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Are Chinese Equities Expensive? Maybe

Ajay Kapur, CFA
Strategist
(+852) 2203 6196
ajay.kapur@db.com

Ritesh Samadhiya, CFA
Strategist
(+852) 2203 6251
ritesh.samadhiya@db.com

With Chinese equities trading at close to 10-year lows, the question in the title may sound a tad unhinged – often, such questions merely justify existing extremes, marking turning points. Still, sometimes life does not mean-revert. So, we take a stab at what the Chinese equity PB multiple might be telling us, using longer-term fundamentals – the ROE and cost of equity. A few of our conclusions follow.

First, short-term fluctuations in the Chinese PB multiple are driven by monetary policy, specifically the gap between M1 and M2 growth. This is currently at a 10-year low, so any modest easing should prop the PB multiple for the duration of such easing.

Second, EBIT margins could fall from 10.5% currently to 6-8% by 2014. The long-term story is different. We examine the three drivers of ROE – EBIT margins, asset turnover and leverage. China's EBIT margins have dropped from 20% to 11% in the past 10 years. The two key long-term drivers of these EBIT margins are past capex/GDP levels and the real effective exchange rate. A weaker exchange rate and/or underinvestment leads to higher EBIT margins, and vice versa. Both these drivers project EBIT margins to fall in the coming 2-3 years, to the 6-8% level.

Third, asset turnover has likely peaked. Since China's WTO entry in 2001, combined with favorable demographics, nominal GDP growth has averaged 16%, up from 9% during 1997-2000, helping the asset turnover ratio (sales/assets) rise from a paltry 55% level in 2001 to its current 80%, hitting global levels. Going forward, weaker nominal GDP growth of around 11% in the next few years (IMF forecast) is likely to drag the asset turnover ratio from 80% to about 56%.

Fourth, China's leverage ratio (assets/equity) has jumped sharply from 1.8x in 2001 to 2.5x now, reaching global levels. We optimistically assume this leverage ratio will remain stable. Combining a 7.4% projected EBIT margin, a projected 56% sales/assets ratio and stable leverage (asset/equity) ratio, we think ex-financials' ROEs could fall from 13% currently to 6.8% in 2-3 years. **With a projected cost of equity of around 10%, the "fair value" PB for the Chinese equity market (ex-financials) should be about 0.9, 50% lower than the 1.4 today.** On *today's* ROE of 13% and COE of 10%, the current PB of 1.4 is at fair value, not cheap.

Fifth, this view would be incorrect if we were to see a sustained multi-year monetary easing; if there is a huge shift of domestic savings from property to equities; if new sectors see explosive sales growth; if the massive infrastructure build-out drives efficiency gains that boost margins; if the currency devalues substantially, soon; or if financial leverage rises even further.

Deutsche Bank AG/Hong Kong

Are Chinese Equities Expensive? Maybe

What is the Chinese equity market telling us?

With Chinese equities trading at close to 10-year lows, the question in the title may sound a tad unhinged – often, such questions merely justify existing extremes, marking turning points. Just when we come up with a clever explanation for very high or very low valuations, often citing a new paradigm, the market decides to humiliate these rationalizations, and reverses its course. Still, sometimes life does not mean-revert. We have research reports in our library that suggest Japanese equities looked cheap in late 1994 – 18 years later, they look even cheaper. So, we take a stab at what the Chinese equity PB multiple might be telling us, using longer-term fundamentals – the ROE and cost of equity.

We make a few points. First, short-term fluctuations in the Chinese PB multiple are driven by monetary policy, specifically the gap between M1 and M2 growth. This is currently at a 10-year low, so any modest easing should prop the PB multiple for the duration of such easing.

Second, the long-term story is different. We examine the three drivers of ROE – EBIT margins, asset turnover and leverage. China's EBIT margins have dropped from 20% to 10.5% in the past 10 years. The two key long-term drivers of these EBIT margins are past capex/GDP levels and the real effective exchange rate. A weaker exchange rate and/or underinvestment leads to higher EBIT margins, and vice versa. Both these drivers – significant over-investment and a strengthening currency – project EBIT margins to fall in the coming 2-3 years, to the 6-8% level. These are Japanese-like margins, a potentially concerning prospect for any equity investor.

Third, since China's WTO entry in 2001, combined with favorable demographics, nominal GDP growth has averaged 16% annually, up from the 9% per annum in the 1997-2000 period, helping the asset turnover ratio (sales/assets) rise from a paltry 55% level in 2001 to about 80% now, hitting global levels. Going forward, weaker nominal GDP growth of around 11% in the next few years (according to IMF forecasts) is likely to drag the asset turnover ratio from 80% to about 56%.

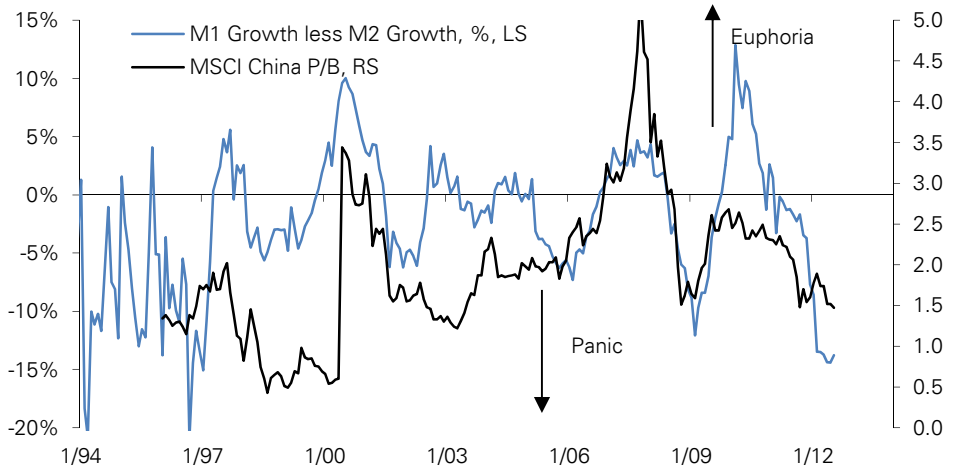
Fourth, China's leverage ratio (assets/equity) has jumped sharply from 1.8x in 2001 to 2.5x now, reaching global levels. We optimistically assume this leverage ratio to remain stable. Combining a 7.4% projected EBIT margin, a projected 56% sales/assets ratio and stable leverage (asset/equity) ratio, we think ex-financials' ROEs could fall from 13% currently to 6.8% in 2-3 years. **With a projected cost of equity of around 10%, the "fair value" PB for the Chinese equity market (ex-financials) should be around 0.9, 50% lower than the current 1.4. This would imply that Chinese equities are "expensive" if we use our projections for ROE and COE *2-3 years out*.** On *today's* ROE of 13% and COE of 10%, the current PB of 1.4 is at fair value, not cheap. We abstract here from the multiple-corroding "corporate governance" issues that emerge frequently, the "bezzle" in any leverage-driven boom like in China.

Fifth, this view would be incorrect if we were to see a sustained multi-year monetary easing; if there is a huge shift of domestic savings from property to equities; if new sectors see explosive sales growth; if the massive infrastructure build-out, paid for by

taxpayers, not shareholders, drives efficiency gains that boost margins; if the currency devalues substantially, soon; if financial leverage rises even further; or if we see a wave of consolidation.

As Figure 1 shows, there is a tight correlation between the gap between M1 and M2 growth, and the PB multiple in China. Easing monetary policy pumps the PB multiple, and tightening monetary policy compresses it. We are at about the tightest monetary policy on this indicator. No wonder then that the PB multiple is low. Any easing is likely to boost the equity market multiple for the duration of the easing. However, our concern is the longer-term outlook for the PB multiple, which should reflect the gap between projected ROE and cost of equity. While bubbles and busts are part of the Chinese equity market over short periods, we find quite a robust relationship between PB and the gap between ROE and cost of equity in China.

Figure 1: In the short term, China's PB multiple is driven by liquidity



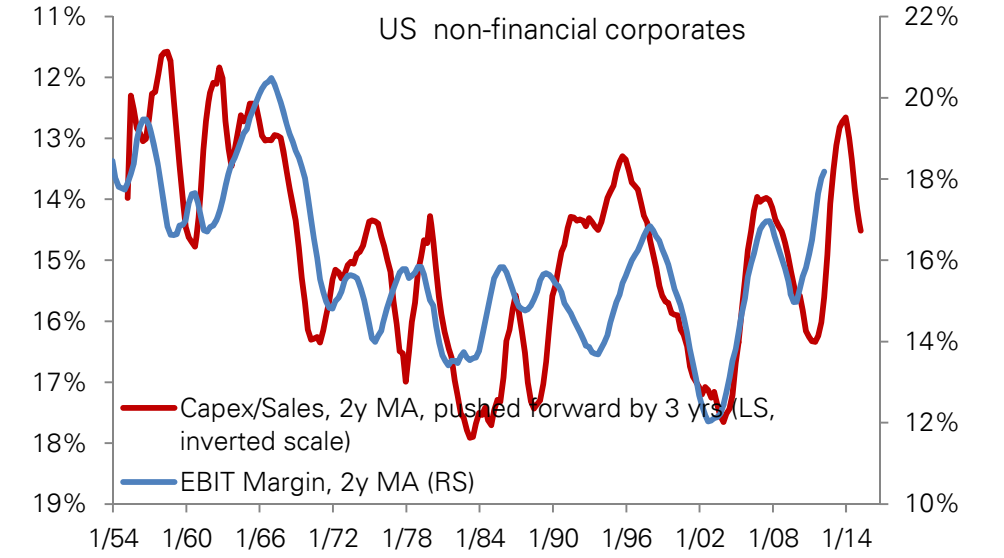
Source: Deutsche Bank, MSCI, Bloomberg Finance LP.

As CFAs, we found one of the more useful parts of that curriculum to be the ROE DuPont decomposition analysis. This breaks up the ROE for the non-financial corporate sector into margins, asset turnover, leverage, tax rates and interest payments. Here, we try to project the EBIT margin and asset turnover for China, using predictive leading indicators. We assume that leverage, interest costs and taxation remain at similar levels in the next few years.

Let us start with EBIT margin projections. Regular readers might remember our work on this issue last year (FITT report, *Cyclical and Structural Drivers of Margins Favor DMs Over EMs,* June 2012). Our main thesis is that past capex levels predict future EBIT margins. Periods of over-investment lead to excess competition and lower pricing power, eroding margins, everything else being equal. Periods of under-investment, normally thrust upon countries via financial crises, clear the arteries, force the excess to exit, and underpin greater pricing power and margins. Figure 2 shows this thesis for the US, where we have about 60 years of data. There is a four-year lead from capex/sales to prospective profit margins. As a side note, the reduction in US investment following the 2007-08 financial crisis has buttressed profit margins in the past few years, but that happy story seems to be coming to an end, perhaps after 2013. Figure 3 shows the same relationship for four regions – the USA, Europe, Japan and Asia ex-Japan – using bottom-up data that goes back to 1985. The general thesis holds. Figure 4 shows the same relationship for Germany, the UK, Australia, India, Brazil, Peru, Indonesia and the Philippines to demonstrate that prior capex/GDP is a reasonably good predictor of future margins. Obviously, the relationship will not work for all countries, especially

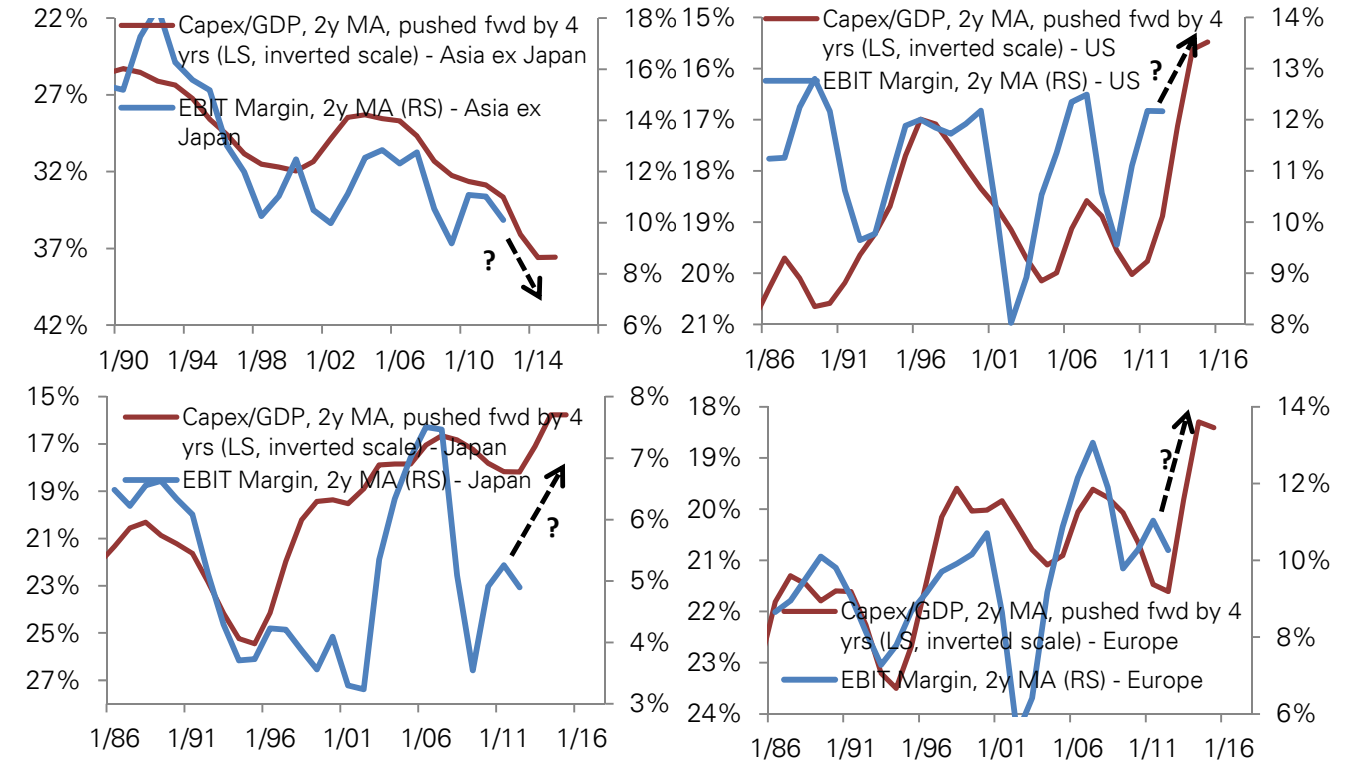
where there is a large disconnect between country-specific capex and a stock market dominated by multinationals with significant overseas operations (such as Spain or Canada).

Figure 2: USA: Capex/Sales leads corporate profit margins by about four years. Still some margin support from post-crisis underinvestment



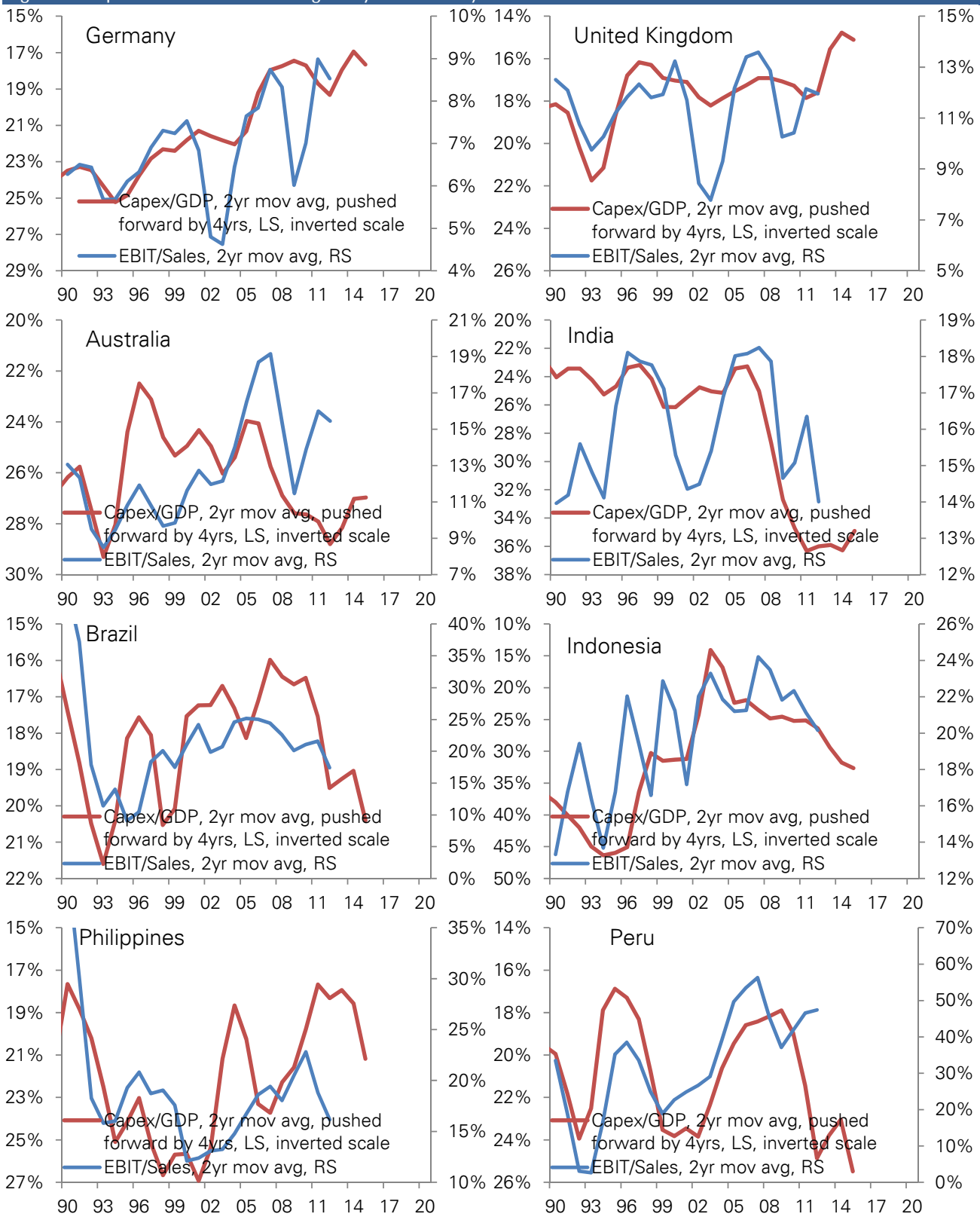
Source: Deutsche Bank, Flow of funds, NIPA Tables from BEA. For capex, check Table F102 and look for FA105050005 code from Flow of Funds database. For sales, check table NIPA 1.14 and look for Gross value added of nonfinancial corporate business item from BEA. For EBIT, check table NIPA 1.14, look for item called Net operating surplus.

Figure 3: Capex/GDP leads profit margins by four years. Over-investment crimps margins and under-investment boosts them



Source: Deutsche Bank, CEIC, Datastream, IMF, Factset. Capex is gross fixed capital formation.
Note: Capex/GDP is the gross fixed capital formation as a percentage of GDP, numbers for Asia ex Japan are US$ nominal GDP weighed. EBIT/sales calculated from a universe of about 2,300 companies (non-financials) in Asia ex Japan, 1,100 companies in the US, 800 companies in Europe and 600 companies in Japan as of 2011.

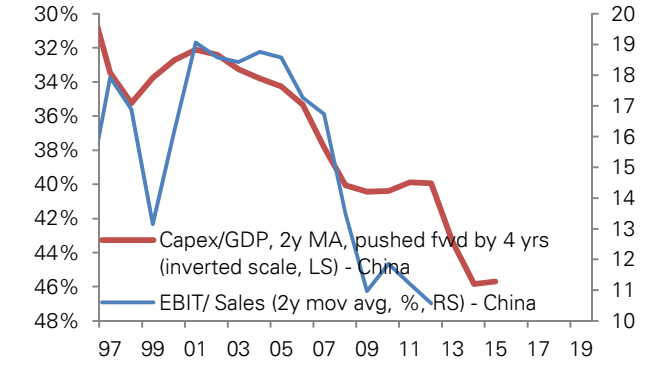
Figure 4: Capex/GDP leads EBIT margins by about four years



Source: Deutsche Bank. IMF. Capex is gross fixed capital formation. EBIT/Sales is based on MSCI universe for the countries.

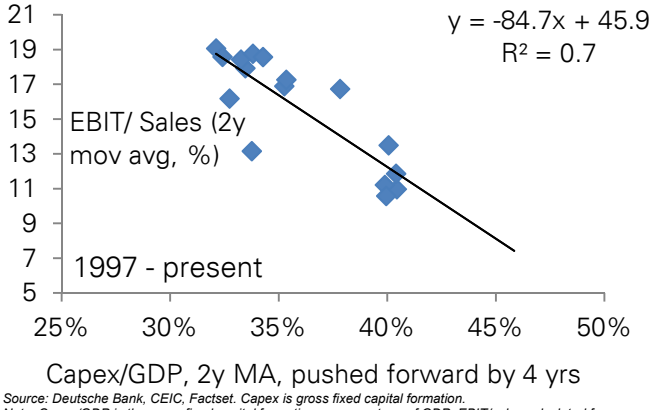
Figure 5 shows the capex/GDP ratio for China and subsequent profit margins for the listed corporate sector (300 companies in the database in 2011). There is a clear inverse relationship, as supported by Figure 6. High capex/GDP normally leads EBIT margins for the listed sector by about four years. Since we already know what capex/GDP was, we should be able to make a guess at what that implies for EBIT margins 2-3 years from now. The projected EBIT margin for 2014 falls to 7.4% from 10.5% last year, using the regression equation in Figure 6. While no single factor determines margins, we think prior capex/GDP (or capex/sales) does a decent job. In China, we have also found that the real effective exchange rate leads the EBIT margin in China by about two years (see Figures 7 and 8). A competitive currency increases global demand for Chinese products and lifts margins with a lag, and vice versa. Given the prior strength of the Renminbi, the currency channel also argues for a projected decline in EBIT margins for the corporate sector in the coming two years, supporting the separate verdict from rising prior capex/GDP. Figures 9 and Figure 10 compare China's EBIT margins and assets turns with global levels – while China's current numbers have converged with those globally, on our projections, China's margins could fall to 7.4% and asset turns to 56% in the coming 2-3 years. (For sector details and global comparisons, see Appendix B.)

Figure 5: China's capex/GDP leads EBIT margins by four years



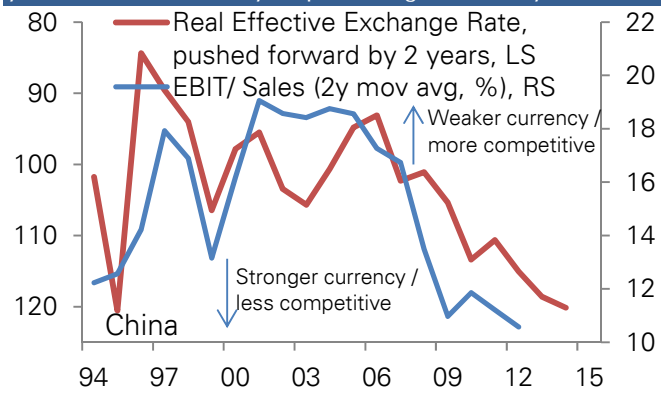
Source: Deutsche Bank, CEIC, Factset. Capex is gross fixed capital formation.
Note: Capex/GDP is the gross fixed capital formation as percentage of GDP. EBIT/sales calculated from a universe of about 300 Chinese companies (non-financials).

Figure 6: Inverse correlation between prior capex/GDP and subsequent EBIT margins in China, four years later



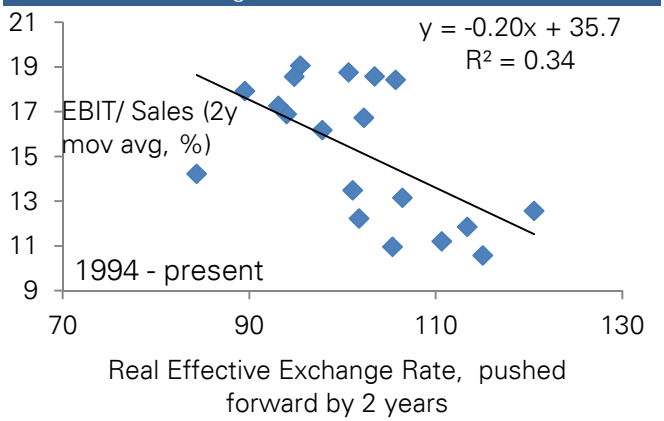
Source: Deutsche Bank, CEIC, Factset. Capex is gross fixed capital formation.
Note: Capex/GDP is the gross fixed capital formation as percentage of GDP. EBIT/sales calculated from a universe of about 300 Chinese companies (non-financials).

Figure 7: China's currency leads EBIT margins by two years; weaker currency helps, stronger currency hurts



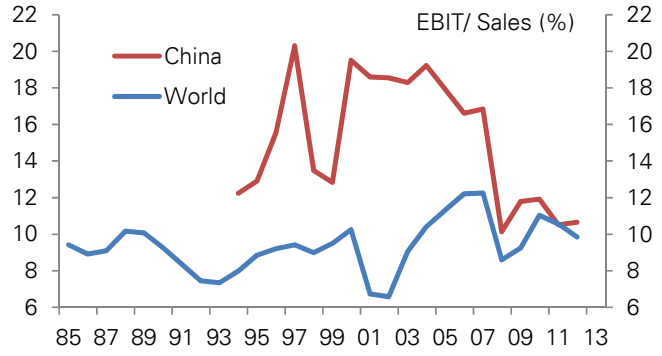
Source: Bloomberg Finance LP. Real effective exchange rate is from JP Morgan. EBIT/sales calculated from a universe of about 300 Chinese companies (non-financials).

Figure 8: Inverse correlation between China's currency and future EBIT margins



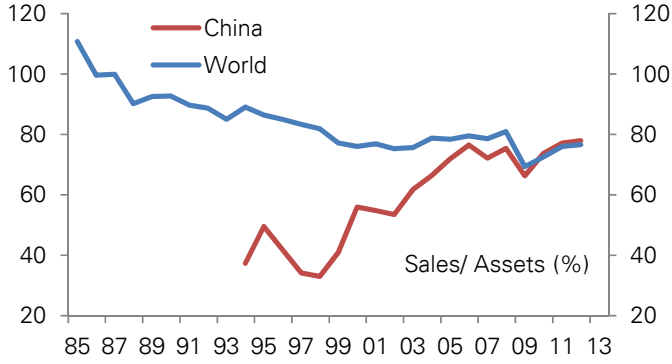
Source: Deutsche Bank, Bloomberg Finance LP. EBIT/sales calculated from a universe of about 300 Chinese companies (non-financials).

Figure 9: China's margins have halved in the past decade, more downside likely, ahead, based on prior over-investment



Source: Deutsche Bank. EBIT/sales for the world is calculated from a universe of about 2,300 companies (non-financials) in Asia ex Japan, 350 companies in emerging markets ex Asia ex-Japan, 1,100 companies in the US, 800 companies in Europe, 600 companies in Japan as of 2011. For China, it is based on 300 companies.

Figure 10: China's asset turnover has converged to global levels. Slower nominal GDP growth likely, ahead, to lower this

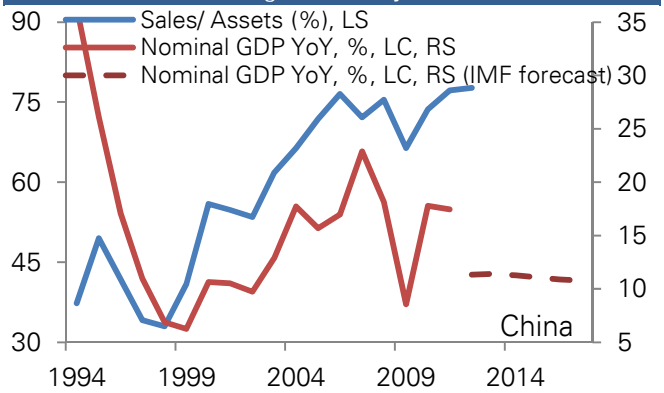


Source: Deutsche Bank. Sales/Assets for the world is calculated from a universe of about 2,300 companies (non-financials) in Asia ex Japan, 350 companies in emerging markets ex Asia ex-Japan, 1,100 companies in the US, 800 companies in Europe, 600 companies in Japan as of 2011. For China, it is based on 300 companies.

Long-term bullish investors on Chinese equities have based their thesis primarily on strong nominal GDP. (We have never been fans of "high GDP equals high equity market returns". Indeed, the long-term relationship is *negative).* However, there should be a relationship between nominal GDP growth and the sales/asset ratio – a key component of the ROE. In China's case, Figures 11 and 12 show the relationship. Since 2001, WTO entry plus great demographics, and an initially undervalued currency, have helped nominal GDP growth to jump from 9% in the 1997-2000 period to 16% in 2001-2010. The IMF forecasts nominal GDP growth to decelerate to 10-11% in the coming five years. Using the regression relationship in Figure 12, and plugging in the IMF nominal GDP growth forecast, the sales/asset ratio could likely drop to 56% in two-three years from its current 80%.

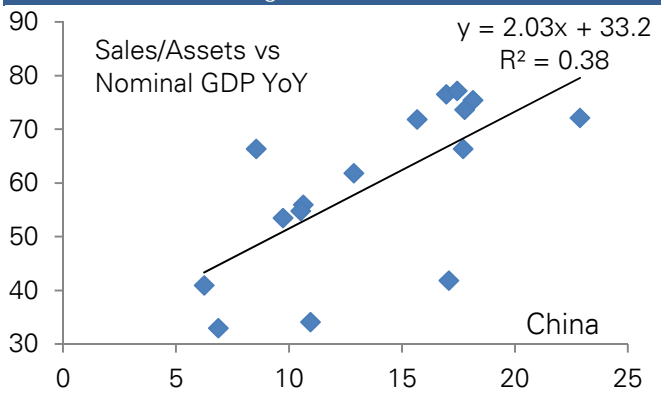
After combining these projections for EBIT margins and sales/assets, with interest costs, taxation and financial leverage (assets/equity) which are assumed to remain unchanged in the next two-three years, the projected ROE for the non-financial sector in 2014 drops to 6.8% from 13.2% in 2011. See Figure 13 for the numbers. Why does this matter?

Figure 11: China: asset turnover (sales/assets) move in line with nominal GDP growth. Projected to fall



Source: Deutsche Bank, IMF.
Sales/Assets for China is calculated from a universe of about 300 companies (non-financials)

Figure 12: China: asset turnover (sales/assets) move in line with nominal GDP growth



Source: Deutsche Bank, IMF.
Sales/Assets for China is calculated from a universe of about 300 companies (non-financials)

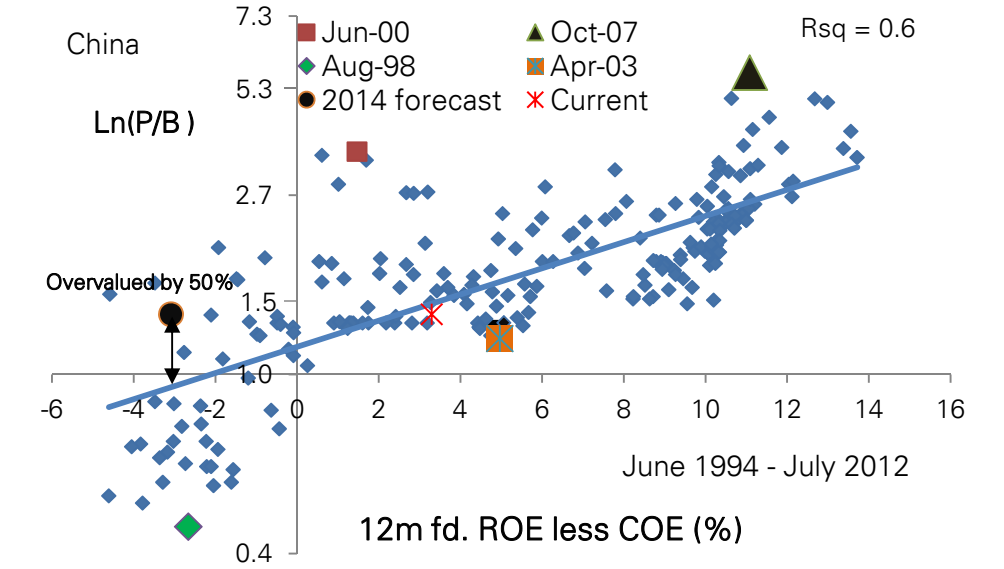
Figure 13: Dupont analysis for China, estimates for 2014-15, actual until 2011

China	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2014-15
# of Companies	44	58	78	82	91	121	137	155	178	217	249	286	333	339	330	325	314	
NI/ EBT, % (1)	105.4	105.9	95.3	83.5	83.6	70.4	70.6	73.4	73.9	74.5	73.3	74.3	75.4	79.9	74.7	76.0	73.9	73.9
EBT/ EBIT, % (2)	72.9	76.4	77.4	60.8	67.6	85.9	88.1	90.7	93.2	93.4	92.6	92.5	92.7	87.2	90.4	92.0	90.0	90.0
EBIT/ Sales, % (3)	12.9	15.5	20.3	13.5	12.8	19.5	18.6	18.6	18.3	19.2	17.9	16.6	16.8	10.1	11.8	11.9	10.5	7.4
Sales/ Assets, % (4)	49.5	41.8	34.1	33.0	40.9	55.9	54.8	53.5	61.8	66.3	71.8	76.5	72.1	75.4	66.4	73.6	77.2	56.1
Assets/ Equity, x (5)	1.9	1.8	1.8	1.9	1.8	1.9	1.8	1.8	1.8	1.9	2.0	2.0	2.0	2.1	2.3	2.4	2.5	2.5
ROE, % (1x2x3x4x5	9.2	9.6	9.0	4.2	5.5	12.4	11.4	11.8	14.4	17.3	17.5	17.4	16.8	11.3	12.0	14.4	13.2	6.8

Source: Deutsche Bank, Factset. Excludes financial companies.

Figure 14 shows there is a (logical) relationship between the PB and the gap between ROE and cost of equity (COE). Readers with a keen mathematical mind can refer to Appendix A for the derivation of the relationship. Plugging in a 6.8% projected ROE for the non-financial corporate sector for 2014, a 9.9% COE (the three-month deposit rate for China is 2.85% plus an equity risk premium of 7.05%), the fair value for Chinese equities (non-financials) should be 0.92. Currently, it is 1.4, implying a 50% overvaluation if our projections for ROE are roughly right. Of course, as Figure 14 shows, the PB multiple can move well away from the fundamentally-driven ROE less COE gap. In June 2000 and mid-2007, a whoosh of excess liquidity (M1 less M2 growth) drove the PB multiple well above what the ROE less COE model was projecting.

Figure 14: Chinese equities are rational: the PB multiple moves with the gap between ROE and COE



Source: Deutsche Bank, MSC, I/B/E/S. COE is calculated as the 3-month deposit rate plus the equity risk premium. The 3-month deposit rate is 2.85% for China. We use the 3-month deposit rate as a proxy for the 1y government bond yield as a longer history is available and both the series track each other closely. The equity risk premium is 7.05% for China from Prof. Damodaran (http://pages.stern.nyu.edu/~adamodar/). The equation for the above regression line is ln(ROE)=0.15+0.07(forward ROE – COE). The ROE is for both the non-financial AND financial sector, and not comparable to data in Figure 13 which just covers the non-financial sector.

In conclusion, China's profit margins have halved in the past decade. Yet, a large rise in the asset turnover (sales/assets) driven by strong nominal GDP growth and a significant increase in financial leverage, kept ROEs to respectable 13-15% levels. Going forward, we think that prior over-investment (and a strong currency) are likely to see margins shrink to 6-8%, while a trend deceleration in nominal GDP should see a drop in the asset turnover ratio. ROEs could drop to 6-8% in the next two-three years. The *projected* "fair value" PB multiple for an ROE that falls short of the COE by 3.3% is about 0.9. Clearly, there will be sectors that belie this trend, based on demographics and threshold per capita income levels. These include financial planning, insurance, entertainment and travel, upscale healthcare, luxury property and environmental services, among others.

Please see our report "*Middle-Aged Spread and Vanishing Youth*, The Investigator, 16 May 2011, for details). We think the multiple could diverge sharply higher from this "fair value" estimate in a number of scenarios, which present the upside risk to our analysis: if we get a sustained multi-year monetary easing; if there is a huge shift in domestic savings from property to equities; if new sectors see explosive sales growth; if the massive infrastructure build-out, paid for by taxpayers, not shareholders, drives efficiency gains that boost margins; if the currency devalues substantially, soon; or if financial leverage rises even further.

Appendix A

A logarithm of the fair value P/B (and not P/B alone) is linearly related to ROE less cost of equity. The following derivation will explain the math behind it – Jarrod W. Wilcox wrote about it in his book "*Investing By The Numbers*".

In equilibrium,

Required return on equity = dividend yield + percentage price appreciation

$R = (D/P) + (\Delta P/P)$ (i)

Where R is the required return on equity expected by shareholders, D is the dividend per share, p is the price per share, and ΔP is the change in price.

Now we can write $P = (P/B)*B$

where B is the book value.

Taking differentials of both sides, we can approximate,

$\Delta P/P = \Delta (P/B)/(P/B) + (\Delta B/B) = \Delta (P/B)/(P/B) + G_B$ (ii)

Where G_B is the growth rate in book value per share.

From equation (i) and (ii), we can write that:

$R = (D/P) + \Delta (P/B) / (P/B) + G_B$ (iii)

The above can be written as:

$d (P/B)/dt = (R - G_B)(P/B) - d$

By replacing D/B by d on the right side of the equation.

Assuming P/B=1 at some end point T.

$P/B = d/(R - G_B) + [(R - d - G_B)/(R - G_B)] * \exp[(R - G_B)(t-T)]$ (iv)

Now we know:

ROE = earnings/book value = (dividends + retained earnings)/book value = $d + G_B$

So, $P/B = d/(R - G_B) + [(R - ROE)/(R - G_B)] * \exp[(R - G_B)(t-T)]$ (v)

Putting t=0, we get:

$P/B = d/(R - G_B) + [(R - ROE)/(R - G_B)] * \exp[-(R - G_B)T]$ (vi)

Since $\exp(x) = 1 + x + x^2/2! + x^3/3! + x^4/4! + ...$

Hence, $\exp[-(R - G_B)T] = 1 + T(G_B - R) + T^2(G_B - R)^2/2! + T^3 (G_B - R)^3/3! + ...$

We can write the above equation (vi) as:
$P/B = d/(R - G_B) + (R - ROE)/(R - GB) + (R - ROE)/(R - G_B)\ T(G_B - R) + (ROE-R)*[\text{higher order terms in } (G_B - R)T]$

$= d/(R - G_B) + (R - ROE)/(R - G_B) + T(ROE - R) + (ROE-R)*[\text{higher order terms in } (G_B - R)T]$ (vii)

Now since $ROE=d + G_B$:

$P/B = (ROE- G_B) /(R - G_B) + (R - ROE)/(R - G_B) + T(ROE - R) + (ROE-R)*[\text{higher order terms in } (G_B - R)T]$

$= 1 + T(ROE - R) + (ROE-R)*[\text{higher order terms in } (G_B - R)T]$ (viii)

If $d=0$ and $G_B = ROE$,

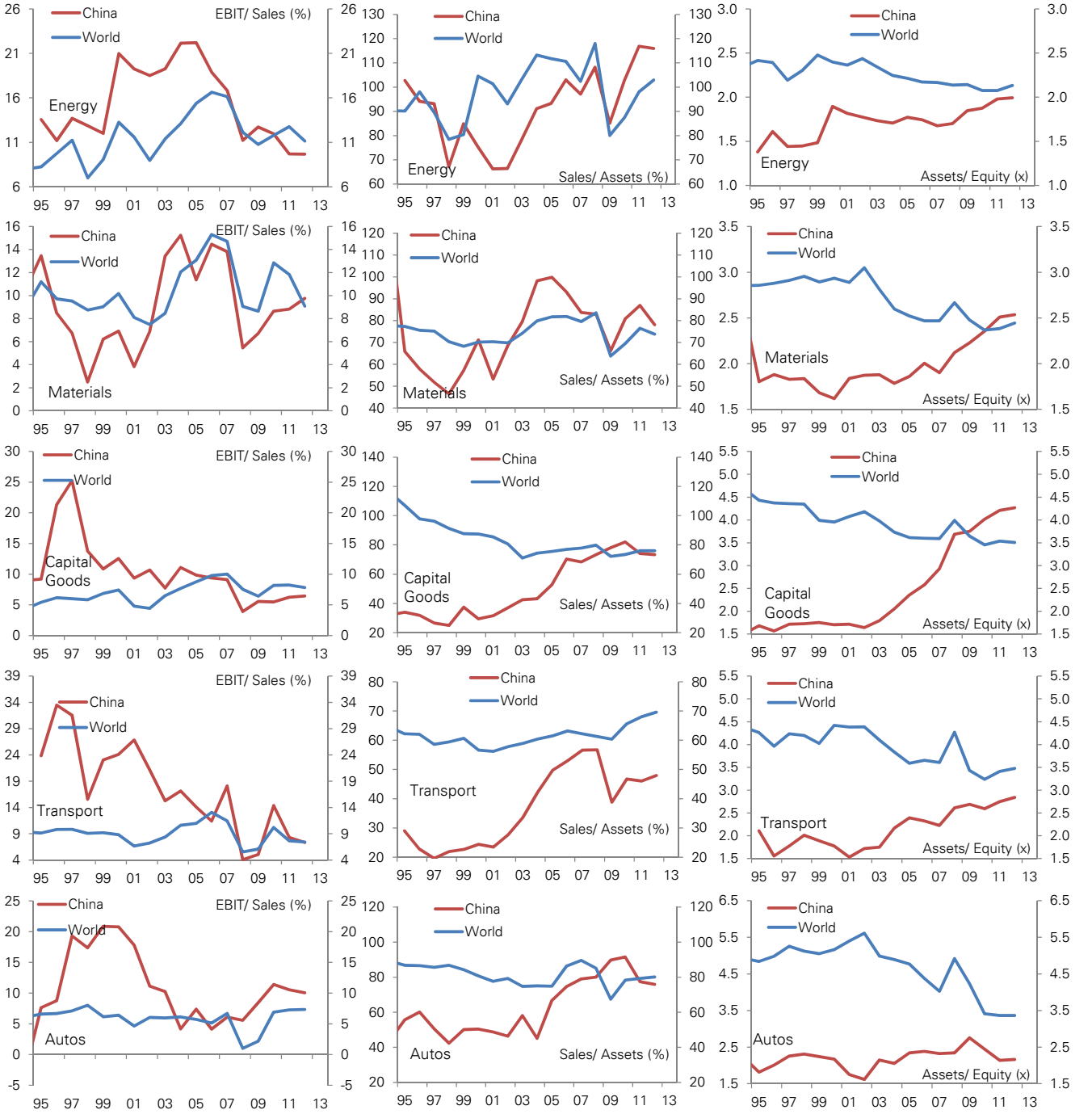
$P/B = \exp[T(ROE-R)]$

Clients can argue about the assumption of d=0, but even if the dividend is not zero, as long as it remains small in comparison to book value, $G_B \sim ROE$.

Now taking a log of both sides we get,
Ln(P/B) = a + b*(ROE – required rate of return on equity)

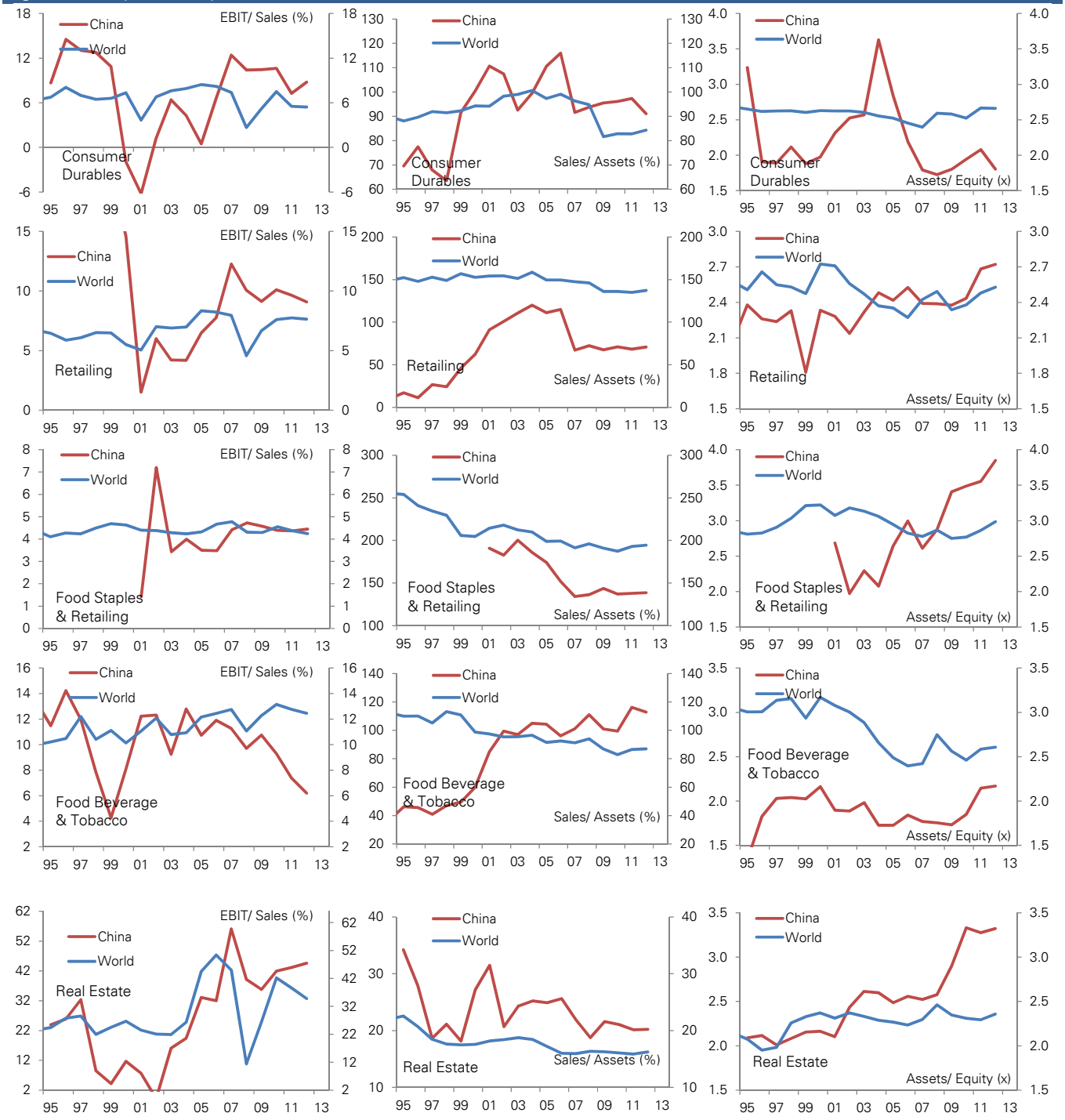
Appendix B

Figure 15: Dupont Analysis for China and the World



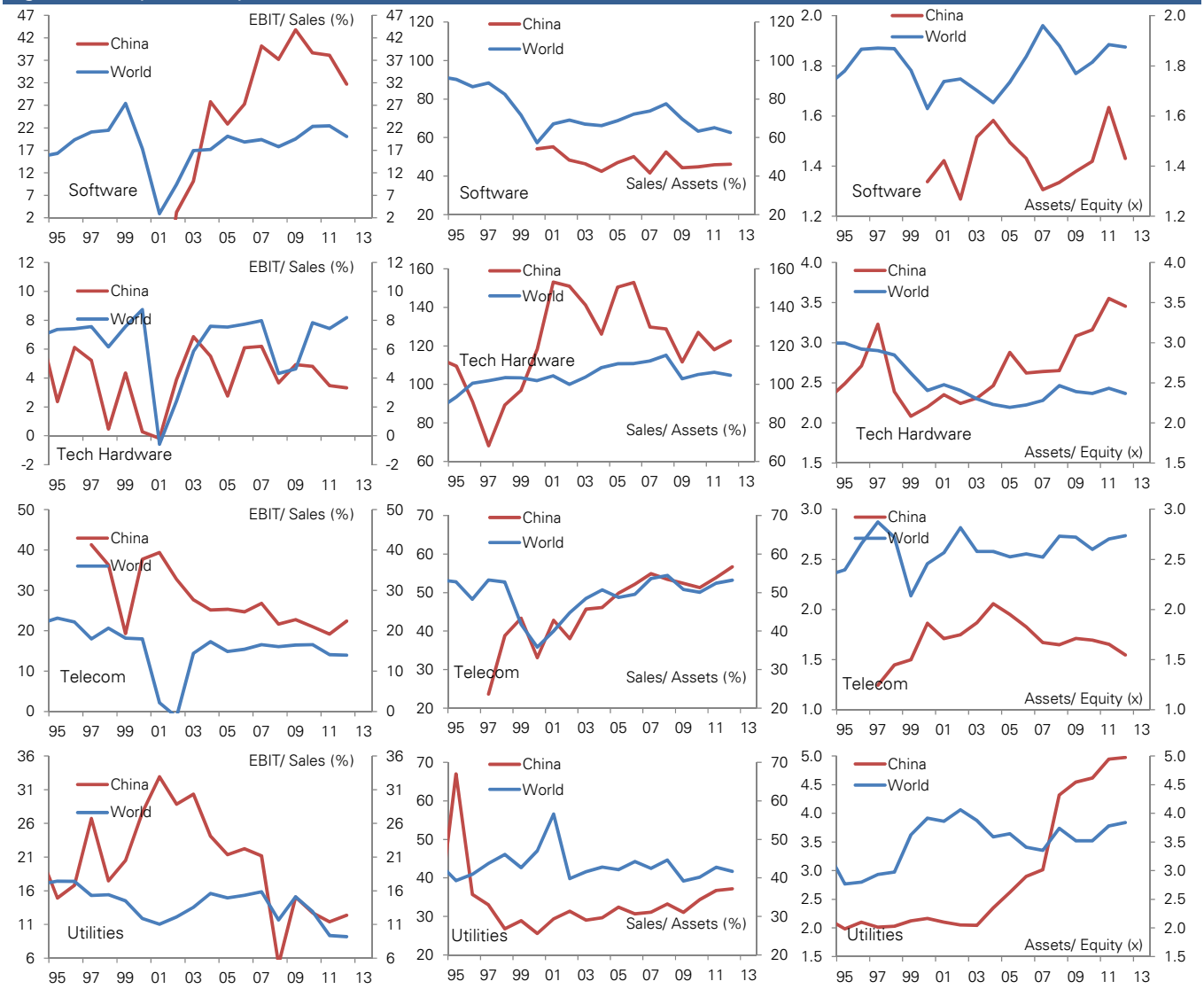
Source: Deutsche Bank, Factset. World analysis is based in about 5100 companies (ex-financials) in 2011. China includes about 300 companies.

Figure 16: Dupont Analysis for China and the World



Source: Deutsche Bank, Factset.

Figure 17: Dupont Analysis for China and the World



Source: Deutsche Bank, Factset.

Appendix 1

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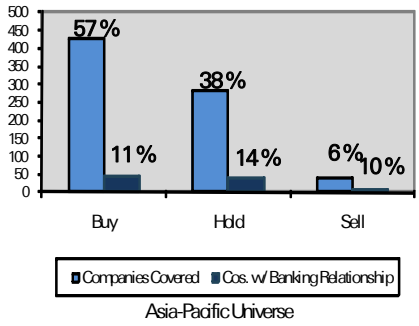
Equity rating dispersion and banking relationships



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Deutsche Bank AG/Hong Kong

Asia-Pacific 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
Filiale Hongkong
International Commerce Centre,
1 Austin Road West,Kowloon,
Hong Kong
tel: (852) 2203 8888

Deutsche Equities India Pte Ltd
3rd Floor, Kodak House
222, Dr D.N. Road
Fort, Mumbai 400 001
SEBI Nos: INB231196834
INB011196830, INF231196834
Tel: (91) 22 6658 4600

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

Deutsche Bank (Malaysia) Berhad
Level 18-20
Menara IMC
8 Jalan Sultan Ismail
Kuala Lumpur 50250
Malaysia
Tel: (60) 3 2053 6760

In association with
Deutsche Regis Partners, Inc.
Level 23, Tower One
Ayala Triangle, Ayala Avenue
Makati City, Philippines
Tel: (63) 2 894 6600

Deutsche Securities Korea Co.
17th Floor, YoungPoong Bldg.,
33 SeoRin-Dong,
Chongro-Ku, Seoul (110-752)
Republic of Korea
Tel: (82) 2 316 8888

Deutsche Bank AG
Singapore
One Raffles Quay
South Tower
Singapore 048583
Tel: (65) 6423 8001

Deutsche Securities Asia Ltd
Taiwan Branch
Level 6
296 Jen-Ai Road, Sec 4
Taipei 106
Taiwan
Tel: (886) 2 2192 2888

In association with
TISCO Securities Co., Ltd
TISCO Tower
48/8 North Sathorn Road
Bangkok 10500
Thailand
Tel: (66) 2 633 6470

In association with
PT Deutsche Verdhana Indonesia
Deutsche Bank Building,
6th Floor, Jl. Imam Bonjol No.80,
Central Jakarta,
Indonesia
Tel: (62 21) 318 9541

International locations

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

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

Deutsche Bank AG
Große Gallusstraße 10-14
60272 Frankfurt am Main
Germany
Tel: (49) 69 910 00

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
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

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