Finansal Araştırmalar ve Çalışmalar Dergisi • Cilt: 11 • Sayı: 21 • Temmuz 2019 ISSN: 1309-1123, ss. 264-286
DOI: 10.14784/marufacd.623408

ARAŞTIRMA MAKALESİ

FACTORS CAUSING CHANGE IN FOREIGN EXCHANGE DEPOSITS IN AN EMERGING ECONOMY: TURKEY CASE

Sıtkı SÖNMEZER*
Ismail Erkan ÇELİK**

Abstract

Financial dollarization has increased substantially in emerging markets in recent years. A material increase in financial dollarization may concern policy makers but it also serves as a cushion for banks and the states. Increase in foreign Exchange deposits may arise from the need to preserve purchasing power, speculation or liquidity concerns. This paper aims to shed light to the relation between foreign exchange deposits and factors such as sight FX deposits, USD/TRY parity, CPI, confidence ındex, VIX, TL deposits, dollar index via a VECM model. Sight FX deposits are found to be a positive and a statistically significant influencing factor on FX deposits; whereas, confidence index and CPI have a negative but a significant relation with FX deposits. Factors that have an influence on the increase in foreign Exchange deposits shall be closely monitored to mitigate the adverse effects of it.

Keywords: Financial Dollarization, Foreign Exchange Deposits, Emerging Markets

JEL Codes: G11, G18, G15

Öz

Son yıllarda finansal dolarizasyon gelişen piyasalarda ciddi şekilde artış göstermiştir. Finansal dolarizasyondaki bu artış politika yapıcıları kaygılandırabileceği gibi, bankalar ve devlet için bir yastık görevi görür. Döviz mevduat hesaplarındaki artışın nedeni; alım gücünü korumak, spekülasyon veya likidite kaygısı olabilir. Bu çalışmanın amacı, döviz mevduat hesapları ile vadesiz hesaplar, TL/USD, enflasyon, güven endeksi, oynaklık endeksi, TL mevduatlar, dolar endeksi gibi değişkenlerin ilişkisine VECM modeli kullanarak ışık tutmaktır.

* Beykent Üniversitesi, İİBF, İşletme Bölümü, sitkisonmezer@beykent.edu.tr
** Dogus Üniversitesi, İİBF, İktisat Bölümü, erkancelik@dogus.edu.tr

Başvuru Tarihi 13.05.2019 **Kabul Tarihi** 12.06.2019

Vadesiz döviz mevduat hesapları ile pozitif anlamlı bir ilişki tespit edilirken; enflasyon ile negative, anlamlı bir ilişki bulunmuştur. Döviz mevduat hesaplarındaki artışın olası, olumsuz etkilerini en aza indirgemek için etki eden unsurları yakınen izlenmelidir

Anahtar Kelimeler: Finansal Dolarizasyon, Döviz Mevduat Hesapları, Gelişen Piyasalar

JEL Kodları: G11, G18, G15

Introduction

Investors have a crucial decision to make in developing countries due to inflationary concerns; They have to time a probable depreciation or a devaluation in domestic currency and decide whether to keep their savings in foreign currency denominated deposits or domestic currency denominated deposits. Relatively high interest on domestic currency funds versus possibility of a huge devaluation in domestic currency forms the tradeoff that investors face.

İnflation may lead to a devaluation in domestic currency that may affect investment returns but there may be times, when it might even alter the sign of the investment returns in dollar terms due to fluctuations in the value of the domestic currency. In that case, focus may be on the denomination of the investment rather than what investment to make. Investors recall times when dollar deposits tripled overnight as well as gradual devaluations of six months or one year that has taken place earlier that has exceeded any domestic currency investment returns significantly. In one hand, foreign currency deposits are shelters against devaluations in developing countries but on the other hand, domestic currency funds earn much more interest, roughly five times more as of July 2017 in Turkey, that may tempt investors to keep their funds in domestic currency.

The dilemma pressures investors to time possible devaluations as well. FX depositors that believe a devaluation is imminent invest their funds long term despite low returns. Some FX depositors invest short term so that they can trade their funds when certain technical or mental levels are reached in the FX value. Interest differentials, liquidity needs, alternative investments returns, behavioral factors such as herding or reference point bias, macroeconomic factors and other factors may have influence on the difference in time deposits' durations.

Local currency depositors are motivated by higher returns and some investors may find FX transactions hard or any other behavioral excuse may play a role in keeping funds in the local currency as well. Transaction costs, liquidity needs, alternative investments' returns, habits, fear of fraud, and other factors may be effective in TL deposits. Similarly, short term investors are assumed to be inclined to move their funds when they see an opportunity.

This study aims to shed light to factors that influence investment decisions in terms of deposits. The relations among different maturities and the transition pattern from one and other is analyzed. Forecasting the transition tendencies and term structure of these deposits may be helpful to policymakers, investors and regulators.

1. Dollarization

1.1 Financial Dollarization

There are four views regarding with financial dollarization. Institutional view, currency substitution view, market failure view and asset portfolio view. The former one argues that policy makers may cause unexpected inflation for growth purposes or fast revenue generating policies that may lead to financial dollarization. Although countries can control their inflation rates, she may face high level of financial dollarization when they have weak institutions (Honig, 2009 and Vieira, Hollande and Resende, 2012). The higher the institutional quality, the lower the financial dollarization. Honig, 2009, argues that European Union membership or accession negotiations lends credibility to a country in terms of strengthening institutions.

Developing countries have their local currencies and foreign currencies in use for financial intermediation. Since US dollars are generally used as foreign currency, the term dollarization is used in literature (Broda and Levy-Yeyati, 2006). In reality, Japanese yen and Euros are also used significantly. Financial dollarization can take two forms; Domestic firms and banks provide funding from abroad in foreign currencies, liability dollarization, or citizens save domestically in foreign currency deposits. The latter is common is Turkey.

1.1.1 Loan Dollarization

By definition, loan dollarization is the ratio of foreign currency denominated loans to total loans of domestic banks to domestic investors. Bank currency matching seems to be the main reason behind liability dollarization (Luca and Petrova,2003). When there is more volatily in foreign Exchange rates, there is a mild reduction in loan dollarization in the short run (Barajas and Morales, 2003). Uncertainty increases and a foreign exhange liability that is not under control should be avoided. Exchange rate regimes are found to be not effective on loan dollarization. (Arteta, 2002)

1.1.2. Deposit Dollarization

Domestic investors invest in foreign currency denominated instruments in order not to loose from devaluations, moreover, in terms of a portfolio, foreign currencies provide a hedge for their domestic assets. From the government perspective; when domestic investors heavily favor foreign currencies, they depreciate the domestic currency and increase the price levels. Secondly, most of the developing countries need to cover short term debts. Thus, they demand foreign currencies themselves when rolling the debt is not feasible or reasonable. Apparently, the need to monitor the transition from domestic currencies to foreign ones is obvious.

Dollarization and interest rates relationship has been studied in earlier studies. Interest rates Deposit dollarization has a negative impact on real interest rates, an increase from zero percent to hundred percent in the share of dollar deposits leads to a decrease in real interest rates of 1.1 Percent in the short run and 2.3 percent in the long run (Bacha, Holland and Goncalves, 2007).

2. Effects of Dollarization

Robustness of banking system, ability in meeting the obligations of the government and open positions of both banks and the government in terms of foreign debt are affected by the changing amounts in financial dollarization. Governments are dependent on portfolio investments and "hot money" to mitigate the amount to borrow from abroad. In case of a sudden stop in foreign stop, FX deposits may serve as a potential source

2.1 Banking System

Banks collect foreign denominated funds from investors and sell them as credits. Most of the time borrower pays back in domestic currency. There may be detrimental differences among currency rates so that banks run losses or may even result in insolvency. Thus, dollar deposits contain exchange risk for firms and from that perspective they are costlier but the nominal interest in Turkish Lira deposits is roughly ten times higher than dollar deposits therefore banks have a tendency to favor the dollar deposits when they believe the rates will not fluctuate much. There is a tradeoff between higher expected profits and higher exchange rate risks. Probable depreciations trigger deposit dollarization and they cause the bank's net worth to decrease. (Kishor and Neandis, 2015)

Banks need to optimize their asset and liability positions when loan dollarization is high. Foreign currency denominated credits and deposits have to be managed wisely. For domestic banks, most of the credits sources are syndicated loans obtained from abroad. When they are due, deposit dollarization may help them to mitigate the adverse effects of exchange rate risk in developing economies.

2.2 Government

Governments need to cope with subsequent current account deficits. Table 1 shows that top ten countries in terms of current account deficit are mostly the same. Thus, need for foreign funds by governments is usually not a one-time event. When citizens compete with their governments to obtain foreign exchanges, they drive prices up and is obviously detrimental in the short run.

Conversely, governments can obtain cheaper financing, if they can convince their citizens to park their foreign deposits in state owned banks as borrowing and lending rates almost always differ.

Table 1. Current Account Deficit, Top 10 Economies, Billions of US dollars

	2012	2013	2014	2015	2016	2017
United States	-426.8	-348.8	-365.2	-407.8	-432.9	-449.1
United Kingdom	-100.9	-142.0	-149.4	-142.2	-140.3	-98.4
Turkey	-48.0	-63.6	-43.6	-32.1	-33.1	-47.3
Canada	-65.7	-59.4	-43.2	-55.4	-49.1	-46.4
India	-91.5	-49.1	-27.3	-22.5	-12.1	-38.2
Australia	-64.5	-47.9	-43.4	-57.4	-41.2	-35.9
Argentina	-2.1	-13.1	-9.2	-17.6	-15.1	-31.6
Algeria	12.1	1.2	-9.3	-27.0	-26.2	-22.1
Mexico	-18.7	-31.2	-24.6	-30.2	-24.0	-19.1
Indonesia	-24.4	-29.1	-27.5	-17.5	-17.0	-17.3

Source: IMF

2.3 Sudden Stops

Sudden stops are substantial and unexpected deteriorations in foreign capital inflows that is feared by the governments and the markets. When a market faces a sudden stop, a market crash is expected to follow. Two standard deviations from the average is regarded as a sudden stop. (Calvo, Izguierdo and Talve, 2006)

Sudden stops are infrequent and have a low probability. They are feared to occur due to its possible consequences; Repatriation of capital, decline in production and absorption, and asset price corrections are the three main regularities of Sudden stops (Mendoza,2008). Interest rate levels in the world and the risk appetite determine capital inflows. The likelihood of transition of capital may change from country to country depending on their features and offers (Mercado, 2019).

Turkey is among the worst ten countries in terms of International investment position as can be seen in Table 2. Minus signs show that financial liabilities are higher than assets and the amounts represent a net liability to the rest of the world. The dependency for foreign investment is apparent and the threat for a country may be a sudden stop in these capital inflows.

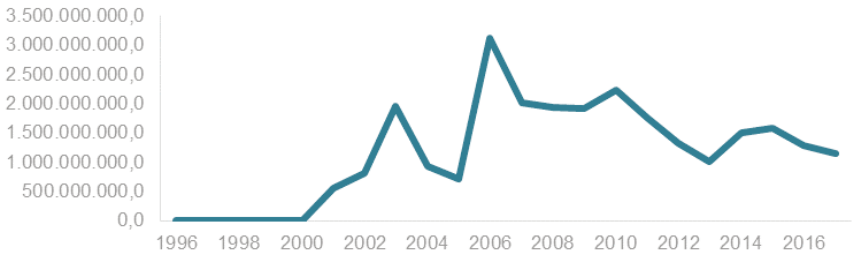
Table 2. Net International Investment Position (Deficit). Top 10 Economies, Billions of USD

	2013	2014	2015	2016	2017
United States	-5,368.60	-6,945.40	-7,461.60	-8,181.60	-7,725.00
Spain	-1,334.50	-1,234.20	-1,053.10	-1,006.20	-1,172.60
Euro Area	-1,983.50	-1,488.10	-1,313.60	-806.5	-823.6
Australia	-752.2	-695.2	-674.2	-699.8	-757.1
Brazil	-723.9	-705.9	-374.7	-566.6	-642.2
Mexico	-616.2	-598.7	-601	-531.7	-559.7
France	-483.4	-407.6	-309.4	-350.2	-553.5
Ireland	-327.4	-380.4	-556.9	-519.3	-526.9
Turkey	-397.3	-445.3	-384.8	-369.2	-462.1
India	-323.2	-361.5	-368.4	-367.3	-428

Source: IMF

Figure 1, depicts the rise in portfolio investments before the crises of 2008 and subsequent fall afterwards. When US dollars were ubiquitous, deposit dollarization was relatively low and as expectedly, it has risen after the slowdown in portfolio investments.

Figure 1. Asset, Portfolio Investment, US Dollars for Turkey



Source: IMF

3. Literature Review

Asset Substitution means domestic players may choose to invest in foreign currencies or foreign currency denominated instrument when they believe their returns will exceed the domestic currency instruments. The effects of asset substitution are neglected in the literature (Ize and Yeyati, 2003)

There are studies that try to clearify the issue of depreciating currencies' impact on dollarization (Neanidis and Savva, 2009) and (Honohan, 2007). Kishor and Neandis, 2015, have investigated 24 countries and they have used world factor, EU factor and country specific factor for financial dollarization and have provided evidence for EU factors are effective on dollarization whereas, world factors are not. Uncertainty and weak economic policies increases financial dollarization; presence of a safety net and a lender of the last resort also help dollarization (Broda and Levy-Yeyati, 2006). Restrictions to dollar holdings have an inverse relationship to dollarization whereas, an increase in Jurisdictional uncertainty and reduction in capital controls give rise to dollarization (Bacha, Holland and Goncalves, 2007).

Vast majority of the domestic literature searched the relation between Foreign currency prices and Foreign trade. They study dollarization in terms of usage of foreign currencies as a mode of payment. Kızıldere et al, (2014) have studied the years 1980-2010 and have used co-integration and ECM models and found no significant effect of exchange rate volatility on foreign trade. Currency substitution constitutes majority of the literature. There are conflicting arguments in the literature regarding with openness to trade and being vulnerable to sudden stops. It is obvious that countries that are more open to financial flows, are more attractive for multinational firms. Any form of capital control may deter foreign investment and lead sudden stops (Frankel and Cavallo, 2008).

4. Data and Methodology

Our data regarding with TL and FX deposits are monthly and obtained from Central Bank of Turkey and Foreign deposits are classified as up to one month and over in between 12.30 2005 to 08.03.2019. sub categories of foreign deposits are USD, EURO, precious metal deposit accounts and other FX deposits. Total amounts' worth is in Turkish Lira. Sight Foreign exchange deposits, USD/TRY, the Dollar Index, gold, confidence index and a technical variable that is calculated by the authors, derived from the distance of the dollar to its highest level up to date, are the independent variables used in this study.

Our methodology is to decide whether a vector error correction model (VECM) or VAR model to be used to provide evidence for long and short run relations between endogenous variable and the exogenous ones. At first, number of lags recommended by criteria embedded in the software is to be determined. For Johansen cointegration test to be used, variables need to be non-stationary at level and after first differencing, they should all become stationary. Thus, unit root tests are to be made. If one cointegration is detected, then VECM Model is to be used. Otherwise VAR model saves from the restrictions. Our data enabled us to use the VECM model.

Lag selection is a preliminary step and Akaike information (AIC) criterion favors for four lag to be used. Variables used in the study had unit root problem. Logarithms are taken for FX, sight FX, TL deposits as well as USD rate, CPI, confidence index and Volatility index to make the series stationary.

4.1 Johansen Test of Cointegration

Precondition for Johansen test to be used is that all variables have to be non-stationary at level and after first differencing they have to be stationary.

Table 3. Johansen Test of Cointegration

Sample: 2006M01 2019M03					
Included observations: 154					
Series: LFXDEP LTLDEP LDOL LSIGHTFX LCPI LCONF LVIX					
Lags interval: 1 to 4					
Selected (0.05 level*) Number of Cointegrating Relations by Model					
Data Trend:	None	None	Linear	Linear	Quadratic
Test Type	No Intercept	Intercept	Intercept	Intercept	Intercept
	No Trend	No Trend	No Trend	Trend	Trend
Trace	3	5	1	1	1
Max-Eig	0	0	0	1	1
*Critical values based on MacKinnon-Haug-Michelis (1999)					
Information Criteria by Rank and Model					
Data Trend:	None	None	Linear	Linear	Quadratic
Rank or	No Intercept	Intercept	Intercept	Intercept	Intercept
No. of CEs	No Trend	No Trend	No Trend	Trend	Trend
	Log Likelihood by Rank (rows) and Model (columns)				
0	1831.385	1831.385	1843.563	1843.563	1851.414
1	1850.391	1850.508	1862.348	1881.857	1889.590
2	1867.313	1867.926	1875.690	1898.503	1903.198
3	1877.762	1879.550	1886.243	1911.079	1915.747
4	1887.164	1889.705	1895.196	1920.481	1923.802
5	1892.885	1898.026	1902.126	1928.482	1931.786
6	1897.109	1903.745	1906.408	1935.103	1938.400
7	1897.831	1907.605	1907.605	1939.136	1939.136
	Akaike Information Criteria by Rank (rows) and Model (columns)				
0	-21.23877	-21.23877	-21.30601	-21.30601	-21.31707
1	-21.30378	-21.29231	-21.36815	-21.60853	-21.63104*

2	-21.34172	-21.32371	-21.35961	-21.62991	-21.62594
3	-21.29561	-21.27987	-21.31484	-21.59843	-21.60711
4	-21.23590	-21.21695	-21.24929	-21.52573	-21.52989
5	-21.12837	-21.13020	-21.15748	-21.43483	-21.45177
6	-21.00142	-21.00968	-21.03127	-21.32601	-21.35585
7	-20.82897	-20.86500	-20.86500	-21.18358	-21.18358
	Schwarz Criteria by Rank (rows) and Model (columns)				
0	-17.37356*	-17.37356*	-17.30276	-17.30276	-17.17577
1	-17.16248	-17.13129	-17.08881	-17.30947	-17.21366
2	-16.92434	-16.86689	-16.80418	-17.03504	-16.93247
3	-16.60213	-16.52724	-16.48332	-16.70775	-16.63755
4	-16.26634	-16.16851	-16.14169	-16.33924	-16.28425
5	-15.88273	-15.78596	-15.77379	-15.95254	-15.93003
6	-15.47969	-15.36962	-15.37149	-15.54792	-15.55803
7	-15.03115	-14.92914	-14.92914	-15.10968	-15.10968

In case, cointegration rank is more than one unrestricted VAR was to be used but Cointegration results enable us to use Vector Error Correction Model (VECM).

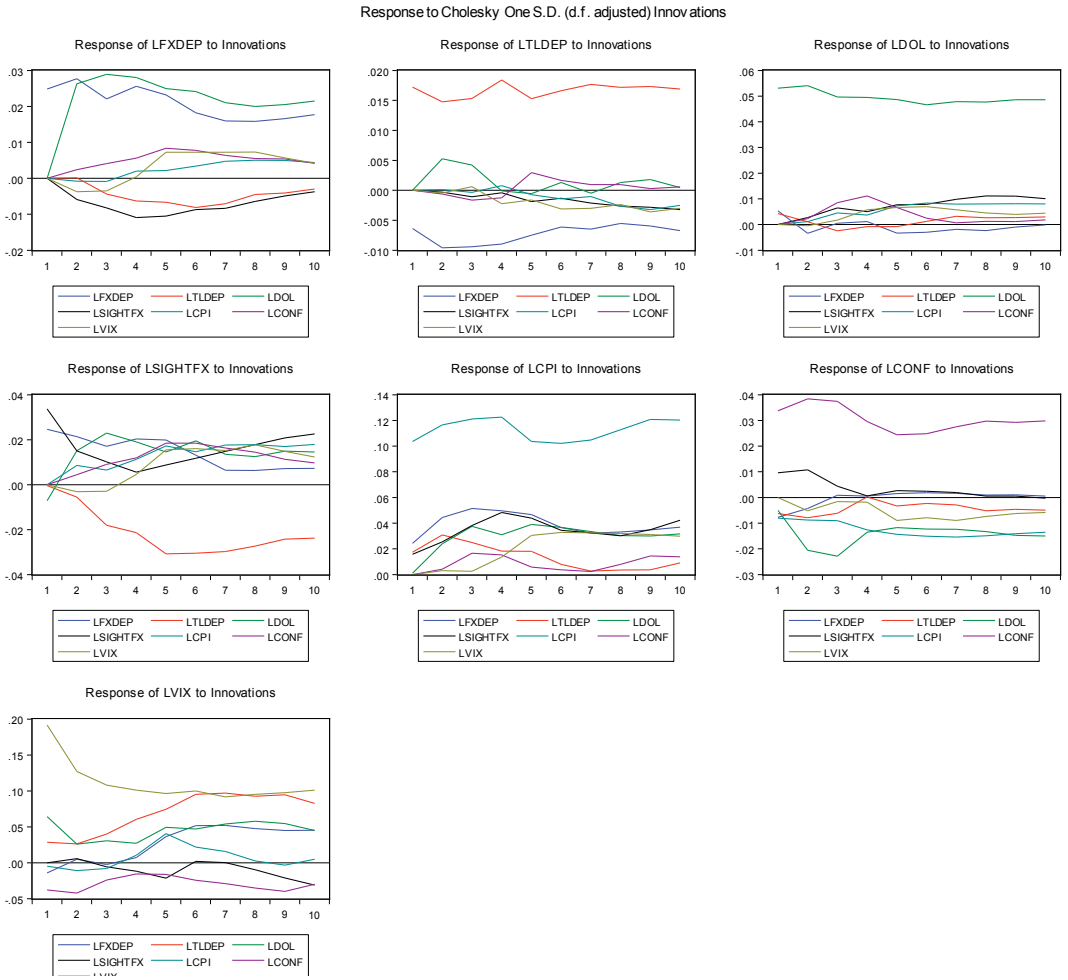
4.2 VECM Model

Our initial VECM model (Appendix A) has found significant relationship of lag1 (t critical 2.38) and lag 3 (t critical 2.17) returns of FX deposits; lag1 (t critical 2.67) TL deposits; lag1 (t critical 5.87) and lag4 (t critical 2.84)USD/TRY parity; lag1 CPI(t critical 1.97), and, lag1 VIX (t critical 2.99).

Figure 2 depicts the effects of changes in each variable. Inverse relationship between FX deposits and TL deposits and FX sight deposits exists for our data sample. TL deposits are a substitute for FX deposits and the inverse relationship is reasonable. The inverse relationship between FX sight

deposits and FX deposits are understandable as sight deposits are usually short term investments. Investors may hold them for trading purposes.

Figure 2. Responses of Variables to Changes



4.3 Test for Serial Correlation

Breusch – Godfrey serial correlation LM test is conducted to detect serial correlation. Table 4 shows that our sample error terms are not significantly correlated.

Table 4. Breusch-Godfrey Serial Correlation LM Test

F-statistic	0.287574	Prob. F(2,132)		0.7505
Obs*R-squared	0.672433	Prob. Chi-Square(2)		0.7145
Test Equation:				
Dependent Variable: RESID				
Method: ARDL				
Sample: 2006M05 2019M03				
Included observations: 155				
Presample missing value lagged residuals set to zero.				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LFXDEP(-1)	-0.023433	0.108538	-0.215901	0.8294
LFXDEP(-2)	0.012220	0.087073	0.140342	0.8886
LTLDEP	0.001423	0.081441	0.017474	0.9861
LTLDEP(-1)	0.001468	0.079433	0.018479	0.9853
LDOL	-0.002605	0.029376	-0.088669	0.9295
LDOL(-1)	0.005837	0.046693	0.125004	0.9007
LDOL(-2)	0.003890	0.056730	0.068575	0.9454
LDOL(-3)	-0.004052	0.056754	-0.071390	0.9432
LDOL(-4)	0.000513	0.029087	0.017630	0.9860
LSIGHTFX	-0.000897	0.030686	-0.029229	0.9767
LSIGHTFX(-1)	0.007465	0.039157	0.190652	0.8491
LCPI	-0.000433	0.014367	-0.030147	0.9760
LCPI(-1)	-0.000601	0.021035	-0.028557	0.9773
LCPI(-2)	-0.000639	0.015347	-0.041635	0.9669
LCONF	-0.005299	0.043431	-0.122006	0.9031
LCONF(-1)	-0.001733	0.060455	-0.028659	0.9772
LCONF(-2)	0.000675	0.042402	0.015923	0.9873
LVIX	0.000546	0.008127	0.067160	0.9466
LVIX(-1)	-0.000961	0.009248	-0.103861	0.9174
LVIX(-2)	0.000346	0.007643	0.045284	0.9639
C	0.071994	0.291649	0.246853	0.8054
RESID(-1)	0.018808	0.140452	0.133913	0.8937
RESID(-2)	0.077155	0.102643	0.751680	0.4536
R-squared	0.004338	Mean dependent var		-1.07E-15
Adjusted R-squared	-0.161605	S.D. dependent var		0.016017
S.E. of regression	0.017263	Akaike info criterion		-5.144344
Sum squared resid	0.039338	Schwarz criterion		-4.692739
Log likelihood	421.6867	Hannan-Quinn criter.		-4.960912
F-statistic	0.026143	Durbin-Watson stat		1.968879
Prob(F-statistic)	1.000000			

4.4 Test for Heteroskedasticity

Error terms should have constant variance and this feature is tested and shown in Table 5.

Table 5. Test for Equal Variance

Heteroskedasticity Test: ARCH				
F-statistic	0.019778	Prob. F(1,152)		0.8883
Obs*R-squared	0.020036	Prob. Chi-Square(1)		0.8874
Test Equation:				
Dependent Variable: RESID^2				
Method: Least Squares				
Date: 04/18/19 Time: 15:48				
Sample (adjusted): 2006M06 2019M03				
Included observations: 154 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000243	3.29E-05	7.382464	0.0000
RESID^2(-1)	0.010747	0.076419	0.140634	0.8883
R-squared	0.000130	Mean dependent var		0.000246
Adjusted R-squared	-0.006448	S.D. dependent var		0.000327
S.E. of regression	0.000328	Akaike info criterion		-13.19457
Sum squared resid	1.63E-05	Schwarz criterion		-13.15513
Log likelihood	1017.982	Hannan-Quinn criter.		-13.17855
F-statistic	0.019778	Durbin-Watson stat		1.947427
Prob(F-statistic)	0.888345			

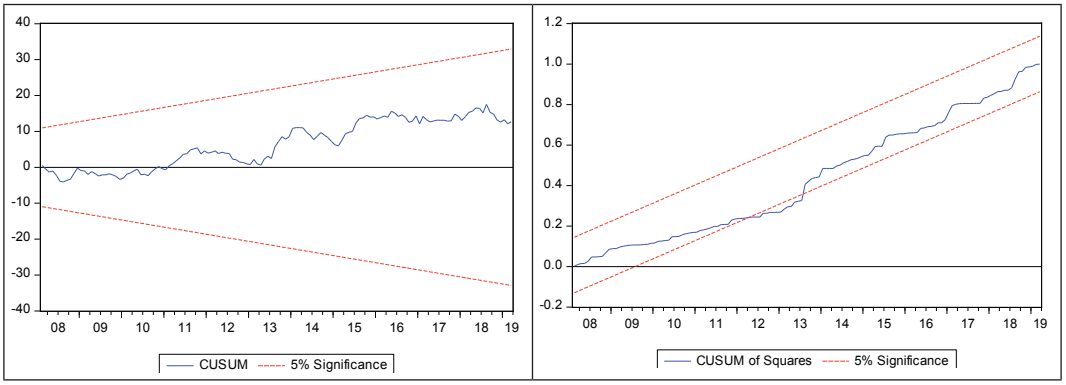
4.5 CUSUM Tests

These tests give a rough idea about a presence of a break in a data set. this test is calculated with recursive residuals. No deviation from the 5% band and changing signs may indicate there is no break in the data set. Similarly, CUSUM of squares test is applied for a second check.

4.5.1 CUSUM Tests

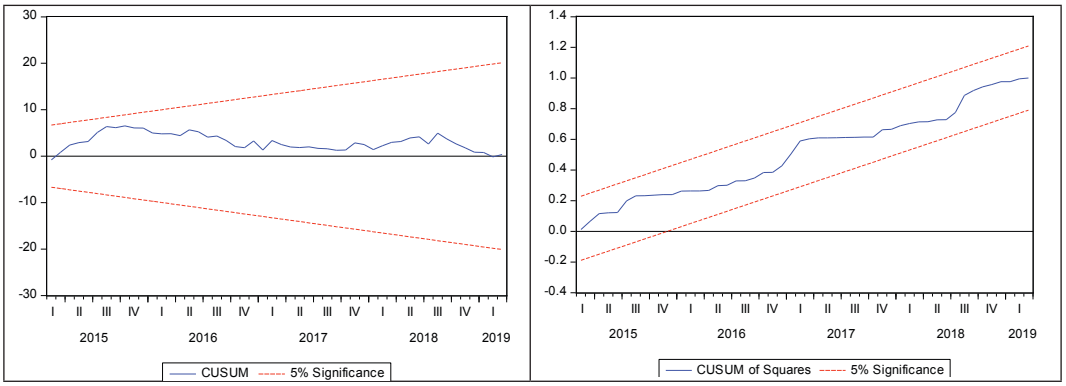
As desired, the recursive residuals are within band when CUSUM test is conducted. However, CUSUM of squares test fails as Shown in Figure 3.

Figure 3. CUSUM Test Results with ARDL 1 Model



As a result of CUSUM of squares test, our ARDL1 model is dropped and ARDL' model is formed. When we apply CUSUM tests, the concern regarding with the structural break is mitigated as shown in Figure 4.

Figure 4. CUSUM Test Results with ARDL 2 Model



5. Findings

5.1 ARDL Model

A dummy variable, D_2015M1, is added to our model to absorb the effects of the detected break in our sample. It has improved our final ARDL model in terms of 7.88 which is higher than the earlier models F score, 4.69 (Appendix B). Our model provide evidence that level of Sight Foreign Exchange deposits and confidence index has 99% significance as well as the constant in explaining the change in FX deposits. Similarly, consumer price index has 90 % significance.

Table 6. ARDL Model

ARDL Long Run Form and Bounds Test				
Dependent Variable: D(LFXDEP)				
Selected Model: ARDL(1, 1, 2, 2, 2, 2, 0)				
Case 2: Restricted Constant and No Trend				
Date: 04/18/19 Time: 15:57				
Sample: 2006M01 2019M03				
Included observations: 157				
Conditional Error Correction Regression				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.838751	0.228325	3.673489	0.0003
LFXDEP(-1)*	-0.078352	0.030279	-2.587694	0.0107
LTLDEP(-1)	0.009093	0.013076	0.695409	0.4880
LDOL(-1)	0.005211	0.018494	0.281782	0.7785
LSIGHTFX(-1)	0.055023	0.026308	2.091476	0.0383
LCPI(-1)	-0.014507	0.008283	-1.751453	0.0821
LCONF(-1)	-0.092047	0.023425	-3.929435	0.0001
LVIX**	-0.015906	0.006404	-2.483916	0.0142
D(LTLDEP)	-0.282500	0.076060	-3.714167	0.0003
D(LDOL)	0.063452	0.028128	2.255804	0.0256
D(LDOL(-1))	0.356566	0.035628	10.00804	0.0000
D(LSIGHTFX)	0.342263	0.029828	11.47474	0.0000
D(LSIGHTFX(-1))	0.047861	0.027451	1.743500	0.0835
D(LCPI)	0.000699	0.013983	0.049999	0.9602
D(LCPI(-1))	-0.025697	0.014597	-1.760490	0.0805
D(LCONF)	-0.145380	0.041148	-3.533129	0.0006
D(LCONF(-1))	0.063125	0.038539	1.637943	0.1037
D_2015M1	-0.037982	0.017886	-2.123580	0.0355
* p-value incompatible with t-Bounds distribution.				
** Variable interpreted as Z = Z(-1) + D(Z).				
Levels Equation				
Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LTLDEP	0.116056	0.152112	0.762961	0.4468
LDOL	0.066513	0.228759	0.290754	0.7717
LSIGHTFX	0.702250	0.188049	3.734400	0.0003
LCPI	-0.185156	0.096460	-1.919509	0.0570
LCONF	-1.174786	0.407298	-2.884343	0.0045
LVIX	-0.203009	0.132796	-1.528728	0.1286

C	10.70494	3.473381	3.081993	0.0025
EC = LFXDEP - (0.1161*LTLDEP + 0.0665*LDOL + 0.7022*LSIGHTFX				
-0.1852*LCPI -1.1748*LCONF -0.2030*LVIX + 10.7049)				
F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	7.884036	10%	1.99	2.94
k	6	5%	2.27	3.28
		2.5%	2.55	3.61
		1%	2.88	3.99
Actual Sample Size	157		Finite Sample: n=80	
		10%	2.088	3.103
		5%	2.431	3.518
		1%	3.173	4.485

Conclusion

Financial dollarization was an inevitable phenomenon in emerging markets due to inflationary concerns. In recent times, speculation and liquidity concerns have fueled dollarization. Sight FX deposits are assumed to be hold for sale and our study has provided evidence that change in sight foreign exchange deposits explain the change in FX deposits significantly. Significant inverse relation between confidence index and FX deposits was expected and evidenced. The significant inverse relation between consumer price index and FX deposits is reasonable as the real interest in domestic currency denominated financial instruments increase as inflation goes down. Higher inflation rates lead to higher financial dollarization in our sample period.

Sudden stops are feared by emerging market economies. In case an unexpected outflow hits an emerging market, foreign exchange deposit levels may become even more important; source for banks to meet their syndicated loans; quality of assets but increasing the exchange rate risk in asset liability management. Bank loans are mostly denominated in domestic currency. A further study may aim to time the upcoming sudden stops.

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APPENDIX

Appendix A – VECM Model

Vector Error Correction Estimates
Date: 04/18/19 Time: 15:31
Sample (adjusted): 2006M06 2019M03
Included observations: 154 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1
LFXDEP(-1)	1.000000
LTLDEP(-1)	3.897649
	(0.47208)
	[8.25637]
LDOL(-1)	-1.191619
	(0.13836)
	[-8.61228]
LSIGHTFX(-1)	2.022734
	(0.30845)
	[6.55769]
LCPI(-1)	-0.295269
	(0.07718)
	[-3.82563]
LCONF(-1)	-1.010604
	(0.19004)
	[-5.31774]
LVIX(-1)	-0.114314
	(0.05343)
	[-2.13947]
@TREND(06M01)	-0.083612
	(0.00943)
	[-8.86344]
C	-120.0173

Error Correction:	D(LFXDEP)	D(LTL-DEP)	D(LDOL)	D(LSIGH-TFX)	D(LCPI)	D(L-CONF)	D(LVIX)

CointEq1	-0.121472	-0.009092	-0.018411	-0.342968	0.067916	0.040963	0.459933
	(0.02724)	(0.02015)	(0.05876)	(0.04645)	(0.11972)	(0.04135)	(0.22848)
	[-4.45903]	[-0.45131]	[-0.31333]	[-7.38429]	[0.56728]	[0.99070]	[2.01297]
D(LFXDEP(-1))	0.308026	-0.189412	-0.440473	0.586169	0.533954	0.179599	-0.122975
	(0.12891)	(0.09533)	(0.27806)	(0.21979)	(0.56655)	(0.19566)	(1.08123)
	[2.38940]	[-1.98683]	[-1.58412]	[2.66696]	[0.94247]	[0.91790]	[-0.11374]
D(LFXDEP(-2))	0.141471	0.098817	0.164042	0.303319	-0.102126	0.240278	0.055883
	(0.13026)	(0.09633)	(0.28097)	(0.22209)	(0.57248)	(0.19771)	(1.09255)
	[1.08604]	[1.02579]	[0.58385]	[1.36575]	[-0.17839]	[1.21529]	[0.05115]
D(LFXDEP(-3))	0.280895	0.066197	0.019898	0.552371	-0.734247	-0.064335	0.970716
	(0.12924)	(0.09558)	(0.27876)	(0.22035)	(0.56798)	(0.19616)	(1.08397)
	[2.17344]	[0.69262]	[0.07138]	[2.50684]	[-1.29273]	[-0.32797]	[0.89552]
D(LFXDEP(-4))	0.044372	0.208320	-0.324935	0.255969	-0.418356	-0.049068	0.842277
	(0.09324)	(0.06895)	(0.20111)	(0.15897)	(0.40978)	(0.14152)	(0.78204)
	[0.47588]	[3.02117]	[-1.61569]	[1.61017]	[-1.02094]	[-0.34672]	[1.07703]
D(LTLDEP(-1))	0.408370	-0.133966	-0.111049	0.907659	0.294774	-0.112624	-1.359368
	(0.15306)	(0.11319)	(0.33013)	(0.26095)	(0.67265)	(0.23231)	(1.28372)
	[2.66812]	[-1.18358]	[-0.33638]	[3.47829]	[0.43823]	[-0.48481]	[-1.05893]
D(LTLDEP(-2))	0.231517	0.039960	-0.150004	0.319734	-0.412859	-0.086456	-0.347633
	(0.14594)	(0.10793)	(0.31478)	(0.24882)	(0.64138)	(0.22151)	(1.22405)
	[1.58637]	[0.37026]	[-0.47653]	[1.28500]	[-0.64370]	[-0.39030]	[-0.28400]
D(LTLDEP(-3))	0.227487	0.218458	0.059998	0.443305	-0.256379	0.115579	0.246336
	(0.13223)	(0.09779)	(0.28521)	(0.22544)	(0.58112)	(0.20070)	(1.10904)
	[1.72040]	[2.23404]	[0.21037]	[1.96637]	[-0.44118]	[0.57589]	[0.22212]
D(LTLDEP(-4))	0.137855	-0.092534	-0.042745	-0.068977	0.082146	-0.298961	-0.416332
	(0.11535)	(0.08530)	(0.24880)	(0.19666)	(0.50693)	(0.17507)	(0.96745)
	[1.19512]	[-1.08478]	[-0.17181]	[-0.35074]	[0.16205]	[-1.70763]	[-0.43034]
D(LDOL(-1))	0.353271	0.088790	0.012346	-0.044909	0.526419	-0.201686	0.236319
	(0.06013)	(0.04447)	(0.12970)	(0.10252)	(0.26428)	(0.09127)	(0.50436)
	[5.87475]	[1.99663]	[0.09518]	[-0.43804]	[1.99193]	[-2.20977]	[0.46855]
D(LDOL(-2))	-0.129894	0.066745	0.138262	-0.151634	-0.049725	-0.130021	0.214194
	(0.07435)	(0.05498)	(0.16036)	(0.12676)	(0.32675)	(0.11285)	(0.62358)
	[-1.74710]	[1.21394]	[0.86218]	[-1.19623]	[-0.15218]	[-1.15220]	[0.34349]

D(LDOL(-3))	-0.054277	-0.091898	-0.053926	-0.140289	-0.160655	0.089662	0.099261
	(0.07268)	(0.05375)	(0.15676)	(0.12391)	(0.31941)	(0.11031)	(0.60957)
	[-0.74680]	[-1.70982]	[-0.34400]	[-1.13217]	[-0.50298]	[0.81281]	[0.16284]
D(LDOL(-4))	-0.206098	-0.071723	-0.004735	-0.334338	0.263161	0.060924	0.261392
	(0.07254)	(0.05365)	(0.15647)	(0.12368)	(0.31881)	(0.11010)	(0.60843)
	[-2.84109]	[-1.33697]	[-0.03026]	[-2.70326]	[0.82545]	[0.55334]	[0.42962]
D(LSIGHTFX(-1))	0.058175	0.015361	0.092557	0.063888	0.042592	-0.079962	-0.558317
	(0.06209)	(0.04592)	(0.13392)	(0.10586)	(0.27287)	(0.09424)	(0.52076)
	[0.93695]	[0.33454]	[0.69113]	[0.60352]	[0.15609]	[-0.84850]	[-1.07212]
D(LSIGHTFX(-2))	0.057654	-0.038496	0.012347	0.130957	0.277347	-0.200688	-0.955099
	(0.06138)	(0.04539)	(0.13239)	(0.10465)	(0.26975)	(0.09316)	(0.51480)
	[0.93931]	[-0.84810]	[0.09327]	[1.25142]	[1.02817]	[-2.15423]	[-1.85528]
D(LSIGHTFX(-3))	-0.019429	-0.014724	-0.065808	-0.005630	0.470731	-0.086461	-1.203967
	(0.05918)	(0.04377)	(0.12765)	(0.10090)	(0.26009)	(0.08983)	(0.49638)
	[-0.32829]	[-0.33643]	[-0.51553]	[-0.05580]	[1.80985]	[-0.96253]	[-2.42552]
D(LSIGHTFX(-4))	0.045332	-0.082327	0.056938	0.031746	0.354607	0.055064	-1.198281
	(0.05671)	(0.04194)	(0.12231)	(0.09668)	(0.24922)	(0.08607)	(0.47562)
	[0.79940]	[-1.96315]	[0.46550]	[0.32835]	[1.42287]	[0.63976]	[-2.51939]
D(LCPI(-1))	-0.040781	-0.003281	0.010775	-0.011044	0.156133	0.012128	0.022374
	(0.02073)	(0.01533)	(0.04471)	(0.03534)	(0.09110)	(0.03146)	(0.17385)
	[-1.96743]	[-0.21405]	[0.24100]	[-0.31252]	[1.71394]	[0.38548]	[0.12870]
D(LCPI(-2))	-0.024161	-0.011343	0.032085	-0.072075	0.055305	0.012366	0.141940
	(0.02089)	(0.01545)	(0.04507)	(0.03562)	(0.09183)	(0.03171)	(0.17524)
	[-1.15637]	[-0.73409]	[0.71195]	[-2.02327]	[0.60228]	[0.38994]	[0.80995]
D(LCPI(-3))	-0.012315	0.007331	-0.010425	-0.034376	-0.028775	-0.011336	0.361753
	(0.02093)	(0.01547)	(0.04513)	(0.03568)	(0.09196)	(0.03176)	(0.17551)
	[-0.58853]	[0.47371]	[-0.23099]	[-0.96353]	[-0.31289]	[-0.35691]	[2.06117]
D(LCPI(-4))	0.004547	-0.001357	0.038488	0.047029	-0.240948	-0.008069	0.454619
	(0.02059)	(0.01522)	(0.04440)	(0.03510)	(0.09047)	(0.03124)	(0.17265)
	[0.22089]	[-0.08916]	[0.86683]	[1.34000]	[-2.66334]	[-0.25826]	[2.63312]
D(LCONF(-1))	-0.072815	-0.030321	0.047600	-0.232919	0.208667	0.149586	-0.039987
	(0.06557)	(0.04849)	(0.14142)	(0.11179)	(0.28815)	(0.09951)	(0.54992)
	[-1.11057]	[-0.62535]	[0.33658]	[-2.08363]	[0.72417]	[1.50316]	[-0.07272]
D(LCONF(-2))	-0.108510	-0.031836	0.178529	-0.217026	0.342539	0.015555	0.758501

	(0.06691)	(0.04948)	(0.14432)	(0.11408)	(0.29406)	(0.10156)	(0.56120)
	[-1.62172]	[-0.64338]	[1.23703]	[-1.90242]	[1.16486]	[0.15317]	[1.35157]
D(LCONF(-3))	-0.119105	-0.026019	0.036218	-0.245181	-0.157975	-0.117823	0.748332
	(0.06283)	(0.04646)	(0.13551)	(0.10711)	(0.27611)	(0.09536)	(0.52693)
	[-1.89581]	[-0.56002]	[0.26727]	[-2.28898]	[-0.57215]	[-1.23561]	[1.42016]
D(LCONF(-4))	0.001318	0.112062	-0.142399	-0.013447	-0.197625	-0.053641	0.416182
	(0.06187)	(0.04575)	(0.13344)	(0.10548)	(0.27189)	(0.09390)	(0.51889)
	[0.02130]	[2.44937]	[-1.06713]	[-0.12749]	[-0.72685]	[-0.57126]	[0.80206]
D(LVIX(-1))	-0.033394	-0.003337	-0.004490	-0.055653	0.023794	-0.022175	-0.284156
	(0.01114)	(0.00824)	(0.02403)	(0.01900)	(0.04897)	(0.01691)	(0.09345)
	[-2.99712]	[-0.40500]	[-0.18682]	[-2.92963]	[0.48591]	[-1.31124]	[-3.04069]
D(LVIX(-2))	-0.016159	-0.000975	0.001474	-0.047844	0.028750	0.021093	-0.159268
	(0.01171)	(0.00866)	(0.02525)	(0.01996)	(0.05145)	(0.01777)	(0.09819)
	[-1.38033]	[-0.11259]	[0.05836]	[-2.39706]	[0.55881]	[1.18709]	[-1.62207]
D(LVIX(-3))	-0.005437	-0.015183	0.026750	-0.016817	0.075479	0.009167	-0.059084
	(0.01170)	(0.00866)	(0.02525)	(0.01996)	(0.05144)	(0.01776)	(0.09817)
	[-0.46451]	[-1.75417]	[1.05962]	[-0.84275]	[1.46737]	[0.51605]	[-0.60188]
D(LVIX(-4))	0.015459	-0.003270	0.011245	0.018536	0.081123	-0.030646	-0.024753
	(0.01109)	(0.00820)	(0.02391)	(0.01890)	(0.04872)	(0.01682)	(0.09297)
	[1.39458]	[-0.39894]	[0.47031]	[0.98076]	[1.66521]	[-1.82149]	[-0.26624]
C	-0.010261	0.009887	0.017704	-0.027956	-0.003289	0.003971	0.048519
	(0.00646)	(0.00478)	(0.01393)	(0.01101)	(0.02838)	(0.00980)	(0.05416)
	[-1.58911]	[2.07055]	[1.27113]	[-2.53938]	[-0.11591]	[0.40523]	[0.89589]
R-squared	0.646659	0.332638	0.113306	0.542096	0.257139	0.355829	0.247438
Adj. R-squared	0.564023	0.176561	-0.094066	0.435005	0.083405	0.205177	0.071436
Sum sq. resids	0.076351	0.041756	0.355209	0.221938	1.474672	0.175889	5.371020
S.E. equation	0.024814	0.018350	0.053522	0.042306	0.109053	0.037662	0.208122
F-statistic	7.825378	2.131248	0.546389	5.062036	1.480074	2.361917	1.405879
Log likelihood	367.4043	413.8748	249.0277	285.2412	139.4193	303.1472	39.89044
Akaike AIC	-4.381875	-4.985388	-2.844515	-3.314820	-1.421029	-3.547366	-0.128447
Schwarz SC	-3.790260	-4.393773	-2.252901	-2.723206	-0.829415	-2.955752	0.463167
Mean dependent	0.016228	0.011162	0.008191	0.016476	0.004498	-0.002452	-0.001179
S.D. dependent	0.037581	0.020222	0.051169	0.056284	0.113906	0.042245	0.215979

Determinant resid covariance (dof adj.)	2.61E-19
Determinant resid covariance	5.74E-20
Log likelihood	1881.857

Akaike information criterion	-21.60853
Schwarz criterion	-17.30947
Number of coefficients	218

IRF:

Appendix B: ARDL Model 1

Dependent Variable: LFXDEP
Method: ARDL
Date: 04/18/19 Time: 15:46
Sample (adjusted): 2006M05 2019M03
Included observations: 155 after adjustments
Maximum dependent lags: 4 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (4 lags, automatic): LTLDEP LDOL LSIGHTFX LCPI
LCONF LVIX
Fixed regressors: C
Number of models evalulated: 62500
Selected Model: ARDL(2, 1, 4, 1, 2, 2, 2)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LFXDEP(-1)	1.012874	0.068972	14.68535	0.0000
LFXDEP(-2)	-0.084492	0.062222	-1.357911	0.1768
LTLDEP	-0.291143	0.079863	-3.645544	0.0004
LTLDEP(-1)	0.297471	0.078167	3.805600	0.0002
LDOL	0.055875	0.029016	1.925640	0.0563
LDOL(-1)	0.308460	0.045619	6.761680	0.0000
LDOL(-2)	-0.398603	0.048834	-8.162436	0.0000
LDOL(-3)	0.091537	0.049693	1.842032	0.0677
LDOL(-4)	-0.058923	0.028905	-2.038534	0.0435
LSIGHTFX	0.341077	0.030457	11.19853	0.0000
LSIGHTFX(-1)	-0.285630	0.034114	-8.372734	0.0000
LCPI	0.000629	0.014233	0.044176	0.9648
LCPI(-1)	-0.040975	0.020821	-1.967934	0.0511
LCPI(-2)	0.027535	0.014580	1.888551	0.0611
LCONF	-0.171936	0.042555	-4.040317	0.0001
LCONF(-1)	0.161499	0.059889	2.696640	0.0079
LCONF(-2)	-0.066137	0.042111	-1.570561	0.1186
LVIX	-0.013774	0.007996	-1.722543	0.0873
LVIX(-1)	-0.014034	0.009068	-1.547768	0.1240
LVIX(-2)	0.015961	0.007576	2.106963	0.0370
C	0.677998	0.247499	2.739399	0.0070

R-squared	0.999477	Mean dependent var	19.43007
Adjusted R-squared	0.999399	S.D. dependent var	0.700607
S.E. of regression	0.017171	Akaike info criterion	-5.165803
Sum squared resid	0.039509	Schwarz criterion	-4.753468
Log likelihood	421.3497	Hannan-Quinn criter.	-4.998322
F-statistic	12812.08	Durbin-Watson stat	1.966543
Prob(F-statistic)	0.000000		

*Note: p-values and any subsequent tests do not account for model selection.

ARDL Long Run Form and Bounds Test
Dependent Variable: D(LFXDEP)
Selected Model: ARDL(2, 1, 4, 1, 2, 2, 2)
Case 2: Restricted Constant and No Trend
Date: 04/18/19 Time: 15:46
Sample: 2006M01 2019M03
Included observations: 155

Conditional Error Correction Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.677998	0.247499	2.739399	0.0070
LFXDEP(-1)*	-0.071618	0.029780	-2.404873	0.0175
LTLDEP(-1)	0.006328	0.014053	0.450309	0.6532
LDOL(-1)	-0.001655	0.020547	-0.080531	0.9359
LSIGHTFX(-1)	0.055447	0.026219	2.114753	0.0363
LCPI(-1)	-0.012812	0.008221	-1.558473	0.1215
LCONF(-1)	-0.076574	0.024817	-3.085520	0.0025
LVIX(-1)	-0.011847	0.007293	-1.624421	0.1066
D(LFXDEP(-1))	0.084492	0.062222	1.357911	0.1768
D(LTLDEP)	-0.291143	0.079863	-3.645544	0.0004
D(LDOL)	0.055875	0.029016	1.925640	0.0563
D(LDOL(-1))	0.365990	0.039000	9.384236	0.0000
D(LDOL(-2))	-0.032613	0.044436	-0.733939	0.4643
D(LDOL(-3))	0.058923	0.028905	2.038534	0.0435
D(LSIGHTFX)	0.341077	0.030457	11.19853	0.0000
D(LCPI)	0.000629	0.014233	0.044176	0.9648
D(LCPI(-1))	-0.027535	0.014580	-1.888551	0.0611
D(LCONF)	-0.171936	0.042555	-4.040317	0.0001
D(LCONF(-1))	0.066137	0.042111	1.570561	0.1186
D(LVIX)	-0.013774	0.007996	-1.722543	0.0873
D(LVIX(-1))	-0.015961	0.007576	-2.106963	0.0370

* p-value incompatible with t-Bounds distribution.

Levels Equation				
Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LTLDEP	0.088362	0.182726	0.483575	0.6295
LDOL	-0.023104	0.290299	-0.079587	0.9367
LSIGHTFX	0.774215	0.232519	3.329679	0.0011
LCPI	-0.178890	0.106820	-1.674697	0.0963
LCONF	-1.069199	0.418150	-2.556976	0.0117
LVIX	-0.165417	0.137948	-1.199130	0.2326
C	9.466897	3.539803	2.674413	0.0084

EC = LFXDEP – (0.0884*LTLDEP – 0.0231*LDOL + 0.7742*LSIGHTFX – 0.1789
*LCPI – 1.0692*LCONF – 0.1654*LVIX + 9.4669)

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	**4.694251**	10%	1.99	2.94
k	6	5%	2.27	3.28
		2.5%	2.55	3.61
		1%	2.88	3.99
Actual Sample Size	155		Finite Sample: n=80	
		10%	2.088	3.103
		5%	2.431	3.518
		1%	3.173	4.485

Appendix C: ARDL Model 2

ARDL 2

Dependent Variable: LFXDEP
Method: ARDL
Date: 04/18/19 Time: 15:52
Sample (adjusted): 2006M03 2019M03
Included observations: 157 after adjustments

Maximum dependent lags: 4 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (4 lags, automatic): LTLDEP LDOL LSIGHTFX LCPI
LCONF LVIX
Fixed regressors: D_2015M1 C
Number of models evalulated: 62500
Selected Model: ARDL(1, 1, 2, 2, 2, 2, 0)
Note: final equation sample is larger than selection sample

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LFXDEP(-1)	0.921648	0.030279	30.43892	0.0000
LTLDEP	-0.282500	0.076060	-3.714167	0.0003
LTLDEP(-1)	0.291594	0.074496	3.914244	0.0001
LDOL	0.063452	0.028128	2.255804	0.0256
LDOL(-1)	0.298326	0.042112	7.084101	0.0000
LDOL(-2)	-0.356566	0.035628	-10.00804	0.0000
LSIGHTFX	0.342263	0.029828	11.47474	0.0000
LSIGHTFX(-1)	-0.239380	0.038058	-6.289863	0.0000
LSIGHTFX(-2)	-0.047861	0.027451	-1.743500	0.0835
LCPI	0.000699	0.013983	0.049999	0.9602
LCPI(-1)	-0.040904	0.020530	-1.992354	0.0483
LCPI(-2)	0.025697	0.014597	1.760490	0.0805
LCONF	-0.145380	0.041148	-3.533129	0.0006
LCONF(-1)	0.116459	0.056343	2.066951	0.0406
LCONF(-2)	-0.063125	0.038539	-1.637943	0.1037
LVIX	-0.015906	0.006404	-2.483916	0.0142
D_2015M1	-0.037982	0.017886	-2.123580	0.0355
C	0.838751	0.228325	3.673489	0.0003

R-squared	0.999480	Mean dependent var	19.41528
Adjusted R-squared	0.999416	S.D. dependent var	0.708243
S.E. of regression	0.017109	Akaike info criterion	-5.190933
Sum squared resid	0.040686	Schwarz criterion	-4.840535
Log likelihood	425.4882	Hannan-Quinn criter.	-5.048624
F-statistic	15717.42	Durbin-Watson stat	1.995097
Prob(F-statistic)	0.000000		

*Note: p-values and any subsequent tests do not account for model selection.