

## Economics

15 February 2012 | 19 pages

# Turkey Macro View

## Lira Carry Trade: Not what it used to be

- Following a dismal performance last year, the lira is back in vogue as an attractive carry trade. Despite the challenging external financing outlook, the markets' unease about the lira seems to have waned thanks to the recent improvement in global risk appetite and the CBT's willingness to defend the lira. In view of this development, we investigate the risk-reward profile of the lira carry trade. To this end, we take a closer look at the lira carry trade in the context of the potential downside risks and assess the lira's relative performance within the EM universe.
- We show that high carry can be viewed as compensation—albeit partial—for inflation risk, volatility and risks stemming from external imbalances and valuation problems. From this angle, Turkey's interest rate differential appears to have been wide enough to compensate for the foreign exchange risk being taken. In fact, the lira was one of the most attractive currencies in the EM world during the period between 2004 and 2007. However, the lira's relative performance since 2007 has been feeble, lagging behind most of its peers despite Turkey's relatively high interest rate. It is true that profits from carry trades involving many other EM currencies also declined since 2007. However, the degree of the reversal for the lira stands out when compared with its peers.
- Our analysis suggests that Turkey's interest rate differential more than compensated for the risks borne by investors in the lira carry trade between 2004 and 2007. Since then, however, the country's interest rate differential *ex post* fell short of offsetting unfavorable movements in the exchange rate, leading to unsatisfactory carry returns. Our empirical findings also confirm that Turkey's seemingly high interest rate no longer provides the kind of cushion it used to offer to cover downside risks.
- Why is this so? In our opinion, this is largely due to the fact that the marked downward trend in Turkey's interest rate since 2007 was chiefly driven by the low global interest environment and an accommodative monetary policy without a commensurate improvement in macroeconomic fundamentals. If anything, as was pointed out in the IMF's 2011 Article IV Report, Turkey's resilience has weakened in recent years.
- Although yields in Turkey may be too high to ignore, our analysis suggests that the lira no longer offers the comforting buffer that it used to provide to compensate for downside risks. In fact, the current interest rate differential is closer to the lower end of our simulation results predicted by alternative models using our 2012 forecasts.
- All in all, our findings suggest that investors should enjoy the lira carry trade with a greater degree of caution and avoid getting carried away by Turkey's seemingly high interest rate.

---

### Ilker Domac

+90-212-319-4623

ilker.domac@citi.com

### Gultekin Isiklar

+90-212-319-4915

gultekin.isiklar@citi.com

---

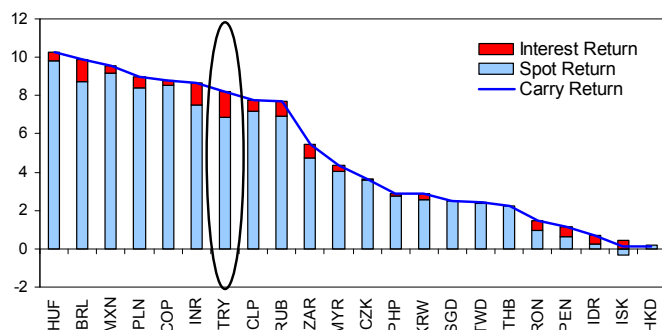
See Appendix A-1 for Analyst Certification, Important Disclosures and non-US research analyst disclosures.

Citi Investment Research & Analysis 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.

## Lira: back in fashion again?

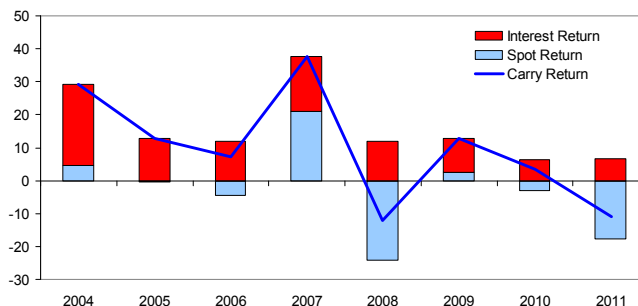
Following a dismal performance last year, the lira is back in vogue as an attractive carry trade (Figure 1). Despite the challenging external financing outlook, the markets' unease about the lira seems to have waned thanks to the recent increase in global risk appetite and the CBT's willingness to defend the lira.<sup>1</sup> As was summarized in our recent note, the lira is likely to be high on investors' radar screen ([Trip Notes: Yields Seen As Too Attractive to Ignore](#) February 6, 2012). Why is this so? Although investors are aware of Turkey's vulnerabilities, the majority argue that yields are too high to ignore owing to fewer alternatives in the EM universe. Given substantial buying power and liquidity on the sidelines, Turkish assets, the lira in particular, are likely to benefit from investors' enthusiasm for EM countries and their quest for yield.

Figure 1. Carry Performance (Ytd): Lira vs. Selected Currencies



Source: Bloomberg and CIRA Note: As of February 14, 2012

Figure 2. Historical Look at the Lira's Performance



Source: Bloomberg and CIRA

**The high interest rate differential, which seems to be the key driving force behind the increased attraction to the lira, is not the only factor affecting the profitability of carry trade.** The lira—like most of its peers—can move abruptly in the face of unforeseen events or new information regarding fundamentals. Currency movements are often characterized as being highly skewed. For example, Brunnermeier, Nagel and Pedersen (2008) note the saying among traders that “exchange rates go up by the stairs and down by the elevator.”<sup>2</sup> In this respect, it is worth noting that the buffer provided by Turkey's interest rate to compensate for such risks appears to be declining (Figure 2). Although this observation can in part be attributed to the low global interest environment, it warrants concern owing to the weakening in Turkey's hard-earned resilience, which was built up following the 2001 financial crisis.<sup>3</sup>

**In light of the above-noted backdrop, this note aims to investigate risk-reward in the lira carry trade.** To this end, we take a closer look at the lira carry trade in the context of the potential downside risks and assess the lira's relative performance in the EM universe.

<sup>1</sup> The Governor's assertive comments about the lira seem to have further bolstered the CBT's position (Bloomberg, January 6, 2012). Specifically, he stated that “2012 will be a year in which the Turkish lira is one of the currencies that strengthens the most. Lira investors in 2012 will gain”. While there are serious concerns about the CBT's ability to support the lira in a sustained manner, it looks like the markets have taken the Bank's threat to defend the lira seriously, at least in the near-term.

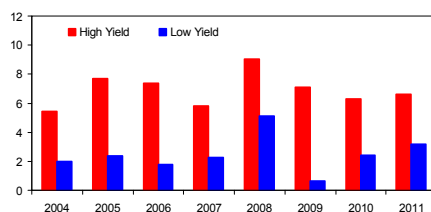
<sup>2</sup> “Carry trades and currency crashes”, NBER Macroeconomics Annual 23, 2009.

<sup>3</sup> Please refer to the IMF's recent Article IV Consultation Staff Report for a comprehensive discussion of this issue.

## What carries the carry trade?

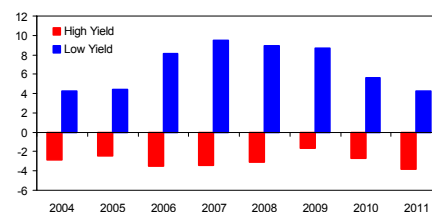
The carry trade—one of the oldest currency speculation strategies—is motivated by the failure of uncovered interest rate parity (UIP).<sup>4</sup> This strategy has stimulated much debate in the academic literature, as researchers struggle to explain its apparent profitability. With this backdrop in mind, it may prove useful to start with a review of the main characteristics of high carry and low carry currencies. To this end, we rank 20 EM countries based on their respective yields and focus on the top 5 and the bottom 5.<sup>5</sup> The result of this exercise is summarized in Figures 3 through 8. Our findings suggest that when compared with low yield currencies, high yield currencies tend to have: (i) *higher inflation* (Figure 3); (ii) *weaker external performance* (Figures 4 and 5); (iii) somewhat weaker growth performance (Figure 6); (iv) *higher volatility* (Figure 7); and (v) larger real exchange rate misalignment (Figure 8).<sup>6</sup> In light of our findings, high carry can probably be viewed as compensation—albeit partial—for inflation risk, volatility and risks stemming from external imbalances and valuation problems. Consequently, it may make sense to focus on the above-noted factors when assessing risk-reward in a specific carry trade.

Figure 3. Inflation (%)



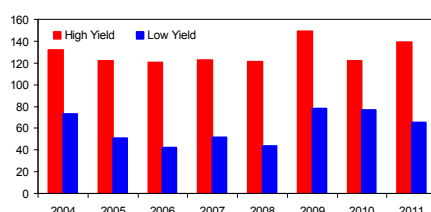
Source: Bloomberg, Haver and CIRA

Figure 4. C/A Balance (% of GDP)



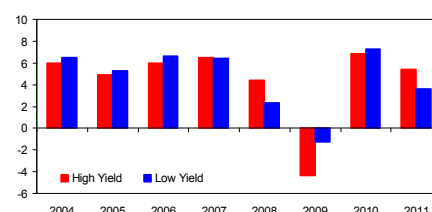
Source: Bloomberg, Haver and CIRA

Figure 5. External Debt/XGS (%)



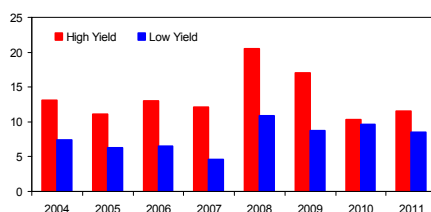
Source: Bloomberg, Haver and CIRA

Figure 6. GDP Growth (%)



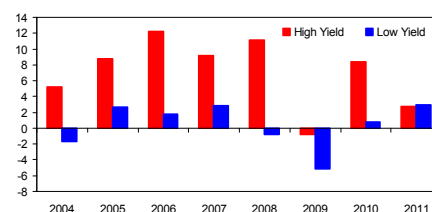
Source: Bloomberg, Haver and CIRA

Figure 7. Volatility (%)



Source: Bloomberg, Haver and CIRA

Figure 8. RER Misalignment (%)



Source: BIS, Bloomberg, Haver and CIRA

<sup>4</sup> UIP implies that the interest rate differential between two currencies is explained by the fact that the high interest rate currency is expected to depreciate relative to the low interest rate currency. See "Carry Trades and Risk", C. Burnside, NBER Working Paper 17278 (August 2011) for more on this.

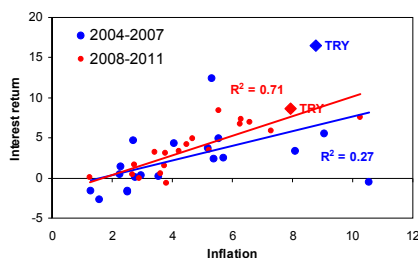
<sup>5</sup> Our sample consists of INR, BRL, IDR, TRY, RON, ZAR, PLN, RUB, HUF, PEN, CLP, MXN, MYR, KRW, PHP, CZK, TWD, COP, THB, and SGD.

<sup>6</sup> REER misalignment is defined as the percentage deviation of REER from its 5-year moving average.

## Lira carry trade: Some stylized facts

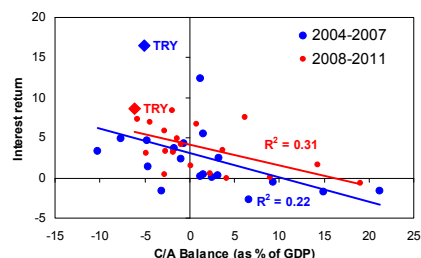
Once we established that high carry is partly a compensation for inflation risk, volatility and risks stemming from external imbalances and valuation problems, we investigate whether Turkey's interest rate differential has been providing adequate insurance.<sup>7</sup> Our analysis summarized below suggests that Turkey's interest rate differential provided sufficient buffer (see also Figures 34 through 63 in Appendices 1 through 5). A similar picture emerges when we look at the current situation using Citi's 2012 forecasts for the relevant variables (See Figures in Appendix 6). According to our cursory analysis, the interest rate differential appears to have been wide enough to provide adequate buffer for unfavorable exchange rate fluctuations that may be associated with standard risk factors. This conjecture seems to be more applicable to the 2004-07 period than the 2008-11 period.

Figure 9. Inflation (%)



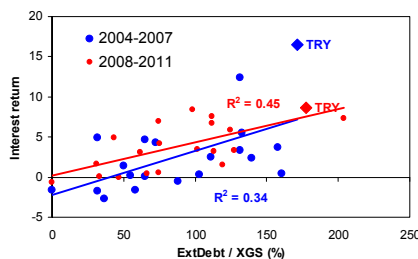
Source: Bloomberg, Haver and CIRA

Figure 10. C/A Balance (% of GDP)



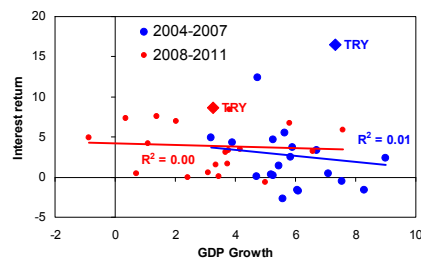
Source: Bloomberg, Haver and CIRA

Figure 11. External Debt/XGS (%)



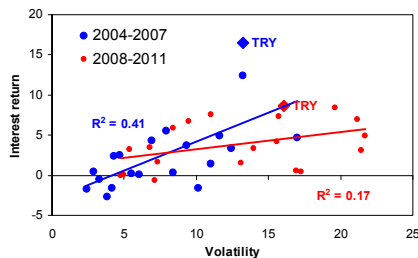
Source: Bloomberg, Haver and CIRA

Figure 12. GDP Growth (%)



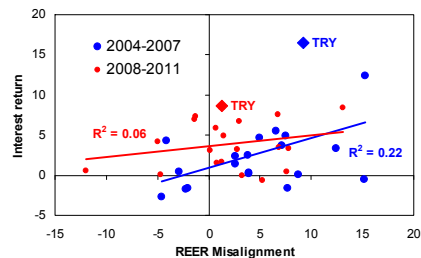
Source: Bloomberg, Haver and CIRA

Figure 13. Volatility (%)



Source: Bloomberg, Haver and CIRA

Figure 14. REER Misalignment (%)



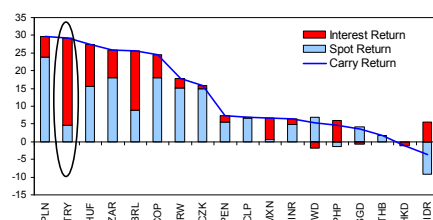
Source: Bloomberg, Haver and CIRA

<sup>7</sup> We realize that assessing whether the interest rate differential has been high enough to compensate exchange rate fluctuations is tantamount to gauging the degree of profitability from the lira carry trade (or testing the validity of the UIP condition). The carry trade remains an enigma in the financial world. Academic studies have failed to explain its continued profitability using traditional risk factors such as consumption growth, stock market returns and other more complex predictors. Some researches argued that higher interest rate in the lent currency may be the payoff for bearing the risk of a peso event (rare and unexpected changes in the market).

## Lira's reversal of fortune

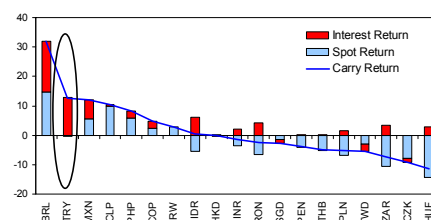
Given Turkey's consistently high interest rate differential, one would expect *a priori* the lira to offer one of the most attractive carry trade profits in the EM universe. This was, in fact, the case during the period between 2004 and 2007 (Figures 15 through 18). However, the lira's relative performance since 2007 has been feeble, lagging behind most of its peers despite Turkey's relatively high interest rate differential.

Figure 15. Currency Performance (2004)



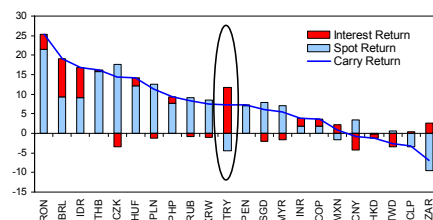
Source: Bloomberg, Haver and CIRA

Figure 16. Currency Performance (2005)



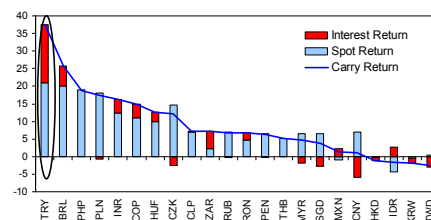
Source: Bloomberg, Haver and CIRA

Figure 17. Currency Performance (2006)



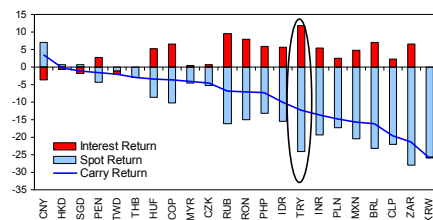
Source: Bloomberg and CIRA

Figure 18. Currency Performance (2007)



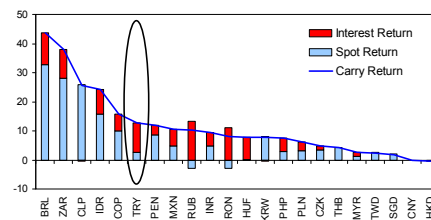
Source: Bloomberg and CIRA

Figure 19. Currency Performance (2008)



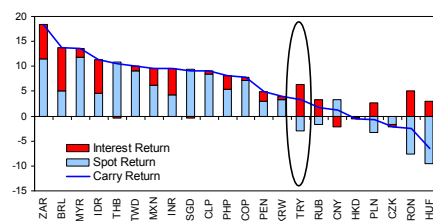
Source: Bloomberg and CIRA

Figure 20. Currency Performance (2009)



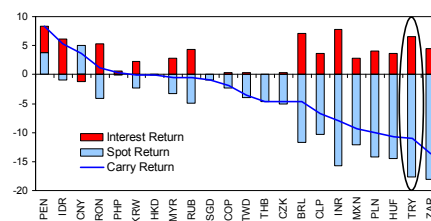
Source: Bloomberg and CIRA

Figure 21. Currency Performance (2010)



Source: Bloomberg and CIRA

Figure 22. Currency Performance (2011)

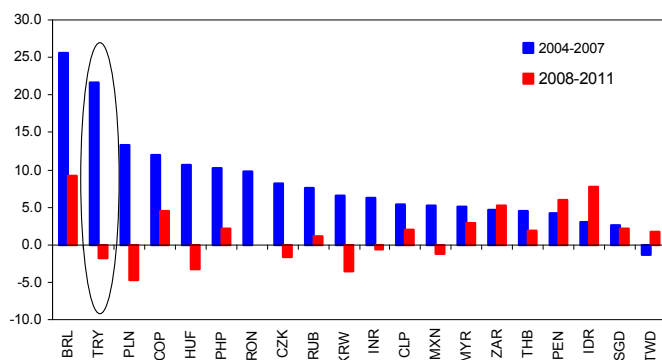


Source: Bloomberg and CIRA

As can be seen from Figures 23 and 24, the reversal of fortune for the lira is indeed stunning. After being among one of the most attractive currencies between 2004 and 2007, the lira's performance has been feeble since 2007. Put differently, Turkey's high interest rate differential, which appeared to provide adequate

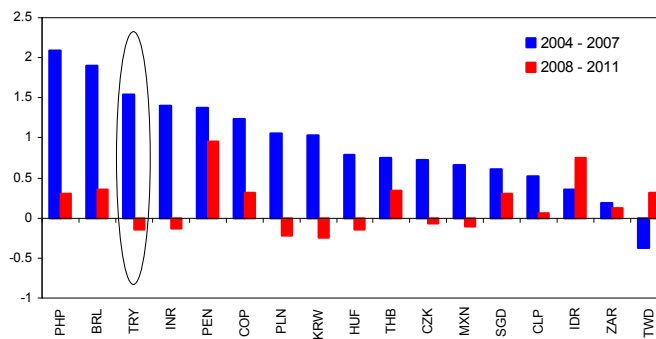
insurance for the key risk factors, fell short of offsetting unfavorable movements in the spot rate since 2007. It is true that profits from carry trades involving many other EM currencies also declined since 2007.<sup>8</sup> However, the degree of the reversal for the lira stands out when compared with its peers (Figure 26).

Figure 23. Carry Return: 2004-07 vs. 2008-11



Source: Bloomberg and CIRA

Figure 24. Carry Return Sharpe Ratio: 2004-07 vs. 2008-11



Source: Bloomberg and CIRA

In order to investigate the relationship between interest returns and standard risks factors more formally, we rely on pooled time series cross-section analysis covering 16 countries for the period of 2004-2011. Figure 25, which summarizes our empirical findings both for fixed and random effects models, shows that the coefficients have the expected signs. Empirical findings suggest that a widening in the current account deficit, a rise in inflation, an increase in CDS spreads and a higher degree of REER misalignment should lead to an increase in interest return.

Figure 25. Interest Return Equation (Pooled times series cross section, 2004-2011)

	Fixed Eff. (cross-section)	Fixed Eff. (period)	Random Eff. (cross-section)	Random Eff. (period)
Constant	-0.71 (-0.90)	-2.35 (-3.90)	-1.19 (-1.34)	-2.15 (-3.39)
C/A Balance (% of GDP)	-0.15 (-1.32)	-0.16 (-3.40)	-0.16 (-2.04)	-0.17 (-3.45)
Inflation	0.27 (2.03)	0.66 (5.39)	0.32 (2.66)	0.53 (4.63)
REER Misalignment	0.09 (2.06)	0.12 (3.24)	0.10 (2.50)	0.11 (2.98)
CDS	0.02 (6.25)	0.02 (5.38)	0.02 (7.38)	0.02 (7.14)
R <sup>2</sup>	0.77	0.65	0.43	0.58
Adj R <sup>2</sup>	0.73	0.61	0.41	0.56
F-statistic	17.88	18.17	21.79	39.83
Prob (F-stat)	0.00	0.00	0.00	0.00

Source: CIRA Note: Consisting of 16 countries (121 observations). Numbers in Parentheses represent t-stats.

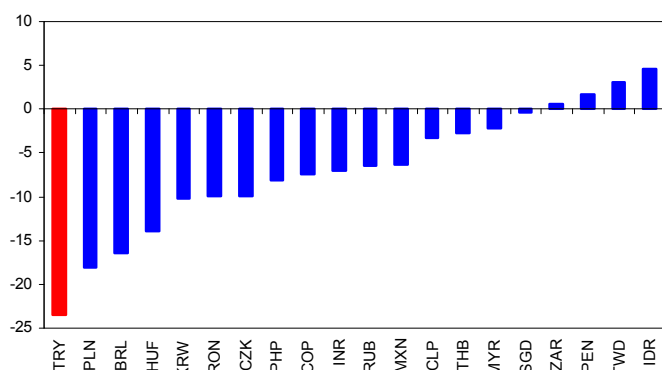
Based on our empirical findings, we investigate whether Turkey's interest rate has been high enough to compensate for downside risks. As can be seen from Figure 27, our empirical results show that Turkey's interest rate differential

<sup>8</sup> See R. Baillie et. al. (2011), "When Carry Trades in Currency Markets Are Not Profitable", for more on the decline in the desirability of carry trading since the financial crisis of 2008.

compensated for the risks borne by investors in the lira carry trade between 2004 and 2007. Since then, however, there has been a marked erosion in the comforting buffer that the lira used to provide to compensate for downside risks.<sup>9</sup> Consequently, the lira's feeble performance after 2007 comes as no surprise in view of this empirical finding.

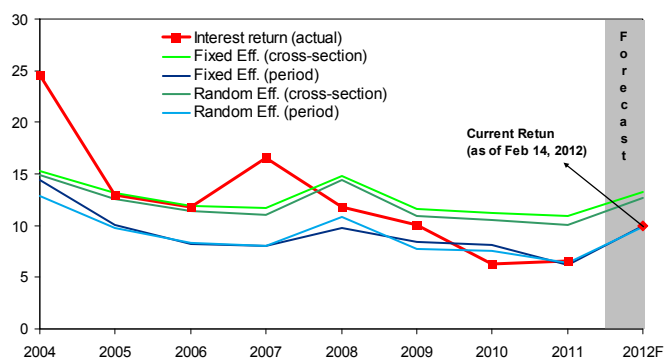
**What do our empirical findings imply for the lira's performance during the remainder of this year?** Using our 2012 forecasts for the variables in question, Figure 27 also presents simulation results based on our models. According to our simulation results, the lira's interest return consistent with standard risk factors (based on our forecasts) range between 10% and 13%. Standing at around 10%, we note that the current net interest return (using 1-month depo rate)<sup>10</sup> is closer to the lower end of our simulation results, which, in turn, highlights the limited buffer offered by Turkey's interest differential.

Figure 26. Reversal of Carry Trade Returns (2008-11—2004-07)



Source: Bloomberg and CIRA

Figure 27. TRY: Net Interest Return (Actual vs. Fitted)



Source: Bloomberg, Haver and CIRA

## What is behind the lira's reversal of fortune?

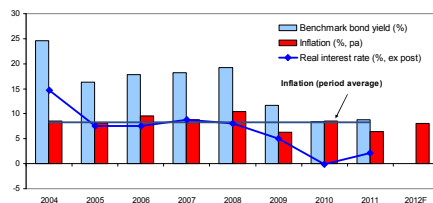
**Our empirical findings have demonstrated that Turkey's seemingly high interest rate no longer provides the kind of cushion it used to offer to cover downside risks.** Why is this so? We argue that this is largely due to the fact that the marked downward trend in Turkey's interest rate since 2007 was driven chiefly by the low global interest environment and an accommodative monetary policy without a commensurate improvement in macroeconomic fundamentals (Figures 28 through 33). If anything, Turkey's macroeconomic picture has become more vulnerable due to the marked widening in the current account deficit. As was pointed out in the IMF's 2011 Article IV Consultation Report, the country's resilience has weakened in recent years. Consequently, the apparent disconnect between the marked decline in interest rates and macroeconomic fundamentals leads us to

<sup>9</sup> It is worth noting that fitted values produced by *cross-section* fixed/random effect models point to higher IRD forecasts than those of *period* fixed/random effect models. This may be due to the low global interest rate environment following the 2008 financial crisis, which is captured by models controlling *period* effects. Leaving econometric issues aside, one can make a case for favouring *period* effects over *cross section* effects or vice versa on economic grounds. Nonetheless, this doesn't change the fact that since 2007 Turkey's interest rate has been providing smaller buffer than it used to offer.

<sup>10</sup> We realize that many investors focus more on Turkey's 1-month FX implied yield when calculating interest return. As can be seen from Figure 70 in Appendix 7, the year-to-date average difference between the two rates is slightly over 1%. Consequently, a similar picture emerges once one makes the adjustment for the difference between these rates.

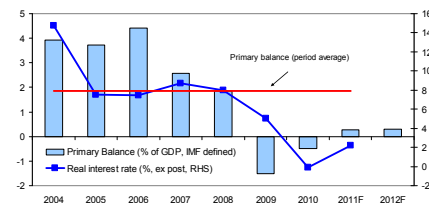
argue that investors should enjoy the lira carry trade with a greater degree of caution and avoid getting carried away by Turkey's seemingly high interest rate.

Figure 28. Inflation and Interest Rates



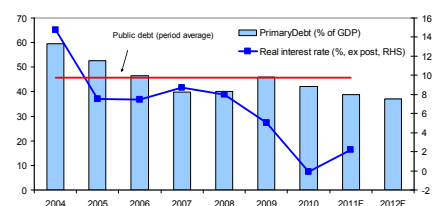
Source: Bloomberg, Haver and CIRA

Figure 29. Primary Balance<sup>11</sup> and Real Rates



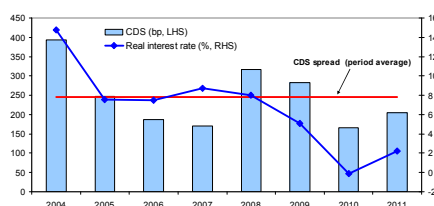
Source: Bloomberg, Haver, Treasury and CIRA

Figure 30. Public Debt and Real Rates



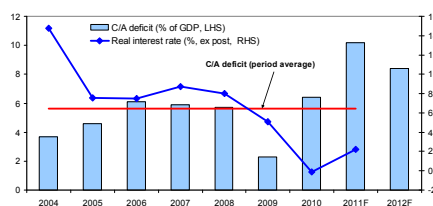
Source: Bloomberg, Haver, Treasury and CIRA

Figure 31. CDS Spreads and Real Rates



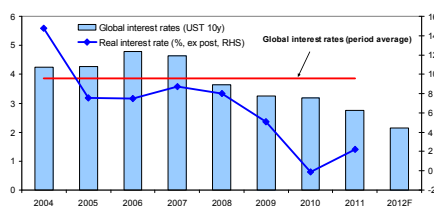
Source: Bloomberg, Haver and CIRA

Figure 32. C/A Deficit and Real Rates



Source: Bloomberg, Haver and CIRA

Figure 33. Global Backdrop and Real Rates



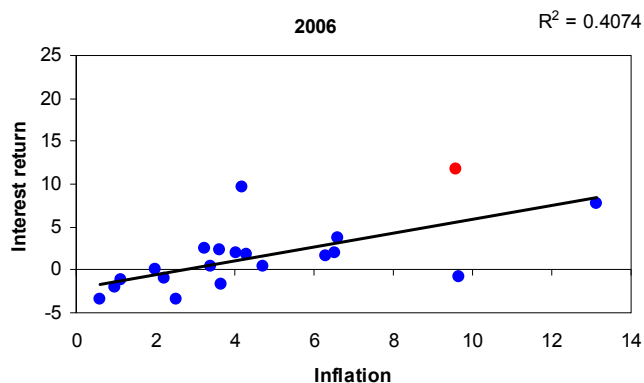
Source: Bloomberg, Haver and CIRA

<sup>11</sup> In line with the spirit of the IMF definition, we excluded one-off amnesty-related revenues when calculating the 2011 primary balance (% of GDP).



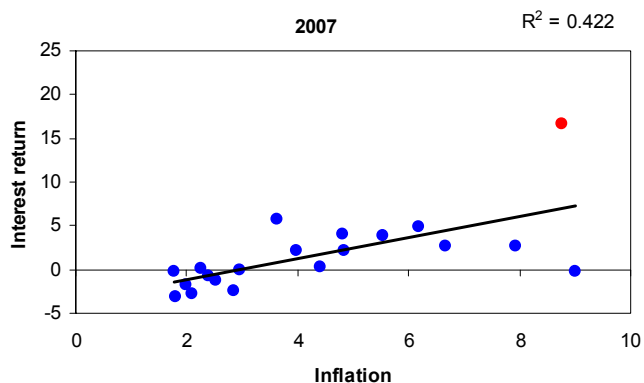
## Appendix 1: Interest Return and Inflation

Figure 34. Inflation (2006)



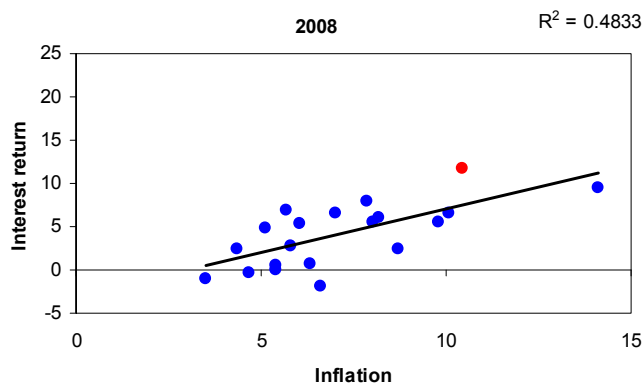
Source: Bloomberg, Haver and CIRA

Figure 35. Inflation (2007)



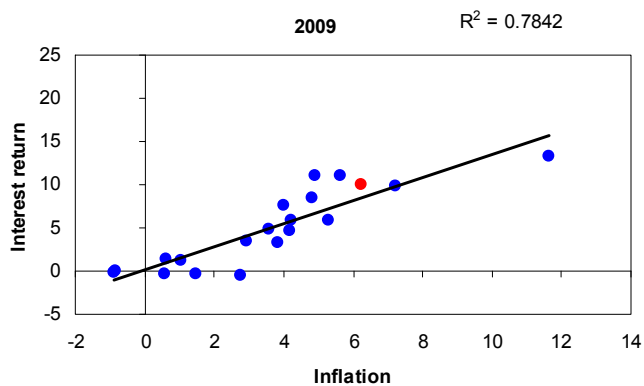
Source: Bloomberg, Haver and CIRA

Figure 36. Inflation (2008)



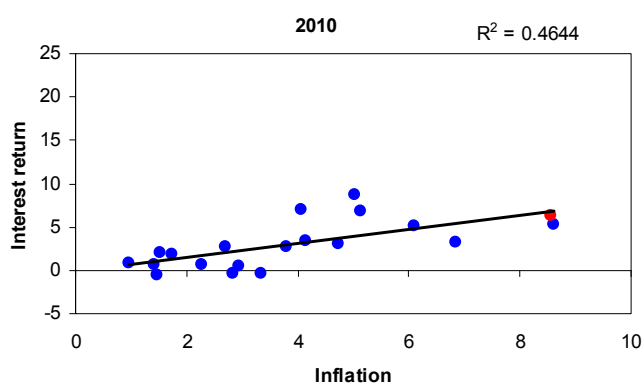
Source: Bloomberg, Haver and CIRA

Figure 37. Inflation (2009)



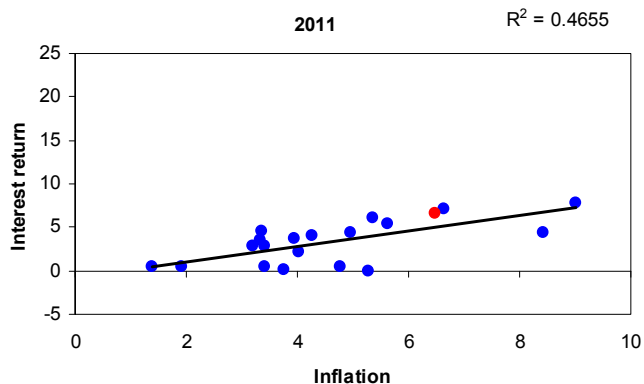
Source: Bloomberg, Haver and CIRA

Figure 38. Inflation (2010)



Source: Bloomberg, Haver and CIRA

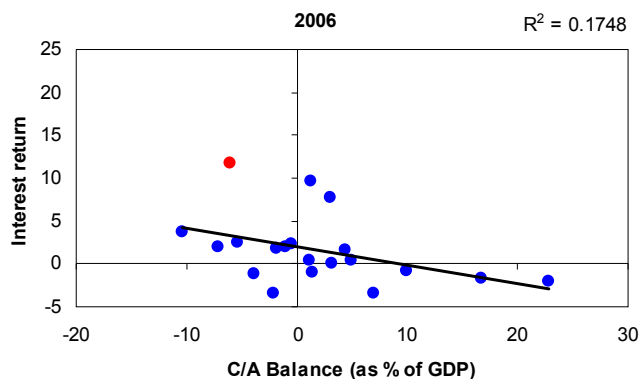
Figure 39. Inflation (2011)



Source: Bloomberg, Haver and CIRA

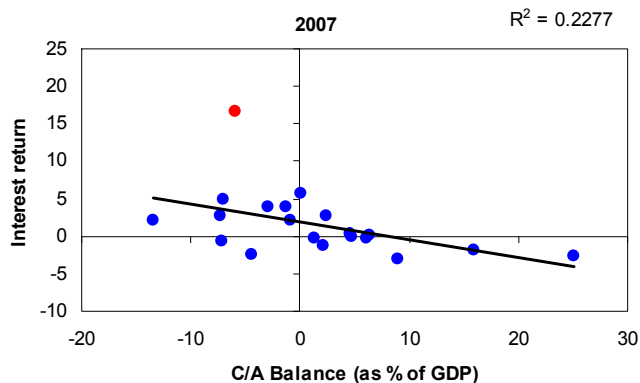
## Appendix 2: Interest Return and C/A Balance (%GDP)

Figure 40. C/A Balance (2006)



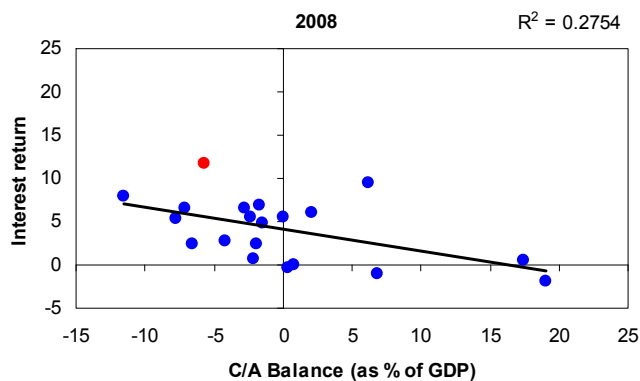
Source: Bloomberg, Haver and CIRA

Figure 41. C/A Balance (2007)



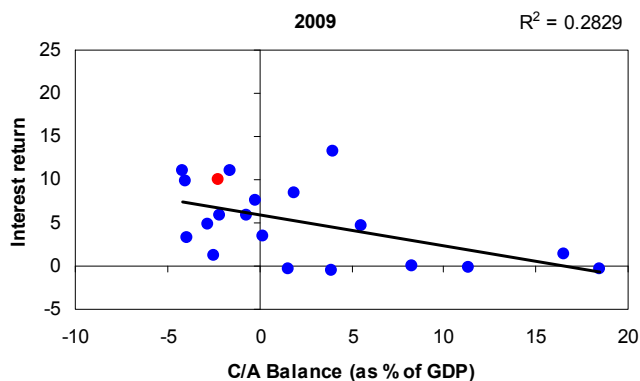
Source: Bloomberg, Haver and CIRA

Figure 42. C/A Balance (2008)



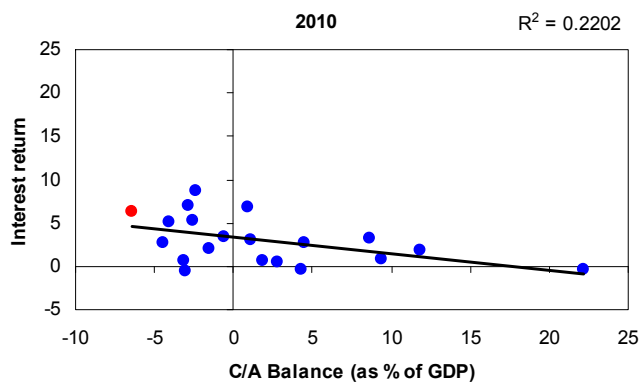
Source: Bloomberg, Haver and CIRA

Figure 43. C/A Balance (2009)



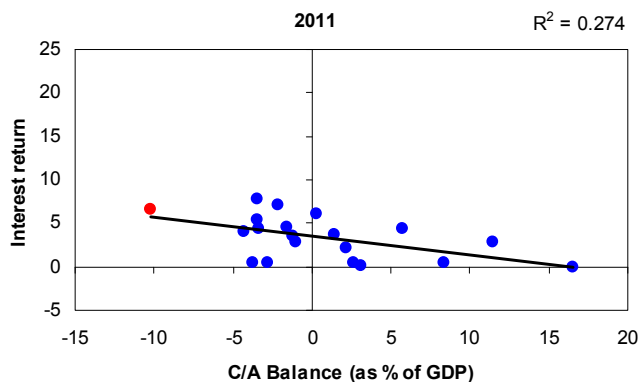
Source: Bloomberg, Haver and CIRA

Figure 44. C/A Balance (2010)



Source: Bloomberg, Haver and CIRA

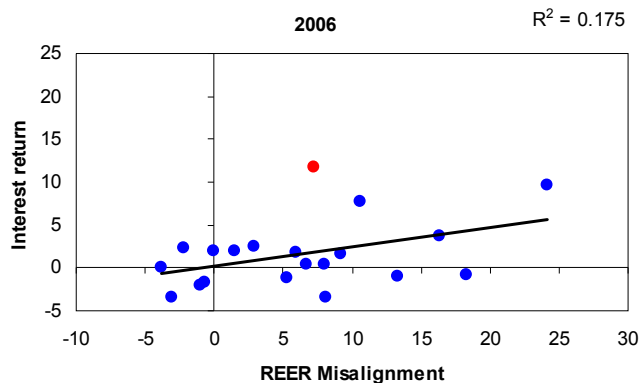
Figure 45. C/A Balance (2011)



Source: Bloomberg, Haver and CIRA

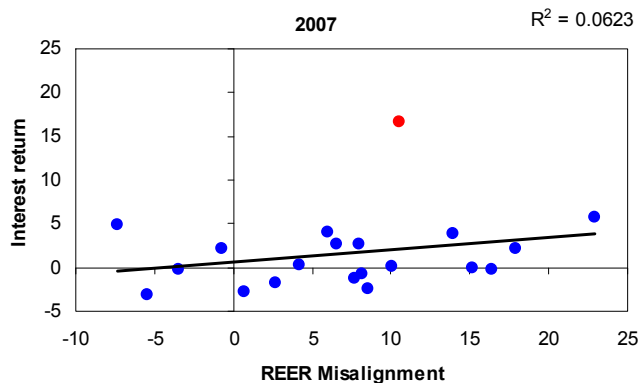
## Appendix 3: Interest Return and REER Misalignment

Figure 46. REER Misalignment (2006)



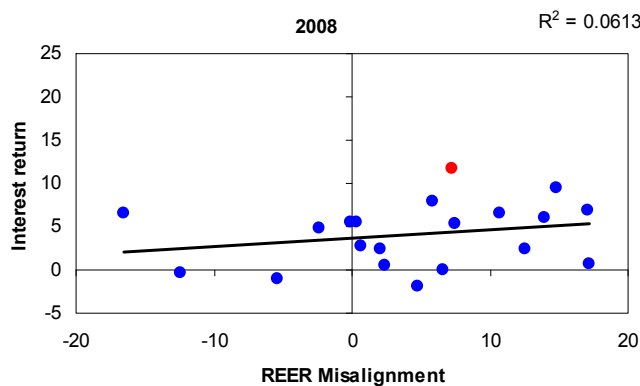
Source: Bloomberg, Haver and CIRA

Figure 47. REER Misalignment (2007)



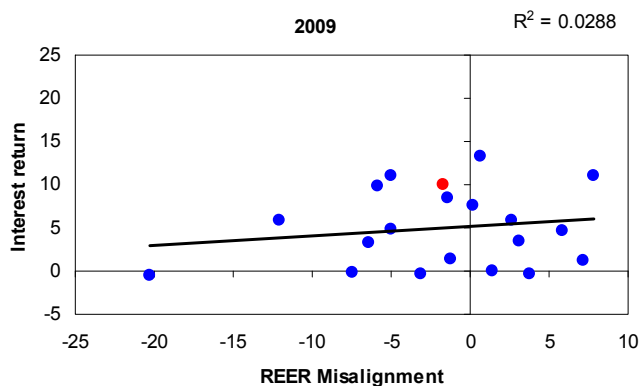
Source: Bloomberg, Haver and CIRA

Figure 48. REER Misalignment (2008)



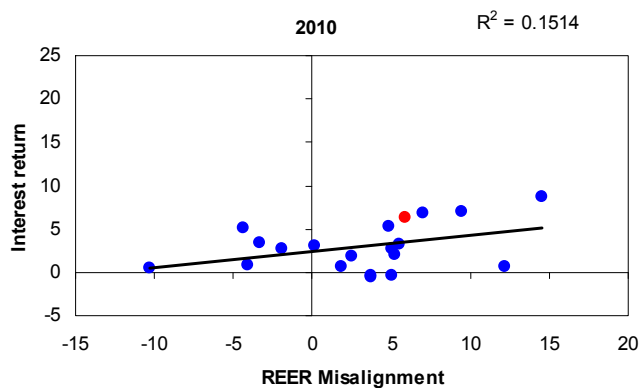
Source: Bloomberg, Haver and CIRA

Figure 49. REER Misalignment (2009)



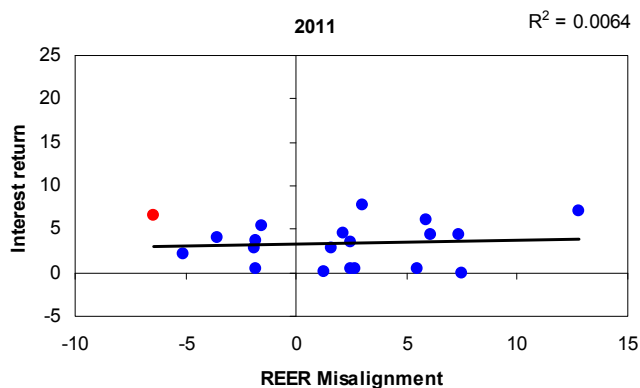
Source: Bloomberg, Haver and CIRA

Figure 50. REER Misalignment (2010)



Source: Bloomberg, Haver and CIRA

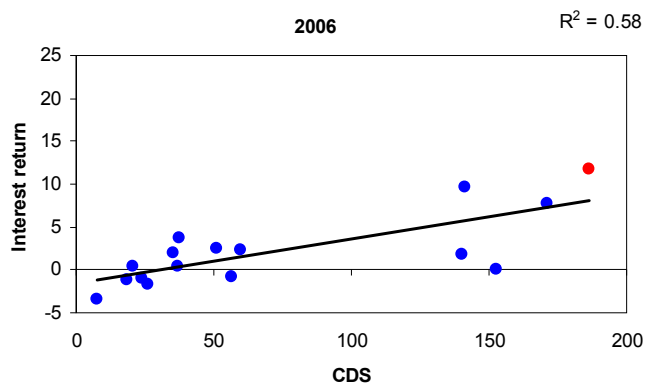
Figure 51. REER Misalignment (2011)



Source: Bloomberg, Haver and CIRA

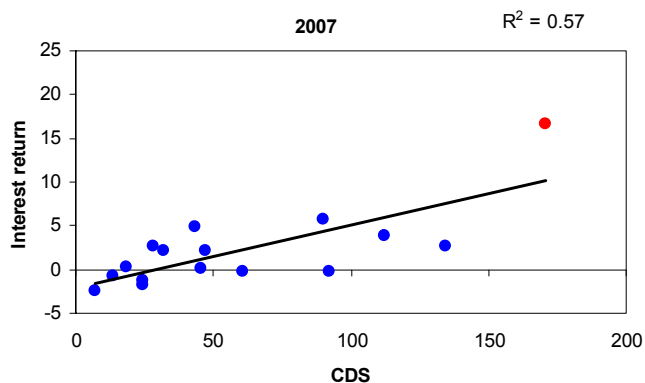
## Appendix 4: Interest Return and CDS Spreads (5-year)

Figure 52. CDS Spreads (2006)



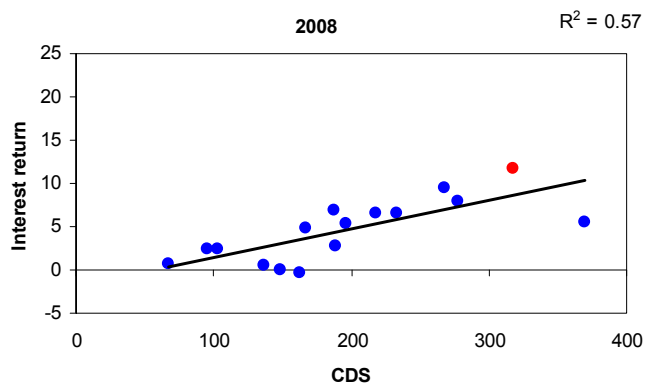
Source: Bloomberg, Haver and CIRA

Figure 53. CDS Spreads (2007)



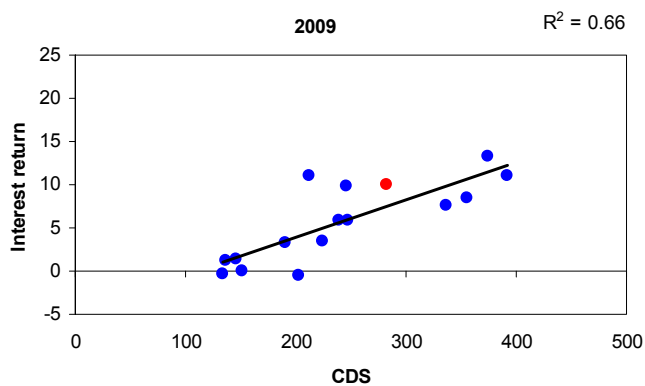
Source: Bloomberg, Haver and CIRA

Figure 54. CDS Spreads (2008)



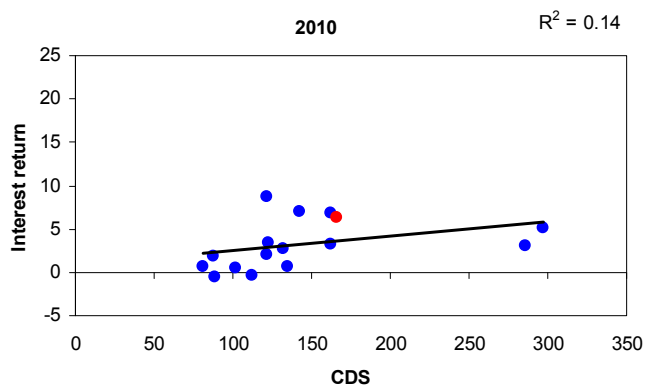
Source: Bloomberg, Haver and CIRA

Figure 55. CDS Spreads (2009)



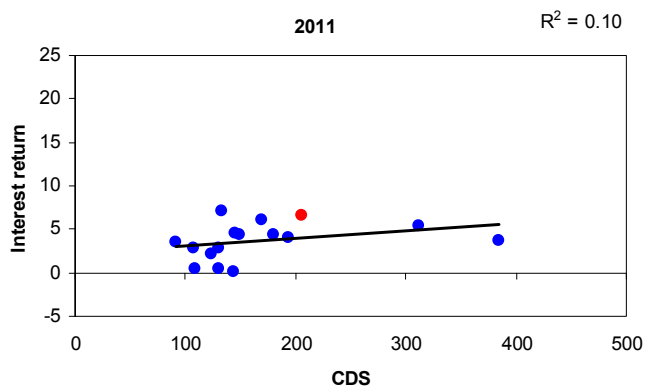
Source: Bloomberg, Haver and CIRA

Figure 56. CDS Spreads (2010)



Source: Bloomberg, Haver and CIRA

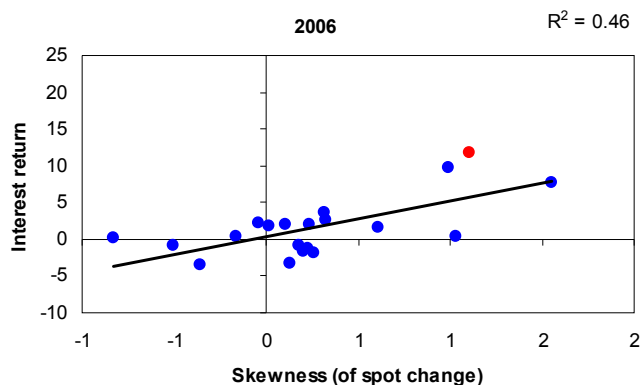
Figure 57. CDS Spreads (2011)



Source: Bloomberg, Haver and CIRA

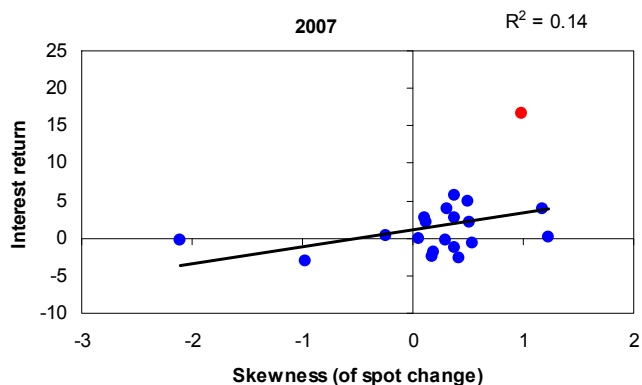
## Appendix 5: Interest Return and Skewness

Figure 58. Skewness (2006)



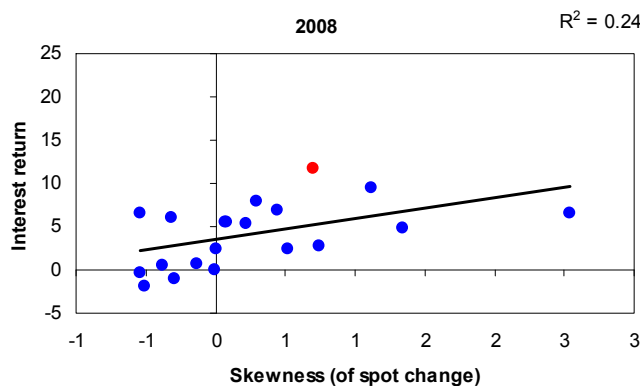
Source: Bloomberg and CIRA

Figure 59. Skewness (2007)



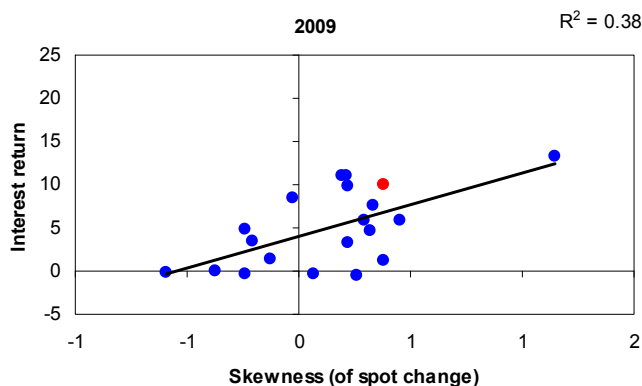
Source: Bloomberg and CIRA

Figure 60. Skewness (2008)



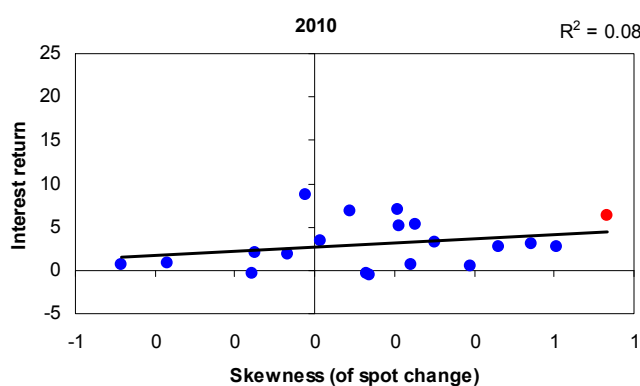
Source: Bloomberg and CIRA

Figure 61. Skewness (2009)



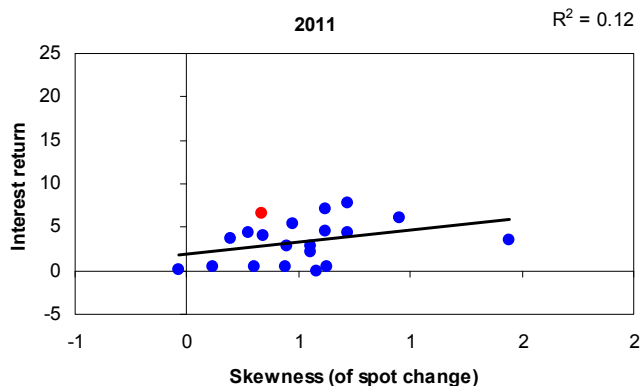
Source: Bloomberg and CIRA

Figure 62. Skewness (2010)



Source: Bloomberg and CIRA

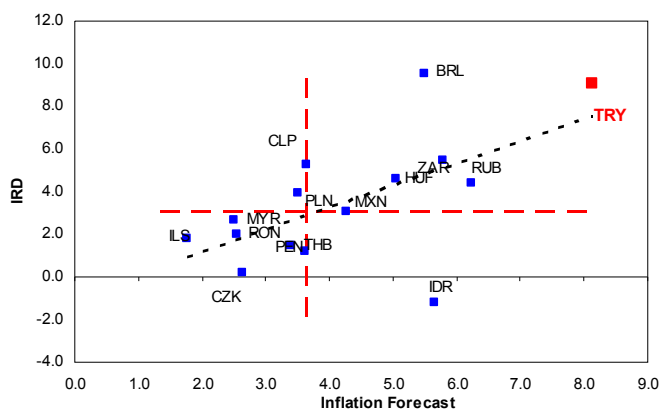
Figure 63. Skewness (2011)



Source: Bloomberg and CIRA

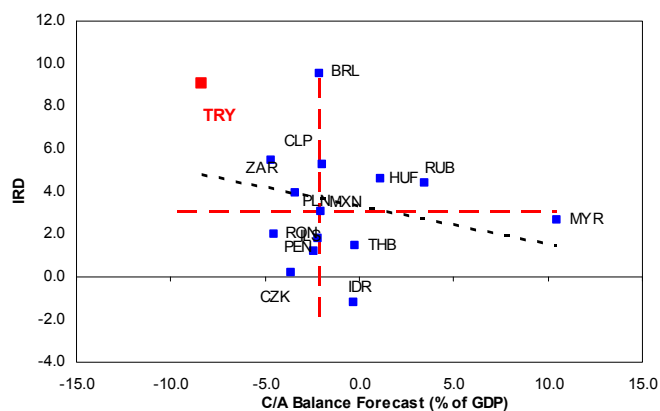
## Appendix 6: Interest Return and 2012 Forecasts

Figure 64. Inflation Forecast (2012F)



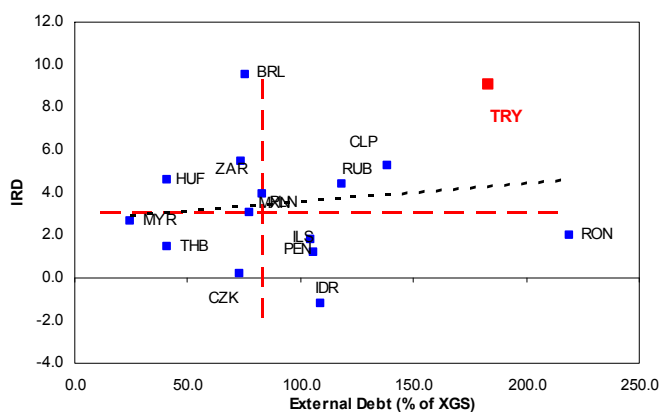
Source: Bloomberg and CIRA

Figure 65. C/A Balance Forecast (2012F)



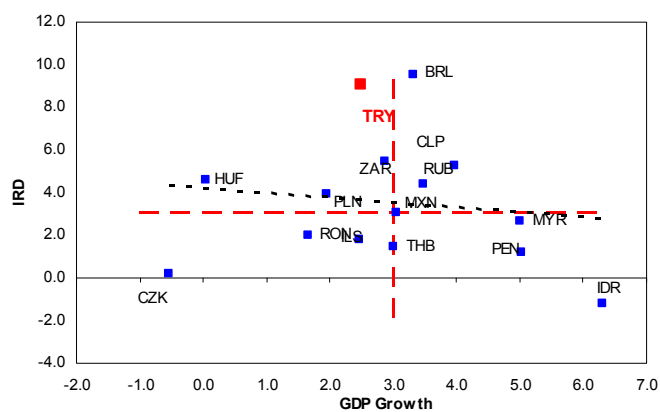
Source: Bloomberg and CIRA

Figure 66. External Debt/XGS (2012F)



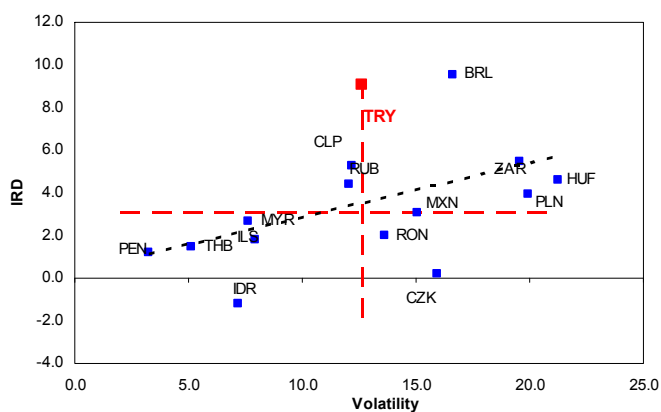
Source: Bloomberg and CIRA

Figure 67. GDP Growth (2012F)



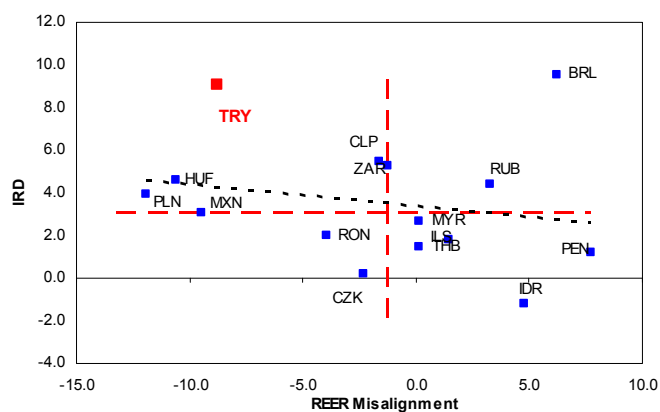
Source: Bloomberg and CIRA

Figure 68. Volatility (Jan 2011-Feb 2012)



Source: Bloomberg and CIRA

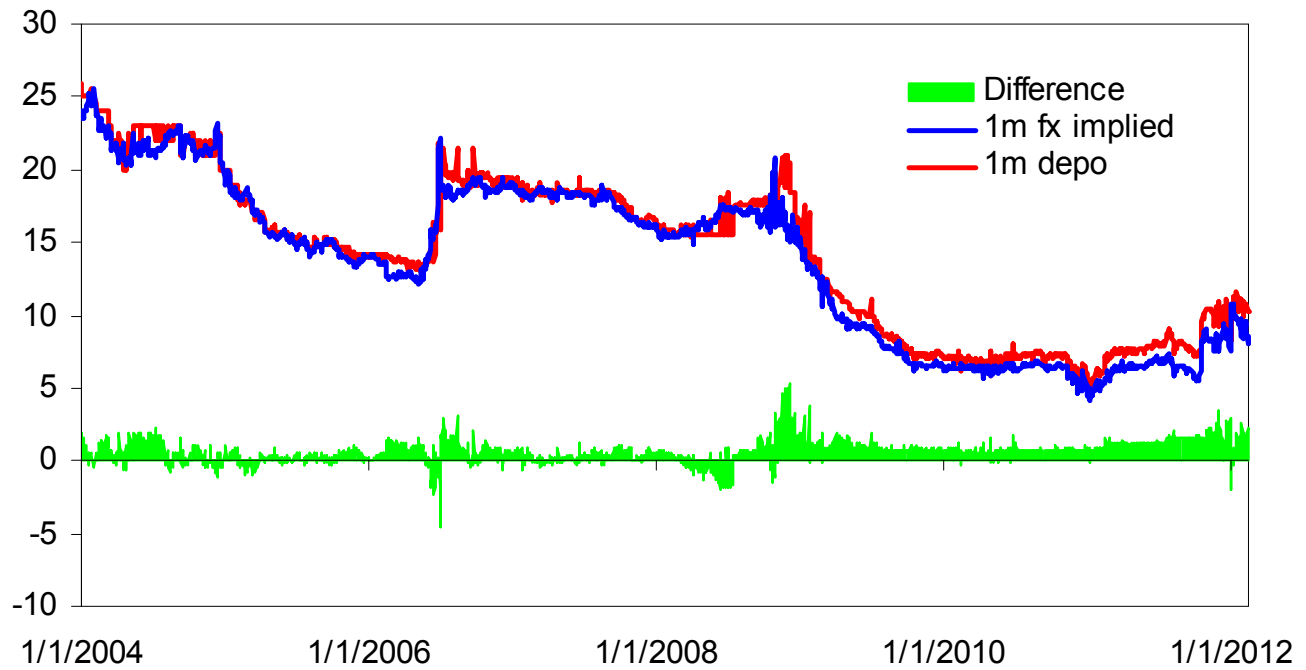
Figure 69. RER Misalignment (As of Dec 2011)



Source: Bloomberg and CIRA

## Appendix 7: Alternative Interest Rates

Figure 70. 1-month Depo Rate vs. 1-month FX Implied Yield



Source: Bloomberg

## 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 Investment Research & Analysis product ("the Product"), please contact Citi Investment Research & Analysis, 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/epublic/citi\\_research\\_disclosures](https://www.citivelocity.com/cvr/epublic/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:

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. LLC (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 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). 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.citivelocity.com/cvr/eppublic/citi\\_research\\_disclosures](https://www.citivelocity.com/cvr/eppublic/citi_research_disclosures).

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. 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 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 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. 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. 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 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?companyCd=A03030&pageDiv=02>. 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 1 Temasek Avenue, #39-02 Millenia Tower, Singapore 039192, 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 **Spain** by Citigroup Global Markets Limited, which is authorised and regulated by Financial Services Authority. 29 Jose Ortega Y Gassef, 4th Floor, Madrid, 28006, Spain. 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. 18/F, 22/F and 29/F, 82 North Sathorn Road, Silom, Bangrak, Bangkok 10500, Thailand. The Product is made available in **Turkey** through Citibank AS which is regulated by Capital Markets Board. Tekfen Tower, Eski Buyukdere Caddesi # 209 Kat 2B, 23294 Levent, Istanbul, Turkey. In the **U.A.E.**, these materials (the "Materials") are communicated by Citigroup Global Markets Limited, DIFC branch ("CGML"), an entity registered in the Dubai International Financial Center ("DIFC") and licensed and regulated by the Dubai Financial Services Authority ("DFSA") to Professional Clients and Market Counterparties only and should not be relied upon or distributed to Retail Clients. A distribution of the different 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 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 regulated by Financial Services Authority. 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 CIRA's Products can be found at [https://www.citivelocity.com/cvr/eppublic/citi\\_research\\_disclosures](https://www.citivelocity.com/cvr/eppublic/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 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. With the exception of our product that is made available only to Qualified Institutional Buyers (QIBs), CIRA concurrently disseminates its research via proprietary and non-proprietary electronic distribution platforms. Periodically, individual CIRA analysts may also opt to circulate research posted on such platforms to one or more clients by email. Such email distribution is discretionary and is done only after the research has been disseminated via the aforementioned distribution channels. CIRA simultaneously distributes product that is limited to QIBs only through email distribution.

The level and types of services provided by CIRA 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.

CIRA product may source data from dataCentral. dataCentral is a CIRA proprietary database, which includes Citi estimates, data from company reports and feeds from Reuters and Datastream.

---

© 2012 Citigroup Global Markets Inc. Citi Investment Research & Analysis 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

---