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# Time Series Analysis of Real Effective Exchange Rate A Case Study of India

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#### Abstract

This paper analyses the trend and seasonal variation of real effective exchange rate (REER) with an objective of building a model for predicting the exchange rate. Classical decomposition of the time series data of monthly export and trade based REER from January 2011 to August 2015 has been performed. The trend and seasonal components have been studied. The results show that the trend and seasonal effect are attributed only to chance (random) and not by a systematic factor like a trend or a seasonal change.

Keywords: Exchange rate, Trend Analysis, Seasonal variation, Classical Decomposition.

### 1. Introduction

Globalised business and its expansion together with the modern global economies have resulted in global corporations. These global corporation often have operations across countries exposing themselves to receivables, payables and liabilities denominated in multiplicity of currencies. Such currency exposures add extra risk because of the volatility of the exchange rate between the home and the foreign currency. They are also impacted in the long run because of a more permanent appreciation, depreciation or devaluation of the home and/or the foreign currency. This calls for the global corporations to be prepared with more carefully devised hedging strategies for short and long run. In doing so, while it is essential to understand the long term trends in the exchange rates for making strategic decisions like direct investment and building long term trade relations with certain countries, at the same time it is also necessary to understand if there are any seasonal effects on the exchange rate movement. This research is an attempt toward this end.

The purpose of this study is to analyse the trend and seasonal characteristics of the REER and build a model for predicting the exchange rate.

The outcome of this study will be important for the industry especially the export and imported oriented industries. It will help the exporters and importers to form suitable hedging strategies for covering their currency exposures. It would also serve as an useful input for forming their long term strategies. It is also important for policy makers. It helps them to have an idea about the expected exchange rates against currencies of all trading partners.

The other sections of the paper are organized as below. Section two makes a review of the past literature on the topic, section three presents the objectives of the study, section four details the data and methodology used for the study. Section five presents the analysis, results and discussions. Conclusion is presented in section six.

#### 2. Review of Literature

Researchers have attempted to study factors affecting exchange rates. Numerous studies have also been done to obtain an empirical evidence of the most fundamental theory in the exchange rate- the PPP theory. Most of such studies also had an additional objective of building a model for predicting the exchange rate.

Chia and Bauer in their study of the exchange rate movement of the Singapore Dollar against US dollar have found that it is difficult to forecast exchange rate using ARIMA model as Singapore Dollar is strongly managed. They have therefore concluded that one has to turn to more judgemental methods to 'predict' exchange rate trends.

Martin and Frutos have argued that equilibrium models have not worked well in explaining the actual exchange rate but with seasonally adjusted data there are reasons to expect spurious rejections of the model. They have modeled exchange rate dynamics by means of an equilibrium models that incorporates seasonal preferences. After evaluation of the model to a set of seasonally unadjusted data of five countries model with seasonal preferences can generate monthly time series of the exchange rate without seasonality, even if the variables that theoretically determine the exchange rate show seasonality.

Yu Cai and Howard Qi have conducted a comprehensive computational investigation of exchange rate using time series and econometric analysis. They have performed an empirical time series analysis of the exchange rate movement between US dollar and the British pound. They have tested a few time series models in an ad hoc

fashion aimed at investigating eth time series characteristics of the exchange rate.

Valakevicius and Brazenas in their study have proposed a new approach to investigating the dynamics of hourly exchange rates between Euro and US dollar. They have analysed exchange rate fluctuation by calculating the sum of absolute differences (SAD) of a time series per hour. They have shown empirically that a new time series constructed from SAD values is more suitable for predicting exchange rate volatility if it takes into account only the magnitude of the exchange rate fluctuation and ignores its direction.

Dornbusch has derived a perfect foresight path and has shown that along that path a monetary expansion causes the exchange rate to depreciate.

Santoya and Soutar have analysed movements in the REER is through a simple accounting decomposition of its elements (the NEER, domestic inflation and the foreign level of inflation.

Zhang Xiaopo has, based on new developments in the equilibrium exchange rate theory, developed equilibrium real exchange rate (ERER) and behavioral equilibrium exchange rate (BEER) models for RMB by using cointegration analysis, the Hodrick-Prescott (H-P) filter and other econometrics techniques. His estimation results show that the exchange rate of RMB is close to the equilibrium level in 1999. He also analyses the trajectory of RMB exchange rate misalignment since 1978, and makes an assessment of RMB exchange rates.

Chia and Bauer have analysed the movements in the US\$/Ringgit exchange rate with the objective of the forces determining the exchange rates so as to be able to predict these trends. They have analysed the trends in the exchange rates (REER and NEER) and found no strong support for the PPP theory in the case of US\$/Ringgit exchange rate.

Sathitwitayakul and Dr. Kriengsin Prasongsukarn have examined the major wave functions that influence the real effective exchange rate of Thai baht. They have used Fourier transform technique to extract the hidden sinusoidal wave function in the main graph. They have built a mathematical model for predicting the future value of exchange rate. Their results show the relativity of economic fundamentals and currency fluctuation, which implies that the basis unit of economic fundamentals exists and its characteristic of time-value (price quantity) function is shown in sinusoidal waveform.

#### 3. Objectives of the Study

The objectives of this study are

- to analyse the trend of REER
- to analyse the seasonal variations in REER
- to develop a forecasting model for REER

# 4. Data and Methodology

Use of index saves the effort of analysing each of the currencies of major trading partners individually. Hence the following two variants of the exchange rate index are generally published by the monetary authority.

NEER (Nominal Effective Exchange Rate): NEER is the weighted average of bilateral nominal exchange rates of the home currency in terms of foreign currencies. It is not adjusted for inflation

REER (Real Effective Exchange Rate): It is defined as a weighted average of nominal exchange rates adjusted for relative price differential between the domestic and foreign countries. It relates to the purchasing power parity (PPP) hypothesis.

Export Based Weights: Average of India's exports with the countries in the index.

Trade Based Weights: Average of India's bilateral trade (exports plus imports) with the countries in the x.

index.

We consider real effective exchange rate (REER published by RBI) as indicator for the exchange rate. Between the two types of REER, the REER with a 6-currency basket and the REER with a 36-currency basket, the latter is chosen as it would have a better representation of the countries with which trade is made.

Monthly Export and Trade Weighted Real Effective Exchange Rate (REER) data from January 2011 to August 2015 from the data base of Reserve Bank of India (RBI) is used for this study. The base year for the index is 2004-05 and the base year index is 100.

Classical decomposition of the time series of export based REER and trade based REER has been separately done followed by an analysis of seasonality. The trend and seasonal variation has then been tested for significance using the t-test.

#### 5. Analysis, Results and Discussions.

#### 5.1 Trend and Seasonality analysis for REER data

Figure 1 gives the time series plot of export based and trade based weight variables for REER. Inspection of the time series plot indicates trend and seasonality, though either of them does not appear to be large.

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Figure 1: Time series plot of export based and trade based weight

# 5.1.2 Trend and Seasonality Analysis for Export based weight REER

Variability in export based weight variable is decomposed in to trend –cyclical, seasonal and random error terms. Conceptual model of this classical decomposition is given as follows.

 $Y_t = (TC)_t S_t R_t$  where  $Y_t$  is the original series data for time period t,  $(TC)_t$  is the trend cycle part at time t,  $S_t$  is the seasonal component at time t and  $R_t$  is the random error term at time period t.

Table 1 reports original series, seasonal factors reported as a percentage of trend, seasonally adjusted series (De - seasonalized series), and trend-cycle along with random error term for the entire data from January 2011 to August 2015. February, March, May, July and September months report seasonal indices above trend and other months below trend. Month of March reports highest seasonal index (101.8) reporting 1.8% seasonal effect above the trend in export based REER. June reports the least (98.6%) with 1.4% below the trend. All the 12 months report seasonal indices close to the trend. Figure 2 gives the plot of original series, trend –cycle and seasonally adjusted series. Figure 3 gives the plot of random error term. This plot reports close resemblance to a stationary process supporting evidence for this factor to be random.



[Insert Table 1: Decomposition of Export based weight REER]

Figure 2: Original series, Trend -Cycle and Seasonally adjusted components of export based weight REER



Figure 3:Random error component of export based weight REER

Table 2 reports original series, seasonal factors reported as a percentage of trend, seasonally adjusted series (Deseasonalized series), and trend-cycle along with random error term for trade based weight REER variable. Matching the results of export based weight, February, March, May, July and September months report seasonal indices above trend and other months below trend. Month of March reports highest seasonal index (101.7) reporting 1.7% seasonal effect above the trend in export based REER. June reports the least (98.4%) with 1.6% below the trend. All the 12 months report seasonal indices close to the trend. Figure 4 gives the plot of original series, trend –cycle and seasonally adjusted series. Figure 5 gives the plot of random error term. This plot reports close resemblance to a stationary process supporting evidence for this factor to be random.



Figure 4: Original series, Trend – Cycle and Seasonally adjusted components of trade based weight REER





Figure 5:Random error component of export based weight REER

Table 3 and 4 report statistical test performed for testing the significance of seasonal dummy variables along with trend component included in regression model for export and trade based weighs respectively.

The conceptual form of the model fitted and tested is as follows.

 $Y_i = \beta_0 + \beta_1 t + \sum \gamma_i D_i + \varepsilon_i$  where  $D_i$ 's are the dummy variables for different months and "t" is the time index variable used to adjust for the effect of trend in the model.

 Table 3: Results of Testing Significance of Trend and Seasonal Dummy Variables for Export based Weight REER.

				95.0% CI	
Month	Estimate ( $\beta$ )	t	Р	Lower Bound	Upper Bound
(Constant)	108.819	42.430	.000	103.647	113.991
Jan	2.839	.921	.362	-3.379	9.058
Feb	3.980	1.292	.203	-2.234	10.195
Mar	4.107	1.334	.189	-2.104	10.318
Apr	3.532	1.147	.258	-2.676	9.741
May	2.783	.904	.371	-3.424	8.990
Jun	2.411	.783	.438	-3.796	8.617
Jul	4.020	1.306	.199	-2.187	10.227
Aug	2.645	.859	.395	-3.564	8.853
Sep	1.300	.401	.691	-5.246	7.847
Oct	2.367	.729	.470	-4.177	8.911
Nov	1.186	.366	.716	-5.357	7.729
Trend	039	-1.022	.313	116	.038

				95.0% CI for B	
Month	Estimate $(\beta)$	t	Ρ.	Lower Bound	Upper Bound
(Constant)	105.797	42.455	.000	100.771	110.822
Jan	2.854	.953	.346	-3.188	8.897
Feb	3.894	1.300	.200	-2.144	9.932
Mar	3.995	1.335	.189	-2.040	10.030
Apr	3.479	1.163	.251	-2.554	9.511
May	2.770	.926	.359	-3.261	8.802
Jun	2.262	.756	.454	-3.769	8.293
Jul	3.924	1.312	.196	-2.108	9.955
Aug	2.559	.856	.397	-3.473	8.592
Sep	1.287	.408	.685	-5.074	7.648
Oct	2.330	.739	.464	-4.028	8.689
Nov	1.194	.379	.707	-5.163	7.551
Trend	- 024	- 634	529	- 098	051

# Table 4: Results of Testing Significance of Trend and Seasonal Dummy Variables for Trade based Weight REER.

Results of the fitted regression model does not report overall model significance (F(12, 43) = 0.404, .954). This means that trend and none of the other seasonal dummy variables are significant predictors of variability in export based REER. This is confirmed by results of t test performed for testing the significance of each predictor variables. P value associated with each predictor variable is comfortably more than .05. These results, report that classical decomposition reports small seasonal effects over and below the trend. But none of months report statistical significance indicating that the seasonal effect reports is attributed only to chance (random) and not by a systematic factor like a Seasonal change. Same result is reported for trade based weight REER variable also. Therefore, it is concluded that export and trade based REER variables does not report significant trend or seasonal effects.

# 6. Conclusion

The results of this analysis show that neither the trend nor the seasonal variation is significant for the REER data over the selected time frame using the classical decomposition method. Hence a forecasting model cannot be fitted.

However it could be possible to fit a forecasting model using more advanced econometric methods. This serves as a scope for further research on this issue.

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# Table 1: Decomposition of Export based weight REER

Month	Series	Seasonal Factor (%)	) Seasonally Adjusted	Trend-Cycle Series	Error Component
Jan 2011	117.340	99.4	118.050	115.447	1.023
Feb 2011	115.520	101.5	113.856	115.172	.989
Mar 2011	115.600	101.8	113.609	114.620	.991
Apr 2011	115.440	99.7	115.747	114.824	1.008
May 2011	114.740	101.1	113.499	115.643	.981
Jun 2011	116.410	98.6	118.107	117.057	1.009
Jul 2011	119.070	100.1	118.974	117.600	1.012
Aug 2011	117.920	99.5	118.500	117.084	1.012
Sep 2011	114.960	100.2	114.765	114.995	.998
Oct 2011	112.070	99.5	112.669	112.369	1.003
Nov 2011	109.040	99.7	109.350	110.090	.993
Dec 2011	105.570	99.1	106.582	109.065	.977
Jan 2012	108.830	99.4	109.489	109.232	1.002
Feb 2012	113.120	101.5	111.490	109.658	1.017
Mar 2012	111.040	101.8	109.127	109.000	1.001
Apr 2012	108.350	99.7	108.638	107.693	1.009
May 2012	105.010	101.1	103.874	106.284	.977
Jun 2012	104.310	98.6	105.830	106.164	.997
Jul 2012	106.950	100.1	106.864	106.709	1.001
Aug 2012	107.340	99.5	107.868	108.105	.998
Sep 2012	108.700	100.2	108.516	109.269	.993
Oct 2012	112.150	99.5	112.750	110.314	1.022
Nov 2012	109.460	99.7	109.772	110.489	.994
Dec 2012	109.090	99.1	110.135	110.479	.997
Jan 2013	110.130	99.4	110.797	110.211	1.005
Feb 2013	111.630	101.5	110.022	110.212	.998
Mar 2013	111.340	101.8	109.422	110.136	.994
Apr 2013	110.970	99.7	111.265	109.941	1.012
May 2013	110.780	101.1	109.582	109.116	1.004
Jun 2013	106.100	98.6	107.647	107.490	1.001
Jul 2013	106.140	100.1	106.055	105.331	1.007
Aug 2013	101.430	99.5	101.929	103.664	.983
Sep 2013	101.250	100.2	101.078	103.210	.979
Oct 2013	104.720	99.5	105.280	104.031	1.012
Nov 2013	104.880	99.7	105.179	104.947	1.002
Dec 2013	104.990	99.1	105.996	105.203	1.008
Jan 2014	104.720	99.4	105.354	104.688	1.006
Feb 2014	103.990	101.5	102.492	104.359	.982
Mar 2014	105.800	101.8	103.978	104.949	.991
Apr 2014	106.810	99.7	107.094	106.538	1.005
May 2014	109.260	101.1	108.078	108.307	.998
Jun 2014	109.360	98.6	110.954	109.784	1.011
Jul 2014	110.540	100.1	110.451	110.510	.999
Aug 2014	110.500	99.5	111.043	111.037	1.000
Sep 2014	111.350	100.2	111.161	111.389	.998
Oct 2014	111.430	99.5	112.026	111.812	1.002
Nov 2014	112.110	99.7	112.429	112.175	1.002
Dec 2014	110.940	99.1	112.003	112.449	.996
Jan 2015	112.390	99.4	113.070	112.806	1.002
Feb 2015	114.660	101.5	113.008	113.264	.998
Mar 2015	115.580	101.8	113.589	113.472	1.001
Apr 2015	114.720	99.7	115.025	113.747	1.011
May 2015	112.560	101.1	111.343	113.840	.978
Jun 2015	114.110	98.6	115.773	114.463	1.011
Jul 2015	115.440	100.1	115.347	115.187	1.001
Aug 2015	113.880	99.5	114.440	115.549	.990

Table 2. Decomposition of flaue based weight REEP	Table 2: Decom	position	of Trade	based	weight	REER
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Jan 2011114.65099.515.260112.7751.022Feb 2011112.810101.3111.373112.522990Mar 2011112.780101.7110.933112.016990Apr 2011112.84099.8113.205112.2421.009May 2011112.850101.1110.932112.955.982Jun 2011113.56098.4115.456114.1961.011Jul 2011115.870100.3115.546114.5041.009Aug 2011114.57099.4115.232113.8911.012Sep 2011110.62.6099.8106.429107.129.993Dec 2011106.26099.5106.544106.3951.001Feb 2012107.89099.5106.544106.8351.019Mar 2012107.890101.3108.876106.8351.019Mar 2012107.950101.7106.182106.1331.000Apr 2012105.41099.8105.658104.8221.008May 2012102.90101.1101.098103.364.978Jun 2012107.90100.3103.500103.614.999Jul 2012105.25099.4106.453107.0631.022Nov 2012106.25099.4106.454106.059.994Oct 2012105.83099.6109.453107.0631.022Nov 2012106.25099.6109.453107.0631.022Nov 2012 <th>Month</th> <th>Series</th> <th>Seasonal Factor (%)</th> <th>Seasonally Adjusted Series</th> <th>Trend-Cycle Series</th> <th>Error</th>	Month	Series	Seasonal Factor (%)	Seasonally Adjusted Series	Trend-Cycle Series	Error
Feb 2011112.810101.3111.373112.522990Mar 2011112.94099.8113.205112.2421.009May 2011112.130101.1110.932112.2459.82Jun 2011113.56098.4115.546114.1661.011Jul 2011115.870100.3115.546114.4541.009Aug 2011114.570100.2111.589118.21998Oct 2011109.11009.4115.232113.8301.012Sep 2011114.87099.4105.232113.8311.012Sep 2011102.81099.5106.6544106.3551.001Feb 2012105.98099.5106.5544106.3551.001Feb 2012105.98099.5106.568104.8221.008May 2012105.10098.4102.992103.179998Jun 2012101.30098.4102.992103.179998Jun 2012101.30098.4102.992103.179998Jun 2012104.18099.4104.782104.950.998Sep 2012105.590100.2105.381106.059.994Jun 2012104.8099.5107.458106.459.994Jun 2013108.80099.5107.458106.9621.002Nov 2012106.33099.8106.419107.184.993Jac 2013108.300101.7106.310107.077.993Jar 201310	Jan 2011	114.650	99.5	115.260	112.775	1.022
Mar 2011         112.780         101.7         110.933         112.2016         990           May 2011         112.340         101.1         110.932         112.955         982           Jan 2011         113.560         98.4         115.456         114.196         1.011           Jal 2011         115.870         99.4         115.232         113.891         1.012           Aug 2011         114.870         99.4         115.232         113.891         1.003           Aug 2011         106.260         99.8         106.429         107.129         .993           Oct 2011         100.810         99.1         103.779         106.195         .977           Jan 2012         107.590         101.7         106.182         106.139         1.000           Mar 2012         107.950         101.7         106.182         106.139         1.000           May 2012         102.410         99.8         105.658         104.822         1.008           May 2012         102.100         101.1         101.098         103.364         .978           Jun 2012         105.400         99.4         104.782         104.950         .998           Sep 2012         105.810	Feb 2011	112.810	101.3	111.373	112.522	.990
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$h_{3}'$ 2011         112.130         101.1         110.932         112.955         .982           Jun 2011         113.560         98.4         115.456         114.196         1.011           Jul 2011         114.570         99.4         115.232         113.891         1.012           Sep 2011         114.570         99.4         115.232         113.891         1.003           Nov 2011         106.260         99.8         106.429         107.129         .993           Dec 2011         102.810         99.5         106.544         106.395         .1001           Feb 2012         107.890         99.5         106.544         106.395         .1001           Mar 2012         107.990         101.7         106.182         106.139         .1.000           Mar 2012         105.410         99.8         105.658         104.822         1.000           Mar 2012         105.390         100.3         103.500         103.614         .999           Jul 2012         103.790         100.3         103.500         103.614         .999           Jul 2012         105.890         109.453         107.063         1.022           Jox 2012         108.830         99.4 <td>Apr 2011</td> <td>112.940</td> <td>99.8</td> <td>113.205</td> <td>112.242</td> <td>1.009</td>	Apr 2011	112.940	99.8	113.205	112.242	1.009
$\begin{split} Jm^2_{2011} & 113.560 & 98.4 & 115.456 & 114.196 & 1.011 \\ Jul 2011 & 115.870 & 100.3 & 115.546 & 114.504 & 1.009 \\ Aug 2011 & 115.810 & 100.2 & 111.589 & 111.821 & 998 \\ Oct 2011 & 109.110 & 99.6 & 109.593 & 109.314 & 1.003 \\ Nov 2011 & 106.260 & 99.8 & 106.429 & 107.129 & 993 \\ Dec 2011 & 102.810 & 99.1 & 103.779 & 106.195 & 9.77 \\ Jan 2012 & 105.980 & 99.5 & 106.544 & 106.395 & 1.001 \\ Feb 2012 & 110.280 & 101.3 & 108.876 & 106.835 & 1.019 \\ Mar 2012 & 105.940 & 99.8 & 105.658 & 104.822 & 10.000 \\ Apr 2012 & 105.410 & 99.8 & 105.658 & 104.822 & 1.008 \\ Apy 2012 & 102.100 & 98.4 & 102.992 & 103.179 & 998 \\ Jun 2012 & 103.790 & 100.3 & 103.500 & 103.614 & 9998 \\ Jun 2012 & 101.300 & 98.4 & 102.992 & 103.179 & 998 \\ Jun 2012 & 101.300 & 98.4 & 102.992 & 103.614 & 9998 \\ Jun 2012 & 103.790 & 100.2 & 105.381 & 106.059 & 994 \\ Oct 2012 & 105.590 & 100.2 & 105.381 & 106.059 & 9948 \\ Sep 2012 & 105.590 & 100.2 & 105.381 & 106.059 & 9998 \\ Sep 2012 & 105.590 & 100.2 & 105.381 & 106.059 & 9998 \\ Sep 2012 & 105.830 & 99.1 & 106.828 & 107.182 & 997 \\ Jan 2013 & 108.830 & 101.3 & 106.950 & 107.055 & 9999 \\ Mar 2013 & 108.830 & 101.3 & 106.950 & 107.055 & 9999 \\ Apr 2013 & 108.830 & 101.3 & 106.828 & 107.182 & 997 \\ Jan 2013 & 108.080 & 104.7 & 106.310 & 107.077 & 9.93 \\ Apr 2013 & 108.080 & 99.8 & 108.284 & 107.009 & 1.012 \\ May 2013 & 107.909 & 101.1 & 106.836 & 106.6343 & 1.005 \\ Jan 2013 & 104.020 & 100.3 & 103.729 & 103.023 & 1.007 \\ Aug 2013 & 102.800 & 99.8 & 103.043 & 102.862 & 1.002 \\ Apr 2013 & 102.800 & 99.8 & 103.043 & 102.862 & 1.002 \\ Apr 2013 & 102.800 & 99.8 & 103.043 & 102.862 & 1.002 \\ Apr 2013 & 102.800 & 99.8 & 103.043 & 102.862 & 1.002 \\ Apr 2014 & 104.970 & 101.3 & 100.671 & 102.2408 & 9.83 \\ Apr 2014 & 107.705 & 99.5 & 103.276 & 103.153 & 1.008 \\ Anz 2014 & 107.705 & 101.1 & 103.906 & 106.153 & 9.98 \\ Apr 2014 & 104.802 & 99.8 & 103.043 & 102.862 & 1.002 \\ Apr 2014 & 104.803 & 99.8 & 103.043 & 102.862 & 1.002 \\ Apr 2014 & 104.803 & 99.8 & 103.043 & 102.862 & 1.002 \\ Apr 2014 & 104.803 & 99.8 & 1$	May 2011	112.130	101.1	110.932	112.955	.982
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$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Dec 2011	102.810	99.1	103.779	106.195	.977
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Feb 2015       112.000       101.3       110.574       110.851       .997         Mar 2015       113.150       101.7       111.297       111.026       1.002         Apr 2015       112.080       99.8       112.343       111.262       1.010         May 2015       110.060       101.1       108.884       111.341       .978         Jun 2015       112.960       100.3       112.644       112.771       .999         Aug 2015       111.630       99.4       112.275       113.164       .992	Ian 2015	110 040	99.5	110 625	110.427	1 002
Mar 2015       113.150       101.7       111.297       111.026       1.002         Apr 2015       112.080       99.8       112.343       111.262       1.010         May 2015       110.060       101.1       108.884       111.341       .978         Jun 2015       112.960       100.3       112.644       112.771       .999         Aug 2015       111.630       99.4       112.275       113.164       .992	Feb 2015	112 000	101.3	110 574	110.851	997
Apr 2015       112.080       99.8       112.343       111.262       1.010         May 2015       110.060       101.1       108.884       111.341       .978         Jun 2015       111.530       98.4       113.392       111.984       1.013         Jul 2015       112.960       100.3       112.644       112.771       .999         Aug 2015       111.630       99.4       112.275       113.164       .992	Mar 2015	113 150	101.5	111 297	111 026	1 002
May 2015       110.060       101.1       108.884       111.341       .978         Jun 2015       111.530       98.4       113.392       111.984       1.013         Jul 2015       112.960       100.3       112.644       112.771       .999         Aug 2015       111.630       99.4       112.275       113.164       .992	Apr 2015	112 080	99 8	112 343	111 262	1 010
Jun 2015       111.530       98.4       113.392       111.984       1.013         Jul 2015       112.960       100.3       112.644       112.771       .999         Aug 2015       111.630       99.4       112.275       113.164       992	May 2015	110.060	101.1	108 884	111.202	978
Jul 2015     112.960     100.3     112.644     112.771     .999       Aug 2015     111 630     99.4     112.275     113.164     .992	Iun 2015	111 530	98.4	113 392	111 984	1 013
Aug 2015         111 630         99 4         112 275         113 164         992	Jul 2015	112 960	100 3	112 644	112 771	999
	Aug 2015	111 630	99.4	112.275	113 164	992