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CAPITAL FLIGHT AND FISCAL POLICY IN DEVELOPING COUNTRY: EVIDENCE FROM ETHIOPIA

Kumadebis Tamiru Gemechu

ABSTRACT: *This study examined the effect of fiscal policy on capital flight in Ethiopia using time series data from 1970 to 2012 by employing ARDL model. The results establish that past capital flight, change in debt, and government expenditure have no significant impact on capital flight in Ethiopia. However, external debt, taxation, and expenditure practices under different political regimes have significant effects on capital flight. The study provided policy implications emerging from the empirical results.*

KEY WORDS: fiscal policy, capital flight, autoregressive distribute lag model, Ethiopia

INTRODUCTION

Capital flight refers to a wealth that is earned, transferred or used by breaking a country's laws (illegal or illicit). It also refers to wealth whose origin is connected with illegal activity, such as corruption, the illicit production of goods, other forms of crime, or the concealment of a company's wealth from a country's tax authorities (The Service Centre for Development Cooperation, 2010). Capital flows are illicit if they involve illicitly acquired funds, or are transferred abroad and held there without full disclosure to national authorities, or both(Leonce Ndikumana, 2015).

During the past decades, many countries experienced considerable capital flight. Residents moved their wealth abroad, using different ways to accumulate foreign assets (Niels Hermes and Robert Lensink, 2014).Since the emergence of the Asian financial crisis of 1997–98, Fiscal policy has gained considerable attention in the literature. At the center of this discussion is how fiscal policy influences economic variables, specifically the flow of funds across borders. While tax rates can be used to attract foreign capital and government spending can be used as a stabilizer and booster of economic growth, the extent of fiscal policy's impact on economic variables is still an open empirical question (Dianah Ngui Muchai and Joseph Muchai, 2016). The past decades have witnessed growing attention in academia and in policy circles to the issue of capital flight from developing countries in general and from African countries in particular. Researchers are intrigued by the stunning paradox posed by large-scale capital flows both to and from Africa. While the continent receives a substantial amount of capital inflows in the form of official development assistance, external borrowing and foreign direct investment, it also suffers a heavy financial hemorrhage through capital flight (Léonce Ndikumana, James K. Boyce and Ameth Saloum Ndiaye, 2014).Hence, capital flight has been an issue of concern for Africa because it reduces the continent's much needed investible funds.

In Ethiopia, Capital flight is estimated at $31 billion over the 1970–2012 periods. On average, the country has lost around half a billion dollars annually under the 'Derg' regime. This amount more than doubled to over 1 billion per annum during the EPRDF regime. The empirical evidence suggests that macroeconomic instability, the degree of financial market deepening, exports, interest rate differentials, political instability, corruption, and debt-creating flows are the most important determinants of capital flight from Ethiopia. The political environment is also found to be crucial. Generally, capital flight was high before violent regime changes and low in the subsequent periods, when regimes were in the process of establishing a firmer grip on power; after this point, however, capital flight began to rise significantly again. The historical analysis points to potential causality running from political factors to capital flight. A strong improvement in economic and political governance will be key to abating the problems of capital flight in Ethiopia (Alemayehu and Addis, 2016).

Despite the serious capital flight problem in Ethiopia, few country specific studies have investigated the size and determinantsof capital flight in the country. The few that exist generally focus on theeconomic determinants of capital flight (see Alemayehuet al., 2016), and While a number of studies have explored the relationship between fiscal policy and capital flight in Africa (see for example.,Muchai., etal 2016), no paper examined howfiscal decisions influence capital flight systematically. Hence, the issue at hand is whether these fiscal decisions influence capital flight or not.

This study defines fiscal policy as the combined government decisions regarding a country's revenue and spending. Fiscal policy therefore relates to government taxation and expenditure decisions that lead to budget deficits or surpluses. In this context, this study addresses the following questions as they pertain to the case of Ethiopia: what is the effect of government consumption on capital flight? Do taxation practices influence capital flight? How do political regimes affect capital flight?

Capital Flight and Fiscal Policy

There are scanty studies in developing countries which analyze the relationship between capital flight and Fiscal Policy variables such as taxation, government expenditure and debt. For instance, Alesinaand Tabellini (1989) state that uncertainty about which group will be in control in the future and thus uncertainty about future fiscal policies is one of the main reasons for the over-accumulation of public debt and private capital flight.

Boyce (1992) finds evidence for debt-motivated capital flight by using the time series data from the Philippines between 1962 and 1986 and suggests that foreign borrowing causes capital flight by contributing to an increased likelihood of debt crisis, worsening macroeconomic condition and the deterioration of general investment conditions.

Eaton (1987) argues that the expectation of increased tax obligations created by the potential nationalization of private debt generates capital flight. Ize and Ortis (1987) also show that when fiscal rigidities create difficulties for servicing foreign debt, private capital flight is encouraged by

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foreign borrowing since there is an expectation of higher domestic asset taxation in order to service future debt. Foreign borrowing provides the resources for channeling private capital abroad as well.

Boyce and Ndikumana (2001) examine 30 sub-Saharan African countries and show that funds borrowed abroad are re-exported as private assets. By comparing cumulative capital flight with private net external assets, they conclude that Sub-Saharan African countries are net creditor vis-a-vis the rest of the world. In the case of capital flight driven debt, capital flight forces governments to borrow from abroad since capital flight decreases national resources by lowering domestic saving and investment. In this case, capital flight provides the resources to finance loans to the same residents who export their capital, which leads to a situation called round tripping or back-to-back loan, motivated by the desire to obtain government guarantees on foreign borrowing.

Capital flight from Ethiopia

Using this method, the capital flight from Ethiopian for the last 42 years is estimated. Table 2 summarizes the results. We have found the total real capital flight during the period 1970 to 2012 to be USD 31 billion. On average, the country has lost around half a billion dollar annually in the ‘Derg’ regime. This amount has more than doubled to over one billion per annum during the EPRDF regime (then you should probably recommend to other researchers to know the reasons why capital flight accumulated more in the current regime than the former while it seems to be more stable and use IMF and World bank advice on more liberal market economy that are assumed to be pro private sector promotion. Capital flight amounts to about 50 per cent of the country’s average annual export during the period.

Table 1: Capital flight from Ethiopia (1970-2012): in millions of real constant US Dollar (2012)

Year	Capital Flight 1970-90 The Derg Regime*	Year	Capital Flight (1991-2012) The EPRDF Regime
1970	10.7	1991	410.6
1971	-140.9	1992	-725.6
1972	771.6	1993	-420.5
1973	163.9	1994	145.6
1974*	-72.4	1995	91.9
1975	-84.5	1996	-33.3
1976	-324.7	1997	605.7
1977	-138.4	1998	398.3
1978	41.0	1999	-689.5
1979	37.6	2000	170.8
1980	-160.8	2001	2969.6
1981	1457.5	2002	3148.6
1982	2784.0	2003	1700.8
1983	1072.0	2004	1631.3
1984	392.1	2005	-144.5
1985	1272.1	2006	309.6
1986	771.4	2007	2376.2

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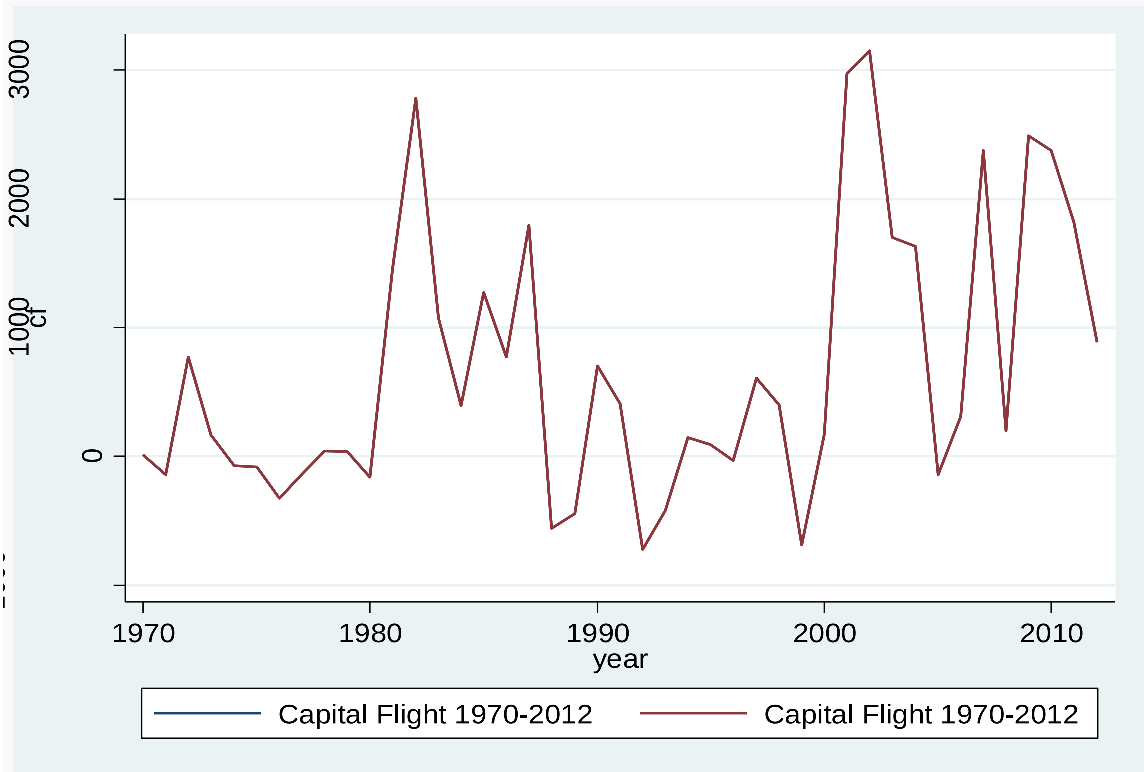
1987	1794.8	2008	198.4
1988	-561.0	2009	2491.2
1989	-445.9	2007	2376.2
1990	702.2	2008	198.4
		2010	4096.3
		2011	1818.7
		2012	886.7
Total Capital Flight		9342.4	21437.1
Average Annual Capital flight		444.9	974.4
Grand Total (1970-2012) = USD **30779.5**			
Average Annual Capital Flight (1970-2012) = USD 715.8			

Source: Alemayehu and Addis, 2017



Source: Own computation

Figure 1: Capital flight from Ethiopia (1970-2012)

As shown on the above figure, the average annual capital flight during the Derg regime was half the amount in the EPRDF regime. Moreover, the EPRDF regime also accounts for about the 70 percent of the stock of capital flight during the entire period under analysis. The highest level of capital flight was registered during EPRDF in 2003. However, during Derg regimes the capital flight has reached its maximum point in 1980's. Then, it was declining continuously up to 2000 when it become low level. The pattern of capital flight is showing cyclical pattern during period under consideration.

Empirical Evidence on Fiscal Policy and Capital Flight

Alemayehu eta al. (2017) in their study attempts to estimate the volume of capital flight and its impact on growth and poverty reduction in Ethiopia. Over the period 1970 to 2012, the total capital flight from the country is estimated at USD 31 billion. Based on a simple ICOR based growth model simulation, the average growth lost owing to the capital flight is found to be about 2.2 percentage points per annum, between 2000/01-2012/13. Using an elasticity of poverty to income and inequality, we have also found the effect of capital flight on total poverty. Had it not been for capital flight, poverty would have been reduced by about 2.5 percentage points in the last decade. This is, however, owing to the nature of growth in Ethiopia in the last decade which was accompanied by rising inequality that wiped out the positive effect of growth on poverty reduction. Had it not been for this inequality that accompanied growth, the lost resource through capital flight would have led to a decline in poverty of about 5 percentage points in the last decade, instead.

Dianah Muchai and Joseph Muchai (2016)stated that Capital flight has been an issue of concern for Africa because it reduces the continent's much needed investible funds. In Kenya, the country lost US$ 4.9 billion in real terms from 1970 to 2010 through capital flight. This study seeks to provide fiscal evidence of capital flight in Kenya. The results establish that past capital flight, change in debt, and government expenditure have no significant impact on capital flight in Kenya. However, external debt, taxation, and expenditure practices under different political regimes have significant effects on capital flight. The study discusses policy implications emerging from the empirical results.

On the other hand, much of contemporary literature on African capital flight has focused on inter alia, lessons from case studies on the causes and effects of capital flight (Ndikumana, 2016) notably: the nexus between fiscal policy and capital flight in Kenya (Muchai&Muchai, 2016), determinants of capital flight in Madagascar (Ramiandrisoa&Rakotomanana, 2016) and Ethiopia (Geda&Yimer, 2016), capital flight and trade misinvoicing in Zimbabwe (Kwaramba et al., 2016) and capital flight in Cameroon; connections between tax revenue and capital flight in Burkina Faso (Ndiaye& Siri, 2016) and the effect of capital flight on public social spending in Congro-Brazzaville (Moulemvo, 2016).

Alemayehu and Yimer (2016) in their study attempts to estimate the volume of capital flight from Ethiopia and its determinants, focusing on economic, institutional, and political determinants. Capital flight is estimated at $31 billion over the 1970–2012 period. On average, the country has lost around half a billion dollars annually under the 'Derg' regime. This amount more than doubled to over 1 billion per annum during the EPRDF regime. The empirical evidence suggests that macroeconomic instability, the degree of financial market deepening, exports, interest rate differentials, political instability, corruption, and debt-creating flows are the most important determinants of capital flight from Ethiopia. The political environment is also found to be crucial. Generally, capital flight was high before violent regime changes and low in the subsequent periods, when regimes were in the process of establishing a firmer grip on power; after this point, however, capital flight began to rise significantly again. The historical analysis points to potential causality running from political factors to capital flight. A strong improvement in economic and political governance will be key to abating the problems of capital flight in Ethiopia.

DATA AND METHODOLOGY

The annual time series data for fiscal and control variables covering the period of 1970–2012 obtained from Ministry of finance and economic cooperation , National bank of Ethiopia and (KNBS) and the World Bank's World Development Indicators. Capital flight is computed using the extended Balance of Payments residual method (see Ndikumana and Boyce, 2010 and 2012). For this study, capital flight data are used from Boyce and Ndikumana (2012).The analysis in the previous sections has revealed a qualitative relationship between fiscal policy variables and capital flight in Ethiopia. This section undertakes a quantitative analysis of the relationship between fiscal policy and capital flight. Fiscal policy variables included in the analysis are: government expenditure, taxation, change in the stock of debt, and external debt. For proper specification of our model, control variables presented in the literature were included. These variables are: the exchange rate, which captures risk and return to investment; political regimes; previous capital flight; financial deepening; and inflation, which captures the macroeconomic environment.
To analyze empirically the fiscal policy variables that could induce capital flight in Ethiopia, we employed a regression model of the following form:

$$\boldsymbol{KF_t = \alpha_0 + \alpha_1 KF_{t-1} + \alpha_2 CD_t + \alpha_3 ED_t + \alpha_4 T_t + \alpha_5 EXP_t + \alpha_6 P_t + \alpha_7 FD_t + \alpha_8 INF_t + \alpha_9 ER_t + \varepsilon_t --(1)}$$

Whereα_1 to $\alpha_9$are parameters to be estimated, t is time and e is the error term
Capital Flight (KF): Capital flight/GDP. Change in the Stock of Debt (CD): CD /GDP. Financial Deepening (FD): M2/GDP. Inflation (INF): Annual average inflation rate (consumer price index). External Debt (ED): Total external debt/GDP. Exchange Rate (ER): Annual average exchange rate; Ethiopian Birr against the US dollar. Tax rate (T): Total taxes/GDP. Expenditure (EXP): Government Expenditure/GDP. Political Regimes (P): Dummy variable: 1 in regimes that demonstrated fiscal discipline relatively (EPRDF), 0 otherwise (Derg regime).

RESULTS AND DISCUSSION

Since we are using time series data, the stationarity of the time series is important. Traditionally, the augmented Dickey–Fuller (ADF) has been used to test for the stationarity of macroeconomic variables and results are presented on table 1 below. However, this test does not consider the fact that the data in question could have structural breaks. To take into account the existence of structural breaks, the Clemente-Montanes-Reyes (1998) test was applied in this study. The Clemente-Montanes-Reyes (CMR) approach has two models: an additive outlier model (AO) which captures a sudden change in the mean of a time series, and an innovative outlier model (IO) which allows for a gradual shift in the mean of the series of the model. We employed the CMR-IO test, which is considered superior to the AO model since it can identify the long-run impact of changes (Kinuthia and Murshed, 2015). Stationarity test results that consider structural break is presented in Appendix A3.

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The diagnostic test run on the residuals of the long-run equation presented on appendix 6 indicates no evidence of Serial Autocorrelation, the Breusch-Godfrey with the null hypothesis of no serial Autocorrelation is accepted, while the white test for Hetroskedasticity also indicates no evidence of Hetroskedasticity. The test for checking the model specification i.e. the Ramsey RESET for model specification was conducted and the result indicated that the model has no evidence of any misspecification.

Unit root test

Determining the stationarity of a time series is a key step before go on board on any analysis. Customarily, the augmented Dickey–Fuller (ADF) has been used to test for the stationarity of macroeconomic variables. Consequently, capital flight, external debt, change in debt, tax rate, government expenditure, exchange rate, and financial deepening are integrated of order (1)while inflation is integrated of order (0). Since seven (of eight) of the variables are I(1) processes, it is possible to run a long-run equation with our stationary variables.

Table 1: Stationarity result

Variables	Without constant and trend	With constant only	With constant and trend	Order of integration
DLNKF	-5.240*	-5.180*	-5.115*	I(1)
DLNCD	-4.323*	-4.246*	-4.219**	I(1)
DLNFD	-4.499*	-4.485*	-5.203*	I(1)
LNINF	3.026*	0.406	-1.269	I(0)
DLNED	-3.680*	-3.638**	-3.580**	I(1)
DLNER	-2.729*	-3.319**	-3.511***	I(1)
DLNT	-3.991*	-3.978*	-4.831*	I(1)
DLNEXP	-3.730*	-3.697*	-4.372*	I(1)

*- significant at 1%, **- significant at 5% and ***- significant at 10%

Bound test for co-integration

Our estimated F-statistics is outside their critical value bounds at 90, 95 and 99 percent. We therefore reject the null hypothesis of no co-integration and no long-run capital flight equation. The ARDL bounds test therefore confirms the existence of a long-run capital flight equation presented on table 2 below. The regression results are presented in Table 3.

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Table 2: Bound co-integration result

Test Statistics	Value	lag	Level of significance	I0 Bound	I1 Bound
F-statistic	5.352466	2	10%	1.95	3.06
			5%	2.22	3.39
			2.5%	2.48	3.7
			1%	2.79	4.1

Table 3: Long Run Coefficients

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
LNT	-13.987043	3.297720	-4.241429	0.0003
P	-15.464325	4.581440	-3.375429	0.0027
LNINF	-1.162713	0.935439	-1.242960	0.2270
LNFD	8.921147	3.557880	2.507434	0.0200
LNEXP	3.616109	3.830957	0.943918	0.3555
LNER	8.932589	3.266884	2.734285	0.0121
LNED	-0.016644	0.479176	-0.034735	0.9726
LNCD	-0.079615	0.128959	-0.617371	0.5433
C	-16.019901	9.374833	-1.708820	0.1016

The finding that previous capital flight has no significant effect on the current capital flight implies that there is no habit formation. The change in the stock of debt was also found to have no significant effect on capital flight in Ethiopia and the result confirm with Dianah Ngui Muchai and Joseph (2016) for kenya , Nyoni (2000), who focused on Tanzania and inconsistent with the findings of other studies such as Hermes and Lensink (1992), Lensink et al. (1998), and Ndikumana and Boyce (2003). Financial deepening has a positive and significant influence on capital flight.

External debt has no positive and significant influence on capital flight. This finding is inconsistent with the findings of Muchai and Joseph (2016) for kenya, Hermes and Lensink (1992), Lensink et al. (1998), and Ndikumana and Boyce (2003), but consistent with the finding of Nyoni (2000).

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Table 4: ARDL Co-integrating and Long Run Form
ARDL Co-integrating and Long Run Form
Dependent Variable: Log of capital flight
Selected Model: ARDL(2, 1, 1, 0, 2, 2, 2, 0, 0)

Co-integrating Form

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNKF(-1))	0.476432	0.186824	2.550164	0.0182
D(LNT)	-10.446250	5.011589	-2.084419	0.0489
D(P)	-3.530503	3.751813	-0.941013	0.3569
D(LNINF)	-1.988996	1.655245	-1.201632	0.2423
D(LNFD)	-7.208446	5.969921	-1.207461	0.2401
D(LNFD(-1))	-8.754956	3.528175	-2.481440	0.0212
D(LNEXP)	15.816610	5.087023	3.109208	0.0051
D(LNEXP(-1))	10.367885	3.739880	2.772251	0.0111
D(LNER)	27.958649	8.282047	3.375814	0.0027
D(LNER(-1))	-10.208636	4.565486	-2.236046	0.0358
D(LNED)	-0.028472	0.821374	-0.034664	0.9727
D(LNCD)	-0.136194	0.214934	-0.633656	0.5328
ECM	-0.710650	0.287751	-5.944904	0.0000

Cointeq = LNKF - (-13.9870*LNT -15.4643*P -1.1627*LNINF + 8.9211
*LNFD + 3.6161*LNEXP + 8.9326*LNER -0.0166*LNED -0.0796*LNCD
-16.0199)

Tax has a significant coefficient, implying that taxation significantly influenced capital flight. This finding is consistent with the study of Muchai and Joseph (2016), Alam and Quazi (2003) but inconsistent with Pastor (1990), Vos (1992), Schineller (1997), and Ndikumana and Boyce (2003). The political regimes variable had a significant effect on capital flight. However, government expenditure had an insignificant impact on capital flight.

CONCLUSION AND POLICY IMPLICATION

This study examined how fiscal policy affects capital flight in Ethiopia using time series data from1970 to 2012. The study defined fiscal policy as decisions taken by government regarding the country's revenue and spending. Econometric analysis was done to ascertain the effect of tax and public expenditure on capital flight. The econometric analysis revealed that taxes had a negative and significant on capital flight in Ethiopia. External debt was found to have a negative and insignificant effect on capital flight, which invalidates the revolving door phenomenon for Ethiopia. Fiscal policy regimes were also considered in the study to explore the effect of political regimes on capital flight and the result established that political regimes that exercised some form of budgetary discipline experienced less capital flight. Furthermore, financial deepening and exchange rate have a significant and positive effect on Capital flight where as Government expenditure and change in the stock of debt had an insignificant impact on capital flight. In addition, previous capital flight has significant effect on the current capital flight implies that there is habit formation. At last, there is no evidence of debt-fueled capital flight in Ethiopia. The inflation rate have always been within tolerable levels for economic players. This could probably explain its insignificance in the econometric results.

Based on the findings from this study some policy implications are derived. Government should be prudent in managing public resources as fiscal discipline is shown to be a significant factor in deterring capital flight. Taxation policies in Ethiopia should be implemented cautiously. The government should therefore cease from a directed focus on tax incentives, but rather focus on the general tax rate in the economy.

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Appendix
Appendix A1: ARDL Estimation Result

Selected Model: ARDL(2, 1, 1, 0, 2, 2, 2, 0, 0)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LNKF(-1)	-0.234219	0.179499	-1.304846	0.2054
LNKF(-2)	-0.476432	0.186824	-2.550164	0.0182
LNT	-10.44625	5.011589	-2.084419	0.0489
LNT(-1)	-13.48069	5.208154	-2.588382	0.0168
P	-3.530503	3.751813	-0.941013	0.3569
P(-1)	-22.92355	7.412287	-3.092642	0.0053
LNINF	-1.988996	1.655245	-1.201632	0.2423
LNFD	-7.208446	5.969921	-1.207461	0.2401
LNFD(-1)	13.71445	6.423568	2.135021	0.0441
LNFD(-2)	8.754956	3.528175	2.481440	0.0212
LNEXP	15.81661	5.087023	3.109208	0.0051
LNEXP(-1)	0.737173	4.990640	0.147711	0.8839
LNEXP(-2)	-10.36788	3.739880	-2.772251	0.0111
LNER	27.95865	8.282047	3.375814	0.0027
LNER(-1)	-22.88675	6.796683	-3.367340	0.0028
LNER(-2)	10.20864	4.565486	2.236046	0.0358
LNED	-0.028472	0.821374	-0.034664	0.9727
LNCD	-0.136194	0.214934	-0.633656	0.5328
C	-27.40445	15.54777	-1.762597	0.0919

R-squared	0.656537	Mean dependent var	-3.994351
Adjusted R-squared	0.375522	S.D. dependent var	2.821711
S.E. of regression	2.229827	Akaike info criterion	4.746025
Sum squared resid	109.3868	Schwarz criterion	5.540119
Log likelihood	-78.29351	Hannan-Quinn criter.	5.035190
F-statistic	2.336304	Durbin-Watson stat	2.355482
Prob(F-statistic)	0.030165		

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

Apendix 2: Lag length selection

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-78.66520	NA	8.876170	5.009440	5.409387	5.147501
1	-78.06862	0.852260	9.124594	5.032492	5.476877	5.185894
2	-72.96474	6.999607*	7.258143*	4.797985*	5.286809*	4.966727*
3	-72.78957	0.230216	7.661290	4.845118	5.378381	5.029200
4	-72.63322	0.196552	8.107191	4.893327	5.471028	5.092749
5	-72.60237	0.037029	8.654916	4.948707	5.570846	5.163469
6	-71.63651	1.103839	8.775189	4.950658	5.617235	5.180760
7	-70.70298	1.013544	8.932353	4.954456	5.665472	5.199899
8	-70.54661	0.160836	9.527952	5.002663	5.758118	5.263446

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

AppendixA3:Breusch-Godfrey Serial Correlation LM Test

F-statistic	1.714259	Prob. F(2,20)	0.2055
Obs*R-squared	5.999919	Prob. Chi-Square(2)	0.0498

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNKF(-1)	0.179249	0.276551	0.648159	0.5243
LNKF(-2)	0.217664	0.222101	0.980023	0.3388
LNT	1.085257	5.106510	0.212524	0.8338
LNT(-1)	2.167350	5.234542	0.414048	0.6832
P	0.087684	3.715660	0.023598	0.9814
P(-1)	1.173019	7.308620	0.160498	0.8741
LNINF	0.196869	1.678308	0.117302	0.9078
LNFD	0.610024	5.915828	0.103117	0.9189
LNFD(-1)	0.910243	6.477481	0.140524	0.8897
LNFD(-2)	-1.053817	3.624339	-0.290761	0.7742
LNEXP	-1.156514	5.011650	-0.230765	0.8198
LNEXP(-1)	-3.101341	5.180925	-0.598608	0.5562
LNEXP(-2)	1.048366	3.790487	0.276578	0.7849
LNER	-2.307302	8.180237	-0.282058	0.7808
LNER(-1)	0.080981	6.606914	0.012257	0.9903
LNER(-2)	1.229632	4.673768	0.263092	0.7952
LNED	0.170081	0.831144	0.204635	0.8399
LNCD	-0.111616	0.232346	-0.480388	0.6362
C	2.976128	15.55519	0.191327	0.8502
RESID(-1)	-0.478782	0.351707	-1.361309	0.1886
RESID(-2)	-0.359583	0.321579	-1.118179	0.2767

R-squared	0.146339	Mean dependent var	1.55E-14

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Adjusted R-squared	-0.707321	S.D. dependent var	1.653684
S.E. of regression	2.160778	Akaike info criterion	4.685364
Sum squared resid	93.37923	Schwarz criterion	5.563047
Log likelihood	-75.04997	Hannan-Quinn criter.	5.004968
F-statistic	0.171426	Durbin-Watson stat	2.158257
Prob(F-statistic)	0.999884		

Appendix A4: Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.410749	Prob. F(18,22)	0.9701
Obs*R-squared	10.31292	Prob. Chi-Square(18)	0.9212
Scaled explained SS	4.294299	Prob. Chi-Square(18)	0.9996

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-17.81438	37.36595	-0.476755	0.6382
LNKF(-1)	-0.170420	0.431390	-0.395048	0.6966
LNKF(-2)	-0.430487	0.448994	-0.958781	0.3481
LNT	-8.229395	12.04435	-0.683258	0.5016
LNT(-1)	-2.004187	12.51675	-0.160120	0.8742
P	-5.547786	9.016729	-0.615277	0.5447
P(-1)	-14.90422	17.81394	-0.836660	0.4118
LNINF	-2.138080	3.978049	-0.537469	0.5963
LNFD	-0.573779	14.34751	-0.039992	0.9685
LNFD(-1)	11.00610	15.43776	0.712934	0.4834
LNFD(-2)	9.000142	8.479261	1.061430	0.3000
LNEXP	8.573388	12.22564	0.701263	0.4905
LNEXP(-1)	-7.810517	11.99400	-0.651202	0.5217
LNEXP(-2)	-13.41368	8.988051	-1.492390	0.1498
LNER	10.50339	19.90424	0.527696	0.6030
LNER(-1)	-7.704293	16.33447	-0.471659	0.6418
LNER(-2)	10.22373	10.97223	0.931783	0.3616
LNED	-0.092985	1.974007	-0.047105	0.9629
LNCD	0.175977	0.516550	0.340678	0.7366

R-squared	0.251535	Mean dependent var	2.667972
Adjusted R-squared	-0.360846	S.D. dependent var	4.593827
S.E. of regression	5.358942	Akaike info criterion	6.499710
Sum squared resid	631.8018	Schwarz criterion	7.293804

Log likelihood	-114.2441	Hannan-Quinn criter.	6.788875
F-statistic	0.410749	Durbin-Watson stat	2.246464
Prob(F-statistic)	0.970140		

Appendix A5: Functional form

Ramsey RESET Test

	Value	df	Probability
t-statistic	1.395729	21	0.1774
F-statistic	1.948060	(1, 21)	0.1774

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	9.285845	1	9.285845
Restricted SSR	109.3868	22	4.972129
Unrestricted SSR	100.1010	21	4.766714

Unrestricted Test Equation:
Dependent Variable: LNKF
Method: ARDL
Date: 06/20/18 Time: 11:11
Sample: 1972 2012
Included observations: 41
Maximum dependent lags: 2 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (2 lags, automatic):
Fixed regressors: C

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LNKF(-1)	-0.453513	0.235744	-1.923758	0.0680
LNKF(-2)	-1.041138	0.444026	-2.344769	0.0289
LNT	-25.84933	12.07761	-2.140268	0.0442
LNT(-1)	-27.13816	11.03422	-2.459453	0.0227
P	-7.535996	4.661592	-1.616614	0.1209
P(-1)	-49.96695	20.69045	-2.414977	0.0249
LNINF	-4.279794	2.306617	-1.855442	0.0776
LNFD	-12.89054	7.123278	-1.809636	0.0847
LNFD(-1)	27.11312	11.47663	2.362464	0.0279
LNFD(-2)	18.17432	7.581473	2.397201	0.0259
LNEXP	35.54378	14.98590	2.371814	0.0273
LNEXP(-1)	2.030143	4.973499	0.408192	0.6873
LNEXP(-2)	-22.30722	9.305005	-2.397336	0.0259
LNER	59.74629	24.17553	2.471354	0.0221
LNER(-1)	-47.00820	18.51933	-2.538332	0.0191
LNER(-2)	20.49197	8.617761	2.377877	0.0270
LNED	-0.277127	0.823724	-0.336431	0.7399

LNCD	-0.164502	0.211422	-0.778072	0.4452
C	-55.95215	25.49699	-2.194461	0.0396
FITTED^2	0.140520	0.100679	1.395729	0.1774

R-squared	0.685694	Mean dependent var	-3.994351
Adjusted R-squared	0.401321	S.D. dependent var	2.821711
S.E. of regression	2.183281	Akaike info criterion	4.706094
Sum squared resid	100.1010	Schwarz criterion	5.541983
Log likelihood	-76.47494	Hannan-Quinn criter.	5.010479
F-statistic	2.411251	Durbin-Watson stat	2.485346
Prob(F-statistic)	0.026646		

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

Appendix A6: Diagnostic tests

The diagnostic test run on the residuals of the long-run equation presented in the table below indicates no evidence of Serial Autocorrelation, the Breusch-Godfrey with the null hypothesis of no serial Autocorrelation is accepted, while the white test for Hetroskedasticity also indicates no evidence of Hetroskedasticity.

Breusch-Godfrey Serial Correlation LM Test: Serial Autocorrelation			
F-statistic	1.714259	probability	0.2055
Obs*R-squared	5.999919	probability	0.0498
White Heteroskedasticity Test			
F-statistic	0.410749	probability	0.9701
Obs*R-squared	10.31292	probability	0.9212
Ramsey RESET Test: Model Misspecification			
F-statistic	1.948060	probability	0.1774
Log likelihood ratio	-76.47494	Probability	5.010479

As shown on the above table the test for checking the model specification i.e. the Ramsey RESET for model specification also indicates that the model has no evidence of any misspecification.