Goldman Sachs | Economics Research

16 November 2017 | 2:28PM GMT

Global Viewpoint

Top Trade Recommendations for 2018

GS MACRO OUTLOOK 2018

See all our year-ahead forecasts in one place. Visit the page.

We present the first seven of our *recommended Top Trades for 2018*. These trades represent some of the highest conviction market expressions of the economic outlook we laid out in the latest *Global Economics Analyst* and the related investment themes we discussed in our *Global Markets Analyst*.

Top Trade #1: Position for more Fed hikes and a rebuild of term premium by shorting 10-year US Treasuries.

Top Trade #2: Go long EUR/JPY for continued rotation around a flat Dollar.

Top Trade #3: Go long the EM growth cycle via the MSCI EM stock market index.

Top Trade #4: Go long inflation risk premium in the Euro area via EUR 5-year 5-year forward inflation.

Top Trade #5: Position for 'early vs. late' cycle in EM vs the US by going long the EMBI Global Index against short the US High Yield iBoxx Index.

Top Trade #6: Own diversifed Asian growth, and the hedge interest rate risk via FX relative value (Long INR, IDR, KRW vs. short SGD and JPY).

Top Trade #7: Go long the global growth and non-oil commodity beta through long BRL, CLP, PEN vs. short USD.

Francesco Garzarelli
+44(20)7774-5078 |
francesco.garzarelli@gs.com
Goldman Sachs International

Charles P. Himmelberg
+1(917)343-3218 |
charles.himmelberg@gs.com
Goldman Sachs & Co. LLC

Silvia Ardagna
+44(20)7051-0584 |
silvia.ardagna@gs.com
Goldman Sachs International

Kenneth Ho
+852-2978-7468 | kenneth.ho@gs.com
Goldman Sachs (Asia) L.L.C.

Lotfi Karoui
+1(917)343-1548 | lotfi.karoui@gs.com
Goldman Sachs & Co. LLC

Caesar Maasry
+1(212)902-8763 |
caesar.maasry@gs.com
Goldman Sachs & Co. LLC

Christian Mueller-Glissmann, CFA
+44(20)7774-1714 | christian.mueller-glissmann@gs.com
Goldman Sachs International

Zach Pandl
+1(212)902-5699 | zach.pandl@gs.com
Goldman Sachs & Co. LLC

Kamakshya Trivedi
+44(20)7051-4005 |
kamakshya.trivedi@gs.com
Goldman Sachs International

Danny Suwanapruti
+65-6889-1987 |
danny.suwanapruti@gs.com
Goldman Sachs (Singapore) Pte

For the exclusive use of JOSEPH.STEIN@GS.COM

Investors should consider this report as only a single factor in making their investment decision. For Reg AC certification and other important disclosures, see the Disclosure Appendix, or go to www.gs.com/research/hedge.html.

Top Trade Recommendations for 2018

We present the first seven of our recommended Top Trades for 2018. These trades represent some of the highest conviction market expressions of the economic outlook we laid out in the latest Global Economics Analyst ("As Good As It Gets", *Global Economic Analyst*, Nov. 15, 2017), as well as in our Top 10 Market Themes for 2018 ("Late-Cycle Optimism", *Global Markets Analyst*, Nov. 16, 2017). Some of the key market themes reflected in our trade recommendations include:

- **Strong and synchronous global expansion.** We forecast global GDP growth of around 4% in both 2017 and 2018, suggesting that next year's global economy will likely surprise on the upside of consensus expectations.
- **Relatively low recession risk.** Given the low inflation and well-anchored inflation expectations across DM economies, we think central banks have little reason to risk 'murdering' this expansion with the kind of aggressive rate hikes that would have historically been warranted to fight the risk of inflation becoming entrenched.
- **But relatively high drawdown risk.** Even if growth remains strong in the coming year, markets are still susceptible to temporary drawdowns, especially given the high level of valuations. We think the two most prominent risks to markets in 2018 are (1) pressures on US corporate margins from rising wages and 2) a swing in market psychology around the withdrawal of QE, which could lead to a faster re-pricing of interest rate markets than we assume.
- **More room to grow in EM.** While most developed economies are currently growing well above potential, most emerging market economies still have room for growth to accelerate in 2018.

Our *Top Trade* recommendations reflect our *Top Ten Market Themes* for the year ahead. To capture the gradual normalization of the bond term premium and position for a more hawkish path of the Fed funds rate than the market currently expects, we recommend going short 10-year US Treasuries. Given our expectations of a 'soggy Dollar' in 2018, we think investors should position for a rotation into Euro area assets and continued Yield Curve Control from the BoJ by going long EUR/JPY. We expect EM growth to accelerate further in the coming year and suggest going long the EM growth cycle via the MSCI EM stock market index. At the same time, the EM credit cycle appears 'younger and friendlier' than the ageing US credit cycle, so we recommend going long the EMBI Global against US High-Yield credit. The combination of solid global growth and supportive domestic factors should help the Indonesian Rupiah, the Indian Rupee and Korean Won rally in 2018, while we expect the low-yielding Singaporean Dollar and Japanese Yen to underperform. Since the strong global demand environment should also help the commodity complex perform well but commodities as an investment carry poorly, we recommend going long BRL, CLP and PEN to gain diversified exposure to the commodities story.

We will mark the starting levels for these Top Trade recommendations as of the New York close on November 16.

For the exclusive use of JOSEPH.STEIN@GS.COM

Top Trade #1: Position for more Fed hikes and a rebuild of 'term premium' by shorting 10-year US Treasuries

Go short 10-year US Treasuries with a target of 3.0% and a stop at 2.0%.

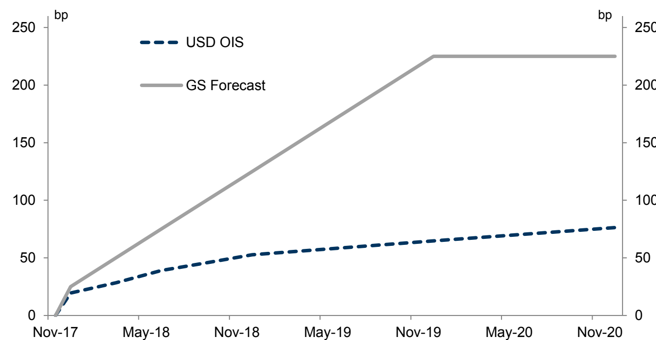
We forecast that the yield on 10-year US Treasury Notes will head towards 3% next year, levels last seen before the decline in oil prices in 2014. By contrast, the market discounts that 10-year yields will be at 2.5% at the end of 2018, a meagre 20bp above spot levels. Our view builds on two main assumptions. First, QE and negative rate policies conducted by central banks in Europe and Japan have amplified the fall in the term premium on bonds globally and have contributed to flatten the US yield curve this year – a central ingredient in our macro rates strategy for 2017. As a result of this, we think that US monetary conditions are too accommodative for the Fed's comfort in light of the little spare capacity left in the jobs market. This will likely lead the FOMC to deliver policy rate hikes in excess of those discounted by the market (Exhibit 1). On our US Economists' baseline projections, Dec 2018 Eurodollar futures, trading at an implied yield of 2.0%, will settle at 2.5%.

Second, we expect a normalization in the US bond term premium from the current exceptionally low levels over the coming quarters (Exhibit 2). This will reflect the compounding of two forces. One is an increase in inflation uncertainty as the economic cycle continues to mature. The other reflects the interplay of the lower amount of Treasury bonds that the Fed will roll over (quantitative tightening, QT) and higher Treasury issuance. We expect these dynamics to come to the fore particularly in the second half of the year.

For the exclusive use of JOSEPH.STEIN@GS.COM

Exhibit 1: Market Pricing of Fed's Policy Path Is Too Flat Relative to Our Economists' Projections

Cumulative changes in US policy rates - market pricing and GS expectations



Source: Bloomberg, Goldman Sachs Global Investment Research

Exhibit 2: The Decline in the Term Premium Has Contributed to Easier Financial Conditions

Estimates of 10-year expected short-term rate and term premium based on affine term structure model

Source: Bloomberg, Federal Reserve Board, Goldman Sachs Global Investment Research

Top Trade #2: Go long EUR/JPY for continued rotation around a flat Dollar

Go long EUR/JPY with a target of 140 and a stop at 130.

Although most economies are sharing in the upturn in global activity, there remains scope for divergence in capital flows and therefore FX performance. Among the major developed markets, we think this is particularly true for the Euro and Yen. We expect both currencies to head back to one twenty—1.20 for EUR and 120 for JPY—over the

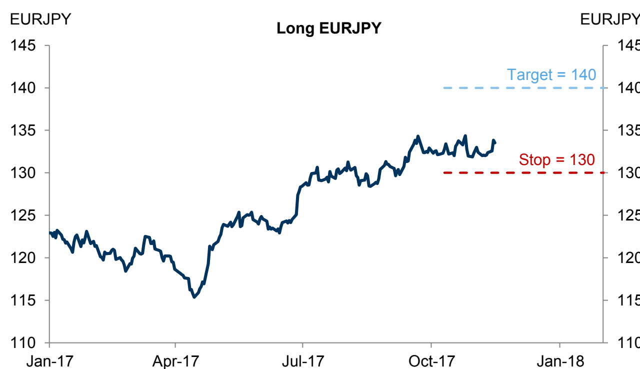
For the exclusive use of JOSEPH.STEIN@GS.COM

coming months. We therefore recommend that investors go long the cross, with a target of 140 and stop of 130 (Exhibit 3).

We interpreted the run-up in the Euro in 2017 as a kind of 'short-covering' rally. Euro area growth picked up, national politics trended in a favourable direction, and the ECB began to turn its attention away from monetary easing and towards the eventual normalisation in policy by tapering bond purchases. Against this backdrop, many investors seem to have decided that Euro shorts were no longer appropriate—especially given estimates of long-run 'fair value' for EUR/USD of around 1.30. Direct measures of investor positioning bear this out. For instance, net speculative Euro length in futures swung from a short of $9bn at the start of the year to a long of $12bn as of last week. These portfolio shifts seem to have more room to run: bond funds remain long USD in aggregate, and FX reserve managers have not started to cover their substantial EUR underweight. Continued inflows into Euro area assets should support the EUR currency, even as interest rates remain low.

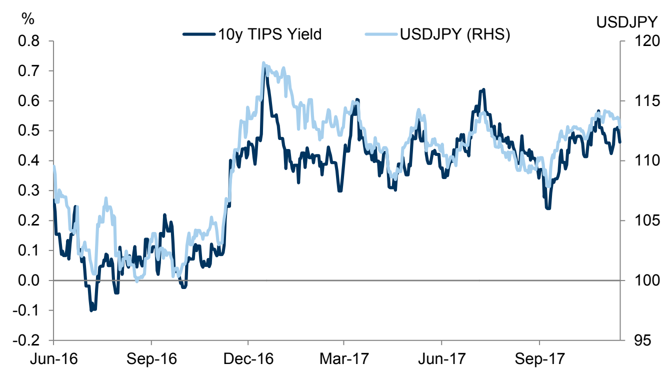
The opposite holds true for the Japanese Yen. Because of the Bank of Japan's Yield Curve Control (YCC) policy, USD/JPY has remained highly correlated with yields on long-maturity US Treasuries (Exhibit 4). As a result of the recent general election—in which the LDP won another supermajority—a continuation of YCC appears very likely for the time being. Although the policy is beginning to bear fruit—in terms of improving price and wage trends—we suspect that Governor Kuroda (or his possible replacement) will judge these favourable signs as well short of what is needed to consider reversing course. Therefore, with global yields pushing higher on the back of solid growth, we think USD/JPY can again approach its cyclical highs.

Exhibit 3: EUR/JPY Has Scope to Push Higher



Source: Bloomberg, Goldman Sachs Global Investment Research

Exhibit 4: Yen Remains Correlated with Long-End Real Rates



Source: Bloomberg, Goldman Sachs Global Investment Research

Top Trade #3: Go long the EM growth cycle via the MSCI EM stock market index

Go long EM equities through the MSCI EM Index with a target at 1300 (+15%) and a stop at 1040 (-8%).

As we outline in our *Top Themes for 2018*, we expect strong and synchronous global growth to continue into 2018. We prefer to own growth exposure in emerging economies, which we think have more room to grow. When EM growth is above-trend and rising, equities typically outperform on a volatility-adjusted basis.

From an earnings perspective, we see much more scope for EM corporates to surprise to the upside, driving equity performance in 2018 (Exhibit 6). MSCI EM EPS have rebounded quite quickly from a six-year stagnation and, in local currency terms, EM earnings per share (EPS) has repaired the 'damage' of the 2010-2016 period. We expect MSCI EM EPS to rise another 10% in 2018, which should drive the bulk of the upside in this trade ("EM equity and the "macro consensus" trade heading into 2018", *Global Markets Analyst*, Nov. 19, 2017).

From a valuation perspective, EM equities are not cheap relative to their own history (they are currently trading in the 86th percentile of the historical P/E range), but they are cheap relative to US equities (38th percentile of historical relative P/E range), which should hopefully offer some cushion in a global risk-off event. We find that the relative valuation of EM to DM equity is largely influenced by the growth differential between the two regions; and we forecast this differential to widen another 60bp next year, which in turn should drive EM valuations to expand relative to DM by around 3%.

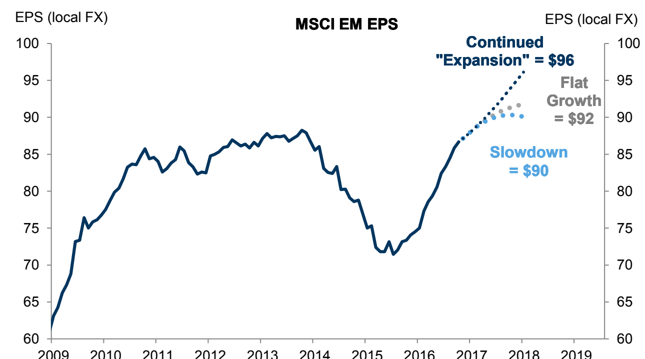
To be sure, a long-only EM equity trade carries significant 'pullback risk', especially given the current entry point. Accordingly, we have set a stop on the recommended trade at -8%, which provides enough buffer to accommodate for a shock similar to the EM equity sell-off around the US election. Although EM equities have had a good run in 2017, we do not view the asset class as over-owned. Indeed, the cumulative foreign flow into major EM equity markets is still tracking below historical averages.

For the exclusive use of JOSEPH.STEIN@GS.COM

Exhibit 5: We Expect MSCI EM to Rise Towards 1300 in 2018...

Source: FactSet, Goldman Sachs Global Investment Research

Exhibit 6: ...Driven by a Continued 'Expansion Phase' in EM Earnings



Source: FactSet, Goldman Sachs Global Investment Research

Top Trade #4: Go long the inflation risk premium in the Euro area via EUR 5-year 5-year forward inflation swaps

Go long EUR 5-year 5-year forward inflation with a target of 2.0% and a stop at 1.5%.

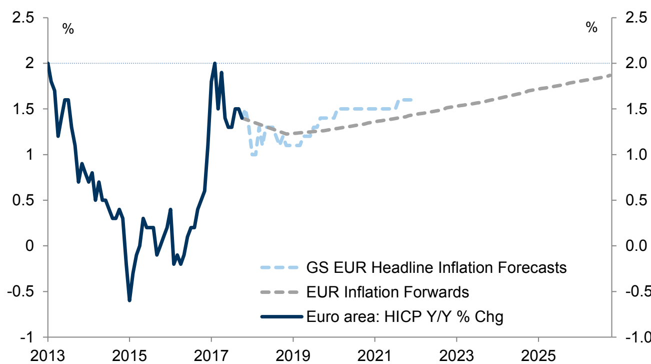
We recommend going long Euro area 5-year inflation 5-years forward (henceforth 5y-5y) through EUR inflation swaps, for an target of 2.0% – levels last seen in mid-2014 ahead of the fall in crude oil prices. The rationale for the trade is threefold. First, the risk premium on Euro area forward inflation is currently depressed, offering an attractive entry point. A low inflation risk premium can be inferred from the flat term structure of

inflation swap yields. The difference between 5-year inflation, which is priced roughly in line with the expectations of our European Economists (Exhibit 7), and 5y-5y forward is near the lowest levels observed since the 2011 crisis. Second, the inflation options market assigns high odds to Euro area headline inflation staying at or below 1% over the next 5 years. Against this backdrop, the ECB has reiterated its determination to keep monetary policy accommodative in order to encourage a rebuild of inflationary pressures. With the expansion in activity and job creation likely to continue, we expect the inflation risk premium to increase.

The third reason to be long forward-dated inflation relates to shifts in central bank policies already in train. We have argued that by pushing down nominal yields below their macro 'fair value', large-scale net purchases of long-dated bonds by the major central banks may have also distorted the pricing of future inflation (Exhibit 8) ("Low Term Premium: Why Should We Care?" *Global Markets Daily*, Nov. 8, 2017; and a recent speech by BIS chief economist Hyun Song Shin 'Do Central Banks Speak Too Much'). As the Fed rolls over only a portion of the Treasuries that mature on its balance sheet in coming quarters and the ECB brings its net purchases of Euro area government bonds to an end, the term premium on long-dated nominal bonds should edge back up. This will, in our view, also promote a steeper slope of the EUR inflation curve.

Exhibit 7: Market Pricing of Euro Area Inflation Over the Next 5 years In Line with GS Projections

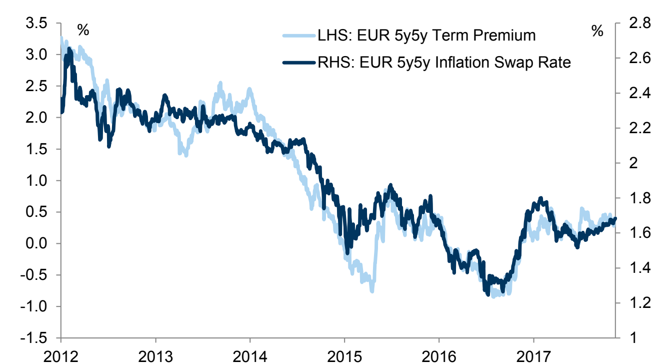
Year-on-year changes in HICP inflation, GS expectations, and 1-year inflation forward rates



Source: Bloomberg, Eurostat, Haver Analytics, Goldman Sachs Global Investment Research

Exhibit 8: 5y5y Term Premium in Euro Area 'Core' Rates and 5y5y Inflation Swaps Exhibit Strong Co-movement

Affine term structure estimates of EUR 5y5y term premium and 5y5y EUR inflation swaps



Source: Bloomberg, European Central Bank, Goldman Sachs Global Investment Research

Top Trade #5: Position for 'early vs. late' cycle in EM vs. the US by going long the EMBI Global Index against short the US High Yield iBoxx Index

Go long EM USD credit through the EMBI Global against US High-Yield credit through the iBoxx USD Liquid High Yield Index, with a 1.5x1 notional ratio, indexed at inception to 100, with a total return target at 106 and a stop at 96.

The EM credit cycle is 'younger and friendlier' relative to an ageing US corporate credit cycle. With the improvement in macro fundamentals across EM, namely better current account balances, dis-inflation and FX reserve accumulation, we do not see a near-term risk of Dollar funding concerns. While EM credit spreads are not cheap *per se*, we see relative value against the US High-Yield market. In addition to the growing exposure of

For the exclusive use of JOSEPH.STEIN@GS.COM

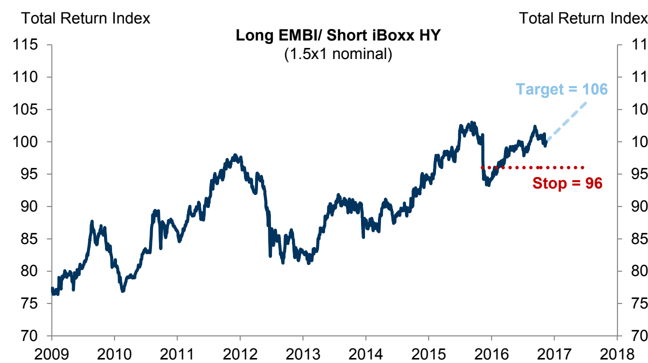
the latter to secularly challenged sectors, with the US cycle maturing and profit margins potentially eroding, we see more fundamental concerns in US High-Yield than in the EMBI (of which 70% of the constituents are sovereign bonds and the remainder in 'quasi-sovereigns').

Unlike most EM trades, long EM credit vs. US High-Yield has yet to fully recover from the sell-off following the US election. Since the 'taper tantrum', EM has generally outperformed with the exception of a few sharp risk-off events that had specific negative-EM implications (such as the sharp decline in oil prices and Russian recession in late 2014/early 2015, and the 2016 US presidential election). However, other risk-off periods, such as the Euro crisis in early 2011, saw EM credit outperform US high-yield.

The relative performance of EM vs. US High-Yield consistently tracks the EM-DM growth differential (Exhibit 10). We expect the general trend of EM outperformance to continue in a pro-risk environment and see the entry point as attractive, albeit admittedly slightly less so following the recent High-Yield sell-off. Finally, this trade is positive carry and should perform well if global spreads move sideways to tighter. We have set the stop at -4%, which coincides roughly with the bottom reached after the US election.

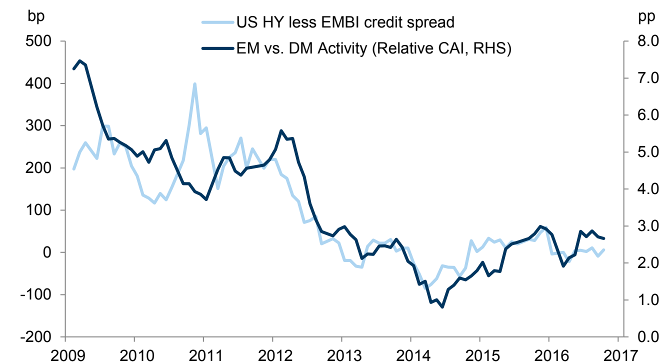
For the exclusive use of JOSEPH.STEIN@GS.COM

Exhibit 9: We Expect EMBI to Outperform US High-Yield Credit...



Source: Datastream, Goldman Sachs Global Investment Research

Exhibit 10: ... as the Growth Differential Between EM and DM Improves



Source: Datastream, Goldman Sachs Global Investment Research

Top Trade #6: Own diversified Asian growth, and the hedge the interest rate risk via FX relative value (long INR, IDR, KRW vs. short SGD and JPY)

Go long an equal-weighted basket of INR, IDR, KRW against an equal-weighted basket of SGD and JPY, indexed at inception to 100, with a total-return target at 110 and stop at 95.

INR, IDR and KRW provide diversified exposure to the strong global growth we forecast in 2018 and specific idiosyncratic factors that should support their currencies in the year ahead. The combination of commodity exporting (IDR) and commodity importing (INR and KRW) currencies on the long leg of the recommended trade offers some protection against swings in commodity prices. By funding out of SGD and JPY, not only do we take advantage of their low yields, but JPY underperformance should also provide a hedge should the move higher in US yields lead to wobbles in the currencies where we

recommend being long. The overall trade carries positively to the tune of about 4% over the year.

Country-specific factors in India, Indonesia and South Korea should boost their currencies, on top of the strong global growth environment we expect next year. Specifically:

India's bank re-capitalization plan should impart a powerful positive impulse to investment in the coming year and should break the vicious cycle of higher non-performing loans, weaker bank balance sheets and slower credit growth. As the drags from GST implementation and de-monetization also fade, we expect growth to move from 6.2% in 2017 to 7.6% in calendar 2018. In addition to the three hikes we expect the Reserve Bank of India to deliver by Q2-2019, the high carry, FDI and equity inflows should also be supportive for the INR. We have moved our 12-month forecast for $/INR stronger to 62.

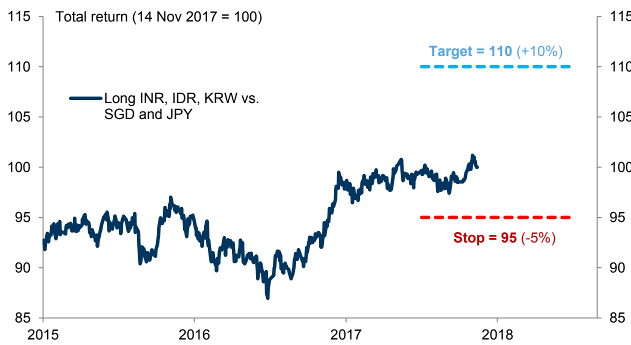
We continue to see Indonesia as a good carry market. As the drag on domestic consumption from the tax amnesty fades in 2018, we expect economic growth to move up to 5.8% in 2018 (from 5.2% in 2017), while the current account, inflation, and fiscal deficit should remain stable. We think Bank Indonesia is done easing and should move to hike rates by 50bp in H2-2018. We also expect Indonesia to be included in the Global Aggregate bond index, which could prompt one-off inflows worth US$5bn in Q1-2018 (vs. US$10bn bond inflows YTD in 2017). We have moved our 12-month forecast for $/IDR stronger to 13000. Finally, Indonesia, like India, has accumulated reserves over the past year that now stand at record high levels and should help mitigate volatility.

We expect the KRW to outperform other low-yielding Asian peers in 2018. The strong memory chip cycle should extend at least through H1-2018, while the government's income-led growth policy provides a fiscal boost. Together with the boost from improving exports, this should allow the Bank of Korea to withdraw monetary accommodation in the face of rising financial stability concerns, with three policy rate hikes to 2.0% penciled in by the end of 2018. The thawing of China/South Korea relations and rebound in Chinese tourists should also help the travel balance. Overall, we expect the current account to remain stable at around 5% of GDP in 2018. Further deregulation in outbound capital flows could temper KRW strength over the medium term, but might not pass the National Assembly in the near future given fragmentation in the legislative body. Our 12-month forecast for $/KRW is now stronger at 1060.

On the funding side, not only do SGD and JPY offer a low yield, we expect them to underperform in the year ahead. While we expect the Monetary Authority of Singapore to steepen its appreciation bias in October, we do not expect any significant SGD appreciation versus Asian peers given that the SGD is already trading on the strong side of the policy band. Meanwhile, we forecast USD/JPY at 120 in 12 months. With the BoJ controlling the yield curve as US rates move higher, JPY should continue to weaken, especially if US rates move higher than the forwards discount, as we expect.

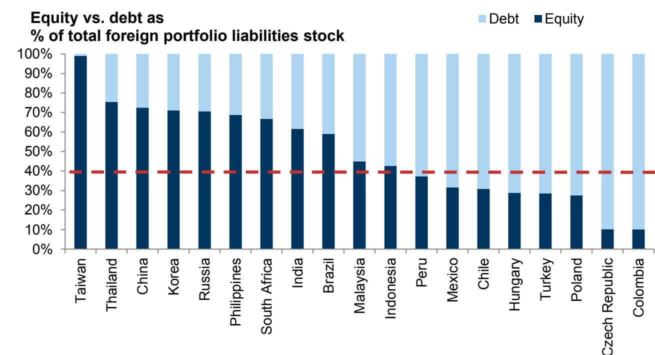
For the exclusive use of JOSEPH.STEIN@GS.COM

Exhibit 11: Accelerating Growth Should Propel INR, IDR and KRW Stronger in 2018...



Source: Goldman Sachs , Goldman Sachs Global Investment Research

Exhibit 12: ... With Equity Inflows Supporting These 'Equity-centric' Markets in Asia



Source: Haver Analytics, Goldman Sachs Global Investment Research

For the exclusive use of JOSEPH.STEIN@GS.COM

Top Trade #7: Go long the global growth and non-oil commodity 'beta' through BRL, CLP, PEN vs. short USD

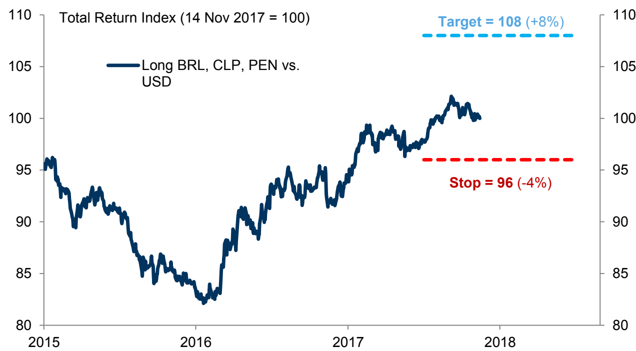
Go long a volatility-weighted basket of BRL, CLP and PEN (weights of 0.25, 0.25 and 0.5) against USD, indexed at inception to 100, with a total return target of 108 and a stop at 96.

The ongoing strength of global growth should continue to support a rally in most industrial metal prices. Our seventh *Top Trade* recommendation aims to capture this dynamic by going long the 'growth and metals beta'. All three currencies on the long side have reliably responded to upswings in global trade and external demand over the past two decades. Moreover, each has performed particularly well in the pre-crisis decade, a period that also featured strong global growth and buoyant industrial metals prices. CLP offers direct exposure to a particularly encouraging story in copper, while BRL and PEN provide more varied metals exposures. The recommended trade has a positive carry of roughly 2.5% a year, and our 12-month forecasts are stronger than the forwards in all cases: we forecast USD/BRL at 3.10 in 12 months, USD/CLP at 605 in 12 months and USD/PEN at 3.15 in 12 months.

Beyond these global factors, our recommended Top Trade allows for diversified exposure to an encouraging Latin American growth recovery. Not only should growth in Brazil pick up as it recovers from a deep recession (and a recent BRL sell-off, creating an attractive entry-point), but BRL screens as strongly undervalued on our GSFEER currency model due to a combination of contained inflation and current account rebalancing, making BRL an attractive high carry currency. Meanwhile, PEN – the low-vol 'tortoise' of Andean FX – offers exposure to one of the most attractive valuation stories in the EM low- to mid-yielder space. Last but not least, CLP – the 'hare' of Andean FX – has moved quickly in 2017, so sends a somewhat less attractive valuation signal, but provides direct exposure to our most encouraging metals view, copper, and what opinion polls suggest is likely to be a market-friendly outcome in the upcoming Chilean election.

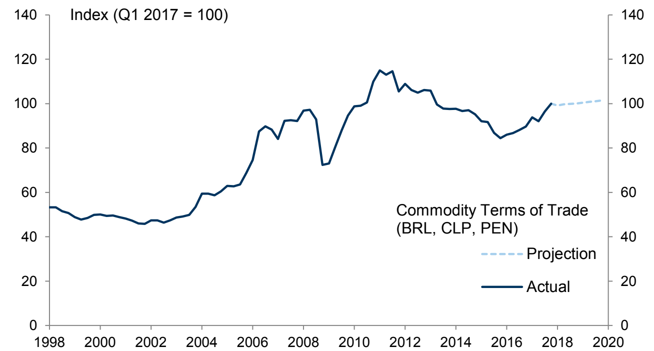
Finally, although it is designed for our global base case of strong growth, our Top Trade #7 can perform well in other external environments, potentially including a global growth disappointment. In particular, while BRL is a high-yielding and 'equity-like' currency, CLP and PEN are each lower-yielding and more 'debt-like': they have historically shown relatively resilient performance vs. the USD during periods of both declining growth and falling core rates.

Exhibit 13: We See BRL, CLP and PEN Recovering from Their Recent Pullback on the Back of Stronger Macro Fundamentals...



Source: Goldman Sachs, Goldman Sachs Global Investment Research

Exhibit 14: ... and Improving Commodity Terms-of-Trade in the Years Ahead



Source: Goldman Sachs, Goldman Sachs Global Investment Research

The Global Macro Markets Team

For the exclusive use of JOSEPH.STEIN@GS.COM

Disclosure Appendix

Reg AC

I, Francesco Garzarelli, hereby certify that all of the views expressed in this report accurately reflect my personal views, which have not been influenced by considerations of the firm's business or client relationships.

Unless otherwise stated, the individuals listed on the cover page of this report are analysts in Goldman Sachs' Global Investment Research division.

Disclosures

Global product; distributing entities

The Global Investment Research Division of Goldman Sachs produces and distributes research products for clients of Goldman Sachs on a global basis. Analysts based in Goldman Sachs offices around the world produce equity research on industries and companies, and research on macroeconomics, currencies, commodities and portfolio strategy. This research is disseminated in Australia by Goldman Sachs Australia Pty Ltd (ABN 21 006 797 897); in Brazil by Goldman Sachs do Brasil Corretora de Títulos e Valores Mobiliários S.A.; Ombudsman Goldman Sachs Brazil: 0800 727 5764 and / or ouvidoriagoldmansachs@gs.com. Available Weekdays (except holidays), from 9am to 6pm. Ouvidoria Goldman Sachs Brasil: 0800 727 5764 e/ou ouvidoriagoldmansachs@gs.com. Horário de funcionamento: segunda-feira à sexta-feira (exceto feriados), das 9h às 18h; in Canada by either Goldman Sachs Canada Inc. or Goldman Sachs & Co. LLC; in Hong Kong by Goldman Sachs (Asia) L.L.C.; in India by Goldman Sachs (India) Securities Private Ltd.; in Japan by Goldman Sachs Japan Co., Ltd.; in the Republic of Korea by Goldman Sachs (Asia) L.L.C., Seoul Branch; in New Zealand by Goldman Sachs New Zealand Limited; in Russia by OOO Goldman Sachs; in Singapore by Goldman Sachs (Singapore) Pte. (Company Number: 198602165W); and in the United States of America by Goldman Sachs & Co. LLC. Goldman Sachs International has approved this research in connection with its distribution in the United Kingdom and European Union.

European Union: Goldman Sachs International authorised by the Prudential Regulation Authority and regulated by the Financial Conduct Authority and the Prudential Regulation Authority, has approved this research in connection with its distribution in the European Union and United Kingdom; Goldman Sachs AG and Goldman Sachs International Zweigniederlassung Frankfurt, regulated by the Bundesanstalt für Finanzdienstleistungsaufsicht, may also distribute research in Germany.

General disclosures

This research is for our clients only. Other than disclosures relating to Goldman Sachs, this research is based on current public information that we consider reliable, but we do not represent it is accurate or complete, and it should not be relied on as such. The information, opinions, estimates and forecasts contained herein are as of the date hereof and are subject to change without prior notification. We seek to update our research as appropriate, but various regulations may prevent us from doing so. Other than certain industry reports published on a periodic basis, the large majority of reports are published at irregular intervals as appropriate in the analyst's judgment.

Goldman Sachs conducts a global full-service, integrated investment banking, investment management, and brokerage business. We have investment banking and other business relationships with a substantial percentage of the companies covered by our Global Investment Research Division. Goldman Sachs & Co. LLC, the United States broker dealer, is a member of SIPC (http://www.sipc.org).

Our salespeople, traders, and other professionals may provide oral or written market commentary or trading strategies to our clients and principal trading desks that reflect opinions that are contrary to the opinions expressed in this research. Our asset management area, principal trading desks and investing businesses may make investment decisions that are inconsistent with the recommendations or views expressed in this research.

The analysts named in this report may have from time to time discussed with our clients, including Goldman Sachs salespersons and traders, or may discuss in this report, trading strategies that reference catalysts or events that may have a near-term impact on the market price of the equity securities discussed in this report, which impact may be directionally counter to the analyst's published price target expectations for such stocks. Any such trading strategies are distinct from and do not affect the analyst's fundamental equity rating for such stocks, which rating reflects a stock's return potential relative to its coverage group as described herein.

We and our affiliates, officers, directors, and employees, excluding equity and credit analysts, will from time to time have long or short positions in, act as principal in, and buy or sell, the securities or derivatives, if any, referred to in this research.

The views attributed to third party presenters at Goldman Sachs arranged conferences, including individuals from other parts of Goldman Sachs, do not necessarily reflect those of Global Investment Research and are not an official view of Goldman Sachs.

Any third party referenced herein, including any salespeople, traders and other professionals or members of their household, may have positions in the products mentioned that are inconsistent with the views expressed by analysts named in this report.

This research is not an offer to sell or the solicitation of an offer to buy any security in any jurisdiction where such an offer or solicitation would be illegal. It does not constitute a personal recommendation or take into account the particular investment objectives, financial situations, or needs of individual clients. Clients should consider whether any advice or recommendation in this research is suitable for their particular circumstances and, if appropriate, seek professional advice, including tax advice. The price and value of investments referred to in this research and the income from them may fluctuate. Past performance is not a guide to future performance, future returns are not guaranteed, and a loss of original capital may occur. Fluctuations in exchange rates could have adverse effects on the value or price of, or income derived from, certain investments.

Certain transactions, including those involving futures, options, and other derivatives, give rise to substantial risk and are not suitable for all investors. Investors should review current options disclosure documents which are available from Goldman Sachs sales representatives or at http://www.theocc.com/about/publications/character-risks.jsp. Transaction costs may be significant in option strategies calling for multiple purchase and sales of options such as spreads. Supporting documentation will be supplied upon request.

Differing Levels of Service provided by Global Investment Research: The level and types of services provided to you by the Global Investment Research division of GS may vary as compared to that provided to internal and other external clients of GS, depending on various factors including your individual preferences as to the frequency and manner of receiving communication, your risk profile and investment focus and perspective (e.g., marketwide, sector specific, long term, short term), the size and scope of your overall client relationship with GS, and legal and regulatory constraints. As an example, certain clients may request to receive notifications when research on specific securities is published, and certain clients may request that specific data underlying analysts' fundamental analysis available on our internal client websites be delivered to them electronically through data feeds or otherwise. No change to an analyst's fundamental research views (e.g., ratings, price targets, or material changes to earnings estimates for equity securities), will be communicated to any client prior to inclusion of such information in a research report broadly disseminated through electronic publication to our internal client websites or through other means, as necessary, to all clients who are entitled to receive such reports.

For the exclusive use of JOSEPH.STEIN@GS.COM

All research reports are disseminated and available to all clients simultaneously through electronic publication to our internal client websites. Not all research content is redistributed to our clients or available to third-party aggregators, nor is Goldman Sachs responsible for the redistribution of our research by third party aggregators. For research, models or other data related to one or more securities, markets or asset classes (including related services) that may be available to you, please contact your GS representative or go to http://360.gs.com.

Disclosure information is also available at http://www.gs.com/research/hedge.html or from Research Compliance, 200 West Street, New York, NY 10282.

© 2017 Goldman Sachs.

No part of this material may be (i) copied, photocopied or duplicated in any form by any means or (ii) redistributed without the prior written consent of The Goldman Sachs Group, Inc.

For the exclusive use of JOSEPH.STEIN@GS.COM