

U.S. Economic Views

Falling Unemployment Need Not Deter Fed from Easy Policy

- As the unemployment rate sinks toward estimates of its natural rate, markets are wondering if a pickup in wage and price inflation is just around the corner.
- The Phillips curve seems to have broken down as there no longer appears to be much of a tradeoff between unemployment and inflation.
- The Fed is openly planning to maintain a policy that is easier than conditions warrant for the next two years.
- The biggest forms of current slack in the labor market are not counted in the unemployment rate.
- We are still convinced that inflation will remain subdued in coming years. As such, we anticipate a very slow trajectory of rate hikes, with the policy rate at 0.5 percent by yearend and 1.0 percent at the end of 2016.

Peter D'Antonio

+1-212-816-9889

peter.dantonio@citi.com

Malcolm D Spittler

+1-212-816-2461

malcolm.d.spittler@citi.com

William Lee

william.lee@citi.com

Dana M Peterson

dana.peterson@citi.com

Joe Seydl

joseph.seydl@citi.com

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

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

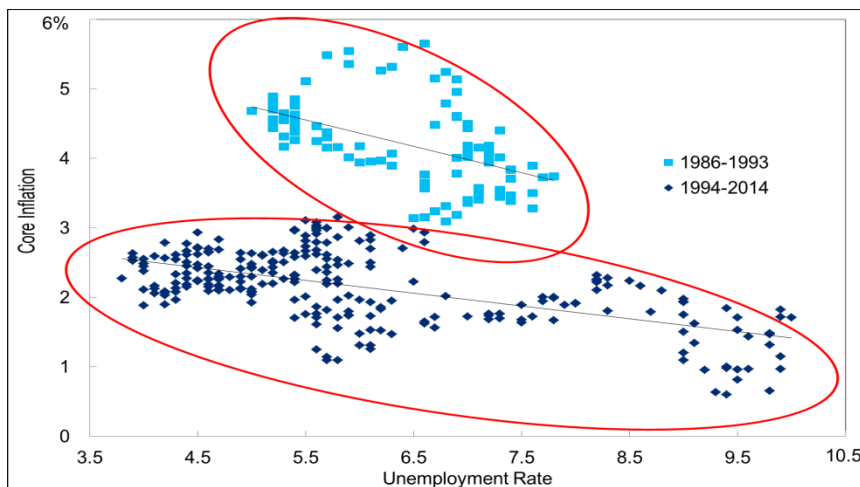
Falling Unemployment Need Not Deter Fed

As the unemployment rate sinks toward estimates of its natural rate, markets are wondering if a pickup in wage and price inflation is just around the corner. However, there is reason to believe that the unemployment rate is not currently capturing all of the labor market slack. The large output gap supports the view that unemployment can continue to fall probably below 5 percent without generating inflation pressures. We anticipate only a gradual rise in wage inflation from an exceptionally low rate in the coming year.

Historically, the unemployment rate has been an important barometer of the degree of slack in the economy. This is notable because declining slack has been associated with rising wage and price inflation. Specifically, as the actual unemployment rate declines toward and eventually below the natural rate, inflation has picked up. The relationship between unemployment and inflation is known as the Phillips curve and has been a bedrock of the inflation model used to underpin monetary policy.

The Phillips curve seems to have broken down as there no longer appears to be much of a tradeoff between unemployment and inflation (Figure 1).^{1 2} One of the most compelling explanations for this shift is that monetary policy has become so credible at anchoring inflation that inflation expectations now supersede slack as the most important inflation driver. In fact, one study showed that inflation is explained well by assuming inflation expectations are constant.³ These alternate specifications for the Phillips curve offer little help to policymakers and markets because they are concerned with such a narrow band of outcomes in which inflation is expected to remain quiescent. But policy needs to be flexible to the possibility that inflation expectations may become unmoored.

Figure 1. The Phillips Curve Has Flattened as Monetary Policy has Become More Credible



Note: Core inflation is year-to-year percent change in Core CPI. Source: Bureau of Labor Statistics.

The Fed has tended to emphasize inflation expectations measured by surveys, which have been remarkably steady. Market based measures have dipped for a variety of reasons, including lower oil prices, weakness in demand and pricing

¹ See Roberts, John M., "Monetary Policy and Inflation Dynamics," International Journal of Central Banking, September 2006.

² See Mandel, Benjamin, "[Perspectives: Missing Inflation? Explaining the Behavior of U.S. Consumer Prices](#)".

³ See Ball and Mazumder, "A Phillips Curve With Anchored Expectations and Short-Term Unemployment." National Bureau of Economic Research, 2014.

abroad, and the appreciation of the dollar. Even so, market measures are more complacent about falling unemployment.

There is no question that inflation expectations now dominate the current path of underlying inflation. They act as a steadying and self-fulfilling force that won't allow inflation to swing too wildly. However, even assuming Fed credibility has stabilized expectations, this inflation anchor is only effective as long as the Fed follows policies that reinforce it.

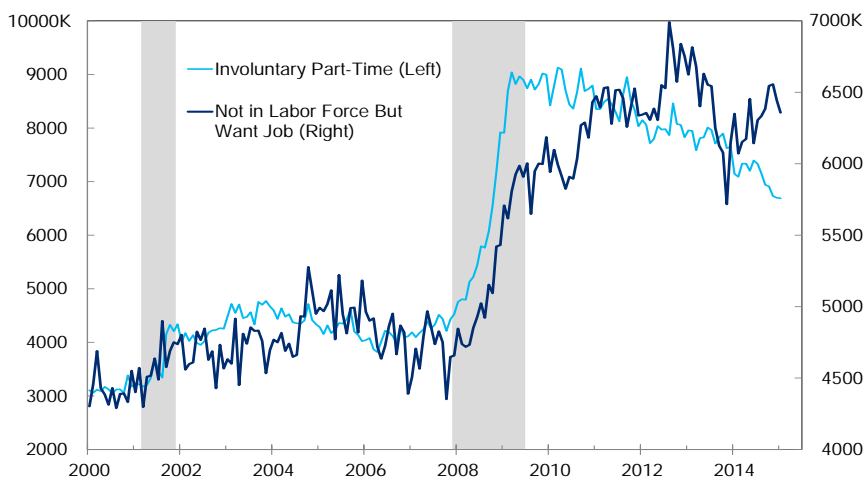
The Fed's inflation-fighting credibility may be jeopardized by its latest policy stance. It is openly planning to maintain a policy that is easier than conditions warrant for the next two years. As such, it is important to remain vigilant on slack as an early warning about the prospects for inflation. The Fed and many market participants expect the unemployment rate to fall through the natural rate in that time. Could this unmoor inflation expectations? Will this pose a problem for inflation prospects? The answers rests on the underlying slack in the economy.

Jobless Rate Overstates Labor Market Improvement

The unemployment rate appears to have improved by much more than the labor market as a whole, giving a false sense that the economy is approaching full employment. The labor market has changed in important ways that may have diminished the effectiveness of the unemployment rate as a tool to measure slack during this business cycle. In fact, there are reasons to believe that the current natural rate may be much lower than generally believed, a view that is implicit in the Fed's plan to maintain easy policy even as the unemployment rate falls below their long run unemployment estimates.

We believe the biggest forms of current slack in the labor market are not counted in the unemployment rate. For instance, 6.4 million workers are not in the workforce but are available and want a job. That figure is one-third higher than the previous decade average. These discouraged workers are not counted as unemployed by the Labor Department. Also, 6.8 million people still involuntarily work part-time, which is 70 percent higher than the previous decade average. These workers are considered employed. Both of these groups represent significant underemployment (**Figure 2**).

Figure 2. The Number of Marginally Attached Workers and Involuntary Part-Time Workers Remains High

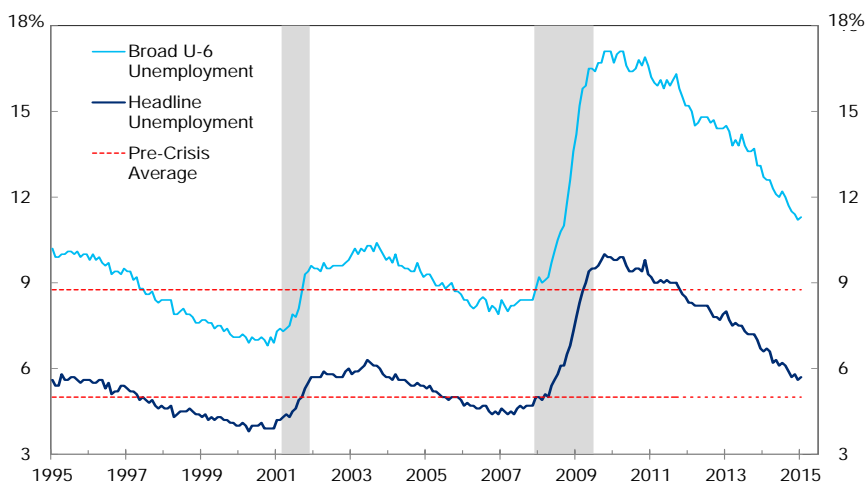


Note: Shaded regions denote recessions. Source: Bureau of Labor Statistics.

The broad U-6 unemployment rate adds these discouraged and part-time workers to the unemployed to get a general measure of underemployment. While the headline unemployment rate is closing in on the natural rate, the U-6 rate still is 2½ percentage points above norms (Figure 3). Our previous statistical work on this suggests that the natural rate could be a half point lower than implied by the headline U-3 unemployment rate.⁴

In addition, the unusual surge in the number of people on disability probably lowers the natural rate of unemployment even further. An estimated 900K extra disability awards were made since the recession, or 0.5 percent of the workforce. As a result, many people who normally would have been counted as unemployed have instead left the labor force permanently. The net effect from the discouraged, part-time and disabled workers is that the natural rate of unemployment could be a point lower than generally believed.

Figure 3. Broad U-6 Unemployment Remains Shows More Slack than Headline Unemployment



Note: Shaded regions denote recessions. Sources: Bureau of Labor Statistics and Citi Research.

Some observers note that the natural rate could be higher because of the huge pool of people unemployed for long durations. The reasoning for this view is that these people have lost skills or have left the workforce in all but name, but they remain (and will continue to be) on the unemployment rolls. Our research suggests that this large group is the legacy of sluggish hiring across all workers. The long term unemployed are finding work over time and should not be assumed to be dead weight adding to the unemployment rate. **We showed in “Unlucky Job Searches” that long term unemployment is cyclical and represents slack just like the short term unemployed.**⁵

The Potential Gap Remains Wide

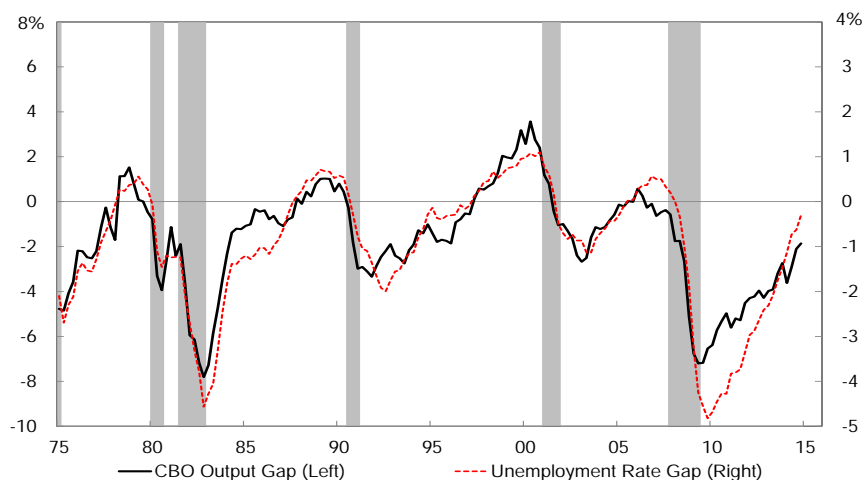
Other measures show significant slack remains in the economy. They are consistent with this view that the unemployment rate can decline substantially below general estimates of the natural rate (5 – 5½ percent) without igniting inflation. For instance, actual GDP is still about 2 percent above its long run potential, according to Congressional Budget Office (CBO) estimates (Figure 4). In fact, this measure,

⁴ See Mandel, Benjamin, [“U.S. Macro Focus: How Much Slack is there in the U.S. Labor Market? Implications of the Shadow Unemployment Rate”](#).

⁵ See D’Antonio, Peter, “Unlucky” Job Searches in [U.S. Economics Weekly: Market and Policy Comments](#) May 2014.

known as the potential gap or output gap, is about as big now (five and a half years into recovery) as it was at the worst point of the 1991 recession. The potential gap suggests that the economy has a lot more room to grow before inflation pressures emerge.

Figure 4. The Unemployment Rate Gap Has Closed By More than the Output Gap

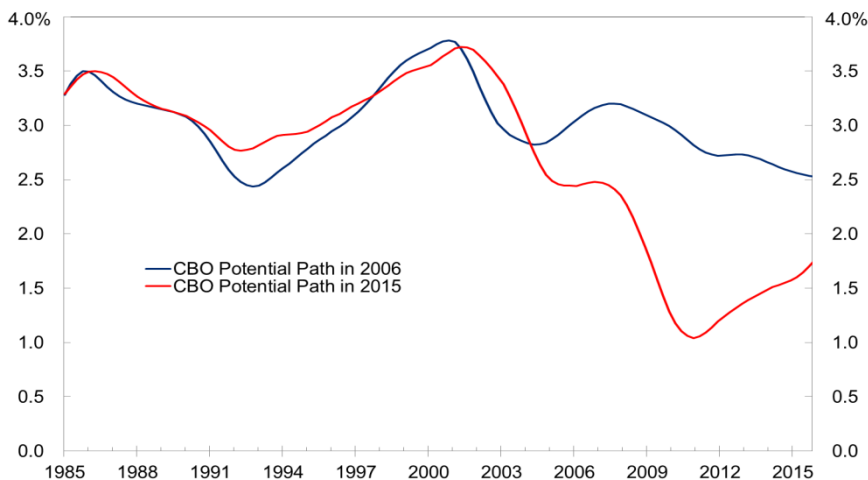


Note: Unemployment rate gap is NAIRU - Unemployment rate. Sources: Congressional Budget Office and Bureau of Labor Statistics.

Some market participants believe there is less slack than suggested by the potential gap. They argue that the economy's potential growth rate has slowed sharply in the past decade, after rising at approximately 3 percent per annum for decades.

We actually agree that potential growth has slowed markedly. Our top-down estimates coincide with CBO bottom-up estimates that normal potential growth has been cut in half in this cycle (**Figure 5**). Factors such as demographics (aging population, slow immigration, low birth rates), underinvestment in infrastructure, increasing regulation, and a distortionary tax system could have played roles in dampening the long run potential.

Figure 5. The Congressional Budget Office Has Drastically Lowered the Path of Real Potential GDP Growth Since the Crisis



Note: Figures are year-to-year percent changes. Source: Congressional Budget Office.

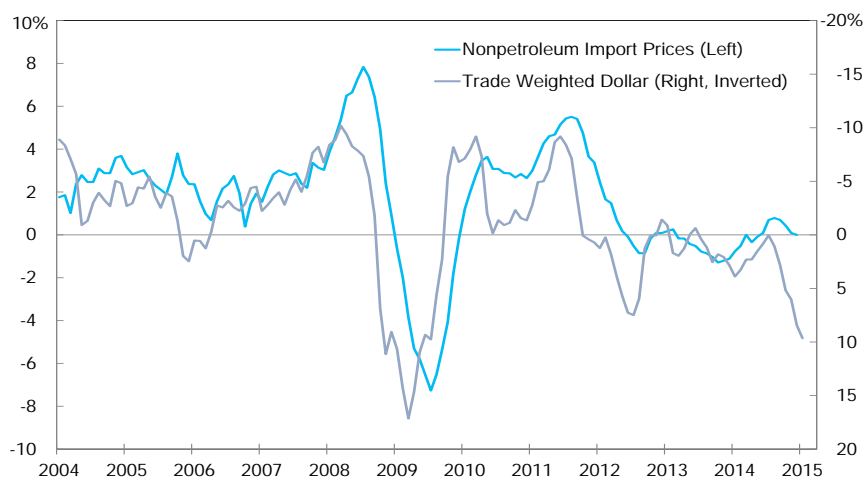
However, the size of the current potential gap is mainly due to two other important factors: (1) The Great Recession of 2008-09 was so deep that it created a massive undershoot on the order of 7 percent of GDP. (2) Growth during this expansion has been extremely sluggish, averaging just 2.3 percent per year. So, despite the slower growth of potential GDP, it is taking a long time to reactivate the underused parts of the economy.

The potential gap offers one more reason to believe that the unemployment rate is not capturing all of the slack in the economy. Underutilization can be manifested in other areas besides the labor market. Indeed, there is a considerable degree of product market slack in sectors such as housing services, residential construction and financial services. These sectors have little labor market content, so any undershoot would not be picked up proportionately in the unemployment rate. For example, there are no employees associated with the flow of housing services from most owner occupied housing, and it takes just a few employees in a building management company to maintain an apartment building. Yet, housing services account for 12 percent of GDP (roughly the same as business fixed investment).

Fed Can Pursue Easy Policy Without Inflation Pressures

Despite the recent rapid improvements in the labor market, we are still convinced that inflation will remain subdued in coming years. For now, inflation expectations remain solidly anchored, despite the steady decline in the unemployment rate. Even as the jobless rate falls through the natural rate, underlying slack in the economy likely will reinforce low inflation. We expect core PCE inflation of about 1½ percent for the next few quarters and only a gradual drift toward the 2 percent target in 2016.

Figure 6. Nonpetroleum Import Prices Move with the Trade-Weighted Dollar



Note: Figures are year-to-year percent changes. The trade-weighted dollar is in nominal terms.
Source: Bureau of Labor Statistics and Federal Reserve Board.

In addition, global overcapacity compounds the slack in the United States, providing another important reason to anticipate only a gradual increase in wage rates and little inflation pressures. The US has become more integrated into the global economy in the past decade.⁶ Weak demand in US trading partners'

⁶ See Lee, William, "U.S. Economic Views: FOMC Edition - US Monetary Tightening Starts Without the Fed"; and "U.S. Economic Views: FOMC Edition - Fed Tactics—Certainly Rates to Rise Slower But Maybe Earlier".

economies and the associated appreciation of the dollar could hold down US domestic pricing power of tradable goods **(Figure 6)**.

The continued subdued inflation outlook and the likelihood that there is ample slack in the economy implies monetary policy can stay on hold longer. The Fed is likely to hold easy policy long after traditional policy rules would suggest a rate increase. We anticipate a very slow trajectory of rate hikes, with the policy rate at 0.5 percent by yearend and 1.0 percent at the end of 2016.

Upcoming Releases of Economic Indicators

Date	Time	Report	Citi	Median	Low	High	Prior Report	2 Periods Ago
2/17	8:30	Empire State Manufacturing (Feb)		8.5	3.5	14.0	9.9	-1.2
2/18	8:30	Producer Price Index (Jan)	-0.4%	-0.4%	-1.1%	0.3%	-0.3%	-0.2%
		Food and Energy	0.1%	0.1%	0.0%	0.2%	0.3%	0.0%
		Housing Starts (Jan)	1,020K	1,070K	1,007K	1,120K	1,089K	1,043
		Permits	1,060K	1,068K	1,007K	1,110K	1,058K	1,052K
	9:15	Industrial Production (Jan)	0.2%	0.3%	-0.1%	0.9%	-0.1%	1.3%
		Capacity Utilization	79.7%	79.9%	79.5%	80.2%	79.7%	80.0%
2/19	8:30	Initial Jobless Claims (Feb 14)	275K	290K	270K	320K	304K	279K
		Beneficiaries (Feb 7)	2.36M				2.35M	2.40M
	10:00	Philadelphia Business Survey (Feb)	5.0%	9.0%	4.0%	15.0%	6.3%	24.3%
		Leading Indicators (Jan)	0.2%	0.3%	0.1%	0.6%	0.5%	0.4%

Events

2/17	8:45	Treasury undersecretary for international affairs Sheets, to speak about the global economy in Washington.
	12:45	Philadelphia Fed President Plosser to deliver his final speech as a Fed President in Philadelphia.
2/18	17:00	Fed Governor Powell to speak on a panel about regulatory reform in New York.

Sources: Bloomberg and Citi Research.

Citi North America Economics Team

For informational purposes only

NEW YORK

North America

Willem Buiter	+1-212 816-2363	Chief Economist
William Lee	+1-212 816-2621	Head of North America Economics
Peter D'Antonio	+1-212 816-9889	U.S. Forecast
Dana Peterson	+1-212 816-3549	U.S. Fiscal Policy and Canada
Joseph Seydl	+1-212 816-2473	Global Economics
Malcolm Spittler	+1-212 816-2461	U.S. Forecast

Note: All of the analysts listed above are employed by Citigroup Global Markets Inc.

NON-US RESEARCH ANALYST DISCLOSURES: The non-US research analysts listed above (i.e., the research analysts listed above other than those identified as employed by Citigroup Global Markets Inc.) are not registered/qualified as research analysts with FINRA. Such research analysts may not be associated persons of the member organization and therefore may not be subject to the NYSE Rule 472 and NASD Rule 2711 restrictions on communications with a subject company, public appearances and trading securities held by a research analyst account. Unless indicated in Appendix A-1 of this document or any of the referenced documents, the analysts listed above have not contributed to this document or any of the referenced documents.

U.S. Economic Views — Previous Essays

	Publication Date
A Crisis Deferred is Not a Crisis Resolved — 2015 Fiscal Policy Reform Wish Lists, Realities, and Market Implications	6 February 2015
Solid US Growth Evokes Patience As FOMC Looks Abroad	29 January 2015
Unchecked Spending Will Soon Entangle Policymakers	16 January 2015
Oil-Induced Growth Lubricates Liftoff	8 January 2015
Cleaning Up Oily Misconceptions and Other Analytical Slips	19 December 2014
Fed Tactics—Certainly Rates to Rise Slower But Maybe Earlier	18 December 2014
Pump Priming Consumption Boosts Growth Temporarily But May Fool Markets and the Fed	12 December 2014
Hot Jobs and Cheap Gas Signal Temporary Spending Boom	5 December 2014
FOMC Minutes Inform Our Revised Fed Call	21 November 2014
Reassessing Downside Risks to Above-Trend Growth	7 November 2014
Domestic Conditions Allow QE to End While Symmetric Data Dependence Shapes Policy Guidance	29 October 2014
Bull Markets to Supermarkets? Wealth as a Driver of Consumer Spending	24 October 2014
Market Turmoil Risks Delaying Fed Tightening	17 October 2014
Fed Minutes Highlight Dollar Risk: Labor Index Proves Uninformative	10 October 2014
US Monetary Tightening Starts Without the Fed	8 October 2014
Job Gains Drive Stronger Spending Ahead	3 October 2014
Fed Focuses on Payrolls...up to a Point	26 September 2014
Wanted by the Fed: Above-Trend Growth	19 September 2014
FOMC Stands Pat But Reveals Its "Tell"	18 September 2014

Global Economics View — Previous Essays

	Publication Date
Did the SNB score an own goal? Francly, yes	16 January 2015
Credit Where it is Due: Bank Lending and the Disappointing U.S. Recovery	1 December 2014
How Will The New Fed Exit Strategy Work?	16 June 2014
The Long-Run Decline in Advanced-Economy Investment	12 June 2014
How Could The EM Turmoil Affect The Advanced Economies?	17 March 2014
Policy Uncertainty and Investment—How Much Lower Must Real Interest Rates Go?	3 February 2014
Secular Stagnation: Only If We Really Ask For It	13 January 2014
Debt Limit—Indecision Raises Long-Term Risks	10 October 2013

U.S. Fiscal Monitor — Previous Essays

	Publication Date
Unchecked Spending Will Soon Entangle Policymakers	16 January 2015
Yearend Political Drama Redux – Poor Theater and Worse Policy Making	8 December 2014
Impending Fiscal Crisis — (Part I - The Key Drivers)	20 November 2014

February 2015

Monday	Tuesday	Wednesday	Thursday	Friday
<p>9</p> <p>Auction 3 & 6 Mth. Bills: \$52.0B</p>	<p>10</p> <p>Wholesale Inventories Nov 0.8%, Dec 0.1%</p> <p>Small Business (Jan)</p> <p>Auction 3-Yr. Note: \$24.0B Auction 1 Mth. Bill: \$40.0B</p>	<p>11</p> <p>Mortgage Applications</p> <p>Auction 10-Yr. Note: \$24.0B</p>	<p>12</p> <p>Jobless Claims 2/7 304 Thous</p> <p>Retail Sales Total: Dec -0.9%, Jan -0.8% ExAuto: Dec -0.9%, Jan -0.9%</p> <p>Business Inventories Nov 0.2%, Dec 0.1%</p> <p>Ann. 30-Yr TIPS: \$9.0B Auction 30-Yr. Bond: \$16.0B</p>	<p>13</p> <p>Import Price Index Total: Dec -1.9%, Jan(E) -3.8% ExPetro Dec 0.1%, Jan(E)</p> <p>Reuters/Michigan Sentiment JanF 98.1 , FebP(E) 93.6</p>
<p>16</p> <p>President's Day NYSE Holiday Federal Gov't Holiday</p>	<p>17</p> <p>Empire State Manufacturing Jan 9.95, Feb(E)</p> <p>Mortgage Deliq. (4Q)</p> <p>Auction 3 & 6 Mth. Bills: \$52.0B(E)</p>	<p>18</p> <p>Mortgage Applications Producer Price Index Final Demand: Dec -0.2%, Jan(E) -0.4% ExF&E: Dec 0.3%, Jan(E) 0.1%</p> <p>Housing Starts Dec 1,089K, Jan(E) 1,020K</p> <p>Permits Dec 1,058K, Jan(E) 1,060K</p> <p>Industrial Production Dec -0.1%, Jan(E) 0.2%</p> <p>Capacity Utilization Dec 79.7%, Jan(E) 79.7%</p> <p>FOMC Minutes Released Auction 1 Mth. Bill: \$40.0B(E)</p>	<p>19</p> <p>Jobless Claims 2/14 275 Thous(E)</p> <p>Philly Outlook Survey Jan 6.3%, Feb(E) 5.0%</p> <p>Leading Indicators Dec 0.5%, Jan(E) 0.2%</p> <p>Ann. 2-Yr. FRN(r): \$13.0B(E) Ann. 2-Yr. Note: \$26.0B(E) Ann. 5-Yr. Note: \$35.0B(E) Ann. 7-Yr. Note: \$29.0B(E) Auction 30-Yr TIPS: \$16.0B(E)</p>	<p>20</p>
<p>23</p> <p>Existing Home Sales Dec 5.04M, Jan(E)</p> <p>Auction 3 & 6 Mth. Bills: \$52.0B(E)</p>	<p>24</p> <p>S&P/CaseShiller (Dec)</p> <p>Consumer Confidence Jan 102.9, Feb(E)</p> <p>Auction 2-Yr. Note: \$26.0B(E) Auction 1 Mth. Bill: \$30.0B(E)</p>	<p>25</p> <p>Mortgage Applications</p> <p>New Home Sales Dec 481K, Jan(E)</p> <p>Auction 2-Yr. FRN: \$13.0B(E) Auction 5-Yr. Note: \$35.0B(E)</p>	<p>26</p> <p>Jobless Claims 2/21</p> <p>Consumer Price Index Total: Dec -0.4%, Jan(E) ExF&E: Dec 0.0%, Jan(E)</p> <p>Durable Goods Total: Dec -3.3%, Jan(E) ExTrans: Dec -0.8%, Jan(E)</p> <p>Real Earnings (Jan) FHFA (Dec)</p> <p>Auction 7-Yr. Note: \$29.0B(E)</p>	<p>27</p> <p>GDP 4Q14A 2.6%, 4Q14P(E)</p> <p>Chain Price Index 4Q14A 0.0%, 4Q14P(E)</p> <p>Chicago Barometer PMI: Jan 59.4, Feb(E) Prices: Jan 44.2, Feb(E)</p> <p>Reuters/Michigan Sentiment FebP 93.6, FebF(E)</p> <p>Farm Prices (Feb) Pending Home Sales (Jan)</p>
<p>Mar 2</p> <p>Personal Income Dec 0.3%, Jan(E)</p> <p>Consumption Dec -0.3%, Jan(E)</p> <p>Construction PIP Dec 0.4%, Jan(E)</p> <p>ISM Manufacturing PMI: Jan 53.5, Feb(E) Prices: Jan 35.0, Feb(E)</p> <p>Auction 3 & 6 Mth. Bills: \$52.0B(E)</p>	<p>3</p> <p>Total Vehicle Sales Jan 16.6M, Feb(E)</p> <p>Auction 1 Mth. Bill: \$30.0B(E)</p>	<p>4</p> <p>Mortgage Applications ADP Employment (Feb)</p> <p>Beige Book</p> <p>ISM Non-Manufacturing PMI: Jan 56.7, Feb(E) Prices: Jan 45.5, Feb(E)</p>	<p>5</p> <p>Jobless Claims 2/28</p> <p>Nonfarm Productivity Prod: 4QP -1.8%, 4QR(E) ULC: 4QP 2.7%, 4QR(E)</p> <p>Factory Orders Ord: Dec -3.4%, Jan(E) Inv: Dec -0.3%, Jan(E)</p> <p>Ann. 3-Yr. Note: \$24.0B(E) Ann. 10-Yr. Note: \$21.0B(E) Ann. 30-Yr. Bond(r): \$13.0B(E)</p>	<p>6</p> <p>Employment Payrolls: Jan 257K, Feb(E) Unem. Rate: Jan 5.7%, Feb(E) Avg Hrlly Earn: Jan 0.5%, Feb(E) Priv. Wrkvw: Jan 34.6H, Feb(E)</p> <p>International Trade Balance Dec -\$46.6B, Jan(E)</p> <p>Consumer Credit Dec \$14.8B, Jan(E)</p>

(E) Indicates Citigroup estimates. (A) Advance. (P) Preliminary. (F) Final. (UNCH) Unchanged. (R) Revised. Contributor: Martha Berasain.

Appendix A-1

Analyst Certification

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

IMPORTANT DISCLOSURES

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

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

NON-US RESEARCH ANALYST DISCLOSURES

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

Citigroup Global Markets Inc

Peter D'Antonio; Malcolm D Spittler; William Lee; Dana M Peterson; Joe Seydl

OTHER DISCLOSURES

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

Securities recommended, offered, or sold by the Firm: (i) are not insured by the Federal Deposit Insurance Corporation; (ii) are not deposits or other obligations of any insured depository institution (including Citibank); and (iii) are subject to investment risks, including the possible loss of the principal amount invested. Although information has been obtained from and is based upon sources that the Firm believes to be reliable, we do not guarantee its accuracy and it may be incomplete and condensed. Note, however, that the Firm has taken all reasonable steps to determine the accuracy and completeness of the disclosures made in the Important Disclosures section of the Product. The Firm's research department has received assistance from the subject company(ies) referred to in this Product including, but not limited to, discussions with management of the subject company(ies). Firm policy prohibits research analysts from sending draft research to subject companies. However, it should be presumed that the author of the Product has had discussions with the subject company to ensure factual accuracy prior to publication. All opinions, projections and estimates constitute the judgment of the author as of the date of the Product and these, plus any other information contained in the Product, are subject to change without notice. Prices and availability of financial instruments also are subject to change without notice. Notwithstanding other departments within the Firm advising the companies discussed in this Product, information obtained in such role is not used in the preparation of the Product. Although Citi Research does not set a predetermined frequency for publication, if the Product is a fundamental research report, it is the intention of Citi Research to provide research coverage of the/those issuer(s) mentioned therein, including in response to news affecting this issuer, subject to applicable quiet periods and capacity constraints. The Product is for informational purposes only and is not intended as an offer or solicitation for the purchase or sale of a security. Any decision to purchase securities mentioned in the Product must take into account existing public information on such security or any registered prospectus.

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

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

The Citigroup legal entity that takes responsibility for the production of the Product is the legal entity which the first named author is employed by. The Product is made available in **Australia** through Citigroup Global Markets Australia Pty Limited. (ABN 64 003 114 832 and AFSL No. 240992), participant of the ASX Group and regulated by the Australian Securities & Investments Commission. Citigroup Centre, 2 Park Street, Sydney, NSW 2000. The Product is made available in Australia to Private Banking wholesale clients through Citigroup Pty Limited (ABN 88 004 325 080 and AFSL 238098). Citigroup Pty Limited provides all financial product advice to Australian Private Banking wholesale clients through bankers and relationship managers. If there is any doubt about the suitability of investments held in Citigroup Private Bank accounts, investors should contact the Citigroup Private Bank in Australia. Citigroup companies may compensate affiliates and their representatives for providing products and services to clients. The Product is made available in **Brazil** by Citigroup Global Markets Brasil - CCTVM SA, which is regulated by CVM - Comissão de Valores Mobiliários, BACEN - Brazilian Central Bank, APIMEC - Associação dos Analistas e Profissionais de Investimento do Mercado de Capitais and ANBID - Associação Nacional dos Bancos de Investimento. Av. Paulista, 1111 - 11º andar - CEP. 01311920 - São Paulo - SP. If the Product is being made available in certain provinces of **Canada** by Citigroup Global Markets (Canada) Inc. ("CGM Canada"), CGM Canada has approved the Product. Citigroup Place, 123 Front Street West, Suite 1100, Toronto, Ontario M5J 2M3. This product is available in **Chile** through Banchile Corredores de Bolsa S.A., an indirect subsidiary of Citigroup Inc., which is regulated by the Superintendencia de Valores y Seguros. Agustinas 975, piso 2, Santiago, Chile. The Product is distributed in **Germany** by Citigroup Global Markets Deutschland AG ("CGMD"), which is regulated by Bundesanstalt fuer Finanzdienstleistungsaufsicht (BaFin). CGMD, Reuterweg 16, 60323 Frankfurt am Main. Research which relates to "securities" (as defined in the Securities and Futures Ordinance (Cap. 571 of the Laws of Hong Kong)) is issued in **Hong Kong** by, or on behalf of, Citigroup Global Markets Asia Limited which takes full responsibility for its content. Citigroup Global Markets Asia Ltd. is regulated by Hong Kong Securities and Futures Commission. If the Research is made available through Citibank, N.A., Hong Kong Branch, for its clients in Citi Private Bank, it is made available by Citibank N.A., Citibank Tower, Citibank Plaza, 3 Garden Road, Hong Kong. Citibank N.A. is regulated by the Hong Kong Monetary Authority. Please contact your Private Banker in Citibank N.A., Hong Kong, Branch if you have any queries on or any matters arising from or in connection with this document. The Product is made available in **India** by Citigroup Global Markets India Private Limited, which is regulated by Securities and Exchange Board of India. 1202, 12th Floor, FIFC, G Block, Bandra Kurla Complex, Bandra East, Mumbai - 400051 Corporate Identity Number: U99999MH2000PTC126657 Tel:+9102261759999 Fax:+9102261759961. The Product is made available in **Indonesia** through PT Citigroup Securities Indonesia. 5/F, Citibank Tower, Bapindo Plaza, Jl. Jend. Sudirman Kav. 54-55, Jakarta 12190. Neither this Product nor any copy hereof may be distributed in Indonesia or to any Indonesian citizens wherever they are domiciled or to Indonesian residents except in compliance with applicable capital market laws and regulations. This Product is not an offer of securities in Indonesia. The securities referred to in this Product have not been registered with the Capital Market and Financial Institutions Supervisory Agency (BAPEPAM-LK) pursuant to relevant capital market laws and regulations, and may not be offered or sold within the territory of the Republic of Indonesia or to Indonesian citizens through a public offering or in circumstances which constitute an offer within the meaning of the Indonesian capital market laws and regulations. The Product is made available in **Israel** through Citibank NA, regulated by the Bank of Israel and the Israeli Securities Authority. Citibank, N.A., Platinum Building, 21 Ha'arba'ah St, Tel Aviv, Israel. The Product is made available in **Italy** by Citigroup Global Markets Limited, which is authorised by the PRA and regulated by the FCA and the PRA. Via dei Mercanti, 12, Milan, 20121, Italy. The Product is made available in **Japan** by Citigroup Global Markets Japan Inc. ("CGMJ"), which is regulated by Financial Services Agency, Securities and Exchange Surveillance Commission, Japan Securities Dealers Association, Tokyo Stock Exchange and Osaka Securities Exchange. Shin-Marunouchi Building, 1-5-1 Marunouchi, Chiyoda-ku, Tokyo 100-6520 Japan. If the Product was distributed by SMBC Nikko Securities Inc. it is being so distributed under license. In the event that an error is found in an CGMJ research report, a revised version will be posted on the Firm's Citi Velocity website. If you have questions regarding Citi Velocity, please call (81 3) 6270-3019 for help. The Product is made available in **Korea** by Citigroup Global Markets Korea Securities Ltd., which is regulated by the Financial Services Commission, the Financial Supervisory Service and the Korea Financial Investment Association (KOFIA). Citibank Building, 39 Da-dong, Jung-gu, Seoul 100-180, Korea. KOFIA makes available registration information of research analysts on its website. Please visit the following website if you wish to find KOFIA registration information on research analysts of Citigroup Global Markets Korea Securities Ltd. <http://dis.kofia.or.kr/websquare/index.jsp?w2xPath=/wq/fundMgr/DISFundMgrAnalystList.xml&divisionId=MDIS03002002000000&serviceId=SDIS030020020000>. The Product is made available in Korea by Citibank Korea Inc., which is regulated by the Financial Services Commission and the Financial Supervisory Service. Address is Citibank Building, 39 Da-dong, Jung-gu, Seoul 100-180, Korea. The Product is made available in **Malaysia** by Citigroup Global Markets Malaysia Sdn Bhd (Company No. 460819-D) ("CGMM") to its clients and CGMM takes responsibility for its contents. CGMM is regulated by the Securities Commission of Malaysia. Please contact CGMM at Level 43 Menara Citibank, 165 Jalan Ampang, 50450 Kuala Lumpur, Malaysia in respect of any matters arising from, or in connection with, the Product. The Product is made available in **Mexico** by Acciones y Valores Banamex, S.A. De C. V., Casa de Bolsa, Integrante del Grupo Financiero Banamex ("Accival") which is a wholly owned subsidiary of Citigroup Inc. and is regulated by Comision Nacional Bancaria y de Valores. Reforma 398, Col. Juarez, 06600 Mexico, D.F. In **New Zealand** the Product is made available to 'wholesale clients' only as defined by s5C(1) of the Financial Advisers Act 2008 ('FAA') through Citigroup Global Markets Australia Pty Ltd (ABN 64 003 114 832 and AFSL No. 240992), an overseas financial adviser as defined by the FAA, participant of the ASX Group and regulated by the Australian Securities & Investments Commission. Citigroup Centre, 2 Park Street, Sydney, NSW 2000. The Product is made available in **Pakistan** by Citibank N.A. Pakistan branch, which is regulated by the State Bank of Pakistan and Securities Exchange Commission, Pakistan. AWT Plaza, 1.1. Chundrigar Road, P.O. Box 4889, Karachi-74200. The Product is made available in the **Philippines** through Citicorp Financial Services and Insurance Brokerage Philippines, Inc., which is regulated by the Philippines Securities and Exchange Commission. 20th Floor Citibank Square Bldg. The Product is made available in the Philippines through Citibank NA Philippines branch, Citibank Tower, 8741 Paseo De Roxas, Makati City, Manila. Citibank NA Philippines NA is regulated by The Bangko Sentral ng Pilipinas. The Product is made available in **Poland** by Dom Maklerski Banku Handlowego SA an indirect subsidiary of Citigroup Inc., which is regulated by Komisja Nadzoru Finansowego. Dom Maklerski Banku Handlowego S.A. ul.Senatorska 16, 00-923 Warszawa. The Product is made available in the **Russian Federation** through ZAO Citibank, which is licensed to carry out banking activities in the Russian Federation in accordance with the general banking license issued by the Central Bank of the Russian Federation and brokerage activities in accordance with the license issued by the Federal Service for Financial Markets. Neither the Product nor any information contained in the Product shall be considered as advertising the securities mentioned in this report within the territory of the Russian Federation or outside the Russian Federation. The Product does not constitute an appraisal within the meaning of the Federal Law of the Russian Federation of 29 July 1998 No. 135-FZ (as amended) On Appraisal Activities in the Russian Federation. 8-10 Gasheka Street, 125047 Moscow. The Product is made available in **Singapore** through Citigroup Global Markets Singapore Pte. Ltd. ("CGMSPL"), a capital markets services license holder, and regulated by Monetary Authority of Singapore. Please contact CGMSPL at 8 Marina View, 21st Floor Asia Square Tower 1, Singapore 018960, in respect of any matters arising from, or in connection with, the analysis of this document. This report is intended for recipients who are

accredited, expert and institutional investors as defined under the Securities and Futures Act (Cap. 289). The Product is made available by The Citigroup Private Bank in Singapore through Citibank, N.A., Singapore Branch, a licensed bank in Singapore that is regulated by Monetary Authority of Singapore. Please contact your Private Banker in Citibank N.A., Singapore Branch if you have any queries on or any matters arising from or in connection with this document. This report is intended for recipients who are accredited, expert and institutional investors as defined under the Securities and Futures Act (Cap. 289). This report is distributed in Singapore by Citibank Singapore Ltd ("CSL") to selected Citigold/Citigold Private Clients. CSL provides no independent research or analysis of the substance or in preparation of this report. Please contact your Citigold/Citigold Private Client Relationship Manager in CSL if you have any queries on or any matters arising from or in connection with this report. This report is intended for recipients who are accredited investors as defined under the Securities and Futures Act (Cap. 289). Citigroup Global Markets (Pty) Ltd. is incorporated in the **Republic of South Africa** (company registration number 2000/025866/07) and its registered office is at 145 West Street, Sandton, 2196, Saxonwold. Citigroup Global Markets (Pty) Ltd. is regulated by JSE Securities Exchange South Africa, South African Reserve Bank and the Financial Services Board. The investments and services contained herein are not available to private customers in South Africa. The Product is made available in the **Republic of China** through Citigroup Global Markets Taiwan Securities Company Ltd. ("CGMTS"), 14 and 15F, No. 1, Songzhi Road, Taipei 110, Taiwan and/or through Citibank Securities (Taiwan) Company Limited ("CSTL"), 14 and 15F, No. 1, Songzhi Road, Taipei 110, Taiwan, subject to the respective license scope of each entity and the applicable laws and regulations in the Republic of China. CGMTS and CSTL are both regulated by the Securities and Futures Bureau of the Financial Supervisory Commission of Taiwan, the Republic of China. No portion of the Product may be reproduced or quoted in the Republic of China by the press or any third parties [without the written authorization of CGMTS and CSTL]. If the Product covers securities which are not allowed to be offered or traded in the Republic of China, neither the Product nor any information contained in the Product shall be considered as advertising the securities or making recommendation of the securities in the Republic of China. The Product is for informational purposes only and is not intended as an offer or solicitation for the purchase or sale of a security or financial products. Any decision to purchase securities or financial products mentioned in the Product must take into account existing public information on such security or the financial products or any registered prospectus. The Product is made available in **Thailand** through Citicorp Securities (Thailand) Ltd., which is regulated by the Securities and Exchange Commission of Thailand. 399 Interchange 21 Building, 18th Floor, Sukhumvit Road, Klongtoey Nua, Wattana, Bangkok 10110, Thailand. The Product is made available in **Turkey** through Citibank AS which is regulated by Capital Markets Board. Tekfen Tower, Eski Büyükdere Caddesi # 209 Kat 2B, 23294 Levent, Istanbul, Turkey. In the **U.A.E.**, these materials (the "Materials") are communicated by Citigroup Global Markets Limited, DIFC branch ("CGML"), an entity registered in the Dubai International Financial Center ("DIFC") and licensed and regulated by the Dubai Financial Services Authority ("DFSA") to Professional Clients and Market Counterparties only and should not be relied upon or distributed to Retail Clients. A distribution of the different Citi Research ratings distribution, in percentage terms for Investments in each sector covered is made available on request. Financial products and/or services to which the Materials relate will only be made available to Professional Clients and Market Counterparties. The Product is made available in **United Kingdom** by Citigroup Global Markets Limited, which is authorised by the Prudential Regulation Authority ("PRA") and regulated by the Financial Conduct Authority ("FCA") and the PRA. This material may relate to investments or services of a person outside of the UK or to other matters which are not authorised by the PRA nor regulated by the FCA and the PRA and further details as to where this may be the case are available upon request in respect of this material. Citigroup Centre, Canada Square, Canary Wharf, London, E14 5LB. The Product is made available in **United States** by Citigroup Global Markets Inc, which is a member of FINRA and registered with the US Securities and Exchange Commission. 388 Greenwich Street, New York, NY 10013. Unless specified to the contrary, within EU Member States, the Product is made available by Citigroup Global Markets Limited, which is authorised by the PRA and regulated by the FCA and the PRA. Pursuant to Comissão de Valores Mobiliários Rule 483, Citi is required to disclose whether a Citi related company or business has a commercial relationship with the subject company. Considering that Citi operates multiple businesses in more than 100 countries around the world, it is likely that Citi has a commercial relationship with the subject company.

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

Compensation of equity research analysts is determined by equity research management and Citigroup's senior management and is not linked to specific transactions or recommendations.

The Product is not to be construed as providing investment services in any jurisdiction where the provision of such services would not be permitted.

Subject to the nature and contents of the Product, the investments described therein are subject to fluctuations in price and/or value and investors may get back less than originally invested. Certain high-volatility investments can be subject to sudden and large falls in value that could equal or exceed the amount invested. Certain investments contained in the Product may have tax implications for private customers whereby levels and basis of taxation may be subject to change. If in doubt, investors should seek advice from a tax adviser. The Product does not purport to identify the nature of the specific market or other risks associated with a particular transaction. Advice in the Product is general and should not be construed as personal advice given it has been prepared without taking account of the objectives, financial situation or needs of any particular investor. Accordingly, investors should, before acting on the advice, consider the appropriateness of the advice, having regard to their objectives, financial situation and needs. Prior to acquiring any financial product, it is the client's responsibility to obtain the relevant offer document for the product and consider it before making a decision as to whether to purchase the product. Citi Research generally disseminates its research to the Firm's global institutional and retail clients via both proprietary (e.g., Citi Velocity and Citi Personal Wealth Management) and non-proprietary electronic distribution platforms. Certain research may be disseminated only via Citi's proprietary distribution platforms; however such research will not contain changes to earnings forecasts, target price, investment or risk rating or investment thesis or be otherwise inconsistent with the author's previously published research. Certain research is made available only to institutional investors to satisfy regulatory requirements. Individual Citi Research analysts may also opt to circulate published research to one or more clients by email; such email distribution is discretionary and is done only after the research has been disseminated.

The level and types of services provided by Citi Research analysts to clients may vary depending on various factors such as the client's individual preferences as to the frequency and manner of receiving communications from analysts, the client's risk profile and investment focus and perspective (e.g. market-wide, sector specific, long term, short-term etc.), the size and scope of the overall client relationship with Citi and legal and regulatory constraints. Citi Research product may source data from dataCentral. dataCentral is a Citi Research proprietary database, which includes Citi estimates, data from company reports and feeds from Thomson Reuters. The printed and printable version of the research report may not include all the information (e.g., certain financial summary information and comparable company data) that is linked to the online version available on Citi's proprietary electronic distribution platforms.

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

ADDITIONAL INFORMATION IS AVAILABLE UPON REQUEST
