

2017 INVESTMENT THEMES

A Wind of Change

Citi GPS: Global Perspectives & Solutions

January 2017



Citi is one of the world's largest financial institutions, operating in all major established and emerging markets. Across these world markets, our employees conduct an ongoing multi-disciplinary global conversation – accessing information, analyzing data, developing insights, and formulating advice for our clients. As our premier thought-leadership product, Citi GPS is designed to help our clients navigate the global economy's most demanding challenges, identify future themes and trends, and help our clients profit in a fast-changing and interconnected world. Citi GPS accesses the best elements of our global conversation and harvests the thought leadership of a wide range of senior professionals across our firm. This is not a research report and does not constitute advice on investments or a solicitation to buy or sell any financial instrument. [For more information on Citi GPS, please visit our website at **www.citi.com/citigps**.](http://www.citi.com/citigps)

Macro Contributors**Tina M Fordham**

Chief Global Political Analyst

+44-20-7986-9860 | tina.fordham@citi.com

**Jeremy Hale**

Head of Global Macro Strategy Product

+44-20-7986-9465 | jeremy.hale@citi.com

**Sandy Kaul**

Global Head of Business Advisory Services

+1-212-723-5118 | sandy.kaul@citi.com

**Tiia A Lehto**

Global Economics Team

+44-20-7986-4460 | tiia.lehto@citi.com

**David Lubin**

Head of Emerging Markets Economics

+44-20-7986-3302 | david.p.lubin@citi.com

**Edward L Morse**

Global Head of Commodities Research

+1-212-723-3871 | ed.morse@citi.com

**Ebrahim Rahbari**

Global Economist

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

**Mark Schofield**

Global Head of Macro Product

+44-207-986-5891 | mark.schofield@citi.com

Equity Contributors**Antonella Bianchessi**

Head of European Utilities Team

+44-207-986-4371 |
antonella.bianchessi@citi.com**Roland Shu**

Head of Asian Regional Semiconductor Team

+886-2-8726-9090 | roland.shu@citi.com

**Martin Wilkie**

Head of European Capital Goods Team

+44-207-986-4077 | martin.wilkie@citi.com

2017 INVESTMENT HIGHLIGHTS

A Wind of Change

Mark Schofield

Global Head of Macro Product

The introduction to our 2016 Investment Themes GPS report was titled "New Normal or No Normal". In it we argued that a return to strong growth and increased cyclicity in economies was unlikely. We said that a return to the historical levels of growth and inflation would require far more radical changes than looked likely at that time. This proved to be an accurate assessment of the 2016 outcome; however, a number of events have taken place during the past year that make us think that 2017 could be very different.

A wind of change is sweeping through politics, economics and markets and it threatens to bring with it a new direction for economies and financial markets. Three core themes are evident in this new dawn: rising *Vox Populi* risk, increased headwinds to globalization trends and a transition in the policy landscape.

Rising political risk is not a new theme for us at Citi. *Vox Populi* risk in its various forms has been a mainstay of our research over the last few years. However 2016 saw a dramatic shift in focus, away from geo-political tensions towards a new socio-political discord that culminated in unexpected outcomes such as the UK referendum on EU membership and the U.S. presidential elections. Neither the vote for Brexit nor Donald Trump's election victory should necessarily be systemically critical, but both are symptomatic of a strong underlying dissatisfaction. Not all of the Brexit supporters voted because they really believe that the UK will benefit from leaving the UK and not all Trump supporters fully support his campaign policies. What many people voted for was change. Change from a status quo in which they had lost faith. Change of any type is now viewed as better than no change at all. The crucial aspect of this phenomenon, and what makes it potentially more consequential than geo-political unrest, is that it has triggered a wave of populist policy responses that have a very direct transmission mechanism into economies and markets.

It would be disingenuous to claim that globalization is going into reverse. Many aspects of the globalization trend are robust and even accelerating. In a few key areas, however, there are signs of mounting headwinds; the most notable among these being migration, trade and investment. Overall, a shift away from globalization is likely to weigh on economic activity and investment; however these trends are not at all uniform. The impact of changing momentum in these areas is, nonetheless, likely to be heavily felt in 2017 although it may be more marked in regional and cross-sector variations than in aggregate global growth.

The third key theme in our 2017 outlook is a major shift in the policy landscape. Monetary policy is likely to become much less accommodative, led by the Federal Reserve raising rates and followed by tapering from the ECB and perhaps the BoJ. At the same time, fiscal stimulus is likely to accelerate. Fiscal policy has been a long time coming, but history suggests that it is usually quite persistent. Now that it is here, it is likely to stay, and while it will be a welcome support to beleaguered monetary policy, fiscal policy is not without its costs. There is a risk that, being somewhat driven by political factors, the policies chosen may not always be the most economically effective. Furthermore, with high levels of debt across most advanced economies, it is possible that the bond markets may look upon fiscal stimulus with considerable skepticism.

As with all periods of transition there are considerable risks, both to the upside and the downside. While the shifting direction of the major trends may become increasingly apparent, the exact trajectory of those trends will be hard to predict.

We see three areas of uncertainty that could have an impact on economic and market dynamics: the question of whether or not inflation is now rising in the advanced economies, commodity prices and whether or not emerging market growth can withstand the effects of Trumponomics. Historically, a stronger dollar and rising U.S. rates has been an unpalatable combination for emerging economies. Coming against a backdrop of increasingly protectionist policies and slowing trade and investment, many countries will have to search hard to find new growth drivers.

Combining our core themes with these risks, we get a fascinating set of challenges for investors to navigate. We see three major investment themes for 2017: a stronger dollar, a turn in the yield cycle and a major shift in the policy landscape.

The impact of a rising U.S. dollar will be felt not only in emerging markets, but also in broader financial conditions. Investors will need to evaluate the extent to which this becomes self-regulating. If tighter financial conditions destabilize the recovery before fiscal stimulus has had a chance to work, we could see another dip in growth next year.

The question of whether or not the 30-year bull market in bonds is over is of huge importance. Bond technicians will tell you that it is too soon to call the end of the bull market, while bullish fundamental analysts will point to the risk of tighter financial conditions as a self-regulator. Nonetheless, yields are rising. The big issue for investors to focus on in 2017 is the evolution of risk premia. Bonds have three main drivers: funding costs, inflation risks and credit risks. All three of these probably merit higher risk premia going forwards. It may be too early to call an aggressive cyclical bear-market for bonds, but we have probably seen the secular lows in risk premia.

Our third investment theme is how the new policy mix, with tighter monetary policy and greater fiscal stimulus, will impact asset allocation decisions across fixed income and equity markets and how the investment industry is adapting to these new challenges.

With monetary policy turning less accommodative and fiscal stimulus on the horizon, there will be renewed expectations of a "Great Rotation" out of bonds and into equities. However, as we argued in our October 2014 GPS report, risk rotations tend to take place within asset classes and not between them. This has clearly been the case over the past couple of years as bond and equity prices have become positively correlated, reflecting reduced risk premia in both markets on the back of a very supportive policy environment.

Just as the impact of the various macro-economic drivers is likely to be nuanced across geographies and business sectors, so we expect risk rotations to remain predominantly in-asset class. This means rotation between cash and bonds and rotations up and down the yield and credit curves as inflation and credit risk premia fluctuate. In equities, the shifting risk premia are likely to be seen across regions and sectors, reflecting shifting trends in buybacks, dividends and capex. As such, the positive correlation between bond and equity prices is likely to break down as the drivers of each asset class diverge. A more traditional cyclical-looking price dynamic may emerge, but it is important not to confuse a re-pricing of risk premia with a real money flow rotation.

This changing dynamic in risk premia and asset correlations is also being reflected in broader industry trends. A recent Citi Business Advisory Services survey revealed a steady transition from asset class-based to factor-based portfolio construction that is helping fuel an accelerated move in capital pools away from actively managed to passively managed funds, particularly towards Exchange Traded Funds (ETFs).

These themes are all investigated in more detail in a series of essays over the following pages of this report. Alongside the major macro and investment themes, we also present three essays that examine trends affecting equity investment and stock selection.

We look at how technologies like sensing and data collection, optimization, and analysis could redefine the future of manufacturing. We also investigate the impact that China's burgeoning semiconductor demand could have on the sector globally and finally we examine how increased energy efficiency and rising demand for renewable energy sources is impacting the landscape of energy production, consumption, pricing and hedging.

We are pleased to present our investment themes for 2017 in this report. Overall we believe that 2017 may herald a new direction for economies and financial markets after several years of stasis. The future looks uncertain, but uncertainty can be a good thing. With shifting trends come shifting risk premia and greater price volatility. With greater volatility comes greater opportunity. We wish all readers of our Citi GPS series successful investing in the year ahead.

Contents

2017 Investment Themes: Macro Analysis

Central Bank Policy	7
The Changing AE Fiscal-Monetary Policy Mix	7
Global Political Outlook	14
The Trump Effect and Beyond	14
Inflation	21
Is Advanced Economy Low-flation Ending?	21
Emerging Markets	28
Can EM Survive “Trumponomics”?	28
Global Asset Allocation	37
Themes, Risks and Tilts for 2017	37
Three Themes:	38
Four Risks	40
Three Tilts – Be Tactical	41
Commodities	42
The New Normal Unfolds	42

2017 Investment Themes: Equity Analysis

The Factory of the Future	47
Not Just the Rise of the Machines	47
Key Growth Areas	50
Greater China Semiconductors	52
Powered to Reshape the Global Landscape	52
European Utilities	58
Energy Efficiency to Cut Electricity Demand	58

2017 Investment Themes: Macro Analysis

Asset Managers	64
At the Tipping Point on Passive Fund Investing	64

2017 Investment Highlights: Macro Analysis

Ebrahim Rahbari
Global Economist

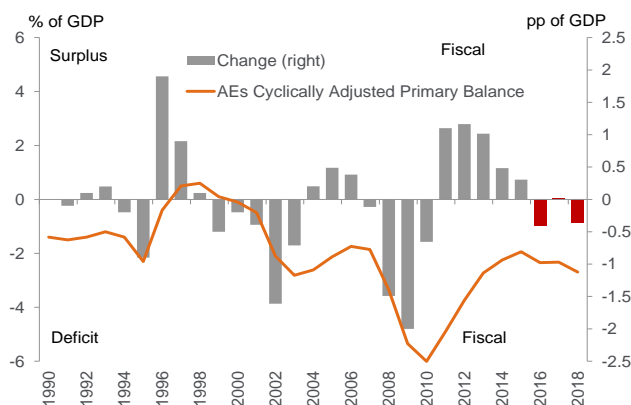
Cesar Rojas
Global Economics Team

Central Bank Policy

The Changing AE Fiscal-Monetary Policy Mix

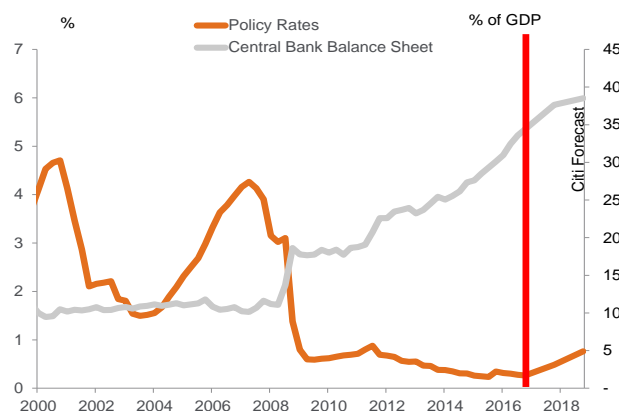
The fiscal-monetary policy mix in advanced economies (AEs) is slowly changing. After years of constraint and consolidation, AE fiscal policy¹ was probably expansionary in 2016 for the first time since 2010. Even though 2017 may – depending on the timing of U.S. stimulus plans – be somewhat of a pause for AE fiscal policy, we expect the trend towards AE fiscal loosening to continue (Figure 1). Meanwhile, AE monetary policy² may be set for a pause and perhaps a turning point in 2017, after years of extensive additional monetary easing. We expect only two AE central banks to cut policy rates in 2017 (in Canada and New Zealand), the U.S. Federal Reserve (Fed) to raise policy rates, and no announcements of major additional asset purchases. Ongoing large asset purchases (e.g. by the Bank of Japan, or BoJ, and the European Central Bank, or ECB) imply, however, that central banks' balance sheets will likely continue to expand significantly in 2017. AE monetary policy therefore looks set to remain rather accommodative (Figure 2). We broadly welcome this change in the policy mix (indeed, we think it is somewhat overdue), but it comes with its own challenges.

Figure 1. AEs – Cyclically-Adjusted Primary General Government Balance Level and Change (% of GDP, pp of GDP), 1990-2018F



Note: Fiscal stimulus measured as the change in CAPB. AEs is a GDP-weighted average, at market exchange rates, of the level/change of IMF GG CAPB for the US, Japan, euro area, UK, Canada, Australia, New Zealand, Denmark, Norway, Sweden and Switzerland. Citi estimates from 2016-2018.
Source: IMF and Citi Research

Figure 2. AE's - Quarterly Average Policy Rate (%) and Central Bank Balance Sheet Size (% of GDP), 2000-2018F



Note: The Pension Fund Global is excluded for Norway. Forecast for end of period 2016-2018.
Source: National Central Banks and Citi Research

Is Advanced Economy Fiscal Policy Finally Taking Off?

We expect fiscal policy to continue to turn more expansionary in AEs in 2016-18. The fiscal stance turned more expansionary, measured by the change in the cyclically-adjusted general government primary balance, in 2016 for the first time since 2010, with moderate fiscal loosening across a wide range of AEs.

¹ According to Investopedia, fiscal policy is the means by which a government adjusts its spending levels and tax rates to monitor and influence a nation's economy.

² According to Investopedia, monetary policy is a central bank's actions that influence the country's money supply and the overall economy. The central bank tries to ensure that money supply grow neither too quickly, causing excessive inflation, nor too slowly, hampering economic growth.

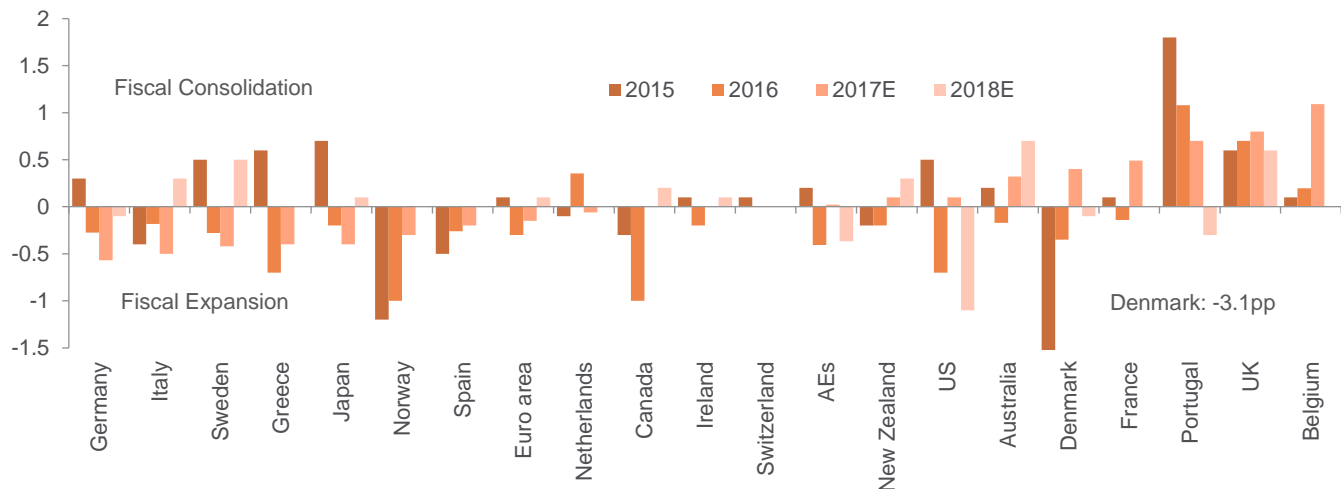
We expect 1 percentage point of GDP from further fiscal loosening in 2016-18.

We expect further loosening in coming years, in the order of cumulatively roughly 1 percentage point of GDP in 2016-18. Even though we expect the trend towards gradual AE fiscal loosening to continue, 2017 may see little (or no) incremental stimulus. This is in part because we currently think that the bulk of fiscal stimulus in the U.S. will only hit in 2018 (Figure 3). The change in the AE fiscal stance we foresee is relatively modest compared to the moderate level of fiscal tightening in 2014-15. But it is rather more significant when comparing with the roughly 1 percentage point of fiscal tightening in AEs in 2011-13.

Fiscal trends across AEs are unlikely to be uniform

There are still significant constraints to more vigorous fiscal expansion in many AEs. While we expect fiscal easing in the U.S., the Eurozone and Japan in coming years, we stress that fiscal trends across AEs are unlikely to be uniform. Most of these constraints are political rather than debt-market constraints. For instance, in Australia, both major parties favor fiscal consolidation. Ideological reservations hinder more fiscal expansion by the German government and perhaps in Japan, while institutional constraints exist for example in the euro area due to the EU's fiscal rules. High debt levels across many AEs also limit fiscal space (Figure 4).

Figure 3. Advanced Economies – Change in Cyclically-Adjusted General Government Primary Balance (% of GDP), 2015-2018F



Note: Fiscal impulse measured through the change in the CAPB. AEs is a GDP-weighted average, at market exchange rates, of the change in GG CAPB for the US, Japan, euro Area, Canada, Australia, New Zealand, Denmark, Norway, Sweden, and Switzerland. Citi estimates from 2016-2018.

Source: IMF and Citi Research

Major fiscal tightening appears unlikely in most AEs in the coming two to three years, unless and until either financial markets or institutional arrangements (in the euro area) compel authorities to tighten policy, even though there are a few exceptions (i.e., the UK, Australia, and Belgium).

What is Driving the Change in the AE Fiscal Stance?

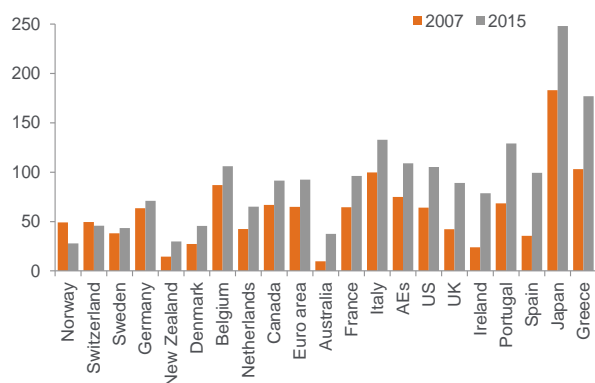
Low growth, weak political mandates, and rising populism is driving the trend to loosen fiscal policy

In our view, the trend towards incrementally looser fiscal policy is in part based on the *Vox Populi* logic: low growth, weak political mandates, and rising populism. The perception that monetary policy is increasingly ineffective probably supports the case for more fiscal easing too, as does the rising intellectual consensus among academics, financial market participants, and politicians in favor of more expansionary fiscal policy. Meanwhile, across most AEs, there is little market pressure against additional government debt issuance and low interest rates. Indeed, despite generally high levels of gross government debt, public interest burdens are usually fairly moderate in most AEs due to low interest rates.

The “Trump Stimulus”

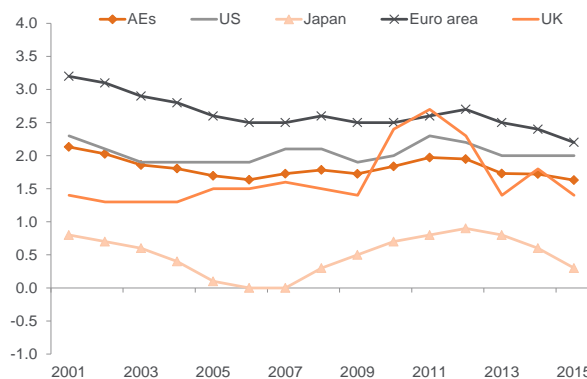
The recent U.S. election is likely to be followed by a sizable fiscal stimulus in the coming 2-3 years. Our U.S. colleagues expect the fiscal package of the new administration to include individual income tax rate cuts (reducing the tax brackets from seven to three), corporate tax rate cuts (from 35% to 15%), a broadening of the tax base, higher infrastructure spending (about \$55 billion of federal infrastructure spending per year over 10 years), as well as a delay of sequestration. The size of the stimulus is likely to be significant, even though it is likely to fall short of President-elect Trump’s earlier campaign promises, and its size (and timing) remains uncertain. However, our colleagues estimate that the fiscal stimulus will only really have an effect in 2018. They pencil in fiscal loosening of 1.1% of GDP in 2018, and a cumulative impulse of 1.5% of GDP over 2018-2021.

Figure 4. Selected Countries – General Government (GG) Gross Debt (% of GDP), 2007 vs. 2015



Note: AE is the GDP-weighted average of GG gross debt in the US, UK, Japan, euro area, Denmark, Norway, Sweden, Switzerland, Australia, New Zealand, and Canada.
Source: IMF and Citi Research

Figure 5. Selected Countries – General Government (GG) Net Interest Payments (% of GDP), 2001-2015



Note: Net interest payments are the difference between GG Primary Balance and GG Overall Balance.
Source: IMF and Citi Research

The outcome of the U.S. election will likely also have some political multiplier effects on fiscal decisions elsewhere, in our view. Fiscal loosening in the U.S. may encourage others to follow suit. In addition, the new U.S. administration may put some subtle or not-so-subtle pressure on its allies to increase their defense spending.

Figure 6. US – CBO Estimates of Fiscal Multipliers on Real GDP Growth

Type of Activity	Estimated Multiplier	
	Low	High
Federal Government purchases of goods and services	0.5	2.5
Transfer payments to State and Local Governments for Infrastructure	0.4	2.2
Transfer payments to State and Local Governments for Other purposes	0.4	1.8
Transfer payments to individuals	0.4	2.1
One-time payments to Retirees	0.2	1.0
Two-Year tax cuts for lower- and middle-income people	0.3	1.5
One-Year tax cuts for higher-income people	0.1	0.6
Extension of first-time homebuyer credit	0.2	0.8
Corporate tax provisions primarily affecting cash flow	0.0	0.4

Note: The estimates were produced for CBO’s analysis of the American Recovery and Reinvestment Act of 2009.
Source: Congressional Budget Office (CBO) and Citi Research

What Effects Will Fiscal Stimulus Have?

Fiscal stimulus has more impact when a country has budgetary slack

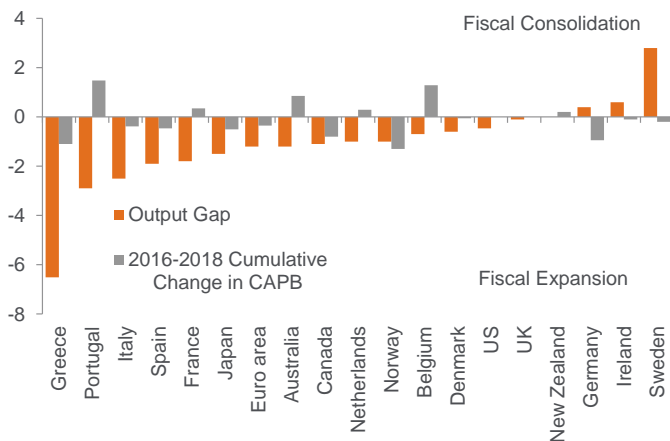
In general, we see the shift towards more active fiscal policy as benign and supportive of economic activity and higher inflation. The effects of fiscal loosening on growth (i.e. the fiscal multiplier) depend on the nature of the fiscal measure, its duration, as well as the position of an economy in the economic cycle – the more budgetary slack there is, the more impact a fiscal stimulus can have on economic activity (see Figure 6). We note that the economies where we expect to see some fiscal easing are among those that tend to have relatively less slack (such as Germany, Japan or the U.S., see Figure 7), which should reduce the stimulus impact on growth and make it more inflationary. In addition, the bulk of the fiscal measures we expect tend to be tax measures (such as reductions in personal income and corporate income taxes), which will probably only have moderately high multipliers, too.

More expansive AE fiscal policy also carries risks

Even though we welcome more active fiscal policy, we note that more expansionary AE fiscal policy also carries a number of risks. These include rising debt burdens for a number of already-highly-indebted AE sovereigns. Should (real) interest rates rise, debt sustainability issues could come to the fore (see Figure 5). Meanwhile, the effects of more expansionary AE fiscal policy on emerging markets (EMs) are likely to be mixed. The first-order effect could come from higher exports to AEs. However, more active fiscal policy can also have adverse effects on EMs by raising long-term (U.S. and EM) interest rates and tightening EM financial conditions.

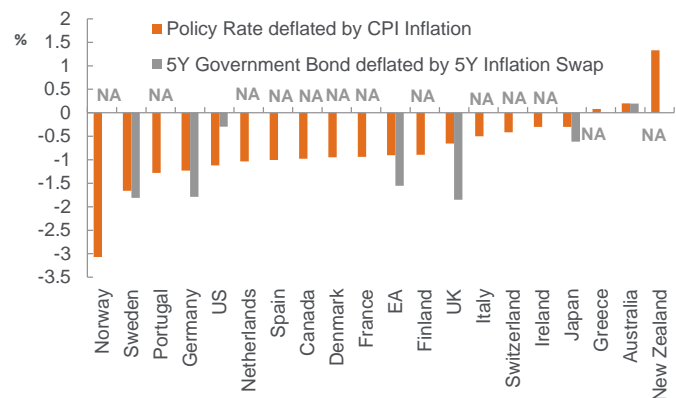
Fiscal easing should in general reduce the need for incremental monetary easing. In practice, we think the interactions between fiscal and monetary policy are nuanced and complex. Indeed, fiscal and monetary stimulus could be deployed jointly where inflation remains stubbornly low or where high debt levels imply that the private sector may not fund fiscal stimulus – it is not long ago that ‘helicopter money’ (monetized fiscal stimulus) was the topic du jour. However, at this juncture, we expect that AE monetary policy may be set for a pause and that fiscal dynamics probably feed into receding pressure for central banks to ease policy further.

Figure 7. Selected Countries – IMF Output gap (% of Potential GDP) and Cumulative Change in CAPB (pp of GDP), 2016 vs. 2016-2018



Note: Change in CAPB estimates from Citi Research for 2016-2018
Source: IMF and Citi Research

Figure 8. Selected Countries – Real Policy Rates (Deflated by CPI Inflation) and 5-Yr Sovereign Bond Yields (Deflated by 5-Yr Inflation Swap Rates), Latest Available



Note: Policy rates deflated by YoY% inflation in 3Q-16 for AU and NZ, in Oct-16 for CA, DE, EU, JP, SW, UK, US, FI, PO and in Nov-16 in NO, CF, FR, GE, GR, IR, IT, NL.

Source: National Central Banks and Statistical Offices, Bloomberg and Citi Research

The Great AE Monetary Easing Cycle may be Ending

Since August 2007, the average AE policy rate has fallen 377 basis points...

Since the great financial crisis (GFC), monetary policy eased significantly across AEs. Since August 2007, the average AE policy rate (weighted by nominal GDP at current market exchange rates) has fallen by 377 basis points, ranging from not very much in Japan (given that short-term rates were already low to begin with) to 650 basis points in New Zealand. Consequently, current policy rates are low in virtually all AEs (ranging from -0.75% in Switzerland to 1.75% in New Zealand).

...and AE central bank balance sheets have expanded materially

In addition, AE central bank balance sheets have expanded dramatically, from 11% of GDP in the AE average in mid-2007 to 34%. Balance sheet increases were largest in Japan (from 22% of GDP to 91%) and Switzerland (19% to 111%).

We only expect two AE central banks to cut policy rates in 2017

In contrast to the large waves of monetary easing in recent years, we only expect two central banks to cut policy rates in 2017 (the Bank of Canada and the Reserve Bank of New Zealand) after seven out of 11 AE central banks cut rates in 2016, and we do not expect major announcements on additional asset purchases. Even though we only expect the Fed to hike among AE central banks in 2017, we expect the average GDP-weighted AE policy rate to rise from 0.3% at the end of 2016 to 0.5% at the end of 2017 which would be the largest rise in AE policy rates since 2006.

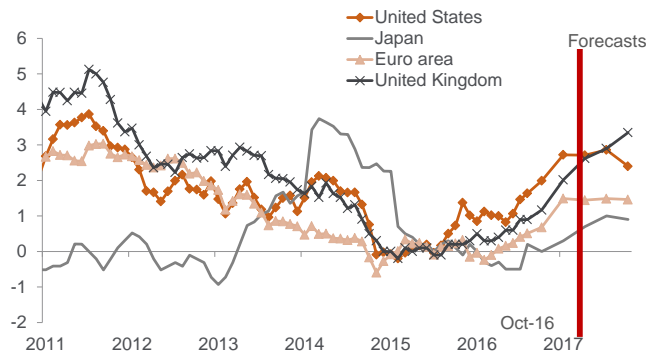
Average AE policy rates ex-U.S. are expected to be unchanged in 2017

After hiking in December, we expect the U.S. Fed to hike twice in 2017 and in 2018, respectively. However, we expect the average AE policy rate ex-U.S. to be roughly unchanged in 2017 (and increase only 10 basis points in 2018). In 2018, we currently expect six countries to hike and none to cut.

Still, AE monetary policy looks set to remain accommodative. The BoJ, the ECB and Sweden's Riksbank will continue to buy assets in large size, which implies that AE central bank balance sheets would still expand significantly in 2017. Real interest rates (measured either as the policy rate deflated by realized CPI inflation or derived from government bond yields and inflation swaps) are negative across most AEs (Figure 8) and are expected to remain so in 2017. They are most negative in Norway, Sweden or Germany, while they are much higher in New Zealand, Greece or Japan.³

³ In principle, the level of monetary accommodation should depend not on the level of the real interest rates but its difference to the economy's natural rate, which can vary significantly across economies.

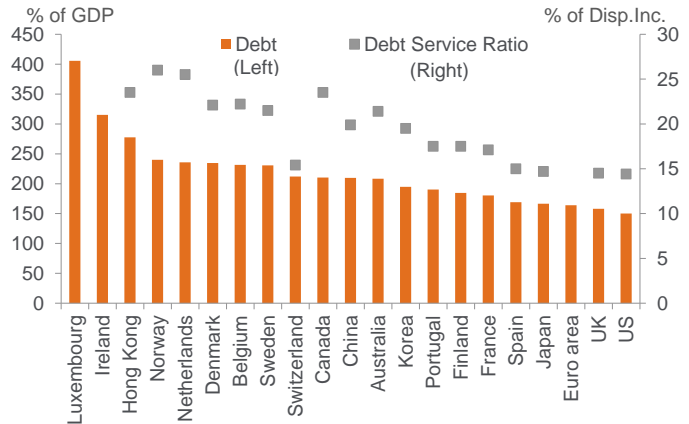
Figure 9. Selected Countries – Headline CPI Inflation (%), 2011-2017F



Note: Consumer Price Index (CPI)

Source: National Statistical Offices, IMF, and Citi Research

Figure 10. Selected Countries – Private Sector Debt (% of GDP) and Debt Service Ratios (% of Gross Disposable Income), Q1 2016



Note: Debt service ratio not available for euro area, Luxembourg and Ireland.

Source: BIS and Citi Research

Why AE Monetary Policy is Set for a Pause

Monetary policy is set for a pause because AE inflation is picking up and perceptions have changed on monetary easing

There are two main reasons why monetary policy is set for a pause in 2017:

- First, AE inflation is picking up, probably to roughly 2% in the AE average in the spring, the highest level since 2012 (Figure 9). Many of the drivers behind the current uptick may well be temporary and we believe that, for now, underlying inflation in AEs remains low. However, downside risks to AE inflation may be receding somewhat and upside risks to inflation are rising. Meanwhile, AE growth is running slightly above potential growth, average unemployment in AEs is at the lowest level since September 2008 and fiscal policy is loosening across AEs.
- Second, the perceived costs and benefits of incremental monetary easing are changing. The ECB and the the BoJ have recently noted that low banking sector profitability can tighten monetary conditions and discussed the role of monetary policy in this context. The BoJ also acknowledged the limited power central banks have to raise inflation quickly. Popular and political opposition to incremental monetary easing appears to be rising, including in Germany, Japan, the U.S., and the UK. Operational challenges also appear to be growing, (including the possibility of running out of suitable assets to buy or running up against the effective lower bound (ELB) on nominal policy rates). Concerns that monetary policy is increasingly distorting financial markets are also on the rise.

Hurdles to Tightening Monetary Policy

But, the prospects of tightening monetary policy is quite low across AEs

However, the prospects for actually tightening monetary policy are quite low across most AEs, in our view, for four related reasons.

- Inflation and inflation expectations remain fragile. Most available measures of inflation expectations are still quite low. Some of the current drivers of rising inflation are likely to be temporary.
- Some central bank officials have recently argued that it may be desirable to let the economy 'run a little bit hot' temporarily, to re-anchor inflation expectations and possibly boost labor force participation through a 'reverse hysteresis' effect.

- Debt levels are high across many economies and sectors (Figure 10). Several studies suggest that high levels of debt service can precipitate financial crises and major contractions in private spending. An increase in (real) interest rates could therefore raise debt service to levels that can have potentially major negative effects on aggregate demand across a number of economies.
- Risks for asset prices, as very easy monetary policy has boosted a wide range of asset prices in recent years and possibly driven them away from their fundamentals. Withdrawing that support could lead to lower asset prices even if the reason for withdrawing central-bank support is higher inflation. For individual economies, monetary tightening can also lead to undesirable foreign-exchange, (FX) strength.

Risks and Potential Surprises

There are also a number of risks and potential surprises to tightening monetary policy.

- First, inflation could rise more quickly than we currently expect. This could necessitate larger and faster rate hikes eventually, which would likely be disruptive – indeed, a broader tightening in monetary conditions is among the major risks we see for the global economic outlook in 2017/18.
- Second, changes in the political climate, institutional arrangements, and/or of key central bank personnel could trigger changes in central bank reaction functions. In the U.S., Congress may constrain the Fed's operational independence. Chair Yellen's term ends in February 2018 and there are two vacancies in the Fed board. In addition, BoJ Governor Kuroda's term ends in 2018, while ECB President Draghi and Bank of England (BoE) Governor Carney are due to depart in 2019.
- Lastly, it is certainly conceivable that the current uptick in inflation will fade again soon and that advanced economy inflation will once again surprise on the downside, as in previous years. In that case, fiscal policy may not be able to fill the void and monetary policy is likely to be called on again.

Monetary stability is not purely by choice. Part of the reason why monetary policy is stuck is also because it is facing operational and effectiveness challenges, especially at or near the effective lower bound (ELB). AE central banks will likely enter the next downturn with continued huge balance sheets and the policy rate so close to the ELB, which makes an early encounter with the ELB all but unavoidable. In pre-GFC cycles, AE central banks used to cut the policy rate by about 300-500 basis points – peak to trough – on average. It must be a source of concern that AE central banks are likely to enter the next downturn with their policy arsenal not significantly less impaired than it is today.

AE monetary policy may therefore end up exploring new avenues once more. Measures could include lowering the ELB, purchasing an even wider range of assets, or lending at even longer maturities or against even wider ranges of assets as collateral. AE monetary policy continues to evolve, as the example of the BoJ shows. Even though for the time being it appears that monetary policy is set for a pause, we doubt that the future of AE monetary policy will be any less exciting than its recent past.

Global Political Outlook

The Trump Effect and Beyond

Tina M Fordham

Chief Global Political Analyst

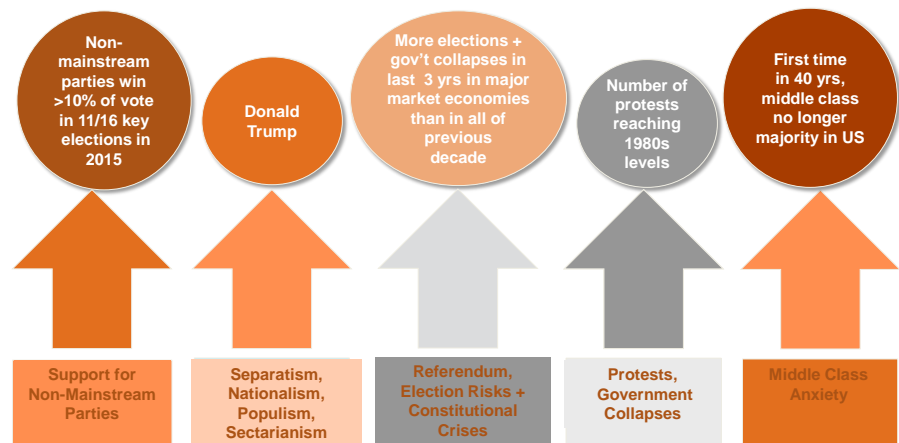
Tiia Lehto

Global Economics Team

Following a contentious race that exposed deep divisions among Americans by class, race, and region and that was marked by alleged foreign interference and other unusual interventions, outsider candidate Donald Trump will become the 45th United States president – the first to lack either political or military experience, and a virtual unknown from a policy perspective.

Trump's election marks the most high-profile example to date of *Vox Populi* risk (see [Citi GPS: Vox Populi, Taking It to the Streets](#)) with a non-mainstream candidate winning the leadership of the United States. With Trump's election taking place the same year as the Brexit outcome, these developments mark a pronounced shift in AE political risk that we first flagged at the start of 2016 (see [Citi GPS: Global Political Risk](#)) and which we expect to continue into 2017, with its concentration of major EU elections (France, Germany, Netherlands, and possible early elections in the UK and Italy), and well beyond. Trump's election will provide a salient demonstration-effect to other non-mainstream candidates and parties capitalizing upon anti-immigrant and anti-establishment sentiment as a winning formula, even though it could also serve as a wake-up call for the hard-of-hearing in the mainstream parties who had slept through Brexit (EU popularity has risen since the Brexit vote across the EU, including in the UK⁴).

Figure 11. Vox Populi Risks High and Gathering Steam in Developed Markets



Source: Pew Research Center, The American Middle Class is Losing Ground: No longer the majority and falling behind financially, 9 December 2015; World Economic Forum: The Global Risks Report 2016, Citi Research

Republicans in the U.S. are expected to close ranks and project unity

In the U.S. Congress, Republicans maintain their control of both chambers of Congress, resulting in rare single-party control, as well as the ability to appoint a potentially pivotal Justice to the Supreme Court (even though Republicans still do not have a filibuster-proof majority in the Senate). We expect that internal divisions within the Republican Party could result in tensions over aspects of the incoming president's policy plans, particularly spending, but that the broad trend initially will be for the party to close ranks and project unity following an election campaign that was also divisive within the Republican Party.

⁴ Bertelsmann Foundation August survey.

In the U.S., domestic and international policy will be a source of uncertainty for a considerable time

Following the short-lived initial shock at the surprise election outcome, markets appear to have settled into a focus on expectations of fiscal loosening, deregulation, and changes to external trade, investment, and immigration policy. But the truth is that whether we see the emergence of "Hard Trump" or "Soft Trump", the change in domestic and international policy will be a source of uncertainty for a considerable period, with much-scrutinized personnel choices for the new administration providing the earliest hints of likely direction between now and Inauguration Day on January 20, 2017.

More broadly, we expect heightened uncertainty in U.S. foreign, security, and defense policy with the possibility of disruption to key alliances such as NATO and U.S.-Japan, and the risk other actors seek to capitalize on the likely shifts under the new U.S. regime. The resulting re-calibration in international relations is likely to be the most significant of the post-Cold War era in our view, with changes in Russia-U.S. relations, the likely expansion of the influence of Russia and China globally, and pressure on the longstanding nuclear non-proliferation regime. Whether isolationism or interventionism lies ahead for future U.S. defense and security policy is a genuinely open question.

Figure 12. What Lies Ahead: Key Elections and Political Signposts, 2016-2018

2017	Jan	Jan	Mar	Apr-May	Jun	Jul	Aug-Oct	2H of 2017	Other snap elections or referendums?
	UK, Supreme Court Ruling on Parl Vote for Art 50 (mid-Jan, TBC) US, Inauguration of President	Italy, Constitutional Court ruling (24 Jan) France, Left Primaries (20-27 Jan) EU-Russia Sanctions Renewed? (31 Jan)	Dutch General Election (15 Mar) Article 50 Triggered In UK (by end of Mar?)	French Presidential Election (23 Apr, 7 May) Iranian Presidential Election (19 May)	France, Legislative Elections (11-18 Jun)	Indian Presidential Election (TBC, by 25 Jul) Thailand, General Election TBC	Spain, Possible Independence Referendum in Catalonia (Sep) German Federal Election (Aug 27-Oct 22, TBC)	19th National Congress of the Communist Party of China Thai General Election, TBC	
2018	Mar	Apr-May	Spring	July	Sep	Oct	Nov	Dec	Other snap elections or referendums?
	Russian Presidential Election (TBC)	Italy, General Election (no later than 23 May)	Hungary, Parliamentary Election (in or before Spring)	Mexico, General Election (TBC)	Sweden, General Election (9 Sep)	Brazil, First Round of General Election (7 Oct)	U.S. Mid-Term Elections (6 Nov)	Japan, General Election (on or before 13 Dec)	

- Possible early elections in Italy and the UK in 1H 2017

Source: IFES, European Commission, The National Democratic Institute, Citi Research

The U.S. election outcome has a broader political read-across

Beyond America: 2017 Features a Constellation of Key European Elections

In our view, the U.S. election outcome also has a broader political read-across. Anti-establishment movements and parties will likely be encouraged (and it will be harder to be confident about measuring their support, following the diminished credibility of election polling), presenting downside risks to the global economic outlook. Beyond the U.S. presidential election, and partly following encouraging statements from Trump's inner circle about European "alt-right" counterparts, investors should brace themselves for new AE political risk.

Following the Brexit vote and the rise of Trump, AE politics are having an EM moment. *Vox Populi* risk, a concept we first formulated in 2012 following the wave of protests, coups, and the rise of non-mainstream political parties, has now become a global phenomenon.

In a related trend, YouGov⁵ in recent European survey research, has identified high levels of Authoritarian Populism, a set of beliefs that includes hostility to human rights, the EU, and immigration, coupled with a strong foreign policy stance. Authoritarian Populism levels in France and Holland, two countries with elections due in 2017, rank third- and fourth-highest respectively of 12 countries surveyed.

Notably, support for Authoritarian Populism in Germany is the second-lowest surveyed, underscoring the low support for non-mainstream, especially far-right parties in that country, a factor that bolsters our longstanding view that Angela Merkel, who has recently announced her bid for a fourth term as Chancellor, is likely to buck the broader anti-establishment, anti-incumbent trend and win.

According to the IMF's recently published World Economic Outlook,⁶ AE political risk has become the single biggest threat to global growth. The increase in AE political risk is a marked reversal to previous decades, and a trend that we expect to weigh on politics, the economy, and markets for the next decade and beyond. Thus far, while we have seen few non-mainstream parties gain full political power, their influence has had a considerable impact on the policy debate, and many mainstream parties have adopted slightly sanitized versions of their proposals and policies as their own.

As a case in point, Britain's UK Independence Party (UKIP) may have won only a single seat in the 2015 UK election, but the pressure they exerted resulted in their core policy – an In/Out EU referendum – being adopted by the Conservative Party, and eventually resulting in a pro-Brexit vote in the referendum. A number of factors may converge to prevent a National Front (FN) victory in France, such as the history of left and right voting strategically in the second round of French presidential and regional elections to keep out the FN in the past. But it is not clear that these longstanding political taboos will endure indefinitely. Whether the 'Trump Effect' emboldens or chastens FN supporters will be difficult to predict with confidence. Trump-style tactics could backfire in other environments.

Figure 13. Rising Numbers of Europeans Espouse Authoritarian Populist Views

Country	Authoritarian Populists (AP) Total, %
Romania	82
Poland	78
France	63
Holland	55
Finland	50
Denmark	49
Britain	48
Italy	47
Sweden	35
Spain	33
Germany	18
Lithuania	0

Source: YouGov/Buzzfeed, Citi Research

Note: To identify the Authoritarian Populist groupings Exploratory Factor Analysis was used on a series of variables associated with the theoretical foundations of Authoritarian Populism (anti-human rights, anti-EU, anti-immigrant, pro-strong foreign policy) with an alpha scale check that gives you a reliability coefficient.

⁵ YouGov/Buzzfeed, Revealed: Nearly Half the Adults in Britain and Europe Hold Extremist Views, 7 October 2016.

⁶ IMF World Economic Outlook, October 2016
<http://www.imf.org/external/pubs/ft/weo/2016/02>

Geopolitical Risks, Great Power Sclerosis and Frenemies

The U.S. served as the guarantor of stability around the globe after the Cold War

During the Cold War, and for the most part after it ended, the United States served as the direct and indirect guarantor of stability around the globe through diplomatic activism backed up by unrivaled military power. Its national interests were globally defined, and by protecting them, it supported and promoted the interests of many other nations that shared the U.S. commitment to regional stability, free markets, open trade routes, and unfettered access to global commodity markets.

But over the past decade there has been a weakening of the U.S.'s position in global affairs

This power structure changed significantly over at least the past decade. The U.S. position in global affairs has weakened while other powers have become stronger. Inward-looking, isolationist leanings gained political traction in America's political mainstream before the rise of President-elect Donald Trump. The threshold of what constitutes U.S. national interest has narrowed markedly in comparison to previous decades. As we noted in 2016 in our Global Political Risks GPS report ([see here](#)), international relations are now characterized by a "Great Power Sclerosis" and a more tenuous "Frenemies" phenomenon between major players. This is a situation in which Pax Americana has not been effectively supplanted by another system of global order, but in which the U.S. ability to resolve crisis, foster compromise, discipline rogue players, and defuse regional and local conflict is greatly diminished.

Expect the new U.S. administration to change from normative and strategic U.S. engagement to a more personalized style

We expect another feature of Mr. Trump's presidency will be a change from the current normative and strategic U.S. engagement to a more personalized style with less importance placed on longstanding alliances. Initial signs suggest that not only President Putin but other world leaders may welcome the change to a U.S. relationship based more on personal dynamics than on principles such as commitment to democracy and human rights. Tensions between China and Japan, the Philippines under President Rodrigo Duterte, and North Korea are all potential sources of geopolitical risk, and could test Trump's support for the U.S.-security umbrella in Asia. Note that President Duterte of the Philippines has stated that he can get along with Trump as he has not 'meddled' in human rights issues.⁷ Beyond international relations, other "rogue" and/or non-state actors could seek to exploit the change in U.S. engagement with the world.

The U.S.-China relationship – arguably the most important bi-lateral relationship in the world and one that has remained broadly professional and stable over the past decade – also faces uncertainty. To what extent President-elect Trump will follow through on his campaign promises, such as to name China a currency manipulator or reverse the breakthrough Paris climate-change deal is yet to be seen. Among the year's other important political transitions will be that of the Chinese Communist Party leadership taking place in the autumn of 2017, which will include a reshuffle within the Politburo Standing Committee, with up to 5 of its 7 members retiring.

Relations between Washington and key allies in the Middle East will also be in flux. Some of the region's leaders are likely to welcome the probable shift away from normative U.S. leadership to having greater emphasis on personal relationships, despite the Trump campaign's stridently anti-Muslim rhetoric and vow to deport Muslims from the U.S. The likely reduction in the significant foreign security assistance that many countries in the region benefit from could cause greater instability, for example, for countries such as Egypt and Jordan.

⁷ International Business Times, Duterte says he can get along with Trump because he has not 'meddled' in human rights issues, 16 November 2016.

The future of the Iran nuclear deal could be one of the greatest political risks from the U.S. regime change

The future of the Iran nuclear deal is potentially one of the greatest geopolitical risks impacted by the regime change in Washington. Trump and other figures advising on security and defense have been intensely critical of the Iran deal; should additional sanctions be re-imposed, the risk that Iran revives its nuclear program will grow, and the longstanding risk of an attack on Iran's nuclear facilities will be revived.

With regard to the conflict in Syria, Trump has stated that he supports the Russian position on Syria, including support for President Assad – a reversal of U.S. and EU policy. Even if joint U.S.-Russia action is able to further reverse the territorial gains of the Islamic State, the underlying reasons for its rise will remain, while the continuation of President Assad in power in Syria does not suggest that the refugee crisis that last summer sparked significant EU political risks, will be resolved soon.

How a potentially closer U.S.-Russia alliance would impact current sanctions against Russia is an additional wild card; following attacks against civilians in Aleppo, Russia has come under renewed scrutiny by Europe, increasing our expectation that EU sanctions, expiring at the end of January 2017, would be extended by at least another year. If Washington were to go its own way and soften or even reverse these, it would be a major blow to Western cooperation on security and defense matters.

One of the traditional U.S. allies that Trump and key influencers on security matters during his campaign appear to continue to support is Israel; meanwhile NATO allies will be feeling less secure given the President-elect's varying comments on commitment to the North Atlantic Alliance – and could move to increase their defense commitments and outlays, and pursue alternatives or complements to NATO such as a European Defense Force.

Europe in the Cross Hairs?

Europe is the most exposed to many of the risk themes we've highlighted

Europe is perhaps most exposed to the confluence of key risk themes we identified; both AE political risk amid a concentration of elections, and the potential fallout from shifts in traditional security relations, plus a potentially more emboldened Russia and China. Eastern and Southeastern Europe continues to have a security vacuum due to a reduced U.S. footprint, which Europeans are unwilling or unable to fill through their own increased investments in diplomatic and military capabilities. It is likely that we will see even less American involvement in the region under President Trump. To what extent President-elect Trump will support the U.S. partnership with Ukraine or continued sanctions against Russia is unclear.

If it is likely that there will be a softening of the sanctions regime, Putin could become more emboldened in the region, and NATO could be tested. It is unlikely that we will see direct military confrontation, but information warfare, including cyber-warfare, will be a key tool of the Russian government in upcoming EU elections following the evidence of interference of the U.S. election.⁸ Such dynamics reduce the likelihood that EU sanctions on Russia will be lifted soon. Other key risks include what the 'Trump Effect' will be on German and French elections, especially the latter, and how this will affect Hard Brexit risk.

Low Trust in Institutions Key Driver of Political Risk

Low trust in institutions and elites has linked AE and EM political risks

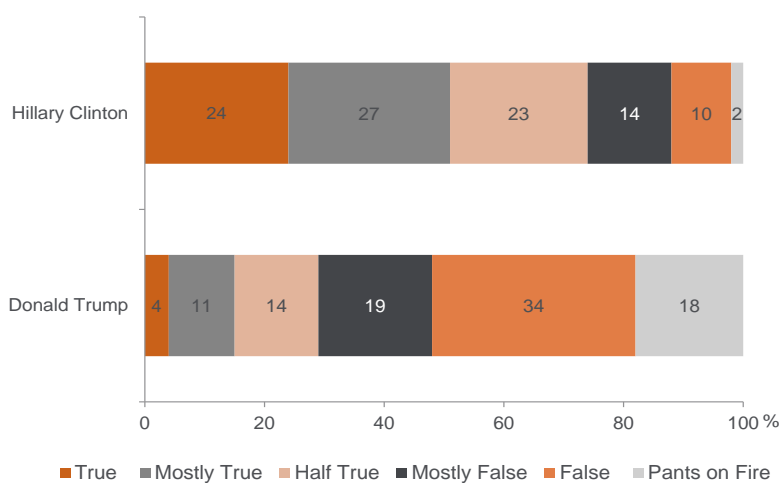
What links the new AE political risk with its EM cousin is low trust in institutions and elites: political, business, "experts", as well as the media. It is trust, plus belief in the future – not growth alone – that immunizes the body politic against the populist virus.

⁸ The Atlantic Council, Dinu Patriciu Eurasia Center, The Kremlin's Trojan Horses.

We reviewed recent data from the Edelman Trust Barometer,⁹ which measures the level of trust in the institutions of business, government, media, and non-governmental organizations (NGOs) across a range of countries and observed that the overall level of trust is actually currently higher in EMs compared to AEs, a remarkable reversal over the past 20 years. There is also a higher gap in the level of trust between the “informed public”¹⁰ and the “mass population”¹¹ in AEs. Interestingly in light of Brexit and the result of the U.S. election, the U.S. and the UK have the greatest gap in trust between the elite and mass population. While the average gap in trust in the institutions of business, NGOs, government and the media is 12 points worldwide, it is 19 points in the U.S. and 17 points in the UK. Historically, low-trust societies have been fertile ground for conspiracy theories as well revolutions in the most extreme cases. Perhaps the AE version happens in a more orderly fashion politically, but with greater economic and market impact.

The collapse of trust is also evident in the high proportion of “pants on fire” lies Politifact tracked during the U.S. campaign. If everything is bogus, then anything goes. It is perhaps not surprising that the Oxford English Dictionary’s word of the year for 2016 was “post-truth”.

Figure 14. Fact Checkers Suggest that Politicians Don’t Always Tell the Truth



Source: Politifact (accessed 28 October 2016), Citi Research

Additional “soft drivers” of de-globalization such as identity and cultural change, as well as technological advances, serve as multipliers for social dislocation and unease, with the pace of change regarded as “too fast” by a majority according to the Edelman Trust Barometer.¹² Additionally, information warfare in the guise of the weaponization of Soviet-era “kompromat” (compromising material) via the modern transmission mechanism of Wikileaks also is alleged to be a factor in the U.S. elections. Given the importance of Germany for Europe, could Germany see its elections similarly disrupted?

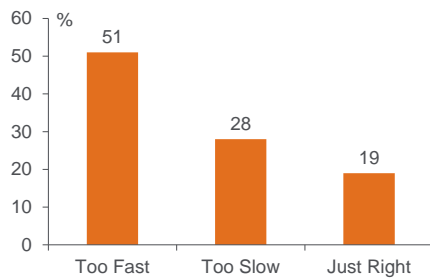
⁹ Edelman Trust Barometer 2016: <http://www.edelman.com/insights/intellectual-property/2016-edelman-trust-barometer/>

¹⁰ Those with at least a college education, who are very engaged in media, and have an income in the top 25 percent.

¹¹ The “mass population” is the remaining 85 percent of the sample.

¹² Edelman Trust Barometer 2015: <http://www.edelman.com/insights/intellectual-property/2015-edelman-trust-barometer/>

Figure 15. Stop the World, I Want to Get Off?
“The Pace of Change is...”



Source: The Edelman Trust Barometer 2015, Citi Research

The old correlations between growth, approval ratings, and election outcomes have broken down, and the line between so-called Advanced and Emerging Market politics may have disappeared along with it. The new AE normal looks a lot like the EM old normal, but with higher stakes for the global economy and business environment. We are also facing the highest risk in a decade of Great-Power trade war, regional tests of security arrangements, and risk of the continued rise of non-mainstream political actors.

Inflation

Is Advanced Economy Low-inflation Ending?

Ebrahim Rahbari

Global Economist

Cesar Rojas

Global Economics Team

We expect AE headline consumer price index (CPI) inflation to rise from 0.8% in 2016 (the third-lowest annual rate since 1970) to 2.0% in 2017, the highest rate since 2012. Much of the increase should take place between now (1.1% YoY in November 2016) and the spring (2% YoY expected in the first quarter of 2017).

Many of the drivers of this uptick are likely to be temporary: statistical base effects, rising commodity prices, and fading external drags (including from prior currency appreciations). But others may be more durable: AE GDP growth (at 1.5-2.0%) probably exceeds AE potential growth, output gaps are no longer large across most AEs, and fiscal policy is loosening across AEs.

Core AE inflation remains low...

For now, core AE inflation remains quite low, in our view, and disinflationary forces remain quite powerful in a number of AEs (notably Japan and the Eurozone). Inflation expectations are quite low. Meanwhile in the U.S. – the main driver of the pick-up in AE inflation rates – dollar strength will probably cap inflation in 2017.

...but it is probably not longer falling

However, core inflation is probably no longer falling and indeed there are some upside risks to AE inflation. These include potentially significant increases in commodity prices (notably for oil), a faster-than-expected pickup in wage growth (in the U.S.), larger-than-expected fiscal expansion in AEs and perhaps a stagflationary impact of trade disruptions and anti-immigration policies.

Stable/rising inflation is reducing the pressure on AE central banks to ease policy further. Yet, after years of inflation undershoots, low inflation expectations and few options to ease further, and a publically-expressed willingness by some key central bankers to tolerate temporary overshooting of the inflation target, we suspect that central banks will be cautious to remove accommodation, as long as inflation remains moderate.

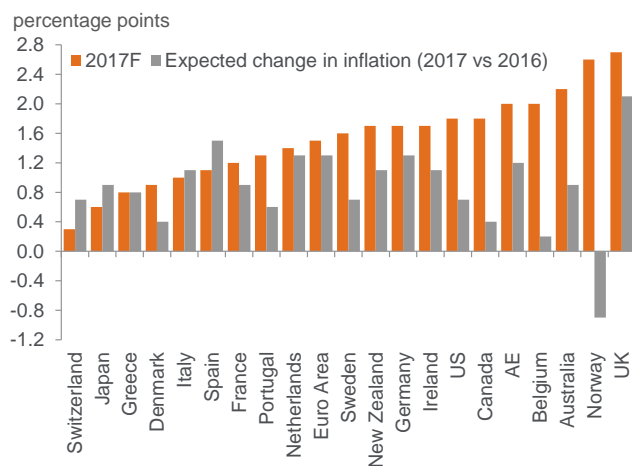
Increase in AE CPI inflation is broad-based...

The increase in AE CPI inflation is broad-based across countries. We expect inflation rising in all AEs we track except Norway (see Figure 16). 2017 inflation is likely to be highest in the UK (at 2.7% from 0.6% in 2016 due to sterling weakness), the U.S. (2.7% from 1.3% for the CPI and 1.8% from 1.1% for the PCE), Norway (2.6% from 3.5% in 2016), Australia (2.2% from 1.3% in 2016), and Canada (1.8% from 1.4% in 2016). We expect CPI inflation to pick up significantly, too, in the euro area (from 0.2% to 1.5%) and Japan (from -0.3% to 0.6%).

...and could be close to or above long-term averages for many economies in 2017

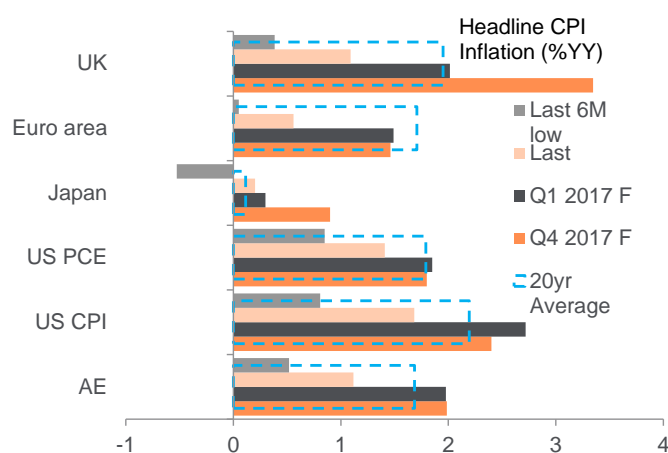
These forecasts imply that AE inflation would be close to or above long-term (1995-2015) averages for many economies in 2017 (see Figure 17), including the U.S. (for both CPI and PCE), Japan, Canada, Germany, Belgium, Sweden and the UK (but not in the euro area, Australia or New Zealand, for instance). By contrast, inflation in 2016 was below its long-term average in all major AEs except Norway.

Figure 16. Selected Countries – Citi's Forecast of Level and Change in Headline CPI Inflation (pp), 2017F



Source: National Statistical Offices, Citi Research

Figure 17. Selected Countries – Headline CPI Inflation (% YoY), 2016-2017F



AE inflation is the GDP-weighted average, at market exchange rate, of headline CPI inflation (% YoY) rates for the U.S., Japan, euro area, Canada, Denmark, Australia, new Zealand, Norway, Sweden, Switzerland and the UK.

Source: National Statistical Offices, Citi Research

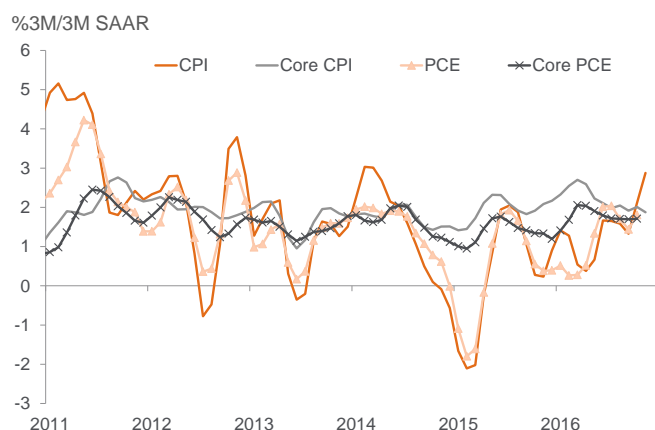
AE Inflation Pick Up is due Mostly to Temporary Factors

- **Base effects:**¹³ Of the roughly 1 percentage point increase in AE headline year-over-year CPI inflation we expect by the first quarter of 2017, more than half is due to statistical base effects, as month-on-month inflation rates were very low in early 2016 (Figure 21). Japan would have large positive base effects in March/April, the euro area in January/February, and the U.S. personal consumption expenditure (PCE) index in December 2016 and February (with a negative base effect in April).

Sequential measures of AE inflation have been quite stable ex-U.S. However, in the U.S., 3 month-on-3 month (3M/3M) CPI inflation stood at an annualized rate of 2.9% in November (Figure 18), the highest rate since March of 2014 and also lifting the advanced economy headline rate (Figure 20) (the quarter-on-quarter annualized PCE inflation rate was 1.8% in October).

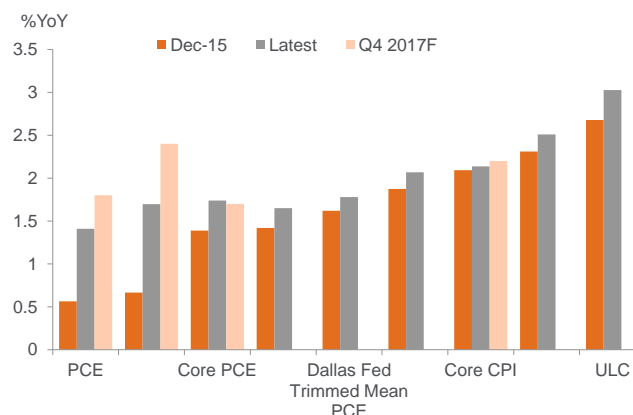
¹³ We define base effects here as the deviation of % MoM inflation one before from its long-term trend. The 6mo change in headline inflation without base effects is calculated as the 6mo change of % YoY inflation excluding the cumulative 6mo base effects.

Figure 18. U.S. – CPI and PCE Inflation (% QoQ SAAR), 2011-2016



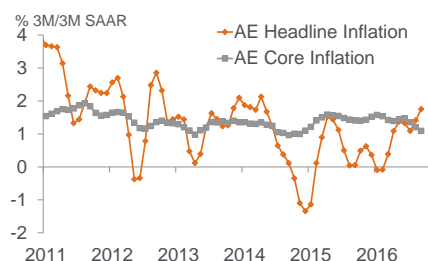
Source: BEA, BLS, Citi Research

Figure 19. U.S. – Measures of Inflation (% YoY), 2015-2017F



Note: Latest is October for all measures by CPI (November) and ULC (3Q).
Source: FRB of Cleveland, FRB of Dallas, FRB of San Francisco, BEA, BLS, Citi Research

Figure 20. AE – Headline and Core CPI Inflation (% QoQ SAAR), 2011-2016

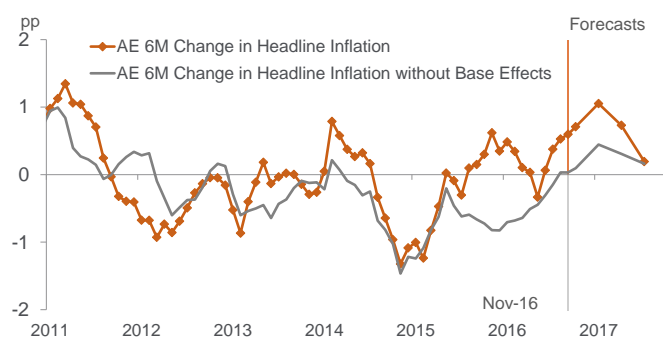


Source: National Statistical Office, IMF, Citi Research

■ **Rising commodity prices.** Oil prices bottomed in early 2016 and year-over-year changes in oil prices are now turning positive and will be quite high in 2017 (around 30% year-over-year in the first quarter according to both futures and the forecasts of our Commodities team). In early 2016, year-over-year changes in commodity prices (notably energy) were deeply negative (Figure 22).

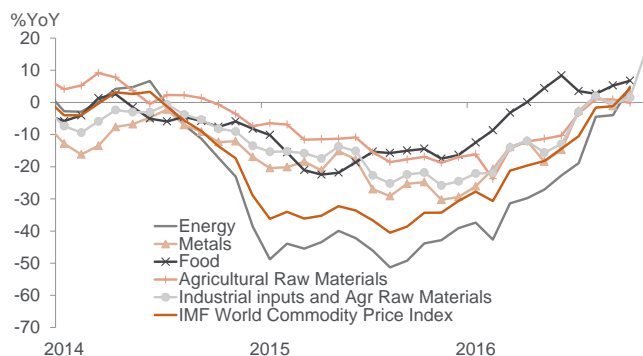
AE core (ex-food and energy) inflation has been fairly stable, at 1.4% year-over-year in November after locally peaking at 1.6% in February 2016. On a 3M/3M measure, core inflation was only 1.1% annualized in November, down from 1.6% in March (Figure 20). Recently, core inflation has only picked up in the UK among the major AEs (due to the weak sterling). It trod water in the U.S. and fell in the Eurozone, Japan, Canada, Denmark, and Norway.

Figure 21. AE – 6 Month Change in Headline CPI Inflation With and Without Base Effects (pp), 2011-2017



Note: See footnote 3 for a description of how base effects are calculated.
Source: National Statistical Offices, Citi Research

Figure 22. IMF World Commodity Price Index (% YoY), 2014-2016



Source: IMF, Citi Research

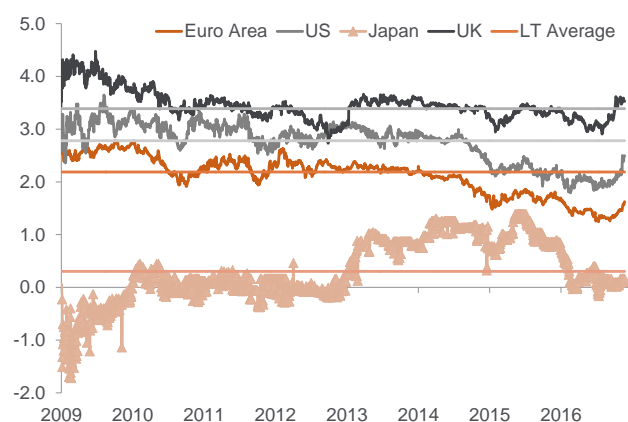
■ **Fading external drags.** Global disinflationary pressures have eased somewhat, as EM growth bottomed (with Brazil, Russia, etc. coming out of recession), rising inflation (CPI and producer price index) in China, and fading effects of earlier AE (mainly dollar) currency appreciation (the average AEs trade-weighted exchange rate had been quite stable until recently over the last year or so).

Disinflationary Forces Remain Quite Powerful

- **Inflation expectations remain low despite the recent pick up.** We think that the recent pickup in inflation expectations mainly reflects a correction for somewhat excessive deflation/disinflationary expectations. Most measures of AE inflation expectations (both market-based and survey-based) remain relatively low (Figure 23 and Figure 24).
- **Second-round effects of low-inflation linger.** The BoJ recently noted the effect of actual/recent inflation in affecting inflation expectations, while there is at least anecdotal evidence of second-round effects of low recent inflation on low wage demands by trade unions in Germany and Japan. We suspect that low inflation expectations will remain a major headwind for AE inflation.
- **External drags on AE inflation may return.** Excess capacity remains ample across many sectors. EM weakness could return in the context of dollar strength and rising long-term interest rates. One open question is whether there could be an asymmetry in that dollar strength would push down inflation in the U.S., while currency depreciation may only have a modest upward effect on inflation in the Eurozone or Japan.

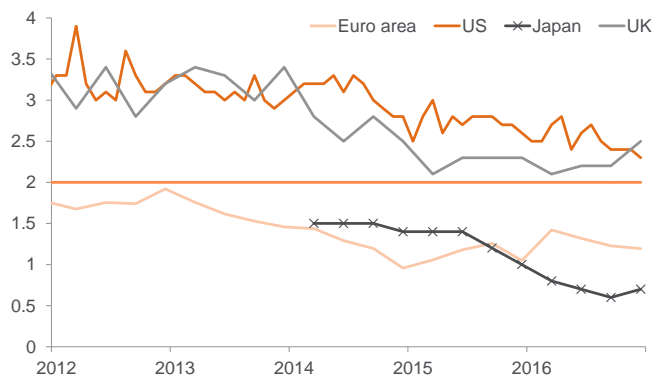
AE inflation has routinely undershot most forecasts in recent years, even as advanced economy unemployment has also come in lower-than-expected.

Figure 23. Selected Countries – 5yr/5yr Market-Based Inflation Expectations (%), 2010-2016



Source: Bloomberg, Citi Research

Figure 24. Selected Countries – Survey-Based 12mo-Ahead Inflation Expectations (%), 2012-2016



Source: University of Michigan, BoE/TNS, ECD, BoJ, Citi Research

There are Some Upside Risks for Inflation

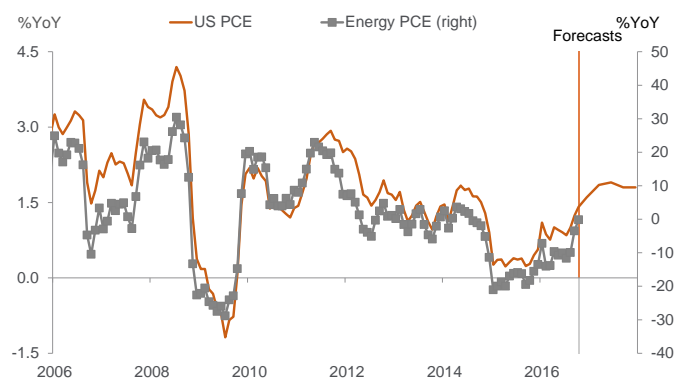
- **Commodity prices.** Commodity prices, and energy prices in particular, can at times account for much of the higher-frequency volatility in headline inflation (Figure 25), even though energy only accounts for a relatively modest share of the CPI basket across most advanced economies (usually around 5-10%).

Meanwhile, the headline CPI inflation forecasts of most central banks (including the U.S. Federal Reserve and the European Central Bank) and of most of our AE teams are based on energy futures, suggesting some upside risks to headline inflation if our colleagues' forecasts are otherwise correct.

A rough estimate of the potential impact of a 25% upside surprise in oil prices on headline CPI inflation can be computed by multiplying it with the estimated pass-through to energy CPI of a change in oil prices (~30% within six months to a year) and the share of energy in the CPI basket (5-10%), suggesting 0.3-0.5 percentage point of upside risk at the end of 2017.

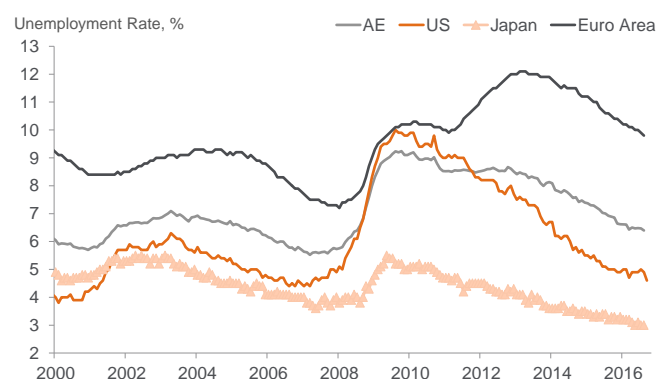
Even though the effects of commodity prices on inflation should be temporary (i.e., price level shocks), there could also be some second-round effects (including through affecting inflation expectations).

Figure 25. U.S. – PCE Inflation (% YoY) and Energy PCE (% YoY), 2013-2017F



Source: IMF, Citi Research

Figure 26. Selected Countries – Unemployment Rate (%), 2000-2016



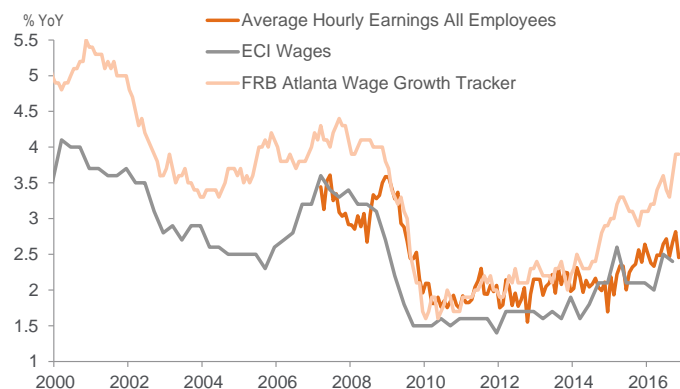
Source: National Statistical Offices, Citi Research

- **Upside risks to nominal and real wage growth.** In a range of advanced economies (including the U.S., the UK, Japan, and others), unemployment is now close to some or most of the estimated natural rates of unemployment. The average AE unemployment rate reached 6.4% in October 2016, the lowest rate since September 2008, and we expect a further decline to around 6% by the fourth quarter of 2017, including further reductions in the euro area, Australia, the U.S., and Japan (Figure 27).

Overall, there are few signs of nominal wage growth picking up across AEs. However, in the U.S., there are perhaps some incipient signs of wage pressure according to some measures (Figure 28). In November, the Atlanta Wage growth tracker stood at 3.9% year-over year (+0.8 percentage points year-to-date), its highest level since November 2008, average hourly earnings grew at 2.5% year-over-year (-0.2 percentage points year-to-date) the employment cost index's (ECI) salary and wages series grew at 2.4% year-over year in the third quarter (+0.3 percentage points year-to-date). We do not want to overstate the significance of these wage growth developments quite yet, and, at least in the U.S., these may be moderated by increases in labor force participation. But anecdotal mentions of labor shortages and rising labor costs are accumulating (e.g. in the Beige Book and National Federation of Independent Business (NFIB) surveys).

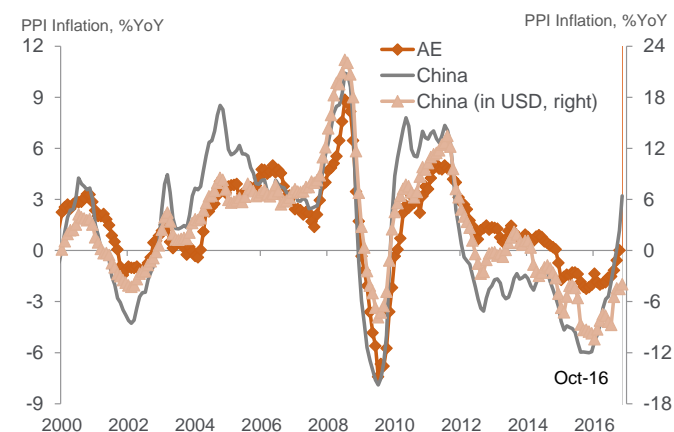
- Meanwhile, more expansionary fiscal policy in AEs could reinforce wage pressures (notably in the U.S., where a sizable fiscal stimulus is likely to hit in 2018 or even late 2017 when slack is relatively low), while potential trade disruptions and/or anti-immigration policies could potentially exert some stagflationary impact (even though we do not expect major trade disruptions in our base case).

Figure 27. U.S. – Average Hourly Earnings, ECI Wages, and FRB Atlanta Wage Growth Tracker (% YoY), 2010-2016



Source: FRB Atlanta, BLS, Citi Research

Figure 28. AE – PPI Inflation (% YoY) and China PPI Inflation (% YoY CNY and USD), 2011-2016



Source: IMF, National Statistical Offices, NBS, Citi Research

There Seems to be Some Inflation in the PPI Pipeline

PPI tends to lead CPI inflation — AE PPI seems to be stabilizing after continuous negative prints since December 2014

AE producer price index (PPI) inflation is gradually picking up. PPI inflation often (but not always) tends to lead CPI inflation. AE PPI year-over-year inflation was almost zero in October 2016, after continuous negative prints since December 2014. The rolling three month seasonally adjusted annual rate picked up to 1.2% in October from 1% in September, as PPI inflation rose in the U.S. (0.7% from 0.3%), Sweden (7% from 5.3%), and the UK (to 4%), while it turned less negative in Japan (-1.6% from -3%). In contrast, PPI moderated in the euro area, Norway, Canada, and Switzerland.

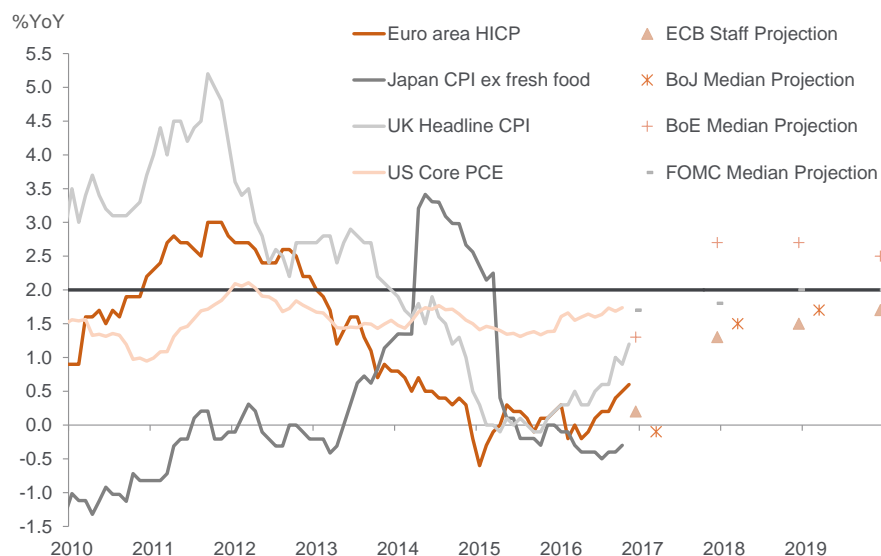
China PPI exceeded CPI in November for the first time in five years

PPI inflation in China is positive and rising. At 3.3% year-over-year in November, Chinese PPI inflation was higher than CPI inflation (2.3% year-over-year) for the first time in five years. On a rolling three month seasonally adjusted annual rate basis, PPI inflation was 6.6% in October (up from 3.6% in September), the highest rate since April 2011. In AEs and in China, commodity prices are a major driver of the uptick in PPI inflation, while in China the RMB depreciation over the last year also plays a big role.

Monetary Policy Will Reach Cautiously to Rising Inflation

With inflation no longer falling, pressure on AE central banks to ease monetary policy further has been reduced

For now, we expect the impact of these inflation developments on AE monetary policy to be somewhat limited. Clearly, the fact that inflation is no longer falling is reducing the pressure on AE central banks to ease policy further. In 2016, inflation was below 2% in all major AEs but Norway, and in 2017— even with the increase we expect — we only see inflation back to target in Australia and above target in the UK. In the fourth quarter of 2017, we forecast headline CPI inflation at 2.4% year-over-year in the U.S. (PCE at 1.8%YoY), 0.9% year-over-year in Japan, 1.4% year-over-year in the euro area, and 3.3% year-over-year in the UK.

Figure 29. CPI Inflation (% YoY) and Central Bank Median Inflation Projections, 2010-2019F

Note: Fiscal year for Japan, year average for euro Area
 Source: BoJ, ECB, FOMC, BoE, Citi Research

Despite signs of inflation upticks, we suspect central banks will be cautious to remove accommodation

Yet, after years of inflation undershoots, low inflation expectations and few options to ease further, and some suggestions of a willingness by some central bankers to tolerate temporary overshooting of the inflation target, we suspect that central banks will be cautious to remove accommodation, as long as inflation remains moderate.

Emerging Markets

Can EM Survive “Trumponomics”?

David Lubin

Head of Emerging Markets Economics

Michel Nies

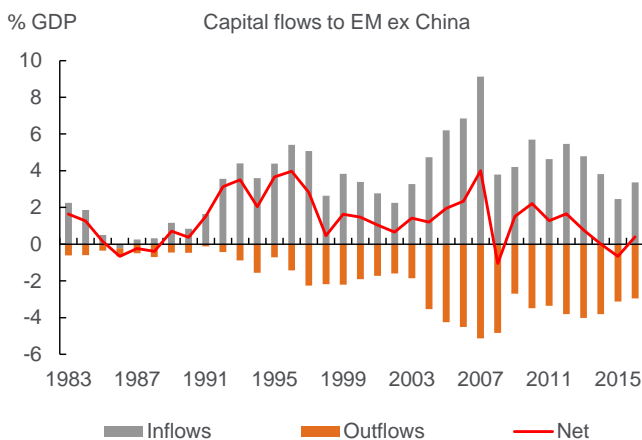
Emerging Markets Economics Team

Uncertainty of the U.S. policy mix under President-elect Trump is huge

‘Trumponomics’ causes two kinds of uncertainty for emerging economies. The first has to do with the mix of U.S. fiscal and monetary policies that it entails. And the second has to do with the potential for ‘de-globalizing’ trade and investment policies under a Trump administration. In this section, we seek to analyze the effects of each type of uncertainty on EM. The conclusion is not especially optimistic. A strong dollar is not associated with generous flows of capital to EM. And we find few countries that are structurally insulated from the consequences of ‘de-globalizing’ policies. Finally, we express some concern about countries – especially in South America – whose ‘liberal’ policy frameworks will only bear fruit on the assumption that capital flows to emerging economies will regain some of the strength that has been lost in recent years.

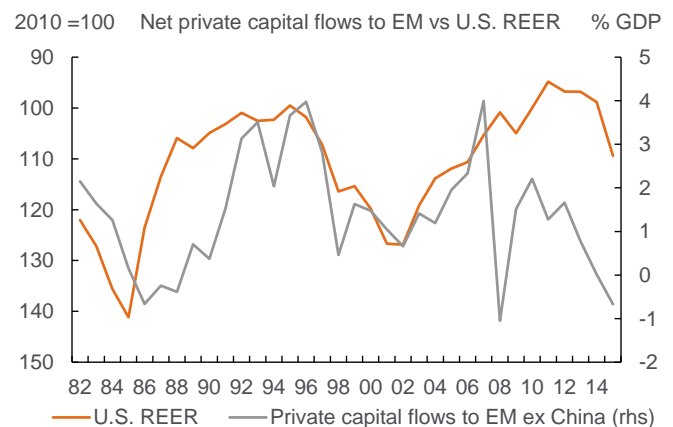
There is still huge uncertainty about what policy mix we can expect from a Trump administration. Two questions are relevant above all: (1) how much fiscal loosening will there be?; (2) will fiscal loosening invite more monetary tightening than is currently priced in? Answering the first question is difficult because it is unclear whether fiscal conservatives in the U.S. Congress will tolerate a substantial fiscal loosening which combines both tax cuts and increased infrastructure spending; and it is also difficult because the possible repatriation of corporate liquidity held offshore could lead to an increase of U.S. tax revenues that might cause negative fiscal impulse next year.¹⁴ Answering the second question is also difficult, based on the uncertainty surrounding the first question.

Figure 30. Net Private Capital Flows to EM are Already Extremely Low...



Source: IIF, Citi Research

Figure 31. ...and Net Flows to EM have Tended not to be Strong During Periods of Dollar Appreciation



Source: Haver Analytics, IIF, Citi Research

A looser fiscal-plus-tighter money policy by the U.S. would be risk for EM capital...but EM is more resilient than in the past

If the U.S. policy mix during a Trump administration can be described as looser-fiscal-plus-tighter-money, that will be a reason to be nervous about capital flows to emerging markets. The last time the U.S. policy mix was decisively loose-fiscal-tight-money was during the early 1980s, when the dollar surged and capital was sucked out of emerging economies with devastating effects. Of course, the magnitude of the monetary tightening in the U.S. during the Volcker crunch, with the Federal Funds Target rate moving from 9% to 19% in the space of a year (July

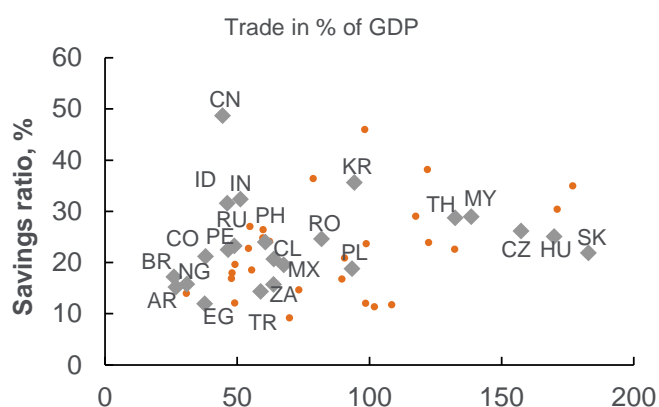
¹⁴ [US Economics Weekly – “Trumponomic” Forecasting — Policies and Prospects](#)

1980-July 1981), was many multiples larger than the largest conceivable policy rate increase during 2017 and 2018. We are not at all arguing that emerging markets have anything like the kind of vulnerability that it had during the early 1980s, when Latin America slipped into its 'lost decade'. To the contrary, we have argued that the progressive 'de-risking' of emerging markets in the past three years has left it with more financial resilience than at any time in recent memory.¹⁵ But there are two things to note. The first is that capital flows are already exceptionally weak in historical terms. Figure 30 shows that the 2014-16 period has seen less availability of external financing for emerging markets than in any period since the 1980s. (Indeed, one of main reasons why emerging markets have gone through this 'de-risking' process is precisely in response to the growing lack of availability of capital flows.) And second, an appreciation of the U.S. dollar should make investors nervous about the scale of capital flows to emerging markets. What we're used to seeing is that a strong dollar is associated with capital flowing out of emerging markets (Figure 31).

U.S. dollar appreciation could raise the change that China's capital account becomes a source of risk aversion for EM

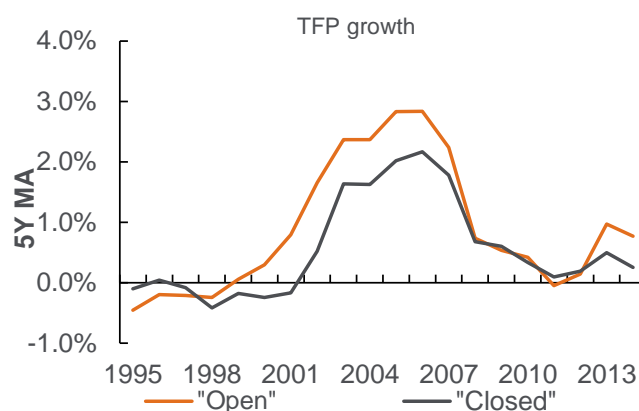
The risk of dollar appreciation could also re-trigger the 'negative feedback loop' that connected U.S. monetary policy with China's capital account in 2015. Two episodes during 2015 — in July/August and in December — saw sharp increases in net capital outflows from China which, in both cases, were provoked by expectations of imminent monetary tightening in the U.S. By contrast, 2016 has been remarkably free of concerns about the risk of large net capital outflows from China. Yet we do not believe that those concerns have disappeared for good. An important reason why China's capital account seemed so 'well-behaved' this year was precisely the fact that U.S. monetary policy was much looser than had been expected at the start of the year, with the result that the dollar stayed relatively weak. That dollar weakness helped to keep Chinese capital at home — supported of course by a stimulus-driven improvement in Chinese macro data, and an intensification of Chinese efforts to restrict capital outflows. Our concern is that a renewed period of dollar appreciation could raise the chance that China's capital account again becomes a source of risk aversion in emerging markets.

Figure 32. Relatively Closed Economies with Relatively High Savings Ratios are Likely to be Best Insulated from 'De-Globalization'



Source: Haver Analytics, Citi Research

Figure 33. More Open Economies have Enjoyed Faster Rates of Growth and Total Factor Productivity During the Era of Globalization



Source: Penn World Tables 9.0, World Bank, IMF, Haver Analytics, Citi Research

¹⁵ [EM Economics View — 'No pain, no gain'? Not in EM, it seems.](#)

'De-globalization policy actions by the U.S. will increase the risk premia to EM

A more structural concern for EM would be U.S. policies that aim to restrict the free movement of goods, people and capital. "Emerging markets" is an asset class whose growth has coincided with an era of globalization. Indeed, it is relatively straightforward to argue that EM only has significance as an investment theme as long as globalization remains intact. That's because the increase in economic integration which has characterized the past 30 years has disproportionately benefited the relatively small, relatively open economies that populate EM. The prospect of a process of 'de-globalization' spearheaded by U.S. policy actions will continue to add risk-premium to emerging markets for as long as there is a prospect or evidence of trade conflict, the closing of physical borders, or the squeezing of global capital mobility in an effort to bring manufacturing jobs back to the U.S.

Countries wanting to insulate themselves from a Trump-led process of de-globalization will need to satisfy a number of conditions.¹⁶ In principle, the countries that are likely to be least affected by U.S. policies that inhibit international integration will be countries that have:

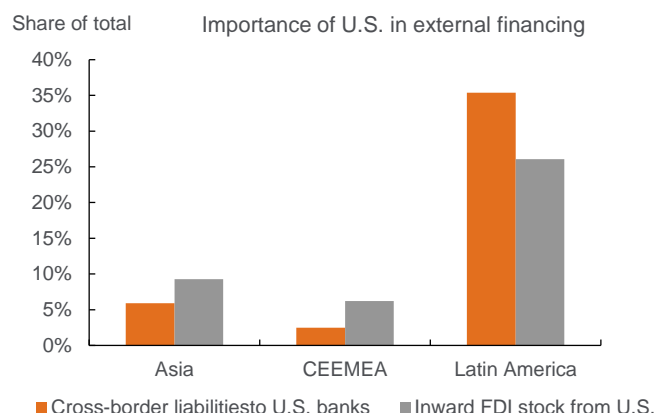
- **Economies with relatively high savings ratios relative to their investment ratios.** Countries with low savings ratios are, by definition, likely to depend on external financing in order to grow. If U.S. policies restrict capital flows, either because of the U.S. macro policy mix or because of explicit efforts to repatriate U.S. capital, then it will be countries with low savings ratios whose growth rates will be most threatened.
- **Relatively closed economies.** The more open a country is, the more it is likely to have benefited from international integration. If we define an 'open' economy as one in which either the trade share of GDP has exceeded 90% in the past 15 years, or in which the trade share has risen by 20 percentage points in the past 15 years, it is possible to conclude that openness has been good for growth during a period of globalization.¹⁷ Countries that meet these criteria have, on average, grown 0.5 percentage points faster during the past 25 years. It is also clear that 'open' economies have enjoyed faster rates of growth of total factor productivity (Figure 4). As a corollary to all this, therefore, the countries that will be best 'protected' from de-globalization will be relatively closed rather than relatively open.
- **Economies not dependent on the U.S. as a source of external financing.** While this may be an unnecessarily cautious point, an extreme scenario in which U.S. capital is given incentives to return to the U.S. would create a disproportionate burden for Latin America (Figure 5).
- **Economies with relatively strong net international investment positions, unburdened by large net U.S. dollar liabilities.** Market participants had plenty of occasions to start worrying in 2014 and 2015 about the build-up of dollar-denominated liabilities in EM. Those worries eased in 2016 against the background of a weaker dollar, but should be expected to resume in the scenario that 'Trumponomics' strengthens the dollar, either because of loose-fiscal-tight-money policy mix, or because of the repatriation of U.S. corporate liquidity held offshore.

¹⁶ See Appendix to this note.

¹⁷ One area of controversy in this respect are countries like Brazil and Argentina, which on a trade measure appear to be closed. Yet we think it is worth considering these economies more open than they appear: the fact that they have low savings ratios means that their economic performance is more closely aligned with the global economic environment than their trade share would suggest.

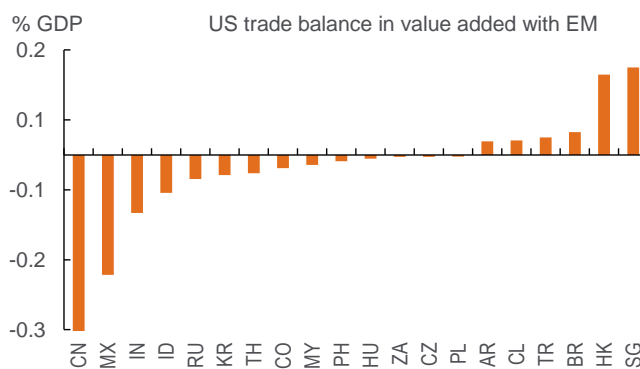
- **Economies not at risk of obvious trade conflict with the U.S.** A simple proxy for countries most at risk of trade conflict with the U.S. are those running the largest bilateral surpluses. All in all, there are few obvious countries within EM who are not at risk in some form or other from the consequences of 'Trumponomics'.

Figure 34. If Financial or Real Capital gets Pulled back to the U.S. Under the Guise of 'Economic Nationalism', LatAm Stands to Lose the Most



Source: BIS, IMF, Haver Analytics, Citi Research

Figure 35. ...While Mexico, China, and Korea are Vulnerable if bilateral Trade Surpluses with the U.S. are any Guide to Possible Trade Conflict



Source: IMF, World Bank, Haver Analytics, Citi Research

India and Indonesia seem relatively insulated from EM vulnerabilities spelled out above

Few countries have none of these possible vulnerabilities, but India and Indonesia seem to be relatively insulated. India alone – with a large, relatively closed economy characterized by a high savings ratio, relatively little external dependence and not obviously a candidate for trade conflict with the U.S. (though it does have a trade surplus with the U.S.) – seems best protected. Similarly, Indonesia, another large, relatively closed economy with a high savings ratio and moderate dependence on non-foreign direct investment, or non-FDI, external financing (given its rather low current account deficit) also strikes us as relatively insulated.

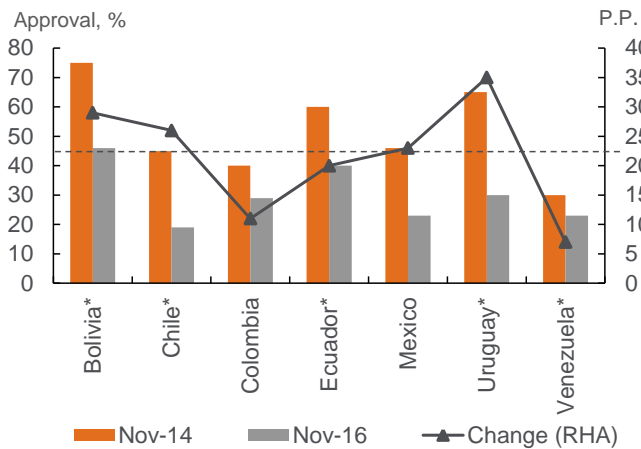
Two experiments are happening in EM — economic liberalism and economic nationalism

What we've outlined so far are the structural features of an economy that are likely to do relatively well in a de-globalizing economic environment. But policies are also important. What's interesting in EM these days is that there seem to be economic experiments taking place at the extreme ends of the policy spectrum. At one end is the 'economic liberalism' of new governments in Argentina, Peru, and Brazil (possibly to be followed next year by Ecuador and Chile). These newly-arrived governments contain a high proportion of conventionally U.S.-trained economists from elite universities, who make a virtue of their highly orthodox approach to policymaking. At the other end of the spectrum is an 'economic nationalism' that can be identified with policymaking in Russia, Hungary, and Poland. These governments more or less explicitly eschew orthodox policymaking, and are seeking to adopt an economic framework that is more self-reliant, less integrated with international capital markets, and heavier on state intervention than their predecessors during the past 25 years. Which of these policy frameworks is more likely to succeed in a world that can be described as 'de-globalizing'?

The 'liberal' economic experiments in South America aim to create a virtuous circle of stable public finances, net capital inflows, and GDP growth. Each government in Argentina, Brazil, and Peru is committed to fiscal consolidation but the objective is not to implement a brutal fiscal adjustment. Instead, these governments are aiming

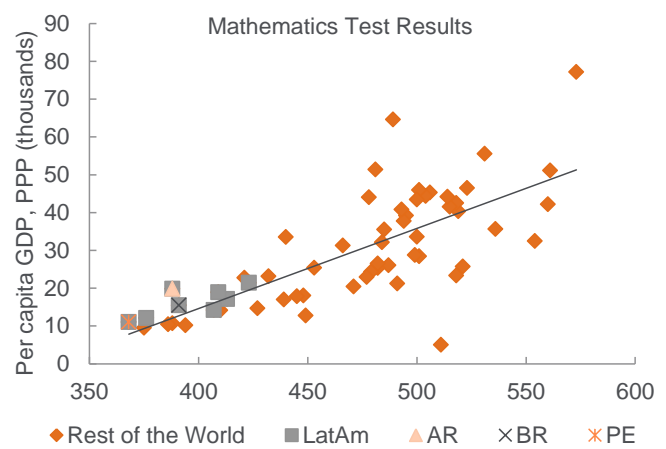
for what one economist has described as ‘intelligent austerity’,¹⁸ a policy that recognizes both the political constraints which prevent an excessively hawkish fiscal policy, and which also aims to improve the productivity of public spending by focusing on areas like education and infrastructure. The overall aim of the fiscal strategy, however, is to engage international capital markets in order to ensure a flow of resources necessary for economic growth.

Figure 36. Latin Policymakers Must Tread Carefully, Either Because They are Losing Popularity, or were Elected with Thin Majorities...



Source: Asociación de Comunicación Política, Citi Research

Figure 37. ...and Might Find it Difficult to Implement Politics (such as Investing In Education) that Might Raise Potential Output



Note: Argentina (AR), Brazil (BR), Peru (PE)

Source: IMF, OECD, Citi Research

Economic liberalism faces three main obstacles: fragile political consensus, implementation of intelligent changes in spending and optimism about global capital flows

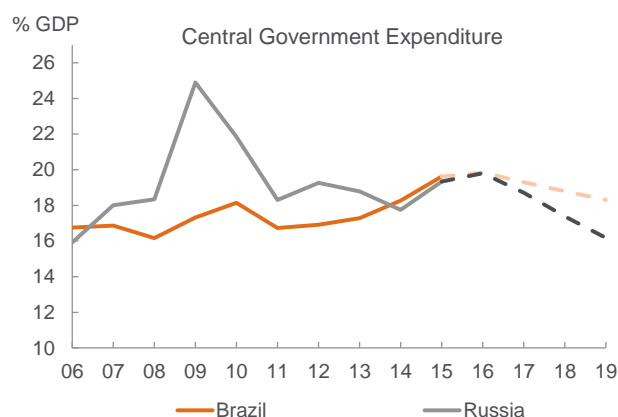
“Economic liberalism” faces three obstacles. The first is the fragile political consensus that prevails in Latin America these days. The current administrations in Argentina and Peru won elections on the thinnest of majorities, and the Brazilian government is faced with a very delicate political balance in the aftermath of the country’s corruption scandals. So, tolerance for fiscal consolidation might be limited if there is no quick evidence of economic recovery or a sustained net inflow of foreign capital. The second obstacle is that we have yet to see if governments in the region really will implement the kind of ‘intelligent’ change in spending priorities that can improve potential output. And finally, success for these countries requires a kind of optimism about global capital flows. The policies that these governments are implementing aim to catalyze net private capital inflows by convincing market participants that each government’s commitment to fiscal consolidation is rock-solid. The idea is that as capital inflows rise, growth improves and the fiscal constraints become more manageable: a virtuous circle is created. It would be easier to have confidence in this virtuous circle if the outlook for capital flows to EM was rosier. But as we argued above, we think it is difficult to be confident about the outlook for net capital flows, particularly to Latin America. So it might be ‘economic nationalism’ that proves the more durable experiment.

¹⁸ See Ernesto Talvi’s piece in Project Syndicate, <http://www.project-syndicate.org/commentary/latin-america-political-economic-history-by-ernesto-talvi-2016-10?referrer=/1QAZ62hZbr>

Economic nationalism aims to limit a country's dependence on foreign capital

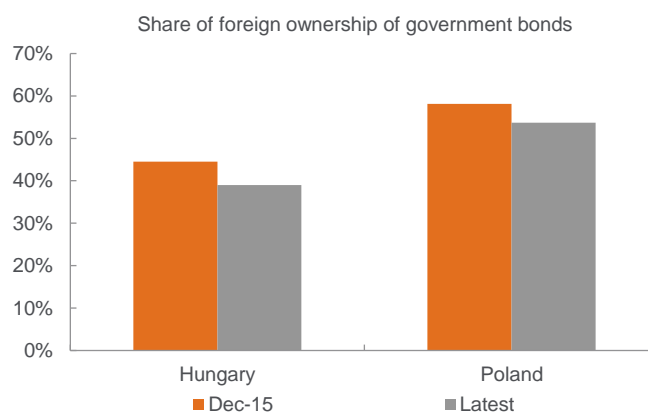
"Economic nationalism" is different from populism, as it is a defensive strategy, not an aggressive one. Populism is a 'no holds barred' strategy, a pursuit of growth and income redistribution without concern for fiscal or foreign exchange constraints.¹⁹ Its historical record is not encouraging, having failed repeatedly in Latin America. By contrast, 'economic nationalism' (or 'economic patriotism' in the words of Hungary's prime minister) is a more careful strategy whose aim is to limit a country's dependence on foreign capital. In that sense it is somehow related to a 'mercantilistic' or autarkic policy.

Figure 38. Russia Aims to Freeze Nominal Public Spending, While Brazil Aims to Freeze Real Spending, as it Seeks to Limit External Dependence.... (Central Government Expenditure)



Source: National authorities, Citi Research

Figure 39. ...While Both Hungary and Poland have Implemented Policies Which have led to a Decline in Foreign Ownership of Their Bonds



Source: National Authorities, Citi Research

In Russia, economic nationalism is leading to the pursuance of a very tight macroeconomic stance

Russian economic policy is the most obviously 'nationalistic'. We think Russia's macroeconomic framework is aimed at maintaining a state of affairs in which the economy is kept free from dependence on external financing. This is not primarily a reaction to the international sanctions Russia faces. Rather, it is a reaction both to the legacy of Russia's 1998 financial crisis, and a requirement of the Kremlin in its desire for self-determination.²⁰ What this means in operational terms is that aggregate spending has to stay lower than aggregate income. Following this rule means that Russia is able to sustain its current account surplus, and this is a necessary condition for the economy to avoid a state of dependence on international capital markets. This leads Russia towards pursuing a very tight macroeconomic stance. Fiscal policy is exceptionally restrictive. While the Brazilian government aims to freeze public spending in real terms, the Russian government aims to freeze it in nominal terms.

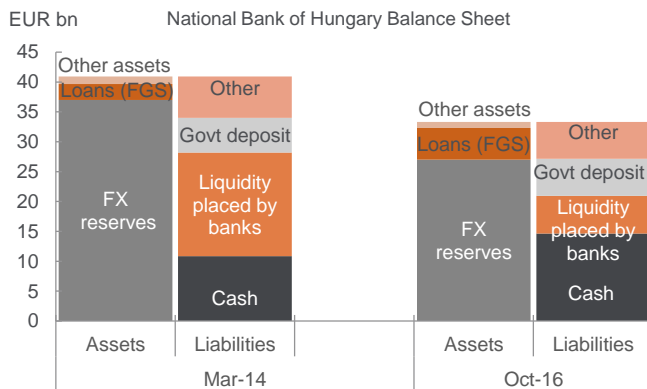
¹⁹ See Dornbusch and Edwards, 'The Macroeconomics of Populism in Latin America', <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.353.648&rep=rep1&type=pdf>

²⁰ "We must above all understand that our development depends primarily on us. We will only succeed if we work towards our own well-being and prosperity, rather than hope for favorable circumstances or foreign markets". President Putin, 2014, quoted in 'Russia's Sovereign Globalisation: Rise, Fall and Future', Nigel Gould-Davies, Chatham House Research Paper, January 2016.

Hungary and Poland have also adopted the theme of freedom from dependence on global markets

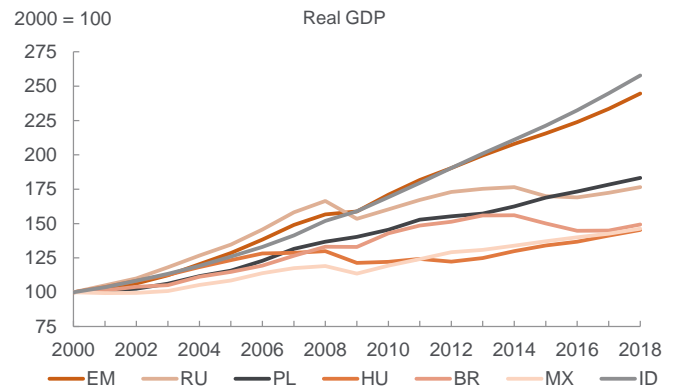
Freedom from dependence on global markets has also become a theme of policymaking in Hungary, and in Poland too. Policies to increase national ownership in finance, retail, energy and media are evident in both countries, with the explicit aim of limiting external dependence. As Poland's deputy prime minister put it in earlier this year: 'We have reached the trap of dependent development. To a huge extent we are dependent on foreigners' (Financial Times, 9 June). This kind of nationalism has encouraged the Hungarian government to pursue an aggressive strategy of repaying its external debt (or what it calls 'self-financing'). This strategy has relied on government efforts to increase the holdings of its debt by domestic banks and retail investors (who now own some 15% of Hungary's public debt). The liquidity created by these holdings increased the government's deposits at the central bank which were then exchanged for the bank's foreign exchange reserves to repay sovereign external debt, which has fallen from EUR33 billion in early 2014 to EUR22 billion now.

Figure 40. Hungarian 'Monetary Nationalism' has Mobilized Resources in an Effort to Repay External Debt by Drawing Down Reserves



Source: Hungarian National Bank, Citi Research

Figure 41. Economic Nationalism is Unlikely to Produce Impressive Growth Outcomes Unless Accompanied by Aggressive Structural Reform



Note: Emerging Markets (EM), Russia (RU), Poland (PL), Hungary (HU), Brazil (BR), Mexico (MX), Indonesia (ID)
Source: Citi Research

Growth outlooks under economic nationalism could be weak

"Economic nationalism" might be a safer policy than the liberal alternative if capital flows are likely to stay weak, but the growth outlook will not be strong. As mentioned above, the essence of a liberal approach to economic policy is that capital flows and growth are designated to have a virtuous-circle kind of relationship: fiscal consolidation aims to crowd in capital flows and allow the economy to be financed. But if capital flows to EM will be weakened by 'Trumponomics' – either because the U.S. policy mix is hostile, or because de-globalization takes several steps forward – the liberal strategy might not generate the pay-off of capital inflows that it needs to sustain itself. The nationalist approach, by contrast, will look best in a world where capital inflows are scarce, because the strategy is designed to operate in a way that minimizes dependence on those inflows. But the nationalist approach, by limiting international economic integration, is unlikely to be good news for growth. Either way then, our relative pessimism around the EM growth outlook is sustained. While we expect EM GDP growth to accelerate a bit next year – from 3.8% to 4.3% – half of this is simply due to the fact that Russia and Brazil will be easing out of their recession. But the risks are probably to the downside.

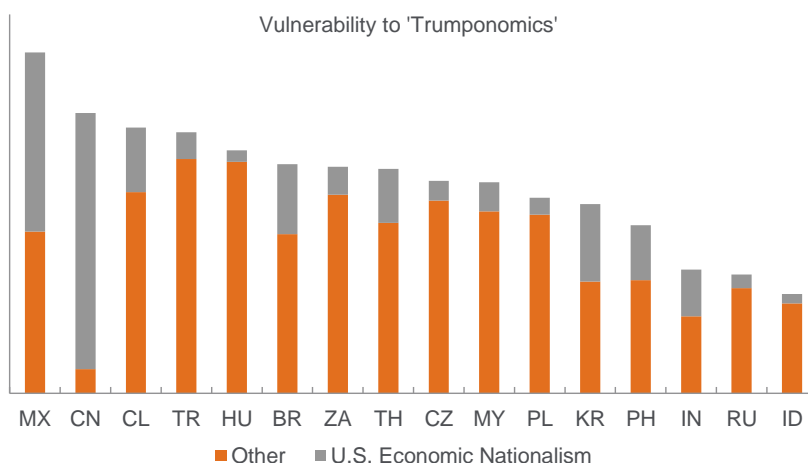
The scale of vulnerability to 'Trumponomics' across EM varies greatly

Annex: Measuring EM's vulnerability to 'Trumponomics'

We believe that EM's vulnerability to 'Trumponomics' will be determined by their savings ratios, their degree of economic openness, their net dollar liabilities, their reliance on the U.S. for external finance and investment and their likelihood to become a target for protectionist measures by the incoming U.S. administration. The scale of these vulnerabilities – and, hence, exposure to 'Trumponomics' - varies a lot across EM. The potential impact of future U.S. policies on EM is hard to quantify, partly because of the lack of precedent in recent decades, but mostly due to the large uncertainties about what policies the new administration will finally implement.

Although the impact of 'Trumponomics' might be difficult to estimate, we think that it is possible to show the relative vulnerability among major emerging markets. We therefore developed a simple scoring model that assesses economies' exposure to possibly detrimental U.S. policies based on a number of indicators. These indicators can be broadly grouped in two categories: general vulnerability to unfavorable external conditions and vulnerability from potential economic nationalism in the U.S. under the incoming administration. The former is based on an economy's savings ratio (average 2013-2015) and trade share in GDP (average 2013-2015) as well as the ratio of dollar liabilities to foreign exchange reserves. The latter is calculated using an economy's reliance on the U.S. for external financing and investment, estimated from outstanding liabilities to U.S. based banks and the inward FDI stock originated from the U.S., and the likelihood to be targeted by protectionist measures from the incoming administration. This last variable is based on the trade balance in value added with the U.S., which is calculated by combining the share of value added in gross bilateral trade (computed by the OECD, 2011 data) with gross bilateral trade data from the IMF. Both the trade balance and the inward stock of FDI are adjusted for the importance of the manufacturing sector; we believe that nationalist economic policies of the incoming administration would mostly aim at shielding U.S. manufacturers from competition and repatriate parts of global value chains. All indicators are then rescaled such that the country with the highest vulnerability in a variable is attributed the value 1 and the country with the lowest vulnerability the value 0. The final indicator is a weighted average of the different rescaled variables. The weights used were allocated according to our subjective judgment.

Figure 42. Latin America Most Exposed to U.S. While Displays High General Vulnerability



Note: Mexico (MX) Canada (CN), Turkey (TR), Hungary (HU), Brazil (BR), South Africa (ZA), Thailand (TH), Czech Republic (CZ), Malaysia (MY), Poland (PL), Korea (KR), Philippines (PH), India (IN), Russia (RU), Indonesia (ID)
Source: IMF, World Bank, BIS, OECD, Citi Research

To not much of a surprise, our results show that Mexico is likely to be the most vulnerable to 'Trumponomics'. This is largely caused by important exposures to the U.S., which buys more than 70% Mexican exports and holds almost 50% of the country's inward FDI stock. Also other Latin American countries figure in the upper third of the ranking due to the economic importance of their northern neighbor.

However, the country with the largest U.S.-specific exposure is China. Although China does not depend too much on the U.S. for external financing, the large U.S. trade deficit (mostly in manufactured goods) with China, specifically mentioned by the President-elect, will make it the prime target for protectionist measures. Its general vulnerability on the other hand is the lowest in the sample, due to the economy's exceptionally high savings rate, relatively low degree of openness and vast amount of foreign exchange reserves.

In CEEMEA, and partly Asia, most countries would be more affected by the indirect effect of U.S. policy — de-globalization and higher EM risk premia — than by the direct effect of economic nationalism in the U.S. This is especially true for the small, open economies in Central Europe, whose exposure is to Europe not the U.S. But also other countries like South Africa, Malaysia or Thailand exhibit an important degree of vulnerability to a less favorable external environment.

India, Russia, and Indonesia might turn out to be the least affected by 'Trumponomics'. These countries benefit from rather high savings ratios (India, Indonesia), low degrees of openness and limited exposure to the U.S. (Russia, Indonesia). As mentioned in the note, at least in the case of Russia, the relatively low vulnerability might be the result of policies with this very target.

Global Asset Allocation

Themes, Risks and Tilts for 2017

Jeremy Hale

Head of Global Macro Strategy Product

Graham S Bishop

Maximillian Moldaschl

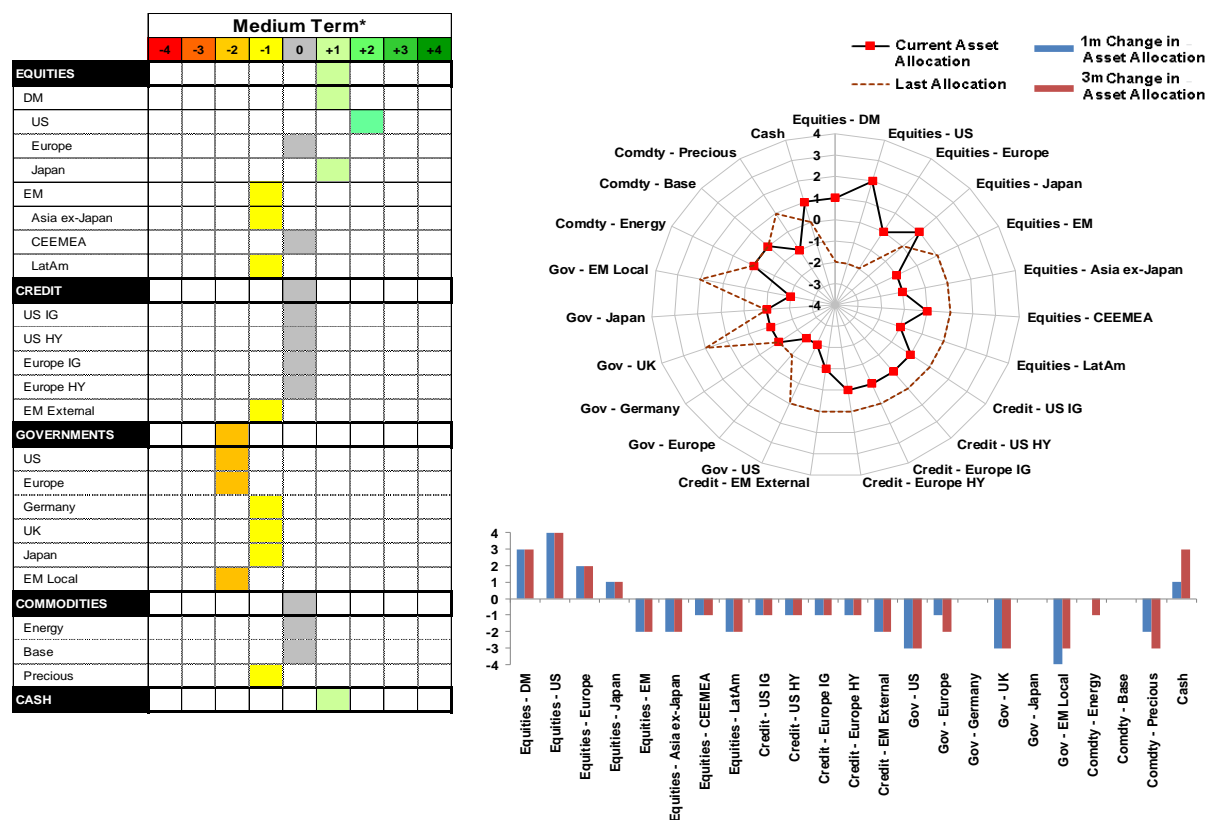
Amir Amin

Global Macro Strategy & Asset Allocation

Team

Post the U.S. election we have switched our base-case almost 180 degrees. Fiscal policy, tax cuts, and infrastructure under Trump could be the game changer that the U.S. and the world needed. We are now slightly overweight in equities as a result, driven by developed market (DM) stocks. On the equity side, we are +2 overweight in U.S. equities and +1 in Japanese stocks, neutral in Europe and underweight in EM, except for CEEMEA, which is neutral. In the government bond space we are now underweight across the board, especially in the U.S., EMU periphery and EM local. In a rising benchmark rate world, credit total returns may be hit even as spreads tighten. As a result credit is a halfway house between equities and government bonds, at neutral. EM external is underweight. In commodities we are neutral overall, with a bias to be positioned more positive on industrials metals versus precious metals. Finally, to balance the portfolio, we are slightly overweight in cash (see Figure 43).

Figure 43. Medium-Term Asset Allocation²¹ & Comparison to Previous Allocations



Allocation measured in units of under/overweight: -4 = Max Underweight; -3 = Very Underweight; -2 = Underweight; -1 = Slightly Underweight; 0 = Neutral; +1 = Slightly Overweight; +2 = Overweight; +3 = Very Overweight; +4 = Max Overweight.

These measures do not formally take into account market capitalization or liquidity. They do not necessarily sum to zero across the allocation. * Assumes a 12-month horizon.

Source: Citi Research

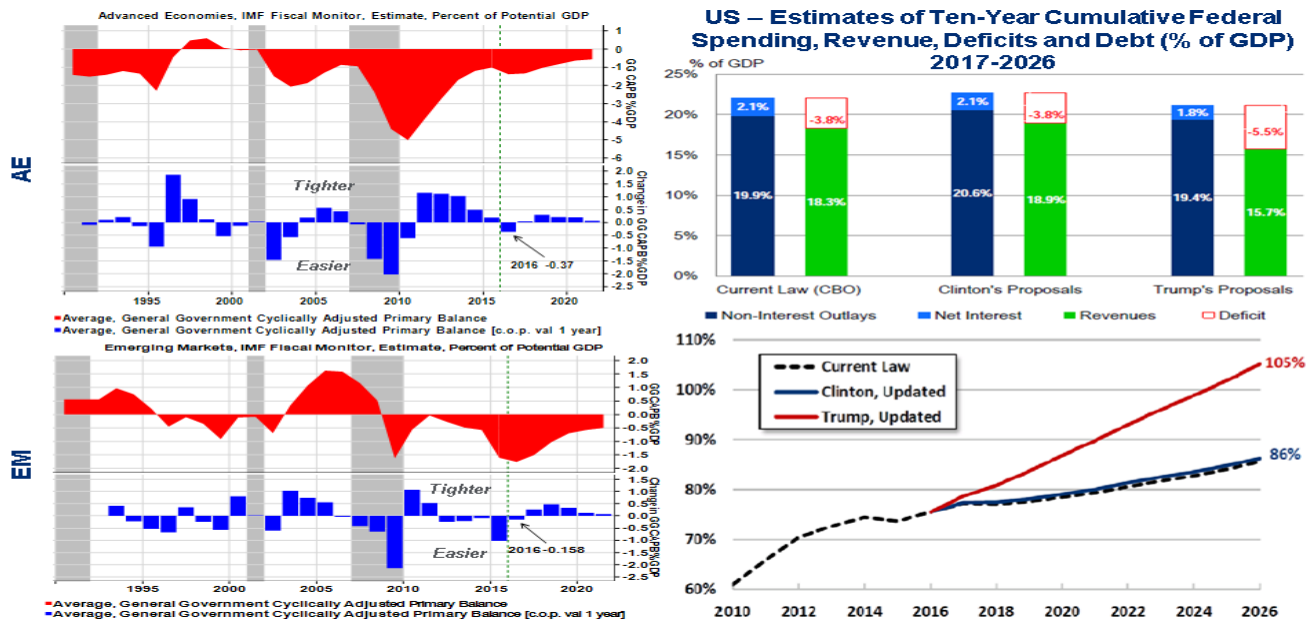
²¹ Our allocation framework deliberately avoids specific allocations of capital budget to individual asset classes and markets since we anticipate that investors will operate under many different benchmark mandates and regulatory regimes. Rather, our framework uses a scaling of -4 through +4 to indicate preferences based on our assessment of likely risk-adjusted returns over the medium-term horizon. We also offer allocations at a relatively macro level of granularity.

Three Themes:

1. Monetary Policy Less Accommodative, Fiscal Turns Expansionary

Even before the U.S. Elections, this shift was underway. EM economies' average fiscal thrust²² turned significantly positive in 2015, by about 1% of GDP, led by China. Although the EM fiscal thrust this year is less supportive, DM policy has taken up the running. DM policy overall in 2016 was expansionary by 0.4% of GDP vs. a contractionary stance averaging around 0.75% of GDP over the prior four years (Figure 44, left hand side). But of course the thrust of U.S. policy is center stage. At this point, it is still partly guesswork and the Trump effect is not included in IMF data in Figure 44, left hand side. On the right side of Figure 44 CRFB estimates show Trump running fiscal deficits of around 1.7 percentage points of GDP more than the likely baseline cumulatively over the next ten years. Behind this fiscal stimulus lie the following Trump "promises" (courtesy Citi U.S. Economics team): corporate income tax cut, individual income tax cut and simplification, infrastructure spending, and corporate profit repatriation.

Figure 44. Fiscal Policy Swings to Expansionary

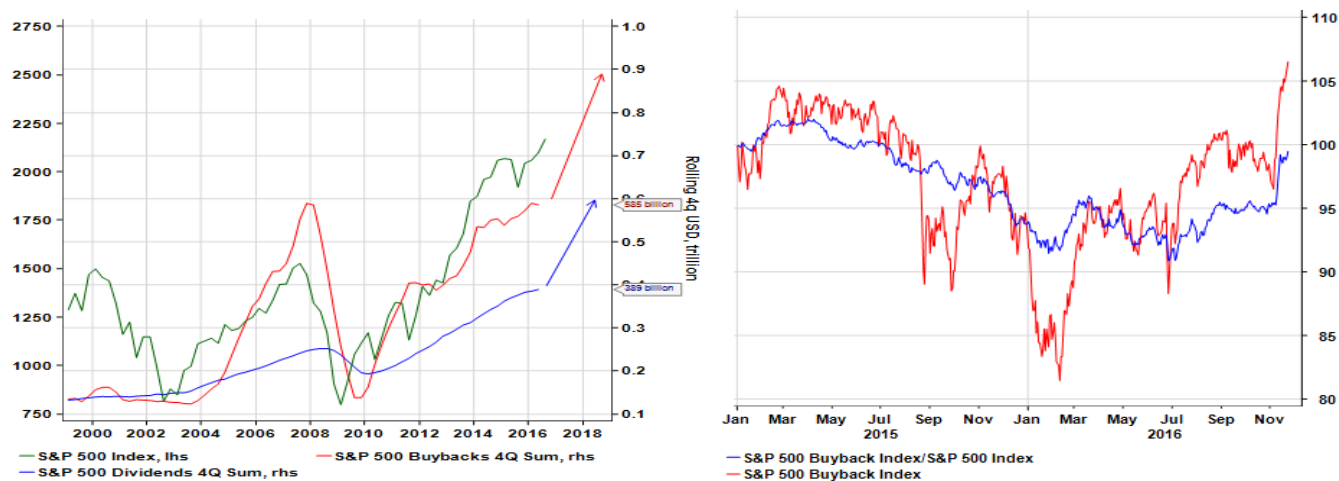


Source: Bloomberg and Citi Research <http://cfrb.org/papers/promises-and-price-tags-preliminary-update>

On corporate profit repatriation, this is a one-time repatriation of corporate profits held abroad at a tax rate of 10 percent. It may actually help capital expenditure spending but more likely provide a huge support to equities via dividends and buybacks. With around \$0.75-1.2 trillion estimated to be held on overseas balance sheets, the corporate inflow, even reduced by a 10% tax, would be about 4-6% of GDP (and of S&P 500 market cap which is roughly the same as nominal GDP). Of this, as a rough intuitive rule of thumb, we feel buybacks may take about 50% with the other half split between additional capital expenditure and dividends. Buybacks over the past year have amounted to about \$585 billion. The Homeland Investment Act (HIA2) may raise buybacks by about 60-90% on a one time basis. Dividends for the S&P 500 over the last year were \$390 billion and could therefore rise one time by 40-70%. See Figure 45.

²² Change in the cyclically adjusted primary general government deficit.

Figure 45. HIA2 Bullish for Buyback and Dividends....And U.S. Stocks?

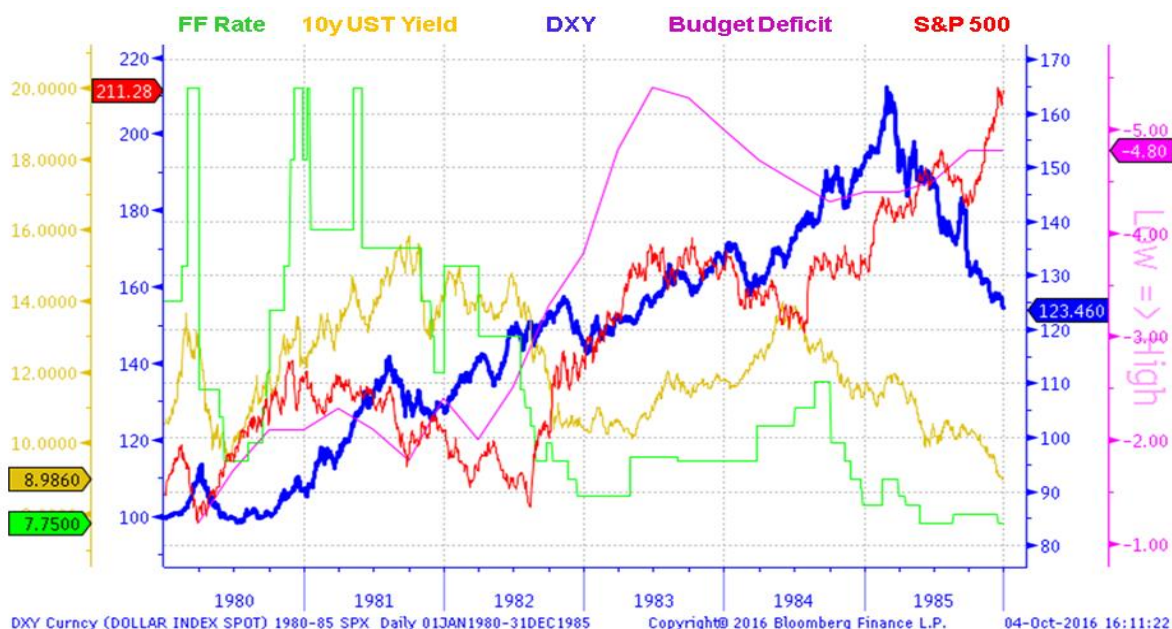


Source: Bloomberg Citi Research

A good template for today's swing to easier fiscal and tighter monetary policy is the 1980-85 Reagan/Volcker experience

Overall, this implies the swing to easier fiscal and tighter monetary policies is underway and extending over time. A good template (though not perfect) is the 1980-85 Reagan / Volcker experience (Figure 46). In October 1980, a somewhat maverick Republican President Ronald Reagan replaced the establishment Democrat. He promised tax reform, tax cuts for households and corporates, and accelerated depreciation allowances for investment. In practice, deficits blew out to over 5.5% of GDP and by a magnitude similar to some estimates of the fiscal costs of President-elect Trump's promises. But way before this happened, bond yields rose sharply and the U.S. dollar rallied in anticipation, helped, of course, by tight money from Fed Chair Volcker's non-borrowed reserve targeting (a kind of inverse quantitative easing, or QE, where reserves are drained and rates find a level). Higher yields and a stronger U.S. dollar form our next two themes.

Figure 46. 1980-85, Reagan and Accidental Keynesianism



Source: Bloomberg and Citi Research

EM asset classes did badly in the 1980s in the context of the LatAm debt crisis (though data limitations mean it's not so easy to show). While a strong U.S. dollar and higher U.S. Treasury yields are not normally good for EM, however, if commodity prices are generally firm and growth stronger (albeit maybe from 2018 onwards) this may not be so bad an environment for EM as some think.

2. The Yield/Rate Cycle Has Turned

Recently higher yields and a stronger U.S. dollar are likely to dampen the U.S. economy some, and this will occur before fiscal stimulus kicks in during 2018, it is possible that current momentum in the economy is both underestimated and a driver of higher yields. Some short-term softening in activity may still generate a slowing in the yield rise, and breakeven levels may also fall back some. But, over time, we are increasingly sure that yields have bottomed. If so, this will have implications for EM local rates, corporate credit and of course foreign exchange.

3. Strong U.S. Dollar (\$)

HIA2 corporate profit repatriation may boost buybacks and dividends as discussed above but will likely also provide significant support to the U.S. dollar. In 2005, the late 2004 HIA Act helped the U.S. dollar appreciate by 15% in the middle of a ten year bear market in the currency. With overseas profits probably four times as large as in 2005, surely the impact will be at least as large even if only 10-20% of these overseas funds are actually in foreign currencies today. But the fiscal and monetary policy mix will also be a significant boost to the U.S. dollar. The fact that stimulus likely only impacts in 2018 is a bit of a red herring as the U.S. dollar in 1980 bottomed out about two years before serious deficit deterioration began.

Four Risks

1. Financial Conditions Index (FCI) Tightening

In all likelihood the thrust of any U.S. fiscal impulse will be a 2018 phenomenon. By implication that means not much happens before then, thus any tightening of financial conditions poses a threat to the economic outlook.

2. Trade Wars

The new Trump administration reportedly wants to address trade policy in the first 100 days, perhaps via the use of executive orders if needs be. How this pans out will surely depend on the common ground between President Trump and the Republican-led Congress.

3. Geopolitics and Real Wars

Geopolitical unrest has always featured on any list pertaining to risks to financial markets. Investors may think a Trump presidency exacerbates those concerns because he drew into doubt U.S.-NATO and other international umbrella commitments.

4. Trump a 'Paper Tiger'

President Trump's effectiveness is far from assured. For one thing, Congress, despite being Republican, may provide a check. So if it turns out that Trump is the new Berlusconi, not the new Thatcher, then financial markets may have jumped the gun.

Three Tilts – Be Tactical

Whilst our asset allocation tilts are our best guess at what 2017 holds, by no means do we expect straight line moves across asset classes the way we have seen in recent session. And the time-inconsistency between fiscal expectations being priced in, actual announcements thereof, and the economic impact on growth and inflation can also not be ignored. All this makes our conviction over a longer time horizon low, and this is reflected in the fairly slim over/underweights relative to neutral in our medium term global asset allocation. Conclusion: be tactical. We explore a few trends below.

1. Reflation Trade

Bonds have broken into a new world – after posting lower highs and lower lows for a long time, the break above 2% on the 10-year U.S. Treasury yield has ended this. The equity counterpart to this reflationary trade is obviously towards stronger stocks for now, especially in the U.S. and especially taking into account likely surging buybacks. Sectorally, cyclicals should outperform defensives in a world of better growth and higher yields. Curve steepening should add an additional boost to Financials, although political risks in Europe cannot be ignored. Within commodities, we see cyclical hard assets like industrial metals to continue to outperform, especially if infrastructure spending occurs, whilst especially gold (little/no industrial uses, highly inversely linked to the U.S. dollar and yields) should underperform.

2. Stronger \$ & Higher Yields: Impact on Other Assets

EM comes to mind, where a tightening FCI/hawkish Fed presents a negative, on top of the FDI flows and de-globalization/trade risks under Trump. We therefore prefer DM to EM assets across the board, with perhaps EM credit most at risk given previous outperformance. But we don't necessarily expect the tight, universally negative correlation between commodities and the U.S. dollar to hold. The observed link is really a by-product of the risk-on/risk-off nature under QE programs post GFC, and historically has been much weaker to even inexistent. Credit is also an interesting asset class in a higher benchmark rate environment. Spreads probably tighten a bit, but counteracting benchmark rates rises might be hard from a total return perspective.

3. Regional and Geopolitical RVs within EM

Russia and China, or more broadly CEEMEA versus Asia, stand out on several considerations, and the valuation backdrop is also supportive across asset classes. China is still potentially in the firing line on tariffs and currency manipulation. Russia could be a beneficiary of glasnost². Valuations for either foreign exchange or equities suggest Russia is more attractive.

Commodities

The New Normal Unfolds

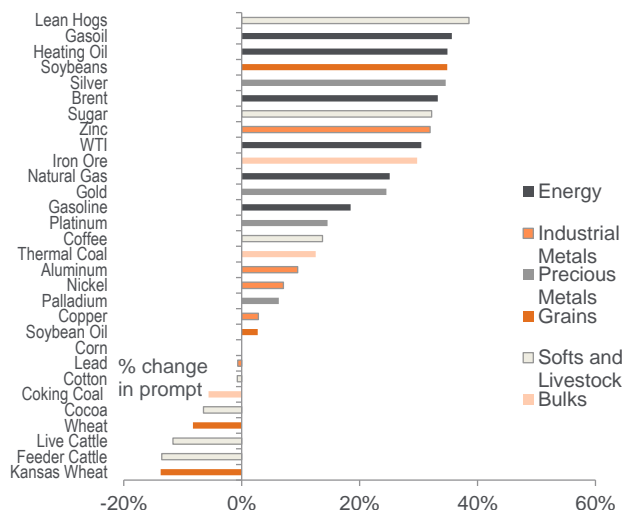
Edward L Morse

Global Head of Commodities Research

Theme #1: Positive outlook for commodities

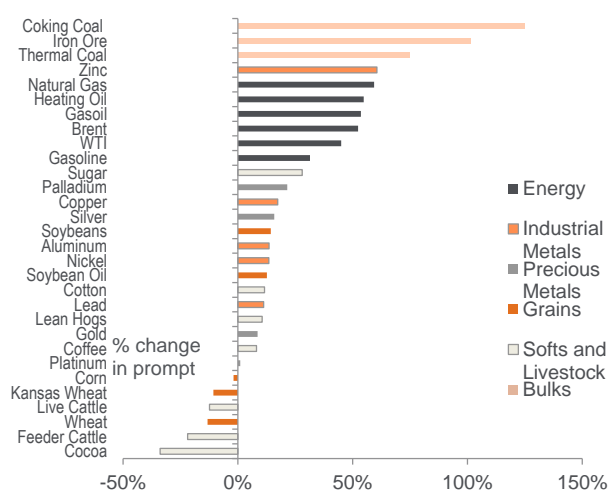
Nearly all commodities ended 2016 in positive territory, yielding tangible investor returns for the first time in six years, and with momentum continuing for even higher returns in 2017 and 2018. This positive outlook for commodities constitutes our first major theme of the coming year. Part of this tightening of the market reflects healthier growth in the global economy with Citi's economists projecting a 2.7% increase in 2017 global GDP versus 2.5% in 2016, which should be accompanied by higher commodity demand growth, all else equal. More important are the increasingly constructive supply versus demand fundamentals in most individual commodities, due to a tailing off of supply growth in oil, natural gas, most industrial metals, and some key agricultural commodities at recent prices. For commodities in general, the oversupply that was induced by high prices in the first decade of this century are finally being balanced. What's more, the cost structures across commodities are reaching the end of a period of persistent and record deflation. With demand for commodities growing, supply will have to come from increasingly expensive sources at the margin, with cost inflation potentially setting in just as commodity prices themselves continue to rise.

Figure 47. Commodities Price Changes 2015



Source: Bloomberg, Citi Research

Figure 48. Commodities Price Changes 2016*



Note: * as of end-December 2016

Source: Bloomberg, Citi Research

Only bearish on a few of the bulk commodities

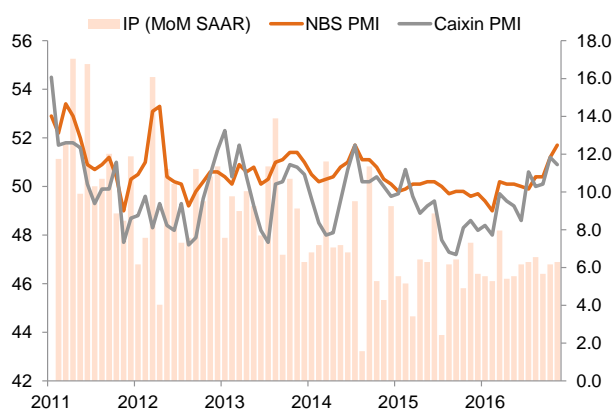
There are only a few major commodity groups for which we are overall bearish — the bulk commodities (thermal and coking coal and iron ore) because their out-performance in 2016 was a fluke and largely a result of domestic policies in China confronting market forces that remain inherently bearish; soybeans because of exceptional weather and exceptional crops, particularly in the U.S. and Brazil; and gold, due to an appreciating U.S. dollar and rising real interest rates outweighing what would otherwise be a more bullish scene given global political and economic uncertainty and the potential for higher inflation.

China Adding Volatility

Theme #2: Enhanced price volatility ahead

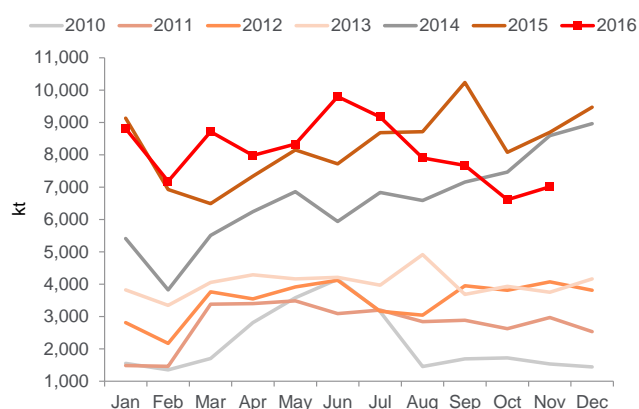
Our second major theme is enhanced price volatility ahead, due in part to the mechanics of markets balancing in fits and starts; but equally important are the growing ways that domestic politics in China are having disruptive impacts on global commodity markets. Price volatility is nearly always enhanced when demand hits supply limits. In today's high-liquidity environment it is further impacted by the volatility of financial flows from one to another investment sector and from fickle markets moving rapidly between bearish and bullish trading flows. But this new set of 'made-in-China' forces differ significantly from the one-way street of the 20 years starting around 1990 when China's growing appetite for raw material imports to feed frenetic fixed asset investment and industrial production made just about any commodity or long-only commodity index investment profitable as Chinese demand and global prices moved in tandem. Now it is the huge growth in liquidity in China's commodity markets in Dalian and Shanghai, which have become the targets of Chinese speculative investment impacting global prices. But even more disruptive have been abrupt changes in Chinese policies that have radically impacted commodity prices in 2016 and are poised to be even more disruptive in 2017.

Figure 49. China Industrial Activity Expected to Maintain Steady Growth in 2017



Source: Citi Research

Figure 50. Chinese Steel Net Exports Continued to Surge in 2016 Despite Anti-Dumping Measures



Source: Citi Research

Including and Beyond China, Physical Trade in Commodities Should Flourish

China should see the trend continuing of transforming the country's huge production capacity into a processing center of finished products across energy (particularly oil) and industrial metals. But other commodity producers, including the U.S., are also seeing a surge in export volumes, and with it, a growth in trade.

Chinese policies should have disruptive impacts globally in 2017

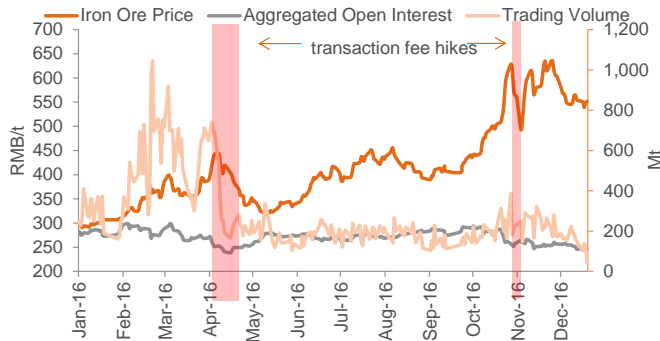
Beyond the impacts of speculation on China's commodity exchanges, domestic policies designed to deal with excess costly production capacity should also have disruptive impacts globally in 2017. This past year saw a clash between government policies and market dynamics having a profound impact on bulk commodity prices. Efforts to reduce excess capacity in steel and in coal mining bred incredible results during 2016. In the physical market, the National Development and Reform Commission's (NDRC) decision on coal supply cuts propelled Newcastle thermal coal prices to nearly double to over \$100/t, and coking coal prices to more than triple to ~\$270/t, just as steel prices were supported by environmental crackdowns and temporary closures. We expect these interventionist policies to continue this

year, with high, excess government stockpiles in cotton, sugar, corn, and soy at risk of sell-offs. Markets ex-China, infused with enormous liquidity, should also see heightened volatility. In oil we can expect price swings of as much as \$20-25 a barrel to become part of the new norm. The pace at which China fills its oil storage facilities matters too.

Theme #3: Positive outlook for commodities trade

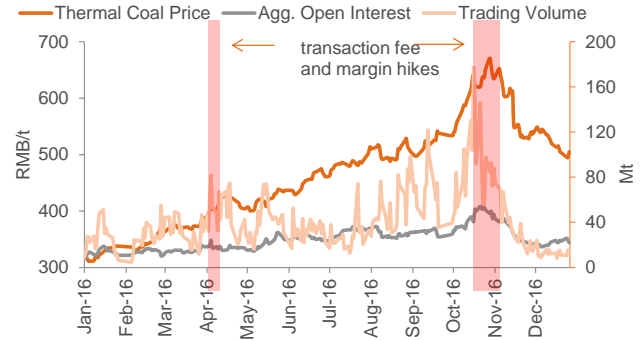
China also played a role in the extraordinary resurgence in commodities trade in 2016, which is likely to be sustained still in 2017. Here China is joined by OPEC and the U.S. among large trading economies, even with OPEC's plans to curtail output in 2017. The positive outlook for commodities trade is a third major theme for 2017. At the end of 2015 we focused on the stagnation of commodities trade post-2010 and expected this to continue through 2016, placing a further drag on global growth. But trade actually boomed in 2016 and signs are that 2017 will see this resurgence in commodities trade continuing, providing a counter to feared rising protectionism. Trade growth could actually boost GDP expectations.

Figure 51. Iron Ore Trading Activities Cooled Down Temporarily Amid Government Intervention



Source: Bloomberg, Citi Research

Figure 52. Thermal Coal Experienced Similar Moves Recently



Source: Bloomberg, Citi Research

A change in Chinese trade — a simultaneous increase in both crude oil imports and product exports — should increase commodity trading

China's part in this has been significant. In 2016, China saw commodity imports grow by some 9%, with especially noteworthy growth in diesel and refined nickel. The main change in China was the change in trade, with both crude oil imports and product exports growing simultaneously as China increased its' processing of crude via licensing of so-called teapot refineries. What's more, this growth in both crude oil imports and processed product exports is set to continue to grow. China's largest refiner, Sinopec, recently announced refinery capacity additions of 1.1-mm b/d by 2020 and more teapots might be brought into higher capacity use including the processing for exports. What's true in oil is also the case in other commodities where China will be using spare capacity to process more finished goods for export markets.

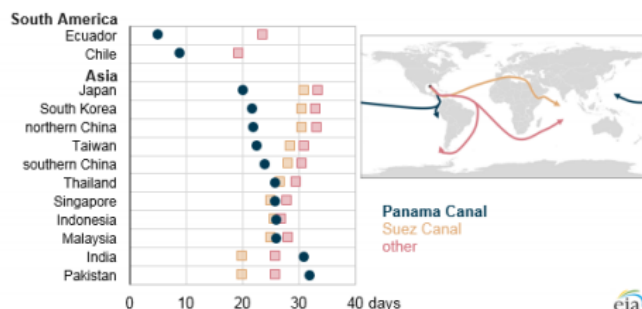
But this situation is not just related to China. OPEC as a whole, increased output by an average 1.88-million barrels per day (mm b/d) for the first three quarters of 2016 vs. 2015, most of which went into exports/stock builds. And the U.S. saw massive increases through the third quarter of 2016 in exports of agricultural and petroleum products.

U.S. Gulf Coast LNG could start a revolution in pricing of global gas in the year ahead

The liquified natural gas (LNG) trade is almost certainly going to see among the biggest boosts in trade volumes in 2017 of all commodities and with that growth, particularly out of the U.S. Gulf Coast, a revolution in the pricing of global gas unfolding in the year ahead. Pipeline gas transportation from Russia to Europe and from the U.S. to Mexico already reached record volumes this past year. But the major impact on pricing is likely to come from the U.S. Total global LNG trade of 250.4-million metric tonne per annum (mmtpa) in 2015 grew around 4.7% in 2016 and another 10.57% in 2017 to 289.6-mmtpa, far short of growing capacity, with further leaps through 2020, according to WoodMac estimates.

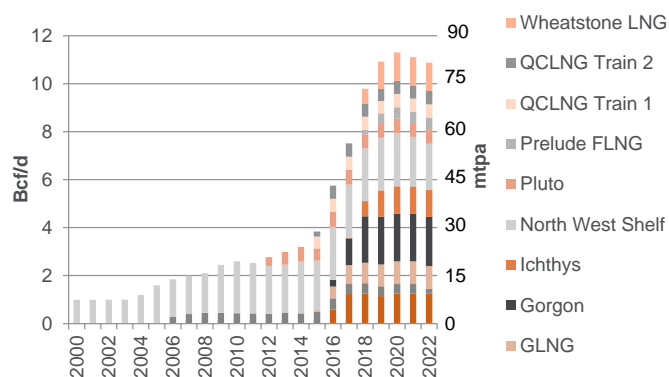
Most of this increment is coming from Australia (with capacity doubling between 2015 and 2017) but the lion's share of the growth come in the last years of the decade from the U.S., which already should be growing from an annualized 10-mmtpa in 2016 to as much as 23.9-mmtpa by the end of 2017. Already a spot market is growing on the U.S. Gulf Coast due to the lack of destination requirements for U.S. LNG. From that we can anticipate the emergence of a forward spot curve and perhaps a U.S. Gulf Coast natural gas contract price that could well become the effective price of global LNG by 2018, eroding significantly the place of oil-indexed pricing in the rest of the world.

Figure 53. U.S. LNG to Optimize Voyage Times from U.S. Gulf Coast to Asia/South America Along Various Routes



Source: WoodMac, Company Reports, Citi Research

Figure 54. Beyond Winter, LNG Supply Should Rise With Many Start Ups in Australia and Lower Global Gas Prices



Source: WoodMac, Company Reports, Citi Research

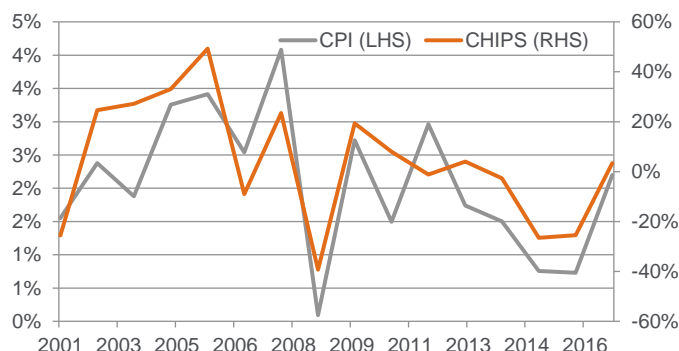
Signs of Inflation Also Growing with Higher Trade Volumes and Prices

With commodity markets in the process of rebalancing, there is likely to be an ongoing boost in headline inflation in 2017. This is particularly the case for fuel, but likely also for food-at-home on base effects. This may materialize in advanced economies and emerging markets alike, the latter potentially seeing currency depreciation amid a rising U.S. dollar.

Trend #4: Upward change in commodity prices impacting inflation metrics

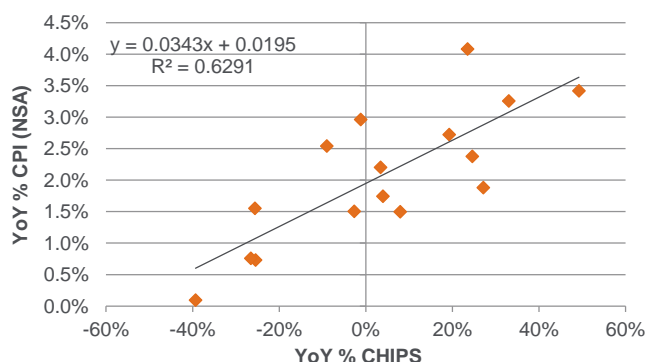
Our fourth trend of the year relates to the inflationary impact of the upward changes in commodity prices now unfolding as well as changes in the costs of services in extractive industries, which have seen record deflation over the past decade and soon should see cost inflation ahead. For the past half-decade, commodity prices have been deflationary, especially in headline costs of food and fuel, more so in emerging markets than advanced economy countries. Over the next year, perhaps longer, commodity prices are likely to bolster headline inflation.

Figure 55. Year-on-Year Changes in U.S. CPI vs. Changes in Citi CHIPS



Note: Citi CHIPS index is a basket of wholesale commodity prices weighted to track changes in the Producer Price Index (PPI)
Source: Bloomberg, Citi Research

Figure 56. Year-on-Year Changes in U.S. CPI vs. Changes in Citi CHIPS



Note: Citi CHIPS index is a basket of wholesale commodity prices weighted to track changes in the Producer Price Index (PPI)
Source: Citi Research

Two problems confront the world economy when it comes to commodities. First, most metals are seeing an end to the only moderate cost deflation that unfolded over the past half-decade. Second, unlike bulks and energy commodities, no new abundance of low cost ones were discovered and a significant amount of cost reduction was related to the high energy intensity of metals exploitation. With incremental output more expensive in any event, high energy costs should weigh heavily on these commodities through 2020.

Trend #5: Expect significant flow entering commodities in the years ahead

Finally, in our fifth theme, we see significant flows entering commodities in the years ahead. The past year saw at times record positive flows into commodities, although the pattern of flows was broadly the same in 2014 and 2015. During those two years, robust inflows in the first half ebbed and reversed through the second half. In 2016, the second half retreat was much milder in comparison, and net inflows into commodity exchange traded funds (ETFs) and passive indices amounted some \$40 billion for the year as a whole, with passive index inflows at the strongest pace since at least 2012. We expect more significant flows into commodity structures in 2017 and beyond. Citi not only expects underlying prices to rise but also forward curves for major commodities to flatten if not revert to backwardation, enabling investors more consistent roll returns as well as price returns.

2017 Investment Highlights: Equity Analysis

Martin Wilkie

Head of European Capital Goods Team

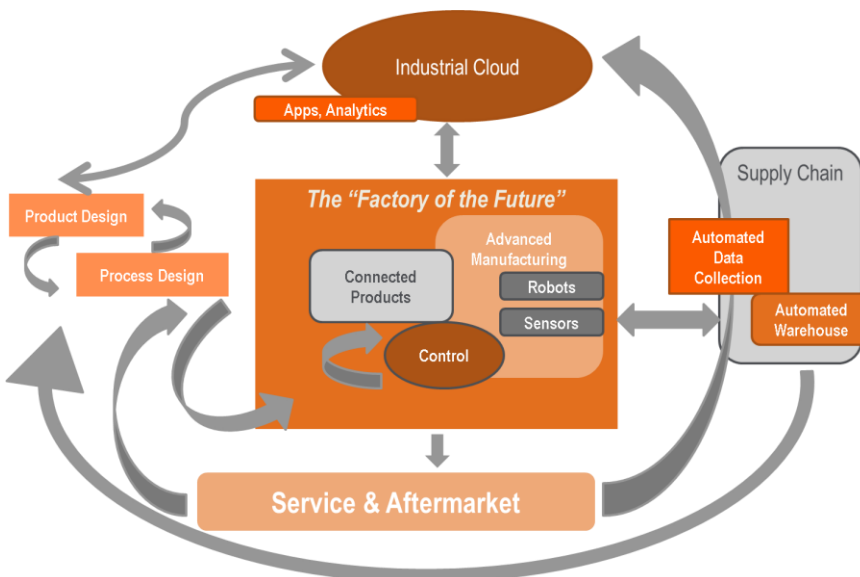
The Factory of the Future

Not Just the Rise of the Machines

Speed and flexibility are key drivers of smarter factories, but so too is productivity — in a low-growth world efficiency becomes an even more important driver. This need has seen many industrial companies push further into software markets, either organically or through acquisitions, and to develop data and ‘industrial cloud’ strategies. This is not just internally driven — several government bodies have outlined their own visions of the ‘factory of the future’ in order to spur regional investment, and many customer companies — especially in the automotive and aerospace sectors — have also outlined visions of their own.

While software and digital are the common threads that we see running through these visions, there are many other enabling technologies that we see as growth areas; automated data capture to track products, sensing and machine vision to identify and measure them, and additive manufacturing to make them, are all areas of growth in their own right, but also further spurring software and digital investment.

Figure 57. Data and Software are the Key Linkages for the Factory of the Future



Source: Citi Research

What is the Factory of the Future?

Changing demand expectations from e-commerce are key drivers of smarter factories

The significantly changing demand expectations driven by e-commerce are a key driver of smarter factories, but so too is productivity — in a low growth world, efficiency becomes an ever more important driver. This push towards ‘smarter’ factories has several key drivers focused around flexibility, efficiency, and speed:

- **Flexibility and ‘individual mass production’:** In 1908, Ford’s Model T famously only came in one color, and according to Ford, almost half the cars in the world in 1920 were essentially the same variant of the Model T. In contrast, in 2016 the Ford F-150 pick-up has 16 equipment option categories (color, engine, trim, and so on) that allow more than 600,000 different variants of the F-150 to be produced in its Dearborn plant.

- **Efficiency and productivity:** Improving productivity has been an ongoing theme in manufacturing ever since the industrial revolution — whether the introduction of the assembly line in 1913, the advent of factory automation in the 1960s, the widespread adoption of Just-In-Time production since the 1970s, or ‘lean’ principles more generally adopted since the 1990s. In the 2000s manufacturing costs were reduced further still through outsourcing or shifting footprint to low-cost countries. Manufacturing productivity is, however, slowing — GE estimates that annual productivity across the industry has slowed from 4% in the 1990s to 1% now. With the windfall from low-cost country footprints largely done, companies need to find other ways to lower costs.
- **Speed and agility:** Reducing time-to-market for new product launches, or reducing lead times for new orders involves software which links design, planning, engineering, production, and services, rather than have manufacturing as a (relatively) standalone function. Siemens estimates that the launch time-to-market for the Maserati Ghibli was reduced from 30 months to 16 months using its integrated design and manufacture software.

The Key Concepts

As is often the case, there are varying definitions as to what the ‘factory of the future’ entails, but we’d say it can broadly be summarized in the following categories:

- **Product life cycle management (PLM):** Product life cycle management is underpinned by a view that optimal production efficiency can only be achieved if production is considered as part of product design. While computer aided software (CAD) is not an especially recent development, the integration of product design into manufacturing and servicing, with feedback loops, is a much more recent concept.
- **Advanced manufacturing (AM) processes:** While much of the concept of the factory of the future is around the efficiency of the process, one exception is that around advanced manufacturing processes, including additive manufacturing (i.e. 3D printing). AM technologies combined with innovations in computer design software (i.e. CAD) could potentially fully digitize production and enable deeper levels of automation across the manufacturing workflow. We believe the digital factory floor has the potential to expand the limits of product design, form, and function.
- **Advanced manufacturing systems:** While the penetration of robots in the automotive industry is quite high (>90% for some tasks), the penetration in general industry is far lower. The adoption of cobots — robots who work alongside humans — is in its infancy. Other related technologies include sensors and machine vision.
- **Cyber-physical systems:** The digitalization of manufacturing hinges on several concepts — that physical machinery is connected (the industrial Internet), that the product and processes can be designed and simulated on-line (the concept of the ‘digital twin’), and that big data applications can access all of this in order to use simulation and analytics to optimize efficiency (the industrial cloud). Other areas like virtual and augmented reality will be used to optimize plant design but are in their infancy at this stage.

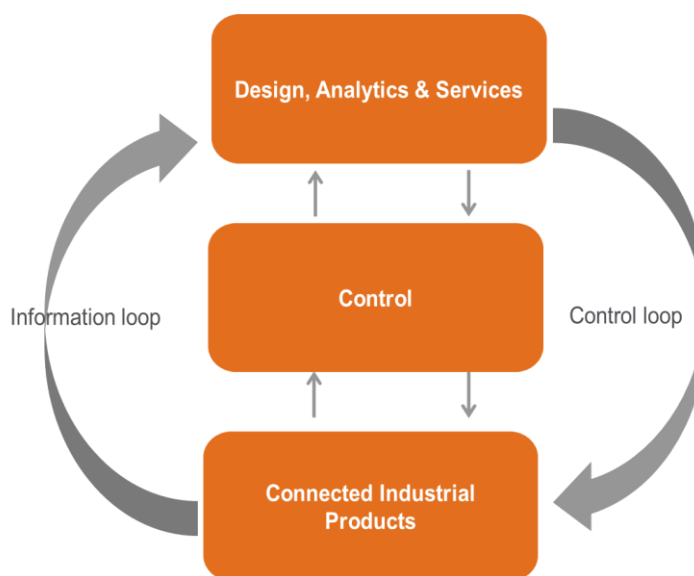
- **Digital supply chain and smart logistics:** The digitalization of manufacturing and the digitalization of customer ordering necessitates that distribution of the products through warehouse and fulfilment centers is also increasingly automated. Technologies like automatic data capture (ADC) help identify, track, and trace products through the supply chain.

Going Digital

The market for embedded software is mature while that of industrial IoT and industrial cloud platforms is only just emerging

'Vertical software', designed and used for a very specific industry, is already one of the largest and fastest-growing software end markets. While the market for embedded software in industrial applications is relatively mature (programmable logic controllers, the bread-and-butter of industrial automation, have had embedded software in them since the 1960s), the market for industrial Internet-of-Things (IoT) platforms and industrial cloud platforms is only just emerging, with the first platform launches over the last 12-18 months. The widespread adoption of connected devices, however, creates a virtuous circle as more data collection allows for more advanced analytics, and so further product and manufacturing process improvement through software.

Figure 58. Industrial Companies are Shifting from Software for Control Towards Software for Design, Analytics, and Service



Source: Citi Research, Schneider Electric

Industrial Players are Still Largely 'Embedded' Software Providers

Most industrial software has historically been in embedded form — pre-installed and priced as part of an industrial hardware product. ABB and Schneider Electric both estimate that close to half of revenues are digitally enabled, but for most industrial companies pure software revenues are relatively small — at the group level Schneider generates about 7% of revenue in software (licenses, subscriptions, etc.) and ABB about 6%. We estimate that Siemens will also generate about 6% of group sales in 'vertical' software and digital services in 2017.

Software exposure will increase through the launch of industrial IoT platforms

The launch of industrial IoT platforms — similar to app stores for industrial applications — and industrial cloud platforms (to store data collected from monitoring hardware and processes) will increase software exposure, although the revenue and pricing models for such applications is still evolving.

Key Growth Areas

We see software and data as the biggest opportunities in the 'factory of the future'

The 'factory of the future' conjures up images of legions of robots, but we see software and data as the biggest opportunities, with sensing and warehouse automation also offering huge growth potential. The industrialization of new technologies like additive manufacturing (3D printing) is a growth opportunity in its own right, but we also see digital manufacturing further spurring the adoption of software, particularly in product lifecycle management (PLM) design software.

From Control to Design and Analytics

Software focus for industrial companies is shifting from control toward broader uses

The historical focus of industrial companies on software for control has tilted towards software for broader uses — in areas like product design, analytics, and simulation. Siemens's combined > \$12 billion acquisition spend in product lifecycle management (PLM) and related software — including UGS for \$3.5 billion in 2008, and more recently Mentor for \$4.5 billion in 2016 — pushed the company into a market previously dominated by IT companies like Dassault Systemes and PTC. While Schneider Electric's announced interest in Aveva in both 2015 and 2016 was more focused around plant engineering for process automation rather than factory automation, it also pointed to a potential shift towards software for design and simulation, rather than simply industrial control.

GE's September 2016 acquisition of Meridium for \$495 million and ABB's 2010 acquisition of Ventyx for \$1 billion also show the interest in industrial asset management software (used to optimize industrial asset use), a theme we expect to continue as data gathering from industrial Internet platforms grows.

Supply chain and warehouse software is also a focus — Honeywell reportedly considered a \$3 billion acquisition of supply chain software specialist JDA (the companies in question have not commented on the reported acquisition) and has also in 2016 completed the \$1.5 billion acquisition of Intelligrated, which includes warehouse automation software. KION's acquisition of Dematic also includes a substantial software component.

Most industrial companies recognize that connecting hardware installed bases is one of the most valuable assets in a digital world — Schneider estimates that 45% of its products are already digitally enabled (i.e. with a potential to connect to the IoT), ABB 51% — but also that many aspects of software are better provided through partners than internally, including cloud platforms, web services, and even virtual reality. Outside of PLM software, we'd say that industrial companies and software companies complement and partner rather than compete.

The Addressable Market

The traditional factory automation market is >\$90 billion in size, although it has all the hallmarks of a mature industrial market — typically cyclical and growing at a multiple of industrial production. Faster growing markets on the hardware side include robotics, sensors, machine vision, automated data capture, and warehouse automation, while on the software side it includes vertical industrial software and PLM.

The fastest growth will come in markets which are barely above zero in size today, like the IoT platform

The fastest growth will come from markets which are barely above zero in size today but can grow rapidly over the next five years. PTC estimates that the IoT platform market will grow at a 33% compound annual growth rate to be a \$1.65 billion market by 2021, from ~\$300 million currently. This estimate is based on the narrow definition of IoT platforms to cover only 'application enablement platforms'.

GE believes that the industrial cloud opportunity (\$225 billion in 2020) will be larger than the \$200 billion enterprise IT market, although this includes third party applications. GE estimates that this will be split \$125 billion in applications and \$100 billion in platforms.

Figure 59. Key Components of the Factory of the Future – Software Markets Typically Growing High Single Digit vs. Low Single Digit for Traditional Products

Key Markets for the Factory of the Future	Market Size	Next 5-Year CAGR	Market Size and Outlook	Key Players
Factory Automation	\$90 billion	3-4%	Estimates vary substantially depending on market definition, but Rockwell estimates its addressable market at \$90 billion. Siemens estimates automation market growing 3-4% through 2020.	Siemens, Schneider, Rockwell, Keyence, Omron, Panasonic
Robots and Robot Systems	\$43 billion for robots + systems	15%	IFR estimates robot market at \$10.7 billion and systems market at ~\$32 billion.	Fanuc, ABB, Yaskawa
Warehouse Automation	\$20 billion	>10%	Honeywell estimates the market size at \$20 billion and both KION and Honeywell have seen 8-10% CAGR over the last 3 years and see 10% growth in the medium-term.	Daifuku, KION, Jungheinrich, Honeywell
Vertical Software for Discrete Manufacturing Markets	\$15 billion	High single digit		~\$15 billion
Product Lifecycle Management (PLM) Software	\$11 billion	High single digit	Dassault Systemes estimated in 2014 that the PLM software market size was \$11 billion. Dassault targets an 8% organic revenue CAGR 2014-2019.	Dassault Systemes, Siemens, PTC
Automated Data Capture	\$5-\$7 billion	~3-5%	We estimate the global ADC market is in the \$5-\$7 billion range, has been growing at a low-single-digit range the last few years and is set to reach \$7 billion+ by 2020 driven by relatively higher growth of scanning/bar code equipment.	Honeywell, Zebra Technologies
Electronic Design Automation (EDA) Software	\$8 billion	7%	Siemens estimates EDA market size to be >\$11 billion by 2020.	Synopsys, Cadence Design Systems, Siemens/Mentor Graphics
Machine Vision	\$7 billion	9%		Keyence, Cognex, Omron, Panasonic
Industrial Sensors	\$5 billion	~10%		Keyence, Omron, Mitsubishi Electric, Siemens, Bosch, Rockwell, Honeywell, GE
IoT Application Enablement Platforms	<\$0.5 billion	>30%	PTC estimates that the IoT platform market will grow at a 33% CAGR to be a \$1.6 billion market by 2021. ABB also sees a ~30% CAGR in cloud computing and infrastructure platforms for industry.	PTC, Siemens, GE
Industrial Cloud Applications	~0	Not material	GE believes the industrial cloud opportunity (\$225 billion in 2020) will be larger than the \$200 billion enterprise IT market.	

Source: Citi Research, IFR, Company data

Factors to Watch

- **Same and early adoption matters:** IoT Analytics estimated in January 2016 there were over 360 IoT platform providers — this is equivalent to having > 300 distinct app stores. Not all of these are industrial, but many are; most automation players have developed, or are developing, their own IoT platforms. Not all will be needed and we think the network effects from scale and an early launch will be differentiators.
- **Industrial installed base and domain expertise matter:** Industrial software platforms benefit enormously from 'equipment on the ground' — controllers, sensors, motors and other industrial devices well positioned to collect data in order to optimize equipment and streamline processes. These connected products are arguably the largest barriers to entry to new entrants.
- **New applications open up several new competitive debates:** Pricing models, the use of open source software, and data ownership and security are amongst the key themes.

Greater China Semiconductors

Powered to Reshape the Global Landscape

Roland Shu

Head of Asian Regional Semiconductor Research

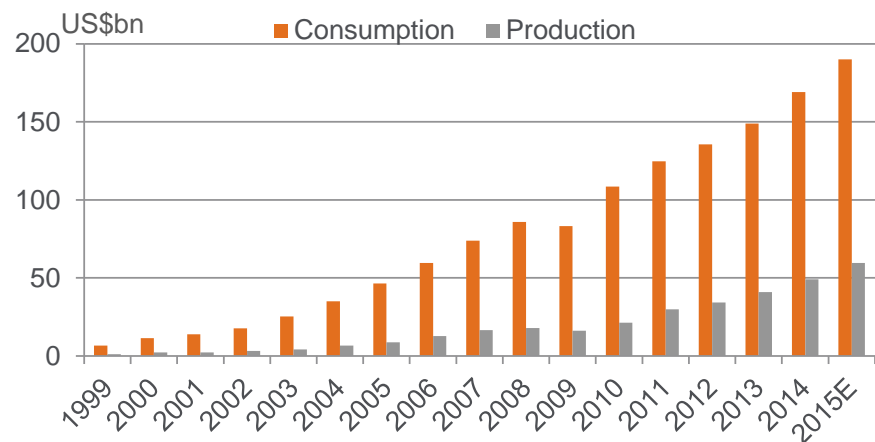
Despite China's large consumption of global semiconductors, its IC industry is relatively small

China is the largest integrated circuit (IC) consumption market in the world, consuming ~60% of total IC's globally (up from less than 19% in 2003). According to Semiconductor Equipment and Materials International (SEMI), 80% of the world's mobile phones, 60% of LCD televisions, 70% of notebooks/tablets and 75% of digital cameras are manufactured in China. Despite its significant market share, China's semiconductor consumption has still grown at a double digit compound annual growth rate over the past three years, outpacing the global markets growth rate of 3% from 2013-2016E.

We attribute the outperformance to: (1) the continuing shift in electronic device production to China; (2) the increase in semiconductor content in devices; and (3) the higher growth in China's domestic consumption. According to Gartner, China's share of electronic devices production is expected to increase to more than 38% by 2017 while the average semiconductor content in electronic devices is expected to increase to over 35%, leading to an expected rise in China's share of worldwide semiconductor consumption of 4 percentage points in 2017.

Although China is a large consumer of global semiconductors, its IC industry has a relatively small market share in the mid-teens and a self-sufficiency rate of ~20%. The reason for this divergence is that most of the semiconductors consumed in China are re-exported to other countries, which means the buying decisions for advanced ICs are mostly made overseas, making it harder for Chinese companies to penetrate into the supply chain.

Figure 60. Comparison of China's Integrated Circuit Consumption and Production



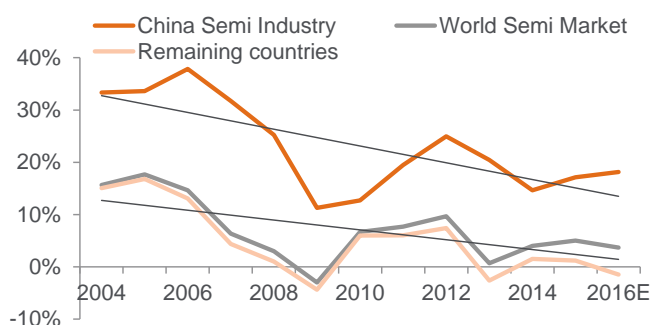
Source: CCID, CISA, PwC, Citi Research

Increasing importance of Chinese brands is helping local semiconductor vendors

Nonetheless, we believe that the increasing importance of the China-based brands has helped local semiconductor vendors to gain market share in the global market. More and more international players in almost every industry (IT, industrial, auto, etc.) have been increasing their R&D investment in China. According to McKinsey research, in 2014 more than 50% of PCs and 30-40% of embedded systems (for automotive, commercial, industrial and medical applications) contained content designed in China, either through China vendors or R&D centers in China. The trend is rising and that implies China could soon influence almost half of the

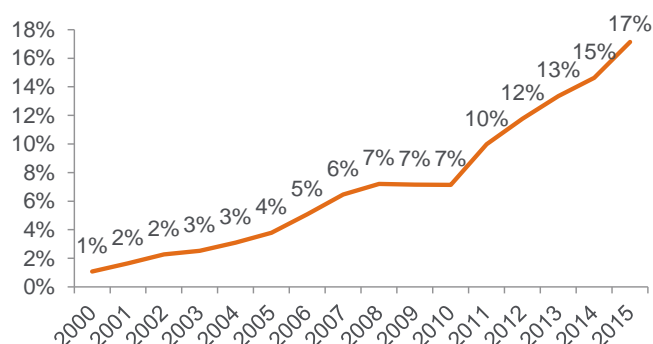
hardware design globally. The increasing importance of Chinese players in the supply chain should result in more components being bought from local suppliers.

Figure 61. Semiconductor 3-Year Average Industry Growth Rate



Note: Percentage growth for each year is based on a rolling average of past 3 years.
Source: CCID, CSIA, PwC, Citi Research

Figure 62. China's IC Industry Revenue as % of Global IC Market



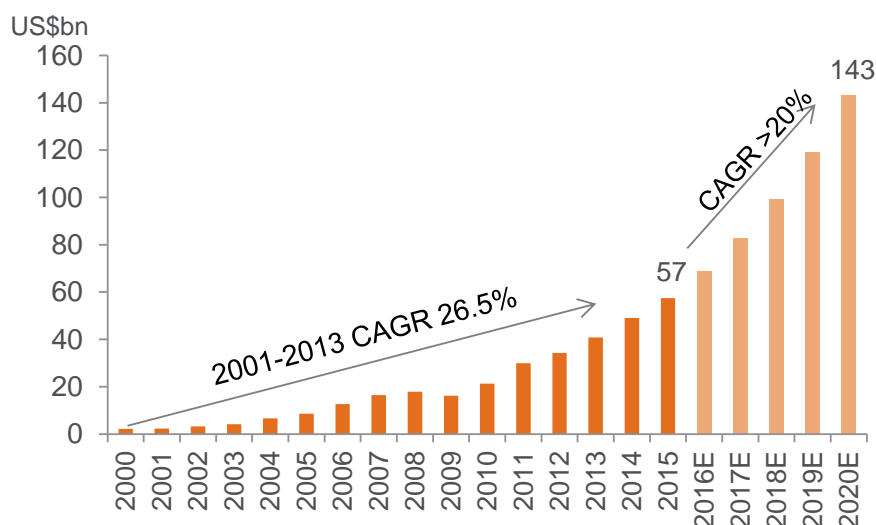
Source: CCID, CSIA, PwC, Citi Research

China aims to increase its semiconductor self-sufficiency level

Along with increasing demand and emerging opportunities for local vendors, China aims to increase the semiconductor self-sufficiency level. In 2014, the government put out several policies and set up an investment fund (the China Integrated Circuit Industry Investment Fund) to support local semiconductor makers to build up a domestic semiconductor ecosystem.

China targets a revenue compound annual growth rate (CAGR) of 20% in 2016-2020 for its IC industry, to \$143 billion or 2.5x the current \$57 billion industry, according to SEMI. We expect China's semiconductor industry to outpace the global rate and become the main growth driver for the global semiconductor industry.

Figure 63. Revenue Target Under 2014 China Industry Guideline



Note: Revenue is the sum of China IC companies' sales (fabless, foundry, IDM and OSAT)
Source: SEMI, CSIA

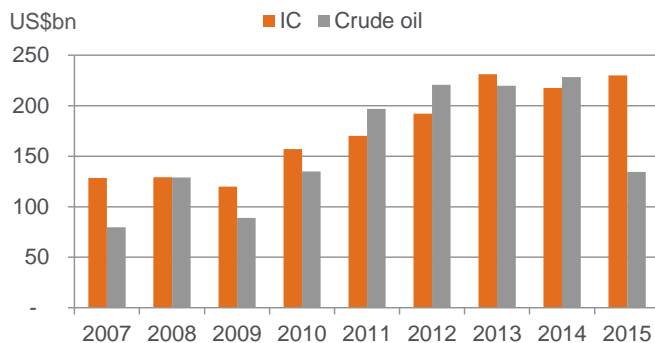
China's under-developed semiconductor industry has led to an enormous trade deficit and reliance on foreign supplies

Why does China Need to Develop its Semiconductor Industry?

We believe China has good reasons to develop its semiconductor industry. The shortfall in the industry has led to an enormous trade deficit and reliance on foreign supplies, and could be a bottleneck to its economic growth. We believe China is keen on developing its semiconductor industry, especially while the country's economy is undergoing a restructuring.

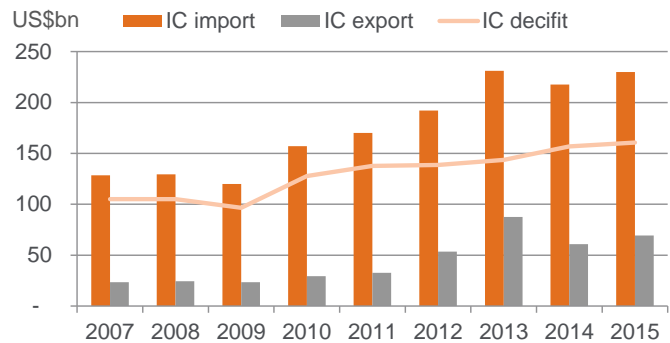
- **Boost economy by cutting trade deficit and moving up the value chain:** In 2014, semiconductors become the single trade deficit item in China, higher than even crude oil. In 2014, China imported \$231 billion semiconductors and exported only \$69 billion, contributing \$161 billion to the trade deficit. Developing the semiconductor industry can help China close the trade deficit gap and boost its local economy at the same time. As China is striving to reform its economy, moving up the value chain in the electronic supply chain by tapping into the semiconductor industry can help strengthen its rise and prevent the country from falling into a middle-income trap.

Figure 64. China Imports – Integrated Circuits vs. Crude Oil



Source: CCID, CISA, Citi Research

Figure 65. China Integrated Circuit Imports vs. Exports



Source: CCID, CISA, Citi Research

- **Industry upgrade with technology improvement:** China's brisk GDP growth has so far relied heavily on investment, which surged even more with the large credit stimulus introduced in response to the Great Financial Crisis. As part of its economic reform, China has taken several initiatives to rebalance its economy growth and upgrade its industry. The semiconductor industry is at the essence and foundation of the action plan. The strategy seeks to strengthen the advanced manufacturing and innovation capabilities of China. As a high value added, capital, and knowledge intensive industry, semiconductors is highlighted in the 10 sectors of focus in China's 2025 strategy.
- **National security:** With growing concerns of cybersecurity, China released a draft of the Cyber Security Law of the People's Republic of China for public comment in 2015. The draft showed that China is focusing on reinforcing cyberspace sovereignty and national security. The use of foreign-supplied components raises the leakage risk of critical information.

In developing its semiconductor industry, we see China leveraging its domestic market to see global collaboration

How is China Developing its Semiconductor Industry?

As a latecomer to the semiconductor industry, China is trying to catch up in scale and technology. Although it faces challenges such as limited access to advanced technology, entry barriers, and an insufficient ecosystem, we believe China will develop its semiconductor industry by leveraging its domestic market to seek global collaboration and tapping into capital markets amid policy support. The new investments will contribute to the establishment of China-based capacity and create a stronger semiconductor industry in China.

Steps towards developing China's semiconductor industry include:

- **Funding:** The announcement of a China National Semiconductor Industry Investment Fund aimed at advancing key semiconductor sectors of design, silicon manufacturing, wafer processing, assembly and packaging and equipment industries and to support development of major regional semiconductor manufacturing clusters in key areas. Other funds, including local semiconductor funds, private equity funds, and holding companies are also encouraged.
- **Alliances:** A government-backed, high-end chip alliance was formed to create a complete ecosystem for domestic semiconductor manufacturers — from chip architecture to chip product, operation systems, devices, platforms, and finally the IT service market.
- **Policy support:** Documents have been issued by the China State Council with guidelines for tax-deduction rules for eligible companies in the semiconductor industry as well as help on land acquisition costs and R&D subsidies.

Figure 66. Available Policy Support for Semiconductor Investment Projects

Items	Details
Land acquisition	Local government could help on land acquisition and grading to help reduce the land acquisition costs
Tax benefit	For eligible companies who manufacture IC with linewidth under (or equal to) 0.8 micron, 2 year tax break from the first profitable year, and 50% tax deduction (of 25% tax rate) for the next three years. For eligible companies who manufacture IC with linewidth under 0.25 micron or invested more than RMB 8 billion, 5-year tax break from the first profitable year, 50% tax deduction (of 25% tax rate) for the next five years and 15% tax rate afterward.
Funding	China banks and provide policy loan for the eligible investment projects
R&D subsidy	Government funded R&D projects

Source: Citi Research

- **Valuation:** Chinese semiconductor companies have been trading at higher valuations than global peers, driven by China's retail investors – a typical trend in China. Such investors tend to give a rich premium to policy-supported industries or companies, making them well placed to acquire foreign companies. Acquiring foreign companies with advanced technologies could speed up the narrowing of the gap with industry leaders.
- **Long-term focus:** The current market-led approach should help the industry by increasing its capability to allocate resources and identify potential winners for capital support.

- **Tie-ups with global leaders to incubate talent, ecosystem:** We believe the opportunities for Chinese semiconductor development lies in domestic demand and import substitution. For international players, China provides incentives to cooperate with local companies and set up local manufacturing facilities. Although we don't believe global leaders will transfer the most cutting-edge technologies to their Chinese partners nor set up their best facilities in China, longer term, cooperation will help China accelerate its semiconductor industry development by improving its ecosystem, cultivating local talents and building up a strong foundation for the industry's development.

OSAT and Fabless Ahead of Foundry

A practical way to develop cutting-edge technology is through technology sourcing

Given China's semiconductor companies are latecomers to the market, they need to spend extra efforts and sources to forge ahead. We believe it is challenging for Chinese vendors to develop cutting-edge technology, in-house. A practical way is to raise the overall industry capability through technology sourcing, i.e., partnerships or joint ventures, or mergers & acquisitions (M&A). As such, for Chinese vendors in the near term, we expect the achievement to be asymmetric. We believe the Chinese players will achieve earlier success in areas with low barriers to entry and where more M&A can be undertaken, such as IC design and outsourced assembly and test (OSAT).

OSAT players likely to gain traction in the near term

We believe Chinese OSAT players will gain traction in the near term with relatively mature development. The OSAT players will benefit from foreign foundries and integrated device manufacturers stepping into China. For years, China has been a major hub for IC packaging, with some global tier-one companies having plants in China. Further investment and capacity build will benefit the OSAT industry in China.

Fabless companies are likely to emerge to serve local demand and low-cost market segments, as Chinese players have a lower return on investment requirement (thanks to the high multiples in the capital market) and thus can endure lower margins compared with global peers. We believe the gap between global leaders and the national champions will gradually shrink.

Implications for the Global Semi Supply Chain

China's push into the semiconductor industry will change the global landscape

China's push into the semiconductor industry will undoubtedly change the global semiconductor landscape. It will create significant opportunities and challenges for global companies. With the overall semiconductor market growth slowing, many semiconductor companies are suffering from intensifying competition. Market opportunities in China and increasing dependence on it have made global players proactive in exploring opportunities. We believe industry leaders will benefit from this trend.

Winners to Lead

Global industry leaders will likely find opportunities to expand their footprint in China

We see huge opportunities for industry-leading companies, which are more likely to end up with win-win situations. Opportunities might come from investment in China, partnership with Chinese parties or completely new market opportunities. While China is a later-comer trying to catch up, the technology gap implies that China will continually demand foreign technology, equipment, know-how, and systems. These create opportunities for the global industry leaders to expand their footprint in China.

First, we see investment opportunities for the international companies in China as the government seems to increase the silicon self-sufficiency rate. It would give international leaders an opportunity to modernize their legacy technologies with good policy backing and incentives.

Second, we see significant partnership opportunities for industry leaders, either through joint ventures in facilities, equity investment or strategic collaboration. Emerging Chinese players need to partner with industry leaders to gain access to technology, IP, and know-how to improve their capability and cultivate local talent. For the industry leaders, the associations with Chinese partners provide an opportunity to strengthen the position in (or gain access to) China and eliminate upcoming competition from China rivals.

Last but not least, market opportunities also rise from China's demand in high-end service, equipment and materials. The heterogeneous development in different subsectors in China would create excessive demand in some areas. For instance, the robust development in the IC design created resilient demand for leading-edge foundry manufacturing capacities that China itself is not able to satisfy. High-end equipment and material vendors are also likely to benefit from the local capacity ramp-up.

Mixed Consequences for Laggards

For second-tier players, the rise of China's semiconductor industry might intensify competition in the trailing-edge segments. The new market entrants from China will set market share gain as their priority rather than profitability because of the incentives and policy goals. The Chinese vendors might compete through aggressive pricing and cause operating pressures for the low-tier players.

Seeking inorganic growth is a more realistic way for Chinese players to reach the policy growth/scale target. We expect Chinese semiconductor players (especially government fund-backed ones) to be more actively pursuing M&A among second-tier players (trailing players have less to lose in the "winner takes all" semiconductor industry). For some second-tier players under a looser regulatory environment and with IP inventories instead of being hunted, they might benefit from the resources (either capital or market) and opportunities brought by their Chinese partners.

M&A Should Remain a Theme

While China has been ambitious in developing its semiconductor industry, overseas governments have been cautious based on national security reasons. Government intervention has been a huge uncertainty and might slow the industry's progress. However, M&A could bring opportunities for potential acquirers through new business areas.

European Utilities

Energy Efficiency to Cut Electricity Demand

Antonella Bianchessi
Head of European Utilities Team

Investors and operators are aware of the impact that energy efficiency has had on power demand over the past five years. In our view, this is only the beginning.

Over the period 2010-14 energy consumption (all sources including coal, gas, nuclear, and renewable) in Europe declined by 9%, driven to a large extent by energy efficiency. Over the same time period, and contrary to historical trends, European electricity demand also declined by 5%, reflecting increased penetration of energy efficiency, such as increasingly efficient large appliance, LED lighting, and improvements to existing and new building standards. Energy efficiency measures materially affected residential consumption (8% in 2010-14).

More energy savings are possible with existing technologies

As we looked into the energy efficiency market, we found that existing technologies have the potential to generate more energy savings, especially given the legislative push in that direction. Current European and national energy policies are based on the assumption that European electricity demand will modestly grow until 2020 and that growth will accelerate thereafter. This scenario has affected sector policy, including the national renewable capacity targets, regulation to grant security of supply regulation, and the electricity and gas network development plans.

Evidence increasingly points to an erosion in electricity demand which could trigger changes in policy and environmental targets

However, evidence is increasingly pointing to a scenario of structural erosion in electricity demand (EU electricity demand declined by 3.8% over the past 5 years), a scenario that, if confirmed, would have material economic, financial, and political implications for Europe. In fact, over and above the direct impact on the electricity sector financial dynamic (power price pressure, gas oversupply implications), diminishing energy demand would trigger changes in the EU energy policy, environmental targets, and would influence EU international relations, in particular with reference to gas supply.

The large economic and political implications of a change in the outlook have so far suggested cautiousness and may have deterred EU policymakers from adopting an energy decline scenario as their base case. Hence, there is a lack of data and scenario analysis about the implications on power prices, gas demand, and overall energy sector structure as it relates to a decline in energy demand.

Analysis on the implications for a gradual demand deterioration in EU electricity demand has been insufficient

While electricity demand in the EU is and will be affected by a number of events (GDP evolution, financial stability, commodity prices, progress of energy saving technology, the speed of adoption of electric vehicles, to mention only a few) we feel that the analysis of the implications for a gradual demand deterioration is insufficient. We also believe that, if no exceptional elements were to materialize (i.e. material changes to consensus economic outlook, financial instability, technology disruption, material changes in commodity prices), energy efficiency will continue to erode demand.

We find that existing technologies have the potential to generate more energy savings, especially given the legislative push

As we looked into this poorly investigated topic, we found that existing technologies have the potential to generate more energy savings, especially given the legislative push in that direction. Our analysis shows that LED uptake, A+++ appliance penetration, housing efficiency, wideband gap semiconductors, and other technologies can generate an additional 257TWh energy savings by 2020, cutting total European power demand by another 9.2%. Against that, demographics (+1% population in the EU over 2015-20E) or demand growth (+8% GDP over 2015-20E) will not be enough to grow demand. Overall, we expect European power demand to shrink by 1.1% per year over 2015-20E.

We see 257TWh of energy savings in 5 years through energy efficiency in Europe

EU Electricity Demand Erosion Set to Continue

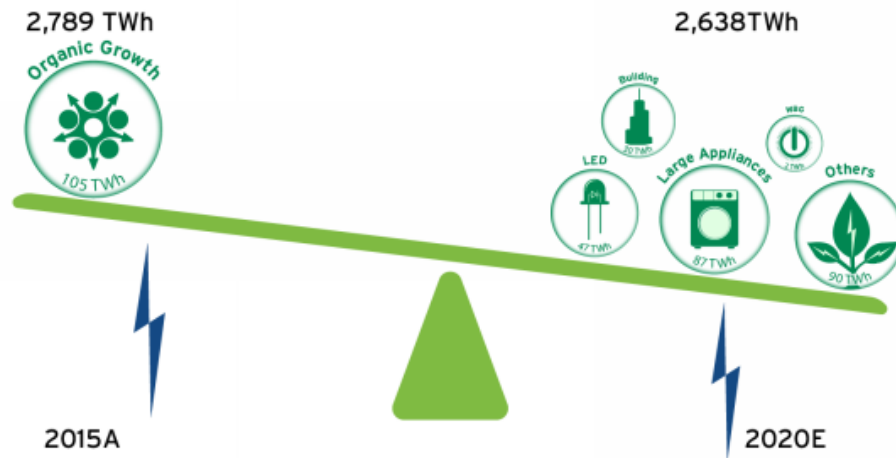
Technology is set to remain the major driver of energy efficiency in Europe and, on our estimate it is set to lead some 257 terawatt hours (TWh) of energy savings in 5 years (a decline of 9.2% in total demand). There are many energy saving technologies and, although determining the impact on electricity demand progression requires certain assumptions, owing to the granularity of our analysis and historical market trends, we believe that the outlook is clearly identifiable and energy efficiency disruption is here to stay.

Given what we know of policy direction (based on favorable legislation to meet 2020 and 2030 consumption targets), we think technology improvements could have the following impacts:

- Refrigerators and washing machines are the single largest contributors to household appliance consumption. Assuming penetration of A+++ refrigerators and washing machines (on average 22% more efficient than A++ appliances) increased from 4% to 43%, respectively, to 25% and 64%, respectively, we estimate appliance energy efficiency can increase by 12% to 2020.
- LED lighting is up to 74% more efficient than halogen bulbs. If market penetration increases to 55%, in line with recent trends and market commentary, we think LED lighting penetration could lead to a 13% reduction in lighting consumption.
- Housing consumption has seen on average a 1.73% improvement in energy efficiency each year over the period 2000-12. In light of the zero carbon new homes deadline of 2020 for EU member states, as well as other legislation encouraging the improvement of existing buildings efficiencies, we believe 2% per year of energy efficiencies can be achieved, saving 10% of buildings energy consumption by 2020.
- Wide bandgap (WBG) semiconductors are a potentially disruptive technology that could entirely change the power semiconductor industry (components for all electricity devices). We think on purely energy loss savings alone, we see potential for 8% in electricity energy loss savings. However, at current Citi estimates of 6.7% market penetration by 2020, the impact is not likely to be material in the near term. However, as has been the case with prior highly disruptive innovations, once the technology is sufficiently competitive, WBG could be poised to transform the power semiconductor industry.

In our model, we factor in some underlying energy consumption growth mainly related to GDP growth (+1.6% per year average in the EU, according to Citi economists) and the 1% population growth in Europe over the next five years expected by the EU. Taking into consideration the expected productivity gains and the recent trends, we reckon that underlying growth of electricity demand (before efficiency) is in the region of 0.8% per year. As a result, electricity demand in Europe (weather adjusted) is set to continue to deteriorate.

Figure 67. European Electricity Demand: Technology Set to Destroy 257TWh of Demand



© Citi Research 2016

Source: Citi Research, Eurostat, ODYSEE-MURE.eu

European Installed Electricity Capacity

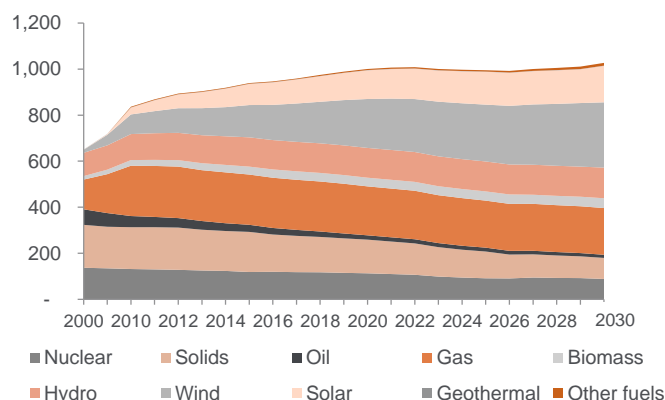
We forecast European installed electricity capacity to increase by 61GW by 2020 driven mainly by increases in wind capacity

To construct our model, we analyze each EU member state's 2015 status, planned capacity retirement, national targets for renewable capacity, and individual company business plans. We assume current plans on retirement of nuclear and coal capacity are executed and the development of renewables continues as planned, although at a slower pace than in the previous decade. This results in a forecast of European installed capacity to increase by 61GW (or by 6%) to 1,001GW by 2020, driven mainly by 72GW of wind (onshore and offshore), particularly in Germany and France. We also expect installed solar capacity to increase materially over the next five years (+33GW), with Germany again driving the process, adding 19.4GW of solar capacity in five years. In the meantime, we expect nuclear capacity installed in Europe to decline by 6GW, mainly reflecting some retirement of capacity in France, Sweden, and Germany offset by some development of capacity in Slovakia and Finland. We also expect some 28GW net closures of coal generation by 2020 and a modest decline in gas generation capacity.

We continue to see a move in the generation mix across Europe towards increased renewables

Across Europe we expect a move in the generation mix from 2015 to 2020 towards increased renewables (with the exception of Poland). This is particularly pronounced in the UK, where we note that the UK government's proposals to end coal-fired production imply a shift from coal to renewables of 11%. The shift to renewables is also significant in Germany and France, and to a lesser degree in Italy and Spain, at the expense of coal- and gas-fired generation (and nuclear in France).

Figure 68. European Installed Capacity Set to Increase Driven by Wind and Solar (MW)

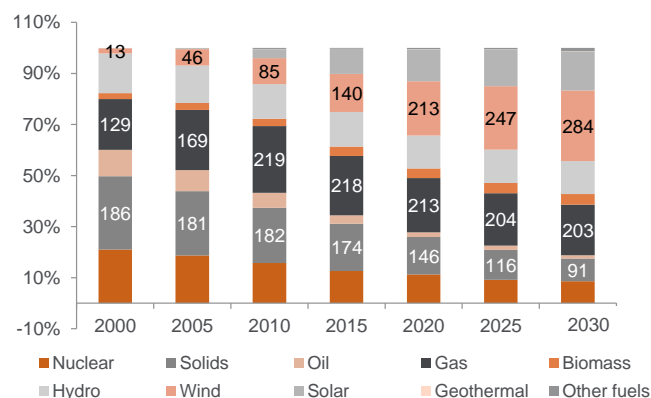


Source: Market data, EU Commission, Citi Research estimates (2016-2030)

A decline in demand and an increase in installed capacity should increase EU reserve margins

We believe electricity production in Europe is set to decline, in-line with demand dynamics, or -1.1% per year to 2020

Figure 69. Renewable Capacity to Reach 50% of Total Capacity Installed by 2020E



Source: Market data, EU Commission, Citi Research estimates (2016-2030)

The combination of an expected decline in demand (and peak demand) and an increase in installed capacity should increase EU reserve margins and security of supply. While the shift of installed capacity away from (reliable) thermal and nuclear generation to intermittent capacity may suggest the need for an increased reserved margin (i.e. solar in a dark winter in northern European evening peak may not be very helpful), we see an additional element providing security to the system — an increase in interconnection. Improving cross-border electricity interconnections should help the EU achieve its climate and energy goals. Connecting Europe's electricity systems would also allow the EU to boost its security of electricity supply and to integrate more renewable energy.

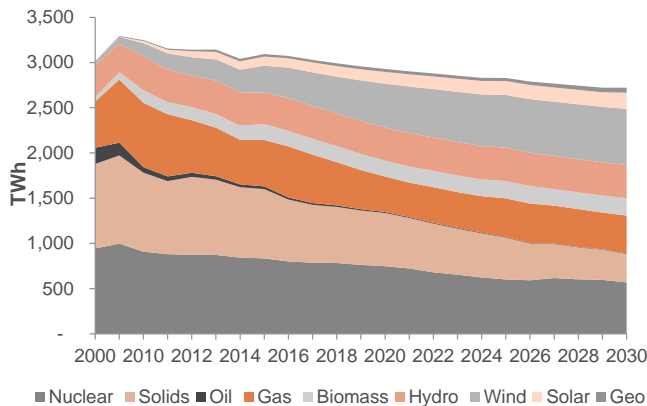
European Electricity Production

On the back of our assumptions for EU demand dynamics and taking into consideration the overall capacity expected to be developed in the long run, we can estimate the output trend in European generation. On our estimates, overall electricity production in Europe is set to decline in-line with demand dynamics (-1.1% per year 2015-20E). We also expect the European generation mix to change materially and, while nuclear looks set to remain the largest source of energy (25% of total, down from 27% in 2015) and coal the second-largest (20% in 2020, down from 25%), we expect wind to surge to become the third-largest source of electricity, reaching 17% of the total (vs. 10% in 2010). Solar's share of total production is set to increase to 4% in 2020E from 3% currently, highlighting its additional potential.

Thermal generation's output share of total electricity production in Europe is set to decline gradually over time such that it should represent less than 35% of the total by 2020E. Despite the closure of capacity (-48GW), we expect the average fleet load factor to erode and then remain at 25-35% over the next decade

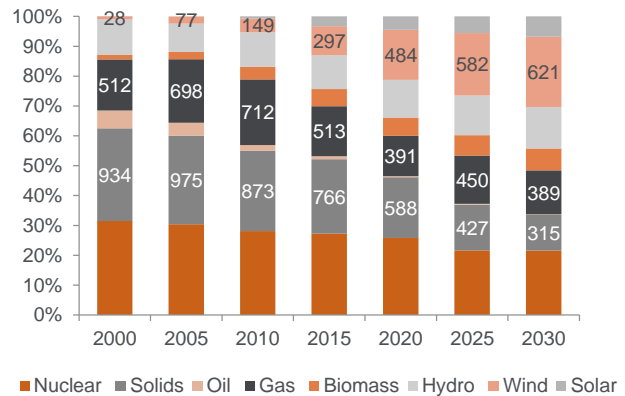
Gas generation is set to decline by ~31% from its 2016E peak (supported by coal to gas switching and nuclear outages in France) to 2020E, with load factor diminishing to a level well below 25% towards the end of the decade. Post 2020 we see some potential recovery of gas output on the back of decommissioning of nuclear and additional closures of coal. However, the long-term outlook will be exposed to development of new technologies (batteries, wind, solar LCOE) as well as climate change policy modifications.

Figure 70. EU Electricity Production -1.1% Per Year



Source: Market data, EU Commission, Citi Research Estimates (2016-2030)

Figure 71. Nuclear and Coal to Continue to Dominate but Wind Share of Total Output Set to Increase to 17% in 2020E from 10% in 2015



Source: Market data, EU Commission, Citi Research Estimates (2016-2030)

We continue to see renewable investment leading to thermal power plants being squeezed

Power Markets Will Change

Against declining demand, European governments are still stimulating renewable investment. We think this will result in 28% growth to 504GW of installed capacity by 2020E (50% of total capacity). Thermal power plants will be squeezed between growing renewables and a shrinking market and will become marginal on a merchant basis (some of them may find a second life as ancillary service providers to the grid). By 2020, we expect thermal power output to fall from 42% of power production today to 34%. While we expect non-renewable power capacity to fall by a net 51GW by 2020E and a new 123GW by 2025 (-23%), we expect thermal load factors to fall as well, from 36% in 2015 to 30% in 2020E. The correlation between power prices and energy commodities will diminish while weather and the availability of renewable resources (hydro, wind, solar) will increasingly have an impact on prices and company earnings.

As the penetration of energy efficiency technologies and behaviors grow with the largely untapped residential customer base, their contribution to peak demand should fall. Additionally, there is an increasing policy focus on demand-side responses and energy storage. In southern Europe, the expansion of solar generation could add to this and cut the summer peak role of thermal further. That combination suggests that peak demand pressure will somehow smooth (peak shaving) and peak price events will be increasingly less frequent. On the other hand, the increase in wind and solar supply (producing simultaneously in a region) will increase the frequency of oversupply episodes (nearly zero power prices) leading to material pressure on achieved wind and solar market power prices.

Less Power Means Less Gas

Despite the closure of coal and nuclear plants, lower demand for power means less demand for gas-fired generation output

In this context, despite the closure of coal and nuclear plants, we continue to expect gas-fired medium-term generation output to fall (-24% 2015-2020E). In 2016, where we forecasted gas demand +3.1% on a switch from coal to gas in generation and better weather patterns, we proved that European elasticity of gas demand to gas prices is modest. This largely reflects the limited flexibility of European generation: coal is concentrated in some areas like the UK, Germany, and Poland where gas generation capacity availability and interconnection flexibility represent a bottleneck for a coal-to-gas switch. We model European gas demand to fall to 433bcm in 2020E (3.8% below 2015 levels). This suggests that Europe is not an unlimited sink of excess liquefied natural gas.

Power Price to be Lower, Weather Driven and with Shorter Time Horizon

Today, power prices are broadly set by thermal assets at the margin, with occasional interference from renewables in extreme weather conditions.

We believe that tomorrow equilibrium will change as:

- We expect renewables to increasingly be at the margin in some specific regions (Iberia and increasingly Central Europe). Those assets' pricing power is limited, as they are largely on a tariff or support mechanism or their opportunity cost is limited. This, we think, will result in a cut to average power prices going forward.
- In areas with high demand or where weather conditions are adverse and renewable output has been cut, we expect thermal assets and reservoir/pumped storage hydro to set the rates, at material higher prices.

Power price will no longer correlate strongly with gas or coal prices and affected greatly by renewables players

Effectively, our message is that average power prices will (1) no longer correlate as strongly to gas or coal prices and that (2) depending on the mix of their portfolio, power companies could see their achieved power price diverge materially from the annual average with renewable players achieving below average power prices and pump storage and thermal generator prices achieving a premium.

Also, this means that while today power market participants hedge two or three years down the line, tomorrow this will become more difficult. This will shorten the time horizon on power markets and will increase the risk profile of suppliers, whose earnings will be increasingly volatile and exposed to unpredictable power market conditions.

Policy Response to Focus on Networks and Services

Energy policy should address optimizing the system

To reduce volatility in prices and increase security of supply, energy policy should address optimizing the system. This can be achieved by improving liquidity or managing demand.

- Improving liquidity by building cross-border connectors and improving internal links is, according to the EU, the most effective way to secure supply and, according to an EU study, could translate into some €12-40 billion in utility bill savings in Europe. The resulting increase in physical interconnections would in fact enable demand to rely on a fleet of assets further afield, which are more likely to have different weather conditions at a given point in time. This diversification would reduce problems caused by extreme weather, and even if weather conditions were similar across Europe, would enable thermal assets further down the cables to intervene. The EU target is to increase interconnections to 10% of capacity installed by 2020 and 15% by 2030 which will gradually help in smoothing EU price differentials.
- Managing demand can be achieved by existing technologies, the development of smart grids and smart meters, and demand-side management distributed storage. These processes are ongoing and any decline in demand will accelerate their impact on pricing.

2017 Investment Highlights: Equity Analysis

Sandy Kaul

Global Head of Business Advisory Services,
Citi

Asset Managers

At the Tipping Point on Passive Fund Investing

The use of passive investing products has been a growing part of the industry for some time, but a number of drivers are coming together to accelerate investors' use of these offerings and drive assets under management (AUM) growth in these products to new levels of significance. As a result, the industry is being forced to rethink the definition of and delivery of active fund management.

Chronic underperformance from active fund managers relative to benchmark indices has resulted in an accelerated shift of investor capital out of actively managed and into passively managed funds. By all measures — flows, AUM, and market share — passive fund management is now growing at a rapid pace and active fund management is in retreat. Successive waves of product innovation which are democratizing investors' ability to access and trade indices in a more fluid manner are helping to drive this change.

Of these product innovations, the emergence of exchange-traded funds (ETFs) has had the largest impact on the market. Inherent advantages make these funds both affordable and easy to trade. Rapid growth in the range of ETF products means that there are now many investment options across asset classes and in many emerging and niche regions of the world. This is encouraging investors to consider replacing exposure to security holdings with index ETFs. For institutional participants, ETFs dual ability to both provide exposure to broad sets of securities and to be used as trading tools to manage liquidity and hedge is adding to their growth.

Active Management Costs Hard to Justify in Eroding Return Environment

In the years following the Great Financial Crisis (GFC), the longstanding debate about the ability of active managers to outperform their benchmarks has intensified as a result of the subdued return environment. The core of this debate comes down to one's belief about what is possible in the market.

As Investopedia notes, "Investors who believe in active management do not follow the efficient market hypothesis. They believe it is possible to profit from the market through any number of strategies that aim to identify mispriced securities."²³ Their definition of active management goes on to say "Active management seeks to produce better returns than those of passively managed index funds."²⁴

Figure 72 presents an analysis of the 2015 S&P SPIVA Scorecard. This annual publication compares the performance of various S&P indices to the performance of active managers across market capitalization (large, mid, and small cap) and investment style (growth, core, and value).

Active manager performance has not been strong vs. index benchmarks

Green indicates that more than 50% of the active managers were able to beat the index benchmark; yellow indicates that the index outperformed 51-80% of the active managers pursuing those same strategies (only 20-49% of active managers beat the index) and red indicates that the index outperformed more than 80% of active managers in those categories (fewer than 20% of active managers beat the relevant index). The predominance of red boxes in Figure 72 gives some sense as to why the passive vs. active debate has heated up so much in recent years.

²³ Investopedia, <http://www.investopedi.com/terms/a/activemanagement.asp>

²⁴ Ibid

Figure 72. SPIVA Scorecard – Percentage of U.S. Equity Funds Outperformed by Benchmarks

Fund Category	1-Yr	3-Yr	5-Yr	10-Yr
All Domestic U.S. Equity Funds	90.20%	87.41%	94.58%	87.47%
Global Equity Funds	75.35%	76.96%	82.45%	81.19%
Emerging Market Equity Funds	42.22%	77.42%	67.63%	81.94%
Investment Grade Long Funds	94.39%	97.32%	98.41%	98.21%
High Yield Funds	75.00%	80.47%	88.78%	96.62%
Emerging Market Debt Funds	74.65%	88.89%	92.31%	81.82%

49% or less of Active Managers
Underperformed the Index

50-79% of Active Managers
Underperformed the Index

80%+ of Active Managers
Underperformed the Index

Source: S&P Dow Jones Indices, LLC <https://us.spindices.com>

Critics of the SPIVA scorecard approach “argue that actively managed mutual funds are real funds with actual costs including management, sales tax, fund administration, and trading, whereas indices on the other hand are not investable and simply represent the calculated performance of a particular basket of securities, selected according to the rules of the index, without any cost deductions.”²⁵

Active management needs to outperform indices to avoid flows moving to passive products

This point about costs is true, but that is the problem according to survey participants. If active management cannot outperform indices over time because their costs eat up too much of the portfolio’s returns, then an investor would be better off trading in the index itself, many argue. This in part is what has helped drive an increasing share of flows to passive products that offer such index exposure.

Investors Accelerate the Shift in Flows from Active to Passive

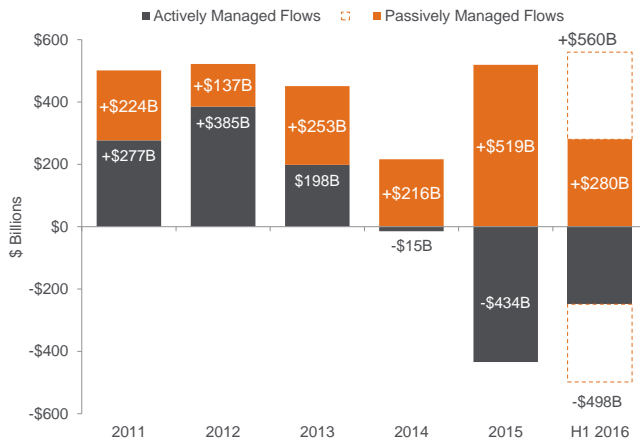
Flows into passive products has outpaced those to actively managed products by 3.1x

On a global basis, the challenges facing active fund management can be easily summarized by looking at the level of investor flows these products have attracted relative to the size of flows moving into passive fund strategies. As highlighted in Figure 73, over the last five years, from 2011 to 2015, flows into passive products globally reached \$1.35 trillion, a figure 3.1x larger than the \$442 billion in capital directed to all actively managed products. In particular, this trend highlights that the pace of flows moving from active to passive is actually accelerating.

Beyond experiencing an increase in flows, passive fund performance has also been positive in the years’ post-GFC, benefitting from broadly positive equity and bond market returns. This is evidenced by the steady AUM gains noted in Figure 74. As shown, passive AUM grew from only \$2.6 trillion in 2003 to \$11.0 trillion in 2015.

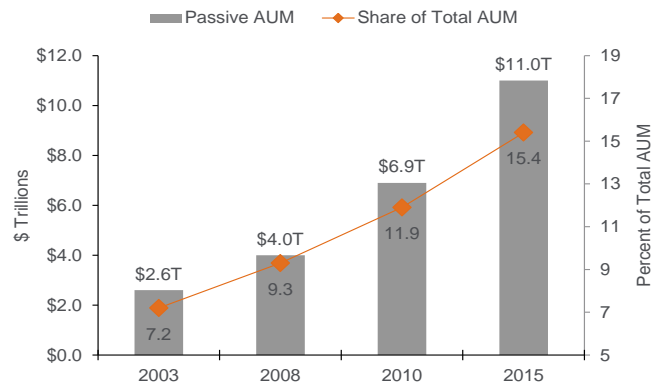
²⁵ “Active Mutual Fund Managers Take Another Beating,” Financial post, Michael Nairne, October 13, 2013. <http://www.business.financialpost.com/investing/active-mutual-fund-managers-take-another-beating?isa=cb96-d764>

Figure 73. Net Investor Flows into Active & Passive



Source: Bloomberg, Citi Business Advisory Services based on data from: eVestment, ICI, Preqin, HFR, Strategic Insight, BlackRock ETP report, IMA, OECD, Towers Watson, P&I, Lipper

Figure 74. Growth in Passive AUM & Passive Share of Industry Total AUM



Source: Bloomberg, Citi Business Advisory Services Estimates based on Global Asset Management 2016: Doubling Down on Data, The Boston Consulting Group

The share of passive funds in the total asset pool has grown

The proportionate share that passive funds represent of the total asset pool has been growing as well. The Boston Consulting Group (BCG) reports that total AUM on a global basis rose by \$7.0 trillion to \$43.0 trillion from 2003 to 2008 while AUM in passive products grew by \$1.4 trillion in the same period, thus accounting for 20% of total industry gains. From 2010 to 2015, that rate of growth accelerated. Passive AUM increased by \$4.0 trillion to \$11.0 trillion, a figure equivalent to 30% of total AUM gains. By the end of 2015, passive products made up 15.4% of global asset management industry assets, up from 7.2% in 2003.

Passive AUM has thus been increasing across all significant measures — the level of investor flows, the absolutely level of assets being run in these strategies and the proportionate level of assets these strategies represent of the global AUM pool. All of these gains have come at the expense of actively managed funds.

ETF Product Set Makes Accessing Exposures Easier for All Investors

Product innovation has helped the rise of passive fund management

Survey participants noted that while the overall rise in passive fund management AUM is important, it is the level of product innovation that is taking place within the passive fund world that is likely to transform the investment management industry going forward.

Indices as a benchmarking tool have been used for decades but getting access to index exposure as a product is a newer phenomenon. Originally, investors were only able to get exposure to an index by individually purchasing each of the securities that made up that index and rebalancing their own exposures by adjusting their shareholdings. The emergence of index trading via separately managed accounts (SMAs) helped to improve and simplify this approach.

ETFs help make index trading affordable and portable

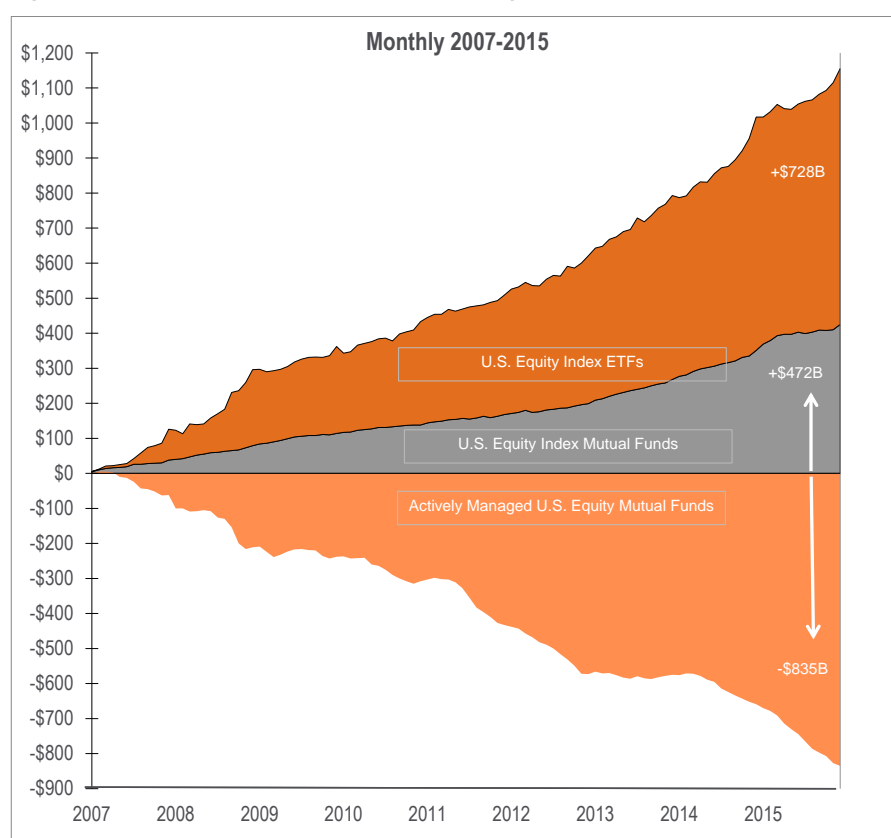
The introduction of ETFs as a new vehicle to obtain index exposure marked a significant step forward in being able to make index trading both affordable and portable. ETFs allow investors to buy shares on the index directly, not shares in a fund that owns the index. Each share of the ETF thus offers the investor a proportionate amount of each security contained in that index. As a result, the investor gets a portion of the earnings or the interest paid by the companies that make up the index and he gets a share of the residual value if the fund is liquidated.

Rising ETF assets are coming at the direct expense of other U.S. funds

ETF Growth Begins to Outpace Gains in Other Passive Products

ETFs are proving highly attractive to investors. The number of ETFs in the marketplace has risen to 5,169 in June 2016 from just 1,315 in 2007 and AUM has risen to \$3.1 trillion from \$825 billion in the same time period. ETF trading focused on the U.S. indices remains the largest share of this global pool, making up 72.3% of global AUM. These figures, while impressive, mask the most significant impact of this growth — that rising ETF assets are coming at the direct expense of other U.S. funds. The Investment Company Institute (ICI) shows that, when viewed on a cumulative monthly basis, flows out of actively managed U.S. equity mutual funds fell by \$835 billion between 2007 and 2015. In the same period, flows into passively managed equity fund products (equity index mutual funds and equity index ETFs) rose by \$1.2 trillion. This marks a massive dislocation of capital.

Figure 75. Cumulative Flows into U.S. Domestic Equity Funds



Note: Equity mutual fund flows include net new cash flow and reinvested dividends. Data excludes mutual funds that invest primarily in other mutual funds.

Source: ICI, 2016 Fact Book

Growth of ETFs outside the U.S. is strong

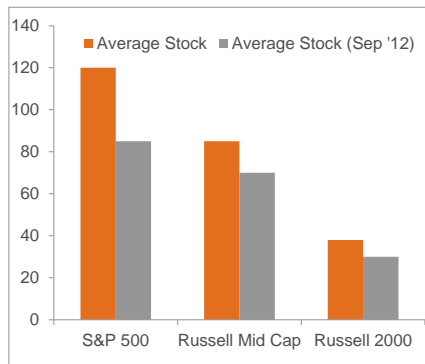
Outside the U.S., there has also been a rapid growth in both the number of ETF offerings and in the AUM they represent. In 2007, there were only 659 ETFs linked to indices outside the U.S. This figure increased 4.9x by June 2016 as the total number of ETFs linked to indices outside the U.S. jumped to 3,233.²⁶ AUM controlled by these funds is also rising. In 2007, there was only \$212 billion in ETFs

²⁶ Citi Business Advisory Services analysis based on proprietary data subscription to Strategic Insight SimFund database

Demand for passively managed strategies is having a negative effect on the trading of individual securities

"Traditional" price discovery interactions between buy-side and sell-side counterparties are starting to distort

Figure 76. Number of ETFs Holding Stocks in Select U.S. Indices



Source: Citi Research

outside the U.S. By June 2016 that figure had risen 4.1x to \$868 billion.²⁷ This rapid growth in the availability of ETF funds, not only in the U.S., but especially in other regions, is seen as having a profound effect on how markets are being traded.

Concerns Emerge as Large Share of Market Exposure Shifts to Passive

In this year's survey, multiple respondents cited concerns about the influence of passively managed strategies on the trading dynamics of the overall capital markets. Many warned we were reaching a point where investor demand for passively managed strategies, especially trading in ETFs, is having a negative effect on the trading of individual securities.

Passive funds' share of AUM in U.S. equity strategies has increased from 16% in 2005 to 31% in 2015. This 1.9x increase means that passive funds now account for 31 cents out of every dollar of market assets and that active managers are now competing against each other in a proportionately smaller opportunity pool (69 cents out of every dollar in 2016 vs. 84 cents in 2005).

Not only are the dynamics between passive fund management and active investing becoming more difficult because of this rising share of passive AUM, the competition between passive fund providers is also beginning to distort "traditional" price discovery interactions between buy-side and sell-side counterparties, as ETF rebalancing has become more prevalent, and create-redeem teams within sell-side organizations play a more critical role as liquidity providers.

Figure 76 provides some context as to why this activity is having a growing impact. As shown, in 2012 the average stock that traded in the S&P 500 index was held in 85 different ETFs. That figure jumped to 120 different ETFs by 2015 — an increase of 41%. Similar increases were evident in the Russell Mid-Cap and in only a slightly lower extent in the Russell 2000 indices. This means that there are more ETF providers each day needing to adjust their holdings of these stocks based on create-and-redeem demand.

Survey participants noted three impacts on active fund management saw a result of the quickly rising share of passive funds and the rising number of ETF offerings trading each index. These impacts are:

- First, there is a growing sense among many market participants that the fundamentals of an individual company are being subsumed or their influence at least weakened by shifts in index demand, even though the company may represent only one of many index constituents. They worry that price movement is starting to become disentangled from a specific company's underlying fundamentals.
- Second, investors' ability to easily compare the performance of active fund managers to comparable indices in real-time is eroding their willingness to allow long-term strategies to play out and pushing the industry toward hair-trigger responses to underperformance. This in turn is seen as consciously or unconsciously driving active managers to either (1) overtrade in an attempted to differentiate their returns, which could just as easily lead to exaggerated losses, or (2) cleave too closely to the index itself, and thus show low tracking error despite charging significantly higher fees.

²⁷ Ibid

- Third, the ebb and flow of demand for indices is creating challenges for investment managers in their ability to establish and hold onto positions, as oftentimes there will be index-related competition for shares that create short-term volatility and exaggerated market impact. Competition from high frequency and quantitatively-driven firms were also cited as factors that can exacerbate this situation.

The Steepening Equities Trading Volume Curve

Trading has increased near the open and the close of the market...

While not as directly tied to growth in passive fund AUM, another structural market impact was noted by participants as also affecting the ability of active fund managers to effectively access intra-day liquidity. Market observers on both the sell-side and buy-side are noticing much more trading volume near the open and close of the market.

...creating an 'Intraday lull'

In speaking with several industry participants, the pronounced activity after the start of daily trading and near the close has greatly accentuated the period in between, which many participants are beginning to call the "Intraday lull".

In the period pre-GFC, market-makers began to notice an uptick in volumes soon after the market open and again just before the market close. In recent years, market participants have observed an acute increase in such start of day and end of day volume spikes. The net result is a decrease in volume through the "Intraday lull", which is having a disproportionate effect on the amount of available intra-day liquidity. This has been resulting in period of increased volatility and creating more difficulty for money managers to work with sell-side firms to establish and/or sell out of positions.

Conclusion

Trend towards passive investing could lead to broken capital markets

Despite all of these potentially negative impacts on active management, survey participants warned that they saw potential for the trend towards passive investing to progress only so far. Many noted that if 100% of the markets' activity were to become passive, then the capital markets would be irrevocably broken because they were no longer going to be able to serve as an efficient pricing mechanism.

Or, the continued drive could reinvigorate active fund management

Others noted that a continued drive to passive investing would eventually help to reinvigorate active fund management, because there would be less competition and remaining managers would have more opportunities identify and capture opportunities without the over-crowding of trades they contend with today.

In the near-term, we expect passive strategies to continue to grow

While both these considerations may prove accurate in the longer run, the near-term prospect is for passive strategies to continue to grow. Indeed, the shift toward passive is likely to accelerate even more as the ability to have a diversified portfolio of index-driven beta exposures is likely to be seen as increasingly attractive in light of investors realizing that the alpha component of market outperformance is actually quite limited, and that those managers able to successfully obtain such alpha are likely to price their capacity too high for the standard investor.

IMPORTANT DISCLOSURES

This communication has been prepared by Citigroup Global Markets Inc. and is distributed by or through its locally authorised affiliates (collectively, the "Firm") [E6GYB6412478]. This communication is not intended to constitute "research" as that term is defined by applicable regulations. Unless otherwise indicated, any reference to a research report or research recommendation is not intended to represent the whole report and is not in itself considered a recommendation or research report. The views expressed by each author herein are his/ her personal views and do not necessarily reflect the views of his/ her employer or any affiliated entity or the other authors, may differ from the views of other personnel at such entities, and may change without notice.

You should assume the following: The Firm may be the issuer of, or may trade as principal in, the financial instruments referred to in this communication or other related financial instruments. The author of this communication may have discussed the information contained herein with others within the Firm and the author and such other Firm personnel may have already acted on the basis of this information (including by trading for the Firm's proprietary accounts or communicating the information contained herein to other customers of the Firm). The Firm performs or seeks to perform investment banking and other services for the issuer of any such financial instruments. The Firm, the Firm's personnel (including those with whom the author may have consulted in the preparation of this communication), and other customers of the Firm may be long or short the financial instruments referred to herein, may have acquired such positions at prices and market conditions that are no longer available, and may have interests different or adverse to your interests.

This communication is provided for information and discussion purposes only. It does not constitute an offer or solicitation to purchase or sell any financial instruments. The information contained in this communication is based on generally available information and, although obtained from sources believed by the Firm to be reliable, its accuracy and completeness is not guaranteed. Certain personnel or business areas of the Firm may have access to or have acquired material non-public information that may have an impact (positive or negative) on the information contained herein, but that is not available to or known by the author of this communication.

The Firm shall have no liability to the user or to third parties, for the quality, accuracy, timeliness, continued availability or completeness of the data nor for any special, direct, indirect, incidental or consequential loss or damage which may be sustained because of the use of the information in this communication or otherwise arising in connection with this communication, provided that this exclusion of liability shall not exclude or limit any liability under any law or regulation applicable to the Firm that may not be excluded or restricted.

The provision of information is not based on your individual circumstances and should not be relied upon as an assessment of suitability for you of a particular product or transaction. Even if we possess information as to your objectives in relation to any transaction, series of transactions or trading strategy, this will not be deemed sufficient for any assessment of suitability for you of any transaction, series of transactions or trading strategy.

The Firm is not acting as your advisor, fiduciary or agent and is not managing your account. The information herein does not constitute investment advice and the Firm makes no recommendation as to the suitability of any of the products or transactions mentioned. Any trading or investment decisions you take are in reliance on your own analysis and judgment and/or that of your advisors and not in reliance on us. Therefore, prior to entering into any transaction, you should determine, without reliance on the Firm, the economic risks or merits, as well as the legal, tax and accounting characteristics and consequences of the transaction and that you are able to assume these risks.

Financial instruments denominated in a foreign currency are subject to exchange rate fluctuations, which may have an adverse effect on the price or value of an investment in such products. Investments in financial instruments carry significant risk, including the possible loss of the principal amount invested. Investors should obtain advice from their own tax, financial, legal and other advisors, and only make investment decisions on the basis of the investor's own objectives, experience and resources.

This communication is not intended to forecast or predict future events. Past performance is not a guarantee or indication of future results. Any prices provided herein (other than those that are identified as being historical) are indicative only and do not represent firm quotes as to either price or size. You should contact your local representative directly if you are interested in buying or selling any financial instrument, or pursuing any trading strategy, mentioned herein. No liability is accepted by the Firm for any loss (whether direct, indirect or consequential) that may arise from any use of the information contained herein or derived herefrom.

Although the Firm is affiliated with Citibank, N.A. (together with its subsidiaries and branches worldwide, "Citibank"), you should be aware that none of the other financial instruments mentioned in this communication (unless expressly stated otherwise) are (i) insured by the Federal Deposit Insurance Corporation or any other governmental authority, or (ii) deposits or other obligations of, or guaranteed by, Citibank or any other insured depository institution. This communication contains data compilations, writings and information that are proprietary to the Firm and protected under copyright and other intellectual property laws, and may not be redistributed or otherwise transmitted by you to any other person for any purpose.

IRS Circular 230 Disclosure: Citi and its employees are not in the business of providing, and do not provide, tax or legal advice to any taxpayer outside of Citi. Any statements in this Communication to tax matters were not intended or written to be used, and cannot be used or relied upon, by any taxpayer for the purpose of avoiding tax penalties. Any such taxpayer should seek advice based on the taxpayer's particular circumstances from an independent tax advisor.

© 2017 Citigroup Global Markets Inc. Member SIPC. All rights reserved. Citi and Citi and Arc Design are trademarks and service marks of Citigroup Inc. or its affiliates and are used and registered throughout the world.

