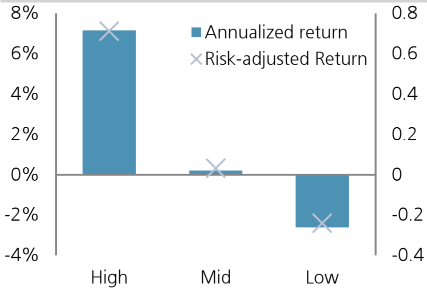
Source: MSCI, Wind, UBS Quantitative Research

In a nutshell, these two scores generate certain un-correlated alpha. By combining them, we form our final models.

Final model

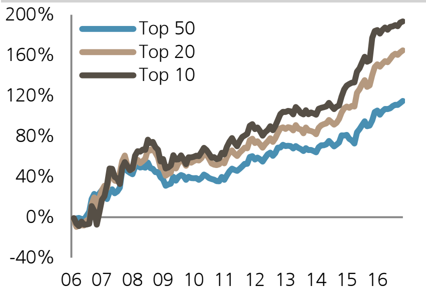
We combine the composite score and delta score by taking the simple average of the ranks of these two scores to form our final score. We look at the performances of the regular high-, mid-, and low-score baskets, as well as the top 10, 20, and 50 stocks. The latter group are, in practice, more interesting if you are looking for a basket to trade. The portfolios are rebalanced on a monthly basis and the returns are calculated using market-cap weight (see Figure 15 to Figure 17).

Figure 15: Back-testing relative performance since 2006



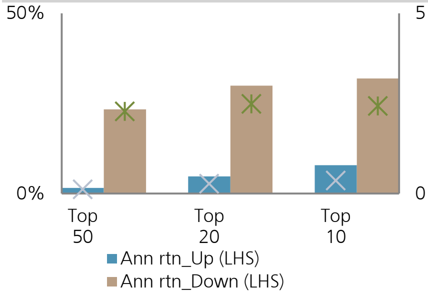
Source: MSCI, Wind, UBS Quantitative Research

Figure 16: Back-testing relative performance for top 10/20/50 names



Source: MSCI, Wind, UBS Quantitative Research

Figure 17: Back-testing relative performance under different market conditions



Source: MSCI, Wind, UBS Quantitative Research

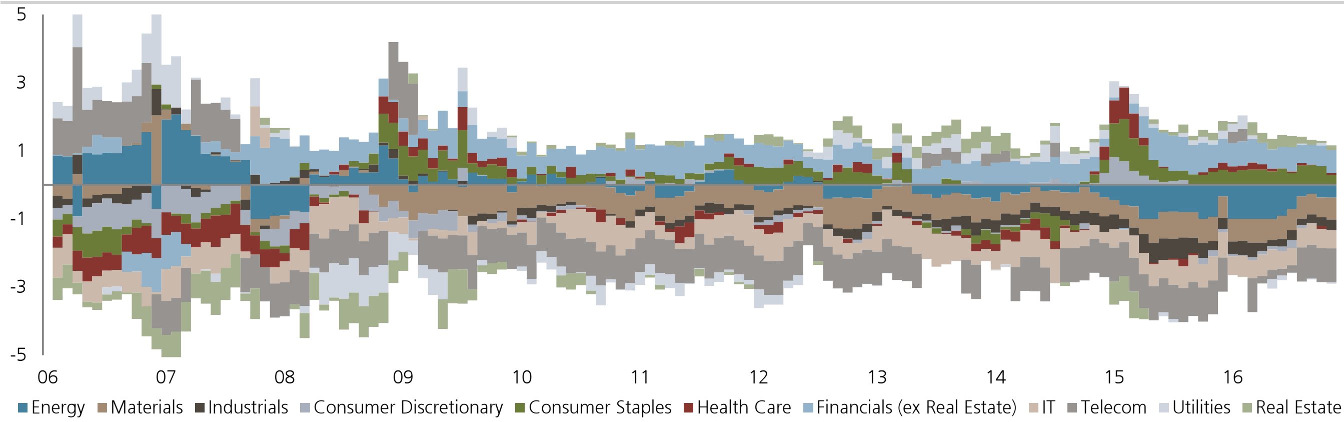
Back-testing shows the model would have delivered extremely strong returns during down markets, while the performance in up markets is not as significant. The major setback for the model is from August 2008 to February 2009, when the market rebounded from a trough. Overall, back-testing shows the model performed well over the past decade. Over the past five years especially, back-testing shows the top 10/20/50 baskets would have delivered annual relative returns of more than 10%, with risk-adjusted returns greater than 1.

Digging into details

Sector composition

Sector rotation contributes a meaningful portion of alpha in the Chinese domestic market. As a result, we do not apply a sector-neutrality in our model. Currently, the model is most overweight Financials and Consumer Staples and most underweight Telecommunication Services, IT and Materials (see Figure 18).

Figure 18: Adjusted relative sector weight for the top basket[3]



Source: MSCI, Wind, UBS Quantitative Research

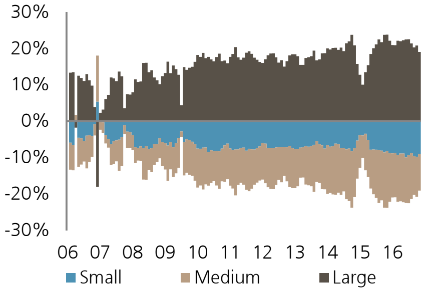
[3] The adjusted relative weight is calculated as (sector weight in top basket – sector weight in the index)/sector weight in the index.

Size tilt

Small cap has been one of the best-performing styles in the market over the past decade. However, we do not want to build the small-cap tilt into our model for the reason mentioned at the beginning of the report. Our model actually tilts towards large caps most of the time (see Figure 19).

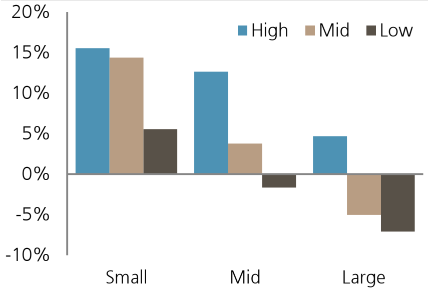
With a natural large-cap tilt

Figure 19: Adjusted relative weight across size bands for the top-third basket[4]



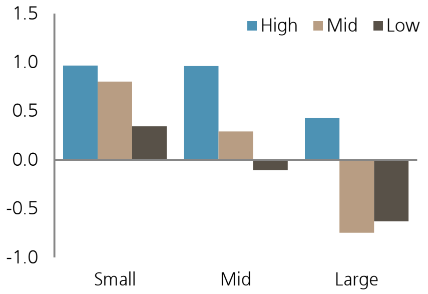
Source: MSCI, Wind, UBS Quantitative Research

Figure 20: Relative performance within different size bands



Source: MSCI, Wind, UBS Quantitative Research

Figure 21: Risk-adjusted performance within different size bands



Source: MSCI, Wind, UBS Quantitative Research

Notably there was a period towards the end of 2006 when the portfolio experienced a large degree of size rotation. By the end of December 2006, it was overweight small caps and underweight large caps. This was driven mainly by the strong performance of large-cap financial (ex-real estates) names. From the previous section we can see that the financial sector has been constantly overweight in our portfolio due to its low valuation and the value component of our score. The strong performance during the last few months of 2006 pushed the valuation of these financial stocks higher and, as a result, they rotated out of the portfolio. At the same time, materials and industrial stocks, which are normally smaller, rotated into the basket. The positions were unwound rapidly in the subsequent few months.

Back-testing shows the model would have delivered stronger performance in small-cap universe

A large-cap tilt is a desirable feature. Nevertheless, if the investors are able to invest in the smaller section of the market, the model could deliver even stronger excess returns (see Figure 20 and Figure 21). Here we firstly divide the universe equally among large-, mid-, and small-sized bands according to the market cap, and then apply the model within each of the size bands. Investing in stocks with the highest third of the score within small caps yields a 16% annualized relative return during our back-test period, compared with a 7% annualized relative return if you invest in the top third of stocks in the whole universe.

[4] The adjusted relative weight is calculated as (size weight in top basket – size weight in the index)/size weight in the index.

Distance between theory and reality

Does the model look good only on paper? In reality, we face several challenges. We are going to address the major ones in the following sections.

Turnover and transaction costs

High turnover is a common shortcoming for a lot of quant strategies. The turnover for our model is shown in Figure 22. We now apply the following transaction costs to the model and compare the performance before and after costs (see Appendix for more details):

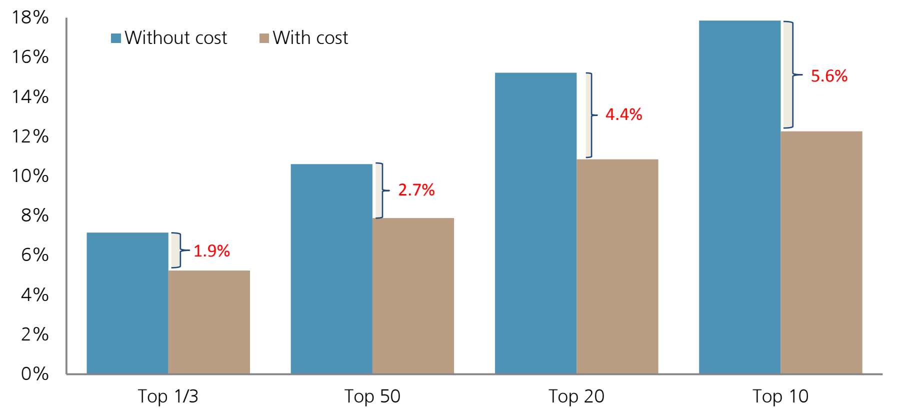
- Sell transaction: 60 bps (= 20bps commission fee + 10bps stamp duty + 30bps price impact)
- Buy transaction: 50 bps (= 20bps commission fee + 30bps price impact)

Figure 22: Monthly two-way turnover

	Top 1/3	Top 50	Top 20	Top 10
Turnover	30%	42%	66%	85%

Source: Wind, MSCI, UBS Quantitative Research

Figure 23: Performance comparison – without cost vs. with cost



Source: Wind, MSCI, UBS Quantitative Research

The turnover increases as the size of the portfolio decreases, and hence the impact of the transaction cost increases. Nevertheless, the Top 10 basket still delivered a 12% annual relative return over the back-test period (see Figure 23).

Turnover reduction solution

There are many ways to reduce turnover. The simplest one is to set a buffer. For example, for the Top 10 basket, if we set the buffer at 50, as long as the rank of a stock does not fall out of the top 50, we keep it in the portfolio. The turnover was significantly reduced after applying the buffer (see Figure 24).

Figure 24: Turnover ratio of top 10, 20, and 50 portfolio

	Top 10	Top 20	Top 50
Original strategy	85%	66%	42%
Buffer by top 50	26%	29%	
Buffer by top 20	69%		

Source: Wind, MSCI, UBS Quantitative Research

The lower the buffer level (i.e., the larger the number of stocks used for the buffer), the lower the turnover and therefore the cost but, of course, the worse the pre-cost performance. For example, for Top 20 basket, if we set the buffer at

50, the pre-cost back-testing performance falls to 13% from 15%, but the post-cost back-testing performance for the buffered version is the same as for the non-buffered version, namely 11%. For the Top 10 basket, if we set a tighter buffer of 20, the pre-cost back-testing performance does not change much and, due to the cost reduction, the post-cost back-testing performance for the buffer version actually increases slightly, from 12% to 13% (see Figure 25).

Figure 25: Annualized relative back-testing performance comparison

			No buffer	Buffer by 20	Buffer by 50
Top 20	Annualized return	Without cost	15%		13%
		With cost	11%		11%
	Risk-adjusted return	Without cost	0.95		0.75
		With cost	0.68		0.64
Top 10	Annualized return	Without cost	18%	18%	11%
		With cost	12%	13%	10%
	Risk-adjusted return	Without cost	0.94	0.98	0.63
		With cost	0.64	0.73	0.54

Source: Wind, MSCI, UBS Quantitative Research

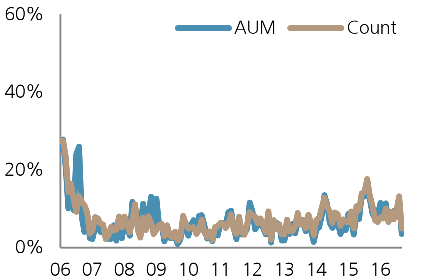
Generally speaking, depending on the market liquidity, cost level and the size of the portfolio, there should be an optimal point.

Suspension

Large numbers of suspensions may lead to problems. The most memorable event in China's domestic market would be the large number of suspensions that happened in summer 2015. Turbulence in the equity market forced the managements of listed companies to suspend trading in their companies' stocks in order to avoid the share price crash. On 9 July 2015, 1,437 out of 2,777 stocks on the A-share market were suspended.

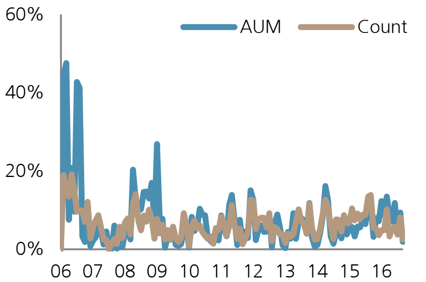
The impact of suspension comes when we build up or rebalance the portfolio. When building a theoretical portfolio, we simply rank all the stocks in the universe and rebalance based on that, without considering whether the stocks are suspended at the rebalancing day. Here we rebuild the portfolio taking into account the impact of suspension. At the rebalancing day, we rank only the non-suspended stocks and take the top one-third, 50, 20, or 10 into the portfolios. Of course, the stocks that are suspended and that are already in the portfolios will remain as well.

Figure 26: % of suspension - MSCI China A index universe



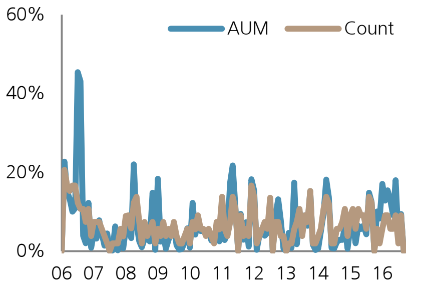
Source: Wind, MSCI, UBS Quantitative Research

Figure 27: % of suspension – Top-third basket



Source: Wind, MSCI, UBS Quantitative Research

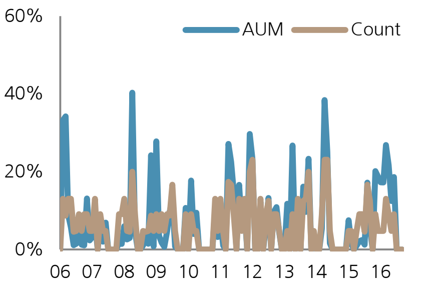
Figure 28: % of suspension - Top 50 basket



Source: Wind, MSCI, UBS Quantitative Research

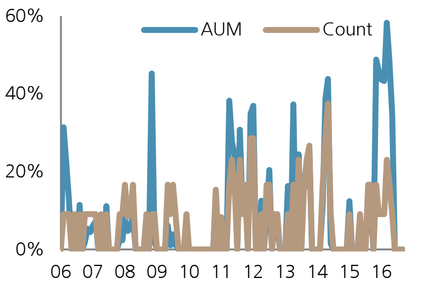
On average less than 10% of stocks in the MSCI China A index universe were suspended at the last working day of the months (which is our rebalancing day) during our back-test period. In the summer of 2015 during the turmoil in the China market, the percentage increased and peaked at 17% (see Figure 26).

Figure 29: % of suspension - Top 20 basket



Source: Wind, MSCI, UBS Quantitative Research

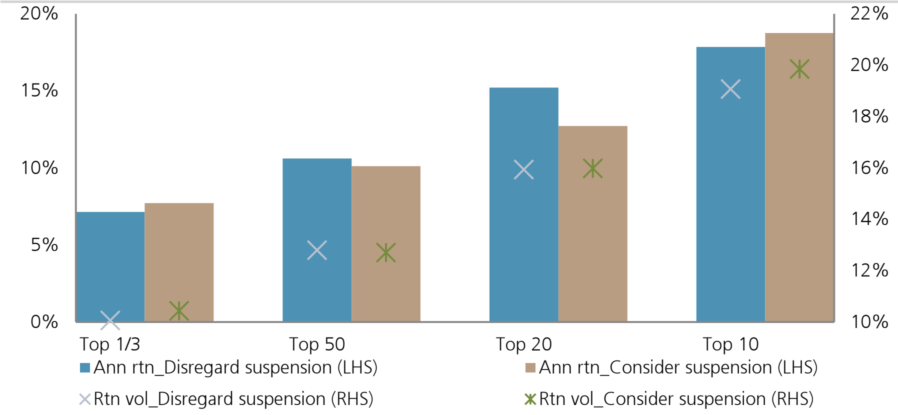
Figure 30: % of suspension - Top 10 basket



Source: Wind, MSCI, UBS Quantitative Research

The percentage of suspensions in the portfolio increases as the size of the portfolio decreases. For the Top 10 baskets, the highest percentage in terms of number of stocks suspended reached 37.5%, and the highest percentage in terms of AUM was 58.3%.

Figure 31: Impact of suspension – performance comparison



Source: Wind, MSCI, UBS Quantitative Research

Suspension caused instability in performance

The impact to the annualized relative returns varied. The annualized relative returns for the top one-third barely changed; the returns declined for the Top 20 and Top 50 baskets, and increased slightly for the Top 10 basket. Nevertheless, the return volatility increased for most of the portfolio, suggesting that suspensions resulted in instability in its performance (see Figure 31).

Price limit

Rules on price limit

Since 16 December 1996, the Shanghai and Shenzhen Stock Exchanges have both operated a ±10% price limit. Except for the IPO day, a stock price cannot change by more than 10% from the previous day's closing price. Once the price hits that limit, investors can still buy or sell the stock, but need to buy or sell at a price within the 10% range. Therefore, in practice, once a stock's price hits the +10% limit, more purchases will not be possible in the market; similarly, selling will no longer be available when price hits the -10% limit. Bid or ask prices will be limited until the end of trading hours. The limit will be reset on the following trading day.

Figure 32: Summary statistics for historical limit-up and limit-down

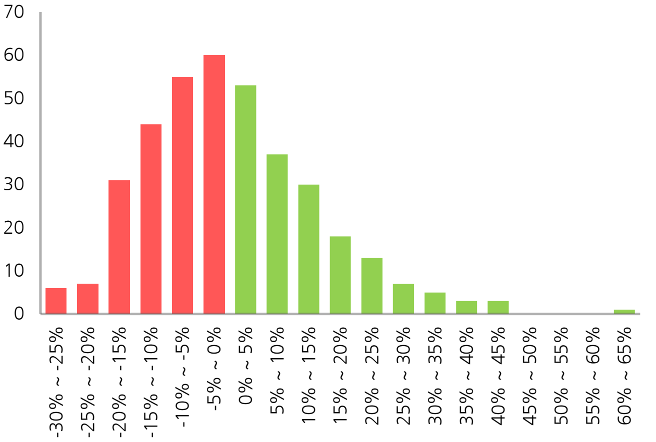
	Limit up	Limit down
Count	373	230
Median subsequent one-month relative return	-1.4%	1.2%

Source: Wind, MSCI, UBS Quantitative Research

Price reversal at work

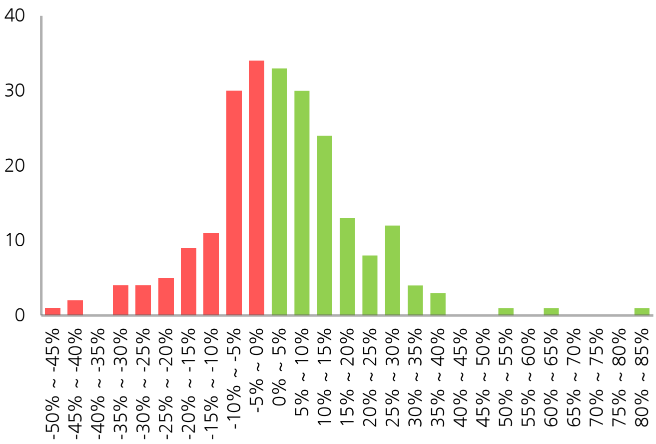
During our back-test period, 373 limit-up cases and 230 limit-down cases happened on the rebalancing day for the MSCI China A index universe. Due to the price-reversal effect, limit-up stocks tended to underperform the benchmark in the subsequent month, whilst limit-down stocks tended to outperform the benchmark.

Figure 33: Distribution for subsequent one-month returns – limit up



Source: Wind, MSCI, UBS Quantitative Research

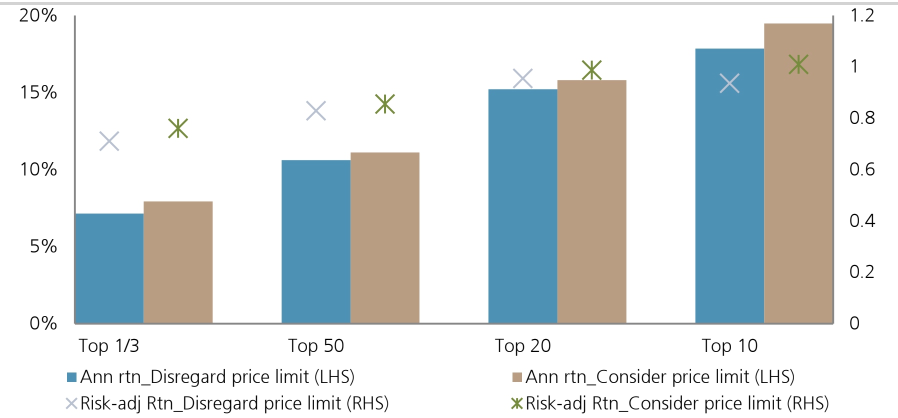
Figure 34: Distribution for subsequent one-month returns – limit down



Source: Wind, MSCI, UBS Quantitative Research

As a result, when we take into account the impact of the price limit (i.e. keep the limit-down stocks as they cannot be sold in practice and do not buy the limit-up stocks as they cannot be bought) in our back-testing, the performance actually improved slightly.

Figure 35: Back-testing impact of price limit – performance comparison

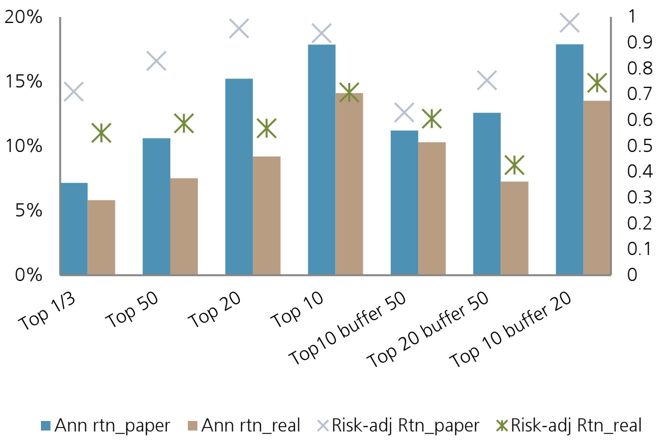


Source: Wind, MSCI, UBS Quantitative Research

Putting everything together

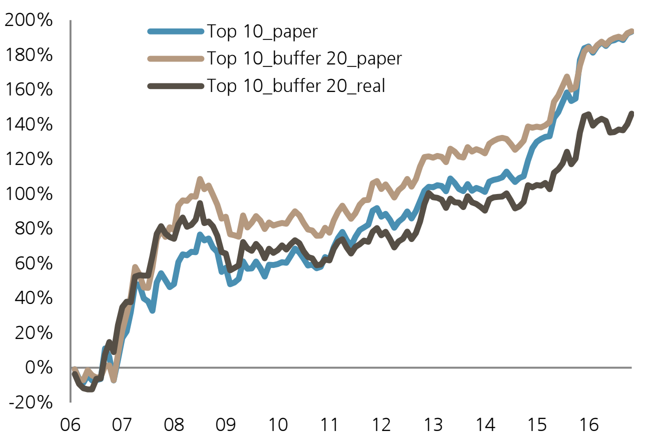
Our model now takes into account transaction costs, suspensions, and price limits. Back-testing after costs, the Top 10 baskets with buffer level 20 in the real settings would have yielded 13.5% relative annualized returns in the back-test period.

Figure 36: Back-testing performance comparison – paper portfolio versus real portfolio



Source: Wind, FactSet, UBS Quantitative Research

Figure 37: Back-testing historical cumulative relative performance for the Top 10 names



Source: Wind, FactSet, UBS Quantitative Research

What does the model suggest at the moment?

Figure 38: Top 20 names suggested by the model (as of end December 2016)

Ticker	Company Name	Sector	Fwd P/BV	Fwd PE	Fwd ROE (%)
601166	INDUSTRIAL BANK CO LTD -A	Financials	0.8	5.6	15.1
600177	YOUNGOR GROUP CO-A	Real Estate	1.4	8.3	16.9
600066	ZHENGZHOU YUTONG BUS CO -A	Industrials	2.5	9.8	27.5
601939	CHINA CONSTRUCTION BANK-A	Financials	0.8	5.8	13.7
600060	HISENSE ELECTRIC CO LTD-A	Consumer Discretionary	1.5	10.9	13.7
600036	CHINA MERCHANTS BANK-A	Financials	1.0	6.7	15.3
601398	IND & COMM BK OF CHINA-A	Financials	0.7	5.7	13.7
600064	NANJING GAOKE CO LTD-A	Real Estate	1.2	9.3	17.1
601988	BANK OF CHINA LTD-A	Financials	0.7	5.8	11.7
601818	CHINA EVERBRIGHT BANK CO-A	Financials	0.7	5.8	12.9
002508	HANGZHOU ROBAM APPLIANCES-A	Consumer Discretionary	5.2	18.0	30.3
600104	SAIC MOTOR CORP LTD-A	Consumer Discretionary	1.2	7.2	17.9
600153	XIAMEN C & D INC-A	Industrials	1.2	9.2	13.2
600309	WANHUA CHEMICAL GROUP CO -A	Materials	2.6	11.5	22.3
000001	PING AN BANK CO LTD-A	Financials	0.8	6.3	12.2
601377	INDUSTRIAL SECURITIES CO-A	Financials	1.8	14.4	15.4
002244	HANGZHOU BINJIANG REAL EST-A	Real Estate	1.5	12.2	15.3
600519	KWEICHOW MOUTAI CO LTD-A	Consumer Staples	4.7	20.8	23.5
002573	BEIJING SPC ENVIRONMENT-A	Industrials	4.2	18.8	22.7
000538	YUNNAN BAIYAO GROUP CO LTD-A	Health Care	4.1	22.5	18.6

Source: MSCI, Wind, UBS Quantitative Research

Figure 39: Bottom 20 names suggested by the model (as of end December 2016)

Ticker	Company Name	Industry	Fwd P/BV	Fwd PE	Fwd ROE (%)
002266	ZHEFU HOLDING GROUP CO LTD-A	Industrials	4.5	30.3	7.9
002298	ANHUI SINONET & XONGLONG SCI	Industrials	2.3	60.8	4.3
603993	CHINA MOLYBDENUM CO LTD-A	Materials	4.0	46.4	5.0
600862	AVIC AVIATION HIGH-TECHNOL-A	Industrials	4.8	75.6	5.9
600896	LANHAI MEDICAL INVESTMENT -A	Industrials	2.7	-	-5.2
600428	COSCO SHIPPING SPECIALIZED-A	Industrials	1.3	96.1	1.5
600005	WUHAN IRON & STEEL CO LTD-A	Materials	1.2	95.5	1.2
600198	DATANG TELECOM TECH CO-A	Information Technology	3.0	38.3	7.9
002570	BEINGMATE BABY & CHILD FO-A	Consumer Staples	3.9	123.8	2.8
002155	HUNAN GOLD CORP LTD-A	Materials	3.8	75.3	5.1
600289	BRIGHT OCEANS INTER-TELECO-A	Information Technology	3.5	50.3	6.3
600050	CHINA UNITED NETWORK-A	Telecommunication Services	1.5	45.2	4.3
002283	TIANRUN CRANKSHAFT CO -A	Industrials	2.5	35.4	6.1
600759	GEO-JADE PETROLEUM CORP-A	Energy	2.4	52.9	6.1
600410	BEIJING TEAMSUN TECHNOLOGY-A	Information Technology	3.8	89.9	2.0
002073	MESNAC CO LTD -A	Industrials	2.4	54.8	6.0
002577	SHENZHEN RAPOO TECHNOLOGY -A	Information Technology	6.8	78.2	8.2
002251	BETTER LIFE COMMERCIAL CHA-A	Consumer Staples	2.3	57.8	4.2
000519	NORTH INDUSTRIES GROUP RED-A	Industrials	4.2	58.7	7.1
002312	CHENGDU SANTAI HOLDING GRP-A	Information Technology	2.7	276.9	1.0

Source: MSCI, Wind, UBS Quantitative Research

We would like to thank Cathy Fang of UBS-S for her assistance in preparing this research report.

Appendix

Calculation on composite score

Our model is based on a combination of three style categories: value, quality and earnings momentum and certainty. In each category, we choose two major factors. Factor definitions are shown as below.

Figure 40: Factor definitions

Type	Name	Definition
Value	Book / Price	The inverse of the 12m forward P/BV multiple
	Earnings Yield	The inverse of the 12m forward PE multiple
Quality	ROE	The 12m forward Earnings Yield / Book to Price
	Volatility 3M	Volatility of daily total returns on trading days over the past 3 months
Earnings	3M Earnings Momentum	The percentage change in forecast EPS over the previous 3 months
	EPS Coefficient of Variation	-log (the standard deviation of 12m EPS forecasts / the absolute value of average 12m EPS forecasts)

Source: UBS Quantitative Research

We calculate the composite score for each stock at each month end. The score calculation is a five-step methodology as follows:

- **Step 1:** Based on MSCI China A index, we rank the universe by each individual factor.

- **Step 2:** Calculate the average ranking in each category.

$$RANK_{i,t}^{Value} = (RANK_{i,t}^{Book/Price} + RANK_{i,t}^{Earnings\ Yield})/2$$

$$RANK_{i,t}^{Quality} = (RANK_{i,t}^{ROE} + RANK_{i,t}^{Volatility\ 3M})/2$$

$$RANK_{i,t}^{Earnings} = (RANK_{i,t}^{3M\ Earnings\ Momentum} + RANK_{i,t}^{EPS\_CV})/2$$

We have two factors in each style, and if any factor data missing, for instance, if there was no consensus forecast for the forward 12-month P/BV multiple for stock i at time t, i.e. $RANK_{i,t}^{Book/Price} = N/A$, we will then calculate the ranking with available data, i.e. $RANK_{i,t}^{Value} = RANK_{i,t}^{Earnings\ Yield}$. If both factors are missing in the same category, the ranking will be marked as N/A and the stock i will be excluded from the portfolio at month end t. In this way, we manage to guarantee that there is at least one factor available in each of the three categories, and we cast an equal weight for each category, as below.

- **Step 3:** Composite score is the average ranking over three categories.

$$Comp\ Score_{i,t}^{Absolute} = (RANK_{i,t}^{Value} + RANK_{i,t}^{Quality} + RANK_{i,t}^{Earnings})/3$$

- **Step 4:** We further develop a delta score, namely, the month over month changes of the composite score.

$$Comp\ Score_{i,t}^{Change} = Comp\ Score_{i,t}^{Absolute} - Comp\ Score_{i,t-1}^{Absolute}$$

- **Step 5:** Our final model combines the composite score (Step 3) and the delta score (Step 4), by ranking according to the two scores, separately, and calculate the average ranking, equal weighted.

$$Comp\ Score_{i,t}^{Final} = (RANK_{i,t}^{Absolute} + RANK_{i,t}^{Change})/2$$

Price impact cost

Figure 41 shows the latest price impact estimates. It varies depending on the size of the stocks and the amount traded.

Figure 41: Latest price impact estimates

		Amount traded (Rmb)		
		100,000	250,000	900,000
Free-float market cap of a stock (RMB)	<1bn	43	71	177
	1-2bn	20	32	77
	2-3bn	16	24	54
	3-5bn	13	19	42
	5-10bn	11	13	31
	>10bn	8	11	19
	market average	11	16	33

Source: Shanghai stock exchange

For our top one-third and top 10 portfolios, the free float market cap distributions are as follow:

Figure 42: Statistics for free float market cap (in Rmb bn)

		mean	median	min	10%	25%	75%	90%	max
Top 1/3	2015	74.6	30.1	3.2	8.9	14.5	67.6	161.6	1,183.8
	2016	62.9	24.1	3.8	8.9	13.5	50.9	128.3	1,129.5
Top 10	2015	135.0	81.1	18.6	25.3	33.7	148.1	299.4	527.6
	2016	201.0	116.6	25.8	37.1	57.3	226.1	439.1	760.9

Source: UBS Quantitative Research

The majority of stocks in our portfolios have a free float market cap of more than Rmb10bn, which implies a relatively low price impact when trading them. But to get a more conservative result, we take 30bps as the price-impact cost.

Required Disclosures

This report has been prepared by UBS Securities Asia Limited, an affiliate of UBS AG. UBS AG, its subsidiaries, branches and affiliates are referred to herein as UBS.

For information on the ways in which UBS manages conflicts and maintains independence of its research product; historical performance information; and certain additional disclosures concerning UBS research recommendations, please visit www.ubs.com/disclosures. The figures contained in performance charts refer to the past; past performance is not a reliable indicator of future results. Additional information will be made available upon request. UBS Securities Co. Limited is licensed to conduct securities investment consultancy businesses by the China Securities Regulatory Commission. UBS acts or may act as principal in the debt securities (or in related derivatives) that may be the subject of this report. This recommendation was finalized on: 16 January 2017 07:05 AM GMT.

Analyst Certification: Each research analyst primarily responsible for the content of this research report, in whole or in part, certifies that with respect to each security or issuer that the analyst covered in this report: (1) all of the views expressed accurately reflect his or her personal views about those securities or issuers and were prepared in an independent manner, including with respect to UBS, and (2) no part of his or her compensation was, is, or will be, directly or indirectly, related to the specific recommendations or views expressed by that research analyst in the research report.

UBS Investment Research: Global Equity Rating Definitions

12-Month Rating	Definition	Coverage[1]	IB Services[2]
Buy	FSR is > 6% above the MRA.	45%	29%
Neutral	FSR is between -6% and 6% of the MRA.	39%	27%
Sell	FSR is > 6% below the MRA.	15%	16%
Short-Term Rating	**Definition**	**Coverage[3]**	**IB Services[4]**
Buy	Stock price expected to rise within three months from the time the rating was assigned because of a specific catalyst or event.	<1%	<1%
Sell	Stock price expected to fall within three months from the time the rating was assigned because of a specific catalyst or event.	<1%	<1%

Source: UBS. Rating allocations are as of 31 December 2016.
1:Percentage of companies under coverage globally within the 12-month rating category.
2:Percentage of companies within the 12-month rating category for which investment banking (IB) services were provided within the past 12 months.
3:Percentage of companies under coverage globally within the Short-Term rating category.
4:Percentage of companies within the Short-Term rating category for which investment banking (IB) services were provided within the past 12 months.

KEY DEFINITIONS: Forecast Stock Return (FSR) is defined as expected percentage price appreciation plus gross dividend yield over the next 12 months. **Market Return Assumption (MRA)** is defined as the one-year local market interest rate plus 5% (a proxy for, and not a forecast of, the equity risk premium). **Under Review (UR)** Stocks may be flagged as UR by the analyst, indicating that the stock's price target and/or rating are subject to possible change in the near term, usually in response to an event that may affect the investment case or valuation. **Short-Term Ratings** reflect the expected near-term (up to three months) performance of the stock and do not reflect any change in the fundamental view or investment case. **Equity Price Targets** have an investment horizon of 12 months.

EXCEPTIONS AND SPECIAL CASES: UK and European Investment Fund ratings and definitions are: Buy: Positive on factors such as structure, management, performance record, discount; **Neutral:** Neutral on factors such as structure, management, performance record, discount; **Sell:** Negative on factors such as structure, management, performance record, discount. **Core Banding Exceptions (CBE):** Exceptions to the standard +/-6% bands may be granted by the Investment Review Committee (IRC). Factors considered by the IRC include the stock's volatility and the credit spread of the respective company's debt. As a result, stocks deemed to be very high or low risk may be subject to higher or lower bands as they relate to the rating. When such exceptions apply, they will be identified in the Company Disclosures table in the relevant research piece.

Research analysts contributing to this report who are employed by any non-US affiliate of UBS Securities LLC are not registered/qualified as research analysts with FINRA. Such analysts may not be associated persons of UBS Securities LLC and therefore are not subject to the FINRA restrictions on communications with a subject company, public appearances, and trading securities held by a research analyst account. The name of each affiliate and analyst employed by that affiliate contributing to this report, if any, follows.

UBS AG Hong Kong Branch: Shanle Wu, PhD; Josh Holcroft. **UBS Securities Australia Ltd:** Paul Winter; Oliver Antrobus, CFA; Luke Brown, CFA; Pieter Stoltz. **UBS Limited:** David Jessop; Nick Baltas, PhD. **UBS Securities Co. Limited:** Ting Gao.

Unless otherwise indicated, please refer to the Valuation and Risk sections within the body of this report. For a complete set of disclosure statements associated with the companies discussed in this report, including information on valuation and risk, please contact UBS Securities LLC, 1285 Avenue of Americas, New York, NY 10019, USA, Attention: Investment Research.

Global Disclaimer

This document has been prepared by UBS Securities Asia Limited, an affiliate of UBS AG. UBS AG, its subsidiaries, branches and affiliates are referred to herein as UBS.

Global Research is provided to our clients through UBS Neo and, in certain instances, UBS.com (each a "System"). It may also be made available through third party vendors and distributed by UBS and/or third parties via e-mail or alternative electronic means. The level and types of services provided by Global Research to a client may vary depending upon various factors such as a client's individual preferences as to the frequency and manner of receiving communications, a 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 UBS and legal and regulatory constraints.

All Global Research is available on UBS Neo. Please contact your UBS sales representative if you wish to discuss your access to UBS Neo.

When you receive Global Research through a System, your access and/or use of such Global Research is subject to this Global Research Disclaimer and to the terms of use governing the applicable System.

When you receive Global Research via a third party vendor, e-mail or other electronic means, your use shall be subject to this Global Research Disclaimer and to UBS's Terms of Use/Disclaimer (http://www.ubs.com/global/en/legalinfo2/disclaimer.html). By accessing and/or using Global Research in this manner, you are indicating that you have read and agree to be bound by our Terms of Use/Disclaimer. In addition, you consent to UBS processing your personal data and using cookies in accordance with our Privacy Statement (http://www.ubs.com/global/en/legalinfo2/privacy.html) and cookie notice (http://www.ubs.com/global/en/homepage/cookies/cookie-management.html).

If you receive Global Research, whether through a System or by any other means, you agree that you shall not copy, revise, amend, create a derivative work, transfer to any third party, or in any way commercially exploit any UBS research provided via Global Research or otherwise, and that you shall not extract data from any research or estimates provided to you via Global Research or otherwise, without the prior written consent of UBS.

This document is for distribution only as may be permitted by law. It is not directed to, or intended for distribution to or use by, any person or entity who is a citizen or resident of or located in any locality, state, country or other jurisdiction where such distribution, publication, availability or use would be contrary to law or regulation or would subject UBS to any registration or licensing requirement within such jurisdiction. It is published solely for information purposes; it is not an advertisement nor is it a solicitation or an offer to buy or sell any financial instruments or to participate in any particular trading strategy. No representation or warranty, either expressed or implied, is provided in relation to the accuracy, completeness or reliability of the information contained in this document ("the Information"), except with respect to Information concerning UBS. The Information is not intended to be a complete statement or summary of the securities, markets or developments referred to in the document. UBS does not undertake to update or keep current the Information. Any opinions expressed in this document may change without notice and may differ or be contrary to opinions expressed by other business areas or groups of UBS. Any statements contained in this report attributed to a third party represent UBS's interpretation of the data, information and/or opinions provided by that third party either publicly or through a subscription service, and such use and interpretation have not been reviewed by the third party.

Nothing in this document constitutes a representation that any investment strategy or recommendation is suitable or appropriate to an investor’s individual circumstances or otherwise constitutes a personal recommendation. Investments involve risks, and investors should exercise prudence and their own judgement in making their investment decisions. The financial instruments described in the document may not be eligible for sale in all jurisdictions or to certain categories of investors. Options, derivative products and futures are not suitable for all investors, and trading in these instruments is considered risky. Mortgage and asset-backed securities may involve a high degree of risk and may be highly volatile in response to fluctuations in interest rates or other market conditions. Foreign currency rates of exchange may adversely affect the value, price or income of any security or related instrument referred to in the document. For investment advice, trade execution or other enquiries, clients should contact their local sales representative.

The value of any investment or income may go down as well as up, and investors may not get back the full (or any) amount invested. Past performance is not necessarily a guide to future performance. Neither UBS nor any of its directors, employees or agents accepts any liability for any loss (including investment loss) or damage arising out of the use of all or any of the Information.

Any prices stated in this document are for information purposes only and do not represent valuations for individual securities or other financial instruments. There is no representation that any transaction can or could have been effected at those prices, and any prices do not necessarily reflect UBS's internal books and records or theoretical model-based valuations and may be based on certain assumptions. Different assumptions by UBS or any other source may yield substantially different results.

This document and the Information are produced by UBS as part of its research function and are provided to you solely for general background information. UBS has no regard to the specific investment objectives, financial situation or particular needs of any specific recipient. In no circumstances may this document or any of the Information be used for any of the following purposes:

(i) valuation or accounting purposes;

(ii) to determine the amounts due or payable, the price or the value of any financial instrument or financial contract; or

(iii) to measure the performance of any financial instrument.

By receiving this document and the Information you will be deemed to represent and warrant to UBS that you will not use this document or any of the Information for any of the above purposes or otherwise rely upon this document or any of the Information.

UBS has policies and procedures, which include, without limitation, independence policies and permanent information barriers, that are intended, and upon which UBS relies, to manage potential conflicts of interest and control the flow of information within divisions of UBS and among its subsidiaries, branches and affiliates. For further information on the ways in which UBS manages conflicts and maintains independence of its research products, historical performance information and certain additional disclosures concerning UBS research recommendations, please visit www.ubs.com/disclosures.

Research will initiate, update and cease coverage solely at the discretion of UBS Investment Bank Research Management, which will also have sole discretion on the timing and frequency of any published research product. The analysis contained in this document is based on numerous assumptions. All material information in relation to published research reports, such as valuation methodology, risk statements, underlying assumptions (including sensitivity analysis of those assumptions), ratings history etc. as required by the Market Abuse Regulation, can be found on NEO. Different assumptions could result in materially different results.

The analyst(s) responsible for the preparation of this document may interact with trading desk personnel, sales personnel and other parties for the purpose of gathering, applying and interpreting market information. UBS relies on information barriers to control the flow of information contained in one or more areas within UBS into other areas, units, groups or affiliates of UBS. The compensation of the analyst who prepared this document is determined exclusively by research management and senior management (not including investment banking). Analyst compensation is not based on investment banking revenues; however, compensation may relate to the revenues of UBS Investment Bank as a whole, of which investment banking, sales and trading are a part, and UBS's subsidiaries, branches and affiliates as a whole.

For financial instruments admitted to trading on an EU regulated market: UBS AG, its affiliates or subsidiaries (excluding UBS Securities LLC) acts as a market maker or liquidity provider (in accordance with the interpretation of these terms in the UK) in the financial instruments of the issuer save that where the activity of liquidity provider is carried out in accordance with the definition given to it by the laws and regulations of any other EU jurisdictions, such information is separately disclosed in this document. For financial instruments admitted to trading on a non-EU regulated market: UBS may act as a market maker save that where this activity is carried out in the US in accordance with the definition given to it by the relevant laws and regulations, such activity will be specifically disclosed in this document. UBS may have issued a warrant the value of which is based on one or more of the financial instruments referred to in the document. UBS and its affiliates and employees may have long or short positions, trade as principal and buy and sell in instruments or derivatives identified herein; such transactions or positions may be inconsistent with the opinions expressed in this document.

United Kingdom and the rest of Europe: Except as otherwise specified herein, this material is distributed by UBS Limited to persons who are eligible counterparties or professional clients. UBS Limited is authorised by the Prudential Regulation Authority and regulated by the Financial Conduct Authority and the Prudential Regulation Authority. **France:** Prepared by UBS Limited and distributed by UBS Limited and UBS Securities France S.A. UBS Securities France S.A. is regulated by the ACPR (Autorité de Contrôle Prudentiel et de Résolution) and the Autorité des Marchés Financiers (AMF). Where an analyst of UBS Securities France S.A. has contributed to this document, the document is also deemed to have been prepared by UBS Securities France S.A. **Germany:** Prepared by UBS Limited and distributed by UBS Limited and UBS Europe SE. UBS Europe SE is regulated by the Bundesanstalt fur Finanzdienstleistungsaufsicht (BaFin). **Spain:** Prepared by UBS Limited and distributed by UBS Limited and UBS Securities España SV, SA. UBS Securities España SV, SA is regulated by the Comisión Nacional del Mercado de Valores (CNMV). **Turkey:** Distributed by UBS Limited. No information in this document is provided for the purpose of offering, marketing and sale by any means of any capital market instruments and services in the Republic of Turkey. Therefore, this document may not be considered as an offer made or to be made to residents of the Republic of Turkey. UBS AG is not licensed by the Turkish Capital Market Board under the provisions of the Capital Market Law (Law No. 6362). Accordingly, neither this document nor any other offering material related to the instruments/services may be utilized in connection with providing any capital market services to persons within the Republic of Turkey without the prior approval of the Capital Market Board. However, according to article 15 (d) (ii) of the Decree No. 32, there is no restriction on the purchase or sale of the securities abroad by residents of the Republic of Turkey. **Poland:** Distributed by UBS Limited (spolka z ograniczona odpowiedzialnoscia) Oddzial w Polsce regulated by the Polish Financial Supervision Authority. Where an analyst of UBS Limited (spolka z ograniczona odpowiedzialnoscia) Oddzial w Polsce has contributed to this document, the document is also deemed to have been prepared by UBS Limited (spolka z ograniczona odpowiedzialnoscia) Oddzial w Polsce. **Russia:** Prepared and distributed by UBS Bank (OOO). **Switzerland:** Distributed by UBS AG to persons who are institutional investors only. UBS AG is regulated by the Swiss Financial Market Supervisory Authority (FINMA). **Italy:** Prepared by UBS Limited and distributed by UBS Limited and UBS Limited, Italy Branch. Where an analyst of UBS Limited, Italy Branch has contributed to this document, the document is also deemed to have been prepared by UBS Limited, Italy Branch. **South Africa:** Distributed by UBS South Africa (Pty) Limited (Registration No. 1995/011140/07), an authorised user of the JSE and an authorised Financial Services Provider (FSP 7328). **Israel:** This material is distributed by UBS Limited. UBS Limited is authorised by the Prudential Regulation Authority and regulated by the Financial Conduct Authority and the Prudential Regulation Authority. UBS Securities Israel Ltd is a licensed Investment Marketer that is supervised by the Israel Securities Authority (ISA). UBS Limited and its affiliates incorporated outside Israel are not licensed under the Israeli Advisory Law. UBS Limited is not covered by insurance as required from a licensee under the Israeli Advisory Law. UBS may engage among others in issuance of Financial Assets or in distribution of Financial Assets of other issuers for fees or other benefits. UBS Limited and its affiliates may prefer various Financial Assets to which they have or may have Affiliation (as such term is defined under the Israeli Advisory Law). Nothing in this Material should be considered as investment advice under the Israeli Advisory Law. This Material is being issued only to and/or is directed only at persons who are Eligible Clients within the meaning of the Israeli Advisory Law, and this material must not be relied on or acted upon by any other persons. **Saudi Arabia:** This document has been issued by UBS AG (and/or any of its subsidiaries, branches or affiliates), a public company limited by shares, incorporated in Switzerland with its registered offices at Aeschenvorstadt 1, CH-4051 Basel and Bahnhofstrasse 45, CH-8001 Zurich. This publication has been approved by UBS Saudi Arabia (a subsidiary of UBS AG), a Saudi closed joint stock company incorporated in the Kingdom of Saudi Arabia under commercial register number 1010257812 having its registered office at Tatweer Towers, P.O. Box 75724, Riyadh 11588, Kingdom of Saudi Arabia. UBS Saudi Arabia is authorized and regulated by the Capital Market Authority to conduct securities business under license number 08113-37. **Dubai:** The information distributed by UBS AG Dubai Branch is intended for Professional Clients only and is not for further distribution within the United Arab Emirates. **United States:** Distributed to US persons by either UBS Securities LLC or by UBS Financial Services Inc., subsidiaries of UBS AG; or by a group, subsidiary or affiliate of UBS AG that is not registered as a US broker-dealer (a **'non-US affiliate'**) to major US institutional investors only. UBS Securities LLC or UBS Financial Services Inc. accepts responsibility for the content of a document prepared by another non-US affiliate when distributed to US persons by UBS Securities LLC or UBS Financial Services Inc. All transactions by a US person in the securities mentioned in this document must be effected through UBS Securities LLC or UBS Financial Services Inc., and not through a non-US affiliate. UBS Securities LLC is not acting as a municipal advisor to any municipal entity or obligated person within the meaning of Section 15B of the Securities Exchange Act (the "Municipal Advisor Rule"), and the opinions or views contained herein are not intended to be, and do not constitute, advice within the meaning of the Municipal Advisor Rule. **Canada:** Distributed by UBS Securities Canada Inc., a registered investment dealer in Canada and a Member-Canadian Investor Protection Fund, or by another affiliate of UBS AG that is registered to conduct business in Canada or is otherwise exempt from registration. **Mexico:** This report has been distributed and prepared by UBS Casa de Bolsa, S.A. de C.V., UBS Grupo Financiero, an entity that is part of UBS Grupo Financiero, S.A. de C.V. and is an affiliate of UBS AG. This document is intended for distribution to institutional or sophisticated investors only. Research reports only reflect the views of the analysts responsible for the reports. Analysts do not receive any compensation from persons or entities different from UBS Casa de Bolsa, S.A. de C.V., UBS Grupo Financiero, or different from entities belonging to the same financial group or business group of such. For Spanish translations of applicable disclosures, please see www.ubs.com/disclosures. **Brazil:** Except as otherwise specified herein, this material is prepared by UBS Brasil CCTVM S.A. to persons who are eligible investors residing in Brazil, which are considered to be: (i) financial institutions, (ii) insurance firms and investment capital companies, (iii) supplementary pension entities, (iv) entities that hold financial investments higher than R$300,000.00 and that confirm the status of qualified investors in written, (v) investment funds, (vi) securities portfolio managers and securities consultants duly authorized by Comissão de Valores Mobiliários (CVM), regarding their own investments, and (vii) social security systems created by the Federal Government, States, and Municipalities. **Hong Kong:** Distributed by UBS Securities Asia Limited and/or UBS AG, Hong Kong Branch. **Singapore:** Distributed by UBS Securities Pte. Ltd. [MCI (P) 007/09/2016 and Co. Reg. No.: 198500648C] or UBS AG, Singapore Branch. Please contact UBS Securities Pte. Ltd., an exempt financial adviser under the Singapore Financial Advisers Act (Cap. 110); or UBS AG, Singapore Branch, an exempt financial adviser under the Singapore Financial Advisers Act (Cap. 110) and a wholesale bank licensed under the Singapore Banking Act (Cap. 19) regulated by the Monetary Authority of Singapore, in respect of any matters arising from, or in connection with, the analysis or document. The recipients of this document represent and warrant that they are accredited and institutional investors as defined in the Securities and Futures Act (Cap. 289). **Japan:** Distributed by UBS Securities Japan Co., Ltd. to professional investors (except as otherwise permitted). Where this document has been prepared by UBS Securities Japan Co., Ltd., UBS Securities Japan Co., Ltd. is the author, publisher and distributor of the document. Distributed by UBS AG, Tokyo Branch to Professional Investors (except as otherwise permitted) in relation to foreign exchange and other banking businesses when relevant. **Australia:** Clients of UBS AG: Distributed by UBS AG (Holder of Australian Financial Services License No. 231087). Clients of UBS Securities Australia Ltd: Distributed by UBS Securities Australia Ltd (Holder of Australian Financial Services License No. 231098). This Document contains general information and/or general advice only and does not constitute personal financial product advice. As such, the Information in this document has been prepared without taking into account any investor's objectives, financial situation or needs, and investors should, before acting on the Information, consider the appropriateness of the Information, having regard to their objectives, financial situation and needs. If the Information contained in this document relates to the acquisition, or potential acquisition of a particular financial product by a 'Retail' client as defined by section 761G of the Corporations Act 2001 where a Product Disclosure Statement would be required, the retail client should obtain and consider the Product Disclosure Statement relating to the product before making any decision about whether to acquire the product. The UBS Securities Australia Limited Financial Services Guide is available at: www.ubs.com/ecs-research-fsg. **New Zealand:** Distributed by UBS New Zealand Ltd. UBS New Zealand Ltd is not a registered bank in New Zealand. The information and recommendations in this publication are provided for general information purposes only. To the extent that any such information or recommendations constitute financial advice, they do not take into account any person's particular financial situation or goals. We recommend that recipients seek advice specific to their circumstances from their financial advisor. **Korea:** Distributed in Korea by UBS Securities Pte. Ltd., Seoul Branch. This document may have been edited or contributed to from time to time by affiliates of UBS Securities Pte. Ltd., Seoul Branch. **Malaysia:** This material is authorized to be distributed in Malaysia by UBS Securities Malaysia Sdn. Bhd (Capital Markets Services License No.: CMSL/A0063/2007). This material is intended for professional/institutional clients only and not for distribution to any retail clients. **India:** Distributed by UBS Securities India Private Ltd. (Corporate Identity Number U67120MH1996PTC097299) 2/F, 2 North Avenue, Maker Maxity, Bandra Kurla Complex, Bandra (East), Mumbai (India) 400051. Phone: +912261556000. It provides brokerage services bearing SEBI Registration Numbers: NSE (Capital Market Segment): INB230951431, NSE (F&O Segment) INF230951431, NSE (Currency Derivatives Segment) INE230951431, BSE (Capital Market Segment) INB010951437; merchant banking services bearing SEBI Registration Number: INM000010809 and Research Analyst services bearing SEBI Registration Number: INH000001204. UBS AG, its affiliates or subsidiaries may have debt holdings or positions in the subject Indian company/companies. Within the past 12 months, UBS AG, its affiliates or subsidiaries may have received compensation for non-investment banking securities-related services and/or non-securities services from the subject Indian company/companies. The subject company/companies may have been a client/clients of UBS AG, its affiliates or subsidiaries during the 12 months preceding the date of distribution of the research report with respect to investment banking and/or non-investment banking securities-related services and/or non-securities services. With regard to information on associates, please refer to the Annual Report at: http://www.ubs.com/global/en/about_ubs/investor_relations/annualreporting.html

The disclosures contained in research documents produced by UBS Limited shall be governed by and construed in accordance with English law.

UBS