CONSUMER CONFIDENCE, STOCK PRICES AND EXCHANGE RATES: THE CASE OF TURKEY

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Abstract
During the last few years a large number of economist and institutions have expressed increasing concerns regarding to importance of confidence on economic variables. They believe that increase in economic agents' confidence will affect economic variables positively. The main objective of this study is to investigate the effect of Consumer Confidence Index[1] (CCI) on reel exchange rate and stock market in Turkey over the 2002:1 – 2008:12 periods by utilizing several econometric techniques. Most of the empirical studies have examined the effect of macroeconomics variables on confidence and ignored the effect of confidence on macroeconomics variables. In this study, we will try to fill up this gap by examining the effect of CNBC-e Consumer Confidence Index on reel exchange rate and stock market in Turkey. The results showed that Granger-causality run from stock price and real exchange rate to CCI but not vice versa. Also, the results from GARCH-M and OLS model showed that CCI affect reel exchange rate and stock price.

JEL Classification: C22, G10, E40, E50
Keywords: Macroeconomic variables, Consumer confidence. Stock market, Exchange rate

1. Introduction

Economists have long claimed that lack of the confidence is one of the main reasons behind the financial crises. Therefore, confidence of economic agents becomes very important subject in economic literature[2]. According to Fukuyama (2000), the confidence of economic agents can be thought as a social capital. Increase in the confidence of economic agents supposed to affect macroeconomics variables positively. If confidence of economic agents increases (decrease) demand and investment supposed to increase (decrease) and unemployment decrease (increase).

There are many studies in literature which investigate effect of selected macroeconomic variables on confidence. However, there are a few studies which investigate effect of confidence on macroeconomic variables. Also, most of the studies ignored relationship between stock prices-CCI and exchange rate-CCI and mainly focused on relationship between CCI-GDP and CCI-consumer spending. At the same time in this field, there are limited studies related to Turkey. Therefore, to our best knowledge this is the first study to investigate the effect of CCI on stock prices and exchange rate in Turkish experience.

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1 We will use CNBC-e consumer confidence index.

[2] Bram, J. and Ludvigson, S. (1998), Howrey, P. (2001), Jansen, W and Nahuis, N. (2003), Ozsagır, A. (2007).

The rest of this paper is organized as follows. Section 2 represents a brief literature review about prior theoretical and applied papers. Section 3 is explaining data. Section 4 represents empirical results. The last section is conclusion.

2. Literature Review

A number of both theoretical and applied papers exist in the literature to investigate the effect of confidence upon economics activities such as GDP and consumer spending.

Yew-Kwang (1992)'s theoretical study shows that a stock market crash can cause collapse of business confidence and then reduce real activities. Matsusaka and Sbordone (1995) examined the link between CCI and GNP using the U.S. data from 1953 to 1998 and found that direction of causality run from CCI to GNP fluctuation. Utaka (2003) used quarterly data for Japan from 1980 to 2000 to investigate link between CCI and GDP. His study showed that causality run from CCI to GDP. Afshar (2007) investigated relationship between CCI and economic fluctuations using quarterly data for the U. S. from 1980 to 2005 and found that CCI did Granger caused GDP. Barro(1991) and Knack and Keefer (1997)'s empirical studies show that there are positive relationship between confidence and growth rate (Ozsagır, A. 2007). Also, Carroll, C.D., Fuhrer, J.C. and Wilcox, D.W. (1994), Nahuis, N.J. (2000), Batchelor, R. and Dua, P. (1998) and McNabb, B. and Taylor, K. (2007) found similar results that CCI has effect on GDP.

Bram and Ludvigson (1998) created their own CCI for the U.S. and showed that adding the CCI variable in to the baseline equation increases predictability of the next period's consumption growth 9 percent. Qiao, McAleer and Wong (2009) used monthly data from 1985 to 2005 to examined effect of CCI on consumer spending. Result from nonlinear Granger-causality test showed that CCI is helpful to predict consumption spending.

Recently, a number of studies have investigated to link between CCI and stock prices. Majority of these studies found that the direction of causality run from stock prices to CCI[3].

There are two separate channels to explain effect of stock prices on CCI. First channel is wealth effect where increase in stock prices increase consumers' wealth and then CCI. Second channel is expectation effect where consumers may read current stock prices increase as stock prices and wealth will increase in future too. Therefore, CCI may increase. Also, there are two separate channels to explain effect of CCI on stock prices. First, we may expect that decline in consumer confidence can decrease consumer spending, simultaneously decreasing firms' profit and stock prices. Second, announcement of CCI data may have psychological effect on stock prices (Jansen and Nahuis, 2002).

Bremmer (2008) investigated the relationship between CCI and nine different stock market indexes for the U.S. using different econometric techniques. His results from the estimated regressions showed that unexpected changes in CCI affected stock prices. Otoo (1999) used monthly data for the U.S. from 1981 to 1999 and found that stock market returns Granger-caused to CCI, but not vice versa. Jansen and Nahuis (2002) looked at the relationship between stock prices and CCI for eleven European

[3] Otoo (1999) and Jansen and Nahuis (2002).

countries and found that stock prices did Granger-caused CCI in six of eleven countries. However, Granger-causality runs from CCI to stock price only for France.

Prior studies ignore link between CCI and exchange rate. We expect that an increase in the confidence of economic agents supposed to effect exchange rate positively. If confidence of economics agents increase (decrease) demand for exchange rate decrease (increase), value of domestic currency increases. At the same time, devaluation of domestic currency supposed to decrease CCI. Unfortunately, there is no empirical study to support this.

3. Data

In this study, monthly data was used over the period 2002:1-2008:12 for following variables:

RER	Reel Exchange rate
CONFIDENCE	CNBC-e CCI
WSMI	The world stock market index
CPI	Consumer price index
INDPRODTR	Industrial production index of Turkey
STOCKPRICE	Turkish stock market index
INDPRODDIF	Difference of Turkey and the U.S. industrial production index
CPIDIF	Difference of Turkey and the U.S. inflation rate
M1DIF	Difference of Turkey and the U.S. money supply
RDIF	Difference of Turkey and the U.S. interest rate

Most of the variables were obtained from the Central Bank of Turkey[4]. The Central Bank and CNBC-e create data for CCI. The Central Bank's data stars from 2007 and CNBC-e's data starts from 2002. We will use CNBC-e CCI data in this study because it is cover longer time period than the Central Bank's CCI. The world stock market index provided from Morgan Stanley Countries Index. The U.S. data provided from International Financial Statistics CD-ROM database.

The CNBC-e consumer confidence index started in 2002 on a monthly basis. The final survey's result for each month becomes available at the beginning of the following month. The survey is made by phone with 704 households. To get better result those 704 households chosen from different cities, age group, gender and income levels. At the same time, the half of survey sample (households) changes with new one on a monthly basis. The following five questions are asked to households.

1. Are you better off or worse off financially than you were a year ago?
2. Do you think economic condition of country is good or bad?
3. Do you think that a year from now, you will be better off or worse off financially?
4. Do you think economic condition of country will be better off or worse off in the future?
5. Do you think now is a good or bad time for people to buy durable goods?

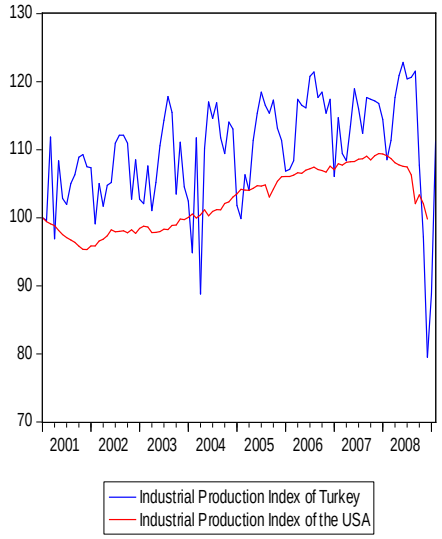
CNBC-e consumer confidence index calculated as:

[4] hhtp://www.tcmb.gov.tr

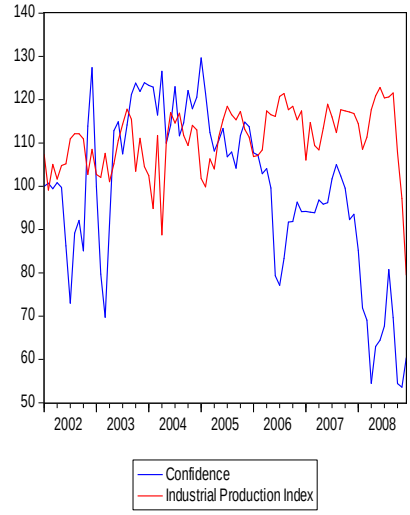
CCI = (((Positive answers – Negative answers)/704)*100 + 100)

Graph 1 presents monthly data of industrial production indexes, of Turkey and the United States for the period 2001.1 to 2009.2, and graph 2 the evolution of industrial production index and consumer confidence in Turkey for the period 2002.1 to 2008.12. Industrial production indexes correspond to their evolution with base 2001.1 equal to 100, and consumer confidence index to base 2002.1 equal to 100.

Graph1. Industrial production indexes in Turkey and USA



Graph 2. Industrial Production and Consumer Confidence indexes in Turkey



We notice that the industrial production index of Turkey was usually higher, for that period, than in the USA, although with higher volatility. Given that Turkey needs to increase industrial production per capita in order to reach higher levels of development it is highly positive that the industrial production index have experienced important increases during the period 2001-2008, although it should be desirable a lower level of volatility.

As seen in Guisan and Exposito(2006) industrial production per capita in Turkey had a very low level, in comparison with OECD countries in 1985, and had experienced very important increases for the period 1985-2005 from 989 constant dollars per capita in year 1985 to 1704 in year 2005, with an overall increase of 72% in that period, while the OECD average evolved from 4919 to 6467, with an increase of 31%. The United States increased from 6043 in year 1985 to 8041 in year 2005, with a percentage of increase, of 33%, slightly over the OECD average.

Regarding consumer confidence in Turkey we notice a negative trend during the second half of the period 2002-2008.

4. Emprical Results

To investigate the relationship between CCI-stock prices and CCI-exchange rate, we need to specify an appropriate empirical technique. First, all the time series variables of models are tested for a unit root conducting the Augmented Dickey-Fuller (ADF) test. Table 1 reports ADF test results for unit root both level and first-difference[5].

Table 1. ADF Stationary Test Statistics

	ADF	Probabilities
RER	-1.644	0.456
DRER	**-8.125**	**0.000**
M1DIF	0.881	0.994
DM1DIF	-0.133	0.940
RDIF	-1.410	0.574
DRDIF	**-8.448**	**0.000**
CONFIDENCE	-1.172	0.682
DCONFIDENCE	**-8.547**	**0.000**
INDPRODDIF	**-4.920**	**0.000**
DINDPRODDIF	**-8.055**	**0.000**
CPIDIF	**-3.419**	**0.012**
DCPIDIF	**-7.323**	**0.000**
CPI	**-3.965**	**0.002**
DCPI	**-7.995**	**0.000**
WSMI	-1.254	0.647
DWSMI	**-6.948**	**0.000**
INDPRODTR	**-4.027**	**0.002**
DINDRODTR	**-13.15**	**0.000**
STOCKPRICE	-1.273	0.639
DSTOCKPRICE	**-10.88**	**0.000**

Most of the previous emprical studies used Engle and Granger (1987), Johansen (1988) and Johansen and Juselius (1990)'s cointegration tests to determine long-run relationship between CCI and selected macroeconomic variables. By definition, cointegration tests necessitates that the variables have to be integrated of the same order. ADF test result showed that some of variables violated this necessitates. Therefore, we can not use above econometric techniques. Pesaran, Shin and Smith (2001) developed a bound test to solve this problem. According to this approach, even if some of time series are integrated of order I(0) or I(1), long-run relationship between series can be investigated. If some of time series are integrated of higher than order I(1), then this method can not be used. In our model, money supply (M1DIF) variable is integrated order I(2) and violated bound test condition. After money supply (M1DIF) variable is dropped from model, bound test can be conducted for the null hypothesis of no cointegration.

[5] Letter D in table 1. shows first difference of series.

To implement the bounds testing procedure, we start by modeling equation (1) and (2) as a conditional ARDL-ECM, respectively:

$$\Delta RER = c + \sum_{1}^{3} \alpha_1 \Delta RER_{t-i} + \sum_{1}^{3} \alpha_2 \Delta M1DIF_{t-i} + \sum_{1}^{3} \alpha_3 \Delta CPIDIF_{t-i} + \sum_{1}^{3} \alpha_4 \Delta RDIF_{t-i} + \sum_{1}^{3} \alpha_5 \Delta CONFIDENCE_{t-i} + \sum_{1}^{3} \alpha_6 \Delta INDPRODDIF_{t-i} + \beta_1 RER_{-1} + \beta_2 M1DIF_{-1} + \beta_3 CPIDIF_{-1} + \beta_4 RDIF_{-1} + \beta_5 CONFIDENCE_{-1} + \beta_6 INDPRODDIF_{-1} + \varepsilon_t \quad \textbf{(1)}$$

$$\Delta STOCKPRICE = c + \sum_{1}^{2} \alpha_1 \Delta STOCKPRICE_{t-i} + \sum_{1}^{2} \alpha_2 \Delta RER_{t-i} + \sum_{1}^{2} \alpha_3 \Delta CPI_{t-i} + \sum_{1}^{2} \alpha_4 \Delta WSMI_{t-i} + \sum_{1}^{2} \alpha_5 \Delta CONFIDENCE_{t-i} + \sum_{1}^{2} \alpha_6 \Delta INDPROD_{t-i} + \beta_1 STOCKPRICE_{-1} + \beta_2 RER_{-1} + \beta_3 CPI_{-1} + \beta_4 WSMI_{-1} + \beta_5 CONFIDENCE_{-1} + \beta_6 INDPROD_{-1} + \varepsilon_t \quad \textbf{(2)}$$

The minimum AIC level is reached at the third lag level for first equation and the second lag level for second equation. Following Pesaran et all. (2001), two separate statistics are employed to 'bounds test' for the existence of a long-run relationship. The calculated F-statistic is obtained using R^2 of unrestricted and restricted ARDL-ECM. Critical values of F-statistic tabulated by Pesaran et all. (2001). If the calculated F-test exceeds the upper critical value, the null hypothesis of no cointegration can be rejected or vice versa. The result from table 2a and 2b show that calculated F-test statistic is less than the lower critical value, the null hypothesis can not be rejected and there is no cointegration.

Table 2a Bound test result for equation (1)

k	**F-statistic**	**%1 Critical Value**	
		Lower Bound Value I(0)	Upper Bound Value I(1)
5	2.63	3.41	4.68

Pesaran et all. (2001:300). Table C1 (iii).

Table 2b Bound test result for equation (2)

k	**F-statistic**	**%1 Critical Value**	
		Lower Bound Value I(0)	Upper Bound Value I(1)
5	0.875	3.41	4.68

Pesaran et all. (2001:300). Table C1(iii).

Above tests results showed that there is no long-run relationship between selected variables. However, if variables under consideration have the same order of integration

I(1), short-run relationship can be investigated using Granger-causality test on the basis of the following equations.

$$\Delta CONFIDENCE_t = \alpha_0 + \sum_{i:1}^{n} \alpha_1 \Delta CONFIDENCE_{t-1} + \sum_{i:1}^{n} \alpha_2 \Delta RER_{t-1} + \varepsilon_t \quad \textbf{(3)}$$

$$\Delta RER_t = \alpha_0 + \sum_{i:1}^{n} \alpha_1 \Delta RER_{t-1} + \sum_{i:1}^{n} \alpha_2 \Delta CONFIDENCE_{t-1} + \varepsilon_t \quad \textbf{(4)}$$

Table 3a Granger Causality Tests

Null Hypothesis	Observations	F-Statistics	Probability
DRER does not cause DCONFIDENCE	78	2.47	0.04
DCONFIDENCE does not cause DRER	78	0.32	0.89

$$\Delta CONFIDENCE_t = \alpha_0 + \sum_{i:1}^{n} \alpha_1 \Delta CONFIDENCE_{t-1} + \sum_{i:1}^{n} \alpha_2 \Delta STOCKPRICE_{t-1} + \varepsilon_t \quad \textbf{(5)}$$

$$\Delta STOCKPRICE_t = \alpha_0 + \sum_{i:1}^{n} \alpha_1 \Delta STOCKPRICE_{t-1} + \sum_{i:1}^{n} \alpha_2 \Delta CONFIDENCE_{t-1} + \varepsilon_t \quad \textbf{(6)}$$

Table 3b Granger Causality Tests

Null Hypothesis	Observations	F-Statistics	Probability
DSTOCKPRICE does not cause DCONFIDENCE	78	2.42	0.04
DCONFIDENCE does not cause DSTOCKPRICE	78	0.30	0.90

Where Δ is the first-difference operator and $CONFIDENCE_t$, RER_t and $STOCKPRICE_t$ are stationary time series for CCI, exchange rate and stock price, respectively. The results from Table 3a and 3b show that Granger-causality runs from stock prices and reel exchange rate to CCI but not vice versa. As seen in Guisan(2001) and (2003) Granger causality, although an interesting test, not always lead to acceptance of true relationships due to multicollinearity problems and to missing not lagged explanatory variables which may be important in explanation.

Finally, we can estimate equation (7) using GARCH-M and equation (8) using OLS models[6]. Autoregresive Conditional Heteroskedasticitiy (ARCH) model were developed by Engle and Generalized ARCH (GARCH) by Bollerslev (1986) which residual variances of model is not constant over time and depends on past residuals and variances of residuals.

$$\Delta RER = c + \alpha_1 \Delta RER_{-1} + + \alpha_2 \Delta M1DIF + \alpha_3 CPIDIF + \alpha_3 \Delta RDIF + \alpha_4 \Delta CONFIDENCE + \alpha_5 INDPRODDIF + \varepsilon_t \quad \textbf{(7)}$$

[6] Test results shows that there is no serial correlation and heteroskedasticity problem in both model. GARCH-M is best fit for equation (7) and OLS is best fit for equation (8). Test results is provided in appendix 1 and 2.

Table 4 Results from GARCH-M estimation

Dependent Variable= DRER				
Variables	Coefficient	Std.Error	t-statistics	Prob
DM1DIF	0.025	0.043	0.592	0.553
CPIDIF	-0.445	0.301	-1.477	0.139
DRDIF	-0.754	0.306	-2.461	0.013
DCONFIDENCE	0.241	0.048	4.965	0.000
INDPRODDIF	0.118	0.070	1.675	0.093
DRER(-1)	0.193	0.072	2.660	0.007
C	1.809	1.695	1.067	0.285
Variance Equation				
C	3.051	0.830	3.673	0.000
RESID (-1)^2	-0.131	0.025	-5.153	0.000
GARCH (-1)	0.994	0.0242	40.976	0.000
R^2=0.32 N=83 DW=1.72				

The result from GARCH-M model (table 4) showed that INDPRODDIF and DRER (-1) variables are significant at the 10% and 1% levels, respectively. Increase in INDPRODDIF and DRER(-1) has positive effect on RER as expected. Increase in confidence has a positive effect on reel exchange rate as expected and significant at the 1% level. As consumer confidence increase, their demand for foreign currency will decrease and value of domestic currency will increase (RER increases). Even if DRDIF variable is significant at the 5% level its sign is not consistent with theory. Theory says that increase in domestic interest rate will attract more foreign currency and reel exchange rate supposed to increase. RESID (-1)^2 and GARCH (-1) variables are significant which indicate that residual variances of model depends on past residuals and variances of residuals, respectively.

$$\Delta STOCKPRICE = c + \alpha_1 \Delta STOCKPRICE_{-1} + \alpha_2 \Delta RER + \alpha_3 CPI + \alpha_4 \Delta WSMI + \alpha_5 \Delta CONFIDENCE + \alpha_6 INDPROD + \varepsilon_t \quad \textbf{(8)}$$

Table 5 Results from OLS estimation

Dependent Variable= DSTOCKPRICES				
Variables	Coefficient	Std.Error	t-statistics	Prob
DRER	97.804	54.007	1.810	0.074
CPI	-176.01	283.07	-0.621	0.535
DWSMI	147.15	22.058	6.671	0.000
DCONFIDENCE	6.751	33.469	0.201	0.084
INDPROD	18.687	44.375	0.421	0.674
DSTOCKPRICE (-1)	-0.293	0.0908	3.229	0.001
C	-1244.9	3859.9	-0.322	0.747
R^2=0.47 N=83 DW=1.81 F-test = 11.46				

The result from OLS model (table 5) showed that DRER and DWSMI variables are significant at the 10% and 1% levels, respectively. Increase in both variables will increase stock prices as expected. Increase in confidence has a positive effect on stock

price as expected and significant at the 10% level. An increment in consumer confidence can increase consumer spending, simultaneously increasing firms' profit and stock prices.

5. Conclusion

In this study, we examined effect of CCI on reel exchange rate and stock prices in case of Turkish experiences over the 2002:1- 2008:12 periods by utilizing ARDL-ECM,Granger-causality, GARC-M and OLS methods. The results from bound test showed that calculated F-test statistic is less than the lower critical value, the null hypothesis can not be rejected and there is no cointegration between stock prices-confidence and reel exchange rate-confidence.

Next, we tried to investigate short-run relationship between stock prices-confidence and reel exchange rate-confidence. The results from Granger-causality test showed that stock prices and reel exchange rate are Granger caused to CCI but not vice versa.

Finally, the results from GARCH-M and OLS models showed that an increase in confidence has a positive effect on reel exchange rate and stock prices as expected and significant at the 1 % level and 10 % level, respectively. Those findings are consistent with theory and our expectation. As consumer confidence increase, their demand for foreign currency will decrease and value of domestic currency will increase. Also, as wealth effect and announcement effect indicated, an increase in confidence will increase stock prices.

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Appendix 1. Test results for equation (7)

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.320050	Probability	0.201771
Obs*R-squared	29.02672	Probability	0.144099

ARCH Test:

F-statistic	0.703391	Probability	0.808039
Obs*R-squared	17.65232	Probability	0.726392

White Heteroskedasticity Test:

F-statistic	1.278148	Probability	0.251013
Obs*R-squared	14.91761	Probability	0.245973

Appendix 2. Test results for equation (8)

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.844022	Probability	0.660755
Obs*R-squared	21.23765	Probability	0.506095

ARCH Test:

F-statistic	1.884467	Probability	0.042180
Obs*R-squared	31.82746	Probability	0.080386

White Heteroskedasticity Test:

F-statistic	0.835899	Probability	0.613696
Obs*R-squared	10.40294	Probability	0.580656

Industrial production indexes of Turkey and the USA, 2001.01 to 2008.12 (2001.M01 equal to 100)

Month	Turkey	USA	Month	Turkey	USA	Month	Turkey	USA
01M01	100.00	100.00	03M09	115.48	98.87	06M05	116.52	106.53
01M02	99.61	99.42	03M10	103.48	98.94	06M06	116.13	106.98
01M03	111.87	99.11	03M11	111.10	99.80	06M07	120.77	107.21
01M04	96.90	98.86	03M12	104.52	99.73	06M08	121.42	107.44
01M05	108.39	98.13	04M01	102.45	100.03	06M09	117.68	107.09
01M06	102.84	97.51	04M02	94.84	100.56	06M10	118.45	106.93
01M07	101.94	97.08	04M03	111.74	99.95	06M11	115.35	106.70
01M08	105.03	96.72	04M04	88.77	100.43	06M12	117.42	107.59
01M09	106.32	96.39	04M05	110.19	101.17	07M01	106.06	107.04
01M10	108.90	95.83	04M06	117.03	100.27	07M02	114.71	107.92
01M11	109.29	95.36	04M07	114.58	100.93	07M03	109.42	107.72
01M12	107.48	95.32	04M08	116.90	101.17	07M04	108.39	108.13
02M01	107.35	95.84	04M09	111.74	101.16	07M05	113.42	108.22
02M02	99.10	95.85	04M10	109.42	102.09	07M06	118.97	108.27
02M03	105.03	96.59	04M11	114.06	102.33	07M07	116.00	108.60
02M04	101.68	96.85	04M12	113.03	103.05	07M08	112.39	108.67
02M05	104.77	97.34	05M01	101.81	103.50	07M09	117.68	109.06
02M06	105.16	98.22	05M02	99.87	104.17	07M10	117.42	108.48
02M07	110.97	97.92	05M03	106.32	104.05	07M11	117.16	109.10
02M08	112.13	97.99	05M04	104.00	104.02	07M12	116.77	109.44
02M09	112.13	98.07	05M05	111.35	104.32	08M01	114.45	109.38
02M10	110.97	97.78	05M06	115.35	104.70	08M02	108.52	109.09
02M11	102.71	98.22	05M07	118.45	104.63	08M03	111.35	108.71
02M12	108.52	97.71	05M08	116.52	104.84	08M04	117.68	108.08
03M01	102.71	98.44	05M09	115.35	103.02	08M05	120.90	107.77
03M02	102.06	98.77	05M10	117.29	104.20	08M06	122.84	107.54
03M03	107.61	98.64	05M11	113.16	105.36	08M07	120.39	107.47
03M04	101.03	97.82	05M12	111.35	106.04	08M08	120.65	106.28
03M05	105.16	97.84	06M01	106.84	106.07	08M09	121.55	102.08
03M06	110.58	97.96	06M02	107.10	106.06	08M10	107.74	103.37
03M07	114.32	98.33	06M03	108.39	106.25	08M11	97.16	102.08
03M08	117.81	98.27	06M04	117.42	106.63	08M12	79.48	99.82