Global Economics View

What Does The Chinese Devaluation Mean For the World?

- Last week, the People's Bank of China changed its exchange rate mechanism to – at face value – allow the market to play a greater role in setting the renminbi (RMB) exchange rate and the RMB has since depreciated by 3%.

- We expect the PBOC to continue to manage the RMB heavily, and expect a modest further depreciation to 6.8 RMB per USD within 12 months. As the Chinese economy slowed, it made little sense for the RMB to appreciate alongside the USD over the last year. But the positive impact on Chinese growth from the depreciation we expect is likely to be moderate – perhaps boost Chinese GDP by up to 0.5% and CPI by 1.5% over a year, and there could be some negative balance sheet effects in China due to unhedged dollar borrowing. Additional policy easing in China therefore remains likely (we expect five RRR cuts and two policy rate cuts within 12 months).

- There are many channels of transmission of the changes in the RMB exchange rate (and system) and exchange rate system to the rest of the world. By themselves, the RMB weakening and associated FX volatility will be a modest drag on growth and inflation for the rest of the world.

  – We therefore expect a weaker RMB to reinforce the theme of 'lower for longer' monetary policy in the US and other advanced economies. We have not changed our calls at this point, but the recent developments increase the risk of a later and shallower hiking path for the Fed and the BoE, earlier and more extensive additional easing by the ECB and additional and/or more extended easing by the Bank of Japan. In Australia and New Zealand, the developments reinforce our expectation of further rate cuts this year and a later start to their hiking cycles.

  – Emerging markets that articulate their product chain and/or compete with China in China, at home or in third markets, including Korea, Taiwan, Philippines, and Thailand are likely to manage their currencies down alongside the weakening RMB. Those countries whose exchange rate is closely tied to the USD (Hong Kong, Singapore, Argentina, Ecuador, Saudi Arabia and some of the other Gulf states, will find themselves at a competitive disadvantage and the viability of their dollar (crawling) pegs will be tested.

  – The likely policy responses in other countries, especially looser monetary, credit and exchange rate policies, moderate the otherwise negative effect of a weaker RMB on global growth and inflation. The main risk to that outlook is a greater focus on 'beggar thy neighbor' policies, including greater resort to protectionism, which would damage growth prospects.

  – The recent developments also highlight the trend for higher FX volatility and the potential for occasional discontinuous changes in FX, often following periods of relative calm and stability.

Willem Buiter
+1-212-816-2363
willem.buiter@citi.com

Johanna Chua
+852-2501-2357
johanna.chua@citi.com

Minggao Shen
+852-2501-2485
minggao.shen@citi.com

Guillermo Mondino
+1-212-816-6499
guillermo.mondino@citi.com

Ebrahim Rahbari
+1-212-816-5081
ebrahim.rahbari@citi.com

Prepared for CIRA Email Monitoring

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

Citi Research is a division of Citigroup Global Markets Inc. (the "Firm"), which does and seeks to do business with companies covered in its research reports. As a result, investors should be aware that the Firm may have a conflict of interest that could affect the objectivity of this report. Investors should consider this report as only a single factor in making their investment decision. Certain products (not inconsistent with the author's published research) are available only on Citi's portals.

The Renminbi and the World

On 11 August, the People's Bank of China (PBOC) announced what at first blush may seem like a modest change, but what in reality over time could evolve into a dramatically different arrangement for the renminbi (RMB) exchange rate. The RMB regime could become a managed float, i.e. a market-determined exchange rate subject to periodic intervention by the PBOC. With a continuing albeit gradual liberalization of cross-border capital flows, the effectiveness of direct foreign exchange market interventions will steadily diminish.

Effective from 11 August, market makers submit their quotations of the RMB central parity based on the closing rate on the previous day, *"in conjunction with demand and supply conditions in the foreign exchange market and exchange rate movement of the major currencies."* The new daily fixing will be a weighted average of those submitted quotations. The weighting is determined by China Foreign Exchange Trading System (CFETS), a subordinate of the PBOC (previously, the CFETS asked for the price quotations from market makers based on the fixing in the previous day). The PBOC has not, thus far, changed the size of the band of +/-2% around which the exchange rate is allowed to deviate from the daily fixing. Furthermore, the central bank will continue to intervene even if the exchange rate is within the bands.

This decision by the PBOC is a significant event, even if its implications and motivations are not yet fully clear. It appears that the Chinese government has moved from operating a pretty stable peg to something closer to a managed float, raising questions about how strongly it will manage it. As liberalization proceeds, (sterilized) foreign exchange market intervention will effectively only work through signaling and announcement effects. However, 'domestic' interest rate policies, credit and other financial and/or fiscal policies are likely to gain strength as well as they affect the 'market-determined' exchange rates. As such, monetary policy and exchange rates will work in tandem as there is no such thing as a policy-independent exchange rate, regardless of how freely it floats.

Given our foreseen path for activity and policies, we envisage a path of the renminbi with an additional depreciation (to RMB 6.8 per dollar in the next 12 months vs 6.3 in the next 12 months previously). That path is likely to be characterized with greater volatility and uncertainty over the future policy intentions of the Chinese authorities. These factors are likely to have significant implications for the rest of the world given the major role China now plays in virtually all areas of the world economy. In this note, we explore the decision of the PBOC, its implications for China and for the rest of the world.

Even though we stress that the decision of the PBOC has the potential to be significant, we are skeptical that the actual changes we will see will be dramatic in the near-term. In our view, it is not obvious that the Chinese government would like to engineer a large depreciation (of, say, 20% vs the USD) and quite unlikely that it will have suddenly found an appetite for more volatility. The new system therefore will gradually transition to its ultimate destination of managed float. Along this process it can be made to work similarly to the old system (in terms of inducing a path for the exchange rate desired by the authorities): the authorities can influence the closing rate on the last trading hour by outright intervention or, through moral suasion they can influence the quotations submitted by market makers; they can also discreetly choose and change the weighting of the closing quotations as they constitute private information. Nevertheless, it is now significantly more difficult to manipulate the information as market participants observe transaction prices and it is also costly in terms of reserves to intervene on a large scale, if the objective is to engineer large changes in market prices.

Prepared for CIRA Email Monitoring

An indisputable implication of the change is that now the fixing allows an easier drift in the exchange rate (daily moves can accumulate more easily) and, therefore, the costs of leaning against the changes in the value of the currency are likely to be higher and ultimately more observable. A corollary of this is that the new system is likely to generate more RMB volatility and – given the challenges the Chinese economy faces – also a weaker path for the RMB over the next twelve months. But we caution against expecting dramatic changes in the level of the RMB or its volatility in the near-term.

A Surprising move

Despite the repeatedly proclaimed commitment of the Chinese authorities to domestic financial market liberalization and Renminbi internationalization, which includes (controlled) capital account liberalization, the recent developments were a surprise to us. This is in part because China's recent experience with financial market volatility (in the stock market) – which seems to be the almost inevitable byproduct of liberalization – appears to have taken aback the Chinese leadership. It is also because sometimes the original objectives of the attempted liberalizations proved elusive.

Of course, the equity market is not the full story: the Chinese government has implemented reforms to interest rate setting for bank deposits and loans, encouraged the creation of a market for certificates of deposit, liberalized and induced a rapid development of a market for corporate and local government bonds, and permitted the emergence of a significant and lightly regulated shadow banking sector. In the equity market, the authorities created a pipeline connecting the onshore and offshore equity markets. They also opened up opportunities for Chinese institutional investors to buy foreign assets and for foreign qualified institutional investors to participate in the domestic bond market. They have also pump-primed the equity market with a number of policies directed at liberalizing participation in the market and facilitating the build-up of leveraged positions.

The result of the reforms in the equity market was a huge run-up in valuations that many considered to be at least policy-tolerated and quite possibly policy-encouraged or induced. Amongst the macroeconomic justifications for this particular policy were, people argued, the potential emergence of wealth effects as a new transmission mechanism for monetary policy. In addition, rapidly rising stock valuations appeared to be an easy way to induce a change in the capital structure of many corporations, both directly and by encouraging additional equity issuance, which, in turn, would help resolve their excessive leverage.

After increasing since June 2014 to June 2015 by more than 150%, the equity market has suffered a sharp decline in prices of 24% since then. The decline might have been much larger absent a series of aggressive interventions by policymakers, including restrictions on trading and cancellations of IPOs, instructions to many market participants (banning short selling and in some cases direct selling and mandating share re-purchases) and the provision of a huge line of credit (reported to be up to Rmb 3trn) coordinated by the PBoC to be deployed for the purchase of equities. The sharp correction and the revealed aversion to facing the inevitable consequence of market volatility that follows liberalization, led us to conclude that the Chinese government would be reluctant to rush into liberalizing other key macroeconomic relative prices (see Emerging Markets Macro and Strategy Outlook - China's Wobbly Stabilization).

One may have thought that would apply in particular to the external financial account. After all, rapid liberalization of the financial account in a country subject to

Prepared for CIRA Email Monitoring

internal and/or external economic imbalances is deemed, by many, to be one of the main triggers for the 1997 Asian crisis. A lesson that was drawn from that experience was that liberalization needs to be carefully thought out and follow proper sequencing. In particular, cross-border financial liberalization should follow domestic financial liberalization and even domestic financial liberalization is fraught with risks in the presence of major economic imbalances (and therefore should probably follow after the necessary internal reforms and adjustments have been implemented).

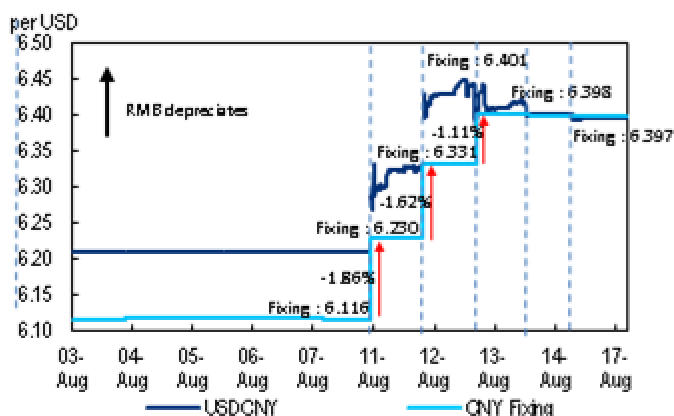
China faces two large and interacting imbalances: excessive leverage (particularly in the local government and SOE sectors) and excess capacity (in many sectors populated by SOE, old-economy champions and in real estate). The Chinese government has in the past also often expressed a preference for stability– not least in its published GDP growth statistics. In the case of China we therefore expected that any market-oriented reforms, including capital account liberalization and introducing a more flexible exchange rate (or more properly, a managed float or market-driven crawling peg), would proceed quite slowly.

So why did the Chinese government do it? Perhaps the Chinese government made more of the IMF report on the SDR last week than we did, when the IMF suggested a more market-determined exchange rate would be needed (as opposed to simply a more freely convertible currency). Perhaps the Chinese government is less worried than we are about the risk of domestic and international financial instability (including the scale and scope of its imbalances) or more confident than we are about its ability to manage it. If the driver was instead that growth prospects were worse than the Chinese government previously thought or that the RMB was more out of sync with the state of the Chinese economy, that would only partly explain it: it would explain a one-off devaluation that would long have been appropriate, but it would not explain the move to a more market-determined exchange rate system.

A combination of the above explanations is probably behind the move. In practice, we think that the Chinese authorities continue to value stability and probably aim to move slowly with the capital account liberalization and the flexibility of the exchange rate (see China Macro Flash - Which Is More Likely, Regime Flexibility or Currency Stability?).

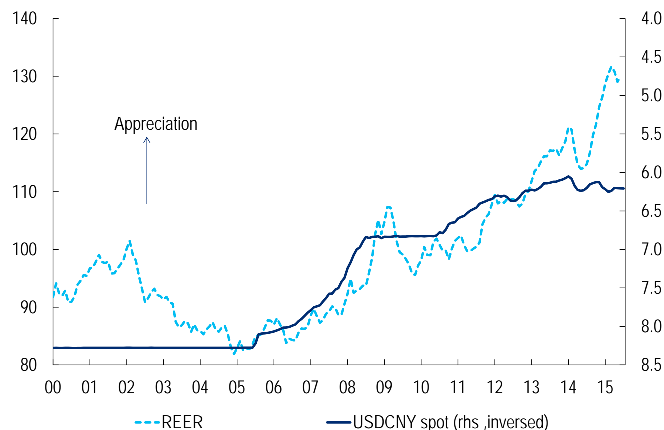
How far will the currency go?

Figure 1. China - Daily fixing of USDCNY, 3-17 August 2015



Source: Bloomberg and Citi Research

Figure 2. China - RMB exchange rate: USDCNY vs. REER, 2000-15



Source: Citi Research

Prepared for CIRA Email Monitoring

We acknowledge that there are now major (certainly larger than previously) uncertainties about the path of the renminbi. In part, this is the inevitable result of moving to a more market-determined exchange rate. This is true despite the fact that the PBOC is likely to stay very heavily involved in managing the RMB through interventions and trading restrictions. In addition to market pressures, the path of the renminbi will therefore depend on the i) the motives behind the move – in particular, how much the Chinese government wants to engineer a depreciation to boost growth (this would require a significantly weaker effective exchange rate) vs. how much the primary motivation of the reforms is a desire to signal that the external value of the Renminbi will be more market-driven (thus boosting the odds that the Renmibi will be added to the SDR basket sooner rather than later), and ii) the tolerance of the Chinese government for FX instability.

For the time being, we have no reason to believe that the authorities are aiming for a major depreciation. In its briefing on 13 August, the PBOC argued that the old fixing was 3% stronger than the true market rate, and denied the speculation that China will devalue its currency by 10% to stimulate exports (The IMF in June also deemed the RMB to be close to its equilibrium level). This may suggest a possible tolerance level between for the exchange rate to fluctuate between 6.3 and 6.8.

We now expect the USDCNY to go to 6.8 within three months vs to 6.3 over twelve months, which implies a 9.5% depreciation vs the US dollar over the next 12 months compared to the pre-announcement level and a 6.3% depreciation from today (on the day before the announcement, the USDCNY closed at 6.21 and the latest fixing on 17 August is at 6.397, Figure 1). We therefore expect that the USDCNY exchange rate will head back towards the range it held after the Global Financial Crisis up until mid-2010, thereby unwinding the CNY appreciation vs. USD since then (a period of huge central bank balance sheet expansions and accumulation of large open/unhedged FX liabilities by many Chinese corporates), but still leave the RMB higher on a (nominal and real) trade weighted basis compared to 2010 (Figure 2).

As regards the timing, at least for the managed part of the renminbi depreciation, one would think that the Chinese government would want to engineer it as quickly as possible, thereby limiting the scope of outflows trying to beat an anticipated further weakening of the currency – until we reach the new local equilibrium (should it exist).

Implications and effects for China

Estimating the effects of a weaker exchange rate on China's exports, imports and GDP is complex, since much will depend on what drives the depreciation to begin with. If, for example, the depreciation is the product of large capital outflows that result from lack of profitable domestic opportunities, it is likely that the impact on growth will be rather modest. Even worse, in the unlikely case that the depreciation leads to financial turmoil, it could prove counter-productive, forcing an adjustment in domestic spending (lower domestic spending resulting in lower output despite a higher trade balance!). On the opposite extreme, if a weaker currency is the result of expansionary policies, then the new managed float may add effectiveness to monetary policy by improving the transmission mechanism.

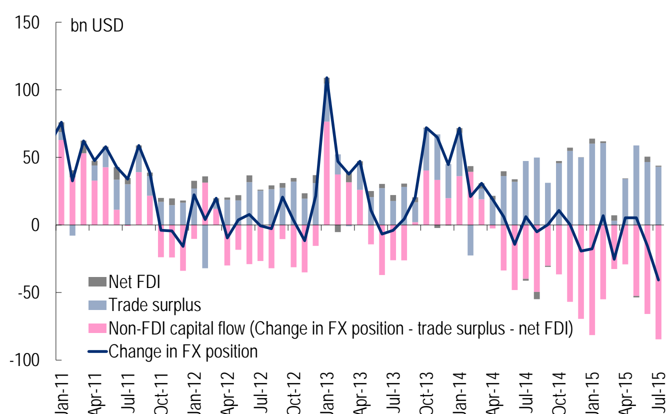
In the case of the present RMB depreciation, we think the most relevant effects on China will come through i) effects on the relative price of tradables, ii) effects on Chinese inflation, iii) the effects on capital outflows, iv) wealth and balance sheet effects, v) the induced changes in other Chinese policies and (vi) the response of foreign policy makers.

Prepared for CIRA Email Monitoring

A (policy induced) weaker renminbi can have a reflating effect at home. It may induce an increase in profits and local currency valuations of equities, supporting the market and inducing a wealth effect. Also, a weaker currency is likely to increase the domestic price of tradable goods and services, reducing the real burden of debt, but raising the cost of imported goods for consumers. The magnitude of these effects is hard to pin down, as estimates of FX pass-through in China are unreliable (even more so than in other countries, as the exchange rate has been heavily managed and has not been very volatile).

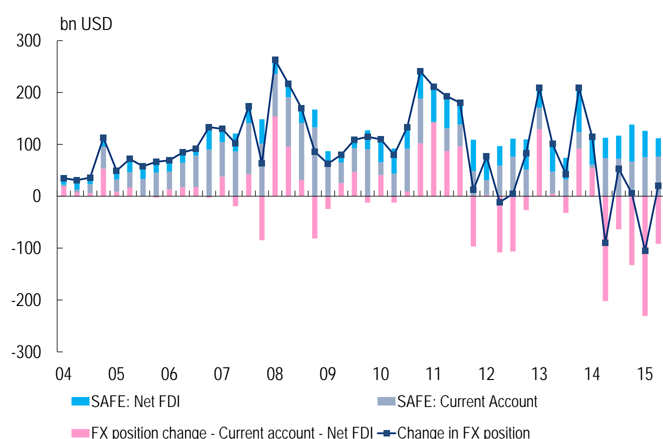
There is considerable uncertainty as to what the equilibrium level of the renminbi might be and over the path of future economic growth. Prior to the recent decision, China's capital outflows have been so significant that they not only mopped up the whopping current account surplus but also resulted in a reduction in international reserves –a clear sign of the FX being out of equilibrium. Figure 3 and Figure 4 show different approximations to the large capital outflows observed (the pink lines pointing south since early 2014) and the fall in international reserves –though some of the fall in reserves is explained by valuation effects amid the surge in USD (Figure 5).

Figure 3. China capital outflows based on trade surplus



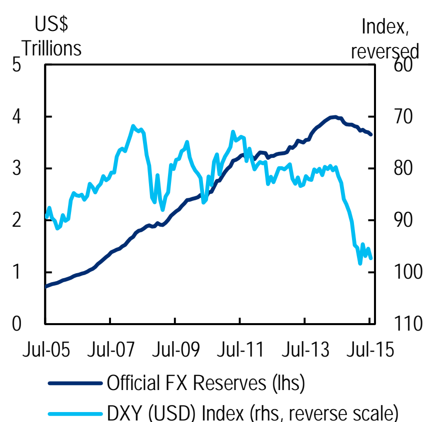
Source: Citi Research

Figure 4. China capital outflows based on current account activities



Source: Citi Research

Figure 5. China – Foreign Exchange Reserves (in US$ Trillion) vs. DXY Index



Source: CECI, Bloomberg, Citi Research

Note that in principle, a one-off depreciation should lower the pressure for further capital outflows, if it adequately removes further depreciation expectations (or it is close to where market perceives it to be at equilibrium). In reality, assessing RMB equilibrium is highly complex and will depend on various fundamental developments in the economy that impact supply and demand for RMB vs USD. In the case of China, however, at least in the near-term, the current depreciation probably will increase expectations of further moves in a similar direction, creating a risk of more damaging exchange rate volatility, some adverse balance sheet effects, and even perhaps an increased risk of a hard landing.

China's external liabilities have increased raising the potential risk of balance sheet effects and/or demand for FX hedges. SAFE recently reported that China's gross external debt according under a new revised definition compliant with IMF Special Data Dissemination Standards (SDDS) has reached $1.67trn in Mar-2015, with an extra US$804.7bn of external liabilities not counted in previous historical series (reported external debt was only $895bn in end of 2014) with the discrepancy accounted largely by non-resident deposits and foreign debt in RMB, mostly in trade finance (Figure 6). This means that China's external debt is really around 16% of GDP and 67% of exports of goods and services instead of earlier reported 9% and

Prepared for CIRA Email Monitoring

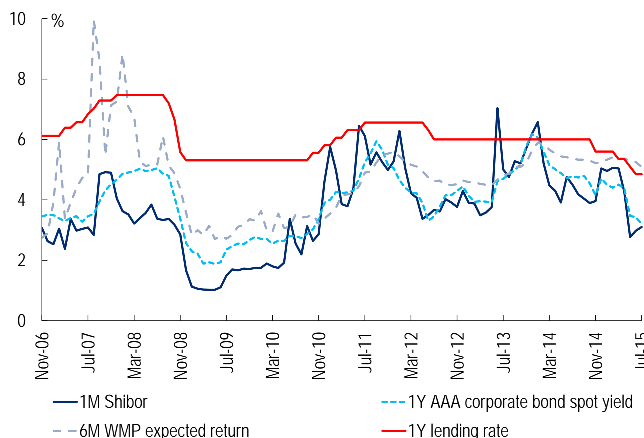
36%, respectively. Moreover, while the older external debt series suggest external borrowings doubled since 2009, we estimate that the revised series suggest they have risen 170% instead. Furthermore, citing PBoC data, the IMF noted that China has about US$710bn of non-resident holding of RMB-denominated bank liabilities. Larger than previously thought external liabilities and sizable foreign holdings of RMB assets suggest there is still a large potential demand for FX hedges in the near future.

Further policy action needs to reflect the effect of the depreciation-cum-FX intervention-cum-asset market and inflation effects. The silver lining of a genuine float is that it should improve the transmission mechanism of monetary policy, adding punch to any monetary and credit-easing policies as leakages through capital outflows ought to be reduced and the movement of the currency is likely to add another vehicle through which policies might work. Therefore, since the depreciation would, other things equal, boost Chinese real GDP growth (by boosting the prospects of growth in exports and import-competing production) and inflation, one may think that at the margin it can somewhat reduce the need for further monetary easing. However, this is only true once the move towards a floating FX regime is completed.

Figure 6. China – Significant build-up of External Debt in Recent Years

Source: SAFE, CEIC, BIS< and Citi Research; Note: In 1Q2015, SAFE revised the external debt data to comply with IMF's SDDS template, resulting in a sharp jump in external debt from $895bn at end of 2014 to $1.673 trillion in March 201. We adjust the historical data to create a consistent series by including estimate for nonresident deposits and RMB-denominated trade finance.

Figure 7. China - Evolution of Key Chinese interest rates (%), 2006-15



Source: Citi Research

In an environment with increased uncertainty and potentially larger capital outflows, market interest rates may increase and domestic liquidity conditions tighten (see Figure 7), which in turn could potentially call for more, rather than less additional monetary and credit easing. It is also worth noting that the exchange rate and interest rate cuts or credit easing are not equivalent: tradable sector firms will be more directly affected by the exchange rate, while domestically-oriented firms or households may well be more directly affected by changes in interest rates. There are likely to be some losers from these policy actions – and if recent months and years are any guide, the Chinese government may be sensitive to the fate of those losers and respond to it. In fact, the experience in the equity market shows that things don't always turn out as the Chinese government wants, which could lead it to adopt potentially conflicting measures in response to undesired (and potentially unexpected) volatility.

Prepared for CIRA Email Monitoring

For the time being, we continue to expect five more reserve requirement ratio (RRR) cuts (50x5=250bps) and two more 25 bps policy rate cuts in next 12 months. We think that RRR cuts will probably come before the next policy rate cut. The RRR cuts may be directed to compensate for the tightening of liquidity conditions due to capital outflows. On the other hand, the authorities may feel that the pressure on interest rates to account for most of the policy response has been reduced. This factor and a desire to reduce the incentive for further capital outflows may lead the PBOC to decide to postpone interest rate reductions. This logic notwithstanding, for now we expect two rate cuts will still take place once the authorities have recovered confidence on the valuation of the currency or when they become (even) more concerned with the path of economic activity. Of course, the Chinese government can always complement or substitute for RRR or interest rate cuts with other policy measures with similar impact (such as leaning on policy banks and even on commercial banks to lend more or to adjust rates, carrying out special tenders to provide liquidity, etc).

Figure 8. Impact of a 1% RMB depreciation on China's Economic Variables (%)

	1 year	5yrs
Real GDP	0.06	0.02
Consumption Exp	-0.01	-0.04
Real Investment	0.03	0.07
CPI	0.18	0.53
Current Acct (% of GDP)	0.05	-0.01
Fiscal Bal (% of GDP)	-0.02	-0.04

Source: Oxford Economics

The impact of a policy-induced RMB depreciation on China is therefore complex and dependent on a number of other policy decisions. As a benchmark, we use the Oxford Economic Forecasting Model to estimate the short-run (1 year) and long term (5 year) response of a range of Chinese macro variables to a 10% RMB devaluation, assuming that the path of monetary policy in China will not be affected by the FX move (see Figure 8). We find that in the short-run, the depreciation raises China's real GDP by 0.6%, but that the impact fades over time. Contrary to the desire to rebalance the economy towards consumption, the model estimates that any positive growth lift in China from a weaker RMB comes at the expense of consumption, as it raises the price level (which increase by 1.8% in the first year) more than nominal incomes.

An important question for China is what the change means for the risk of a hard landing. On the one hand, surely, given the travails of the Chinese economy, the renminbi should be weaker than it currently is to act as a shock absorber. On the other hand, we fear that greater international financial liberalization when the imbalances in the Chinese economy are large probably raises the risk of a financial crisis at some point. A competing narrative is that opening up the capital market would lead to some inflows, and that China would eventually be able to shift some of its losses onto those foreign investors. That may well be true, but this will unlikely be enough to avert an eventual financial crisis, only that some of the losses would be borne by foreigners.

A secondary question is whether this form of capital account liberalization also means that domestic financial liberalization will be accelerated, too.

China Matters for the World Economy – on Many Dimensions

The potential significance of the developments in China of course relates to its importance in the world economy – as a producer, a source of demand and in many other areas. For instance,

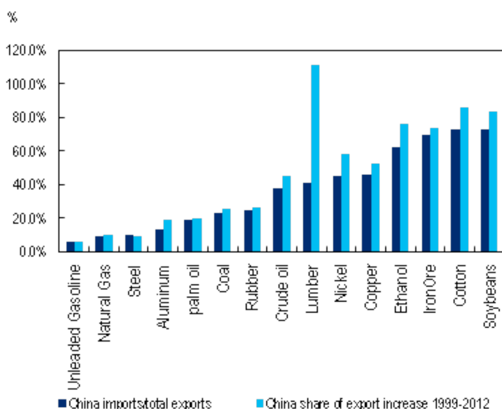
- China accounted for 15% of global GDP in 2014 at market-exchange rates (ME) and 17% at purchasing-power-parity (PPP)-based exchange rates. In recent years, China accounted for roughly one third of global GDP growth (both in ME and PPP terms).
- China accounted for 10% of global exports of goods and services (in USD) and 9% of global imports in 2014 (and over the last five years China has gained

Prepared for CIRA Email Monitoring

export market share of over 3ppts to account for 13% of world exports, as well as accounted for 13% of global growth in imports).

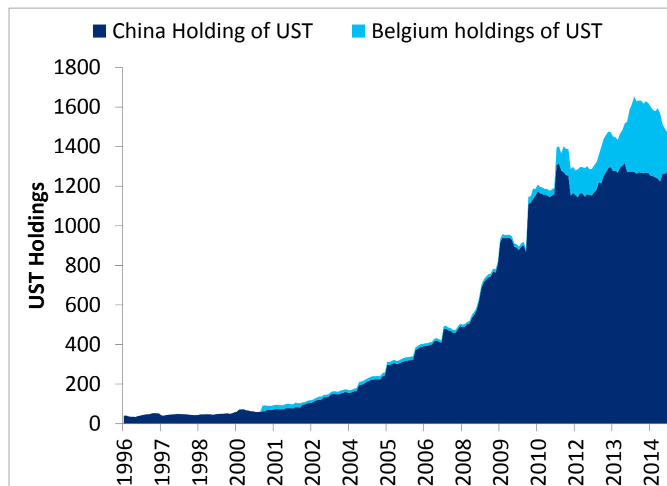
- China is a major consumer of commodities (Figure 9). Chinese imports account for more than 50% of global exports in ethanol, iron ore, cotton or soybeans and a significant share of the exports of a number of other commodities.

Figure 9. China – Imports By China As a Share of World Export of Commodities (%),



Source: Citi Research

Figure 10. China – Holdings of US Treasury Securities (US Bn), 1996-2014



Source: Citi Research

- The PBOC's foreign exchange reserves in July amounted to $3.65trn, around 30% of the world's total, down from a peak of $4trn in mid-2014. We estimate that China holds roughly $1.5trn of US Treasuries alone (including an estimate of Chinese holdings via clearing houses), roughly 12% of the total amount outstanding of marketable US debt (Figure 10).

- China also accounts for a significant share of the revenues and profits of foreign companies.[1]

Effects on the Rest of the World

If the effects of the change in the RMB and its determination on China are complex, that is even more true for their effect on the rest of the world. There are a variety of channels, including direct and indirect effects on the trade of goods and services, effects on relative prices, balance sheet and wealth effects, changes to the volatility of many key prices and quantities and of course the effects will also depend on the policy responses of the other countries.

Trade exposure

One place to start is the direct exposure of other countries to trade with China. As in Emerging Markets Macro View - The China Syndrome, for the export exposure to China we focus on a proxy for the exports of final goods to China, due to the large

[1] See Global Equity Strategy - China Exposed Stocks, European Equity Strategy - China Risk & European Equity Exposure, Equity Strategy - Tactically Thinking and Australia Equity Strategy - Alert: Companies' Sales Exposure to Asia and China

Prepared for CIRA Email Monitoring

share of processing trade in China's overall trade (we do this by using only a country's exports to China that are classified as primary, consumption and capital goods in the RIETI database, see Figure 11).

The increase in exposure to China (both as a share of exports and a share of GDP) is evident in virtually all countries. The largest exposures (and often the largest increases over the last decade or so) can be found among commodity exporters (especially Australia, New Zealand, Brazil, Chile, Peru, South Africa and Indonesia) – final goods export exposure in many of these countries amounts to more than 3% of GDP and more than 5% of GDP in Australia.

Figure 11. Exports to China for China's 'Inferred' Final Goods (% of GDP and % of Total Exports) – 2003-07 Average vs. 2013

Source: RIETI, Citi Research; Note: We use the RIETI database which is only updated until 2013 and provides a relatively granular approach to categorizing exports by classifying over 1,200 product segments into five product categories that distinguish intermediate and final goods. Singapore data only includes domestic exports to China. (See http://www.rieti-tid.com). Note: EU5 includes Germany, UK, France, Italy and Spain.

But a number of non-commodity exporters are also heavily exposed, in particular in Asia (e.g. Vietnam, Thailand, Taiwan, and Korea) – in Vietnam again, final goods exports to China account for more than 5% of GDP. Among the EMs, the export exposure of the Indian sub-continent, Mexico and parts of CEEMEA are much lower. The same applies to varying degrees to the US, the EU or Japan (where exports of final goods to China amount to 1% of GDP or less). To estimate the effect of a Chinese depreciation on other countries' GDP growth and exports through direct trade exposure, we would need to multiply the export exposure with the relevant sensitivities of GDP and exports to the exchange rate (and also take into account the import response).

A different route to compute direct trade exposures is to use China's share in the BIS's effective exchange rate indices (Figure 12). These weights have the advantage of reflecting some competitive effects and not just the direct trade exposures. They can be used to calculate the size of the effective appreciation of each country vs the RMB. If we multiply the effective appreciation with the respective country's sensitivity of GDP or exports growth to the effective exchange rate change, that could give us a sense of the GDP or export response to the RMB depreciation (usually over a horizon of 1-2 years). For instance, in the Eurozone, several studies suggest that the exchange rate sensitivity of exports is roughly around 0.5 over three years and the sensitivity to GDP around 0.1.[2] Coupled with

[2] Di Mauro et al (2008), "The Changing Role of The Exchange Rate In a Globalised Economy", ECB Occasional Paper Series, September 2008, https://www.ecb.europa.eu/pub/pdf/scpops/ecbocp94.pdf

Prepared for CIRA Email Monitoring

an effective exchange rate weight of 17% and a 10% depreciation of the RMB vs the euro yields a potential impact on Eurozone GDP of less than 0.2% and of Eurozone export volumes of less than 1%.

Figure 12. Selected Countries – Weight in BIS Effective Exchange Rate Indices (in %)

In the EER for:		CNY	EUR	JPY	USD
Australia	AU	**21.1**	17.2	11.1	14.4
Brazil	BR	14.3	**21.1**	4.9	18.9
Chile	CL	**23.3**	**17.2**	6.2	17.0
China	CN		**19.4**	15.9	19.0
Euro area	EA	**17.0**		6.0	6.8
India	IN	16.6	**22.1**	5.3	14.1
Indonesia	ID	**16.3**	11.0	15.7	10.1
Israel	IL	10.3	**26.8**	4.6	**25.7**
Japan	JP	**29.5**	14.0		16.6
Korea	KR	**27.9**	13.4	16.3	13.0
Malaysia	MY	**17.4**	12.6	13.1	14.3
Mexico	MX	13.0	9.3	4.4	**53.1**
New Zealand	NZ	**18.0**	13.4	9.8	11.9
Philippines	PH	14.9	11.5	**17.9**	14.9
Poland	PL	9.9	**53.4**	2.3	3.8
Russia	RU	17.1	**39.8**	6.5	5.9
Singapore	SG	**17.2**	12.8	11.0	13.3
Taiwan	TW	**26.8**	11.1	18.7	13.5
Thailand	TH	17.9	11.3	**20.5**	10.5
Turkey	TR	11.6	**44.2**	2.7	6.0
United States	US	**20.9**	17.4	8.8	

Source: BIS and Citi Research

Figure 13. Modified Finger-Kreinin (Net) Export Similarity Index with China*

Source: UN Comtrade, Citi Research; Note: *See J.M. Finger and M.E. Kreinin. "A Measure of Export Similarity and its Possible Uses" *The Economic Journal* (1979) and revised version used by Australia's Dept of Foreign Affairs & Trade. *China's Industrial Rise: East Asia's Challenge* (2003) and YW Cheung & XW Qian. *Southeast Asia: Similarity in Trade Structures* (May 2009). When calculating the index, only net export values with positive values are used, while those with negative net export values will take zero values. We use single digit SITC codes for commodity 0-5 and 8-9 and 2-digit SITC codes 6 & 7. For index formula details, please see our older report on this topic: *Asia Macro Flash - Asia – External Competitiveness Sensitivity to JPY Weakness*

Given China's role as a major producer of a broad range of commodity and manufactured goods – RMB depreciation, especially at a time of weak global demand, could raise some external competitiveness concerns in countries with relatively similar traded goods structure as China, but does not see similar magnitude of FX adjustment. As a quick gauge, we estimate the relative export competitiveness pressures from China by calculating a 'net export similarity index which is summarized in Figure 13. Despite some caveats to the index, we find that parts of Europe, Asia (Vietnam, India, Taiwan, Malaysia, Philippines, Thailand, and Korea), and some middle income EM countries (Turkey, CEE and Mexico) have relatively high net export similarity with China, and thus, will likely be sensitive to any prospective RMB depreciation relative to their own domestic currency (though some – like MYR and TRY – have been underperforming CNY for far longer).

On the inflation side, assuming full pass-through, the share of imports (really value-added) from China in total household consumption expenditure can yield a rough estimate of the potential effect of the Chinese depreciation on the price level in each country.[3]. In the US, the St Louis Fed in 2011 estimated this share at 2%.[4] Under the assumption of full pass-through of the RMB depreciation to US import prices, but keeping all else constant, a 10% RMB depreciation would therefore lower the US price level by 0.2%, probably over two years.

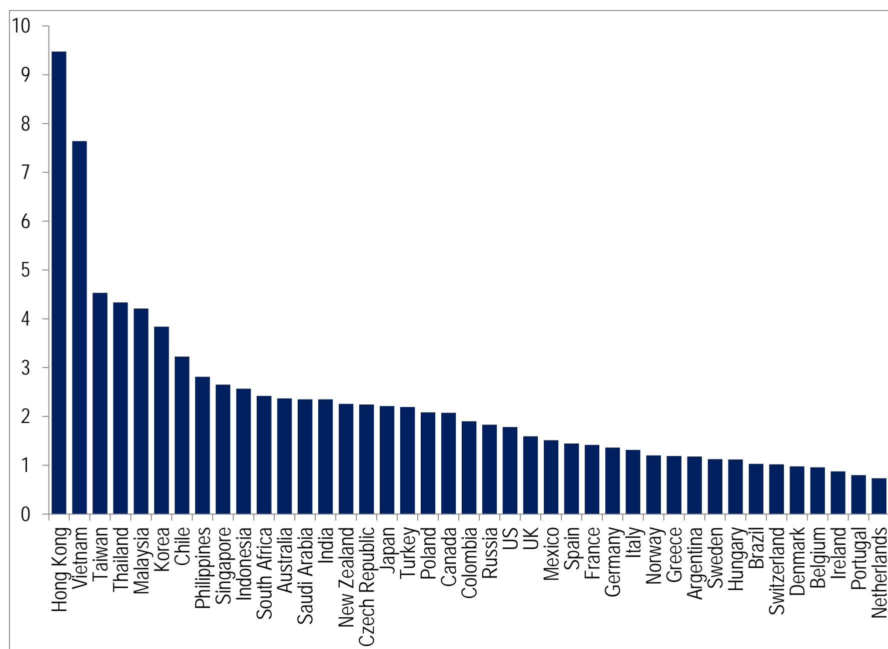
[3] On the one hand, as the exchange rate passthrough to domestic prices tends to be less than full, assuming full pass-through could potentially overstate the effect of the depreciation on the price level. On the other hand, import-competing production would likely react, too, which would magnify the effect on the domestic price level.

[4] In the case of the US, the St Louis Fed has estimated the share of PCE sourced from China, which amounted to around 2% in 2010, reflecting imported intermediate goods but also the share of import spending that falls on US services (for freight, transportation, etc). See http://www.frbsf.org/economic-research/publications/economic-letter/2011/august/us-made-in-china/ and https://research.stlouisfed.org/publications/es/11/ES1117.pdf.

Prepared for CIRA Email Monitoring

We are not aware of a source of such data for a broad range of countries. In Figure 14, we plot the share of imports from China in 2011 (latest data) in value-added terms relative to GDP for a range of countries instead and use that as a proxy for the share of Chinese imports in consumption spending.[5] Unsurprisingly, the share of Chinese imports in GDP is largest in Asia. But in a large number of countries, the GDP share of imports ranges from 1-2.5% of GDP. Assuming the same share for Chinese imports in the consumer price basket implies that a 10% appreciation of the renminbi with full pass-through and no other changes would yield price level effects of roughly 0.1-0.25% over two years.

Figure 14. Selected Countries – Imports of Goods From China (% of GDP), 2011



Note: Imports are in value added terms.
Source: OECD and Citi Research

Other Channels of Transmission

But our calculations above are, at best, a first guess. There are a number of – often related – other potential channels of transmission of the change in the level and volatility of the RMB, which will of course in the end also feed back into the overall effect on GDP and inflation.

Exchange Rates

Many of these will manifest themselves through financial markets. There are obvious repercussions of the recent developments for other exchange rates – on average, we would expect there to be pressure to devalue or adopt policies to encourage depreciation of the currency for the currencies of countries that, other things equal, are either exporting a lot to China or competing with Chinese exports.[6]

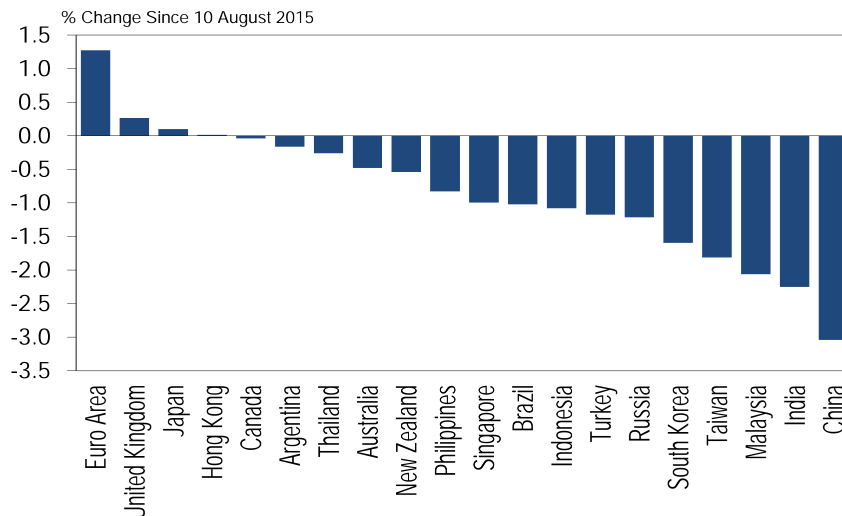
[5] In many countries, capital expenditure are more import-intensive than consumption spending. If the share of Chinese imports is equal in both consumption and capex, our assumption will therefore deliver an overestimate of the effect of the Chinese depreciation on the CPI.

[6] In general, if a country imports a lot from China, there should not really be any reason to desire a weaker currency (after all, it is essentially mostly a benign terms of trade shock). An exception may be

Prepared for CIRA Email Monitoring

Above we noted that Australia, New Zealand, Brazil, Chile, Peru, South Africa, Indonesia, Vietnam, Thailand, Taiwan, and Korea are in the category of countries with large trade exposure to China. India, Malaysia and Taiwan are among the EM countries that also have high export similarities with China.[7] Unsurprisingly, exchange rates in this group of countries also mostly depreciated alongside the RMB (vs the dollar) in the last few days (Figure 15), with the currencies of India, Malaysia, Taiwan and South Korea most affected.

Figure 15. Change in Selected Exchange rates vs USD (%) Since 10 August



Source: Bloomberg and Citi Research

The mirror depreciation of these currencies (even if usually by less than for the RMB), also means that those countries and currencies that are typically supposed to be less affected will experience an even larger (trade-weighted) appreciation than their appreciation relative to the RMB alone. For instance, if we define a 'China' bloc with the countries with high exposures to China, their weight (e.g. in the BIS trade-weighted exchange rate indices), including China, often roughly doubles China's weight, from 21% to 39% for the US, from 17% to 34% for the Eurozone and from 11% to 22% for the UK.[8] If we assume that the currencies of the countries in this bloc depreciate by roughly half of the depreciation of the RMB on average, the movement in those exchange rates would therefore increase the trade-weighted appreciation of the USD, euro or pound by roughly 50% relative to the direct effect of the RMB appreciation alone.

Wealth and Balance Sheet Effects

Changes in exchange rates can of course have notable wealth and balance sheet effects in addition to their effect on relative prices of tradables. Countries (mostly households and corporates) with large unhedged dollar borrowing may be vulnerable, if their exchange rates weaken significantly, not least as we are close to the start of a US rate hike cycle.

if the disinflationary effect, even if in principle driven by benign factors, is itself of concerning, e.g. because it could destabilize inflation expectations. This could be a concern in the Eurozone.

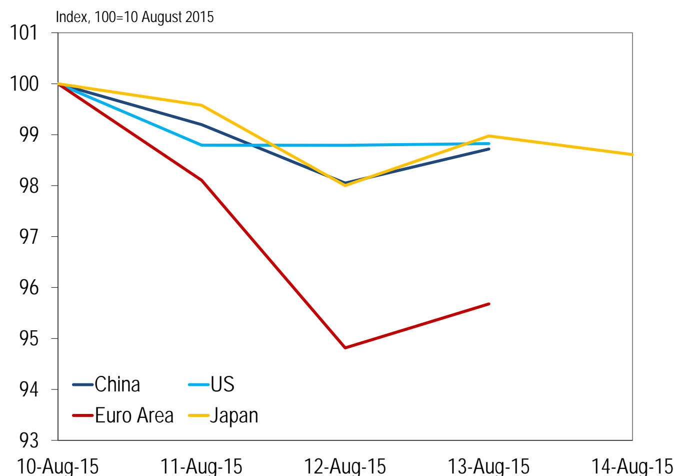
[7] On export similarities, see e.g. Asia Macro View - Revisiting Impact of BoJ Policies on Asia.

[8] The countries we define to be part of this China bloc are: Australia, New Zealand, South Africa, Brazil, Chile, Colombia, Peru, Venezuela, Saudi Arabia, UAE, Taiwan, Hong Kong, India, Indonesia, Korea, Malaysia, Philippines, Singapore, Thailand and China.

Prepared for CIRA Email Monitoring

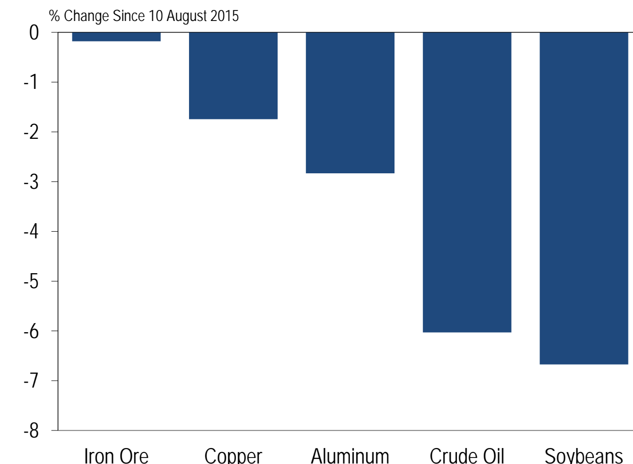
Equity prices in other countries have mostly reacted negatively to the RMB announcement so far (Figure 16), but it is not clear whether this is because the announcement in China was a signal that the economy was weaker than previously thought or due to the negative impact of competitiveness and potentially margins for firms exporting to China or competing with Chinese firms.

Figure 16. Reaction of Selection Equity Markets Since 10 August (%)



Source: Bloomberg and Citi Research

Figure 17. Selected Commodity Price Changes Since 10 August (%)



Source: Bloomberg and Citi Research

One market that may be particularly in focus may be the US Treasury market, given the size of Chinese holdings. However, in our view, the implications for this market are not all that clear. On balance, it seems likely that demand for dollar reserve assets from China will probably weaken over time (demand for reserves overall and demand for dollar reserves relative to other reserves), as China moves gradually away from an effective dollar peg. In the near-term, the Chinese government may indeed step up its interventions to stabilize the currency by selling dollar reserves in size. Other things equal that could raise US interest rates, but both the expected US appreciation and the volatility associated with the change in the RMB regime may overturn this effect on US rates. So far, US (10Y) Treasuries have risen in value (yields have slightly fallen), even though the change in yields is probably more closely related to differences in Fed policy rate expectations than the demand for dollar assets per se.

Terms of Trade Effects

Commodity prices have also fallen in recent days (Figure 17), particularly for soybeans and crude oil (even though China is, of course, not the only driver of the prices of these and other commodities). Why that would be is not entirely clear. The most plausible fundamental expectation is, again, that the Chinese action is taken as a sign of a weaker underlying Chinese economy. Also, since these prices are typically quoted in dollars, denomination effects may play a role too.

What will happen to Chinese demand, however, is unclear. On the one hand, if prices rise in RMB terms, the relative price effect should reduce Chinese demand for these commodities. But the RMB depreciation is also shifting demand towards China, which is more commodity-hungry than most other economies, and which would, other things equal, boost overall commodity demand. Perhaps one factor in the commodity price decline was an expectation that Chinese buyers – which have significant market power in some of the commodity markets – would try to keep prices stable in RMB terms (and therefore lower them in USD terms).

Prepared for CIRA Email Monitoring

Volatility

At least in the near-term, the change in the exchange rate regime is likely to lead to more uncertainty and to volatility in a range of asset markets, most notably FX markets, particularly in countries that have high exposure to China or are otherwise particularly vulnerable. Other things equal, this increase in uncertainty will be weighing on demand and be somewhat disinflationary.

Policy Responses In Other Countries

The effect of the developments we describe above will probably be to shift demand away from the rest of the world and towards China. Without policy responses elsewhere, China exports deflation/disinflation to the rest of the world and weakens activity in the rest of the world. Globally, the inflationary/expansionary impact on China and the disinflationary/contractionary effects on the rest of the world would probably largely cancel each other out (the uncertainty and volatility it creates may be mildly disinflationary/contractionary initially). To the extent that the Chinese devaluation is supported by Chinese credit expansion, the net global effect could ultimately be slightly positive. The rest of the world would, however, probably still be faced with disinflation and weakening demand. Other things equal, countries in the rest of the world are therefore likely to respond with additional demand-supporting policies of their own – we mostly think that it would take the form of changes in monetary or FX policies.

In some countries, the exchange rate as a shock absorber may do part of the job and therefore reduce pressure for explicit policy reactions. For instance, as noted above the exchange rates of many of China's Asian neighbors have weakened alongside the RMB, reducing the growth-dampening and disinflationary impact on these countries. We think that countries where inflation is currently low and FX mismatches, too, such as Korea, Taiwan, Thailand, Philippines will probably welcome the FX weakness (see Asia Macro Flash - Implications of PBoC's Shock FX move on Asia). India would probably welcome the initial disinflationary effect of of RMB weakness via commodity price weakness -- we still expect a rate cut in 4Q) and we don't see a significant change in its policy path, despite some FX weakness.

An interesting question is whether there are any countries that currently have a peg that may loosen it in response to the PBOC decision (or indeed, for any other reason). The obvious candidates are in China's vicinity. Vietnam already widened the Dong's trading band. If we see increased FX volatility with the Singaporean dollar (SGD)'s nominal effective exchange rate persistently at the bottom of the band, it raises the likelihood that the Monetary Authority of Singapore (MAS) will widen the band of the SGD (as the MAS did in 1997 & 2001). In Hong Kong, we think that the Hong Kong Monetary Authority (HKMA) will likely absorb the external shock and leave the Hong Kong Dollar (HKD) peg intact for now as they continue to prize the stability the peg provides and, in their view, the RMB appreciation would only wind down a fraction of the change observed since 2010. Elsewhere, speculation has risen that Saudi Arabia could loosen its peg to the dollar (with low oil prices a major driver), which could quite possibly happen eventually, but is unlikely in the near-term, in our view (Saudi Arabia Macro View - Why Saudi Riyal revaluation is a long shot).

Even where the exchange has weakened, it may not have weakened sufficiently to compensate for the effects of the RMB. In those cases, explicit policy intervention will be likely. We are wary of calling for immediate policy rate cuts elsewhere yet, even though some of the countries with low inflation and vulnerable growth and that have not eased recently (e.g. the Philippines or Taiwan) are candidates for further

Prepared for CIRA Email Monitoring

easing. In a number of other countries, rate hikes that may otherwise be plausible, have become less likely.

But there are also countries that are affected where policies may be constrained. For example, countries that are worried about asset bubbles may try to avoid further monetary easing, while countries with large unhedged dollar liabilities or at risk of major capital outflows may resist further exchange rate depreciation. For instance, Indonesia's external vulnerabilities and the sensitivity of its bond market to the exchange rate means that the Bank of Indonesia is now less likely than before to cut interest rates (we still expect a cut next year). Malaysia, in turn, facing political uncertainty and capital outflows may be wary of further Ringgit weakness. Yet, their relatively modest reserves and concerns over activity are likely to restrict policy actions in the near term to stem the appreciation.

Of course, not all exchange rates can depreciate at the same time. Countries that face a (trade-weighted) appreciation may choose to alter their policy mix. At a minimum that may mean that the prospects for monetary tightening may weaken somewhat. In the US, we think that the RMB depreciation is unlikely to deter a first rate hike in September, but we acknowledge that it has still somewhat increased the risk of a more gradual pace. A stronger path for the dollar is likely to reinforce the slow pace of hiking and a significant USD appreciation could even prematurely arrest the hiking cycle altogether (U.S. Macro Flash: FOMC Edition - China Is Important But Not Likely to Deter Fed September Move).

A similar case applies to the UK – a stronger pound probably increases the risk of a later start to the hiking cycle and a slower path, but probably does not prevent a hike in the coming 6-12 months (see UK - How Much Does the UK Trade With China?).

In the Eurozone, the appreciation of the euro vs the RMB (in addition to the weak economy in China and weaker commodity prices, even though of course the three are all related), further strengthens the case for our expectation that the ECB's QE programme will be extended beyond September 2016 (Euro Area - The relative near-term importance of China).

In Australia and New Zealand, the key factors are the potential impacts on commodity demand, and other imports. China is Australia's and New Zealand's largest export destination, thus the RMB devaluation could have other ripple effects as well. Given the developments and the downside risks to Chinese growth, we continue to expect a further 25bp interest rate cut by the Reserve Bank of Australia (RBA) before year-end and two more 25 bps cuts by the Reserve Bank of New Zealand (RBNZ). We also recently pushed out the timing for the start of the hiking cycles in Australia and New Zealand to the end of 2016 (Australia & New Zealand Economics Weekly - Implications for the RBA and RBNZ of China's RMB depreciation).

In Latin America, the impact of the Chinese devaluation arrives at a difficult time. Growth is low across the region and adjustment is proving to be quite challenging, in an environment where all governments enjoy low levels of approval ratings (in some cases extraordinarily low). Argentina, Venezuela and Ecuador have, thus far, abandoned the use of the exchange rate as an adjustment mechanism and, therefore, fully transmit the external shock (from weaker commodity prices) to domestic income and demand. The likelihood that the exchange rate arrangements in these countries last into 2016 has therefore declined and we could see discrete movements in the FX with potential side effects on domestic stability.

Prepared for CIRA Email Monitoring

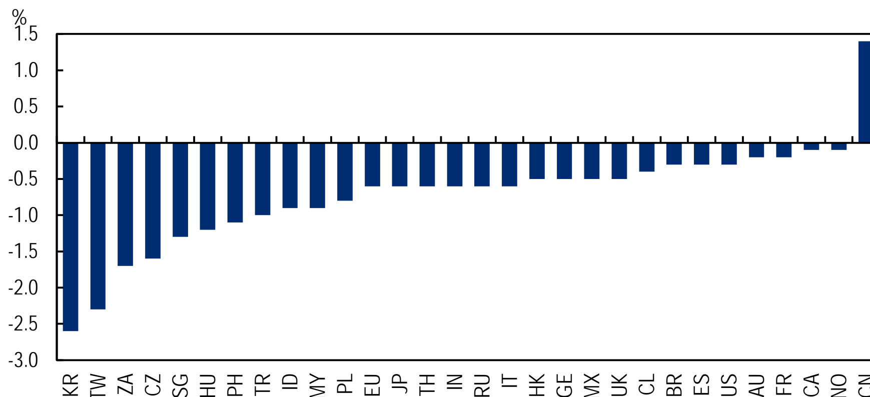
The exchange rate is more likely to carry the brunt of any adjustment in the cases of Brazil, Chile, Peru, Colombia and Mexico. The first four countries have close ties to China through commodities and are facing in 2015 a significant economic slowdown. Their currencies have depreciated in the last few months and added another leg of weakness after China's move. As a result, inflation could pick an additional push in the short term. However, they all face other domestic large challenges and therefore, we do not think that either monetary or fiscal policies will be altered much from their previous path. Mexico is more a competitor of China in the North American market and thus stands to lose competitiveness against potentially more aggressive Chinese exports. Mexico's currency had depreciated 6.5% against the dollar since early June, but only moved 0.5% after the Chinese announced the change in regime. It is unlikely that the authorities will respond in the short term as the central bank is focused on Fed actions and the Treasury needs to deliver an already sizable fiscal adjustment to absorb the effects stemming from low oil prices.

All in all, the main thrust of the policy reactions across the globe is therefore likely to be (probably modest) additional stimulus, mainly through monetary policy. One risk, however, is that some of China's competitors respond to their worsening competitive position with protectionist measures – currency wars potentially leading to mild versions of trade wars. A large-scale trend towards more protectionism is – next to the potential for major financial disruption, either in China, or in a major dollar borrowing country – the main downside risk for global growth.

So where does this leave us?

China's recent changes to the exchange rate system have certainly been a 'shock' to the world. For China, a moderate depreciation would certainly be welcome, even though higher volatility and the potential acceleration of capital outflows could also bring risks and may dampen the initial boost of the FX weakening on growth. Over time, however, we think that the weaker RMB will give a modest boost to both growth and inflation in China.

Figure 18. Simulating the Cumulative Impact (2015-18) on Real GDP on a 10% RMB Devaluation in 3Q15 (% Difference from Baseline)



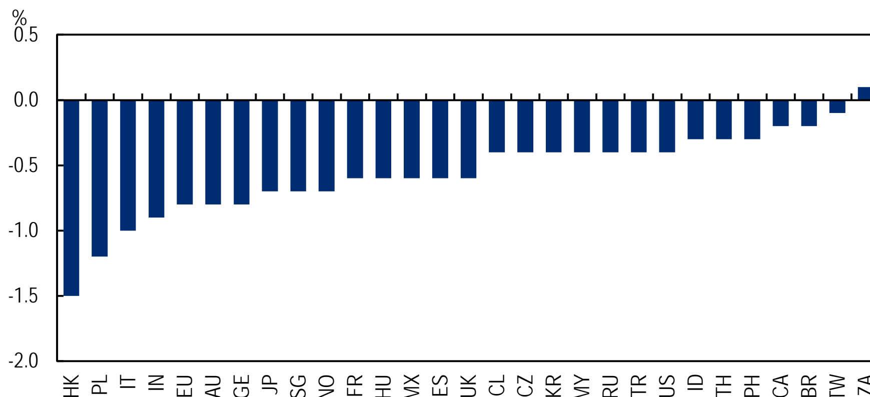
Source: Oxford Economics

The effects on the rest of the world are likely to vary across countries. Excluding the policy responses, the effects on the rest of the world would probably be mostly disinflationary and contractionary, even though, given the expected modest size of the depreciation, they are also likely to be relatively small.

Prepared for CIRA Email Monitoring

For reference, we again turn to the Oxford Economic Forecasting Model and simulate the effects of a 10% CNY depreciation vs the USD on the level of GDP and CPI in a range of countries (In Figure 18 and Figure 19). Of course the Oxford model only features a subset of the channels we describe above and the estimates are subject to significant uncertainty. Nevertheless, we think they are informative and provide a benchmark against which to consider other considerations.

Figure 19. Simulating the Cumulative Impact (2015-18) on CPI Level on a 10% RMB Devaluation in 3Q15 (% Difference from Baseline)



Source: Oxford Economics

The OEFM suggests that a 10% RMB depreciation would overall moderately dampen global growth outside of China. The countries most affected are a combination of those in East Asia (especially Korea and Taiwan) that likely have significant product overlap and those that are probably competing with China (or the China bloc) most intensively, including among some unsuspecting European countries (Czech, Hungary, Poland and the Eurozone). According to the model, the effects on growth are moderate yet not negligible in the Eurozone and Japan (just above 0.5% on GDP).

While a 10% yuan depreciation in this model is reflationary for China (raising CPI by an estimated 8.9% in the subsequent three years), the yuan deprecation tends to be disinflationary for the rest of the world (Figure 19) according to the simulation. This reaction is despite the fact that policy in those other countries is endogenously responding (by and large monetary policy eases in the model as the exchange rate appreciates), as China exports its disinflationary pressures to the rest of the world. The disinflationary impact is particularly strong in Hong Kong (not surprising, given the high share of imported goods and services from China in its CPI basket), followed by Europe (-0.7%) and other developed countries such as Japan and Australia, with smaller effects on the US. Admittedly, we find the effects on prices to be larger than our own intuition suggests and acknowledge that the model results would need to be refined. But these results suggest that even though the implications of the Chinese developments at this point on the rest of the world are unlikely to be dramatic, they still need to be carefully monitored and may well turn out to affect policy decisions.

Prepared for CIRA Email Monitoring

Appendix A-1

Analyst Certification

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

IMPORTANT DISCLOSURES

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

For important disclosures (including copies of historical disclosures) regarding the companies that are the subject of this Citi Research product ("the Product"), please contact Citi Research, 388 Greenwich Street, 28th Floor, New York, NY, 10013, Attention: Legal/Compliance [E6WYB6412478]. In addition, the same important disclosures, with the exception of the Valuation and Risk assessments and historical disclosures, are contained on the Firm's disclosure website at https://www.citivelocity.com/cvr/eppublic/citi_research_disclosures. Valuation and Risk assessments can be found in the text of the most recent research note/report regarding the subject company. Historical disclosures (for up to the past three years) will be provided upon request.

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

Citigroup Global Markets Inc	Willem Buiter; Guillermo Mondino; Ebrahim Rahbari
Citigroup Global Markets Asia	Johanna Chua; Minggao Shen

OTHER DISCLOSURES

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

For securities recommended in the Product in which the Firm is not a market maker, the Firm is a liquidity provider in the issuers' financial instruments and may act as principal in connection with such transactions. The Firm is a regular issuer of traded financial instruments linked to securities that may have been recommended in the Product. The Firm regularly trades in the securities of the issuer(s) discussed in the Product. The Firm may engage in securities transactions in a manner inconsistent with the Product and, with respect to securities covered by the Product, will buy or sell from customers on a principal basis.

Citigroup Global Markets India Private Limited and/or its affiliates may have, from time to time, actual or beneficial ownership of 1% or more in the debt securities of the subject issuer.

Citi Research generally disseminates its research to the Firm's global institutional and retail clients via both proprietary (e.g., Citi Velocity and Citi Personal Wealth Management) and non-proprietary electronic distribution platforms. Certain research may be disseminated only via Citi's proprietary distribution platforms; however such research will not contain changes to earnings forecasts, target price, investment or risk rating or investment thesis or be otherwise inconsistent with the author's previously published research. Certain research is made available only to institutional investors to satisfy regulatory requirements. Individual Citi Research analysts may also opt to circulate published research to one or more clients by email; such email distribution is discretionary and is done only after the research has been disseminated. The level and types of services provided by Citi Research analysts to clients may vary depending on various factors such as the client's individual preferences as to the frequency and manner of receiving communications from analysts, the client's risk profile and investment focus and perspective (e.g. market-wide, sector specific, long term, short-term etc.), the size and scope of the overall client relationship with Citi and legal and regulatory constraints.

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

Securities recommended, offered, or sold by the Firm: (i) are not insured by the Federal Deposit Insurance Corporation; (ii) are not deposits or other obligations of any insured depository institution (including Citibank); and (iii) are subject to investment risks, including the possible loss of the principal amount invested. Although information has been obtained from and is based upon sources that the Firm believes to be reliable, we do not guarantee its accuracy and it may be incomplete and condensed. Note, however, that the Firm has taken all reasonable steps to determine the accuracy and completeness of the disclosures made in the Important Disclosures section of the Product. The Firm's research department has received assistance from the subject company(ies) referred to in this Product including, but not limited to, discussions with management of the subject company(ies). Firm policy prohibits research analysts from sending draft research to subject companies. However, it should be presumed that the author of the Product has had discussions with the subject company to ensure factual accuracy prior to publication. All opinions, projections and estimates constitute the judgment of the author as of the date of the Product and these, plus any other information contained in the Product, are subject to change without notice. Prices and

Prepared for CIRA Email Monitoring

availability of financial instruments also are subject to change without notice. Notwithstanding other departments within the Firm advising the companies discussed in this Product, information obtained in such role is not used in the preparation of the Product. Although Citi Research does not set a predetermined frequency for publication, if the Product is a fundamental research report, it is the intention of Citi Research to provide research coverage of the/those issuer(s) mentioned therein, including in response to news affecting this issuer, subject to applicable quiet periods and capacity constraints. The Product is for informational purposes only and is not intended as an offer or solicitation for the purchase or sale of a security. Any decision to purchase securities mentioned in the Product must take into account existing public information on such security or any registered prospectus.

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

Important Disclosures for Bell Potter Customers: Bell Potter is making this Product available to its clients pursuant to an agreement with Citigroup Global Markets Australia Pty Limited. Neither Citigroup Global Markets Australia Pty Limited nor any of its affiliates has made any determination as to the suitability of the information provided herein and clients should consult with their Bell Potter financial advisor before making any investment decision.

The Citigroup legal entity that takes responsibility for the production of the Product is the legal entity which the first named author is employed by. The Product is made available in **Australia** through Citigroup Global Markets Australia Pty Limited. (ABN 64 003 114 832 and AFSL No. 240992), participant of the ASX Group and regulated by the Australian Securities & Investments Commission. Citigroup Centre, 2 Park Street, Sydney, NSW 2000. The Product is made available in Australia to Private Banking wholesale clients through Citigroup Pty Limited (ABN 88 004 325 080 and AFSL 238098). Citigroup Pty Limited provides all financial product advice to Australian Private Banking wholesale clients through bankers and relationship managers. If there is any doubt about the suitability of investments held in Citigroup Private Bank accounts, investors should contact the Citigroup Private Bank in Australia. Citigroup companies may compensate affiliates and their representatives for providing products and services to clients. The Product is made available in **Brazil** by Citigroup Global Markets Brasil - CCTVM SA, which is regulated by CVM - Comissão de Valores Mobiliários, BACEN - Brazilian Central Bank, APIMEC - Associação dos Analistas e Profissionais de Investimento do Mercado de Capitais and ANBID - Associação Nacional dos Bancos de Investimento. Av. Paulista, 1111 - 11º andar - CEP. 01311920 - São Paulo - SP. If the Product is being made available in certain provinces of **Canada** by Citigroup Global Markets (Canada) Inc. ("CGM Canada"), CGM Canada has approved the Product. Citigroup Place, 123 Front Street West, Suite 1100, Toronto, Ontario M5J 2M3. This product is available in **Chile** through Banchile Corredores de Bolsa S.A., an indirect subsidiary of Citigroup Inc., which is regulated by the Superintendencia de Valores y Seguros. Agustinas 975, piso 2, Santiago, Chile. The Product is distributed in **Germany** by Citigroup Global Markets Deutschland AG ("CGMD"), which is regulated by Bundesanstalt fuer Finanzdienstleistungsaufsicht (BaFin). CGMD, Reuterweg 16, 60323 Frankfurt am Main. Research which relates to "securities" (as defined in the Securities and Futures Ordinance (Cap. 571 of the Laws of Hong Kong)) is issued in **Hong Kong** by, or on behalf of, Citigroup Global Markets Asia Limited which takes full responsibility for its content. Citigroup Global Markets Asia Ltd. is regulated by Hong Kong Securities and Futures Commission. If the Research is made available through Citibank, N.A., Hong Kong Branch, for its clients in Citi Private Bank, it is made available by Citibank N.A., Citibank Tower, Citibank Plaza, 3 Garden Road, Hong Kong. Citibank N.A. is regulated by the Hong Kong Monetary Authority. Please contact your Private Banker in Citibank N.A., Hong Kong, Branch if you have any queries on or any matters arising from or in connection with this document. The Product is made available in **India** by Citigroup Global Markets India Private Limited (CGM), which is regulated by the Securities and Exchange Board of India (SEBI), as a Research Analyst (SEBI Registration No. INH000000438). CGM is also actively involved in the business of merchant banking, stock brokerage, and depository participant, in India, and is registered with SEBI in this regard. CGM's registered office is at 1202, 12th Floor, FIFC, G Block, Bandra Kurla Complex, Bandra East, Mumbai – 400051. CGM's Corporate Identity Number is U99999MH2000PTC126657, and its contact details are: Tel:+9102261759999 Fax:+9102261759961. The Product is made available in **Indonesia** through PT Citigroup Securities Indonesia. 5/F, Citibank Tower, Bapindo Plaza, Jl. Jend. Sudirman Kav. 54-55, Jakarta 12190. Neither this Product nor any copy hereof may be distributed in Indonesia or to any Indonesian citizens wherever they are domiciled or to Indonesian residents except in compliance with applicable capital market laws and regulations. This Product is not an offer of securities in Indonesia. The securities referred to in this Product have not been registered with the Capital Market and Financial Institutions Supervisory Agency (BAPEPAM-LK) pursuant to relevant capital market laws and regulations, and may not be offered or sold within the territory of the Republic of Indonesia or to Indonesian citizens through a public offering or in circumstances which constitute an offer within the meaning of the Indonesian capital market laws and regulations. The Product is made available in **Israel** through Citibank NA, regulated by the Bank of Israel and the Israeli Securities Authority. Citibank, N.A, Platinum Building, 21 Ha'arba'ah St, Tel Aviv, Israel. The Product is made available in **Italy** by Citigroup Global Markets Limited, which is authorised by the PRA and regulated by the FCA and the PRA. Via dei Mercanti, 12, Milan, 20121, Italy. The Product is made available in **Japan** by Citigroup Global Markets Japan Inc. ("CGMJ"), which is regulated by Financial Services Agency, Securities and Exchange Surveillance Commission, Japan Securities Dealers Association, Tokyo Stock Exchange and Osaka Securities Exchange. Shin-Marunouchi Building, 1-5-1 Marunouchi, Chiyoda-ku, Tokyo 100-6520 Japan. If the Product was distributed by SMBC Nikko Securities Inc. it is being so distributed under license. In the event that an error is found in an CGMJ research report, a revised version will be posted on the Firm's Citi Velocity website. If you have questions regarding Citi Velocity, please call (81 3) 6270-3019 for help. The Product is made available in **Korea** by Citigroup Global Markets Korea Securities Ltd., which is regulated by the Financial Services Commission, the Financial Supervisory Service and the Korea Financial Investment Association (KOFIA). Citibank Building, 39 Da-dong, Jung-gu, Seoul 100-180, Korea. KOFIA makes available registration information of research analysts on its website. Please visit the following website if you wish to find KOFIA registration information on research analysts of Citigroup Global Markets Korea Securities Ltd. http://dis.kofia.or.kr/websquare/index.jsp?w2xPath=/wq/fundMgr/DISFundMgrAnalystList.xml&divisionId=MDIS03002002000000&serviceId=SDIS03002002000. The Product is made available in Korea by Citibank Korea Inc., which is regulated by the Financial Services Commission and the Financial Supervisory Service. Address is Citibank Building, 39 Da-dong, Jung-gu, Seoul 100-180, Korea. The Product is made available in **Malaysia** by Citigroup

Prepared for CIRA Email Monitoring

Global Markets Malaysia Sdn Bhd (Company No. 460819-D) ("CGMM") to its clients and CGMM takes responsibility for its contents. CGMM is regulated by the Securities Commission of Malaysia. Please contact CGMM at Level 43 Menara Citibank, 165 Jalan Ampang, 50450 Kuala Lumpur, Malaysia in respect of any matters arising from, or in connection with, the Product. The Product is made available in **Mexico** by Acciones y Valores Banamex, S.A. De C. V., Casa de Bolsa, Integrante del Grupo Financiero Banamex ("Accival") which is a wholly owned subsidiary of Citigroup Inc. and is regulated by Comision Nacional Bancaria y de Valores. Reforma 398, Col. Juarez, 06600 Mexico, D.F. In **New Zealand** the Product is made available to 'wholesale clients' only as defined by s5C(1) of the Financial Advisers Act 2008 ('FAA') through Citigroup Global Markets Australia Pty Ltd (ABN 64 003 114 832 and AFSL No. 240992), an overseas financial adviser as defined by the FAA, participant of the ASX Group and regulated by the Australian Securities & Investments Commission. Citigroup Centre, 2 Park Street, Sydney, NSW 2000. The Product is made available in **Pakistan** by Citibank N.A. Pakistan branch, which is regulated by the State Bank of Pakistan and Securities Exchange Commission, Pakistan. AWT Plaza, 1.1. Chundrigar Road, P.O. Box 4889, Karachi-74200. The Product is made available in the **Philippines** through Citicorp Financial Services and Insurance Brokerage Philippines, Inc., which is regulated by the Philippines Securities and Exchange Commission. 20th Floor Citibank Square Bldg. The Product is made available in the Philippines through Citibank NA Philippines branch, Citibank Tower, 8741 Paseo De Roxas, Makati City, Manila. Citibank NA Philippines NA is regulated by The Bangko Sentral ng Pilipinas. The Product is made available in **Poland** by Dom Maklerski Banku Handlowego SA an indirect subsidiary of Citigroup Inc., which is regulated by Komisja Nadzoru Finansowego. Dom Maklerski Banku Handlowego S.A. ul.Senatorska 16, 00-923 Warszawa. The Product is made available in the **Russian Federation** through ZAO Citibank, which is licensed to carry out banking activities in the Russian Federation in accordance with the general banking license issued by the Central Bank of the Russian Federation and brokerage activities in accordance with the license issued by the Federal Service for Financial Markets. Neither the Product nor any information contained in the Product shall be considered as advertising the securities mentioned in this report within the territory of the Russian Federation or outside the Russian Federation. The Product does not constitute an appraisal within the meaning of the Federal Law of the Russian Federation of 29 July 1998 No. 135-FZ (as amended) On Appraisal Activities in the Russian Federation. 8-10 Gasheka Street, 125047 Moscow. The Product is made available in **Singapore** through Citigroup Global Markets Singapore Pte. Ltd. ("CGMSPL"), a capital markets services license holder, and regulated by Monetary Authority of Singapore. Please contact CGMSPL at 8 Marina View, 21st Floor Asia Square Tower 1, Singapore 018960, in respect of any matters arising from, or in connection with, the analysis of this document. This report is intended for recipients who are accredited, expert and institutional investors as defined under the Securities and Futures Act (Cap. 289). The Product is made available by The Citigroup Private Bank in Singapore through Citibank, N.A., Singapore Branch, a licensed bank in Singapore that is regulated by Monetary Authority of Singapore. Please contact your Private Banker in Citibank N.A., Singapore Branch if you have any queries on or any matters arising from or in connection with this document. This report is intended for recipients who are accredited, expert and institutional investors as defined under the Securities and Futures Act (Cap. 289). This report is distributed in Singapore by Citibank Singapore Ltd ("CSL") to selected Citigold/Citigold Private Clients. CSL provides no independent research or analysis of the substance or in preparation of this report. Please contact your Citigold//Citigold Private Client Relationship Manager in CSL if you have any queries on or any matters arising from or in connection with this report. This report is intended for recipients who are accredited investors as defined under the Securities and Futures Act (Cap. 289). Citigroup Global Markets (Pty) Ltd. is incorporated in the **Republic of South Africa** (company registration number 2000/025866/07) and its registered office is at 145 West Street, Sandton, 2196, Saxonwold. Citigroup Global Markets (Pty) Ltd. is regulated by JSE Securities Exchange South Africa, South African Reserve Bank and the Financial Services Board. The investments and services contained herein are not available to private customers in South Africa. The Product is made available in the **Republic of China** through Citigroup Global Markets Taiwan Securities Company Ltd. ("CGMTS"), 14 and 15F, No. 1, Songzhi Road, Taipei 110, Taiwan and/or through Citibank Securities (Taiwan) Company Limited ("CSTL"), 14 and 15F, No. 1, Songzhi Road, Taipei 110, Taiwan, subject to the respective license scope of each entity and the applicable laws and regulations in the Republic of China. CGMTS and CSTL are both regulated by the Securities and Futures Bureau of the Financial Supervisory Commission of Taiwan, the Republic of China. No portion of the Product may be reproduced or quoted in the Republic of China by the press or any third parties [without the written authorization of CGMTS and CSTL]. If the Product covers securities which are not allowed to be offered or traded in the Republic of China, neither the Product nor any information contained in the Product shall be considered as advertising the securities or making recommendation of the securities in the Republic of China. The Product is for informational purposes only and is not intended as an offer or solicitation for the purchase or sale of a security or financial products. Any decision to purchase securities or financial products mentioned in the Product must take into account existing public information on such security or the financial products or any registered prospectus. The Product is made available in **Thailand** through Citicorp Securities (Thailand) Ltd., which is regulated by the Securities and Exchange Commission of Thailand. 399 Interchange 21 Building, 18th Floor, Sukhumvit Road, Klongtoey Nua, Wattana ,Bangkok 10110, Thailand. The Product is made available in **Turkey** through Citibank AS which is regulated by Capital Markets Board. Tekfen Tower, Eski Buyukdere Caddesi # 209 Kat 2B, 23294 Levent, Istanbul, Turkey. In the **U.A.E**, these materials (the "Materials") are communicated by Citigroup Global Markets Limited, DIFC branch ("CGML"), an entity registered in the Dubai International Financial Center ("DIFC") and licensed and regulated by the Dubai Financial Services Authority ("DFSA") to Professional Clients and Market Counterparties only and should not be relied upon or distributed to Retail Clients. A distribution of the different Citi Research ratings distribution, in percentage terms for Investments in each sector covered is made available on request. Financial products and/or services to which the Materials relate will only be made available to Professional Clients and Market Counterparties. The Product is made available in **United Kingdom** by Citigroup Global Markets Limited, which is authorised by the Prudential Regulation Authority ("PRA") and regulated by the Financial Conduct Authority ("FCA") and the PRA. This material may relate to investments or services of a person outside of the UK or to other matters which are not authorised by the PRA nor regulated by the FCA and the PRA and further details as to where this may be the case are available upon request in respect of this material. Citigroup Centre, Canada Square, Canary Wharf, London, E14 5LB. The Product is made available in **United States** by Citigroup Global Markets Inc, which is a member of FINRA and registered with the US Securities and Exchange Commission. 388 Greenwich Street, New York, NY 10013. Unless specified to the contrary, within EU Member States, the Product is made available by Citigroup Global Markets Limited, which is authorised by the PRA and regulated by the FCA and the PRA.
The Product is not to be construed as providing investment services in any jurisdiction where the provision of such services would not be permitted.
Subject to the nature and contents of the Product, the investments described therein are subject to fluctuations in price and/or value and investors may get back less than originally invested. Certain high-volatility investments can be subject to sudden and large falls in value that could equal or exceed the amount invested. Certain investments contained in the Product may have tax implications for private customers whereby levels and basis of taxation may be subject to change. If in doubt, investors should seek advice from a tax adviser. The Product does not purport to identify the nature of the specific market or other risks associated with a particular transaction. Advice in the Product is general and should not be construed as personal advice given it has been prepared without taking account of the objectives, financial situation or needs of any particular investor. Accordingly, investors should, before acting on the advice, consider the appropriateness of the advice, having regard to their objectives, financial situation and needs. Prior to acquiring any financial product, it is the

Prepared for CIRA Email Monitoring

client's responsibility to obtain the relevant offer document for the product and consider it before making a decision as to whether to purchase the product. Citi Research product may source data from dataCentral. dataCentral is a Citi Research proprietary database, which includes Citi estimates, data from company reports and feeds from Thomson Reuters. The printed and printable version of the research report may not include all the information (e.g., certain financial summary information and comparable company data) that is linked to the online version available on Citi's proprietary electronic distribution platforms.

© 2015 Citigroup Global Markets Inc. Citi Research is a division of Citigroup Global Markets Inc. Citi and Citi with Arc Design are trademarks and service marks of Citigroup Inc. and its affiliates and are used and registered throughout the world. All rights reserved. Any unauthorized use, duplication, redistribution or disclosure of this report (the "Product"), including, but not limited to, redistribution of the Product by electronic mail, posting of the Product on a website or page, and/or providing to a third party a link to the Product, is prohibited by law and will result in prosecution. The information contained in the Product is intended solely for the recipient and may not be further distributed by the recipient to any third party. Where included in this report, MSCI sourced information is the exclusive property of Morgan Stanley Capital International Inc. (MSCI). Without prior written permission of MSCI, this information and any other MSCI intellectual property may not be reproduced, redisseminated or used to create any financial products, including any indices. This information is provided on an "as is" basis. The user assumes the entire risk of any use made of this information. MSCI, its affiliates and any third party involved in, or related to, computing or compiling the information hereby expressly disclaim all warranties of originality, accuracy, completeness, merchantability or fitness for a particular purpose with respect to any of this information. Without limiting any of the foregoing, in no event shall MSCI, any of its affiliates or any third party involved in, or related to, computing or compiling the information have any liability for any damages of any kind. MSCI, Morgan Stanley Capital International and the MSCI indexes are services marks of MSCI and its affiliates. The Firm accepts no liability whatsoever for the actions of third parties. The Product may provide the addresses of, or contain hyperlinks to, websites. Except to the extent to which the Product refers to website material of the Firm, the Firm has not reviewed the linked site. Equally, except to the extent to which the Product refers to website material of the Firm, the Firm takes no responsibility for, and makes no representations or warranties whatsoever as to, the data and information contained therein. Such address or hyperlink (including addresses or hyperlinks to website material of the Firm) is provided solely for your convenience and information and the content of the linked site does not in anyway form part of this document. Accessing such website or following such link through the Product or the website of the Firm shall be at your own risk and the Firm shall have no liability arising out of, or in connection with, any such referenced website.

ADDITIONAL INFORMATION IS AVAILABLE UPON REQUEST

Prepared for CIRA Email Monitoring

VISIT CITIVELOCITY.COM for access to Citi's cross-asset research, commentary, data and analytics.
CitiVELOCITY℠