

## Economics

10 August 2010 | 13 pages

# Turkey Macro View

## Inflation Remains Hostage to Cyclical Factors

- Predicting inflation in Turkey is a particularly difficult undertaking, which is subject to frequent large revisions (Figure 1). With this challenge in mind, this note aims to shed more light on the Turkish inflation process since 2003. Our findings show that: (i) Turkey's trend inflation remains relatively high and rigid; and (ii) inflation is mainly driven by cyclical shocks, which introduces an additional element of uncertainty, thereby making inflation harder to forecast.
- We find that while capacity utilisation, global agriculture and commodity prices have become more important in driving cyclical inflation in the last few years, the relative importance of the exchange rate has declined considerably since mid-2008. In terms of the strongest link between cyclical inflation and the key drivers, the results show that: (i) global agricultural prices have led cyclical inflation by 2 months since mid-2009, compared with 6 months prior to 2008; (ii) capacity utilisation, which became statistically significant only after January 09, leads cyclical inflation by 2 months; and (iii) commodity prices currently lead cyclical inflation by 2 months.
- Our analysis suggests that there is a need to anchor inflation expectations more solidly, as long-run inflation expectations are a key driver of trend inflation. Anchoring of inflation expectations is not a *deus ex machina*. Since it is widely acknowledged that inflation is always and everywhere a monetary phenomenon, monetary policy is likely to be the main driver of long-term inflation expectations. In this regard, there is some evidence leading us to believe that the CBT's policy stance hasn't been erring on the side of caution.
- The results also imply that the current low level of the real benchmark bond rate may not be providing adequate compensation to bond-holders for inflation uncertainty associated with the above-noted feature of the Turkish inflation process.

**Ilker Domac**

+90-212-319-4623

ilker.domac@citi.com

**Gultekin Isiklar**

+90-212-319-4915

gultekin.isiklar@citi.com

**Figure 1. Evolution of the CBT's Inflation Forecasts**

	Year-end Projections in Inflation Report (%YoY)				Outturn	Target
	I (January)	II (April)	III (July)	IV (October)		
<b>2010</b>	6.9	8.4	7.5	...	...	<b>6.5</b>
<b>2009</b>	6.8	6.0	5.9	5.5	<b>6.5</b>	<b>7.5</b>
<b>2008</b>	5.5	9.3	10.6	11.1	<b>10.1</b>	<b>4.0</b>
<b>2007</b>	5.1	5.8	6.0	7.3	<b>8.4</b>	<b>4.0</b>
<b>2006</b>	5.5	5.6	9.8	9.9	<b>9.7</b>	<b>5.0</b>

Source: CBT

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

## Inflation Deserves a Closer Look

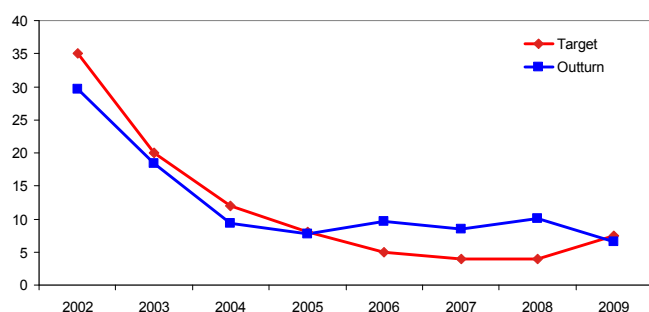
While the CBT's disinflation performance during the implicit targeting period was commendable...

The CBT adopted explicit inflation targeting in 2006, following several years of implementing what the Bank referred to as implicit inflation targeting. The Bank's disinflation performance during the implicit inflation targeting period was commendable: under the umbrella of the IMF-supported economic programme, the CBT was able to keep inflation below the target between 2002 and 2005 (Figure 2). While the improvements in the monetary policy framework during the implicit inflation targeting period were critical factors, prudent fiscal policy, the strong currency, and the favourable external environment also played an important role throughout the successful disinflation process.

...the Bank failed to repeat the same success following the inception of explicit inflation targeting in 2006.

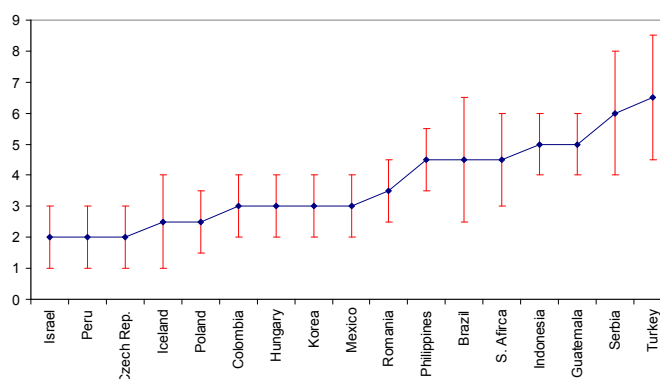
The CBT, however, failed to repeat the same success following the inception of explicit inflation targeting in 2006 and missed its targets by a large margin for three years in a row until the upward revision of the inflation objectives for 2009 (to 7.5% from 4%) and thereafter (Figure 2). The noted revision, in turn, left Turkey with one of the least ambitious inflation targets in 2010 (Figure 3).

Figure 2. Inflation Target and Outcome



Source: CBT

Figure 3. Inflation Target Levels and Bands in 2010



Source: Relevant central banks' websites.

We think there are at least three reasons that warrant a closer look at inflation. First, projected at around 7% by the end of 2010, inflation still remains high and above the target.

Given the increased focus on the economic recovery around the world and the recent improvements in near-term inflation dynamics in Turkey, why should one worry about inflation? We think there are at least three reasons which would justify a closer look at the inflation process in Turkey. *First*, despite expectations of a lower year-end inflation, including by the CBT, which lowered its forecast to 7.5% from 8.4% in the April inflation report, we are still looking at an inflation rate of over 7.0%, which remains above the 6.5% target and fails to compare favourably with the majority of Turkey's peers in the EM universe.

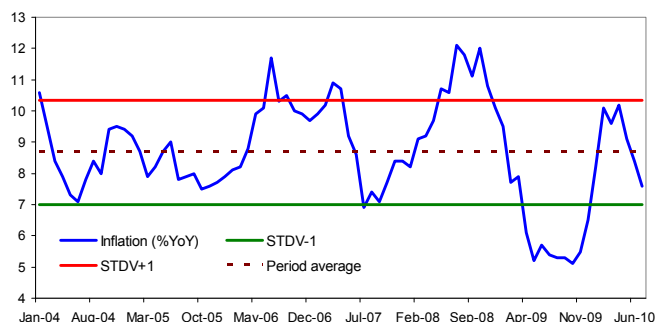
Second, there is no marked change in the underlying trend rate of inflation, as headline inflation is mainly driven by cyclical shocks...

Second, a cursory look at Turkey's inflation since 2003 reveals that there is no marked change in the underlying trend rate of inflation (Figures 4 and 5).<sup>1</sup> Driven by favourable and adverse shocks, inflation has been fluctuating between 5% and 12%, with an average of about 8.7%, during the period under consideration (Figures 4 and 5).

<sup>1</sup> During the period before 2003, the course of inflation was largely driven by crises rather than business-cycle dynamics. As a result, we decided to exclude the period before 2003 from our analysis.

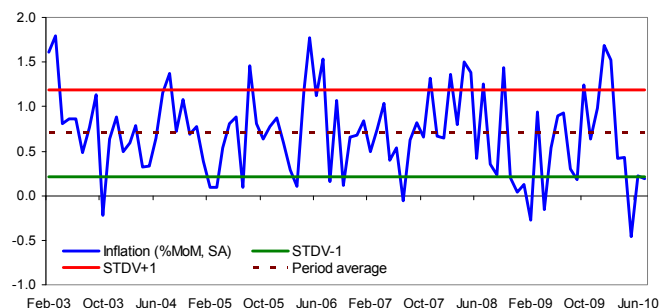
In our view, the absence of a noticeable downward trend suggests that long-run inflation expectations are not firmly anchored in line with the CBT's targets. One-off shocks are more likely to translate into persistent inflation when expectations are not well anchored. Concurrently, the fragility of expectations can also amplify the magnitude of adverse shocks, thereby contributing to the downward rigidity in trend inflation.

Figure 4. Inflation (% YoY)



Source: CIRA and Haver

Figure 5. Inflation (%MoM, SA)

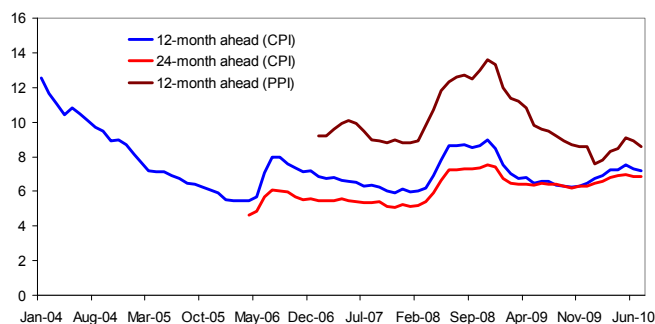


Source: CIRA and Haver

...with inflation expectations remaining sticky.

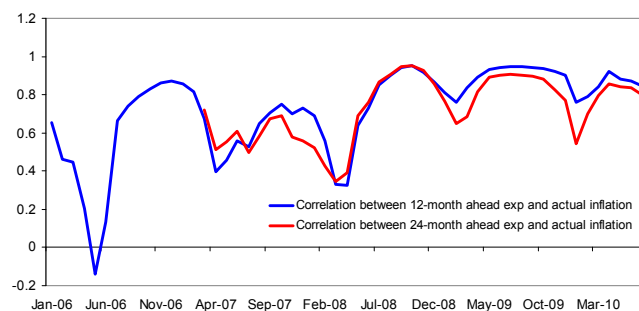
Indeed, forward-looking inflation expectations in Turkey remain sticky, failing to provide much confidence that inflation is likely to converge towards the CBT's medium-term target of 5% in the next year or two (Figure 6). Moreover, the close link between actual inflation outcomes and forward looking expectations further complicates inflation dynamics through raising the persistence of adverse shocks (Figure 7). A high degree of persistence means that a given shock to the price level which raises the inflation rate now has a relatively large and/or more protracted impact on the rate of ongoing inflation.

Figure 6. Evolution of Inflation Expectations



Source: CBT

Figure 7. Link Between Inflation Outturns and Expectations



Source: CIRA and CBT Note: 12-month rolling correlations.

Third, benign inflation readings going forward will be more important for the bond market and the CBT's ability to keep rates on hold.

Third, the CBT's conditional commitment to keep rates on hold during the remainder of the year (and carry out a measured tightening in 2011) will depend on the future course of inflation. Benign inflation readings going forward will be more important for the sentiment in the fixed income market, given the marked compression of the spread between the benchmark interest rate and the one-week repo rate.

This note aims to shed more light on the inflation process with a view to drawing recommendations for investors and policymakers.

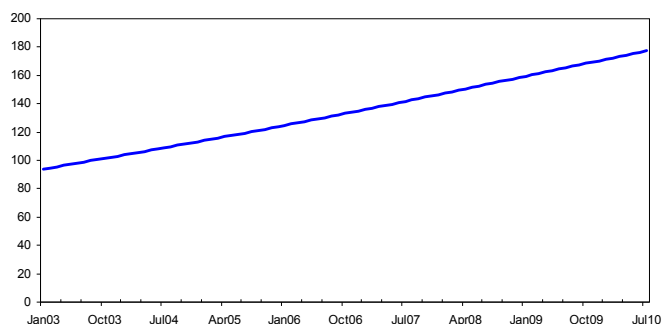
We decompose CPI into sub-patterns to gain more insight about the behaviour of inflation.

This note aims to investigate the inflation process to shed more light on the above-discussed issues. The remainder of the note is organised as follows. The next section takes a closer look at the time series properties of inflation. This will be followed by a discussion of the main drivers of the cyclical component of inflation. The final section concludes the note by summarising the implications of our findings for investors and the conduct of monetary policy.

## Inflation: Looking Under the Hood

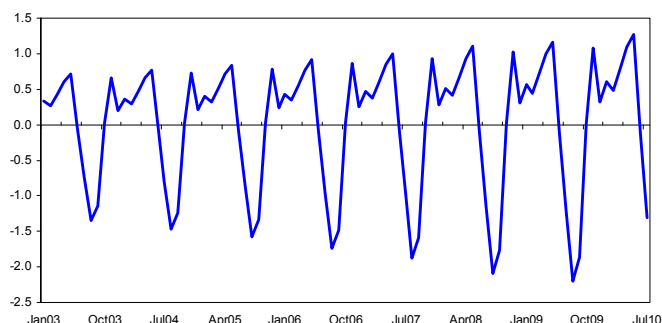
This section aims to investigate the inflation process by decomposing CPI into sub-patterns that identify each component of the index separately. Performing a univariate decomposition of the series into their unobserved components can be done in many ways and there is no particular model with proven superior performance. Here we employ Tramo/Seats approach for the extraction of unobserved components, which is implemented by using Demetra.<sup>2</sup>

Figure 8. CPI: Trend Component



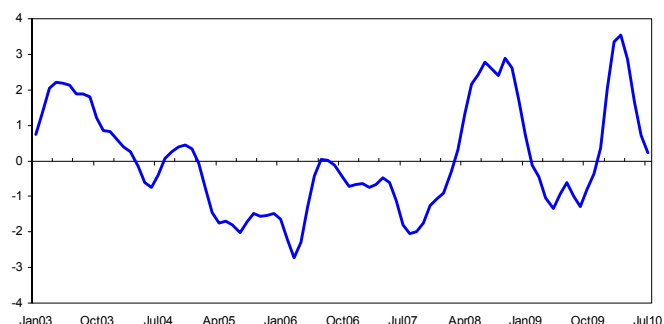
Source: CIRA

Figure 10. CPI: Seasonal Component



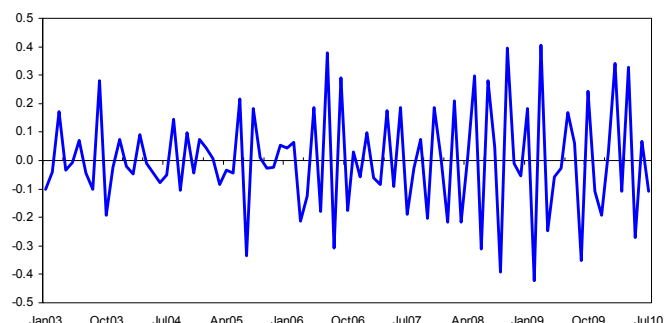
Source: CIRA

Figure 9. CPI: Cyclical Component



Source: CIRA

Figure 11. CPI: Irregular Component



Source: CIRA

We focus on the following components: trend, seasonal, cyclical and irregular.

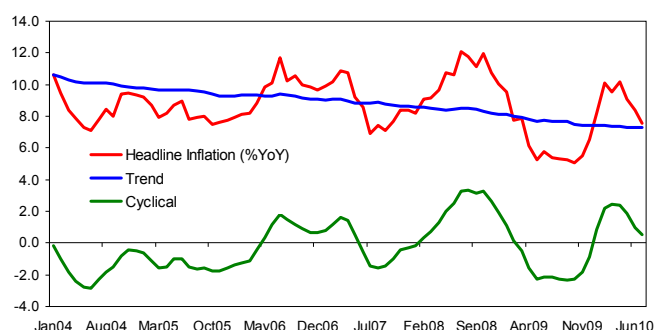
Figures 8 through 11 present the results of the performed decomposition of the CPI basket. The trend component, which captures the long-run behaviour of the CPI basket, displays an upward trend with no obvious break in its slope. The cyclical component, which represents the ups and downs caused by specific events/shocks, contains asymmetric patterns, as duration seems to vary from cycle to cycle. The seasonal component, which reflects periodic fluctuations of constant length and proportional depth, looks fairly ordinary.

<sup>2</sup> Demetra is a user interface developed by EUROSTAT for application of the two most popular seasonal adjustment methods (Tramo/Seats and X12-ARIMA).

The results point to a relatively moderate decline in the contribution of the trend component to headline inflation (only 0.5% per year), which, holding everything else constant, suggests that it would take about 4.5 years to reach the CBT's medium-term target inflation rate of 5%.

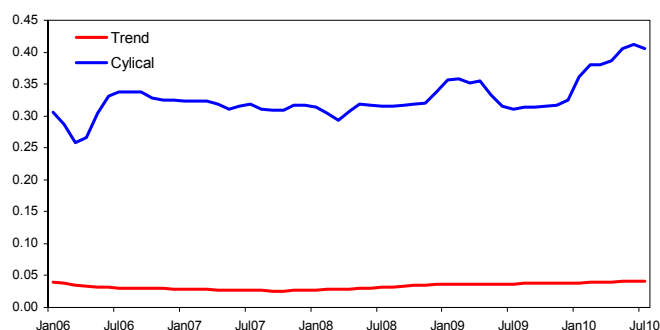
Next, we turn to the contributions of the noted components to year-on-year inflation, which should be more pertinent for our analysis. A quick glance at Figure 12 shows that the contribution of the trend component has remained fairly flat. Our results point to a relatively moderate decline in the contribution of the trend component to inflation (only 0.5% per year). Holding everything else constant, the noted finding suggests that it would take about 4.5 years to reach the CBT's medium-term target inflation rate of 5%. Figure 12 also reveals that the evolution of inflation is largely dominated by the cyclical component. In fact, as can be seen from Figure 13, the volatility of the contribution of the cyclical component to monthly inflation (SA) is considerably higher than that of the trend component.<sup>3</sup>

Figure 12. Contributions to Inflation



Source: CIRA

Figure 13. Volatility of Contributions to Inflation



Source: CIRA. Note: 36-month rolling standard deviation of MoM contributions to seasonally adjusted headline inflation

## What Drives Cyclical Inflation?

We investigate the relative importance of the exchange rate, the extent of economic slack, global food and commodity prices in driving the cyclical component of inflation.

In view of the importance of the cyclical component in shaping headline inflation, we take a closer look at the possible drivers of this particular component. To this end, we consider the following obvious candidates: (i) global commodity prices (proxied by the S&P GSCI Index); (ii) global agriculture prices (proxied by the S&P GSAG Index); (iii) the exchange rate (the lira basket against the USD and EUR with equal weights); and (iv) the extent of economic slack (proxied by seasonally adjusted capacity utilisation rate).

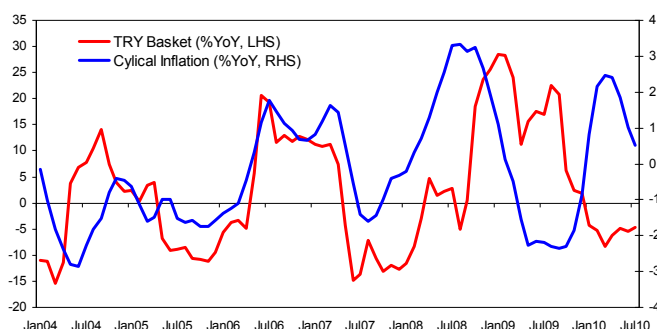
A quick glance at Figures 14 through 17, which present the relationship between these variables and the contribution of the cyclical component to inflation (referred to as cyclical inflation hereafter), suggests the following:

- There seems to be a close link between the exchange rate movements and cyclical inflation until mid-2008. Moreover, it seems like peaks and troughs of the exchange rate led cyclical inflation by a few months during this period. This feature of the exchange rate, however, appears to have weakened thereafter.

<sup>3</sup> This conclusion doesn't change when we consider the contributions to year-on-year inflation. We prefer to focus on the contributions to monthly inflation (SA) since the statics based on year-on-year figures are likely to suffer from serial correlation.

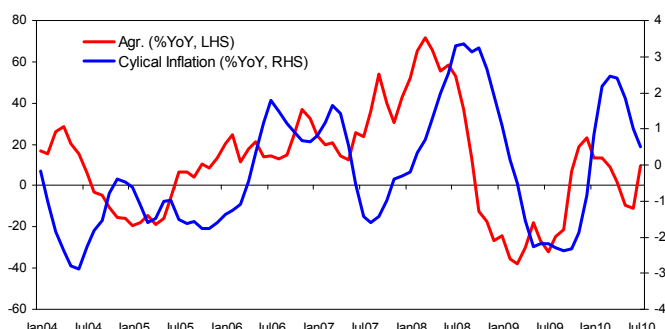
- There is no strong evidence suggesting that supply shocks associated with global food and commodity prices led cyclical inflation in a systematic manner until 2008 (Figures 15 and 16). However, it is observed that global food and commodity shocks started leading cyclical inflation by 1 to 4 months thereafter.
- Capacity utilisation (SA) seems to move in tandem with cyclical inflation only after 2007, leading the movements of the cyclical component by a few months since early 2008.

Figure 14. Cyclical Component of Inflation and the Exchange Rate



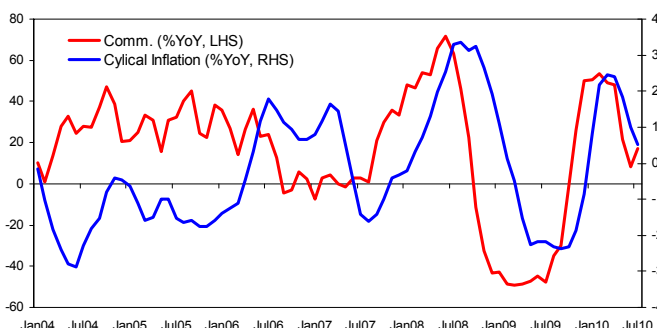
Source: Citi Investment Research and Analysis

Figure 15. Cyclical Component of Inflation and Global Agriculture Prices



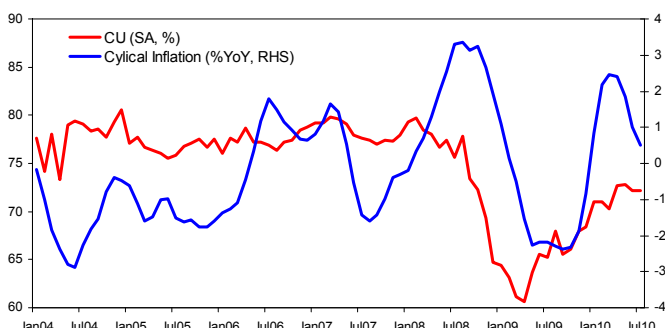
Source: Citi Investment Research and Analysis

Figure 16. Cyclical Component of Inflation and Commodity Prices



Source: Citi Investment Research and Analysis

Figure 17. Cyclical Component of Inflation and Capacity Utilisation



Source: Citi Investment Research and Analysis

**In investigating the lead/lag relationship between the key drivers and cyclical inflation, we follow a two-step approach.**

The evolution of the lead/lag relationship between the key drivers and the cyclical month-on-month inflation (SA) deserves a closer look. To this end, we follow a two-step approach. First, considering leads up to 6 months, we calculate 36-month rolling correlations between the monthly change in the variables of interest and cyclical inflation. We then select the appropriate lead length based on the largest statistically significant correlation (Figure 18). Since this analysis is carried out on a rolling basis, we can identify the possible changes in the lead structure over time. Second, using the results obtained in the first step, we present the corresponding correlation coefficients in Figure 19.

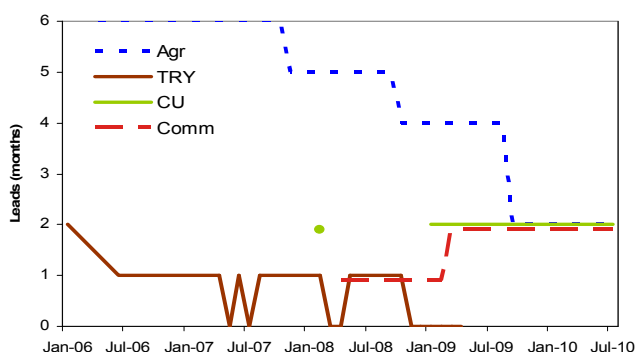
While capacity utilisation, agriculture and commodity prices have become more important in driving cyclical inflation in the last few years...

...the relative importance of the exchange rate has declined considerably since mid-2008.

As can be seen from Figure 18, in terms of the strongest link between cyclical inflation and the key variables, the results suggest that: (i) *global agricultural prices have led cyclical inflation by 2 months since mid-2009, compared with 6 months prior to 2008*; (ii) *capacity utilisation, which became statistically significant only after January 09, leads cyclical inflation by 2 months*; and (iii) *commodity prices, which have turned statistically significant since April 2008, currently lead cyclical inflation by 2 months*.

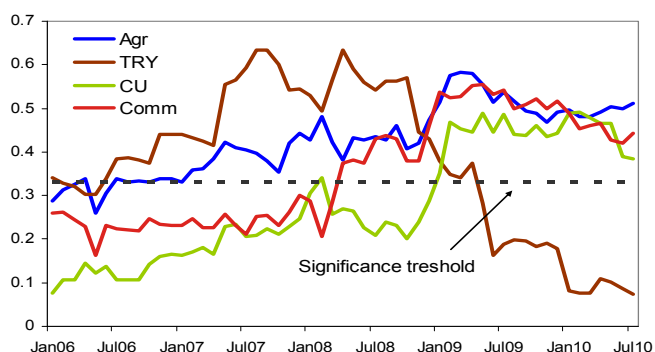
Concerning the evolution of the magnitude of correlations, the findings show that agriculture and commodity prices as well as the capacity utilisation have become more important in driving cyclical inflation in the last few years. By contrast, the relative importance of the exchange rate has declined significantly since mid-2008 (Figure 19).

Figure 18. Evolution of Lead-Lag Dynamics



Source: CIRA. Note: We present leads with the largest statistically significant correlation, while excluding those that are insignificant

Figure 19. Key Inflation Drivers and Cyclical Inflation

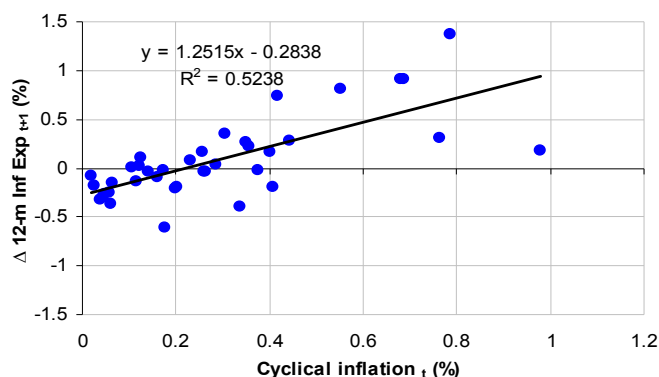


Source: CIRA. Note: 36-month rolling correlation

Evidence suggests that expectations respond to inflationary cyclical movements, while displaying almost no reaction to disinflationary cyclical shocks.

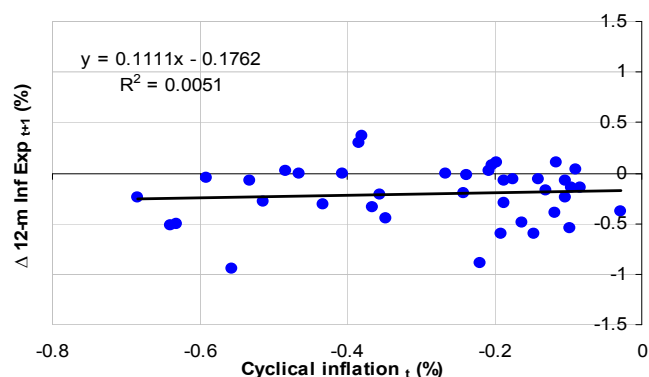
Given the close link between actual inflation outcomes and forward-looking inflation in Turkey, it may prove useful to take a closer look at this relationship in light of our findings summarised above. In particular, the relatively flat inflation trend seems to be consistent with the observed downward stickiness in forward-looking expectations. However, it remains to be seen whether expectations are indeed as fragile as has been claimed. To this end, we investigate the relationship between forward looking inflation expectations and the cyclical component by considering the impact of inflationary and disinflationary cycles separately. Figures 20 and 21 suggest that while inflationary cyclical shocks tend to push inflation expectations higher, favorable cyclical shocks don't seem to affect expectations. The downward stickiness in expectations suggests that relying on favourable shocks in the disinflation process may not be a prudent strategy and that there is a need to respond to adverse shocks vigilantly to keep expectations closer to the target.

Figure 20. Inflationary Cyclical Movements and Expectations



Source: CIRA

Figure 21. Disinflationary Cyclical Movements and Expectations



Source: CIRA

## Implications for Investors and Policymakers

**Our findings demonstrate that there is no marked improvement in Turkey's inflation dynamics, as headline inflation continues to be mainly driven by cyclical shocks.**

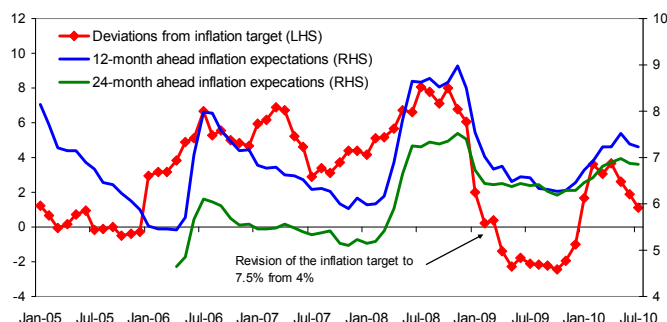
**The results underscore the need to anchor inflation expectations more solidly, as long-run inflation expectations are a key driver of trend inflation.**

Our findings show that Turkey's trend inflation remains relatively high and rigid, which, in our view, is due to the downward stickiness of long-run inflation expectations. Our results also demonstrate that inflation is mainly driven by cyclical shocks, which introduces an additional element of uncertainty, making inflation harder to predict.

Our analysis suggests that there is a need to anchor inflation expectations more solidly, as long-run inflation expectations are a key driver of trend inflation. Since anchoring of inflation expectations is not a *deus ex machina*, it must come from somewhere. In light of the widespread acknowledgment that inflation is always and everywhere a monetary phenomenon, we argue that monetary policy is likely to be the main driver of long-term inflation expectations. In this regard, there is some evidence leading us to believe that the CBT's policy stance hasn't been sufficiently prudent. Why is this so? First, prior to the revision of the inflation target upwards in 2009, there were large deviations from inflation objectives (Figure 22). Second, simple rule-based approaches suggest that the CBT's monetary policy stance was too easy on average, which, in our view, allowed both actual and expected inflation to drift up considerably in the face of adverse shocks (Figure 23). We believe that a stronger commitment to price stability — in both words and actions — and a more preemptive approach in the conduct of monetary policy would have produced a stronger anchoring of long-term inflation expectations. With expectations of inflation better anchored, adverse shocks stemming from energy and food prices or FX would likely have had a smaller impact on expected inflation and hence trend inflation.

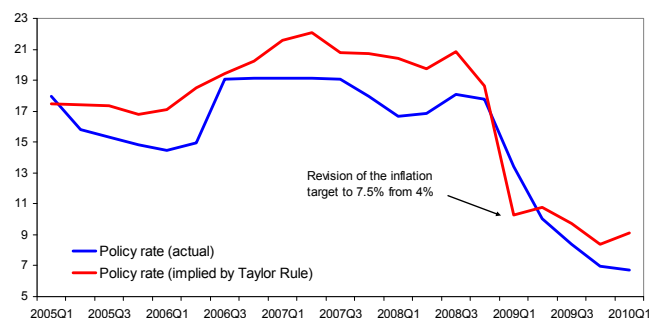


Figure 22. Deviations from the Inflation Target and Expectations



Source: Citi Investment Research and Analysis

Figure 23. Actual Policy Rate vs. Taylor Rule Rate<sup>4</sup>

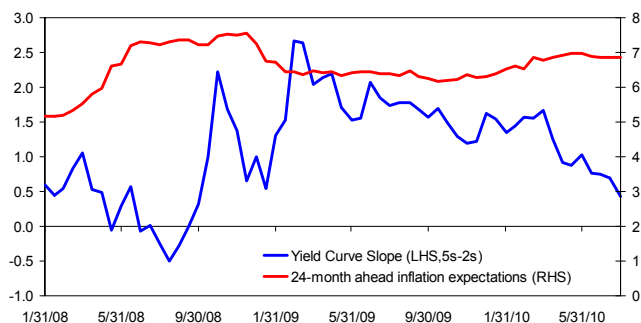


Source: CIRA. Note: We use the original Taylor Rule in which policymakers attach equal weights to deviations from the inflation target and the output gap. In the analysis, we assume Turkey's real equilibrium policy interest rate to be 7% until the end of 2008 and 3.5% thereafter.

The results also suggest that the current low level of the real benchmark bond rate may not provide adequate compensation for inflation uncertainty...

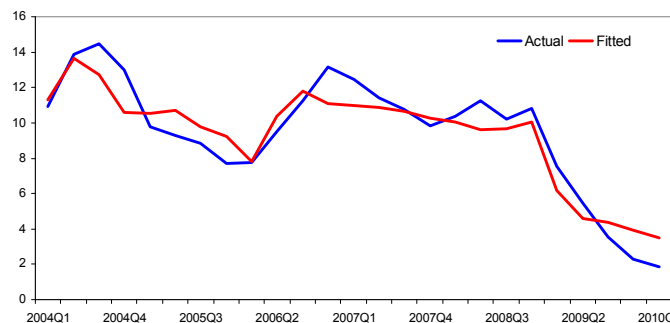
Turning to the implications of our results for investors, the fact that the Turkish inflation process continues to be driven by cyclical factors makes it harder to forecast. Given the current low level of the real benchmark bond rate (around 1%, ex ante), this particular feature of the inflation process suggests that bond-holders may not be adequately compensated for inflation uncertainty. In this regard, the fact that the recent flattening in the yield curve is taking place in the absence of a meaningful improvement in forward looking expectations suggests that the bond market is probably becoming unduly sanguine about the inflation outlook (Figure 24).

Figure 24. Yield Curve Slope and Inflation Expectations



Source: CIRA

Figure 25. Real Interest Rate: Actual vs. Fitted



Source: Bloomberg and CIRA

...which is also confirmed by our earlier analysis suggesting that real rates aren't in line with fundamentals.

Moreover, the current level of the real benchmark interest rate doesn't seem to be in line with fundamentals: our empirical model suggests that the real interest rate has been below the model-implied equilibrium value since 2Q 09 (Figure 25).<sup>5</sup> The deviation from the fitted value in the first quarter of 2010 is even more noteworthy with the actual real rate of 1.8% (period average) staying significantly below the fitted value of 3.5%.<sup>6</sup>

<sup>4</sup> See "When can the CBT start cutting rates (safely)?" 9 September, 08, for more on the construction of the Taylor rule rate.

<sup>5</sup> Moreover, the rapid widening of the current account gap when there are concerns about the overvaluation of the real exchange rate raises the likelihood of a correction, which would further complicate inflation dynamics.

<sup>6</sup> See "Real Rates Will Have to Converge" 20 April 2010 for a detailed discussion of our model.

All in all, while we acknowledge the presence of a number of factors that could support the current positive tone in the bond market in the near term, our findings lead us to believe that the current level of the benchmark bond rate probably provides insufficient compensation for inflation uncertainty.<sup>7</sup>

---

<sup>7</sup> In particular, we can point to the following near-term bond-supportive factors: (i) the CBT's intention to keep rates on hold during the remainder of this year (and carry out a measured tightening in 2011), which was confirmed by the July Inflation Report; (ii) the CBT's decision to raise the auction size will help the CBT to create permanent TRY liquidity, which is likely to be bond friendly in the near term, and (iii) improvement in short-term inflation dynamics (with year-end inflation expectations being revised downwards from 8.4% to over 7.0%).

## Appendix A-1

### Analyst Certification

The research analyst(s) primarily responsible for the preparation and content of all or any identified portion of this research report hereby certifies that, with respect to each issuer or security or any identified portion of the report with respect to an issuer or security that the research analyst covers in this research report, all of the views expressed in this research report accurately reflect their personal views about those issuer(s) or securities. The research analyst(s) also certify that no part of their 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 research report.

### IMPORTANT DISCLOSURES

---

Rohini Malkani has in the past worked with the India government or its divisions in her personal capacity.

---

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 Investment Research & Analysis product ("the Product"), please contact Citi Investment Research & Analysis, 388 Greenwich Street, 28th Floor, New York, NY, 10013, Attention: Legal/Compliance. 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 [www.citigroupgeo.com](http://www.citigroupgeo.com). 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:

Citibank Anonim Sirketi

Ilker Domac, Gultekin Isiklar

### 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 Investment Research & Analysis (CIRA) does not set a predetermined frequency for publication, if the Product is a fundamental research report, it is the intention of CIRA 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 Morgan Stanley Smith Barney LLC Customers:** Morgan Stanley & Co. Incorporated (Morgan Stanley) research reports may be available about the companies that are the subject of this Citi Investment Research & Analysis (CIRA) research report. Ask your Financial Advisor or use [smithbarney.com](http://smithbarney.com) to view any available Morgan Stanley research reports in addition to CIRA research reports.

Important disclosure regarding the relationship between the companies that are the subject of this CIRA research report and Morgan Stanley Smith Barney LLC and its affiliates are available at the Morgan Stanley Smith Barney disclosure website at [www.morganstanleysmithbarney.com/researchdisclosures](http://www.morganstanleysmithbarney.com/researchdisclosures).

The required disclosures provided by Morgan Stanley and Citigroup Global Markets, Inc. on Morgan Stanley and CIRA research relate in part to the separate businesses of Citigroup Global Markets, Inc. and Morgan Stanley that now form Morgan Stanley Smith Barney LLC, rather than to Morgan Stanley Smith Barney LLC in its entirety. For Morgan Stanley and Citigroup Global Markets, Inc. specific disclosures, you may refer to [www.morganstanley.com/researchdisclosures](http://www.morganstanley.com/researchdisclosures) and

[https://www.citigroupgeo.com/geopublic/Disclosures/index\\_a.html](https://www.citigroupgeo.com/geopublic/Disclosures/index_a.html).

This CIRA research report has been reviewed and approved on behalf of Morgan Stanley Smith Barney LLC. This review and approval was conducted by the same person who reviewed this research report on behalf of CIRA. This could create a conflict of interest.

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 Ltd. (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. The Product is made available in France by Citigroup Global Markets Limited, which is authorised and regulated by Financial Services Authority. 1-5 Rue Paul Cézanne, 8ème, Paris, France. The Product may not be distributed to private clients in Germany. The Product is distributed in Germany by Citigroup Global Markets Deutschland AG & Co. KGaA, which is regulated by Bundesanstalt fuer Finanzdienstleistungsaufsicht (BaFin). Frankfurt am Main, Reuterweg 16, 60323 Frankfurt am Main. If the Product is made available in Hong Kong by, or on behalf of, Citigroup Global Markets Asia Ltd., it is attributable to Citigroup Global Markets Asia Ltd., Citibank Tower, Citibank Plaza, 3 Garden Road, Hong Kong. Citigroup Global Markets Asia Ltd. is regulated by Hong Kong Securities and Futures Commission. If the Product is made available in Hong Kong by The Citigroup Private Bank to its clients, it is attributable to Citibank N.A., Citibank Tower, Citibank Plaza, 3 Garden Road, Hong Kong. The Citigroup Private Bank and Citibank N.A. is regulated by the Hong Kong Monetary Authority. The Product is made available in India by Citigroup Global Markets India Private Limited, which is regulated by Securities and Exchange Board of India. Bakhtawar, Nariman Point, Mumbai 400-021. 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 and regulated by Financial Services Authority. Foro Buonaparte 16, 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 Nikko Cordial Securities Inc. it is being so distributed under license. In the event that an error is found in a CGMJ research report, a revised version will be posted on the Firm's Global Equities Online (GEO) website. If you have questions regarding GEO, 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 110-180, 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/fs/dis2/fundMgr/DISFundMgrAnalystPop.jsp?companyCd2=A03030&pageDiv=02>. The Product is made available in Malaysia by Citigroup Global Markets Malaysia Sdn Bhd, which is regulated by Malaysia Securities Commission. Menara Citibank, 165 Jalan Ampang, Kuala Lumpur, 50450. 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 Comisión Nacional Bancaria y de Valores. Reforma 398, Col. Juárez, 06600 Mexico, D.F. In New Zealand the Product is made available through Citigroup Global Markets New Zealand Ltd. (Company Number 604457), a Participant of the New Zealand Exchange Limited and regulated by the New Zealand Securities Commission. Level 19, Mobile on the Park, 157 Lambton Quay, Wellington. 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 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. Chalubinskiego 8, 00-630 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., a Capital Markets Services Licence holder, and regulated by Monetary Authority of Singapore. 1 Temasek Avenue, #39-02 Millenia Tower, Singapore 039192. 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. 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 Spain by Citigroup Global Markets Limited, which is authorised and regulated by Financial Services Authority. 29 Jose Ortega Y Gasset, 4th Floor, Madrid, 28006, Spain. The Product is made available in Taiwan through Citigroup Global Markets Taiwan Securities Company Ltd., which is regulated by Securities & Futures Bureau. No portion of the report may be reproduced or quoted in Taiwan by the press or any other person. No. 1, Songzhi Road, Taipei 110, Taiwan. The Product is made available in Thailand through Citicorp Securities (Thailand) Ltd., which is regulated by the Securities and Exchange Commission of Thailand. 18/F, 22/F and 29/F, 82 North Sathorn Road, Silom, Bangkok, Bangkok 10500, 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 CIRA 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 and regulated by Financial Services Authority. This material may relate to investments or services of a person outside of the UK or to other matters which are not regulated by the FSA 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 regulated by FINRA and 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 regulated by Financial Services Authority. 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 CIRA's Products can be found at [www.citigroupgeo.com](http://www.citigroupgeo.com). 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 may have been distributed simultaneously, in multiple formats, to the Firm's worldwide institutional and retail customers. 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.

---

© 2010 Citigroup Global Markets Inc. Citi Investment Research & Analysis is a division and service mark of Citigroup Global Markets Inc. and its affiliates and is used and registered throughout the world. 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 is prohibited by law and will result in prosecution. 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 information contained in the Product is intended solely for the recipient and may not be further distributed by the recipient. 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

---